ᐅᖃᓕᒫᒐᐸᐅᔭᐃᑦ ᐃᓗᓕᖕᒋᓐᓂᒃ ᓇᓗᓇᐃᒃᑯᑕᐃᑦ ᑖᒃᑲᓂ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖕᒋᓐᓂ ᓇᖕᒥᓂᖅ ᑎᑭᓯᒪᓗᑎᒃ ᐃᓄᓕᒫᓂᒃ ᓈᓚᕆᐊᖅᑐᕐᕕᖃᕐᓂᖕᒋᓐᓂᒃ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᐅᓂᖕᒋᓐᓄᑦ ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ ᑐᒃᓯᕋᐅᑎᒋᔭᖕᒋᑦ ᐱᒋᐊᖅᑎᑕᐅᖁᔨᓂᖕᒋᑦ ᐋᕿᒋᐊᖅᑕᐅᖁᔨᓂᖅ ᑕᒪᐃᓐᓂᒃ ᑲᑎᕝᓗᒋᑦ ᐊᖑᓇᓱᒻᕕᐅᔫᓇᕐᓂᖕᒋᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖕᒋᑦ ᒫᓇᐅᔪᖅ 30-ᖕᒋᓐᓃᑦᑐᓂᒃ ᐋᕿᒃᑕᐅᓗᑎᒃ 0-ᒧᑦ ᐱᑕᖃᖕᒋᑦᑐᓄᑦ

ᐅᓂᒃᑳᖅᑕᐅᑦᑎᐊᕐᓂᖕᒋᑦ	**ᒪᒃᐱᒐᐃᑦ ᐊᕕᒃᑐᖅᓯᒪᓂᖕᒋᓐᓂ**

ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ-ᐃᖃᓇᐃᔭᕐᕕᖕᒐᑦ ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᑐᒃᓯᕋᐅᑎᖕᒋᑦ ᐃᓱᒪᓕᐅᕈᑕᐅᖁᔨᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᑐᕐᓂᐊᖅᑕᖕᒋᑦ ᓴᕿᑎᓐᓂᐊᖅᑕᖕᒋᑦ ᐱᔾᔪᑎᖃᕐᓂᕐᒥᓄᑦ:

ᑎᑎᖅᑲᑎᒍᑦ ᐅᖃᐅᓯᒃᓴᓂᒃᑕᐅᓯᒪᓂᖕᒋᑦ:

ᓄᓇᑦᓯᐊᕐᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑎᑎᖅᑯᑎᖏᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᑦ:

ᑲᑎᒪᔾᔪᑎᖃᑦ ᐅᑯᐊ ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᑮᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᖏᓐᓂ ᑲᒪᒋᓗᒍᑦ ᒐᕙᒪᖓᑯᑦ ᓄᓇᕗᒥ ᑐᑦᓱᕐᐅᑎᖓᑦ ᓄᓖᙳᕆᐊᕐᓗᒋᑦ ᑲᑎᕐᑐᒋᑦ ᐊᔾᙱᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ ᐅᕙᙵᑦ 30 ᐅᕗᖓ 0

ᐅᓪᓗᖅ 1: ᒫᑦᓯ 05, 2020		
ᖃᑦᓯᒨᕐᓂᖓ ᐅᓪᓗᒥ	ᓇᓗᓇᐃᔭᐅᑦ	ᐱᕕᖓᖅ
9:00 – 9:20 a.m.	ᒪᑐᐃᕐᓯᒍᑦ ᑐᑦᓯᐅᑦ ᐊᒻᒪᓗ ᐃᑦᓯᕙᐅᑕᐅᑉ ᒪᑐᐃᕐᑎᓪᓗᒍ ᐅᖃᐅᓯᖏᑦ ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᕿᒥᕐᕈᒍᑎᖏᑦ ᐊᒻᒪᓗ ᐊᖏᕈᑎᖏᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᑲᑎᒪᔾᔪᑎᖓᓂᒃ	20 ᒥᓇᑦ
9:20 – 9:35 a.m.	ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓂ ᒪᓕᒐᓕᕆᔨᐅᑉ ᕿᒥᕐᕈᒍᑎᖏᑦ ᓈᓚᑦᑎᑦᓯᓂᐅᑉ ᑲᒪᒋᔭᐅᓂᖓᓂᒃ, ᒪᓕᒐᑦ, ᐊᒻᒪᓗ ᐃᓂᓕᐅᕈᑏᑦ	15 ᒥᓇᑦ
9:35 – 10:05 a.m.	ᒐᕙᒪᖓᑦ ᓄᓇᕗᒥ–ᐱᓕᕆᕝᕕᖓᑦ ᐊᕙᑎᓕᕆᔩᑦ ᐅᓂᒃᑳᖏᑦ ᐱᓪᓗᒍ *ᑐᑦᓱᐅᑦ ᐃᓱᒪᓕᐅᕈᒻᒥᒃ*	30 ᒥᓇᑦ
10:05 – 10:20 a.m.	ᓂᐅᖃᖅᓇᖅ	15 ᒥᓇᑦ
10:20 – 12:00 p.m.	ᐊᐱᖅᑯᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᑦᓴᑦ ᐱᓪᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᒥ *ᑐᑦᓱᐅᑦ ᐃᓱᒪᓕᐅᕈᒻᒥᒃ*	2 ᒥᓇᑦ
12:00 – 01:15 p.m.	ᐅᓪᓗᕈᕐᒥᓴᕐᓇᖅ	1 ᐃᑲᕐᕋᖅ: 15 ᒥᓇᑦ
1:15 – 2:15 p.m.	ᐊᐱᖅᑯᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᑦᓴᑦ ᐱᓪᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᒥ *ᑐᑦᓱᐅᑦ ᐃᓱᒪᓕᐅᕈᒻᒥᒃ* ᑲᔪᓯᔪᖅ	1 hour
2:15 – 2:45 p.m.	ᖁᖅᓗᖅᑐᖅᒥ ᐊᖑᓂᐊᑎᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
2:45 – 3:00 p.m.	ᐊᐱᖅᑯᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᑦᓴᑦ ᐃᓪᓗᒋᑦ ᖁᖅᓗᖅᑐᖅᒥ ᐊᖑᓂᐊᑎᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
3:00 – 3:15 p.m.	ᓂᐅᖃᖅᓇᖅ	15 ᒥᓇᑦ
3:15 – 3:45 p.m.	ᐅᒥᒃᒪᒃᑑᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑎᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
3:45 – 4:00 p.m.	ᐊᐱᖅᑯᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᑦᓴᑦ ᐱᓪᓗᒋᑦ ᐅᒥᒃᒪᒃᑑᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑎᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
4:00 – 4:30 p.m.	ᕿᙵᐅᒻᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑎᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
4:30 – 4:45 p.m.	ᐊᐱᖅᑯᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᑦᓴᑦ ᐱᓪᓗᒋᑦ ᕿᙵᐅᒻᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑎᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
4:45 – 5:15 p.m.	ᐃᖃᓗᒃᑑᑦᑎᐊᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑎᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑕ ᐅᒥᒃᑳᖏᑦ	30 ᒥᓇᑦ
5:15 – 5:30 p.m.	ᐊᐱᖅᑯᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᑦᓴᑦ ᐱᓪᓗᒋᑦ ᐃᖃᓗᒃᑑᑦᑎᐊᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑎᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
ᐅᓪᓗᖅ 2: ᒫᑦᓯ 06, 2020		

ᖃᑦᓯᒨᕐᓂᖓ ᐅᓪᓗᒥ	ᓇᓗᓇᐃᔾᐅᑦ	ᐱᕕᖅᓴᖅ
9:00 – 9:20 a.m.	ᒪᑐᐃᕐᓯᒍᑦ ᑐᑦᓯᐅᑦ ᐊᒻᒪᓗ ᐃᑦᓯᕙᐅᑕᐅᒃ ᒪᑐᐃᕐᑎᓪᓗᒍ ᐅᖅᑲᐅᓯᖏᑦ ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔾᔪᔪᐊᑦ ᕿᒥᒃᕈᒍᑎᖏᑦ ᐊᒻᒪᓗ ᐊᖏᕈᑎᖏᑦ ᐅᓪᓗᖅ 2 ᑲᑎᒪᔾᔪᑎᖅᓂᒃ	20 ᒥᓇᑦ
9:20 – 9:50 a.m.	ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔩᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
9:50 – 10:05 a.m.	ᐊᐱᖅᑯᑎᑦ ᐊᒻᒪᓗ ᐅᖃᐅᓯᖅᓯᑦ ᐱᓪᓗᒋᑦ ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔩᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
10:05 – 10:20 a.m.	ᓂᐅᕐᑲᕐᓇᖅ	15 ᒥᓇᑦ
10:20 – 10:50 a.m.	ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᕐᑲᑎᒌᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
10:50 – 11:05 a.m.	ᐊᐱᖅᑯᑎᑦ ᐊᒻᒪᓗ ᐅᖅᑲᐅᓯᖅᓯᑦ ᐱᓪᓗᒋᑦ ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᕐᑲᑎᒌᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
11:05 – 11:35 a.m.	ᓄᓇᕗᑦ ᑐᙵᕕᑦ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
11:35 – 11:50 a.m.	ᐊᐱᖅᑯᑎᑦ ᐊᒻᒪᓗ ᐅᖅᑲᐅᓯᖅᓯᑦ ᐱᓪᓗᒋᑦ ᓄᓇᕗᑦ ᑐᙵᕕᒃ ᑎᒥᖏᑕ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
11:50 – 1:05 p.m.	ᐅᓪᓗᕈᕐᒥᓴᕐᓇᖅ	1 ᐃᑲᒡᓕᖅ: 15 ᒥᓇᑦ
1:05 – 1:35 p.m.	ᒐᕙᒪᖓᑦ ᓄᓇᑦᓯᐊᖅᒥ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
1:35 – 1:50 p.m.	ᐊᐱᖅᑯᑎᑦ ᐊᒻᒪᓗ ᐅᖅᑲᐅᓯᖅᓯᑦ ᐱᓪᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᑦᓯᐊᖅᒥ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
1:50 – 2:10 p.m.	Wek' èezhìı ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔩᖏᑕ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
2:10 – 2:25 p.m.	ᐊᐱᖅᑯᑎᑦ ᐊᒻᒪᓗ ᐅᖅᑲᐅᓯᖅᓯᑦ ᐱᓪᓗᒋᑦ Wek' èezhìı ᓄᓇᒥᐅᑕᓂᕆᔩᑦ ᑲᑎᒪᔩᖏᑕ ᐅᓂᒃᑲᖏᑦ	15 ᒥᓇᑦ
2:25 – 2:55 p.m.	ᐊᐅᓪᖀᑎᑦᓯᔩᑦ ᓄᓇᑦᓯᐊᖅᒥ ᐅᓂᒃᑳᖏᑦ	30 ᒥᓇᑦ
2:55 – 3:10 p.m.	ᓂᐅᕐᑲᕐᓇᖅ	15 ᒥᓇᑦ
3:10 – 3:25 p.m.	ᐊᐱᖅᑯᑎᑦ ᐊᒻᒪᓗ ᐅᖅᑲᐅᓯᖅᓯᑦ ᐱᓪᓗᒋᑦ ᐊᐅᓪᖀᑎᑦᓯᔩᑦ ᓄᓇᑦᓯᐊᖅᒥ ᐅᓂᒃᑳᖏᑦ	15 ᒥᓇᑦ
3:25 – 4:25 p.m.	ᐅᓂᒃᑳᑦ/ᐊᐱᖅᑯᑎᑦ ᑭᒃᑯᐃᓐᓇᕐᓂᒃ ᓈᓚᒋᐊᕐᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᑭᐅᔾᔪᑏᑦ	1 ᐃᑲᒡᓕᖅ
4:25 – 6:25 p.m.	ᒪᑐᑎᓪᓗᒍ ᐅᖅᑲᐅᓯᖅᓯᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓂᒃ ᐊᒻᒪᓗ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᑲᒪᕐᑲᑕᓂᒃ	2 ᐃᑲᒡᓖᒃ

ᑎᓯᒻᐱᕆ 13, 2019

ᐋᑑᑎᒋᔭᖓ ᐅᑯᐊ ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᑲᑎᒪᔩᖏᑦ (ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ) ᑕᑯᓐᓇᖅᑎᑑᓪᓗᑎᒃ ᑮᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᖏᑦ ᑲᒪᒋᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥᒻ ᑐᑦᓯᕋᐅᑦ ᐃᓱᒪᓕᐅᕈᒻᒥᒃ (ᑐᑦᓯᕋᐅᑦ) ᑲᑎᒪᔨᓄᑦ ᐱᒐᓱᐊᕐᑐᑦ ᐃᓄᐃᓵᓕᒋᐊᕐᓗᒋᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔾᔨᒋᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ ᕿᙳᐅᑦ ᑐᒃᑐᐃᑦ ᐅᕙᙵᑦ 30 ᐅᕝᖓ 0. ᑐᑦᓯᕋᐅᑦ, ᐃᓚᖃᕐᑐᒍ ᐊᓯᖏᓐᓂᒃ ᑎᑎᖅᑲᓂᒃ ᐱᑕᖃᕈᑕᐅᔪᓂᒃ ᓈᒻᒪᓂᕐᕌᓂᒃ ᐊᑐᐃᓐᓇᕐᓂᒃ ᑐᓴᕐᑦᓴᓂᒃ ᐅᓪᓗᒥᒨᑦ, ᐊᑐᐃᓐᓇᐅᕗᑦ ᕿᒥᕐᕈᔭᐅᒍᓐᓇᕐᑐᑎᒃ ᐅᑦᕙᓘᓐᓂᑦ ᐱᔭᐅᒍᓐᓇᕐᑐᑎᒃ ᐅᕙᙵᑦ ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᐃᑭᐊᕐᕆᕕᖓᑦ (**www.nwmb.com**).

ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᒪᓕᒐᑦ:

1. ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᐊᒻᒪᓗ ᓄᓇᕕᒃᒥ ᑕᕆᐅᕐᒥᐅᑕᓕᕆᔩᒃᑯᑦ (ᑲᑎᒪᔩᑦ) ᑐᓂᓯᓂᐊᕐᐳᑦ ᑐᓴᕐᑎᑦᓯᒍᒻᒥᒃ ᑮᑯᓕᒫᓂᒃ ᑐᙱᓂᐅᙱᑦᑐᖅ ᐊᕙᑎᓪᓗ ᖁᓕᓪᓗ (30) ᐅᓪᓗᐃᑦ ᓯᕗᕐᖓᒍᑦ ᑐᓂᓯᓯᒪᕝᕕᐅᕆᐊᓕᐅᑉ ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᐅᓂᒃᑳᓂᒃ.
2. ᑭᓇᑐᐃᓐᓇᖅ ᖃᐅᔨᒪᒍᒪᔪᖅ ᐃᓄᒃ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒥᐅᔪᑦ ᑐᓂᓯᒍᓐᓇᕐᐳᑦ ᑲᑎᒪᔨᓄᑦ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᐅᓂᒃᑳᓂᒃ ᐊᒻᒪᓗ ᐃᑲᔪᕐᑐᕈᑎᓂᒃ ᑎᑎᖅᑲᓂᒃ[1] ᑭᒍᑕᐅᔪᓂᒃ ᑐᑦᓯᕋᐅᒻᒧᑦ ᐊᖏᕐᑕᐅᒍᑎᓄᑦ ᐅᑯᓂᖓ ᓄᓇᕗᑦᒥ ᓇᓄᕐᓂᒃ ᐊᐅᓚᑦᓯᖅᑎᒋᓐᓂᕐᒧᑦ ᐸᕐᓇᒍᑏᑦ - ᑐᑭᓕᐅᕐᓯᒪᑦᓯᐊᕐᓗᒋᑦ ᐃᓄᒃᑎᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᖃᓪᓗᓈᑎᑐᑦ ᓇᓪᓕᐅᒃᑯᑐᐃᓐᓇᖅ - ᑎᑭᙵᕐᓂᖓᓂ 5:00 ᐅᓐᓄᓴᒃᑯᑦ (ᐃᖃᓗᐃᑦ/ᐃᓄᒃᔪᐊᖅ ᓯᕿᙳᔭᖓᑐᑦ) ᐅᓇ ᕖᕝᕗᐊᕆ 14, 2020.
3. ᐃᑮᒃ ᓱᓕᔪᕆᔭᐅᓕᕈᓐᓇᕐᑐᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᐊᒻᒪᓗ ᑐᑭᓕᐅᕐᑕᐅᒪᔪᑦ ᐱᔾᔪᑕᐅᔪᑦ ᑐᓂᔭᑦ ᑲᑎᒪᔨᓄᑦ ᑭᖑᕙᕐᑐᓂᒃ ᑐᓂᓯᓂᕐᒧᑦ, ᑲᑎᒪᔩᑦ ᑲᒪᒋᖁᙱᑕᖏᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᑐᓂᔭᐅᓐᓂᖏᑉᐸᑕ ᑭᖑᕙᕋᑎᒃ.
4. ᐱᑕᖃᕆᐊᖃᕐᓂᖏᑦ ᑐᑭᓕᐅᕐᑕᐅᒪᔪᑦ ᐅᓂᒃᑳᑦ ᐊᒻᒪᓗ ᐃᑲᔪᕈᑏᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᑐᓂᔭᑦ ᑲᑎᒪᔨᓄᑦ ᐊᑐᕐᓂᖃᙱᑦᑐᖅ ᐃᓄᑐᐊᓄᑦ ᑭᒃᑯᑐᐃᓐᓇᕐᓄᑦ.
5. ᐊᓯᓕᒫᖏᑦ ᑐᓂᓯᔪᑦ ᐃᑲᔪᕐᑐᕈᑎᓂᒃ ᑎᑎᖅᑲᓂᒃ ᑲᑎᒪᔨᓄᑦ, ᐱᑕᖃᕆᐊᖃᕐᓂᖓ ᑐᑭᓕᐅᕐᓯᒪᔪᑦ ᐊᑐᙱᑦᑐᖅ ᑎᑎᖅᑲᓄᑦ ᐊᒥᓲᓂᕐᓴᓂᒃ 10 ᒪᑉᐱᕐᑐᒐᓕᓐᓄᑦ, ᐊᑐᓂᑦ ᐃᑲᔪᕐᑐᕈᑏᑦ ᑎᑎᖅᑲᑦ ᑐᑭᓕᐅᕐᑕᐅᒪᙱᑦᑐᑦ ᐱᑕᖃᕐᐸᑕ ᓱᓕᔪᓂᒃ, ᑐᑭᓕᐅᕐᓯᒪᔪᓂᒃ ᓇᐃᓈᕈᑎᓂᒃ (ᖃᓪᓗᓈᑎᑐᑦ ᐊᒻᒪᓗ ᐃᓄᒃᑎᑐᑦ) ᒪᕐᕈᓐᓂᒃ (2) ᒪᑉᐱᕐᑑᓐᓂᒃ.
6. 6. ᑲᑎᒪᔩᑦ ᐃᑉᐱᒍᓱᓐᓂᐊᕐᐳᑦ ᐃᓅᓇᑎᒃ ᑎᑎᕋᕐᓯᒪᔪᑦ ᑐᓂᔭᑦ ᑕᒡᕗᖓ ᐅᕝᕙᓘᓐᓃᑦ ᐊᓚᒃᑲᕐᑕᖏᑦ ᑖᒃᑯᐊ ᑭᒃᑯᑐᐃᓐᓇᕐᓄᑦ ᐊᑐᐃᓐᓇᐅᕙᓗᐊᕐᒪᖕᖔᑕ, ᐃᓱᒪᒋᓗᒋᑦ ᐊᑐᕐᑐᑦ ᒪᐅᖓᑐᐃᓐᓈᕆᐊᖃᙱᓐᖏᓐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑲᙳᓇᕐᓂᖏᓐᓄᑦ ᐃᓱᒫᓗᑎᒋᑦ.
7. ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᐱᑕᖃᒃᑲᐃᓂᐊᕐᐳᑦ ᑕᒡᕙᓴᐃᓐᓇᖅ ᖃᓪᓗᓈᑎᑐᑦ ᐊᒻᒪᓗ ᐃᓄᒃᑎᑐᑦ/ᐃᓄᐃᓐᓇᕐᑐᓐ ᑐᓵᔩᖃᒃᑲᐃᓂᕐᒥᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ, ᑎᑭᐅᑎᓗᒍ ᐊᔪᕐᓇᖏᓐᓂᖓ.
8. ᓈᒻᒪᑦᓯᓯᒪᔪᑦ ᐆᒪᔪᓕᕆᔩᕐᔪᐊᓂ ᑲᑎᒪᔩᑦ ᐅᐸᑦᓯᒪᓂᐊᕐᐳᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ.
9. ᓇᓪᓕᐊᑐᐃᓐᓇᖅ ᑭᒡᒐᖓᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐱᓕᕆᔩᖓᑦ ᒐᕙᒪᖓᑦ ᑲᓇᑕᒥ ᐅᕝᕙᓘᓐᓃᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥ, ᐊᒻᒪᓗ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᕕᑦᑐᕐᓯᒪᔪᓂ ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔩᑦ ᑎᒥᖏᑦ, ᐊᒻᒪᓗ ᑭᓇᑐᐃᓐᓇᖅ ᐃᓄᒃ ᑐᓂᔭᐅᓂᐊᕐᐳᖅ ᑲᒪᖃᑕᐅᓂᕐᒧᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ.

10. ᐃᓛᒃ ᖃᐃᖅᑯᔭᐅᒪᙱᒃᑯᑎᒃ ᑲᑎᒪᔨᓄᑦ ᑲᒪᖃᑕᐅᓂᕐᒥᒃ, ᐊᓯᓕᒫᖏᑦ ᐃᓄᐃᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒥᐅᔪᑦ ᑕᐃᔭᐅᒍᒪᔪᑦ ᑲᒪᖃᑕᐅᓂᕐᒥᒃ ᑲᑎᒪᔨᓄᑦ ᑐᓂᓯᒋᐊᓖᑦ ᓈᒻᒪᑦᑐᓂᒃ ᑐᑦᓯᕋᐅᑎᓂᒃ ᑎᑎᖅᑲᑎᒍᑦ ᑲᑎᒪᔨᓄᑦ.
11. ᐃᓘᓐᓇᑎᒃ ᑲᒪᖃᑕᑦ ᐊᒻᒪᓗ ᐊᓯᖏᑦ ᐱᖃᑕᐅᔪᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᐱᑦᓯᐊᖃᑦᑕᐅᑎᒋᐊᓖᖅᑦ ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓂᒃ ᓈᓚᑦᓯᐊᕐᓗᑎᒃ.
12. ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐱᑕᖃᒃᑲᐃᓂᐊᕐᐳᑦ ᓈᒻᒪᕐᑐᒥᒃ ᐱᕕᑦᓴᐅᔪᒥᒃ ᐅᖃᐅᓯᒃᑯᑦ ᐅᓂᒃᑳᓂᒃᒥᒃ ᐊᑐᓂᑦ ᑲᒪᖃᑕᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᓂᑭᐊᕐᑕᖓᓄᑦ ᐱᓕᕆᔨᒧᑦ, ᖃᐅᔨᒪᔪᒻᒪᕆᒻᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ ᒪᓕᒐᓕᕆᔨᒧᑦ.
13. ᓇᓪᓕᐊᑐᐃᓐᓇᖅ ᑲᑎᒪᔨ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓂ, ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓂ ᑐᑭᒧᐊᕐᑎᑦᓯᔨ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᒪᓕᒐᓕᕆᔨᖓᑦ ᐊᐱᖅᓱᕈᓐᓇᕐᑐᑦ ᓇᓪᓕᐊᓐᓂᑐᐃᓐᓇᖅ ᑲᒪᖃᑕᒥᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ.
14. ᓇᓪᓕᐊᑐᐃᓐᓇᖅ ᑲᒪᖃᑕᖅ ᐊᐱᖅᓱᕈᓐᓇᕐᑐᖅ ᓇᓪᓕᐊᓐᓂᑐᐃᓐᓇᖅ ᑲᒪᖃᑕᒥᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ.
15. ᐆᒪᔪᓕᕆᔨᕐᒧᐊᑦ ᐱᑕᖃᒃᑲᐃᓂᐊᕐᐳᑦ ᐃᓚᐅᔪᓄᑦ ᑭᒃᑯᑐᐃᓐᓇᕐᓄᑦ ᐅᐸᑦᓯᒪᔪᓄᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᓈᒻᒪᑦᑐᒥᒃ ᐱᕕᑦᓴᐅᔪᒥᒃ ᐅᖃᓕᒪᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐱᖅᓱᓂᒥᕐᒧᑦ ᑲᒪᖃᑕᓂᒃ ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓂᒃ.
16. ᐃᓘᓐᓇᑎᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒦᑦᑐᑦ ᐅᖃᕈᒪᔪᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᐱᖅᓱᕈᒪᔪᑦ ᐃᓵᕆᐊᓖᑦ ᑕᓕᕐᒥᓂᒃ, ᐊᒻᒪᓗ ᐅᖃᓕᑕᐃᓐᓇᕐᓗᑎᒃ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐃᑦᓯᕙᐅᑕᖓᑕ ᑕᐃᑉᐸᒍ ᐊᖑᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᕐᓇᖅ.
17. ᐆᒪᔪᓕᕆᔨᕐᒧᐊᑦ ᐃᑦᓯᕙᐅᑕᖓᑦ ᐃᓱᒪᕐᓱᕐᐳᖅ ᐊᔪᙱᒍᑎᒥᓂᒃ ᐃᓕᓯᓂᕐᒧᑦ ᓈᒻᒪᑦᑐᓂᒃ ᐱᕕᑦᓴᐅᔪᑦ ᑭᓪᓕᖏᓐᓂᒃ ᐅᓂᒃᑳᓂᕐᒧᑦ, ᐅᖃᓕᒪᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐱᖅᓱᓂᕐᒧᑦ.
18. ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᓂᐱᓕᐅᕐᓯᒪᔪᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᐊᑐᐃᓐᓇᐅᑎᑦᓯᓂᐊᕐᑐᑦ ᑐᑦᓯᕋᕐᑐᖃᕐᐸᑦ.
19. [1] "ᐃᑲᔪᕐᑐᕈᑏᑦ ᑎᑎᖅᑲᑦ" ᐅᖃᐅᓯᓕᒃ ᐊᑕᐅᓯᕐᒥᒃ ᐅᕝᕙᓘᓐᓃᑦ ᐊᒥᓲᓂᕐᓴᓂᒃ ᖃᐅᔨᓴᕈᑎᒥᓂᕐᓂᒃ, ᑎᑎᕋᕐᑕᐅᒪᔪᓂᒃ, ᐃᓱᒪᒍᑕᐅᔪᓂᒃ ᐅᕝᕙᓘᓐᓃᑦ ᐊᓯᖏᓐᓂᒃ ᑎᑎᖅᑲᓂᒃ ᐃᒻᒥᒃᑰᕐᑐᓂᒃ ᐃᓅᑉ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒥᐅᔪᑦ ᑎᑎᕋᕐᓯᒪᔭᖏᓐᓂᒃ ᐅᓂᒃᑳᓂᒃ, ᑐᓂᔭᓂᒃ ᐃᓚᐅᑎᑕᐅᓪᓗᑎᒃ ᓇᓗᓇᙱᒍᑎᓄᑦ ᐊᒻᒪᓘᓐᓃᑦ ᐊᐃᕙᒍᑎᓄᑦ ᐃᑲᔪᕐᑐᕐᑐᒋᑦ ᑖᑦᓱᒪ ᐃᓅᑉ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒥᐅᔪᑦ ᐅᓂᒃᑳᖏᓐᓄᑦ.

ᑐᓂᔭᐅᔪᖅ

ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ

ᐱᔾᔪᑎᖓ

ᑐᑭᓯᒋᐊᕈᑎ: **ᑐᑭᑖᕈᑎ: X**

ᐱᔾᔪᑎᖓ: ᖀᑑᕐ ᑐᑦᑐᐃᑦ ᖃᑦᓯᐅᓂᖏᑦᑕ ᒥᑦᓴᐅᓵᕈᑏᑦ ᐱᓯᒪᔪᑦ 2018 ᕿᑐᕐᖏᐅᕐᕕᖏᑦᑕ ᓄᓇᖏᓐᓂ ᐊᔾᔨᓕᐅᕆᓂᒃᑯᑦ ᓈᓴᐃᒍᑏᑦ ᐊᒻᒪᓗ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᓂᒃ ᐱᕐᑯᔨᕗᖕᖠᕕᑏᑦ

ᐃᓗᓕᖏᑦ

- ᑖᒃᑯᐊ ᖀᑑᕐ ᑐᑦᑐᖏᑦ ᓱᐊᑦᑕᐅᔪᑦ ᐆᒪᔪᕋᓱᐊᖅᑕᐅᕙᑦᓱᑎᑦ ᐊᓯᕙᖅᑎᓄᑦ ᓄᓇᑦᓯᐊᕐᓯ ᓄᓇᕗᒻᒥᓗ (ᖁᕐᓗᖅᑐᖅ, ᐃᖃᓗᑦᑑᑦᑎᐊᖅ, ᕿᖕᒐᐅᑦ, ᐊᒻᒪᓗ ᐅᒥᖕᒪᒃᑑᖅ).
- ᐊᕐᕌᒍᖏᑦ 1980 ᑐᖖᓂ, ᑎᑭᐅᑎᑲᓴᓚᐅᖅᓯᒪᔪᑦ ᐊᕙᖏᓐᓄᑦ ᒥᓕᐊᓐ ᖀᑑᕐ ᑐᑦᑐᖏᑦ ᓇᔪᖅᑐᐃᑦ ᐊᕐᕌᒍᑕᒫᑦ. ᑕᐃᑲᙵᓂᒃ 2006−ᒥ 2009−ᒧᑦ, ᑐᑦᑐᖏᑦ ᖃᑦᔫᓇᕈᖅᐹᓪᓕᖅᑐᐹᓘᓚᐅᖅᑐᑦ 32,000−ᖑᓕᖅᓱᑎᑦ ᑐᑦᑐᐃᑦ.
- ᑎᓯᐱᕆ 2010−ᒥ, ᓄᑖᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᒪᓕᒐᐃᑦ ᑎᒍᔭᐅᓚᐅᖅᑐᑦ ᐱᓯᒪᑎᓪᓗᒋᑦ ᒐᕙᒪᒃᑯᖏᓐᓂ ᓄᓇᑦᓯᐊᑉ. ᑖᒃᑯᐊ ᐃᓚᖃᓚᐅᖅᑐᑦ ᒪᑐᔭᐅᓂᖏᓐᓂ ᓱᐃᓛᕿᓂᒃᑯᑦ ᑐᑦᑐᓂᐊᖅᑎᑦᓯᓃᑦ ᓂᐅᕐᕈᑎᖃᕐᓂᒃᑯᓪᓗ ᑐᑦᑐᑦᑕᐅᕙᑦᑐᓂ ᑭᓪᓕᖃᖅᑎᑕᐅᓕᖅᓱᑎᑦ ᓄᓇᖃᖅᑳᖅᓯᒪᔪᐃᑦ ᑐᑦᑐᒍᓐᓇᖅᑎᑕᐅᓪᓗᑎᑦ 300−ᓂᒃ.
- 2015−ᒥ ᒥᑦᓴᐅᓵᕈᑏᑦ ᑐᖖᓂᓚᐅᖅᑐᑦ 19,700 ᖀᑑᕐ ᑐᑦᑐᖏᑦ, ᐃᓄᐃᓴᓐᓂᖅᓴᓕᓇᐅᓪᓗᑎᑦ 2012−ᒥ ᓈᓴᖅᑕᐅᒍᑎᕕᓂᖏᑦᑕ 35,000 ᑐᑦᑐᐃᑦ. ᑖᓐᓇ 2015−ᒥ ᓇᓚᐅᑦᓵᖅᑕᐅᓯᒪᔪᖅ 37%ᓂᒃ ᒥᑭᓂᖅᓴᐅᔪᖅ 2012−ᒥ ᓈᓴᖅᑕᐅᒍᑎᕕᓂᖏᑦᑕ ᐊᕐᕌᒍᑕᒫᑦ ᐃᓄᐃᓴᓕᕙᓕᐊᓂᖃᖅᓱᑎᑦ 14%ᒥᒃ
- ᑭᐅᔾᔭᑎᐅᓪᓗᓂ 2015−ᒥ ᖃᑦᓯᐅᓂᖏᑦᑕ ᓇᓚᐅᑦᓵᖅᑕᐅᒍᑎᖏᑦᑕ, ᒐᕙᒪᒃᑯᖏᑦ ᓄᓇᑦᓯᐊᑉ ᐊᑐᓕᖅᑎᑦᓯᓚᐅᖅᑐᑦ ᑐᑦᑐᑦᑕᐃᓕᑎᑦᓯᓂᕐᒥ ᖀᑑᕐ ᑐᑦᑐᖏᓐᓂᒃ, ᑖᒃᑯᐊᓕ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖅᑎᑦᓯᑎᓪᓗᒋᑦ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᓂᒃ 30 ᐊᖑᓴᓪᓗᐃᓐᓇᐅᓗᑎᑦ, ᓄᓇᕗᒻᒥ.
- ᑕᒪᓐᓇ ᖃᑦᔫᓇᕈᖅᐹᓪᓕᕐᓂᖓᑦ ᐱᐅᓯᕆᔭᐅᔪᕆᔭᐅᔪᖅ ᐅᑎᖅᑕᕐᓂᖏᓐᓄᑦ. ᑐᑦᑐᑦᑕᐅᖃᑦᑕᕐᓂᖏᑦ ᐊᒻᒪᓗ ᐸᕝᕕᓵᖑᓂᖏᑦ ᐱᕙᓪᓕᐊᔪᓄᑦ ᐱᔾᔪᑕᐅᔪᕆᔭᐅᒥᔪᑦ ᖃᑦᔫᓇᕈᖅᐹᓪᓕᖅᓯᒪᓂᖏᓐᓄᑦ, ᐊᑦᑐᐃᓂᖃᖅᓱᓂᓗ ᓇᖅᑭᓐᓂᓇᓚᔭᖅᑕᖏᓐᓂ ᖀᑑᕐ ᑐᑦᑐᖏᑦ.

ᒫᓐᓇᒃᑯᑦ ᖃᓄᐃᓐᓂᖏᑦ

- ᑕᐃᒪᙵᓂᒃ 2017, ᐊᕗᑎᓕᕆᔨᒃᑯᑦ ᐃᓚᐅᖏᓐᓇᖅᑐᑦ ᐱᓕᕆᖃᑎᒌᓐᓂᖏᓐᓂ, ᐱᕚᓕᐊᖃᑎᒌᓐᓂᖏᓐᓂ, ᐊᒻᒪᓗ ᐃᑲᔪᖅᑐᐃᑲᑦᑕᕆᓪᓗᑎᑦ ᐱᓕᕆᓂᒃᑯᑦ ᓄᓇᒥ ᑮᓪᓕᖃᖃᑎᒌᙶᑦᑐᑦ ᐊᐅᓚᑦᓯᖃᑎᒌᓐᓂᖖᑕ (ᓄᓇᕗᑦ ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᖅ) ᐸᖕᓇᐅᑎ ᕿᑦᑑᓯ ᑐᑦᑐᖏᓐᓄᑦ.
- 2018−ᒥ ᐊᔾᔨᓕᐅᕆᓂᒃᑯᑦ ᓈᓴᐃᒍᑏᑦ ᓇᓕᖅᑲᖏᑦ ᓇᓗᓇᐃᖅᓯᔪᑦ ᖃᑦᔫᓐᓇᕈᒃᑲᓐᓂᓚᐅᕆᐊᖏᑦ ᕿᑦᑑᓯ ᑐᑦᑐᖏᑦ, ᒥᑦᓴᐅᔮᖅᑕᐅᔪᑦ ᑐᖖᓃᒋᐊᖏᑦ 8,210 ᑐᑦᑐᐃᑦ. ᑖᓐᓇ ᐃᓄᐃᓴᓐᓂᖅᓴᓪᓚᕆᐅᔪᖅ 2015−ᒥ ᓈᓴᖅᑕᐅᒍᑎᕕᓂᖏᑦᑕ ᒥᑦᓵᓃᑦᑐᓂᒃ 19,700 ᑐᑦᑐᐃᑦ.
- ᐊᕐᕋᒍᙳᓄᑦ 2018-2019 ᑐᑦᑐᓂᐊᕐᓇᐅᕐ, ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ ᑐᓂᔭᐅᓯᒪᔪᑦ ᖃᑦᔫᓐᓇᕈᖅᐹᓪᓕᓚᐅᖅᑐᑦ ᒪᑯᐊ ᒪᓕᑦᓱᒋᑦ: 20 ᓂᕚᙱᑖᑦ ᓱᐃᓲᕿᓂᕐᒧᑦ ᑐᑦᑐᓂᐊᕐᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᑦᓴᑦ ᐅᒥᖕᒪᒃᑑᕐᒥ ᐊᒻᒪᓗ ᕿᖕᒐᐅᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐊᒥᐊᒃᑯᖏᑦ 10 ᓂᕚᙱᑖᑦ ᑐᓂᔭᐅᓚᐅᖅᓱᑎᑦ ᐊᓯᕗᖅᑎᓄᑦ ᖁᕐᓗᖅᑐᕐᒥ.
- ᐅᖃᖅᓯᒪᑎᓪᓗᒋᑦ ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦᑕ ᒪᓕᒐᕋᖓᖏᑦ, ᑖᒃᑯᐊ ᑐᓂᔭᐅᓂᖏᑦ (10 ᓂᕚᙱᑖᑦ) ᐊᓐᓇᐅᒪᒐᓱᐊᕐᓂᕐᒧᑐᐊᖅ ᐊᑐᖅᑕᐅᒋᐊᓖᓪ (ᓱᐃᓲᕿᓂᒃᑯᑦ ᑐᑦᑐᓂᐊᕈᑕᐅᙱᓪᓗᑎᑦ) ᐊᒻᒪᓗ ᑖᒃᑯᐊ ᓂᕚᙱᑖᑦ ᐊᕕᑦᑐᖅᑕᐅᒃᑲᓐᓂᓚᐅᕐᒥᔪᑦ ᑯᓪᓗᙵᖅ ᐃᓚᖏᓐᓄᑦ (5 ᓂᕚᙱᑖᑦ) ᐊᒻᒪᓗ HAᒥᐊᒃ ᐃᓚᒌᑦᑐᓄᑦ (5 ᓂᕚᙱᑖᑦ) ᓄᓇᖃᖅᑐᓄᑦ ᑲᓐᑐᐃᑐ ᑕᓯᙵᓂ.
- ᐊᕗᑎᓕᕆᔨᒃᑯᑦ ᐱᓕᕆᖃᑎᖃᑦᓯᐊᖏᓐᓇᖅᑐᑦ ᐊᑦᑐᖅᑕᐅᓯᒪᓂᖃᖅᑐᓂᒃ ᓄᓇᓕᓐᓂ ᖁᕐᓗᖅᑐᖅ, ᐃᖃᓗᒃᑑᑦᑎᐊᖅ, ᐅᒥᖕᒪᒃᑑᖅ ᐊᒻᒪᓗ ᕿᖕᒐᐅᑦ, ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᓕᕆᖃᑎᒌᑦᑐᓂᒃ ᐃᓚᐅᑎᓪᓗᒋᑦ ᓄᓇᕗᑦ ᑐᙵᕕᒃ, ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ, ᐊᒻᒪᓗ ᕿᑎᕐᒥᐅᑦ ᐆᒪᔪᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓂ ᓇᓗᓇᐃᖅᓯᓚᓱᐊᕐᓗᑎᑦ ᐊᑲᐅᓈᖅᑐᓂᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᒍᓐᓇᖅᑐᓂᒃ.

ᐅᖃᕆᐊᖅᑐᖅᓯᒪᓃᑦ

- ᓇᓕᖅᑲᖏᑦ ᓈᓴᖅᑕᐅᒍᑎᕕᓂᖏᑦᑕ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᓕᕆᖃᑎᒌᑦᑐᓄᑦ ᐊᒻᒪᓗ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐅᖃᕆᐊᖅᑐᖅᓯᒪᓂᖅᖃᑎᓪᓗᒋᑦ ᐅᓪᓗᖓᓂ ᐅᑐᐱᕆ 7, 2019, ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ. ᑭᒻᒪᖅᑐᐃᔪᐃᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᖏᓐᓂ ᖁᕐᓗᖅᑐᖅ, ᐃᖃᓗᒃᑑᑦᑎᐊᖅ, ᐅᒥᖕᒪᒃᑑᖅ ᐊᒻᒪᓗ ᕿᖕᒐᐅᑦ ᐃᓚᐅᖃᑕᐅᓚᐅᖅᑐᑦ ᐅᖃᕆᐊᖅᑐᓯᒪᕕᐅᔪᓂ, ᐃᓚᐅᑎᓪᓗᒋᓪᓗ ᓄᓇᕗᑦ ᑐᙵᕕᒃᑯᑦ.
- ᐅᖃᕆᐊᖅᑐᕐᓯᒪᓂᖅᖃᑎᓪᓗᒋᑦ ᐅᑐᐱᕆ 7−ᒥ, ᐊᕗᑎᓕᕆᔨᒃᑯᑦ ᓇᓗᓇᐃᕆᓚᐅᖅᑐᑦ ᐱᕐᑯᔨᕖᙱᓯᑎᒦᒃ ᑐᑦᑐᑦᑕᐃᓕᑎᑦᓯᓂᕐᒥ ᕿᑦᑑᓯ ᑐᑦᑐᖏᓐᓂ. ᐅᖃᖅᑐᖃᓚᐅᖅᑐᖅ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᓄᖅᑲᙱᑎᑦᓯᓂᖅ ᑐᑦᑐᑦᑕᐃᓕᑎᑦᓯᓂᖅ ᕿᑦᑑᓯ ᑐᑦᑐᖏᓐᓂ ᐊᑦᑐᐃᓂᖃᕐᓂᐊᕆᐊᖓ ᓂᕿᑭᑦᓴᓂᕐᒥ, ᑮᓇᐅᔭᓕᐅᕋᓱᐊᕈᑕᐅᕙᑦᑐᓂ, ᐃᓕᖅᑯᓯᑐᖃᖅᑎᒍᓪᓗ ᐊᑦᑐᐃᓂᖃᕐᓂᐊᕆᐊᙵ ᓄᓇᓕᓐᓂ ᑐᑦᑐᓚᓱᐊᖅᐸᑦᑐᓂ ᕿᑦᑑᓯ ᑐᑦᑐᖏᓐᓂᒃ. ᑖᒃᑯᐊ ᓄᓇᓖᑦ ᐅᖃᕆᐊᓪᓚᒃᑲᓐᓂᓚᐅᖅᑐᑦ ᐊᐅᓚᑦᓯᒍᑎᑦᓴᒃᑲᓐᓂᕐᓂᒃ ᐱᕐᑯᔨᕖᙱᓕᐅᖅᓯᒪᔪᓂᒃ ᐃᓱᒪᒋᔭᐅᖃᓯᐅᑎᓗᑎᑦ ᓂᕐᔪᑏᑦ ᑐᑦᑐᓚᓱᐊᖅᐸᑦᑐᑦ ᐱᔭᐅᓚᓱᐊᕈᑎᑦᓴᖏᑦ ᖁᕝᕚᓯᒋᐊᖅᑕᐅᓗᑎᑦ.

ᐱᕐᑯᓯᕗᓐᓈᕈᑎ

- ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᕐᑯᓯᕗᓐᓈᓕᐅᖅᑐᑦ ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᕐᓗᑎᑦ 0 ᑖᒃᑯᐊ ᕚᑑᔅ ᑐᑦᑐᖏᑦ.

ᑲᑐᑎᓗᒍ ᓄᓇᕗᑦ ᐱᕈᖅᐸᓪᓕᐊᑎᓪᓚᕗᑦ
Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

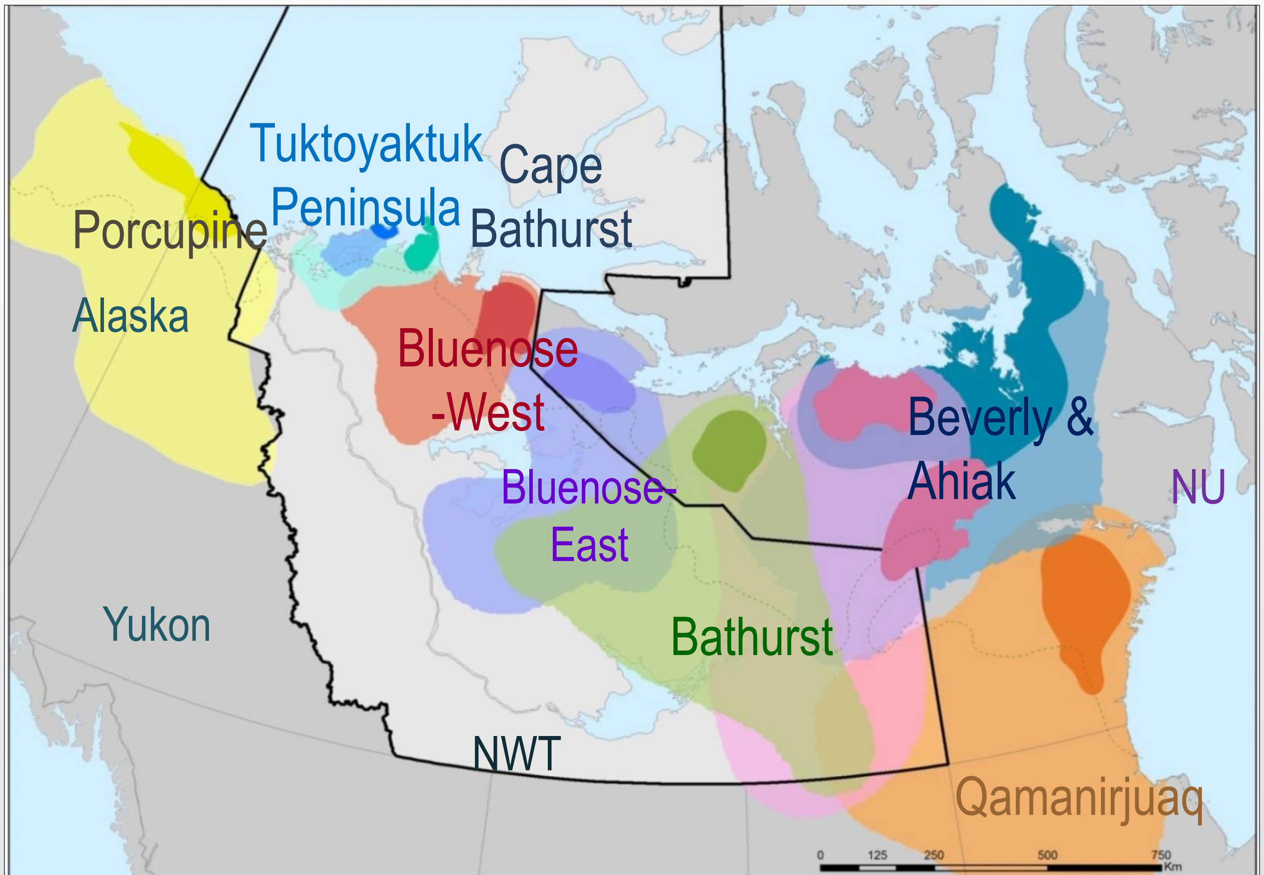
2018 ᖃᑦᓯᐅᓂᖏᑦ ᒥᑦᓴᐅᓛᖅᑕᐅᓯᒪᔪᑦ ᕚᑑᒃ ᑐᑦᑐᖏᑦ

(*Rangifer tarandus groenlandicus*)

ᓈᓴ-ᒪᓈ ᓚᒃᑯᓘᒃ, ᕿᑎᕐᒥᐅᓂ ᐊᕕᑦᑐᖅᓯᒪᔪᓂ ᐆᒪᔪᓕᕆᔨᒻᒪᕆᒃ

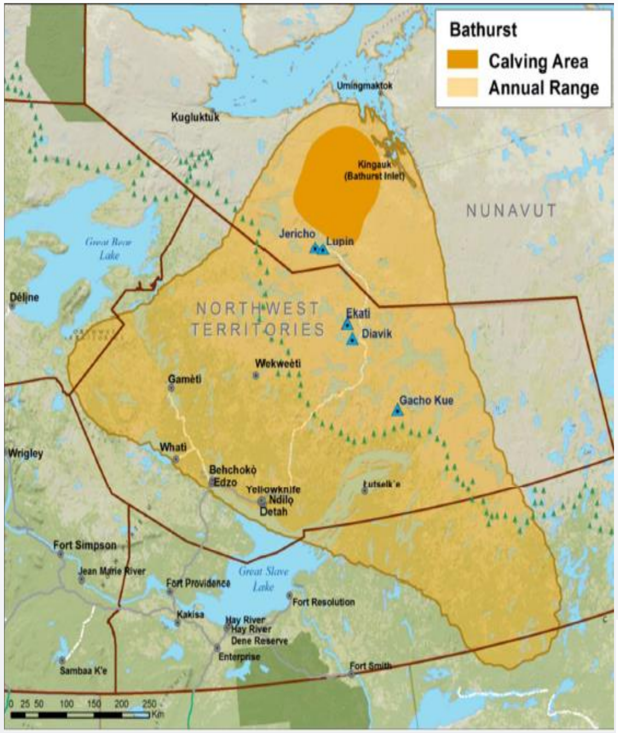
ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᖃᐅᔨᒃᑲᐃᒍᒪᔪᑦ ᑲᑎᒪᔨᓂᒃ 2018 ᒥᑦᓴᐅᔫᖅᑕᐅᒍᑎᖏᓐᓂᒃ ᕚᑑᔅ ᑐᑦᑐᖏᑦᑕ ᐊᐱᕆᓪᓗᑎᓪᓗ ᑲᑎᒪᔨᓂᒃ ᑐᑭᑖᖅᑯᔨᓪᓗᑎᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᖁᔨᕗᖕᒑᖅᑕᐅᓯᒪᔪᓂᒃ

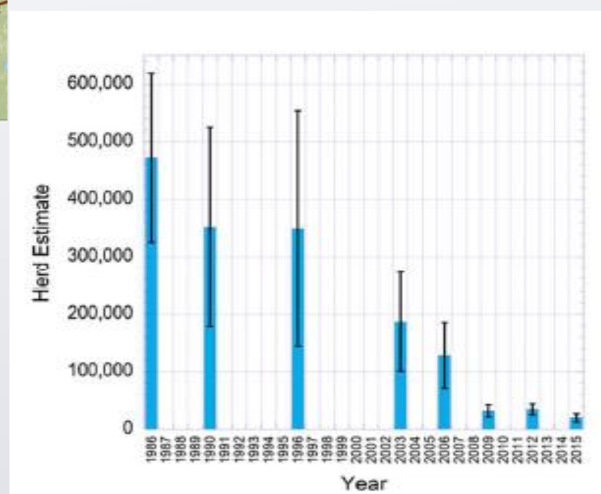
ᓄᓇᐃᓐᓇᕐᒥ ᑐᑦᑐᐃᑦ ᓇᔪᒐᖏᑦ ᖁᑐᖏᐅᕐᕕᖏᓪᓗ



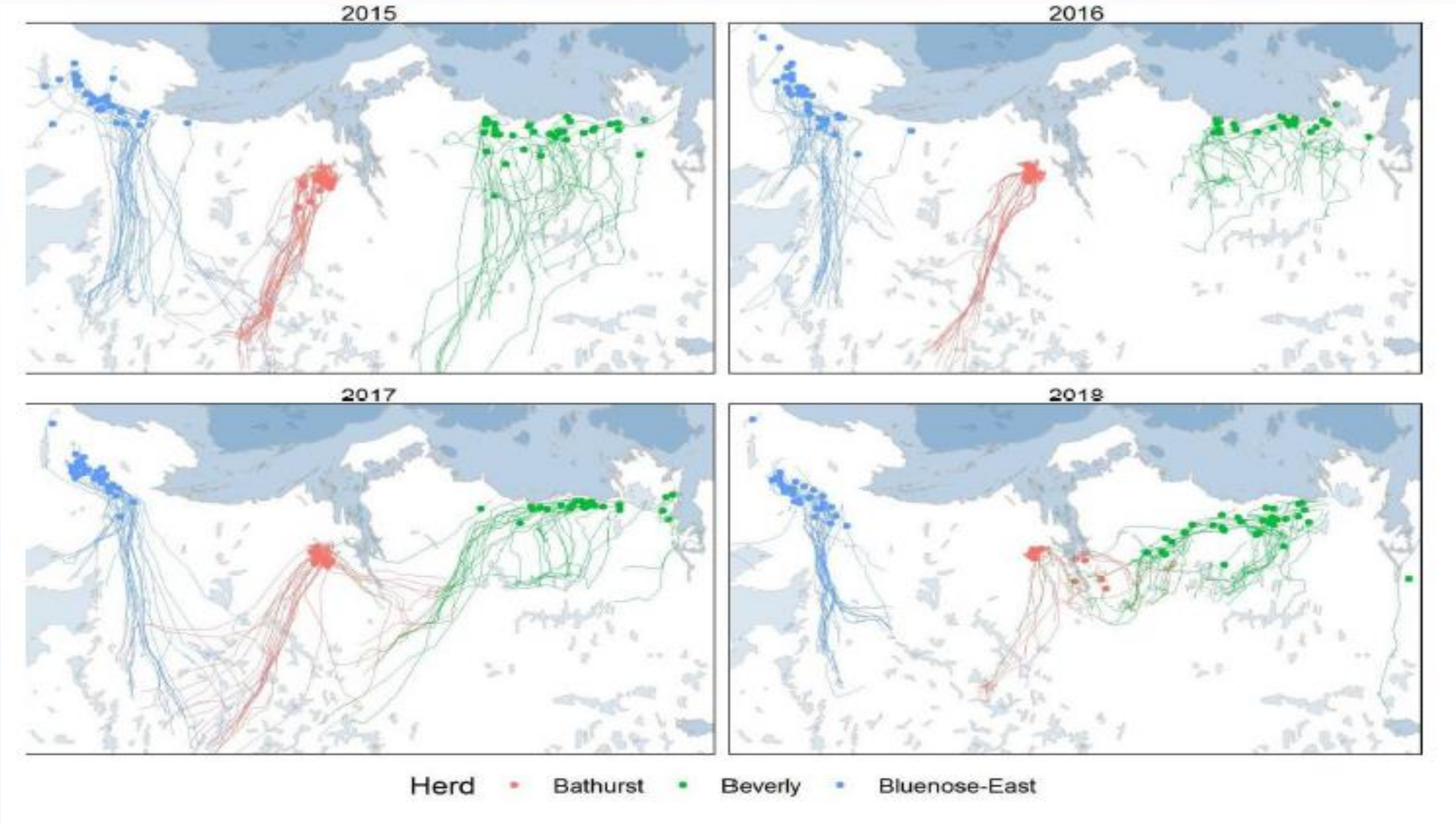
Nunavut

- ᑖᒃᑯᐊ ᕚᑑᔅ ᑐᑦᑐᖕᒋᑦᑕ ᖃᑐᕐᖕᒋᐅᕐᕕᖕᒋᑦ ᓄᓇᕗᑦ ᐃᓗᐊᓃᑦᑐᑦ
- ᕚᑑᔅ ᑐᑦᑐᖕᒋᑦ ᑎᑭᐅᑎᓯᒪᓚᐅᖅᑐᑦ ᐊᒥᓲᓂᖅᐸᐅᓂᖕᒋᓐᓄᑦ ᒥᑦᓴᐅᓵᖅᑕᐅᓯᒪᓪᓗᑎᑦ 472,000-ᖕᒋᓐᓃᑦᑐᑦ, 1986-ᖑᑎᓪᓗᒍ
- ᑖᒃᑯᐊ ᑐᑦᑐᐃᑦ ᖃᑦᓲᓐᓇᕈᖅᐹᓪᓕᕆᐊᙵᓚᐅᖅᑐᑦ ᐊᕐᕌᒍᖕᒋᑦ 1990 ᐊᑐᖅᑎᓪᓗᒋᑦ ᖃᑦᓲᓐᓇᕈᖅᐸᓪᓕᐊᒋᐊᓪᓚᒃᑲᓐᓂᖅᓱᑎᑦ 2003 ᖄᖕᒋᖅᓯᒪᓕᖅᑎᓪᓗᒍ

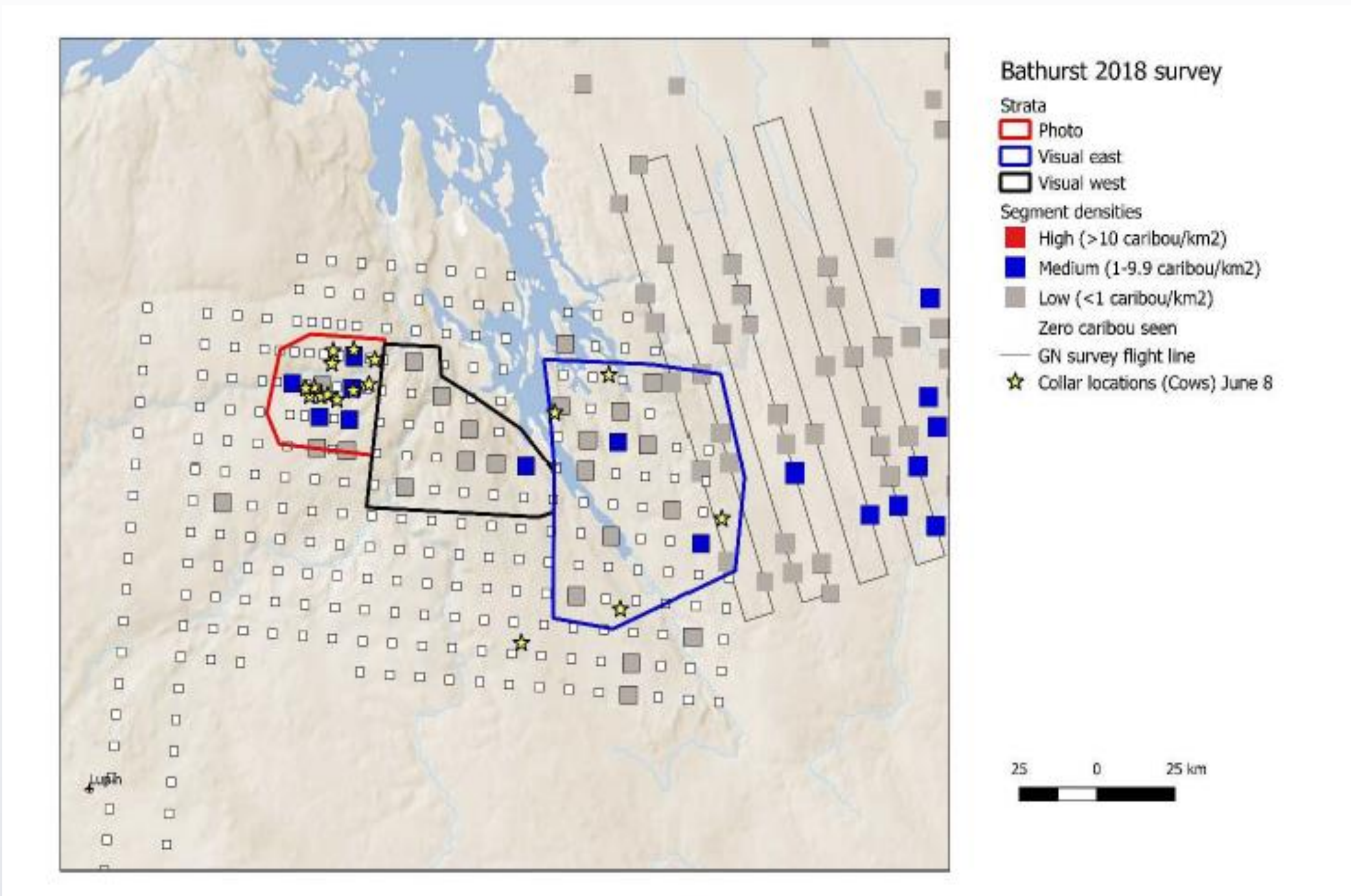


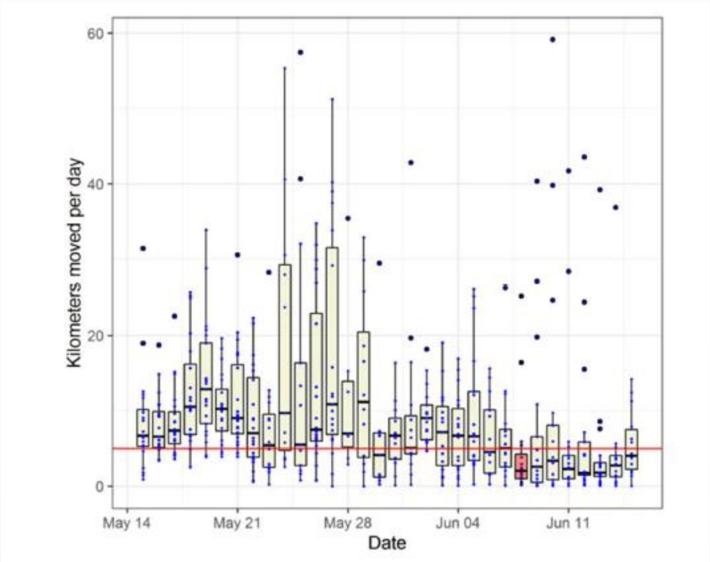


ᐅᔭᒥᑦᑕᐅᓯᒪᔪᑦ ᑐᑦᑐᐃᑦ ᓇᒦᓐᓂᖏᑦ - 2018



ᖃᐅᔩᓴᕆᐊᓪᓚᓐᓂᒃᑯᑦ ᓈᓴᐃᒍᑏᑦ- ᔫᓂ 5-7, 2018

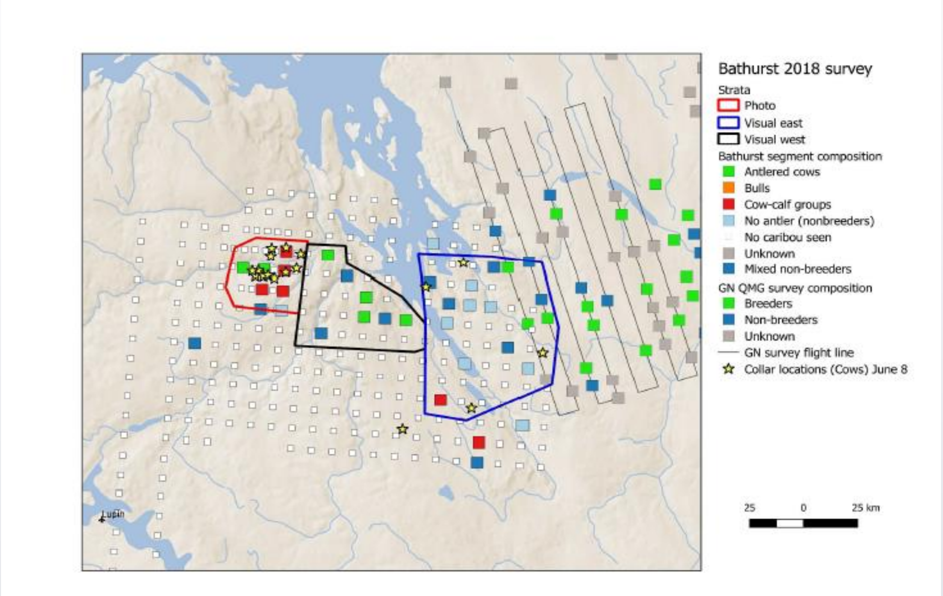




ᓅᑦᑕᕐᓂᖅᑎᑦᑎᒻᒪᑦ ᐊᕐᓇᕕᐊᓐᒑᑦ
ᐅᓴᒥᑦᑕᐅᓯᒪᔪᑦ
ᕿᑐᕐᖏᐅᓚᐅᖅᑎᓐᓇᒋᑦ ᐊᒻᒪᓗ
ᕿᑐᕐᖏᐅᓕᖅᑎᓪᓗᒋᑦ 2018-ᒥ.

ᖃᖓᑕᓚᐅᖅᑎᓐᓇᒋᑦ ᖃᐅᔨᓴᕐᓂᒃᑯᑦ (ᑕᖅᓴᓖᓐᓂ),
ᕿᒥᕐᕈᖃᑦᑕᓚᐅᖅᑐᒍᑦ ᖃᐅᑕᒫᑦ ᖃᓄᑎᒋᑦ ᓅᑦᑕᕐᓂᖏᓐᓂ
ᐊᕐᓇᕕᐊᖏᑦ, ᐊᒻᒪᓗ ᐅᓴᒥᑦᓯᒪᔫᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥ.

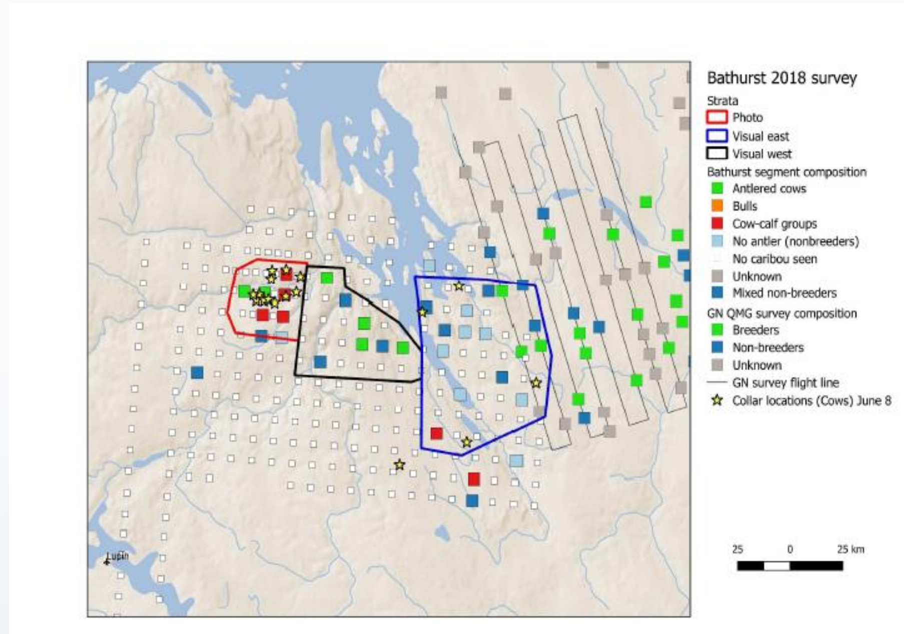
ᕿᒥᕐᕈᓂᒃᑯᑦ ᓈᓴᐃᓂᖅ ᐱᓴᐅᒋᐊᖃᖅᑐᖅ ᐅᓪᓗᐃᑦ 3-ᓗ 4-ᓗ
ᓈᓚᐅᙱᓐᓂᖏᓐᓂ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᓕᖅᑎᓪᓗᒋᑦ.



ᓇᒦᖔᓂᖏᑦ ᐅᓴᒥᑦᑕᐅᓯᒪᔪᐃᑦ ᑹᑏᑦ ᐊᕐᓇᕕᐊᖑᓪᓗᑎᑦ
ᑐᑦᑐᐃᑦ ᐊᒻᒪᓗ ᓅᑦᑕᕐᓂᖏᑦ, ᑎᑭᐅᑎᓪᓗᒍ ᔫᓂ 8, 2019

ᐊᔾᔨᓕᐅᕆᓂᒃᑯᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᑦ

ᖃᐅᔨᓴᕐᕕᐅᔪᑦ, ᓇᓗᓇᐃᖅᑕᐅᒪᔪᑦ ᐊᒥᓲᓂᖃᖅᑐᑦ (ᐊᐅᐸᖅᑐᑦ), ᑎᒻᒥᕕᐅᕙᑦᑐᑦ ᐊᑯᓂᐅᓂᖅᓴᖅ (56%) ᐊᔾᔨᓕᐅᕿᑎᖃᖅᑐᒧᖅ ᖃᖕᒐᑕᔫᕐᒧᑦ.



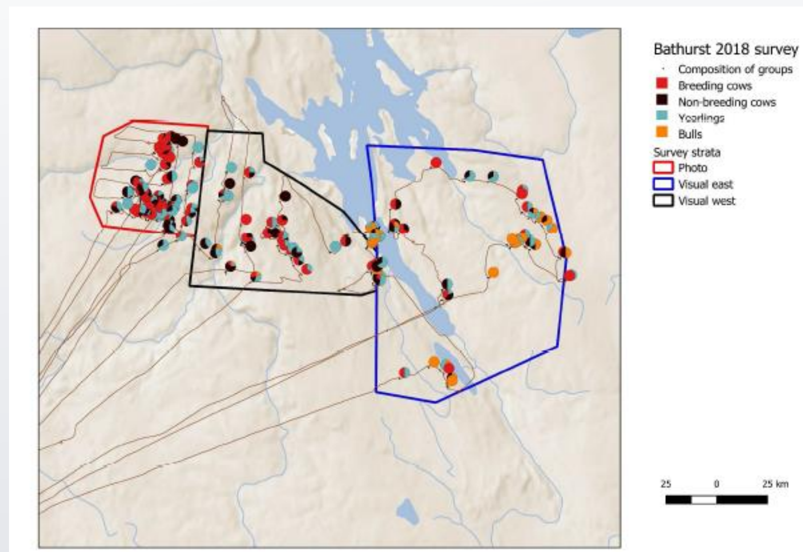
ᓈᓴᐃᔩᑦ ᓈᓴᐃᓯᕙᑦᑐᑦ ᑐᑦᑐᓂᒃ ᐊᔾᔨᙳᐊᓈᑦᑐᓂᒃ ᒥᑦᓴᐅᓵᕈᑏᑦ ᓇᓚᐅᑦᓯᓂᖅᓴᐅᕐᑯᓪᓗᒋᑦ.

ᕿᑐᕐᖏᐅᕐᕕᖏᑦᑕ ᐊᒻᒪᓗ ᐅᑭᐊᑦᓵᒃᑯᑦ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑕ ᓈᓴᐃᒍᑏᑦ

Table 11: Summary of composition survey results on Bathurst calving ground June 2018 in photo and visual strata.

Stratum	# groups	Adult females			Yearlings	Bulls	Total caribou (1 yr+)
		Total	breeding	non-breeding			
Photo	80	1,517	1,134	383	242	0	1,759
Visual East	38	46	20	26	33	36	115
Visual West	52	135	72	63	94	34	263

Cows	Bulls	Calves	Groups
940	532	431	39

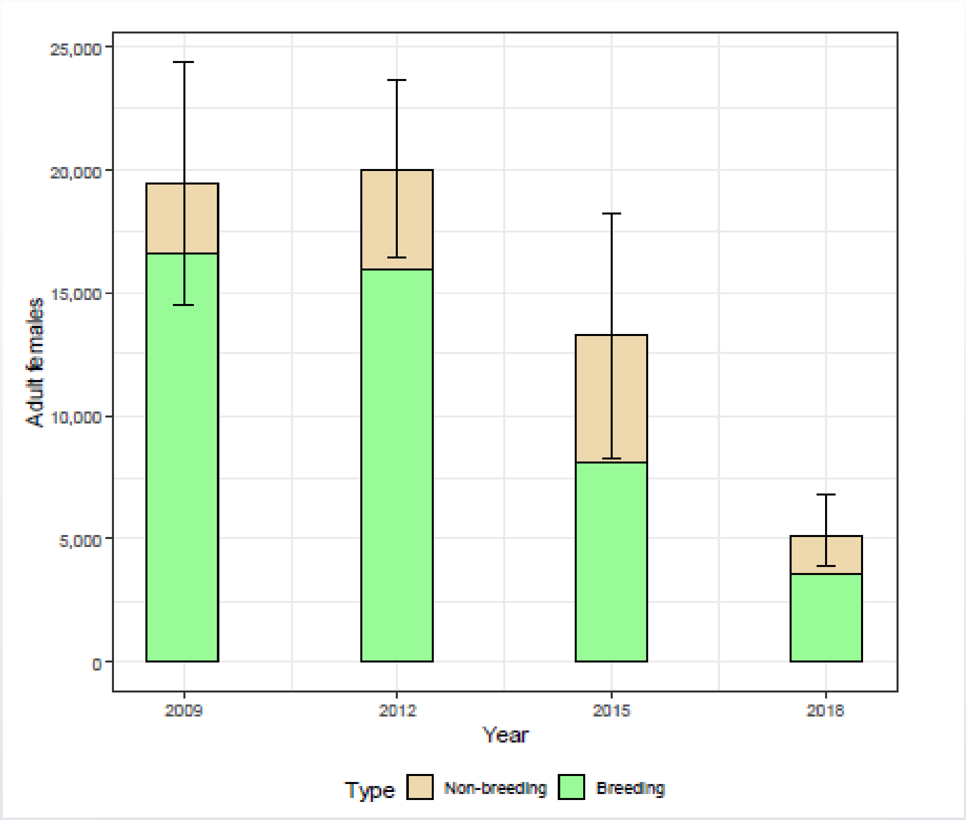


ᕿᑐᕐᖏᐅᕐᕕᖏᑦᑕ ᓄᓇᐃᑦ ᓈᓴᐃᖃᐅᓂᖏᑦ ᐊᑐᖅᑕᐅᕙᑦᑐᑦ ᑐᑭᑖᕈᑎᐅᓪᓗᑎᑦ ᖃᑦᓯᐅᓂᖏᑦ ᕿᑐᕐᖏᐅᕈᓐᓇᖅᑐᑦ ᐊᕐᓇᕕᐊᑦ, ᕿᑐᕐᖏᐅᕈᓐᓇᙱᑦᑐᑦ ᐊᕐᓇᕕᐊᑦ, ᐊᕐᕋᒎᖅᑖᑕᐃᓐᓇᖅᑐᑦ, ᐊᒻᒪᓗ ᐊᖑᓯᓪᓗᐃᑦ.

ᐅᑭᐊᑦᓵᒃᑯᑦ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑕ ᓈᓴᖅᑕᐅᒍᑎᖏᑦ ᐱᔾᔪᑎᖃᖅᐸᑦᑐᑦ ᑐᑭᓯᓇᓱᐊᕐᓂᕐᒥ ᐊᕐᓇᕕᐊᖏᑦ ᐊᖑᓯᓪᓗᖏᓪᓗ ᖃᑦᓯᐅᓕᕐᒪᖔᑕ.

2018 ᖀᓅᒃ ᑐᑦᑐᖏᑦ ᒥᑦᓴᐅᓵᖅᑕᐅᓯᒪᔪᑦ

ᓇᓚᐅᑦᓵᖅᑕᐅᓯᒪᔪᑦ ᐱᕈᕇᖅᓯᒪᓂᖏᑦ ᖀᓅᒃ ᑐᑦᑐᖏᑦᑕ (ᐊᕐᕌᒍᓖᑦ ᒪᕐᕉᓐᓂ ᐅᖓᑖᓂᑦᓗ) 8,207ᖑᒋᐊᖏᑦ.



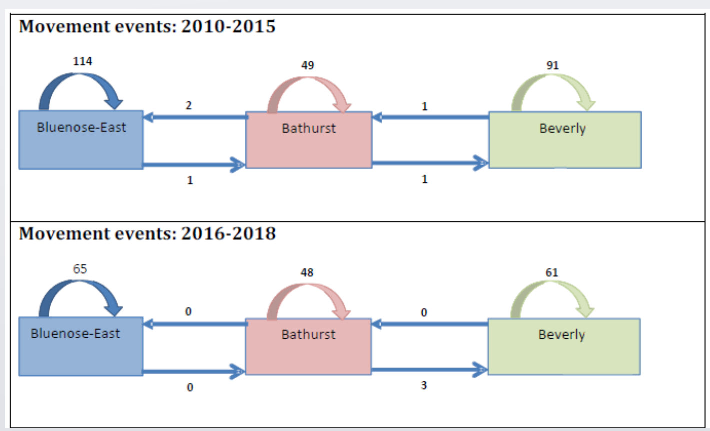
ᒥᑦᓴᐅᓵᕈᑏᑦ ᕚᑑᔅ ᐱᕈᓈᖅᓯᒪᔪᑦ ᐊᕐᓇᕕᐊᑦ, ᓅᓯᒪᓂᖏᓐᓄᑦ ᑯᐃᓐ ᒦᑦ ᓄᓇᖓᓐᓄᑦ

ᓄᑦᑎᒃᑦᑕᕐᓂᖏᑦ ᑐᑦᑐᐃᑦ ᓇᓚᐅᑦᑖᖅᑕᐅᓯᒪᔪᑦ 3% ᐅᑎᖅᑕᖅᑐᐃᑦ ᐊᒻᒪᓗ 97% ᓄᑦᑎᒃᑦᑕᖏᑦᑯᑦ ᕚᑑᔅ ᑐᑦᑐᖏᑦ

11 ᖃᐅᔨᒪᔭᐅᔪᑦ ᕚᑑᔅ ᑐᑦᑐᖏᑦ ᐅᔭᒥᑦᑕᐅᓯᒪᔪᑦ ᖃᐅᔨᓴᕐᓂᖃᖅᑎᓪᓗᒋᑦ. ᓯᑕᒪᐅᔪᖅᑐᐃᑦ ᕿᑐᕐᖏᐅᕐᕕᑐᖃᕐᒥᓐᓄᑦ ᐅᑎᓚᐅᖅᑐᑦ ᐱᖓᓱᐃᓪᓗ ᐅᔭᒥᑦᑕᐅᓯᒪᔪᑦ ᓅᓚᐅᖅᓱᑎᑦ ᕚᕗᓚ ᕿᑐᕐᖏᐅᕐᕕᖏᓐᓄᑦ ᑯᐃᓐ ᒦᑦ ᓄᓇᖓᑕ ᓯᕝᔭᖓᓄᑦ (30%ᖏᑦ ᐅᔭᒥᑦᑕᐅᓯᒪᔪᑦ ᐊᕐᓇᕕᐊᑦ).

ᓅᖃᑦᑕᕐᓂᖏᑦ ᐅᔭᒥᑦᑕᐅᓯᒪᔪᑦ ᐊᖑᓴᓐᓗᐃᑦ ᐊᒻᒪᓗ ᐊᕐᓇᕕᐊᑦ ᓂᕆᐅᒋᔭᐅᓚᐅᙱᑦᑐᑦ ᓅᓂᕆᔭᖏᑦ ᓄᓇᒧᑦ ᖃᓂᒋᔮᓄᑦ ᑯᐃᓐ ᒦᑦ ᓄᓇᖓᑕ, ᑲᑎᓯᒪᓚᐅᖅᑎᓪᓗᒋᑦ ᐊᑕᖏᖅᓱᑎᑦ ᑕᒪᒃᑮᑦ ᑐᑦᑐᖏᑦ ᐅᑭᐅᒃᑯᑦ.

ᑭᓯᐊᓂᓕ, ᑖᒃᑯᐊ ᓅᓯᒪᓂᖏᑦ ᕚᑑᔅ ᐊᕐᓚᕕᐊᑦ ᕚᕗᓚ ᑐᑦᑐᖏᑦᑕ ᕿᑐᕐᖏᐅᕐᕕᖏᓐᓄᑦ ᐱᔭᐅᖃᓯᐅᑎᓯᒪᙱᑦᑐᑦ ᓈᓴᖅᑕᐅᒍᑎᖏᓐᓄᑦ ᖃᑦᓰᓐᓇᕈᖅᐹᓪᓕᖅᓯᒪᑎᓪᓗᒋᑦ ᐱᕈᓈᖅᓯᒪᔪᑦ ᐊᕐᓇᕕᐊᑦ (61%) ᐅᕝᕙᓘᓐᓂᑦ ᖃᑦᓯᐅᓂᖏᑕ ᐊᖏᓂᖏᑦ (58.5%).



ᓄᓇᕗᑦ Nunavut

ᐅᓄᖅᑑᑲᑕᒃᑐᑦ ᓇᓃᓐᓂᖏᓐᓂᒃ ᓇᓗᓇᐃᒃᑯᑎ

ᑲᑎᓯᒪᐅᖅᓱᑎᒃ ᐅᓄᕐᓂᓇᔭᐅᔪᑦ ᐊᕐᓇᕐᓗᐃᑦ ᑐᒃᑐᐃᑦ ᐃᓅᔪᓐᓇᕐᓂᖏᑦ ᒫᓃᑦᑐᑦ 0.82

ᐊᖑᓴᓪᓗᐃᑦ ᐆᒪᓂᓇᕙᒃᑕᖏᑦ: 0.71 2017-ᒥᑦ ᑕᐅᑐᙳᐊᖅᓱᒍ 0.72 2015-ᒥᑦ.

ᖁᑐᕐᖏᐅᖅᐸᓪᓕᐊᓂᖏᑦ 0.25

ᑐᑦᑐᑦᑕᐅᓯᒪᔪᑦ

	2016-2017	2017-2018	2018-2019
ᓄᓇᕗᑦ	30	30	30
ᐊᑕᖕᒋᑦᓗᒋᑦ ᐱᖃᑕᐅᒍᓐᓇᖅᑐᑦ	30	30	30

ᑖᒃᑯᐊ ᑐᑦᑐᐃᑦ ᐱᐅᓯᑐᖃᕐᒥᓐᓂ ᒪᓕᑦᑐᑦ ᐃᓄᐃᓴᓪᓕᕖᓪᓕᐸᑦᓯᑎᑦ. ᑐᑦᑐᓚᓱᐊᖅᐸᑦᑐᐃᑦ ᒫᓐᓇᒃᑯᑦ ᒪᑭᑕᒃᑲᓂᕈᑎᐅᒍᓐᓇᖕᒋᑦᑐᑦ ᑖᒃᑯᐊᓗ ᑐᑦᑐᐃᑦ ᐊᐅᓚᑕᐅᓯᐊᖃᖅᑐᑦ ᐊᑦᑕᓇᖅᑐᒦᓪᒪᑕ.

ᑲᑎᒪᔩᑦ ᑐᑭᑖᕈᑎᖓᑦ ᓄᓇᑦᓯᐊᕐᒥ

- ᒐᕙᒪᒃᑯᖏᑦ ᓄᓇᑦᓯᐊᑉ ᐱᖁᔭᕚᓕᐅᓚᐅᖅᑐᑦ ᐊᑕᖏᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᓕᒫᓄᑦ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ ▯ ᖑᓗᑎᑦ ᑐᑦᑐᐃᑦ ᐱᔭᓂᒃ ᕚᑑᔅ ᑐᑦᑐᖏᓐᓂ ᒪᓕᓪᓗᒋᑦ 2018-ᒥ ᓈᓴᐃᒍᑎᒥᓃᑦ ᓇᓕᖅᑲᖏᑦ.

ᐃᓱᒫᓗᓐᓇᓪᓚᓇᓐᓂᖓᓄᑦ ᐱᐅᖅᓱᐊᕐᓂᐅᔭᖅ, ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᐃᑦ ᒫᓐᓇᒧᑦ ▯ ᕚᑑᔅ ᑐᑦᑐᖏᓐᓂ.

ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᕐᑯᔨᕗᖅᒫᓕᐊᕆᔭᖏᑦ

ᒐᕙᒪᒃᑯᖏᑦ ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐃᑲᔪᖅᑐᐃᕗᑦ ᒐᕙᒪᒃᑯᖏᓐᓂᑦ ᓄᓇᑦᓯᐊᑉ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᕐᓗᑎᑦ ▯ ᕚᑑᔅ ᑐᑦᑐᖏᓐᓂ ᓄᓇᕗᒻᒥ.

ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᕐᑯᔨᕗᖅᒫᓕᐅᕐᒥᔪᑦ ᒪᑯᓂᖓ:

- ᓄᓇᓕᓐᓂ-ᐱᓕᕆᐊᖑᔨᒪᔪᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᓕᕆᔾᔪᑏᑦ ᕐᑯᕝᕙᐹᓪᓕᕐᑯᓪᓗᒋᑦ ᓇᖅᑭᓪᓗᑎᑦ ᑐᑦᑐᐃᑦ;
- ᖃᐅᔨᓴᕆᐊᓪᓚᒃᑲᓐᓂᕐᓗᑎᑦ ᓈᓴᐃᖃᑦᑕᓂᒃᑯᑦ ᐊᕐᕌᒎᒃ ᒪᕐᕉᒃ ᓈᒐᐃᑉᐸᑕ, ᕿᑐᕐᖏᐅᕐᕕᖏᓪᓗ ᐊᒻᒪᓗ ᐅᑭᐊᑦᓵᒃᑯᑦ ᖃᓄᐃᓕᖓᓕᕐᒪᖔᑕ ᖃᐅᔨᓴᖅᑕᐅᕙᓪᓗᑎᑦ ᐊᕐᕌᒍᑕᒫᑦ.

ᖁᔭᓐᓇᒦᒃ

THANK YOU

QUANAQUTIN

MERCI

ᐅᓂᒃᑳᓂᑦ ᕿᙵᐅᑦ ᑐᑦᑐᖕᒋᓐᓂ 2018 ᒥᔅᓴᐅᓴᑦᑕᐅᔪᑦ, ᓄᓇᕗᒻᒥ

ᓇᐃᓈᕆᔪᑎᑦ

ᐅᓇ ᓇᐃᑦᑐᖅ ᑎᑎᕋᒃᓯᒪᔪᖅᑯᑎᖓ ᓇᐃᓈᕆᓂᐅᕗᖅ ᐅᖃᐅᓯᒃᓴᓂ ᑐᓂᔭᐅᔪᓄᑦ ᐅᓂᒃᑳᓕᐊᒥ ᑕᐃᔭᐃᔪᒥ: “ᒥᔅᓴᐅᓴᑦᑕᐅᔪᑦ ᓄᕐᕋᓕᐅᖅᑐᑦ ᐊᕐᓇᐃᑦ ᐊᒻᒪ ᑐᑦᑐᓪᓚᕆᖕᒋᑦ ᐊᒥᓲᓂᖕᒋᑦ ᐊᖕᒋᓂᖕᒋᑦ ᐊᒻᒪ ᖃᐅᔨᓴᖅᑕᐅᓂᖕᒋᑦ ᐊᕕᒃᓯᒪᔪᖕᒋᑎᒍᑦ ᕿᙵᐅᑦ ᑐᑦᑐᖕᒋᓐᓂ ᐅᑭᐅᑕᖅᑐᒥ ᑐᑦᑐᖕᒋᓐᓂ: 2018 ᓄᕐᕋᓕᐅᕐᕕᒃ ᐊᔾᔨᓐᖑᐊᑎᒍᑦ ᖃᐅᔨᓴᕐᓂᖅ.”

ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ ᐱᔪᓐᓇᐅᑎᖃᖅᑐᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᑦᑐᑕᐅᕙᑦᑐᓂ ᕿᙵᐅᑦ ᑐᑦᑐᖕᒋᓐᓂ ᓄᓇᕗᒻᒥ, ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᖅᑐᑦ ᐊᒻᒪ ᖃᐅᔨᓴᖅᑐᑎᑦ (ᓄᕐᕋᓕᐅᕐᕕᖕᒋᓐᓂ ᖃᐅᔨᓴᕐᓂᐅᔪᑦ) ᒐᕙᒪᒃᑯᖕᒋᓐᓂ ᓄᓇᑦᓯᐊᖅ, ᖃᐅᔨᒪᑎᑦᑎᓗᑎ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᕙᓪᓕᐊᓂᖕᒐᓂᑦ. ᐅᑯᐊ ᐅᓂᒃᑳ ᐱᑕᖃᖅᑎᑦᑎᔪᑦ ᖃᐅᔨᓴᖅᑎᓂᑦ ᑐᑭᓯᒋᐊᕈᑎᓂᑦ ᐱᒻᒪᕆᐅᔪᑦ ᓄᖑᓴᐃᖕᒋᑦᑐᓂᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᕿᙵᐅᑦ ᑐᑦᑐᖕᒋᓐᓂ.

ᓇᓗᓇᐃᔭᐃᓂᖅ

ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ ᕿᑎᐊᓃᑦᑐᑦ ᐊᒥᓲᓂᑦ ᓄᓇᕗᒻᒥ ᐊᒻᒪ ᓄᓇᑦᓯᐊᒥ ᓄᓇᓕᓐᓂᑦ, ᑐᓐᖓᕕᔭᖏᑦ ᑖᒃᑯᐊ ᑐᑦᑐᐃᑦ ᑮᓇᐅᔭᓕᐅᕋᓱᓐᓂᒃᑯᑦ, ᐱᖅᑯᓯᒃᑯᑦ ᐊᒻᒪ ᓂᕿᔅᓴᓄᑦ ᐱᔭᐅᔭᓇᐊᖃᖅᑐᓄᑦ.

ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ ᐅᑎᖅᑕᖃᑦᑕᖅᑐᑦ ᐅᑭᐅᑕᖅᑐᒥᐅᑕᐃᑦ ᑐᑦᑐᐃᑦ (*Rangifer tarandus groenlandicus*). ᑖᒃᑯᐊᑐᑦᑐᐃᑦ ᐅᖓᓯᑦᑐᒥᑦ ᐅᑎᖅᑕᐸᑦᑐᑦ ᓇᕚᖅᑐᐃᑦ ᑭᓪᓚᖏᓐᓂᑦ ᓄᓇᕗᒻᒥ ᓄᕐᕋᓕᐅᕐᕕᖏᓐᓄᑦ ᓄᓇᕗᒻᒥ, ᐊᕐᓇᐃᑦ ᑲᑎᖃᑦᑕᖅᑐᑦ ᓄᕐᕋᓕᐅᖅᑐᑎᑦ. ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ ᐊᓯᖏᓐᓅᖃᑦᑕᑦᑐᑦ ᐊᐅᓚᑕᐅᔪᓂᑦ ᑐᑦᑐᓂᑦ, ᓄᓇᑦᓯᐊᖅ ᒐᕙᒪᒃᑯᖏᑦ (GNWT) ᑐᑭᒧᐊᖅᑎᑦᑎᔪᑦ ᖃᐅᔨᓴᖅᑕᐅᓂᖏᓐᓄᑦ ᑖᒃᑯᐊ ᑐᑦᑐᐃᑦ ᑕᐃᒪᐃᑦᑐᑦ ᐱᓕᕆᖃᑎᖃᖅᑐᑎᑦ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᓐᓂᑦ.

1986–ᒥ, ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ ᐊᒥᓲᓂᖏ ᒥᔅᓴᐅᓴᑦᑕᐅᓚᐅᖅᑐᑦ 472,000 ᐆᒪᔪᐃᑦ. ᑐᑦᑐᖏᑦ ᖃᑦᑏᓇᕈᖅᐸᓪᓕᐊᓯᒪᔪᑦ 1990-ᖏᓐᓂᓂᑦ, ᓱᑲᓐᓂᖅᐹᒥ ᐊᑦᑎᓪᓕᒋᐊᕐᓂᖃᖅᑐᑎᑦ ᐊᑯᓐᓂᖏᓐᓂ 2006 ᐊᒻᒪ 2009, ᑐᑦᑐᐃᑦ ᑲᑕᑦᑎᓪᓗᒋᑦ 100,000–ᓂᑦ ᑎᑭᑦᑐᒍ 32,000 ᐆᒪᔪᐃᑦ ᐱᖓᓱᓂᑦ ᐊᕐᕌᒍᓂᑦ. ᖃᑦᑏᓐᓇᕈᓇᐊᕐᓂᖏᑦ ᑖᒃᑯᐊ ᑐᑦᑐᐃᑦ ᐊᒻᒪ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᓂᑦ ᑭᓪᓕᖅᑎᑦᑎᓂᖅ ᓴᖅᑮᓯᒪᔪᖅ ᐊᔅᓯᕈᓐᓇᖅᑐᒥ ᐊᒥᓱᒐᓚᓐᓂᑦ ᓄᓇᓕᓐᓂᑦ.

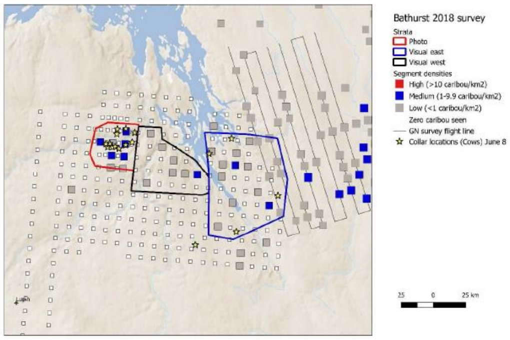
ᒫᓇᐅᔪᒥᑦ ᖁᕝᕙᓯᓐᓂᖓ ᐊᒻᒪ ᑲᔪᓰᓐᓇᕐᓂᖓ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᔪᑦ ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ ᓴᖅᑭᑎᑦᑎᓚᐅᖅᑐᑦ ᐃᓱᒫᓗᑎᓂᑦ ᑐᑦᑐᓯᐊᖃᑦᑕᖅᑐᓂᑦ ᓄᓇᓕᓐᓂᑦ ᐊᒻᒪ ᓴᖅᑮᓪᓗᓂ ᖃᐅᔨᓴᕋᓱᐊᓂᕐᒥᑦ.

ᑐᕌᒃᓴᐃᑦ

ᑖᓐᓇ ᐱᓕᕆᐊᖅ ᑐᕋᒐᖃᖅᑐᖅ ᖃᐅᔨᓴᕐᓗᑎᑦ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᖏᓐᓇᓂᖏᑦ ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ, ᐊᒻᒪᓗᑦᑕᐅᖅ ᐱᑕᖃᖅᑎᑦᑎᓗᓂ ᓄᑖᓂ ᖃᐅᔨᓴᖅᑎᓂᑦ ᑐᕿᓯᒋᐊᕈᑎᓂᑦ ᒥᔅᓴᐅᓴᑦᑕᐅᓯᒪᔪᓂᑦ ᐊᒥᓲᓂᖏᓐᓄᑦ ᓄᕐᕋᓕᐅᖅᑐᑦ ᐊᕐᓇᐃᑦ, ᐃᓐᓇᖏᑦ ᐊᕐᓇᐃᑦ, ᐊᒻᒪ ᓐᓇᐃᑦ ᑐᑦᑐᖏᓐᓂ ᐊᔾᔨᒋᑎᓐᖑᐊᕐᓗᒋᑦ ᖃᓄᐃᓐᓂᓇᔭᐃᑦ ᓄᕐᕋᓕᐅᕐᕕᖏᓐᓂ ᖃᐅᔨᓴᕐᓂᐅᕋᑖᓚᐅᖅᑐᓂᑦ ᑖᒃᑯᓇᓂ ᑐᑦᑐᓂᑦ.

ᐋᖅᑭᒋᐊᕈᑎᑦ

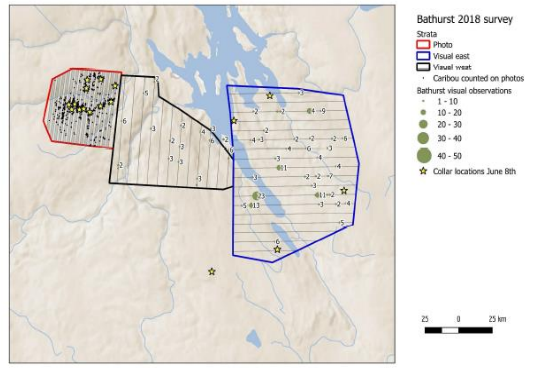
1996-ᒥᓂᑦ, ᕿᙵᐅᑦ ᑐᑦᑐᖏᑦ ᓄᕐᕋᓕᐅᖃᑦᑕᖅᑐᑦ ᑲᓇᓐᓴᖓᓂ ᕿᙵᐅᑦ. 2003-ᒥᓂᑦ, ᓄᕐᕋᓕᐅᕐᕕᖏᑦ ᐊᔾᔨᖑᐊᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᑦ ᒪᖅᑭᖅᓯᒪᔪᑦ ᐱᖓᓱᐊᖅᑎᖅᑐᑎᑦ ᐅᖓᓯᓐᓂᖏᑦ. 17 ᖁᖓᓯᕈᖅᑕᐅᓯᒪᔪᑦ ᑐᑦᑐᐃᑦ ᐊᑐᖅᑕᐅᓚᐅᖅᑐᑦ ᖃᐅᔨᓴᖅᑐᑎᑦ ᓄᕐᕋᓕᐅᓂᕐᖏᑦ ᐊᒻᒪ ᓴᖅᑭᑲᓐᓂᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᑦ (ᖃᐅᔨᓴᕐᕕᐅᔪᑦ 5 ᐊᒻᒪ 10 ᑭᓚᒦᑕᐃᑦ (km) ᐅᖓᓯᓐᓂᖏᑦ) ᖃᖓᑕᓚᖅᑐᑦ ᔫᓂ 4, 5, 6, ᐊᒻᒪ 10, 2018, ᓇᓗᓇᐃᑦᑎᐊᕐᓗᒋᑦ ᐊᕐᖁᒍᑕᒫᑦ ᓄᕐᕋᓕᐅᕐᕕᖏᑦ ᓇᒦᓐᓂᖏᑦ ᐊᒻᒪ ᓴᓂᕐᕙᐃᓗᓂ ᖃᐅᔨᓴᓂᕐᒥᑦ ᑕᑯᔭᐅᔪᓂᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᒥᑦ (ᐊᔾᔨᙳᐊᖅ 1). 10 ᑭᓚᒦᑕ ᖃᐅᔨᓴᕐᕕᐅᔪᖅ ᑭᓪᓕᖏᑦ ᑲᓇᓐᓇᖓᓂ ᕿᙵᐅᑦ ᖃᖓᑕᕕᐅᓚᐅᖅᑐᑦ ᓄᓇᕗᑦᒐᕙᒪᒃᑯᑦ ᖃᐅᔨᓴᖅᑎᖏᓐᓄᑦ ᓇᓗᓇᐃᑦᑎᐊᕐᓗᒋᑦ ᑭᓪᓕᖏᑦ ᕿᙵᐅᑦ ᑐᒃᑐᖏᑦ ᐊᒻᒪ ᖃᒪᓂᑦᑐᐊᑉ ᑐᑦᑐᖏᑦ ᓇᒧᖕᖑᖃᑦᑕᕐᓂᖏᑦ.



ᑐᓐᖓᕕᒋᓪᓗᒋᑦ ᑐᑦᑐᐃᑦ ᓇᒧᓐᖓᖃᑦᑕᕐᓂᖏᑦ ᐊᒻᒪ

ᐊᔾᔨᙳᐊᖅ 1: ᖃᐅᔨᓴᕐᓂᖅ ᑐᒥᖏᓐᓂᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᒥᑦ ᐱᖃᓯᐅᔾᔭᐅᔪᖅ ᐊᒻᒪ ᑕᑯᔭᐅᔪᓂᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᑦ (ᐊᐅᐸᖅᑐᖅ, ᕿᕐᓂᖅᑕᖅ ᐊᒻᒪ ᑐᖑᔪᖅᑕᖅ) ᑐᓐᖓᓂᖃᖅᑐᖅ ᖃᓄᐃᓕᖓᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐱᑕᖃᕐᓂᖏᓐᓄᑦ.

ᐱᑕᖃᕐᓂᖏᑦ, ᖃᐅᔨᓴᕋᓱᓐᓂᐅᔪᖅ ᖃᐅᔨᓴᕐᕕᐅᔪᒥᑦ ᐃᓕᐅᖅᑲᖅᑕᐅᓗᐅᖅᑐᑦ ᐊᑐᖅᑐᑎ ᐃᓚᖓᓂ ᐃᓕᐅᖅᑲᖅᑕᐅᔪᓂᑦ ᐊᑐᖅᑕᐅᔪᓂᑦ ᐊᔾᔨᐸᓗᖏᑦ ᐊᓯᖏᓐᓂ ᓄᕐᖃᓕᐅᕐᕕᐅᔪᓂᑦ ᖃᐅᔨᓴᓂᕐᒧᑦ ᐅᑭᐅᑕᖅᑐᒥ ᑐᑦᑐᓂᑦ. ᐊᐅᐸᖅᑐᑦ, ᑐᑦᑐᓂᑦ ᐱᑕᖃᕐᓂᖅᓴᐃᑦ, ᖃᐅᔨᓴᖅᑕᐅᓗᐅᖅᑐᑦ ᐊᔾᔨᓐᖑᐊᑎᒍᑦ ᖃᖓᑕᓲᒃᑯᑦ, ᐊᒻᒪ ᕿᓐᓂᖅᑕᐃᑦ ᐊᒻᒪ ᑐᖑᔪᖅᑕᐃᑦ ᓇᓗᓇᐃᖅᑕᐅᓗᐅᖅᑐᑦ ᑕᑯᔭᐅᓗᑎ ᖃᐅᔨᓴᕐᓂᐅᔪᓄᑦ ᒪᕿᓐᓂᒃ ᖃᐅᔨᓴᖅᑎᖅᑕᖅᑐᑎᑦ ᐊᑐᓂ ᐊᕙᑎᒃᑭᓐᓂ ᖃᖓᑕᓲᒥᑦ (ᒪᕿᓐᓂᒃ ᖃᐅᔨᓴᖅᑎᓕᒃ ᐊᑐᖅᑕᐅᓂᖓ, ᐊᔾᔨᙳᐊᖅ 2). ᑕᑯᔭᐅᔪᓂᑦ ᖃᐅᔨᓴᕐᓂᖅᑲᓚᐅᖅᑐᑦ ᔫᓂ 8 ᐊᒻᒪ 9, 2018, ᑐᑦᑐᐃᑦ ᐃᖏᕋᓂᖅᑲᓗᐊᖅᑎᓐᓇᒋᑦ ᓄᕋᓕᐅᕐᓂᖅᑲᖅᑎᓪᓗᒋᑦ. ᑕᑯᔭᐅᔪᓂᑦ ᖃᐅᔨᓴᕐᕕᓕᒫᖑᔪᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᐅᖅᑐᑦ ᓱᑲᓐᓂᖅᑲᖅᑐᑎᑦ 160 ᑭᓚᒦᑕ/ᐃᑲᕐᕋᖅ, ᐊᑉᐸᓯᓐᓂᖅᑲᖅᑐᑎᑦ ᖃᓂᒋᔭᐸᓗᐊᓂ 120 ᒦᑕᐃᑦ, ᐊᒻᒪᑐᑦᑐᓕᒫᑦ ᐃᓗᐊᓃᑦᑐᑦᓇᓗᓇᐃᖅᑕᐅᓯᒪᔭᓃᖅᑐᒥ ᖃᐅᔨᓴᕐᕕᐅᔪᒥᑦ ᓯᕗᑐᓂᖅᑲᖅᑐᑦ 800 ᒦᑕᐃᑦ ᑎᑎᕋᖅᑕᐅᓚᐅᖅᑐᑦ.



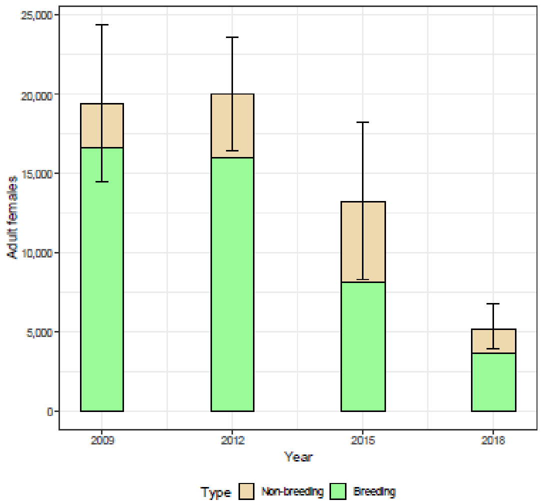
ᐊᔾᔨᙳᐊᖅ 2: ᑕᑯᔭᐅᔪᓂᑦ ᖃᐅᔨᓴᕐᓂᖅ ᖃᐅᔨᓴᕐᕕᐅᔪᒥᑦ ᖃᐅᔨᓴᕐᕕᐅᔪᓂᑦ ᑭᒡᓕᖅᑲᖅᑐᑎᑦ ᐊᒻᒪ ᖁᖕᒐᓯᕈᖅᑕᐅᓯᒪᔪᑦ ᑐᑦᑐᐃᑦ (ᐅᒡᓗᕆᐊᖅ). ᐊᖏᓂᖏᑦ ᐊᔾᔨᐴᐸᓗᐃᑦ ᑕᑯᔭᐅᔪᓄᑦ ᑕᑯᔅᓴᐅᑎᑕᐅᔪᑦ ᐊᔾᔨᐴᖏᑦᑐᑦ ᐊᖏᓂᖏᑦ ᐊᒻᒪᓗᑭᑖᑦ.

ᔫᓂᒥᑦ 8, 2018, ᖃᓄᐃᓕᖓᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᕐᓂᖅᑲᓚᐅᖅᑐᑦ ᖁᑖᓘᓕᒃᑯᑦ ᐱᓪᓗᑎ ᓇᓗᓇᐃᔭᖅᓯᒪᓂᖅᓴᓂᑦ ᒥᔅᓴᐅᓴᑦᑕᐅᔪᓂᑦ ᕿᑐᓐᖏᐅᖅᑐᓂ, ᐊᕐᓇᐃᑦ ᐊᒻᒪ ᐊᓯᖏᑦ ᐊᒻᒪ ᐊᕐᖀᒍᖏᑦ ᖃᓄᐃᑦᑐᓂᖏᑎᒍᑦ ᓄᕐᖃᓕᐅᕐᕕᐅᔪᒥᑦ.

ᖃᓄᐃᓕᖓᓂᐅᔪᓂᑦ

ᐅᓄᕐᓂᖏᓐᓂ ᓇᓚᐅᑦᑖᕆᔭᐅᓯᒪᓂᖏᑦ, 2018

ᒥᔅᓴᐅᓴᑦᑕᐅᓚᖅᑐᑦ ᕿᖕᒐᐅᑦ ᑐᑦᑐᖏᓐᓄ ᐊᒥᓲᓂᖏᑦ 2018-ᒥᑦ ᐅᓇᐅᓚᐅᖅᑐᖅ 8,207 ᐃᓐᓇᐃᑦ ᑐᑦᑐᐃᑦ (ᐊᔾᔨᙳᐊᖅ 3). ᐊᔾᔨᐴᓐᖑᐊᖅᑎᑕᐅᓂᖏᑦ ᐊᑯᓐᓂᖏᓐᓂ 2015 ᐊᒻᒪ 2018 ᒥᔅᓴᐅᑦᑕᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᔪᑦ ᐊᑦᑎᓪᓕᒋᐊᖅᓯᒪᔪᑦ 58.5% ᐊᑕᖏᖅᑐᒋᑦ ᑐᑦᑐᖏᓐᓂ ᐊᒥᓲᓂᖏᑦ, 61% ᐃᓐᓇᓂᑦ ᐊᕐᓇᓂᑦ ᐊᒻᒪ 55% ᑐᑦᑐᓕᐅᖅᑐᓂ ᐊᕐᓇᓂᑦ. ᑖᓐᓇ ᐊᑦᑎᓪᓕᒋᐊᕐᓂᖓ ᑭᓪᓕᓯᓂᐊᖅᑕᐅᓯᒪᔪᓂᑦ ᐊᖏᔪᖅ ᐊᒻᒪ ᐱᔾᔪᑕᐅᔪᓐᓇᖏᑦᑐᖅ ᖃᐅᔨᓴᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᓂᑦ.



ᐊᔾᔨᙳᐊᖅ 3: ᒥᓴᐅᓴᑦᑕᐅᔪᑦᕿᖕᒐᐅᑦ ᑐᑦᑐᙵᑦ (ᐃᓐᓇᐃᑦ ᑐᑦᑐᐃᑦ) ᐊᑐᖅᑐᑎ ᐃᓚᖕᒋᓐᓄ ᐊᕐᓇᓄᑦ ᐊᑐᖅᑕᐅᔪᓂᑦ ᐅᑯᓇᓂ 2009-2018.

ᐅᓄᕐᓂᐅᔪᑦ ᓇᑐᓇᐃᖅᑕᐅᓯᒪᔪᓄᑦ ᑲᑎᙵᓂᐅᔪᓄᑦ ᓇᑐᓇᐃᒃᑯᑕᐅᔪᑦ

ᑭᓪᓕᓯᓂᐊᖅᑕᐅᓯᒪᔪᑦ ᐊᕕᑦᑐᖅᓯᒪᔪᒧᑦ ᖃᐅᔨᓴᐃᓂᕐᒥᑦ ᕿᖕᒐᐅᒻᒥᑦ ᓇᑐᓇᐃᖅᓯᔪᑦ ᐊᑦᑎᑦᑐᓂᑦ ᓄᕋᓕᐅᖃᑦᑕᖅᑐᑦ 2011-2018 ᐊᑯᓐᓂᖕᒋᓐᓂ ᓄᕋᓕᐅᕐᓂᖃᓪᓗᐊᑕᖅᑐᑎᑦ 0.25. ᑐᑦᑐᐃᑦ ᐊᕐᓇᐃᑦ ᐆᒪᓂᕆᕗᑦᑕᖕᒋᑦ ᖁᕗᕚᓯᓐᓂᖕᒐ ᐅᓇᐅᓚᐅᖅᑐᖅ 0.82 (CI = 0.69-0.92), ᑐᑦᑐᐃᑦ ᐊᕐᓇᐃᑦ ᐆᒪᓂᕆᕗᑦᑕᖕᒋᑦ ᖁᕗᕚᓯᓐᓂᖕᒋᑦ 0.88 ᐃᓱᒪᒋᔭᐅᔪᖅ ᐱᑕᖃᕆᐊᖃᖅᑐᓂ ᐊᒥᓲᓂᖕᒋᓐᓄᑦ ᒪᑭᒪᑎᑦᑎᐊᕐᓗᒋᑦ.

2018-ᒥᑦ, ᑐᑭᓯᒋᐊᕈᑏᑦᓇᑐᓇᐃᖅᑕᐅᒋᐊᓕᐅᒐᓗᐊᑦ ᐅᖅᐲᕆᔭᐅᑦᑎᐊᕐᓗᑎ, ᑲᑎᖖᒐᓂᕆᖃᑦᑕᖅᑕᖕᒋᑦ ᕿᖕᒐᐅᑦ ᑐᑦᑐᖕᒋᑦ ᓇᑐᓇᐃᖅᓯᔪᑦ 27% ᐊᕐᓇᓂᑦ ᓅᓯᒪᔪᑦ ᐊᒻᒪ ᐃᓚᒋᔭᐅᓕᖅᑐᑎᑦ ᖃᒪᓂᑦᑐᐊᑉ ᑐᑦᑐᖕᒋᓐᓄ, ᐅᑯᐊᓕ 73% ᓄᕋᓕᐅᖅᓯᒪᔪᑦ ᕿᖕᒐᐅᑦ ᓄᕋᓕᐅᕕᐊᓂ. ᑭᓪᓕᓯᓂᐊᖅᑕᐅᓯᒪᔪᑦ ᓇᑐᓇᐃᕈᑎᖕᒋᑦ ᑕᑯᓴᐅᑎᑦᑎᔪᑦ ᖁᕗᕙᐸᓪᓕᐊᓂᖅᑲᖕᒋᑦᑐᑦ ᕿᖕᒐᐅᑦ ᑐᑦᑐᖕᒋᑦ ᑭᖑᓪᓕᖅᐸᒥᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᔪᒥᑦ, ᓇᑐᓇᐃᖅᓯᔪᑦ ᐊᒥᓲᓂᖕᒋᑦ ᑲᔪᓯᕙᓪᓕᐊᔪᑦ ᐊᒥᓯᓂᑦ ᖃᑦᑎᖕᓇᕈᓇᐊᖅᑐᑎᑦ.

ᐅᖃᓪᓚᑲᑕᓐᓂᖅ

ᐊᑕᖕᒋᖅᑐᒋᑦ ᖃᑦᑏᓐᓇᕈᓇᐊᕐᓂᖕᒋᑦ ᐊᒥᓲᓂᓇᓯᒪᔾᖕᒋᓐᓂ 1986 ᐅᑯᐊ 470,000 ᓱᓕᔪᖅ 98%-ᒥᑦ. ᑖᓐᓇ ᖁᕗᕚᓯᓐᓂᖕᒐ ᖃᑦᑏᓐᓇᕈᓇᐊᕐᓂᖕᒋᑦ ᑐᖏᖕᒐᑎᑕᐅᔾᓇᖕᒋᑦᑐᑦ ᖃᐅᔨᓴᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᔪᓂᑦ ᐊᒻᒪ ᑭᒐᖅᑐᐃᔪᑦ ᐊᖕᒋᔪᒥᑦ ᐊᒻᒪ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᖕᒋᓐᓇᖅᑐᑦ ᑐᑦᑐᐃᑦ ᐊᒥᓲᓂᖕᒋᑦ. ᑐᑦᑐᐃᑦ ᐊᕕᑦᑐᖅᓯᒪᓂᖕᒐᓃᑦᑐᑦ ᓇᑐᓇᐃᖅᓯᔪᑦ ᓄᕋᐃᑦ ᐆᒪᖃᑦᑕᖕᒋᓗᐊᕐᓂᖕᒋᑦ ᐱᐅᓯᒋᐊᖅᓯᒪᔪᑦ, ᑭᓯᐊᓂ ᓱᓕ ᐊᑦᑎᑦᑐᑦ ᐊᐃᓐᓇᐃᑦ ᐊᕐᓇᐃᑦ ᐆᒪᖃᑦᑕᕐᓂᖕᒋᑦ. ᐊᑦᑕᓇᕈᑎᖃᕈᓇᕐᓂᖕᒐ ᐊᕐᓇᐃᑦ ᐆᒪᔪᓐᓃᖃᑦᑕᕐᓂᖕᒋᓐᓄᑦ ᐊᑦᑎᒐᔪᑦᑐᖅ ᓄᕋᓕᐅᖅᑎᓪᓗᒋᑦ, ᑭᓯᐊᓂ ᖃᐅᔾᔭᐅᓯᒪᔪᑦ ᐊᐅᔭᒃᑯᑦ ᐆᒪᔾᓃᐸᑦᑐᑦ ᖁᖕᒐᓯᕈᖅᓯᒪᔪᑦ ᐊᕐᓇᐃᑦ ᑐᑦᑐᐃᑦ ᐊᒻᒪ ᐊᐅᔭᒃᑯᑦ ᓄᕋᓕᐅᑦᑎᐊᑎᓐᓇᒋᑦ ᓂᕆᔭᐅᖃᑦᑕᓕᕈᓐᓇᖅᑐᑦ ᐊᐅᔭᒃᑯᑦ ᐱᔾᔪᑎᒋᔭᐅᓗᑎ ᖃᓄᐃᑦᑎᑦᑎᓂᖕᒋᓐᓄᑦ ᐊᑦᑐᐃᓂᖅᖃᖅᑐᑦ ᐊᒥᓲᓂᖕᒋᓐᓄᑦ.

ᐃᓚᖕᒋᑦ 2018 ᕿᖕᒐᐅᑦ ᖁᖕᒐᓯᕈᖅᓯᒪᔪᑦ ᐊᕐᓇᐃᑦ ᓃᓚᐅᖅᑐᑦ ᐱᖕᒐᓐᓇᒧᑦ ᐊHᐃᐊᕐᒧᑦ (Queen Maud Gulf) ᓄᕋᓕᐅᕕᒻᒧᑦ (27%). ᕿᖕᒐᐅᑦ ᑐᑦᑐᖕᒋᑦ ᑎᑭᑦᑎᓯᒪᑐᐃᓐᓇᓇᐊᓖᑦ ᐱᑕᕐᑲᕐᓂᖕᒋᓐᓄᑦ ᐊᕐᓇᐅᔪᑦ ᒪᓕᑦᑕᐅᓪᓗᑎ ᖃᒪᓂᑦᑐᐊᑉ ᑐᑦᑐᖕᒋᓐᓄᑦ, ᑲᑎᖕᒐᖅᑲᑎᒌᓚᐅᖅᑐᑎᑦ ᐅᑭᐊᓪᓕᕕᖕᒋᓐᓂ ᐱᒋᐊᖅᑐᓂ ᓅᕕᐱᓇ ᑎᑭᑐᒍ ᑎᓯᐱᓇ ᐱᓇᓱᐊᕐᓂᓴᐅᓪᓗᑎ ᓄᕋᓕᐅᓂᕐᒧᑦ ᐊᒥᓲᓂᖅᓴᓂᑦ ᐊᕐᓇᓂᑦ ᓄᕋᓕᐅᕕᖕᒋᓐᓂ ᐊᑦᑎᓪᓕᒋᐊᕐᓗᒋᑦ ᓂᕆᔭᐅᖅᑲᑦᑕᕐᓂᖕᒋᓐᓄᑦ ᐊᑦᑕᓇᕈᑎᐅᔾᓇᖅᑐᑦ.

ᑭᐅᔾᔪᑎᒋᓗᒍ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᖕᒋᓐᓇᕐᓂᖕᒋᓐᓄᑦ, ᖁᕗᕚᓇᐊᓇᐊᓖᑦ ᖃᐅᔨᓴᖅᑲᑦᑕᕐᓂᖅ ᐊᒻᒪ ᖃᐅᔨᓴᕐᓂᖅ ᖃᐅᔨᒐᓱᐊᕐᓗᑎ ᑭᓱᒍᐃᓐᓇᕐᓂᑦ ᐊᓯᔾᔨᒐᓐᓂᖅᑐᓂᑦ ᑐᑦᑐᖕᒋᓐᓂᑦ

ᑲᑐᑎᓗᒍ ᓄᓇᕗᑦ ᐱᕈᖅᐸᓪᓕᐊᑎᓪᓗᒍ
Building Nunavut Together
Nunavuliuqatigiingniq
Bâtir le Nunavut ensemble

ᐊᕙᑎᓕᕆᔨᒃᑯᑦ
Department of Environment
Avatiliqiyikkut
Ministère de l’Environnement

ᐊᓯᔾᔨᖅᑲᑦᑕᖅᓂᖏᓐᓄᑦ ᐊᒻᒪ ᖃᓄᐃᓕᖓᓂᖏᓐᓄᑦ. ᓈᒻᒪᑦᑐᓂᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᕈᑏᑦ ᐊᑐᖅᓕᖅᑎᑕᐅᔭᕆᐊᓖᑦ ᐱᖅᑯᓯᐅᔾᔨᓗᑎ ᖃᑦᑏᓇᕈᖅᐸᓪᓕᐊᓂᖏᑦ ᕿᖕᒐᐅᑦ ᑐᑦᑐᖏᑦ.

ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖃᓇᐊᖅᑐᕐᕕᐅᓯᒪᓂᖏᑦᑕ ᐅᓂᒃᑳᓕᐊᖅ ᕚᑑᔅ ᑐᑦᑐᖏᑦᑕ ᐊᐅᓚᑕᐅᒍᑎᖏᓐᓄᑦ ᐱᖁᔨᕗᖕᒑᕈᑏᑦ

ᐅᑎᐱᓇ 2019

ᐱᓕᕆᕕᖕᒐᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ, ᒐᕙᒪᒃᑯᖏᑦ ᓄᓇᕗᑦ, ᖁᓗᖅᑐᖅ, ᓄᓇᕗᑦ

ᐊᖕᒋᔪᖅᑲᐅᑎᓄᑦ ᓇᐃᓪᓕᒋᐊᖅᓯᒪᔪᖅ

ᒐᕙᒪᒃᑯᖏᑦ ᓄᓇᕗᑦ, ᐱᓕᕆᕖᖓᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑭᒡᒐᖅᑐᐃᔨᖏᑦ ᐅᖃᐊᖅᑐᖅᓯᒪᓂᖃᓚᐅᖅᑐᑦ ᐅᑐᐱᕆ 2019-ᒥ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔩᖏᓐᓄᑦ ᖁᕐᓗᖅᑐᕐᒥ, ᐃᖃᓗᒃᑑᒃᑎᐊᕐᒥ, ᐅᒥᖕᒪᒃᑑᕐᒥ, ᕿᖕᒐᐅᕐᒥ, ᐊᒻᒪᓗ ᐊᐅᓚᓯᖃᑕᐅᔪᓄᑦ, ᓄᓇᕗᑦ ᑐᙵᕕᒃᑯᑦ. ᐱᔾᔪᑎᐅᓗᐊᓚᐅᖅᑐᖅ ᐅᖃᐊᖅᑐᖅᓯᒪᓂᕐᒧᑦ ᓇᓗᓇᐃᖅᑕᐅᓪᓗᑎᑦ ᑭᓪᓕᓯᓂᐊᕈᑎᕕᓃᑦ ᖃᑦᓯᐅᓂᖏᓐᓂ 2018-ᒥ ᕙᓃᒃ ᑐᑦᑐᖏᑦᑕ ᖁᑐᕐᖏᐅᕐᕕᖏᓐᓂ ᐊᑦᔨᓕᐅᕆᓂᒃᑯᑦ ᖃᐅᔨᓴᖅᓯᐅᑎᓂᒃ ᐅᖃᐊᖅᑐᖅᓯᒪᓪᓗᑎᓪᓗ ᐱᖁᔨᕗᖕᒫᕈᑕᐅᓯᒪᔪᓂᒃ ᐊᐅᓚᓯᔾᔪᑎᑦᓴᓂᒃ, ᑲᑎᓪᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᔪᓐᓇᖅᑐᓂᒃ. ᐅᖃᐊᖅᑐᖅᓯᒪᓂᖅᑲᖅᑎᓪᓗᒋᑦ, ᐅᖃᐅᓯᑦᓴᖅᑐᖅᑲᓚᐅᖅᑐᖅ ᐊᐅᓚᑕᐅᓂᕐᒧᑦ ᐱᖁᔨᕗᖕᒫᕈᑎᐅᔪᓂᑦ.

ᑖᒃᑯᐊ ᕚᓃᒃ ᑐᑦᑐᖏᑦ ᒫᓐᓇᒃᑯᑦ ᐊᑐᖅᑕᐅᕙᑦᑐᑦ ᐊᓐᓇᐅᒪᒍᑕᐅᓪᓗᑎᑦ ᑮᓇᐅᔭᓕᐅᕋᓯᐊᕈᑕᐅᓪᓗᑎᓪᓗ, ᑖᒃᑯᐊᓗ ᑐᑦᑐᖏᑦ ᐃᓄᐃᓴᓪᓕᕙᓪᓕᐊᔪᑦ ᖃᑦᓯᐅᓂᖏᑦ ᐃᓱᒪᒋᓗᒍᑎᐅᓪᓗᑎᑦ ᓂᕿᑭᑦᓴᓂᕐᒧᑦ. ᖃᓄᑎᒋ ᐃᓄᐃᓴᓪᓕᕙᓪᓕᐊᓂᖏᑦ ᐃᓱᒪᓗᓐᓇᖅᑐᑦ. ᐊᕙᑎᓕᕆᔩᒃᑯᑦ ᐊᑐᓕᖅᑎᑦᓯᓚᐅᖅᑐᑦ ᑲᑎᓪᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᔪᓐᓇᖅᑐᓂᒃ 30-ᓂᒃ, ᐊᖑᔭᓪᓗᐃᓐᓇᕐᓂᑦ ᕿᖕᒐᐅᕐᒥ 2017-ᒥ ᑖᓐᓇᓗ ᑲᑎᓪᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᔪᓐᓇᖅᑐᐃᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᒋᐊᖃᖅᑐᖅ ᒪᓕᒡᓗᒋᑦ ᓄᑖᑦ 2018-ᒥ ᒥᑦᓴᐅᔫᑉᐲᑦ. ᑖᓐᓇ ᐅᓂᒃᑳᓕᐊᖅ ᓇᐃᓪᓕᒋᐊᖅᓯᒐᓯᐊᖅᑐᖅ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᓂᒃ ᐊᐅᓚᓯᖃᑎᒌᑦᑐᓄᑦ ᑕᐃᑲᓂ ᑲᑎᒪᓂᐅᔪᒥ.

ᐃᓗᓕᖏᓐᓂᒃ ᑐᑭᓯᒋᐊᖅᑎᑦᓯᒍᑎ

ᑖᓐᓇ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᖅ ᑭᒡᒐᖅᑐᐃᔪᖅ ᐱᓕᕆᕕᖕᒐᑕ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐊᑕᖏᕋᓱᐊᖅᑐᓂᒃ ᑐᑭᓯᒋᐊᕈᑎᓂᒃ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᓂᒃ ᐅᖃᓇᐊᖅᑐᕝᕕᐅᓯᒪᑎᓪᓗᒋᑦ ᑲᑎᒪᓂᒃᑯᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ.

ᑕᒪᒃᑯᐊ ᐅᖃᐅᓯᐅᓯᒪᔪᑦ ᑕᕝᕙᓂ ᑭᒡᒐᖅᑐᐃᑦᓴᐃᓐᓇᙱᑦᑐᑦ ᐃᓱᒪᒋᔭᖏᓐᓂ ᐱᓕᕆᕕᖕᒐᑕ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ, ᓄᓇᕗᑦ ᐅᕙᓗᓐᓂᑦ ᒐᕙᒪᒃᑯᖏᑦᑕ ᓄᓇᕗᑦ.

ᓇᓗᓇᐃᖅᓯᒍᑎ ᐃᓗᓕᖓᓂᒃ

1.0 ᐅᓂᒃᑳᓕᐊᑉ ᐱᔾᔪᑎᖓ ᐋᕿᑦᓯᒪᓂᖓᓗ

ᑖᓐᓇ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᖅ ᑲᑎᖅᓱᐃᒐᓱᐊᖅᓯᒪᔪᖅ ᓇᐃᓴᓕᒋᐊᖅᓯᒪᔪᓂᒃ ᐅᖃᐅᓯᐅᓯᒪᔪᓂᒃ, ᐊᐱᖅᑯᑎᐅᓯᒪᔪᓂᒃ, ᐃᓱᒪᒧᑎᐅᓯᒪᔪᓂᒃ, ᐊᒻᒪᓗ ᖃᓄᖅᑑᕆᐊᕈᑕᐅᓯᒪᔪᓂ ᑲᑎᒪᓂᖃᖅᑎᓪᓗᒋᑦ ᐊᐅᓚᑦᓯᔨᐅᖃᑕᐅᔪᑦ ᐱᖁᔨᕙᖕᖏᖅᓂᒃᑯᑦ ᐊᑐᓕᖁᔭᐅᓯᒪᔪᓂ ᕿᓵᔅ ᑐᑦᑐᖕᒋᓐᓄᑦ . ᑖᒃᑯᐊ ᓇᐃᓪᓕᑎᖅᑕᐅᓯᒪᔪᑦ ᐊᒻᒪᓗ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᑦ ᑕᕝᕙᓂ ᑭᓯᐊᓂ ᑲᑎᒪᓂᐅᔪᓂ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᓂ.

2.1 ᐱᔾᔪᑎᖓᑦ ᐅᖃᕐᐊᕿᐅᓯᒪᓂᖏᑕ

ᐅᓪᓗᖓᓂ ᐅᑐᐱᕆ 7, 2019 ᑲᑎᒪᓂᖃᓚᐅᖅᑐᑦ ᐱᔾᔪᑎᖃᓗᐊᖅᓱᑎᑦ ᐅᖃᕐᐊᖅᑐᖅᓯᒪᓪᓗᑎᑦ ᐱᖁᔭᕗᖕᒋᕈᑎᐅᔪᓂᒃ ᐊᐅᓚᑦᓯᒍᑎᑦᓴᓄᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᓗᑎᑦ ᒫᓐᓇᒃᑯᑦ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᔾᔮᓐᓇᖅᑐᑦ. ᑖᓐᓇ ᑲᑎᒪᓂᐅᔪᖅ ᐱᕙᑦᓴᖃᖅᑎᑦᓯᓚᐅᖅᑐᖅ ᑎᑎᖅᑕᐅᓗᑎᑦ ᐃᓱᒫᓗᑎᐅᔪᑦ, ᐅᖃᐅᓯᑦᓴᐅᔪᑦ ᐊᐅᓚᑦᓯᖃᑎᖠᑦᑐᓄᑦ ᐊᑐᕈᒪᓯᒪᔭᖏᑦ ᐊᑐᓕᖅᑎᒍᓐᓇᑐᐃᓐᓇᕈᓐᓇᖁᔪᓗᒋᑦ. ᖁᕐᓗᖅᑐᕐᒥ, ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ, ᐅᒥᖓᒫᑦᑑᕐᒥ, ᐊᒻᒪᓗ ᕿᖓᐅᒥ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᖃᐅᔨᒃᑲᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᕙᑎᓕᓇᔨᒃᑯᑦ ᐱᖁᔨᕗᖕᒋᕈᑎᖏᓐᓂᒃ ᑭᒻᒐᖅᑐᐃᔨᐅᒻᒪᑕ ᐊᓯᕙᖅᑎᐅᓂᒃᑯᑦ ᓄᓇᓕᒻᒥᓂ ᐊᑖᓂ ᓄᓇᕗᑦ ᐊᖏᕈᑎᖓᑦᑕ.

2.2 ᖃᓄᐃᓕᖓᓂᖏᑦ ᑲᑎᒪᓂᐅᔪᑦ

ᐅᖃᕐᐊᖅᑐᖅᓯᒪᓂᕐᒧᑦ ᑲᑎᒪᓂᖅ ᐅᓪᓗᓕᒫᖅ ᐊᐅᓚᓂᖃᓚᐅᖅᑐᖅ. ᑐᑭᓯᒋᐊᕈᑏᑦ ᓲᕐᓗ ᖃᓄᐃᓐᓂᖏᑦ ᑐᑦᑐᐃᑦ, ᐱᖁᓯᕗᖕᒋᕈᑎᐅᓯᒪᔪᖅ ᐊᕙᑎᓕᕆᔾᔪᓐᓄᑦ, ᐊᓯᖏᓪᓗ ᐊᐅᓚᑦᓯᖃᑕᐅᔪᑦ ᐱᖁᔭᕗᖕᒋᕈᑎᖏᑦ ᐅᓂᒃᑲᖑᓚᐅᖅᑐᑦ. ᓄᓇᕗᒥ ᐊᐅᓚᑦᓯᖃᑎᒌᑦᑐᑦ ᐃᓱᒪᒋᔭᖏᑦ ᑎᑎᖅᑕᐅᓚᐅᖅᑐᑦ. ᑖᓐᓇ ᑲᑎᒪᓂᐅᔪᖅ ᐊᐅᓚᑕᐅᓚᐅᖅᑐᖅ ᓯᕗᓕᖅᑕᐅᓪᓗᓂᓗ ᐊᕙᑎᓕᕆᔾᔪᓐᓄᑦ. ᐅᓂᒃᑳᕐᓂᕆᔭᖏᑦ ᐋᖅᑭᑦᓱᖅᓯᒪᓂᖃᓗᐊᓚᐅᙱᑦᑐᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᖃᑎᒌᑦᑐᑦ ᑐᙵᓱᑦᑎᑕᐅᓚᐅᖅᑐᑦ ᐊᐱᖅᓱᕈᓐᓇᖅᑎᑕᐅᓗᑎᑦ, ᐃᓱᒫᓗᑎᒥᓐᓂ ᐅᖃᐅᓯᖃᕈᓐᓇᕐᓗᑎᑦ, ᖃᓄᖅᑑᕆᐊᕈᑎᒥᓂᓗ ᑐᓂᓯᒍᓐᓇᖅᑎᑕᐅᓗᑎᑦ ᐱᖁᔭᕗᖕᒋᕈᑎᓅᖓᔪᓂᒃ. ᐅᖃᖃᑎᒌᓐᓂᖅ ᒪᑐᐃᖓᓚᐅᖅᑐᖅ.

3.0 ᑮᒃᑯᓕᒫᖅᓯᐅᑎ ᐊᒻᒪᓗ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖃᕐᐊᕿᐅᓯᒪᓂᖓᑕ ᓇᐃᓴᓕᒋᐊᖅᓯᒪᔪᖅ

ᐱᔾᔪᑎᖓ ᑕᒪᑐᒪ ᐅᖃᕐᐊᖅᑐᖅᓯᒪᓂᐅᑉ ᓇᓗᓇᐃᖅᑕᐅᑦᓯᐊᓚᐅᖅᑐᖅ ᐊᒻᒪᓗ ᐱᒪᕆᐅᔪᑦ ᑐᑭᓯᒋᐊᕈᑎᑦᓴᐃᑦ ᑐᓂᔭᐅᓪᓗᑎᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᓯᕗᓂᑐᖃᖓᒍᑦ ᐅᖃᕐᐊᖅᑐᖅᓯᒪᓂᐅᑉ, ᐱᕆᐊᓕᖅᑎᓪᓗᒋᓪᓗ ᑲᑎᒪᓂᐅᔪᖅ. ᐊᒥᓱᓚᐅᖅᑐᑦ ᐊᐱᖅᑯᑎᐅᔪᑦ, ᐃᓱᒫᓘᑎᐅᔪᑦ, ᐊᒻᒪᓗ ᖃᓄᖅᑑᕐᓂᒃᑯᑦ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ. ᑖᒃᑯᐊ ᕿᓵᔅ ᑐᑦᑐᖏᑦ ᐋᓇᐅᒪᑎᑦᓯᒍᓐᓇᑉᑐᑦ ᒪᕿᓗᐊᓂᒃ ᐃᓚᒌᑦᑐᓂᒃ ᑕᓯᖓᓐᓂ ᑳᓐᑐᐃᑐ (ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ) ᓂᕿᖃᖅᑎᑦᓯᕚᒃᑭᓪᓗᑎᑦ 400 ᑳᓂᕐᓂᒃ ᐃᓄᓐᓂᒃ, ᓱᐃᓛᕿᓂᒃᑯᓪᓗ ᑐᑦᑐᒐᓱᐊᖅᑎᑦᓯᔨᖃᓪᓗᓂ ᓂᕕᖓᑖᓂᒃ ᐊᑐᖅᐸᑦᑐᒥᒃ ᕿᖓᐅᑦᑕ ᐱᓯᒪᔪᓂᑦ ᐊᒻᒪᓗ ᐅᒥᖓᒫᑐᖅ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓂᒃ. ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖃᐅᓯᖃᓚᐅᖅᑐᑦ ᐃᓱᒫᓗᑎᒥᓂᒃ ᑮᓇᐅᔾᔭᓕᐅᕋᓱᐊᕐᓂᒃᑯᑦ ᐱᔾᔪᑕᐅᔪᓂ ᐃᓚᒌᑦᑐᓄᑦ ᑕᓯᖓᓂ ᑳᓐᑐᐃᑐ. ᕿᖓᐅᑦ ᐊᒻᒪᓗ ᐅᒥᖓᒫᑦᑐᖅ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᖏᑦ ᐃᓱᒫᓗᑎᖃᓚᐅᖅᑐᑦ ᐃᖅᑲᓇᐃᔮᓂᒃ ᑐᑦᑐᒐᓱᐊᖅᑎᑦᓯᕙᑦᑐᓂ ᓱᐃᓛᕿᓂᒃᑯᑦ. ᒪᑯᐊ ᒪᓕᑦᑐᑦ ᓇᐃᓴᓕᒋᐊᖅᓯᒪᔪᑦ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᑦ ᑲᑎᒪᓂᐅᔪᒥ.

4.0. ᐅᖃᕐᐊᑐᖅᓯᒪᓂᖅ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᔾᔮᓐᓇᖅᑐᓂ ᐱᖁᔭᕗᖕᒑᖅᑕᐅᔪᖅ - ᐅᑐᐱᕆ 7, 2019

<u>ᐱᓇᐃᓗᑕᐅᔪᑦ:</u> ᓄᑖᙳᕆᐊᕆᐊᓖᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᖁᔭᕗᖕᒑᖅᑕᐅᓯᒪᔪᑦ (ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᔾᔮᓐᓇᖅᑐᓂ)

ᐱᓯᒪᔪᓂ 2018-ᒥ ᕋᑐᓴ ᕿᑐᕐᕌᕆᐅᕿᕕᖏᑦᑕ ᐊᔾᔨᓕᐅᕐᓂᒃᑯᑦ ᓈᓴᐃᒍᑕᐅᓯᒪᔪᓂᒃ.

ᐱᔾᔪᑎᖓᑦ ᐅᖃᓇᐊᖅᑐᖅᓯᒪᓃᑦ:

ᐅᖃᓇᐊᖅᑐᖅᓯᒪᓂᖅ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᖅ ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ ᐅᓪᓗᖓᓂ ᐅᑐᐱᕆ 7, 2019. ᐱᔾᔪᑎᒋᓗᐊᓚᐅᖅᑕᖓ ᑲᑎᒪᓂᐅᔫᑉ ᐅᖃᖃᑎᖃᕐᓂᖅ ᐊᐅᓚᑦᓯᖃᑎᒌᑦᑐᓂ ᑲᔪᓰᓐᓇᖅᑐᒥ ᕋᑐᓴ ᑐᑦᑐᖏᑦᑕ ᒥᑦᓵᓄᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᕐᑯᔨᕗᖓᕈᑎᓂᒃ. ᑲᑎᒪᓂᐅᔪᖅ ᐱᕕᑦᓴᖃᖅᑎᑦᓯᓚᐅᖅᑐᖅ ᑐᓴᕆᐊᖅᑐᖅᓯᒪᔪᓂᒃ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᕐᑯᔨᕗᖔᕐᒪᑕ ᐃᓄᐃᓴᓐᓂᖅᓴᓂᒃ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᓂ 0 ᒪᓕᑉᓗᒋᑦ ᐊᑐᐃᓐᓇᐅᔪᑦ ᓄᑖᖑᔪᑦ ᖃᐅᔨᓴᕈᑎᒥᓃᑦ.

ᐅᓪᓗᖅ: ᐅᑐᐱᕆ 7, 2019

ᑭᒡᖓᖅᑐᐃᔪᑦ:

ᒐᕙᒪᒃᑯᖏᑦ ᓄᓇᕗᑦ - ᐊᕙᑎᓕᕆᔨᒃᑯᑦ: ᑮᑦ ᐃᖓᓚᓐ, ᑏᓴ-ᒪᕇ ᓕᑭᓕᐅᕐ, ᑭᐊᕙᓐ ᒪᑎᐅᓐ
ᓄᓇᕗᑦ ᑐᙵᕕᒃ: ᑕᐃᕕᑎ ᑏ, ᓯᐅᕈ ᕈᐋ
ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ: ᑲᐃᕈᑉ ᖏᑦᓯ
ᖁᕐᓗᖅᑐᖅ ᐊᖑᓇᐃᑎᑦ ᑲᑐᔾᔨᖃᑎᒌᑦ: ᐋᓖᓐᑕ ᕉᔅ ᑕᒪᓐ, ᕚᕕ ᐊᓇᕕᓗᒃ
ᐃᖃᓗᒃᑑᒃᑎᐊᖅ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ: ᑭᓕᐅᕌᓐᔅ ᑲᐃᔪᖓᓇ
ᕿᖓᐅᑦ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ: ᑳᓂ ᑯᐸᓚᒃ
ᐅᒥᖓᒃᑑᖅ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ: ᐲᑕ ᑯᐸᓚᒃ

ᓇᐃᓪᓕᒋᐊᖅᓯᒪᔪᖅ ᐅᖃᖃᑎᒌᓐᓂᐅᓚᐅᖅᑐᖅ:

ᑖᒃᑯᐊ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖃᐅᓯᖃᓚᐅᖅᑐᑦ ᒫᓐᓇᒃᑯᑦ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ 30-ᖑᑉᓗᑎᑦ ᐊᖑᓴᑉᓗᐃᓐᓇᐃᑦ ᐱᕕᑦᓴᖃᖅᑎᑦᓯᑐᐃᓐᓇᖃᖅᑕᕐᒪᑕ ᐊᑯᓐᓂᖓᓐᓂ ᑕᖅᑮᑦ ᐊᐅᒡᒍᓯ ᐊᒻᒪᓗ ᐅᑐᐱᕆ, ᓇᔾᔪᐃᔭᓕᖅᑎᑉᓗᒋᑦ ᓂᕿᖓᓗ ᐊᑦᑐᖅᑕᐅᖃᓯᐅᑎᕙᓐᓂᖓᓂ. ᓂᕿᖓᑦ ᐃᓘᓐᓇᑎᑦ 30 ᓂᕕᖓᑖᑎᒍᑦ ᑐᑦᑐᑦᑕᐅᕙᑦᑐᓂ ᐊᓐᓇᐅᒪᑦᓯᒍᑕᐅᕙᑦᑐᖅ ᖃᑕᙳᑎᒌᑦᑐᓂ ᑲᓐᑐᐃᑐ ᐊᒻᒪᓗ ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ. ᐃᓘᓐᓇᖏᑦ ᓂᕿᖏᑦ ᐱᔭᐅᕙᑦᑐᑦ ᓱᐃᑢᕿᓂᒃᑯᑦ ᑐᑦᑐᓂᐊᖅᑎᑦᓯᓂᒃᑯᑦ ᑐᓂᔭᐅᕙᑦᑐᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐆᒪᔪᕐᓂᐊᖅᑏᒃᑯᑦ, ᓂᕿᒋᔭᐅᕙᑦᑐᖅ ᐊᕐᕌᒍᓕᒫᖅ. ᕿᖓᐅᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᓇᓚᐅᑦᓵᖅᓯᒪᔪᑦ 10 ᐃᑉᓗᖃᖅᑐᐃᑦ, ᑲᑎᓕᒫᕐᓗᒋᑦ 400 ᐃᓄᐃᑦ ᐊᓐᓇᐅᒪᒍᑎᖃᖅᐸᒻᒪᑕ ᓂᕿᖓᓂᒃ (ᐃᓚᐅᑉᓗᑎᑦ ᐃᓚᖏᑦ ᖃᓂᙱᑦᑑᖓᓗᐊᑦ). ᐃᓘᓐᓇᖓ ᐊᑕᖏᖅᓱᒍ ᑐᑦᑐᓕᒫᖅ ᐱᒻᒪᕆᒋᔭᐅᔪᖅ ᐊᑦᑐᐊᓂᖃᕐᒪᑦ ᐃᓕᖅᑯᓯᑐᖃᖏᓐᓄᑦ. ᓱᐃᑢᕿᓂᒃᑯᑦ ᑐᑦᑐᓕᓱᐊᖅᑎᑦᓯᕙᑦᑐᐃᑦ ᑮᓇᐅᔭᓕᐅᕋᓱᐊᕈᑎᑐᐊᖃᑉᓗᑎᑦ ᐳᓚᕋᖅᑎᑦᓯᔨᓄᑦ, 8 ᐃᖅᑲᓇᐃᔭᖅᑎᑕᐅᕙᑦᑐᑦ ᑐᑦᑐᓕᓱᐊᖅᑎᑦᓯᑎᑉᓗᒋᑦ ᐊᑯᓐᓂᖓᓐᓂ ᐅᒥᖓᒃᑑᖅ ᐊᒻᒪᓗ ᕿᖓᐅᑦ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦᑕ. ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᒋᔭᖅᑐᑦ ᓈᓴᖅᑕᐅᒃᑲᓂᖃᐊᖃᕐᓂᖏᓐᓂ ᕋᑐᓴ ᓄᓇᖃᖅᑐᓂ. ᐃᓱᒪᒋᔭᐅᓚᐅᕐᒥᔪᖅ ᐅᒥᒻᒪᒥᓃᑦ ᑕᐅᖅᓯᐅᑎᒍᓐᓇᕆᐊᖏᑦ ᕗᕇᒃᓚᓐ ᐃᓚᒌᑦᑐᓂ ᑲᓐᑐᐃᑐᒥ.

ᐅᖃᐅᓯᐅᒪᓇᓚᐅᖅᑐᑦ ᓂᕐᔪᑏᑦ ᑐᑦᑐᒐᓱᐊᖅᑏᑦ ᐊᐅᓚᑕᐅᓂᖏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᖅᑕᐅᓂᖏᑦ. ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑕᑯᒍᒪᔪᑦ ᐊᒪᖅᑯᐃᑦ ᐅᔭᒥᑦᑕᐅᓗᑎᑦ. ᐅᖃᖅᑐᖃᖃᑦᑕᓚᐅᕐᒥᔪᖅ ᐊᑭᓕᐅᑎᐅᕙᑦᑐᖅ $300 ᐊᕙᑎᓕᕆᔨᒃᑯᓐᓂᒃ ᐊᒪᖅᑯᐃᑦ ᖃᐅᔨᓴᖅᑕᐅᒍᑎᑦᓴᖏᓐᓄᑦ ᓄᐊᑦᓯᓂᕐᒧᑦ ᐱᓕᕆᐊᑦᓴᖅ ᓈᒻᒪᙱᓗᐊᕆᐊᖓ; ᐊᖏᕐᓕᒋᐊᖅᑕᐅᖅᑳᕐᓗᑎᑦ ᐊᑭᓕᐅᑎᐅᕙᑦᑐᑦ ᐊᒪᖅᑯᓂᐊᕐᓂᕐᒧᑦ ᐊᓯᔾᔨᖅᑕᐅᓚᐅᖅᑎᓐᓇᒍ ᑲᑎᓕᒫᕐᓗᒋᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ. ᐅᖃᐅᓯᐅᑉᓚᕆᓚᐅᕐᒥᔪᖅ ᐊᒪᖅᑯᓂᒃ ᐱᓕᕆᐊᑦᓴᐅᔪᖅ ᓄᓇᑦᓯᐊᕗᒻᒥ - ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ ᐃᓚᐅᖃᑕᐅᒍᒪᔪᑦ ᑕᒪᑐᒧᖓ ᑖᕙᓂ ᐅᑭᐅᖑᓂᐊᖅᑐᖅ. ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᐃᓱᒪᒋᔭᖃᓚᐅᖅᑐᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦᑐᒍᑦ ᐊᒪᖅᑯᐃᑦ ᐊᒥᓱᙵᓗᐊᖅᑎᑕᐅᑦᑕᐃᓕᕙᓚᐅᕐᒪᑕ ᓯᑎᖏᓐᓂ ᐊᒪᖅᑯᐊᕋᐃᑦ ᑐᖁᑕᐅᕙᑦᓯᑎᑦ. ᐅᒥᖓᒃᑑᖅ ᐊᒻᒪᓗ ᕿᖓᐅᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖃᐅᓯᖃᓚᐅᖅᑐᑦ ᐊᒥᓱᙳᓇᐊᓇᓴᓯᐊᖅᓯᒪᓂᕐᒥᓂ ᐊᕐᕋᒍᓂᒃ 20-ᓂᒃ ᓂᕕᖓᑖᓂᒃ ᐊᒃᓱᒍᓐᓇᐅᑎᓂᒃ. ᑐᑦᓯᕋᖅᓯᒪᓪᒥᔪᑦ ᐱᒃᑲᓐᓂᕈᒪᓂᖅᓴᐅᑉᓗᑎᑦ ᕙᕗᓕ ᑐᑦᑐᖏᓐᓂᒃ

ᓱᐃᓛᕿᓂᒃᑯᑦ ᑐᑦᑐᓯᓱᐊᕈᑎᐅᕙᑦᑐᓂᒃ ᓂᕕᖓᑖᓂᒃ.

ᐃᓘᓐᓇᒍᑦ, ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔩᖏᑦ ᐃᓱᒪᒋᔭᖃᓚᐅᖅᑐᑦ ᐱᓯᒪᐃᓐᓇᕈᒪᓕᕐᓗᑎᑦ ᖁᓂᓂᒃ ᓂᕕᖓᑖᓂᒃ ᐃᑉᐱᒋᔭᖃᕋᒥᒃ ᖃᑕᙱᑎᕆᑦᑐᑦ ᑲᓐᑐᐃᑐᒥ ᐱᕆᐊᖃᕐᓂᖏᓐᓂ ᑕᒪᒃᑯᓂᖓ ᓂᕕᖓᑖᓂᒃ. ᐅᖃᖅᑐᖃᓚᐅᖅᑐᖅ ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖓᓐᓄᑦ ᐃᓄᐃᓴᕐᓂᕆᐊᕐᑯᔨᕐᓗᓂ ᑲᑎᓕᒫᕐᓗᕆᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᓂ, ᑭᓱᐊᓂᓂ 0 ᙵᕆᖒᕐᓗᓂ ᐃᓄᐃᓴᕐᓂᕆᐊᕐᓗᕆᑦ ᖁᓂᓂᒃ ᐃᓂᓐᓂᐊᑎᑦᓯᓂᖅᓴᐅᓗᑎᑦ ᓄᓇᒦᓐᓂᕐᒥ. ᕿᖓᐅᑉᒥ ᐅᒥᖓᒫᒃᑑᕐᒥᕐᓗ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᑐᑦᑐᐃᓐᓇᖃᑦᑕᓚᖓᓂᕐᒥᓐᓂ ᑲᑎᓕᒫᕐᓗᕆᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᐃᑦ 0-ᓗ 30-ᓗ ᖑᕙᓗᐊᖅᐸᑕ. ᐅᒥᖓᒫᒃᑑᖅ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔩᖏᑦ ᐅᖃᐅᓯᖃᓚᐅᖅᑐᑦ ᐱᓯᒪᐃᓐᓇᕈᒪᓕᕐᓗᑎᑦ ᓂᕕᖓᑖᕐᓂᒃ 30-ᓂᒃ ᑖᒃᑯᐊᓗ ᓂᕐᔪᑏᑦ ᑐᑦᑐᓯᓱᐊᖅᐸᑦᑐᑦ ᓱᕗᕐᓂᐅᔾᔭᐅᖒᕐᓗᑎᑦ. ᐃᓘᓐᓇᒍᑦ, ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔩᖏᑦ ᐅᖃᐅᓯᖃᓚᐅᖅᑐᑦ ᐃᓱᒪᒋᔭᖃᕆᐊᖅ 30 ᓂᕕᖓᑖᑦ ᐊᑐᖅᑕᐅᒍᓐᓇᕆᐊᖓ ᐃᓂᖅᑯᓯᑐᖃᖅ ᒪᓂᓪᓗᒍ ᐊᒻᒪᓗ ᒥᑦᓯᖃᙱᓐᓂᕋᐃᓪᓗᑎᑦ ᐱᖁᔭᓐᖑᖅᑕᐅᔪᒥᒃ 0 ᐱᔭᐅᕆᐊᖃᙱᓪᓗᑎᑦ.

ᐃᓚᖏᑦ ᐅᖃᐅᓯᐅᓚᐅᖅᑐᑦ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᓯᓚᐅᑉ ᐊᓯᔾᔨᐸᓪᓕᐊᓂᖓ ᐊᒻᒪᓗ ᓂᕐᔪᑏᑦ ᑐᑦᑐᓯᓱᐊᖅᐸᑦᑐᐃᑦ ᐊᑦᑕᓇᖅᑐᒦᑦᑎᓯᒍᓐᓇᕐᒪᑕ ᑖᒃᑯᓂᖓ ᑐᑦᑐᓂᒃ. ᐃᓄᐃᑦ ᐅᖃᖃᑦᑕᖅᓯᒪᔪᑦ ᑕᑯᖃᑦᑕᓂᖅᓴᐅᓂᕋᖅᓱᑎᑦ ᐊᒃᓱᓂᒃ ᐊᑎᖅᑕᓛᖃᖅᑐᓂᒃ ᐱᖓᓱᓂᒃ. ᖁᕐᓗᖅᑐᕐᒥ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᒋᔭᖃᓚᐅᖅᑐᑦ ᖃᓄᕐᓕ ᖃᐅᔨᒪᕙᔪᕐᒪᖒᑦᑕ ᖃᓄᐃᓕᕐᒪᖒᑕ ᑐᑦᑐᐃ ᖃᐅᔨᓴᕋᑦᓴᖃᙱᒃᑯᓂᒃ ᑕᖏᒥᒃ ᑐᑦᑐᑦᑕᐅᔪᓂ. ᑲᑎᓕᒫᕐᓗᕆᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ 0 ᖑᐸᑕ ᐱᔭᐅᕙᓯᐊᖅᑕᐅᓂᖅᓴᐅᓂᐊᖅᑐᑦ ᑖᕕᓐ ᔫᓂᐊᓐ ᑐᑦᑐᖏᑦ. ᐃᑉᐱᓐᓂᐊᕆᔭᖅᑐᓪᓗ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᐱᔪᑦᓭᑎᑕᐅᕆᐊᖏᑦ, ᑭᓱᐊᓂᑦᑕᐅᖅ ᓴᕙᒪᒃᑯᑦ ᐊᐅᓚᑦᓯᒍᓐᓇᕆᐊᖏᓐᓂᒃ ᐊᖅᑯᓯᐅᕋᓱᐊᖅᑐᓂᒃ ᐱᕙᓪᓕᐊᔪᓂᓪᓗ. ᐃᓱᒫᓘᑎᕆᔭᖏᑦ ᑭᐅᔭᐅᖅᑳᕐᑯᔭᖏᑦ ᐊᖅᓵᖅᑕᐅᓚᐅᖅᑎᓐᓇᕆᑦ ᐊᓯᕙᖅᑏᑦ.

<u>ᐱᖁᔭᓐᖑᕈᑎ ᑐᓂᔭᐅᔪᖅ ᓴᕙᒪᒃᑯᖏᓐᓄᑦ ᓄᓇᕗᑦ:</u>

ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᐃᓐᓇᖃᕐᕕᐅᒍᒪᔪᑦ ᐊᑕᖏᖅᑐᓂᒃ ᑐᑭᓯᕆᐊᕈᑎᑦᓴᓂᒃ, ᓈᓴᐃᒍᑎᕕᓂᑐᐃᓐᓇᐅᙱᑦᑐᓂ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕆᐊᕈᑏᑦ ᐊᑐᓕᕈᔭᐅᓚᐅᖅᑎᓐᓇᕆᑦ. ᓇᓕᖅᑲᖏᑦ ᖃᐅᔨᓴᕈᑎᒥᓂᐅᔪᑦ ᑲᒦᑦ ᓄᓇᒦᑦᑐᑦ ᐱᓕᕆᐊᑦᓯᖓᑕ ᐅᓂᒃᑳᖑᓚᐅᙱᑦᑐᑦ, ᐱᖃᓯᐅᑎᓪᓗᑎᑦ ᐃᓐᓇᐃᑦ ᐅᖃᐅᓯᕆᓯᒪᔭᖏᑦ, ᑕᒪᒃᑯᐊᓗ ᐃᓱᒪᖅᓴᖅᓯᐅᕈᑎᐅᕆᐊᓖᒃ. ᑖᒃᑯᐊ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐃᑉᐱᒋᔭᖃᓚᐅᖅᑐᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᓕᕆᐊᖃᖅᑐᑦᓴᐅᓂᖏᓐᓂᒃ ᓇᒻᒥᓂᖅ ᐱᖁᔭᓐᖑᕈᑎᑦᓭᒥᓂᒃ, ᐃᓚᐅᑎᑦᓯᖏᓪᓗᑎᑦ ᓄᓇᑦᓯᐊᕐᒥ ᓴᕙᒪᒃᑯᖏᓐᓂ. ᐃᓘᓐᓇᒍᑦ ᐱᖁᔭᓐᖑᖅᑕᐅᔪᖅ ᐊᑐᖅᑕᐅᒍᒪᙱᓪᓚᕆᓚᐅᖅᑐᖅ ᐃᓄᐃᓴᕐᓂᕆᐊᖅᑕᐅᓗᑎᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ 0-ᒧᑦ. ᐊᑕᖏᖅᓱᑎᑦ ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᑕᑯᒧᒪᓚᐅᖅᑐᑦ ᐊᔾᔨᖅᑕᐅᙱᓪᓗᓂ ᑲᑎᓕᒫᕐᓗᕆᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ. ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖃᐅᓯᖃᓚᐅᖅᑐᑦ ᑲᑎᓕᒫᕐᓗᕆᑦ ᑐᑦᑐᑦᑕᐅᒍᓐᓇᖅᑐᑦ 30 ᐊᑦᑐᐃᖃᓗᐊᙱᑎᑎᐊᖓ ᑐᑦᑐᖏᓐᓂᒃ ᐊᒻᒪᓗ ᐊᕙᑎᖓᓐᓂ ᐊᑦᑐᐃᓂᖃᓗᐊᕐᓂ. ᓄᓇᓕᐅᔪᑦ ᑕᑯᒧᔪᐃᓐᓇᐅᔪᑦ ᐱᐅᓂᖅᓴᓂᒃ ᐊᐅᓚᑦᓯᒍᑎᑦᓴᓂᒃ. ᑕᑯᒃᑲᓐᓂᕈᒪᓪᒥᔪᑦ ᐊᐅᓚᑦᓯᒍᑎᑦᓴᐃᑦ ᐊᑐᖅᑕᐅᕆᐊᕐᓗᑎᑦ ᐅᑎᖅᑎᑕᐅᕙᓪᓕᐊᕐᑯᓪᓗᒍ ᐊᒥᓱᙳᐸᓪᓕᐊᓂᑦᓴᖏᑦ, ᓈᕐᓗ ᐱᓕᕆᐊᖑᕆᐊᒃᑲᓐᓂᖏᓗᑎᑦ ᓂᕐᔪᑏᑦ ᑐᑦᑐᓯᓱᐊᖅᐸᑦᑐᑦ.

<u>ᐅᖃᐅᓯᑦᓴᐃᑦ ᐊᒻᒪᓗ ᐊᐱᖅᑯᑎᑦᓴᐃᑦ:</u>
ᐱᑕᖃᙱᑦᑐᖅ

4.1 ᐱᔭᕇᕈᓯᖅ - ᑭᖑᓪᓕᕐᒥ ᐊᓪᓗᓇᐊᕈᑎᓪᓴᐃᑦ

ᑕᒡᕙᓂ ᐊᐅᔭᐅᓚᐅᖅᑐᒥ, ᕚᑑᐃ ᓈᓴᖅᑕᐅᒍᑎᕕᓂᖏᑦᑕ ᓇᓕᖅᑲᖏᑦ ᑐᓂᔭᐅᓚᐅᖅᑐᑦ ᐆᒪᔪᕐᓂᐊᖅᑎᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐊᓯᖏᓐᓄᑦ ᐊᐅᓚᑦᓯᖃᑎᒌᓐᓂᕐᒧᑦ ᐱᓕᕆᖃᑎᒌᑦᑐᓄᑦ. ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᖃᑎᖃᓚᐅᖅᑐᑦ ᐊᐅᓚᑦᓯᖃᑎᒌᑦᑐᓂ ᐅᖃᓇᐊᖅᑐᕐᓂᒃᑯᑦ ᐅᓪᓗᖓᓂ ᐅᑐᐱᓇ 7, 2019 ᑕᐃᑲᓂᓗ ᓈᓴᖅᑕᐅᒍᑎᕕᓂᖏᑦᑕ ᓇᓕᖅᑲᖏᑦ ᓇᓗᓇᐃᔭᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᒻᒪᓗ ᓄᑖᑦ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐱᖁᔨᕗᖐᕈᑏᑦ ᑕᐅᖅᓰᖅᑎᕇᒍᑎᐅᓪᓗᑎᑦ.

ᑭᖑᓪᓕᕐᒥ ᐊᓪᓗᓇᐊᕈᑏᑦ ᑐᓂᓪᓗᒋᑦ ᑭᖑᓪᓕᖅᐹᓕᐊᕆᓯᒪᔪᑦ ᐱᖁᔨᕗᖐᕈᑏᑦ ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᖏᑦᑕ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐱᑕᖃᑦᓯᐊᖁᓪᓗᒋᑦ ᐱᐅᖅᓱᐊᕈᑎᓪᓴᐃᑦ ᐊᑐᖅᑕᐅᖁᓪᓗᒋᑦ ᓄᓇᓕᓐᓄᑦ, ᐆᒪᔪᕐᓂᐊᖅᑏᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᐊᒻᒪᓗ ᒐᕙᒪᒃᑯᓂᓪᓗ ᑭᐅᔾᔨᑎᒋᓗᒍ ᒫᓐᓇᒃᑯᑦ ᖃᑦᔫᓐᓇᕈᖅᐸᓪᓕᐊᓂᖏᑦ ᕚᑑᐃ ᑐᑦᑐᖏᑦ. ᐱᓕᕆᖃᑎᒌᓐᓂᒃᑯᑦ, ᓇᖅᑭᒍᓐᓇᖅᑐᑦ ᕚᑑᐃ ᑐᑦᑐᖏᑦ.

Government of Northwest Territories Gouvernement des Territoires du Nord-Ouest

ESTIMATES OF BREEDING FEMALES & ADULT HERD SIZE AND ANALYSES OF DEMOGRAPHICS FOR THE BATHURST HERD OF BARREN-GROUND CARIBOU: 2018 CALVING GROUND PHOTOGRAPHIC SURVEY

Jan Adamczewski[1], John Boulanger[2], Heather Sayine-Crawford[1], John Nishi[3], Dean Cluff[1], Judy Williams[1], and Lisa-Marie LeClerc[4]

[1] Environment and Natural Resources, Government of Northwest Territories

[2] Integrated Ecological Research, Nelson, BC

[3] EcoBorealis Consulting Inc., Millarville, AB

[4] Department of Environment, Government of Nunavut

2019

Manuscript Report No. 279

ABSTRACT

This report describes the results of a calving ground photo survey of the Bathurst caribou herd conducted in June of 2018 near Bathurst Inlet in Nunavut (NU). The main objectives were to estimate the numbers of breeding females, adult females, and adults in the herd, to compare with results of previous calving ground surveys of this herd, the last of them in 2015.

We flew a systematic reconnaissance survey with transects at ten km intervals over an area defined primarily by locations of collared female caribou. Adjacent areas were also flown to ensure that the distribution of females was fully defined. The results were used to assess how far calving had progressed, allocate survey effort to geographic strata of similar caribou density, and time the aerial photography to coincide with the peak of calving. Based on average daily movement rates of collared females falling below a threshold of 5 km/day on June 8, and observed proportions of cows with calves from fixed-wing flying, it appeared that the peak of calving would occur on or soon after June 8. The photo plane survey was flown with excellent field conditions (blue skies) on June 8. We delineated one photographic stratum where most of the cows were seen and which contained 12 of the 17 active cow collars, west of Bathurst Inlet. On June 8 and 9 we also conducted visual surveys of two other strata with lower densities of female caribou and five collared cows, on either side of Bathurst Inlet.

Snow cover was patchy in much of the survey area, which made caribou more difficult to see. For the visual surveys, we used a double observer method to estimate and correct for sightability of caribou. A double observer method was also used to estimate and correct for sightability of caribou on the aerial photographs. In addition, extra time was taken by the contract staff who counted the aerial photos to make sure that a very high percentage of caribou were found.

The estimate of 1+ year old caribou on the core calving ground was 6,919 (95% confidence interval (CI) =5,415-8,843) caribou. Combining these numbers with the results of the

composition survey, the estimate of breeding females was 3,636 (CI=2,709-4,880). This estimate was reasonably precise with a coefficient of variation (CV) of 13.9%. The estimate of adult females in the survey area was 5,162 (CI=3,935-6,771). The proportion of adult females classified as breeding was higher (70.4%) than in 2015 (60.9%). Herd size was estimated as the number of adult females on the survey area divided by the proportion of females in the herd from a 2017 fall composition survey, thus accounting for the bulls in the herd. The resulting estimate of Bathurst herd size in 2018 was 8,207 caribou at least two years old (CI=6,218-10,831), compared to 19,769 (CI=12,349-27,189) in 2015.

Reductions from 2015-2018 in estimates of breeding females were 55.0%, in adult females 61.0% and in overall herd size 58.5%. The reduction in herd size indicates an annual rate of decline of 25.5% 2015-2018. This decline could not be attributed to issues with survey methods. Demographic analysis indicates that adult female survival rates (estimated at 0.82 for 2017-2018 using a Bayesian demographic model) had improved from 2015 but continued to be below levels associated with stable populations (0.84-0.90). Overall calf productivity (the product of fecundity and calf survival) prior to 1997 averaged 0.46 while the average for 2011-2018 was 0.25 and was well below levels associated with stable populations. These low vital rates likely account for much of the decline 2015-2018.

Assessment of movement of collared females between the Bathurst and neighbouring Bluenose-East and Beverly calving grounds 2010-2017 showed minimal movement of cows to or from neighbouring herds. However, the Bathurst herd was heavily mixed throughout winter 2017-2018 with the much larger Beverly herd that calves in the coastal lowlands along the Queen Maud Gulf, and was outnumbered by that herd by a ratio of about 12:1 in 2018. Of 11 Bathurst collared cows that were known to have calved on the Bathurst calving ground in June 2017, three moved in the spring of 2018 to the coastal calving ground along the Queen Maud Gulf and did not return later in the year. This is a limited sample and should be interpreted cautiously, but it suggests that a portion (27%) of the herd's cows may have emigrated and joined the Beverly herd while 73% remained on the main Bathurst calving ground. In addition, the Bayesian demographic model was used to project the herd's likely size in 2018 based on its demographics, including or not including the 2018 survey results.

This suggested that about 31% of the cows might have emigrated to the Queen Maud Gulf coastal calving area and about 69% remained on the main Bathurst calving ground. The two estimates suggest that roughly 70% of the Bathurst cows remained on the Bathurst calving ground that the herd has used since 1996 in 2018, but this is based on limited data and model projections, and should be interpreted with caution. In June 2019, three of 17 (17.6%) collared cows that were on the Bathurst calving ground in June 2018 moved well east of Bathurst Inlet with Beverly collared females, suggesting that some eastward emigration of Bathurst cows had continued.

We suggest close monitoring of the herd in the next few years, including population surveys every two years, annual monitoring of cow survival, calf productivity and calf survival for this herd, and increased collar numbers for monitoring and management.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The Bathurst herd's calving grounds have been found since 1996 west of Bathurst Inlet (Figure 1). The herd's summer range includes the calving ground as well as areas south of it. The winter range is primarily in the Northwest Territories (NWT) and in some years has extended as far south as Saskatchewan.

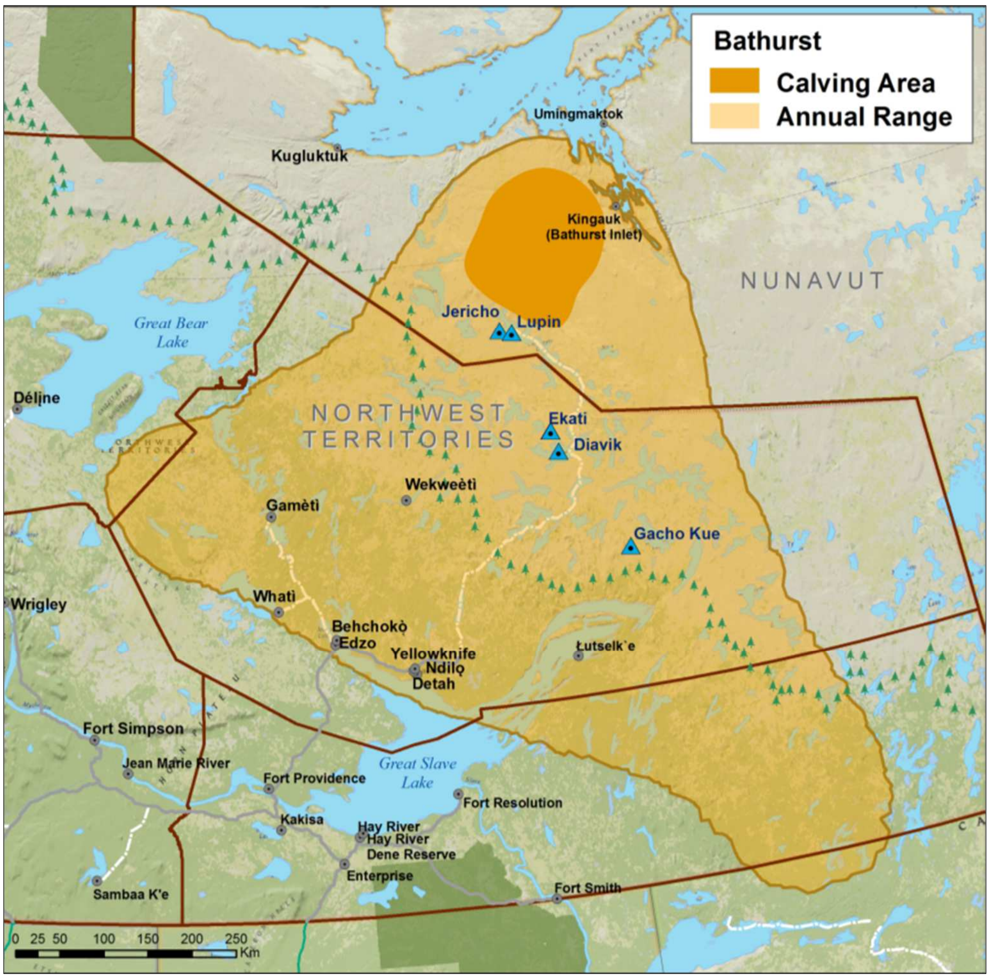


Figure 3: Annual range and calving grounds for the Bathurst herd, 1996-2009, based on accumulated radio collar locations of cows (Nagy et al. 2011). The calving area and a portion of the summer range are in Nunavut (NU) and the rest of the range is mostly in the NWT. At high numbers the herd has occasionally wintered as far south as Saskatchewan. The Gahcho Kué, Ekati and Diavik mines were in active production in 2018 and the Jericho and Lupin mine-sites were under care and maintenance with minimal maintenance staff.

In recent years (2009-2018) the herd's range has contracted as the herd has declined to low numbers, and the herd has wintered near tree-line or on the tundra since 2014. This herd has long been a key country food and cultural resource for Indigenous cultures in the NWT (e.g. Legat et al. 2014, Jacobsen et al. 2016), and the decline and associated harvest restrictions (e.g. WRRB 2016) have resulted in hardships in several communities. In addition, this herd was harvested by big-game outfitters and by NWT resident hunters until 2010 (Adamczewski et al. 2009, Boulanger et al. 2011).

This report describes results of a calving ground photo-survey of the Bathurst caribou herd conducted during June of 2018. A survey of the Bluenose-East herd's calving grounds west of Kugluktuk (Figure 2) was carried out at the same time and the results are reported separately (Boulanger et al. 2019). A survey of the Beverly calving grounds in the Queen Maud Gulf area was also carried out by biologists with the Government of NU (GN) in June 2018 and those results will also be reported separately (Campbell et al. 2019). The Beverly systematic survey transects began next to the Bathurst survey transects east of Bathurst Inlet, and transects were also flown between the Bathurst and Bluenose-East calving grounds, resulting in continuous coverage of the three calving grounds and areas between them.

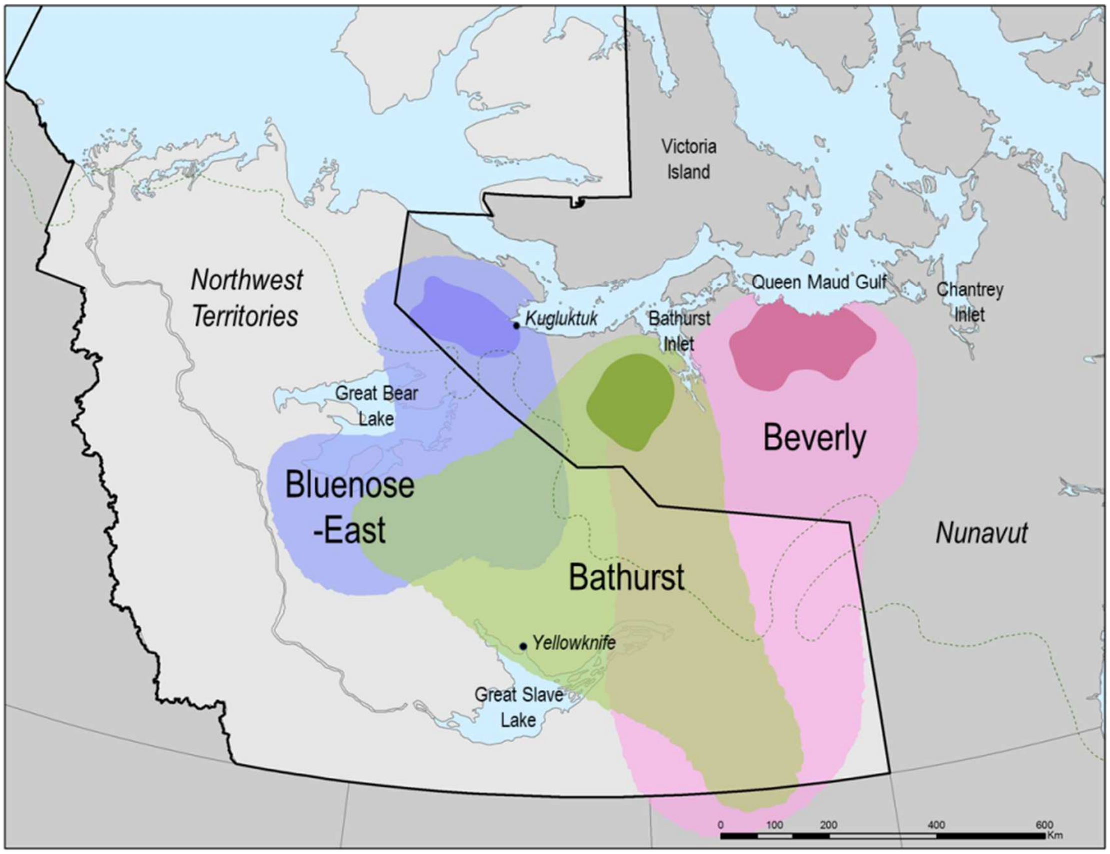


Figure 2: Annual ranges and calving grounds of the Bluenose-East, Bathurst, and Beverly [1] herds, based on accumulated radio collar locations of cows (Nagy et al. 2011). Other herd ranges west and east of these three herds were omitted for simplicity.

Calving ground photo surveys of the Bathurst herd have been carried out since the 1980s and the herd reached peak numbers estimated at 472,000 in 1986 (Figure 3). Surveys have been carried out at 3-year intervals since 2003 when a substantial decline in the herd was detected. The herd initially declined slowly in the 1990s and then at a more rapid pace after 2003. The most rapid decline was between 2006 and 2009 when the herd decreased from over 100,000 to just 32,000 in three years. A demographic evaluation of the herd's decline until 2009, including the role of harvest in the accelerated decline 2006-2009, was carried

[1] The Beverly herd described in this report is the herd defined by the GN as calving in the central and western Queen Maud Gulf. This herd does not correspond exactly to the Beverly herd defined prior to 2009 with an inland calving ground south of Garry Lakes (Adamczewski et al. 2015).

out by Boulanger et al. (2011). The last calving photo survey of the Bathurst herd in 2015 was described by Boulanger et al. (2017).

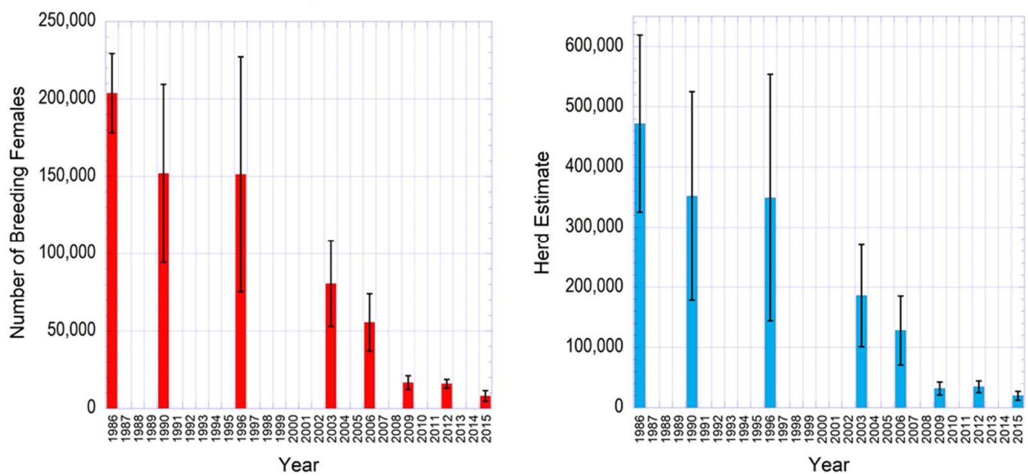


Figure 3: Estimates of breeding females on the left (red) and extrapolated herd size on the right (blue) from 1986-2015, based on calving ground photo surveys of the Bathurst caribou herd. Estimates are shown with 95% Confidence Intervals.

METHODS

Basic Methodology

The calving ground photographic survey was conducted as a sequence of steps described briefly below, then in greater detail in following text.

1. Locations of collared female caribou and prior surveys of this herd's calving grounds were used to define the main area for the survey. Outlying adjacent areas were also flown.

2. A systematic reconnaissance survey was carried out before the peak of calving with transects spaced at 10 km intervals. The same 10 km grid system used to locate transects has been used since 2009. These allowed us to delineate areas where breeding and non-breeding females, bulls and yearlings were found on or near the calving ground. Timing of calving was assessed by evaluating the relative proportion of cows with newborn calves seen during the reconnaissance survey, and from reduced movement rates of collared cows associated with calving.

3. Using information on caribou density and composition derived from the reconnaissance survey, we defined strata (or survey blocks) that would be surveyed again at higher rates of coverage by photographic or visual transects. We allocated aerial photography to one stratum with the highest densities of breeding cows and the bulk of the collared cows. Two visual strata with lower densities of cows were also defined and flown east and west of Bathurst Inlet.

4. We initiated the helicopter-based composition survey soon after the photographic and visual surveys of the calving area. The composition survey crew classified larger groups (i.e. more than about 30-50 caribou) on the ground and classified smaller groups primarily from the air. Groups of caribou in each stratum were classified to determine the proportions of breeding and non-breeding cows, as well as bulls and yearlings.

5. We derived an estimate of breeding females using the estimates of total caribou at least one year old within each stratum, and the proportion of breeding females within that stratum. The total number of adult females was estimated from the proportion of females and the estimate of caribou at least one year old in the survey area.

6. The adult female estimate was used to extrapolate the total size of the Bathurst herd (caribou at least two years old) by accounting for males, using an estimate of the bull:cow ratio from a fall composition survey flown in October 2017.

7. Demographic data for the herd, the new estimates and collar movement data were used in trend analyses and population modeling to further evaluate population changes from 2015-2018 and their likely causes.

Analysis of Collared Caribou Data

Twenty-four collared female caribou were initially considered during the Bathurst June 2018 survey. Two of these reported rarely or erratically and were not considered in survey planning. A further two collars were well south of the survey area in June and not associated with any calving ground, and were also not considered in survey planning. Of the remaining 20 collars, three moved in May-June to the Queen Maud Gulf coastal calving ground with collared Beverly cows, and did not return. This left 17 active cow collars in the Bathurst Inlet area in June 2018. Of these 17, 12 were found within the eventual high density photo block, four in the eventual visual east block and one was just south of the eventual visual west block. Movement rates of these collared caribou females were monitored daily to help identify the timing of the peak of calving. Previous experience (e.g. Gunn et al. 2005, Boulanger et al. 2019) had shown that average daily movement rates of collared cows dropping below 5 km/day were a reliable indicator of the peak of calving.

Systematic Reconnaissance Survey to Delineate Strata

Kugluktuk was the main survey base of operations with two Cessna Caravans dedicated mostly to the Bluenose-East survey and to support the Bathurst survey; a third Cessna Caravan was based at the Ekati diamond mine (Figure 1). The Ekati Caravan flew most of the Bathurst reconnaissance survey and the visual strata, because the Caravans in Kugluktuk were grounded June 2-5 by poor weather. One of the two Caravans based at Kugluktuk flew part of the Bathurst visual survey strata.

Based on a systematic 10 km grid, reconnaissance transects were spaced at 10 km intervals to provide 8% coverage across the main calving area and in adjacent areas. Strip transects were 800 m in width, and caribou were counted within a 400 m strip on each side of the survey plane (Gunn and Russell 2008). For each side of the plane, strip width was defined by the wheel of the airplane on the inside, and a single thin rope attached to the wing strut that became horizontal during flight, served as the outside strip marker. Planes were flown at an average survey speed of 160 km/hour at an average altitude of 120 m above the ground to ensure that the strip width of the plane remained relatively constant.

Transects were spaced at 5 km intervals across the concentrated calving area to provide a more fine-grained assessment of the distribution and density of caribou. The initial focus was on delineating the annual concentrated calving area based primarily on the distribution of collared caribou cows. Once the main calving area had been covered, additional survey transects were flown adjacent to the concentrated calving area (north, west and south) to make sure that no substantial numbers of female caribou were missed. Using the systematic 10 km grid, transects were extended at least one 10 km segment past the last caribou seen.

The GN Beverly caribou survey started on June 5 and coverage started east of Bathurst Inlet and immediately adjacent to our systematic reconnaissance survey of the Bathurst calving ground (Campbell et al. 2019). We communicated daily with the GN survey crew during the Bathurst calving ground survey. We also flew survey transects west of the main Bathurst survey area at 20 km spacing to extend coverage to the Bluenose-East systematic survey area near Kugluktuk (Boulanger et al. 2019).

Two observers, one seated in front of the other, and a recorder were used on each side of the airplane to minimize the chance of missing caribou. Previous research (Boulanger et al. 2010) demonstrated that two observers usually saw more caribou than a single observer. In addition, analysis of the sighting patterns of observer pairs allowed for assessment of what was likely missed (Boulanger et al. 2010). Double observer methods have been used on other recent Bathurst calving ground photographic surveys (e.g. Boulanger et al. 2017). The two observers on the same side communicated to ensure that groups of caribou were not double counted.

On the reconnaissance survey, caribou groups were classified by whether they contained breeding females. Breeding females were cows with hard antlers or cows with newborn calves. A mature female with hard antlers is an indicator that the female has yet to give birth or has just given birth, as cows usually shed their antlers within a week after birth (Whitten 1995). Caribou groups were classified as non-breeders based on the absence of breeding females and newborn calves, and substantial representation of yearlings (identified by a short face and a small body), bulls (identified by thick, dark antlers in velvet and a large body), and non-antlered or females with short antlers in velvet. The speed of the fixed-wing aircraft and observer experience did not allow all caribou to be classified. Thus, the focus was on identifying breeding cows if they were present, and otherwise on the most common types of caribou present. In most cases, each group was recorded individually, but in some cases groups were combined if the numbers were larger and distribution was more continuous. Data were recorded on Trimble YUMA 2 tablets (Figure 4).

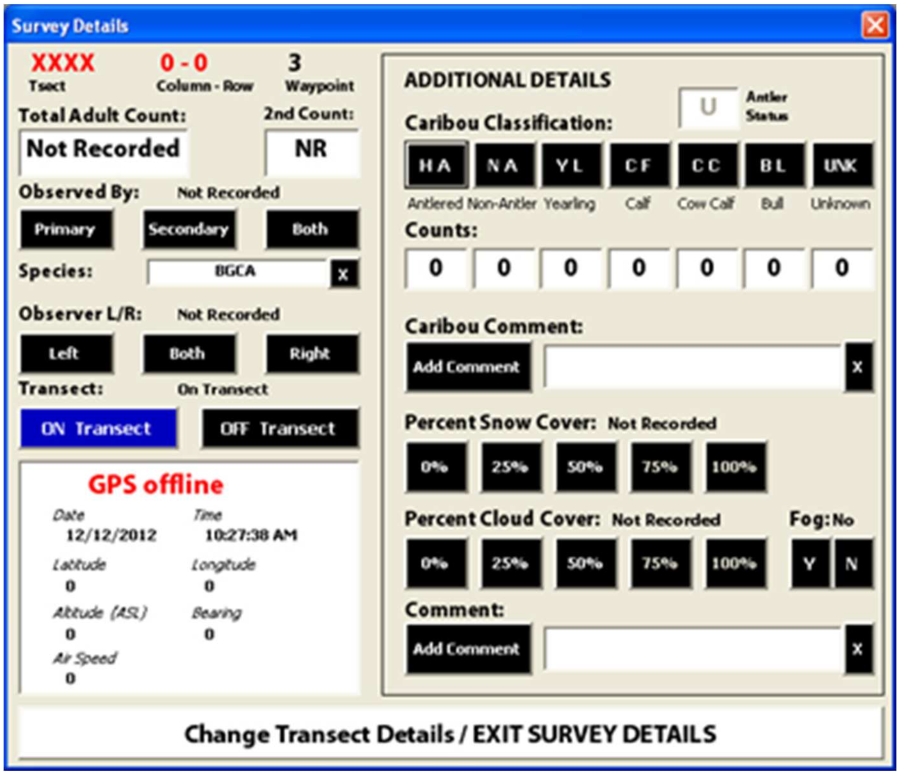


Figure 4: The tablet data entry screen used during reconnaissance and visual survey flying on the Bathurst June 2018 survey. A GPS waypoint was recorded for each observation. The unique segment unit number was also assigned by the software for each observation to summarize caribou density and composition along transect lines.

As each data point was entered, a real-time GPS waypoint was generated, allowing geo-referencing of the survey observations. Other large animals like moose, muskoxen and carnivores were also recorded with a GPS location.

North-south oriented transects were divided into 10 km segments to summarize the density and distribution of geo-referenced caribou counts. The density of each segment was estimated by dividing the count of caribou by the survey area of the segment (0.8 km strip width x 10 km = 8 km^2). The segment was classified as a breeder segment if at least one breeding female caribou or newborn calf was identified. Segments were then displayed spatially and used to delineate strata within the annual concentrated calving area based on the composition and density of the segments. During the survey, daily weather briefings were provided by Dr. Max Dupilka (Beaumont, AB) to assess current and future survey conditions.

Stratification and allocation of survey effort for photographic and visual estimates

The main objectives of the survey were to obtain precise and accurate estimates of breeding and adult female caribou on the calving ground, and to estimate overall adult herd size. To achieve this, the survey area was stratified using the results of the systematic reconnaissance survey, which is a process of grouping areas with similar densities into discrete strata. The stratum with the greatest caribou density was surveyed by the photo plane, with lower-density areas designated for visual surveys using a double observer method.

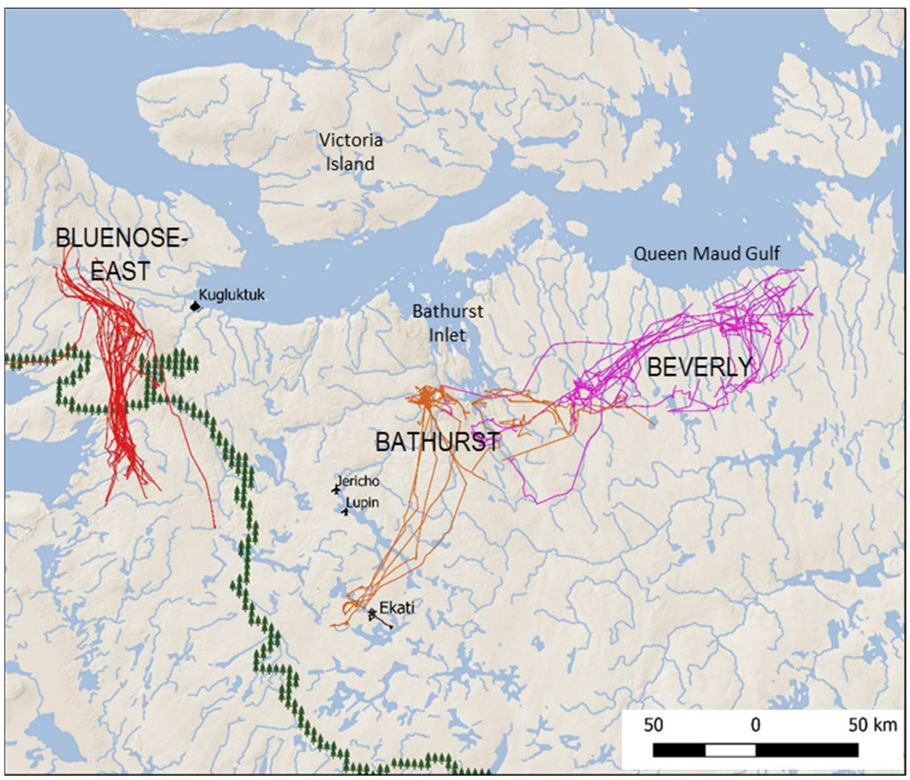


Figure 5: The northward paths of collared females (May 15 - June 11, 2018) from the Bluenose-East (red), Bathurst (orange), and Beverly (violet) caribou herds to their 2018 calving grounds.

In this survey, one photo stratum was defined west of Bathurst Inlet where most of the cows and most of the collared females (12 of 17) were observed. This was similar in size and location to the photo stratum in the June 2015 calving ground survey (Boulanger et al. 2017).

Five of the collared Bathurst female caribou showed an unusual movement in the spring that included a northward movement east of Bathurst Inlet and then a westward shift towards the Inlet and west of it at the beginning of June (Figure 5). As a result, a few Bathurst collared cows were found east and west of Bathurst Inlet at the time of the survey. The reconnaissance survey showed low numbers of caribou just west and east of Bathurst Inlet, with a majority of the caribou east of the Inlet being bulls and yearlings. We defined two low-density visual survey blocks, one east of Bathurst Inlet and one west of it.

Once the three survey strata were defined, an estimate of caribou numbers (animals at least 1+ year old) was derived from the reconnaissance data (Jolly 1969). The relative caribou numbers (and estimated variances) in each stratum were used to allocate survey effort and determine the numbers of transects to sample within each stratum.

Two approaches for allocation were considered for the aerial survey. First, optimal allocation was used to assign more effort to strata with higher densities, given that the amount of variation in counts is proportional to the relative density of caribou within the stratum. Optimal allocation was estimated using estimates of population size and variance for each stratum.

If strata were small, allocation was adjusted to ensure an adequate number of transect lines. For example, empirical results of previous surveys suggested that there should be a minimum of 10 transects per stratum to have good survey precision; in comparison, about 20 transects has been optimal for higher density areas. In general, coverage should be at least 15% with higher levels of coverage for higher density strata, for adequate precision. As populations become more clustered, a higher number of transect lines is required to achieve adequate precision (Thompson 1992, Krebs 1998).

Photographic Survey of High-density Stratum

GeodesyGroup Inc. aerial survey company (Calgary, AB) was contracted for the aerial photography in the 2018 June surveys. They used two survey aircraft, a Piper PA46-310P Jet-prop and a Piper PA31 Panther (Figure 6), each with a digital camera mounted in the belly of the aircraft. Survey altitude above ground level (AGL) to be flown for photos was determined at the time of stratification based on cloud ceilings and desired coverage. To ensure timely completion, both aircraft were used for the Bathurst photo block and all photos (Bathurst and Bluenose-East) were taken on June 8 with excellent survey conditions (blue skies). Coverage on each photo transect was continuous and overlapping so that stereo viewing of the photographed areas was possible.

Figure 6. Piper PA31 Panther aircraft used on Bathurst photo survey in June 2018 by GeodesyGroup Inc.

Caribou on the aerial photos were counted by a team of photo interpreters and supervised by Derek Fisher, president of GreenLink Forestry Inc., (Edmonton, AB) using specialized software and glasses that allowed three dimensional (3D) viewing of photographic images. Two of the authors (J. Boulanger and J. Adamczewski) visited the GreenLink office in Edmonton to gain greater familiarity with this process in fall 2018. The number of caribou counted was tallied by stratum and transect.

The exact survey strip width of photo transects was determined using the geo-referenced digital photos by GreenLink Forestry. Due to differences in topography, the actual strip width varied slightly for each transect flown. Population size (number of caribou at least one year old) within a stratum is usually estimated as the product of the total area of the stratum (A) and the mean density ($\overline{D}$) of caribou observed within the strata ($\widehat{N} = \overline{D}A$) where density is estimated as the sum of all caribou counted on transect divided by the total area of transect sampling ($\overline{D}$=caribou counted/total transect area). An equivalent estimate of mean density can be derived by first estimating transect-specific densities of caribou ($\widehat{D}_i = caribou_i/area_i$) where $caribou_i$ is the number of caribou counted in each transect and $area_i$ is the transect area (as estimated by transect length X strip width). Each transect density is then weighted by the relative length of each transect line (w_i) to estimate mean density ($\overline{D}$) for the stratum. More exactly, $\overline{D} = \sum_i^n \widehat{D}_i w_i / \sum_i^n w_i$ where the weight (w_i) is the ratio of the length of each transect line (l_i) to the mean length of all transect lines($w_i = l_i/\overline{l_i}$) and n is the total number of transects sampled. Using this weighting term accommodates for different lengths of transect lines within the stratum, ensuring that each transect line contributed to the estimate in proportion to its length. Population size is then estimated using the standard formula ($\widehat{N} = \overline{D}A$) (Norton-Griffiths 1978).

When survey aircraft first flew north to Kugluktuk on June 1, snow cover on the survey area was 90% or greater, and in some areas nearly 100%. Over the following ten days, however, snow melted rapidly and in many areas on June 8, snow cover was highly variable and patchy. This made spotting caribou by observers in the Caravans challenging, and also made complete counting of caribou on the aerial photos more difficult. Caribou on snow-free ground were easy to see, but caribou on small snow patches or on their edges required extra effort to find. Two approaches were used to address this with the aerial photos: (1) observers took extra time to search all photos carefully, approximately doubling the time these counts usually take, and (2) a double observer method was used to estimate sightability of the caribou on photos for a subset of photos.

The double observer approach used was to systematically resample a subset of photos to estimate overall sightability in the stratum using a second independent photo interpreter. This 2-stage approach to estimation, where one stage is used to estimate detection rates that are then used to correct estimates in the second stage, has been applied to a variety of wildlife species (Thompson 1992, Barker 2008, Peters et al. 2014). The basic principle was to systematically resample the photo transects to allow an unbiased estimate of sightability from a subset of photos that were sampled by two independent observers. Systematic samples were taken by overlaying a grid over the photo transects and sampling photos that intersected the grid points.

This cross-validation process was modeled as a two-sample mark-recapture sample with caribou being "marked" in the original count and then "re-marked" in the second count for each photo resampled. Using this approach avoids the assumption that the second counter detects all the caribou on the photo. The Huggins closed N model (Huggins 1991) in program MARK (White and Burnham 1999) was used to estimate sightability. A session-specific sighting probability model was used, allowing unique sighting probabilities for the first and second photo interpreter to be estimated. Model selection methods were then used to assess whether there were differences in sightability for different strata sampled. The fit of models was evaluated using the Akaike Information Criterion (AIC) index of model fit. The model with the lowest AIC_c score [2] was considered the most parsimonious, thus minimizing estimate bias and optimizing precision (Burnham and Anderson 1998).

Non-independence of caribou counted in photos most likely caused over-dispersion of binomial variances. The over-dispersion parameter (c-hat) was estimated as the ratio of the bootstrapped (photo-based) and simple binomial variance. Sightability-corrected estimates of caribou were then generated as the original estimate of caribou on each stratum divided by the photo sightability estimate for the stratum. The delta method (Buckland et al. 1993) was used to estimate variance for the final estimate, thus accounting for variance in the original stratum estimate and in the sightability estimate.

Visual Surveys of Low-density Strata

Visual surveys were conducted in two low density strata, one west of Bathurst Inlet and one east of it. The Caravans were used with two observers and a recorder on each side of the aircraft. The numbers of caribou sighted by observers were entered into the Trimble YUMA 2 tablet computers and summarized by transect and stratum.

A double observer method was used to estimate the sighting probability of caribou during visual surveys. The double observer method involves one primary observer who sits in the

[2] The subscript "c" indicates an AIC score that is corrected for small sample sizes.

front seat of the plane, a secondary observer who sits behind the primary observer, and a recorder on the same side of the plane. Analysis of the caribou seen by each of the two observers in each pair allows for an assessment of caribou that were likely missed, and how sighting probabilities are affected by snow cover, cloud condition and the abilities of individual observers. A detailed description of the double observer methods, analyses and results is given in Appendix 1. The methods have also been described in detail in other calving photo survey reports (e.g. Boulanger et al. 2019). The results were used to estimate the proportions of caribou that were likely missed, and numbers of caribou estimated on the two visual survey blocks east and west of Bathurst Inlet were corrected accordingly.

Composition Survey of Caribou on the Calving Ground

The composition survey was carried out June 13-16. Caribou were classified in strata that contained significant numbers of breeding females (based on the reconnaissance transects) to estimate proportions of breeding females and other sex and age classes. This survey was based on aerial and ground-based observations of caribou groups, which provided a more accurate and representative sampling procedure for caribou composition compared to the coarse classification criteria applied to caribou groups observed during the reconnaissance survey. For the composition survey, a helicopter (Aerospatiale A-Star 350 BA) was used to systematically sample groups of caribou throughout the photographic stratum and the two visual strata.

Search effort (i.e. helicopter flight hours) was allocated primarily to the high-density photographic stratum and was distributed within the stratum by developing a predetermined flight route that systematically covered the stratum, and which was subsequently loaded in to a portable GPS unit. Caribou groups encountered during the flight route were classified and their locations stored. The most recent caribou collar locations were also stored as waypoints in the GPS unit, which permitted the navigator/observer to ensure that those general areas were searched. By comparing the actual flight track to the planned route and collar locations, the navigator/observer maintained a systematic search pattern through the stratum and ensured that a caribou group was classified only once. Search effort was also distributed within the visual survey strata in a similar manner, but fewer hours were flown within those two strata.

Caribou groups that comprised ~<50 individuals were classified from the air by a front-seat observer using motion-stabilized binoculars. Classified caribou counts were called out to a rear-seat data recorder who entered the data into a computer tablet. Caribou groups that were generally greater than 50-100 animals were classified on the ground to minimize potential disturbance. The pilot landed the helicopter a few hundred meters from the main group of caribou, upon which the survey team would walk to a suitable position to observe and sample the animals. Using binoculars or a spotting scope, the observer scanned across the group(s) to avoid double counting and called out classified caribou to the data recorder. In larger groups, classification did not include the entire group; the focus was on a representative sample of each group and on limiting disturbance to caribou.

Caribou were classified following the methods of Gunn et al. (1997) (and see Bergerud 1964, Whitten 1995) where antler status, presence/absence of an udder, and presence of a calf are used to categorize breeding status of females (Figure 7). Presence of a newborn calf, presence of hard antlers signifying recent or imminent calving, and presence of a distended udder were all considered as signaling a breeding cow that had either calved, was about to calve, or had likely just lost a calf. Cows lacking any of these criteria and cows with new (velvet) antler growth were considered non-breeders. Newborn calves, yearlings and bulls were also classified.

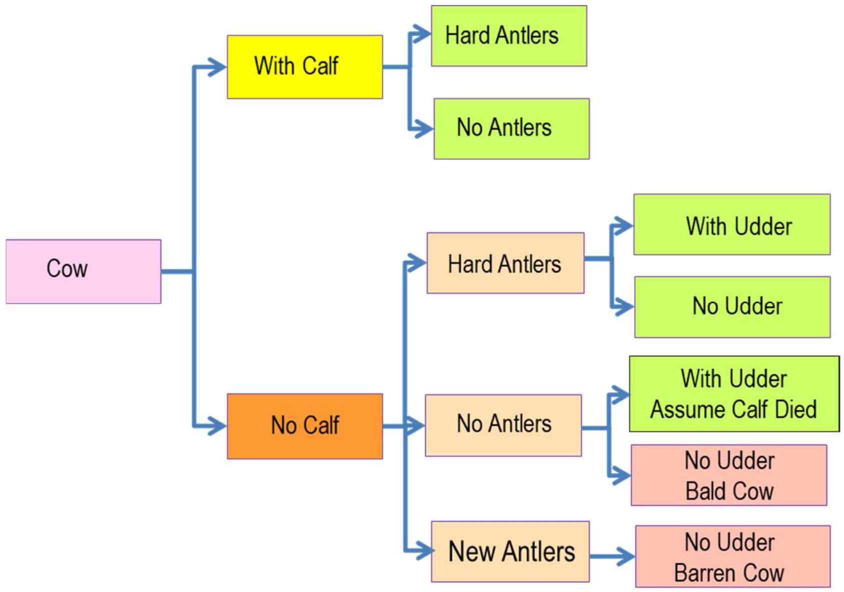


Figure 7: Classification of females used in composition survey of Bathurst caribou in June 2018. Green-shaded boxes were all classified as breeding females (diagram adapted from Gunn et al. 1997). Udder observation refers to a distended udder in a cow that has given birth. Hard antlers are from the previous year, and are distinct from new antlers growing in velvet.

The number of caribou in each group was summed as well as the numbers of bulls and yearlings (calves of the previous year) to estimate the proportion of breeding caribou on the calving ground. Bootstrap resampling methods (Manly 1997) were used to estimate standard errors (SEs) and percentile-based confidence limits for the proportion of breeding caribou.

Estimation of Breeding Females and Adult Females

The numbers of breeding females were estimated by multiplying the estimate of total (at least one year old) caribou on each stratum by the estimated proportion of breeding females in each stratum from the composition survey. This step basically eliminated the non-breeding females, yearlings, and bulls from the estimate of total caribou on the calving ground.

The number of adult females was estimated by multiplying the estimate of total (at least one year old) caribou on each stratum by the estimated proportion of adult females (breeding and non-breeding) in each stratum from the composition survey. This step basically eliminated the yearlings and bulls from the estimate of total caribou on the calving ground.

Each of the field measurements had an associated variance, and the delta method was used to estimate the total variance of breeding females under the assumption that the composition surveys and breeding female estimates were independent (Buckland et al. 1993).

Estimation of Adult Herd Size

Total herd size was estimated using two approaches. The first approach, which had been used in earlier calving ground surveys, assumed a fixed pregnancy rate for adult females, whereas the second approach avoided this assumption.

Estimation of Herd Size Assuming Fixed Pregnancy Rate and Estimated Sex Ratio

As a first step, the total number of adult females (at least two years old) in the herd was estimated by dividing the estimate of breeding females on the calving ground by an assumed pregnancy rate of 72% (Dauphiné 1976, Heard and Williams 1991). This pregnancy rate was based on a large sample of several hundred Qamanirjuaq caribou in the 1960s (Dauphiné 1976). The estimate of total females was then divided by the estimated proportion of females in the herd based on a bull:cow ratio from a fall composition survey conducted in October of 2017, to provide an estimate of total adult caribou in the herd (original methods described in Heard 1985, Heard and Williams 1991). This accounts for the bulls in the herd, very few of which are on the calving grounds in June. This estimator assumes that all breeding females were within survey strata areas during the calving ground survey and that the pregnancy rate of Bathurst caribou was 72% for 2017-2018. Note that this estimate corresponds to adult caribou at least two years old and does not include yearlings because yearling female caribou are not considered sexually mature.

Estimation of Herd Size Based on Estimates of Adult Females and Estimated Sex Ratio

An alternative extrapolated herd size estimator was developed to account for the effect of variable pregnancy rates as part of the 2014 Qamanirjuaq caribou herd survey (Campbell et al. 2015), and has been used in other recent calving photo surveys for the Bathurst herd (Boulanger et al. 2017), as well as the Bluenose-East herd (Adamczewski et al. 2017, Boulanger et al. 2019). This estimator first uses data from the composition survey to estimate the total proportion of adult females (breeding and non-breeding) and the numbers of adult females in each of the survey strata. The estimate of total adult females is then divided by the proportion of adult females (cows) in the herd from one or more fall composition surveys. This accounts for the bulls in the herd, very few of which are on the calving grounds in June. Using this approach, the fixed pregnancy rate is eliminated from the estimation procedure. Pregnancy rates do vary depending on cow condition (Cameron et al. 1993, Russell et al. 1998). This estimate assumes that all adult females (breeding and non-breeding) were within the photographic and visual survey strata during the calving ground survey. It makes no assumption about the pregnancy rate of the females and does not include the yearlings.

In calving ground photographic surveys since the 2014 Qamanirjuaq survey (Campbell et al. 2015), the estimate of females based on total adult females on the calving ground survey area, and adjusted for the bull:cow ratio from a recent fall survey, has become the preferred way for Government of the NWT (GNWT) Department of Environment and Natural Resources (ENR) of estimating herd size from these surveys. With the current sample of collared cows and extensive flying, it has become possible to reliably define the full distribution of the females in the Bathurst herd. Using survey-specific estimates of breeding and non-breeding cows, together with a recent estimate of herd sex ratio, is considered a more robust method of extrapolating to herd size, rather than assuming a constant pregnancy rate that ignores this source of variation. This method also increases the precision of the overall herd estimate.

Trends in Numbers of Breeding and Adult Females

As an initial step, a comparison of the estimates from the 2015 and 2018 surveys was made using a t-test (Heard and Williams 1990), with gross and annual rates of changes estimated from the ratio of estimates.

Longer term trends 2010-2018 were estimated using Bayesian state space models, which are similar to previously used regression methods (Ordinary Least Squares, OLS, as described in Boulanger et al. 2011). However, hierarchical Bayesian models allow more flexible modeling of variation in trend through the use of random effects (Humbert et al.

2009, Kery and Royle 2016). This general approach is described further in the demographic model analysis in the next section. An underlying exponential rate of change was assumed with estimates of λ (where $\lambda = N_{t+1}/N_t$). If λ=1 then a population is stable; values > or <1 indicate increasing and declining populations. The rate of decline was also estimated as 1-λ.

Survival Rate Analyses from Collared Cows

Collar data for female caribou 1996-2018 were compiled for the Bathurst caribou herd by GNWT ENR staff. Fates of collared caribou were determined by assessment of movement of collared caribou, with mortality being assigned to collared caribou based on lack of collar movement that could not be explained by collar failure or device drop-off. The data were then summarized by month as live or dead caribou. Caribou whose collars failed or were scheduled to drop off were censored from the analysis. Data were grouped by "caribou years" that began during calving of each year (June) and ended during the spring migration (May). The Kaplan-Meier method was used to estimate survival rates, accounting for the staggered entry and censoring of individuals in the data set (Pollock et al. 1989). This approach also ensured that there was no covariance between survival estimates for the subsequent demographic model analysis.

Demographic Analyses: Bayesian State Space Integrated Population Model (IPM)

One of the most important questions for the Bathurst herd was whether the adult female segment of the population had declined since the last survey in 2015. The most direct measure that indicates the status of breeding females is their survival rate, which is the proportion of breeding females that survive from one year to the next. This metric, along with productivity (proportion of calves produced per adult female each year that survive their first year of life) largely determines the overall population trend. For example, if breeding female survival is high then productivity in previous years can be relatively low and the overall trend in breeding females can be stable. Alternatively, if calf productivity is consistently high, then slight reductions in adult survival rate can be tolerated. The interaction of these various indicators can be difficult to interpret and a population model can help increase understanding of herd demography.

We used a Bayesian state space IPM (Buckland et al. 2004, Kery and Schaub 2012) based upon the original (OLS) model (White and Lubow 2002) developed for the Bathurst herd (Boulanger et al. 2011) to further explore demographic trends for the Bathurst herd. This work was in collaboration with a Bayesian statistician/modeller (Joe Thorley-Poisson Consulting) (Thorley 2017, Ramey et al. 2018, Thorley and Boulanger 2019). We note that the underlying demographic model used for the hierarchical Bayesian state space model is identical to the previous OLS model. However, the Bayesian IPM method provides a much more flexible and robust method to estimate demographic parameters that takes into account process and observer error. One of the biggest differences is the use of random effects to model temporal variation in demographic parameters. A random effect flexibly and efficiently captures the variation in a parameter by assuming it is drawn from a particular underlying distribution. This contrasts with the OLS method where temporal variation was often not modeled or modeled with polynomial terms which assumed an underlying directional change over time. Appendix 2 provides details on the Bayesian IPM state space modeling, including the base R code used in the analysis.

We used breeding female estimates, as well as calf-cow ratios, bull-cow ratios (Cluff et al. 2016, Cluff unpublished data), estimates of the proportion of breeding females, and adult female survival rates from collared caribou to estimate the most likely adult female survival values that would result in the observed trends in all of the demographic indicators for the Bathurst herd. Calf-cow ratios were recorded during fall (late October) and spring (late March - April) composition surveys whereas proportion of breeding females was measured during June composition surveys conducted on the calving ground. Proportion of females breeding was estimated as the ratio of breeding females to adult females from each calving ground survey.

The Bayesian IPM is a stage-based model that divides caribou into three age-classes, with survival rates determining the proportion of each age class that makes it into the next age class (Figure 8); this structure is identical to the OLS modeling (Boulanger et al. 2011) used previously on the Bathurst and Bluenose-East herds.

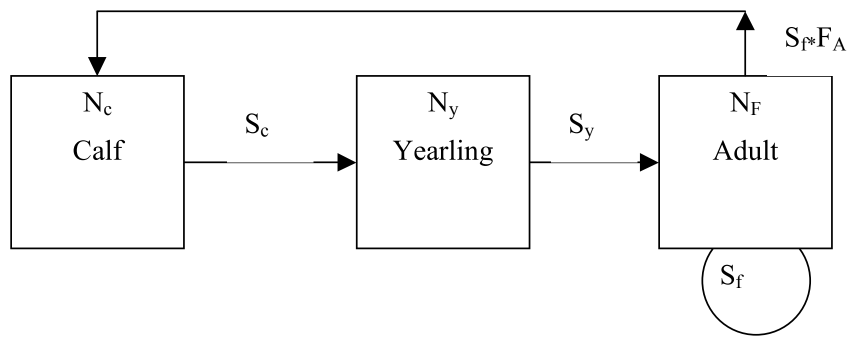


Figure 8: Underlying stage matrix life history diagram for the caribou demographic model used for Bathurst caribou. This diagram pertains to the female segment of the population. Nodes are population sizes of calves (N_c), yearlings (N_y), and adult females (N_F). Each node is connected by survival rates of calves (S_c), yearlings (S_y) and adult females (S_f). Adult females reproduce dependent on fecundity (F_A) and whether a pregnant female survives to produce a calf (S_f). The male life history diagram was similar with no reproductive nodes.

We used the entire Bathurst demographic data set that started in the 1980s (Boulanger et al. 2011, Boulanger 2015) for the analysis but focused modeling efforts and inference on the more recent years, i.e., since 2014. The timeline of recruitment relative to survey years is illustrated in Table 1. It was assumed that a calf born in 2010 would not breed in the fall after it was born, or the fall of its second year, but it could breed in its third year (see Dauphiné 1976 for age-specific pregnancy rates). It was considered a non-breeder until 2013. Calves born in 2014 and 2015 had the most direct bearing on the number of new breeding females on the 2018 calving ground that were not accounted for in the 2015 breeding female estimate.

Table 1: A schematic of the assumed timeline 2011-2018 in the Bayesian IPM analysis of Bathurst caribou in which calves born are recruited into the breeding female segment (green boxes) of the population. Calves born prior to 2013 were counted as breeding females in the 2013 and 2015 surveys. Calves born in 2014 and 2015 recruited to become breeding females in the 2018 survey.

Calf Born	Survey years 2011	2012	2013	2014	2015	2016	2017	2018
2010	yearling	non-breeder	breeder	breeder	breeder	breeder	breeder	breeder
2011	calf	yearling	non-breeder	breeder	breeder	breeder	breeder	breeder
2012		calf	yearling	non-breeder	breeder	breeder	breeder	breeder
2013			calf	yearling	non-breeder	breeder	breeder	breeder
2014				calf	yearling	non-breeder	breeder	breeder
2015					calf	yearling	non-breeder	breeder
2016						calf	yearling	non-breeder

One potential issue with comparison of survival rates across years was that the Bathurst herd had significant harvest until 2010, which reduced survival rates. We therefore added harvest rate to the model based on harvest estimates compared to estimate cow and bull abundance each year. Figure 9 shows the rates used which show an increasing harvest rate up to 2010, when harvest was reduced significantly. The harvest numbers, estimated cow and bull population sizes are given in Appendix 2.

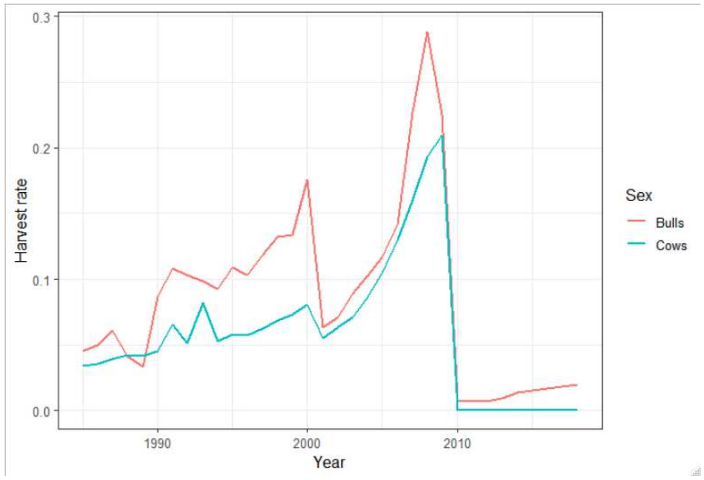


Figure 9: Harvest rates used as inputs into the demographic model. See Appendix 2 for actual harvest numbers and rates used in the model.

In 2018, three of 11 known Bathurst cow collars calved on the Queen Maud Gulf/Beverly calving ground which likely reduced the estimates of Bathurst breeding females used as an input of the model. The demographic model defines the Bathurst caribou herd as the population of caribou that utilized the Bathurst calving ground in the previous year (i.e. 2017). Collared caribou are included in the survival analysis if they utilized the Bathurst calving ground previously or if they were collared in 2018 in the vicinity of known Bathurst cows. In this context, the estimated survival rates from the demographic model are potentially influenced by emigration to the Queen Maud Gulf of adult cows. More precisely, the observed survival of cows is a function of both true survival and fidelity of cows to the calving ground. Low sample sizes of known Bathurst collared cows (11 in 2018) as well as high historic fidelity of caribou to the Bathurst calving ground challenged modeling of cow fidelity. We conducted a sensitivity analysis where the demographic model was run with and without the 2018 estimate to determine how much the 2018 emigration event might have affected demographic parameters. Of most interest was the estimate of cow survival, however of additional interest was the resulting estimate of adult cows when the 2018 estimate and emigration event were not part of the input data set, as described in the next section. As discussed later, more elaborate methods to model fidelity of caribou will be considered in future modeling efforts.

Estimation of Bathurst herd, including caribou that emigrated to Queen Maud Gulf

The estimates of adult females and herd size for the Bathurst herd in 2018 were influenced by movement of known Bathurst cows to the Queen Maud Gulf/Beverly calving ground. Of interest was the potential size of the Bathurst herd if this emigration event had not occurred. We used three approaches to initially assess how emigration of Bathurst cows to the Queen Maud Gulf coastal calving area may have influenced the Bathurst herd estimate.

1) The ratio of known Bathurst collared caribou calving in the Bathurst Inlet calving ground to total known Bathurst collars (8/11=0.727) provides a simple estimate of fidelity to the calving ground. Dividing the adult female estimate for the Bathurst calving ground by fidelity is therefore one estimate of total Bathurst adult females, including those occurring in the Queen Maud Gulf.

2) The Lincoln-Petersen mark-recapture estimator (N_{LP}) has been applied using proportion of collars in the survey area to estimate herd size for the Dolphin Union herd (Dumond and Lee 2013). The Lincoln-Petersen formula is N_{LP}= (((M+1)*(C+1))/(R+1))-1. In this case, M equals the number of known female collared caribou (11), R equals the number of known collared female caribou detected in the calving ground area (8), and C equals the estimate of total adult cows (N_{AF};) (Seber 1982, Krebs 1998). We used a variance estimator proposed by Innes *et al*., (2002) that considers both variance in the proportion collars and the adult female estimate ($var(\,N_{LP}) = N_{LP}^2(\,CV^2(p_{LP}) + CV^2(N_{AF}))$ where CV^2=(var(x)/x^2). The variance of the Lincoln-Petersen estimate of capture probability (p_{LP}) was estimated based on the hypergeometric probability distribution, which is assumed with the Lincoln Petersen estimator (Thompson 1992). This estimator is a variation on the first estimator above.

3) The Lincoln-Petersen estimator of adult females was challenged by the low sample size of known Bathurst herd collared caribou (11) and therefore results should be interpreted cautiously. An alternative estimate of caribou was derived using the demographic model with the 2018 breeding female estimate not included in the input

data set. This amounts to a projection of likely herd size if no emigration had occurred and all Bathurst cows calved on the traditional Bathurst calving ground. In this case an extrapolated herd estimate was only influenced by collar survival rates, previous survey estimates, and composition survey results, thus the estimate was not influenced by emigration of adult cows to the Queen Maud Gulf coastal calving area. This estimate was compared to the demographic model's projected 2018 estimate of cows.

RESULTS

Survey conditions

Weather conditions were challenging due to the late spring with higher than normal snow cover in most of the annual concentrated calving area (Figure 10). At the beginning of the survey on June 1, snow cover was more than 90% in most areas but snow melted rapidly during the first 10 days of June. On June 8 and 9, snow cover varied between ten and 80%. Most areas had about 50% snow cover and much of it was a "salt-and-pepper" patchy mosaic. This made caribou more difficult to see. We reasoned, however, that aerial photo coverage of the one main concentration of calving cows would still provide an accurate estimate that would account for at least 80% of the female caribou in the survey area. The rationale was that caribou would still be reliably seen on high-resolution photos that could be searched carefully and repeatedly with a 3D projection. In addition, the sightability of caribou on photos could be estimated using independent observers.

Figure 10: Photos of variable Bathurst survey conditions during visual surveys near Bathurst Inlet on June 9, 2018, the day after photo surveys were conducted (photos J. Adamczewski). Snow cover in most areas was patchy and ranged from about 80% (top right) to about 10% (bottom right). A view of Bathurst Inlet is shown at top left.

Movement Rates of Collared Female Caribou

The locations of 17 collared female caribou that occurred in or around the Bathurst survey area were monitored throughout the June survey to assess movement rates. The peak of calving is considered close when the majority of collared female caribou exhibit movement rates of less than 5 km/day (Gunn and Russell 2008). Using this parameter, we surmised that the peak of calving was near on June 8, when mean daily movement rates were on average below 5 km for the radio collared caribou (Figure 11). Movement rates remained below 5 km/day for the next week. The peak of calving was further verified from observations of substantial numbers of cows with calves from the visual survey flying on June 8 and 9.

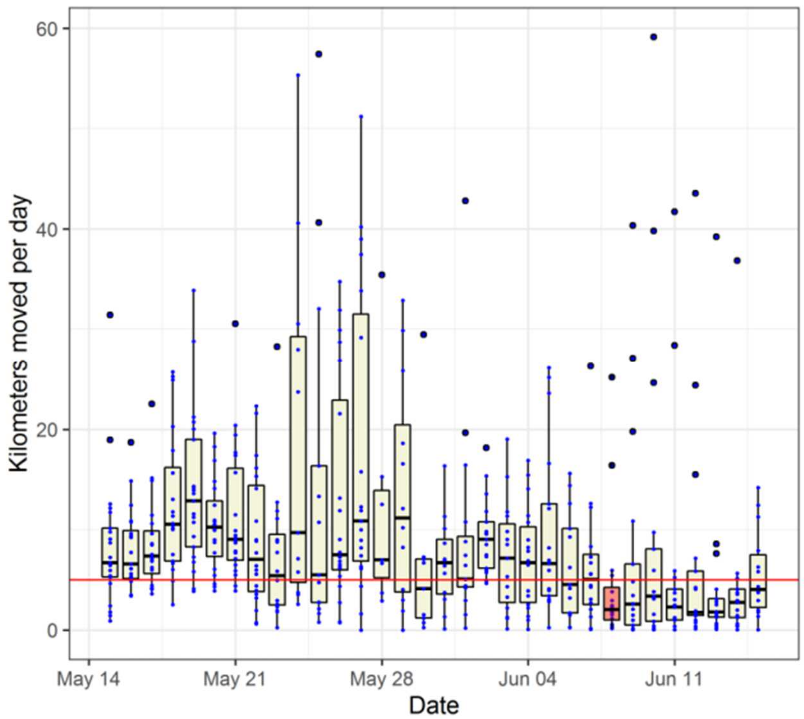


Figure 11: Movement rates of female collared caribou (n=17) on or around the Bathurst calving ground before and during calving in June 2018. The boxplots contain the 25th and 75th percentile of the data with the median shown by the central bar in each plot. The ranges up to the 95th percentile are depicted by the lines with outlier points shown as larger dots. The red line indicates a movement rate of 5 km/day. The movement rates of collared cows on June 8, the date of the photo survey, are highlighted in red. Visual strata were surveyed on June 8 and 9.

Collared Caribou Movements Leading up to June 2018 Survey

Our objectives for the reconnaissance survey were to map the distribution of adult and breeding females and define the concentrated calving area for the Bathurst herd. Collar movements and initial reconnaissance flying demonstrated an unusual distribution of caribou in the Bathurst Inlet area, which affected the way in which the Bathurst survey was designed and flown. An explanation of these collar movements with a sequence of maps is given here to explain the survey design.

In most years, Bathurst collared cows are largely moving northward from wintering areas, and by early June the Bathurst cows are well separated from Bluenose-East cows that calve west of Kugluktuk and Beverly cows that calve well east of Bathurst Inlet (Figure 12). In 2015 and 2016 the Bathurst herd showed these typical patterns. In 2017 the Bathurst herd was well mixed with the Bluenose-East herd, as shown by the southern ends of the collar trails that diverged in May and June, but cows separated well by the beginning of June. There was also substantial winter mixing of the Bathurst collared cows with Beverly collared cows, most Bathurst cows wintered on the tundra, and some wintered east of Bathurst Inlet. In spring 2017, 5 collared Bathurst cows whose 2016 June locations were on the usual Bathurst calving ground were initially east of Bathurst Inlet, but all 5 cows moved west of Bathurst Inlet in early June 2017 (Figure 13).

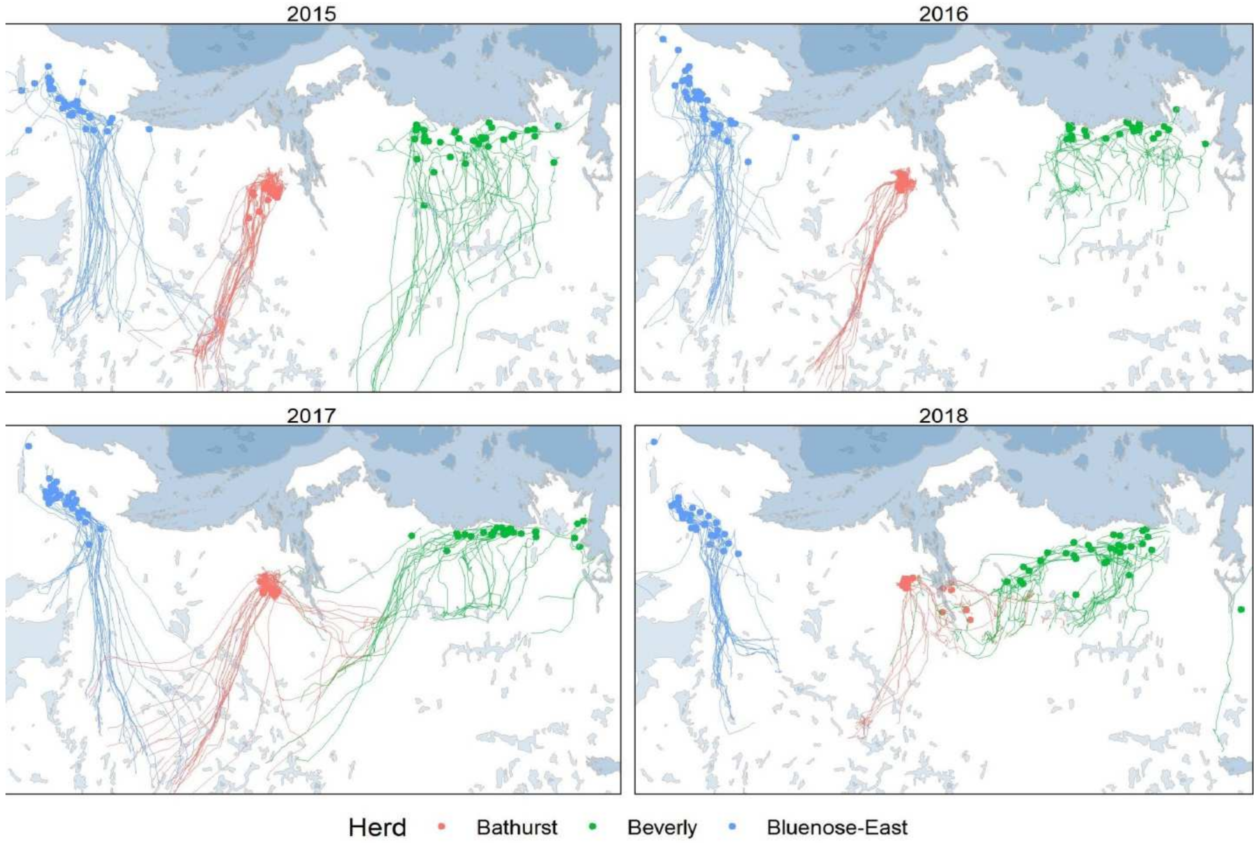


Figure 12: Spring migration paths of collared females from the Bluenose-East (blue), Bathurst (red) and Beverly (green) herds in 2015, 2016, 2017 and 2018 May 1 - June 10 of each year. The circles represent mean collared locations in the first two weeks of June for each year. Note that in June 2018 three of the known Bathurst collars (red dots) were in the main cluster of Beverly collars (blue dots); these are more easily seen in Figure 15b. Collar data are from GNWT and GN.

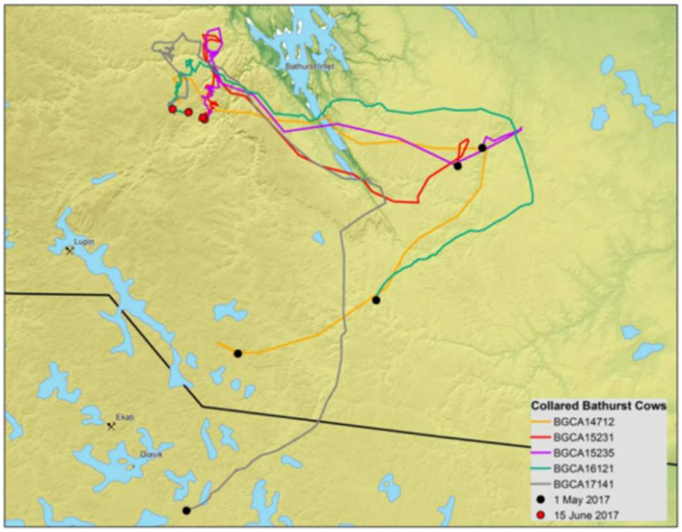


Figure 13: Spring migration paths of five collared Bathurst cows May 1 - June 15, 2017. All five cows were known to have been on the traditional Bathurst calving ground in June 2016. All wintered on the tundra and three wintered south or east of Bathurst Inlet with Beverly collared cows. Beverly collars are omitted for clarity.

In winter 2017-2018, collared Bluenose-East caribou wintered well separated from the Bathurst herd but Bathurst collared cows and bulls were well mixed with Beverly cows and bulls all winter (Figure 14). Bathurst collared cows all wintered on the tundra and some were east of Bathurst Inlet through the winter. In the spring, migration paths of Bathurst and Beverly collared cows showed continued mixing, with some Bathurst cows moving north into the main Beverly calving area (Figures 15a and 15b). Further south, collared Bathurst and Beverly bulls in the spring of 2018 also showed continued mixing and some movement into the Queen Maud Gulf area (Figure 16).

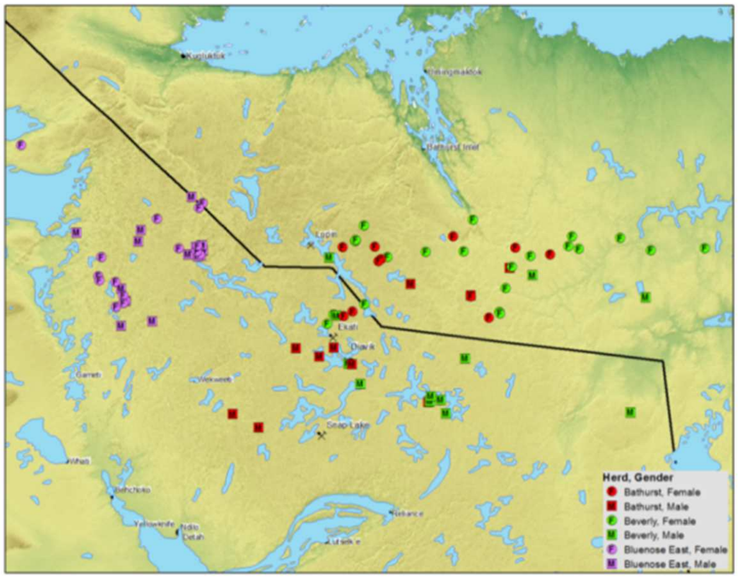


Figure 14: Winter locations (March 15, 2018) of Bluenose-East collared cows (18) and bulls (18) in purple, Bathurst cows (10) and bulls (10) in red, and Beverly cows (23) and bulls (12). The Bathurst and Beverly herds were mixed throughout winter 2017-2018.

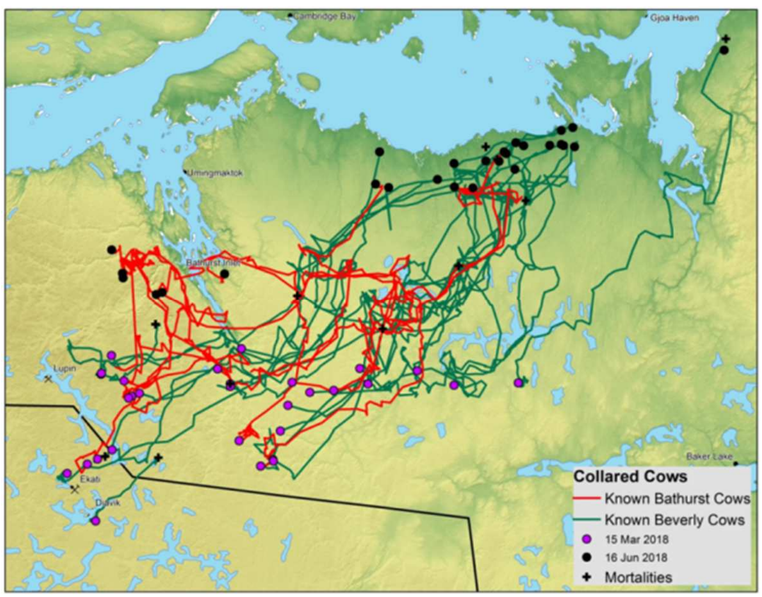


Figure 15a: Spring migration paths northward March 15 - June 16, 2018 of 11 known Bathurst collared cows (red) and 19 known Beverly cows (green). Purple dots are March 15 locations and indicative of wintering areas; black dots are June 16 locations.

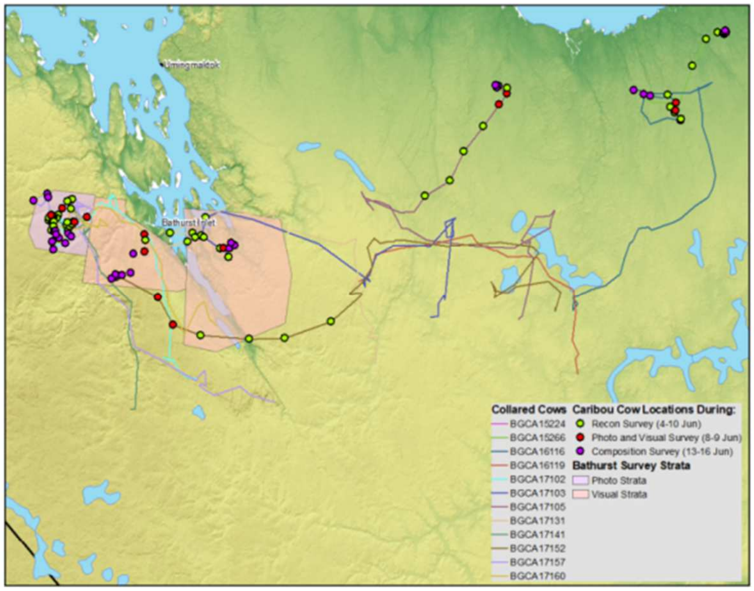


Figure 15b: Spring migration paths May 1 - June 16, 2018 of 11 known Bathurst collared cows, in relation to June 2018 Bathurst calving ground survey area. Eight collared Bathurst cows were within the Bathurst strata during the survey, while three were in the Queen Maud Gulf coastal calving area. Beverly collars are omitted for clarity. Light green dots were during the June 4-10 reconnaissance survey, red dots were at time of photo and visual flying, and purple dots were during the composition survey June 13-16.

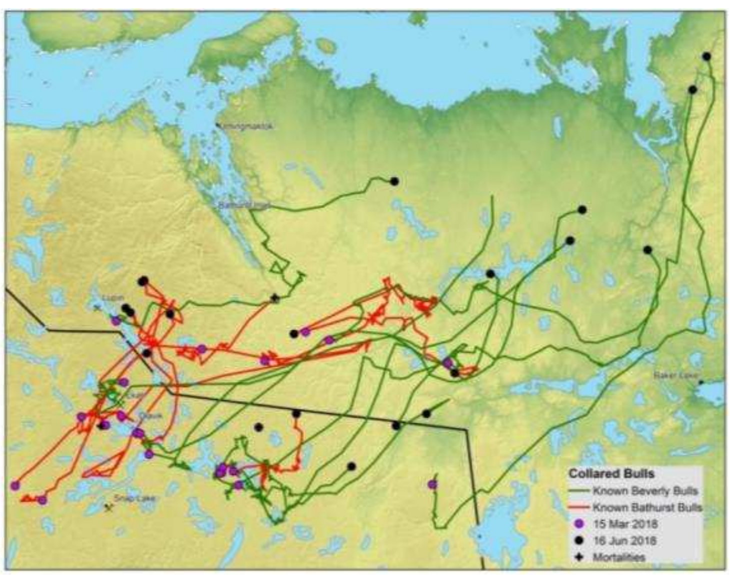


Figure 16: Spring movements (March 15 - June 16) of eight known Bathurst collared bulls and 11 known Beverly collared bulls in 2018.

For clarity, the movements of the 11 known Bathurst collared females are shown separately (Figure 15b). Of the 11 collared cows that were known to have calved on the Bathurst calving ground in 2017 or earlier, three moved well east of Bathurst Inlet and into the main calving area of the Beverly herd based on collared cows and the GN survey in June 2018. These three did not return to the calving ground that the Bathurst herd has used consistently since 1996, in June or thereafter. The remaining eight known collars were either west of Bathurst Inlet in the area the herd has calved in since 1996, or in the Bathurst Inlet area during the June survey period. There were an additional nine newly collared cows (collared winter 2017-2018) that were in the Bathurst Inlet area, thus 17 collared cows total in the Bathurst Inlet area. Of these 17, 12 were west of Bathurst Inlet in the traditional Bathurst calving area and five were east and west of the Inlet on June 8 (the day of the photo survey). These five showed a general westward movement during the initial two weeks of June (Figure 15b).

A further consideration in designing the Bathurst survey area was the observations from GN biologist M. Campbell and NU Tunngavik Incorporated (NTI) biologist D. Lee (pers. comm.) east of Bathurst Inlet, that showed consistent caribou trails in the snow from their first two survey lines with those trails moving westward. Further east, by contrast, all the caribou trails were more heavily used and led in a northeast direction, which followed the movements of the known Beverly cows to the central and eastern Queen Maud Gulf coastal calving area (Figure 15a).

Reconnaissance Survey to Delineate Strata

One Caravan based at the Ekati diamond mine flew the entire Bathurst reconnaissance survey June 4-10, 2018. The initial focus was on the areas with collared cows, and thereafter outlying areas were flown. Two other Caravans were based in Kugluktuk but these aircraft were unable to fly June 2-5 due to fog and low cloud in the Kugluktuk area. June 6-8 these two Caravans were primarily occupied with the Bluenose-East survey. A single day of clear weather with blue skies occurred on June 8, and on this day the Bathurst (one) and Bluenose-East photo blocks (two) were flown. The two Bathurst visual strata were surveyed on June 8 and 9, with one of the Kugluktuk Caravans assisting with covering the Visual East stratum. A summary of the fixed-wing flying on the Bathurst June 2018 survey is given in Table 2.

Table 2: Summary of reconnaissance and visual survey flying on the June 2018 Bathurst calving ground survey.

Date	Caravan 1 (Ekati)	Caravan 2 (Kugluktuk)
June 1	Arrive Ekati	Arrive Kugluktuk
June 4	Recon of core area at 10 km spacing	Grounded (weather)
June 5	Recon of core and surrounding area	Grounded (weather)
June 6	Recon of areas south and east of core area	Bluenose-East survey
June 7	Grounded (weather)	Grounded (weather)
June 8	Bathurst visual west block survey	Bluenose-East survey
June 9	Bathurst visual east block survey	Bathurst visual east block survey & lines between Bathurst and BNE
June 10	Recon lines to the west of Ekati & return to Yellowknife	Recon lines to the East of Kugluktuk & return to Yellowknife

Considering the collar movements of Bathurst and Beverly collared cows, the results of the Bathurst reconnaissance survey and the reconnaissance survey observations of the NU biologists, we reasoned that the Bathurst herd's main calving concentration as in past years was west of Bathurst Inlet with most of the collared Bathurst cows (12 of 17 in the Bathurst Inlet area) and that area should be the focus of the aerial photography. We reasoned further from the locations and movement patterns (generally westward) of the other 5 collared Bathurst cows just east and west of Bathurst Inlet, along with the westward-moving caribou trails reported by NU biologists, that a smaller portion of the Bathurst herd's cows were east and west of Bathurst Inlet, in much lower numbers, and these areas should be visual strata for the Bathurst survey. All known Beverly collared cows were by June 8 far east of Bathurst Inlet (Figure 15a), so it appeared there had been a separation of the two herds just east of Bathurst Inlet. The movement of three of the 11 known Bathurst cows to the main Beverly calving concentration in the Queen Maud Gulf, while based on a limited sample, suggested that a portion of the Bathurst herd's cows may have emigrated to join that herd (Figures 15a and 15b).

Reconnaissance flying included the areas west and east of Bathurst Inlet and all collared cows in the area (Figures 17a and 17b). Areas north, west and east were also flown extensively to make sure that no significant numbers of cows were missed. In the east, our reconnaissance lines adjoined the easternmost lines of the GN Beverly survey.

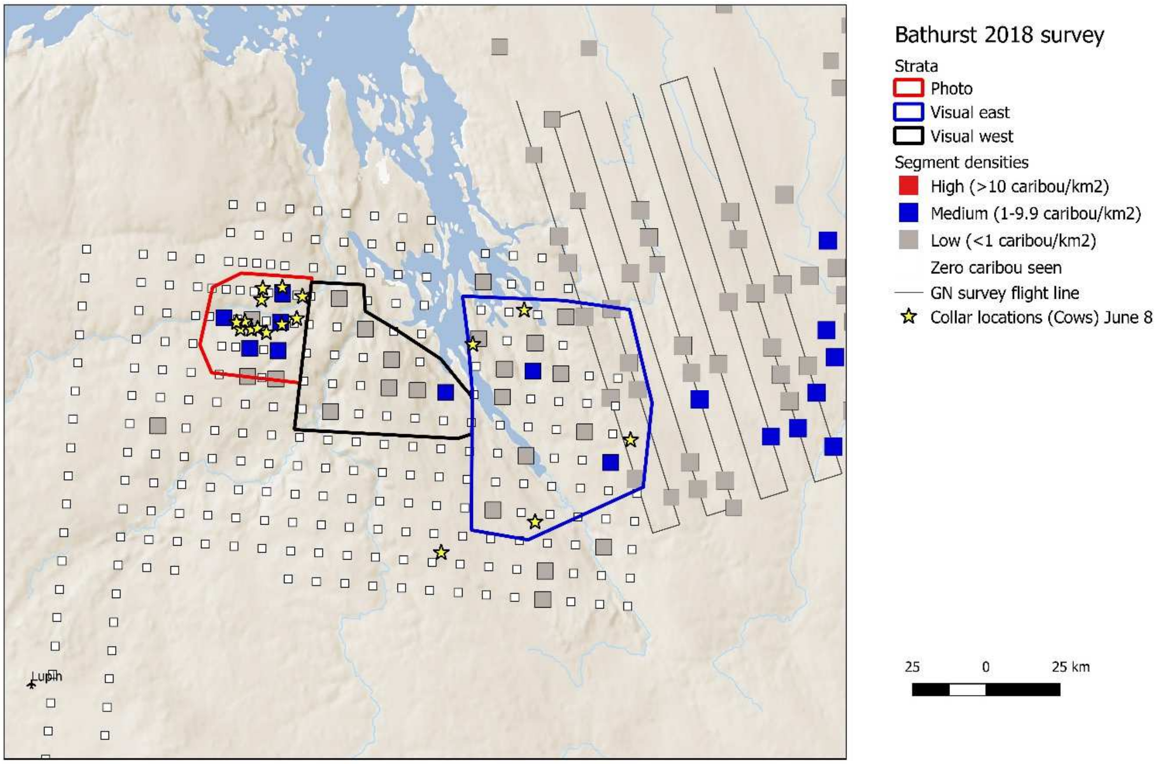


Figure 17a: Reconnaissance survey of the Bathurst calving ground in June 2018 with densities of caribou seen. White squares are from areas where no caribou were seen, grey squares are from low-density areas (< 1 caribou/km^2), and blue squares are from medium density areas (1-9.9 caribou/km^2). Gold stars show locations of collared female caribou on June 8. One caribou in the lower visual east did not return a location for June 8 and the June 7th location is shown. Full movement paths of collared caribou during the survey are shown in later sections of the report. Transects east of Bathurst Inlet were from the first day of flying on the GN Beverly survey in June 2018, courtesy of M. Campbell and D. Lee.

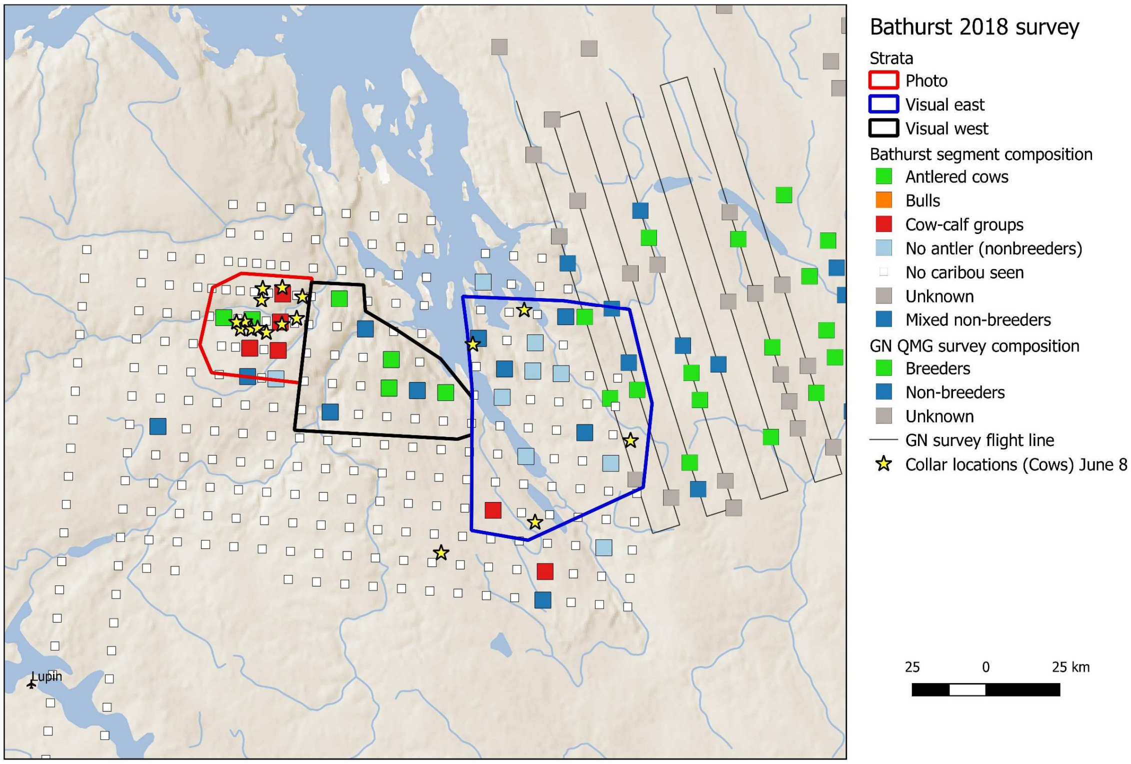


Figure 17b: Reconnaissance survey of the Bathurst calving ground in June 2018 with composition of caribou seen. Areas with cow-calf groups are red, areas with antlered cows are light green, and areas with non-breeders (non-breeding cows, bulls and yearlings) are blue. Gold stars are collared female caribou. Transects east of Bathurst Inlet were from the first day of flying on the GN Beverly survey in June 2018, courtesy of M. Campbell and D. Lee.

Stratification: Photo Stratum and Visual Strata

One photo stratum was defined for the Bathurst 2018 survey (Figures 17a and 17b), which included the majority of adult and breeding females and 12 of 17 collared cows in the survey area. This block was similar in size and location to the Bathurst photo block in June 2015 (Boulanger et al. 2017). Two lower density visual blocks were also defined: a Visual West block west of Bathurst Inlet and a Visual East block east of Bathurst Inlet.

Photo Stratum

With photo planes using high-resolution digital cameras, it is possible for the planes to fly at different altitudes. Flying at a higher altitude increases the strip width and reduces the number of pictures but also reduces the resolution of the pictures as indexed by ground sample distance (GSD). GSD is a term used in aerial photography to describe the distance between pixels on the ground for a photo sensor. In practical terms, the GSD for the aerial photos used in this survey translates into strip width and elevation AGL as follows (Table 3).

Table 3: GSD for photo sensor used on Bathurst June 2018 caribou survey, along with associated elevation AGL and photographed ground transect strip width. Typical elevation and strip width used in earlier film photo surveys are included for reference.

GSD (cm)	Elevation AGL (feet)	Strip width in m
4	2,187	692
5	2,734	866
6	3,281	1,039
7	3,828	1,212
8	4,374	1,385
9	4,921	1,558
10	5,468	1,731
Film Photos	2,000	914.3

With blue skies on June 8, the Bathurst photo stratum was flown at GSD 7 (average elevation 3,828 ft. (1,167 m) AGL) and a total of 1,715 photos were taken (Table 4, Figure 18).

Table 4: Stratum dimensions, transect dimensions, photo numbers and ground coverage for Bathurst photo survey block in June 2018. Actual coverage and photo numbers are in bold and underlined.

Photographic stratum dimensions				**Photos at GSD (Elevation AGL in feet)**			**Coverage at GSD**		
Area (km^2)	Average Transect Width (km)	Transects Sampled	Total transect length (km)	5 (2,734)	6 (3,281)	7 (3,828)	5	6	7
1,159	35	15	525	2,389	2,003	**<u>1,715</u>**	40%	48%	**<u>56%</u>**

Figure 18: Composite photo block west of Bathurst Inlet flown on June 8, 2018. The Hood River valley can be seen in an east-west direction in the upper half of the survey block.

Visual strata

The Bathurst reconnaissance survey was flown June 4-10 by a single plane based at Ekati. Given forecasted weather conditions for June 8 and 9, visual survey flying was designed to allow strata to be flown within two days, with one plane for the Visual West stratum and two planes for the Visual East stratum. Estimates of density from the reconnaissance data suggested that each stratum had relatively equal low densities of caribou (0.15 and 0.13 caribou/km^2 for west and east strata respectively) and therefore allocation of effort was similar for the two strata. Based on logistics 12 and 18 transects were flown in the west and east strata with resulting levels of coverage of 16 and 18% respectively. Dimensions of photo and visual strata are in Table 5.

Table 5: Final dimensions of photo and visual strata for the 2018 Bathurst calving photo survey.

Stratum	Total Transects Possible	# Sampled Transects	Area of stratum (km^2)	Average Strip width (km)	Transect area (km^2)	Coverage
Photo	27	15	1,227.3	1.29[A]	682.7	56%
West Visual	12	12	2,305.6	0.8	368.3	16%
East Visual	18	18	4,661.9	0.8	824.5	18%

Movements of collared caribou within and between reconnaissance and photo/visual blocks

As described earlier, 17 active cow collars were in the Bathurst Inlet area during the June 2018 survey, transmitted locations daily, and were used for survey planning. Twelve of these were in the photo stratum for the duration of the visual/photo survey (Figure 19). One collared cow moved from the Visual West to the Visual East stratum during the survey period, two were contained within the Visual East stratum and two moved out of the Visual East stratum during the visual survey. There was no location given for one of the caribou on June 8, however, it occurred in the stratum on June 7 but was out of the stratum on June 9. It was likely in the stratum during the survey based on the midpoint of the June 7 and June 9 locations (Figure 19). We note that reconnaissance flying to the south of the three survey blocks showed extremely low numbers of caribou present. Three additional collared cows had moved into the main Beverly calving ground far to the east and are not shown on this map.

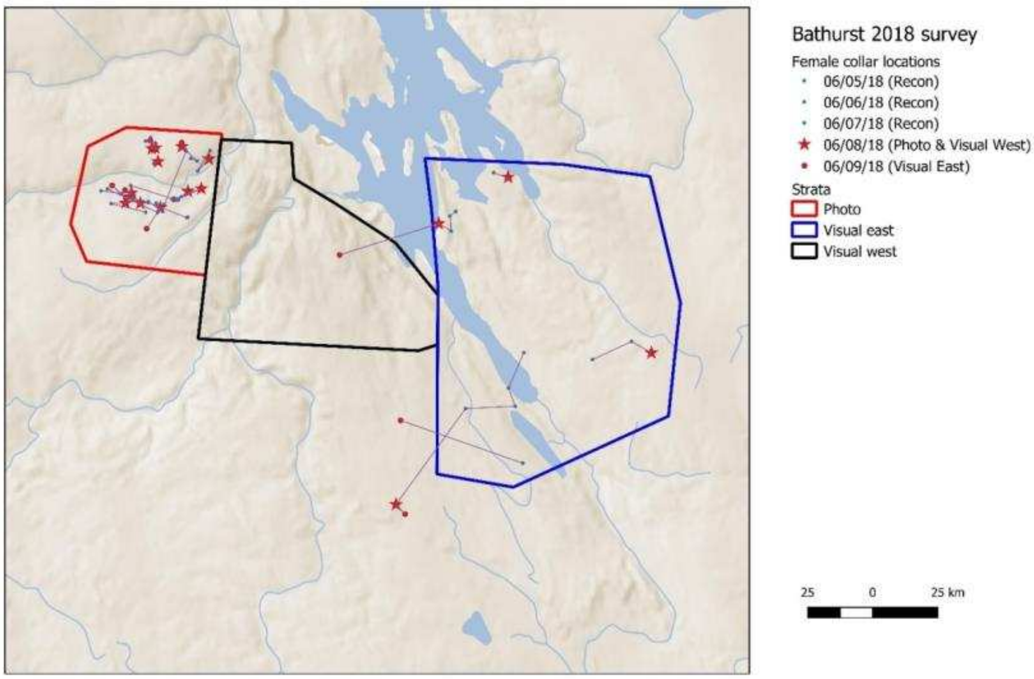


Figure 19: Locations of collared Bathurst female caribou and movements from the reconnaissance phase (June 5-7), photo survey (June 8th) and visual survey of the east stratum on June 9th. One collar near the south end of the Visual East block did not report a location on June 8, so no star is shown.

Collared caribou that had movement rates of greater than 5 km/day were mainly located within the central regions of strata, suggesting that the strata contained the range of caribou movements as indicated by collared caribou. The one collared cow south of the visual strata during the survey was in an area where almost no caribou were seen during the reconnaissance flying (see Figure 17).

In general, the observations of caribou in the Visual East and Visual West blocks confirmed the low numbers found during the reconnaissance survey (Figure 20).

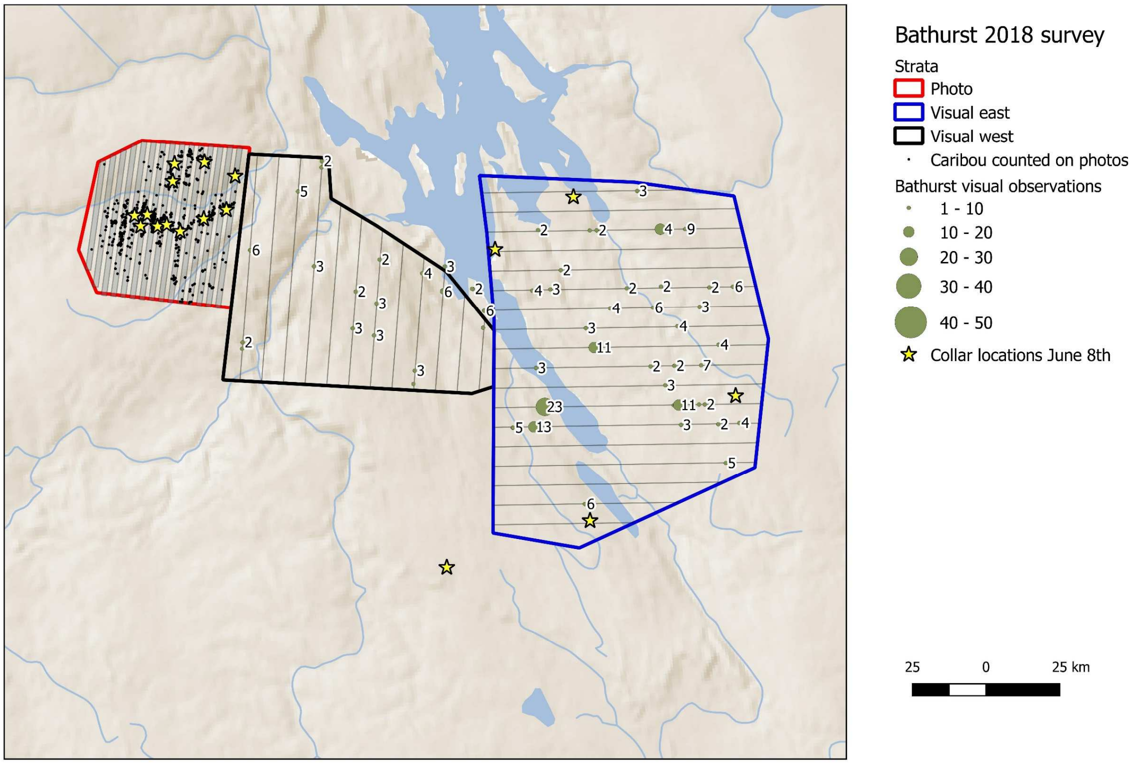


Figure 20: Map of Bathurst June 2018 survey blocks showing the locations of caribou groups seen in the photo block from photos and in the visual blocks from observations June 8 and 9. Relative group sizes for the visual blocks are shown as varying sizes of circles, but not for the groups seen in the photo block (too many).

Estimates of Caribou on Photo Stratum: Sightability

Photo interpreters found that the sightability of caribou on photos was influenced by snow cover. If the ground was bare caribou were readily visible (Figure 21), however, caribou were not as easy to see with patchy snow, particularly when caribou were at the edges of snow patches. Overall, it took nearly twice as long to count the 2018 aerial photos (Bathurst and Bluenose-East) as in the last photo surveys in 2015 when the ground was predominantly bare (D. Fisher, GreenLink Forestry Inc., pers. comm.), to allow for comprehensive searching of all photos.

Figure 21: A zoomed-in portion of one of the Bathurst aerial photos from June 2018 survey. Most caribou and their shadows are readily visible. A caribou on the edge of a snow patch in bottom left corner is less clearly visible. There are 23 caribou on this photo.

Initial quality control of photo counting was carried out by D. Fisher re-counting several hundred of the Bathurst and Bluenose-East photos counted by his staff. In addition, sightability of caribou on photos was estimated by having a 2nd observer from GreenLink Forestry independently re-count caribou on a subset of photos, without knowing what the first observer had found. The second observer was Derek Fisher, who is the most experienced observer of aerial photographs at the company.

The photo survey transect lines were resampled systematically using transects perpendicular to the original photo-plane transects. Two phases of sampling were conducted. In the first phase, transects were sampled regardless of whether caribou were detected in the original counts. In the second phase, photos closest to the first phase transect line that contained caribou in the first phase were resampled. Using this approach, we tested whether all caribou were detected on photos even when they were not detected originally. The second phase still was a systematic sample but increased the sample size of photos with caribou counts, which were most useful for cross validation purposes. Figure 22 shows the photo resampling design.

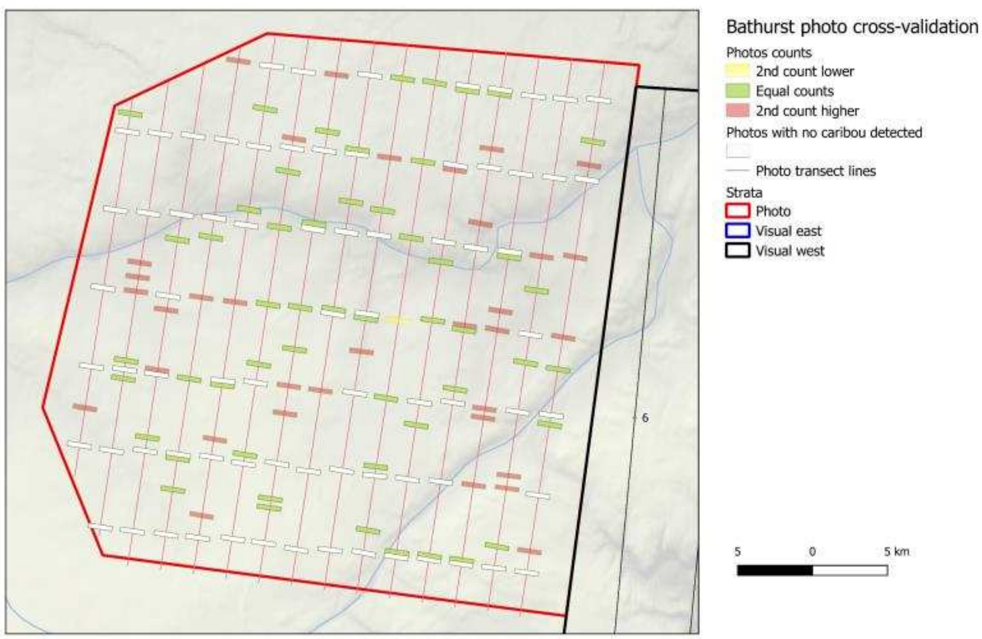


Figure 22: Systematic sampling design for cross validation of photos for the Bathurst June 2018 calving ground survey.

Overall, 161 photos were recounted, of which 87 contained caribou. Seventy-four additional caribou were counted in the second count, with a corresponding ratio of original to second count of 0.842 (Table 6). One assumption in this comparison is that the first and second counter were counting the same caribou on a given photo. To test this assumption the distances between points of counted caribou in the first and second count was measured in GIS to identify any counted caribou that were a further distance from the original counts.

This process did not identify any new caribou. One caribou was counted on a photo during the original counts but not counted in the second count. An additional 228 photos were re-sampled by similar means as part of the Bluenose-East June 2018 survey, with similar results (Boulanger et al. 2019).

Table 6: Summary of photo cross validation data set for Bathurst June 2018 aerial photos. The ratio of the original count to second count is an estimate of photo sightability.

Original count	Second count	New caribou counted in second count	Caribou not detected in second count	Original count/second count
393	467	74	1	0.842

This cross-validation process can be modeled as a two sample mark-recapture sample with caribou being "marked" in the original count and then be "re-marked" in the second count. Using this approach avoids the assumption that the second counter detects all the caribou on the photo. The Huggins closed N model (Huggins 1991) in program MARK (White and Burnham 1999) was then used to estimate sightability. Table 7 below gives the results with the sightability from the first counter being very close to the ratio of the original to second count. The reason for this is that the second counter only missed one caribou not originally counted and therefore his sightability score was very high.

Table 7: Estimates of sightability for the first and second counters on the Bathurst June 2018 aerial photos, from the Huggins closed N model.

Counter	Estimate	SE	LCI	UCI	CV
First	0.841	0.017	0.805	0.872	2.01%
Second	0.997	0.003	0.982	1.000	0.25%

The variance estimate from program MARK assumes that all caribou counted are independent, which is likely violated given that in many cases caribou occurred in larger groups. The violation of this assumption leads to over-dispersion of binomial variances and a resulting negative bias. To confront this issue, we used a bootstrap method (Manly 1997) that bootstrapped based on caribou counted on photos. The assumption in this case is that counts of caribou on each photo are independent rather than all caribou counted being independent. The resulting estimate of SE was 0.042 with a coefficient of variation (CV) of 4.7% which is more realistic, and this was used for subsequent calculations. Future photo counting efforts should classify counted caribou in groups to allow more focused methods of estimating sightability variance.

Estimates of Total Caribou in Photo Stratum

Table 8 below gives the initial estimates of caribou in the photo stratum and the estimates adjusted for photo sightability. We also corrected the initial estimates for differential strip widths, as was done in the 2015 surveys. The photo-sightability estimate was calculated as the initial estimate divided by photo sightability. Variance for the photo sightability was calculated using the delta method (Buckland et al. 1993). The resulting estimate was about 800 caribou (16%) higher than the non-adjusted estimate.

Table 8: Initial estimates of abundance in survey strata, estimated photo sightability and corrected estimates of abundance with photo sightability for Bathurst June 2018 calving photo survey.

Initial estimate of N (not corrected)			Photo sightability			Photo-sightability corrected N estimate		
N	**SE**	**CV**	**p**	**SE**	**CV**	**N**	**SE**	**CV**
4,245.7	580.34	0.136	0.842	0.042	0.050	5,043.4	734.5	0.146

Double Observer Analysis and Estimates of Total Caribou in Visual Strata

Detailed descriptions of the double observer methods and results are provided in Appendix 1. Data from both the Bathurst and Bluenose-East surveys were combined as some survey crews flew portions of both surveys. Overall, double observer corrected estimates (using the MRDS R package) were about 5% higher than non-double observer estimates. Precision was lower than for uncorrected count-based estimates but still acceptable (Table 9).

Table 9: Standard strip transect and corrected double observer model estimates of caribou on Bathurst visual strata in 2018.

Stratum	Caribou counted	Standard estimate			Double observer corrected estimate				
		Estimate	SE	CV	Estimate	SE	Confidence interval		CV
Visual West	88	551	132.1	24.0%	567	140.50	332	970	24.8%
Visual East	220	1,244	286.7	23.0%	1,309	332.70	773	2,216	25.4%
Total	369	1,795	151.7	17.6%	1,877	360.9	1,265	2,783	19.2%

Estimates of Total Caribou on the Calving Ground

The estimate of total caribou at least one year old on the calving ground (6,919) is given in Table 10 below. The CV was slightly high due to the aggregation of caribou (clumped distribution) in the photo stratum as well as the added variance from estimating sightability of caribou on the photos.

Table 10: Estimates of caribou numbers (at least one year old) in photo and visual Bathurst strata in June 2018. These are corrected for sightability.

Strata	N	SE N	Conf. Limit		CV	Density
Photo	5,043	734.5	3,696	6,881	0.146	4.11
West Visual	567	140.5	332	970	0.248	0.24
East Visual	1,309	332.7	773	2,216	0.254	0.27
Total	**6,919**	**818.5**	**5,415**	**8,843**	**0.118**	

Composition Survey in June 2018

A composition survey was conducted in the Bathurst survey area June 13-16, which was five to eight days after the photo and visual survey. Review of the locations of collared females suggested that minimal movement occurred during this time with collared females inside the photo stratum on June 8 remaining within it (Figure 23). One additional collared cow that was south of the photo stratum on June 8 moved into this stratum, thus the composition survey results were still representative of the distribution of Bathurst caribou females. In addition, daily movement rates for Bathurst collared cows were below 5km/day on June 8 and remained there the following week (Figure 11).

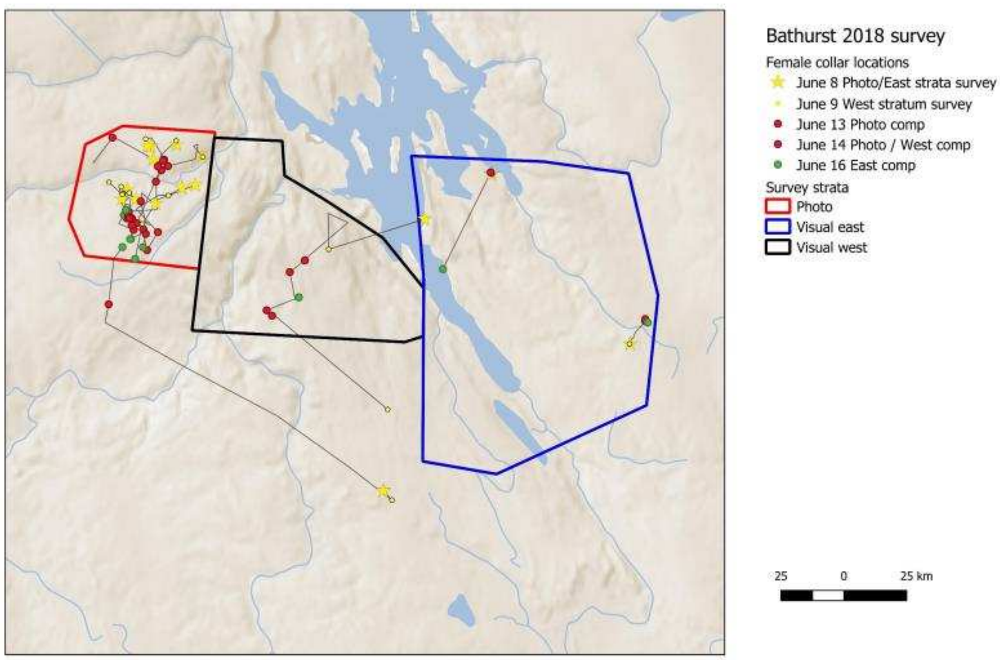


Figure 23: Locations of collared females between the dates of the Bathurst photo and visual strata flown June 8 and 9, and the composition survey flown June 13-16.

The composition survey systematically covered the photo stratum (Figure 24), which confirmed stratum boundaries and showed that most breeding cows were contained within this stratum. The Visual West block had some cow-calf groups and a higher proportion of non-breeding cows than the photo block. The Visual East stratum mainly contained bulls, yearlings and a few non-breeding cows. The numbers of breeding cows, non-breeding cows, yearlings and bulls within each stratum are listed in Table 11.

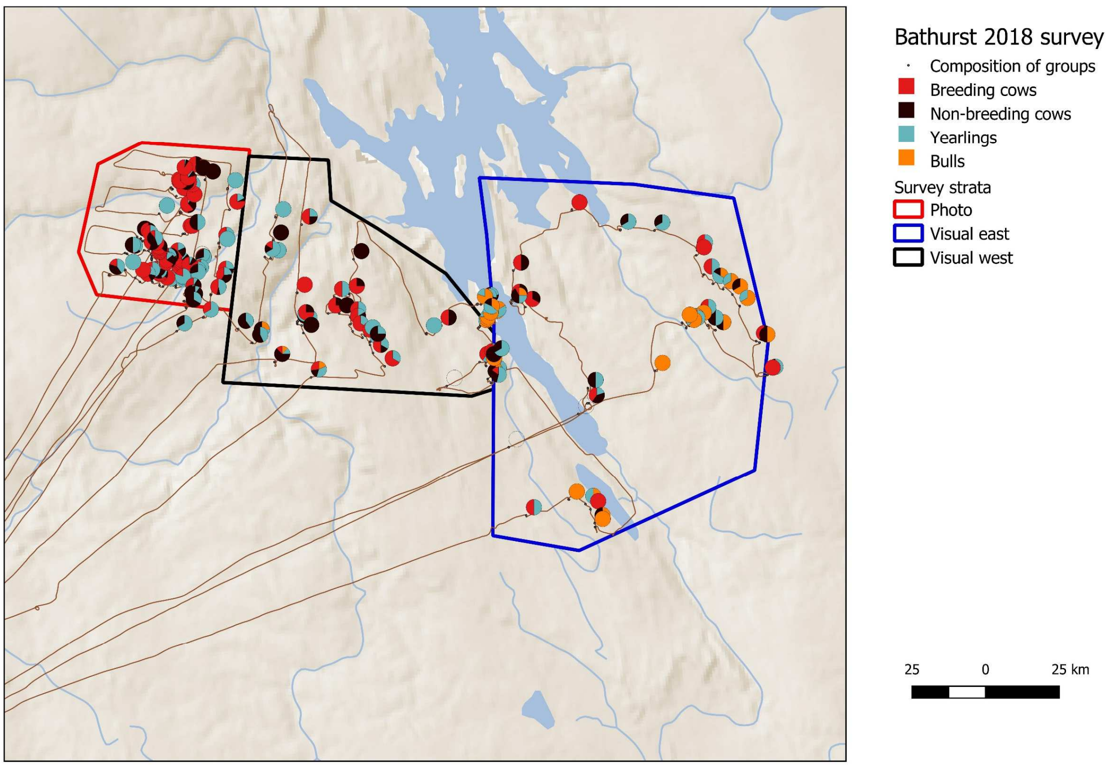


Figure 24: Helicopter flight paths and caribou groups classified during calving ground composition survey of Bathurst caribou, June 13-16, 2018. The size of the pie charts is proportionate to the number of caribou classified in a group. Proportions of age-sex classes make up the individual pie sections.

Table 11: Summary of composition survey results on Bathurst calving ground June 2018 in photo and visual strata.

Stratum	# groups	Adult females			Yearlings	Bulls	Total caribou (1 yr+)
		Total	breeding	non-breeding			
Photo	80	1,517	1,134	383	242	0	1,759
Visual East	38	46	20	26	33	36	115
Visual West	52	135	72	63	94	34	263

Estimates of the proportions of adult females and breeding females were then derived with variance and confidence limits estimated via bootstrap methods (Table 12).

Table 12: Proportions of breeding females and adult females from composition survey on Bathurst calving ground June 13-16, 2018. Proportions are expressed as percentages of caribou at least one year old.

Stratum	Estimated Proportion	SE	Confidence Limit (Upper and Lower)	
Breeding females				
Photo	0.645	0.029	0.581	0.695
Visual west	0.274	0.043	0.185	0.354
Visual east	0.174	0.044	0.098	0.266
Adult females				
Photo	0.862	0.020	0.814	0.896
Visual West	0.513	0.041	0.429	0.593
Visual East	0.400	0.059	0.284	0.524

Estimates of Breeding and Adult Female Caribou

Estimates of the numbers of breeding females (Table 13) were derived by the product of caribou at least one year old (Table 10) and the proportion of breeding females in each stratum (Table 12). Estimates of the numbers of adult females (Table 14) were similarly derived from the product of caribou at least one year old (Table 10) and the proportion of adult females in each stratum (Table 12).

Table 13: Estimates of number of breeding females based upon initial abundance estimates and composition surveys on Bathurst calving ground June 2018.

Stratum	Caribou		Proportion of breeding cows		Number of Breeding Females				
	N	CV.N	pb	CV	N	SE	Conf. Limit		CV
Photo	5,043	0.146	0.645	0.045	3,253	495.8	2,350	4,502	0.152
West Visual	567	0.248	0.274	0.157	155	45.6	82	292	0.294
East Visual	1,309	0.254	0.174	0.253	228	81.7	110	474	0.358
Total	**6,919**				**3,636**	**504.6**	**2,709**	**4,880**	**0.139**

Table 14: Estimates of numbers of adult females based upon initial abundance estimates and composition surveys on Bathurst calving ground June 2018.

Stratum	Caribou		Proportion of adult cows		Number of Adult Females				
	N	CV.N	pa	CV	N	SE	Conf. Limit		CV
Photo	5,043	0.146	0.862	0.023	4,347	641.1	3,174	5,954	0.147
West Visual	567	0.248	0.513	0.080	291	75.7	166	511	0.260
East Visual	1,309	0.254	0.400	0.148	524	153.9	286	960	0.294
Total	**6,919**				**5,162**	**663.7**	**3,935**	**6,771**	**0.129**

The ratio of breeding females to adult females was 70.4%, suggesting a fair-good proportion of pregnant females compared to previous survey years. The proportion of breeding females in June 2015 was lower (60.9%; Boulanger et al. 2017).

Fall Composition Survey October 2017

A composition survey was conducted 23-25 October 2017 to estimate the bull-cow ratio of the Bathurst herd. Overall there were 39 groups observed with totals of bulls, cows and calves summarized in Table 15. Bootstrap methods were used to obtain SEs on estimates (Table 16).

Table 15: Summary of observations from fall composition survey on Bathurst herd October 23-25, 2017.

Cows	Bulls	Calves	Groups
940	532	431	39

Table 16: Estimates of the bull-cow ratio, proportion cows, and calf-cow ratio from the fall composition survey on Bathurst herd October 2017.

Indicator	Estimate	SE	Conf. Limits		CV
Proportion cows	0.629	0.017	0.596	0.666	2.7%
Bull-cow ratio	0.592	0.044	0.501	0.678	7.4%
Calf-cow ratio	0.429	0.018	0.399	0.466	4.1%

Extrapolated Herd Estimates for Bathurst Herd

Estimates of adult herd size (caribou at least two years old) for the Bathurst herd in 2018 are presented in Table 17. The estimate based on an assumed fixed pregnancy rate uses a value of 0.72 (Dauphiné 1976) while the estimated proportion of breeding females in June 2018 was 0.704, which resulted in relatively similar extrapolated herd estimates (8,207 vs 8,029; Table 17). The preferred estimate uses the proportion of females, which is simply the estimate of adult females (5,162) divided by the proportion of cows in the herd (0.629) from the fall 2017 survey. Log-based confidence limits, which were used for other estimates as well as traditional symmetrical confidence limits (estimate ± t*SE) are given. In most cases log-based limits give better representation of confidence estimates than traditional symmetrical methods because the distribution of estimates has a slight positive skew. However, previous analyses have used the symmetrical method. The actual difference in CI's is relatively minor.

Table 17: Extrapolated herd size estimates for the Bathurst herd in 2018 based on two estimators. The estimate based on proportion of adult females is the preferred one and has a smaller variance.

Method	N	SE	Log-based CI		Symmetric Traditional CI		CV
Proportion of adult females	8,207	1079.0	6,218	10,831	5,920	10,494	13.1%
Constant pregnancy rate (0.72)	8,029	1390.9	5,565	11,583	5,064	10,993	17.3%

Trends in Numbers of Breeding and Adult Females and Herd Size 2010-2018

Estimates of breeding cows, nonbreeding cows and (total) adult cows in the Bathurst herd are shown in Figure 25 for surveys 2009-2018. A roughly stable trend 2009-2012 was followed by significant declines to 2015 and 2018. Reductions from 2015 to 2018 in estimates of breeding females were 55.0%, in adult females 61.0% and in overall herd size 58.5%. The reduction in herd size indicates an annual rate of decline of 25.5% 2015-2018. These reductions consider only the numbers of caribou found on the June 2018 Bathurst survey area (and associated extrapolated herd sizes), and do not consider the apparent loss of some of the herd to the Queen Maud Gulf calving ground. The proportion of adult females classified as breeding was higher (70.4%) in 2018 than in 2015 (60.9%).

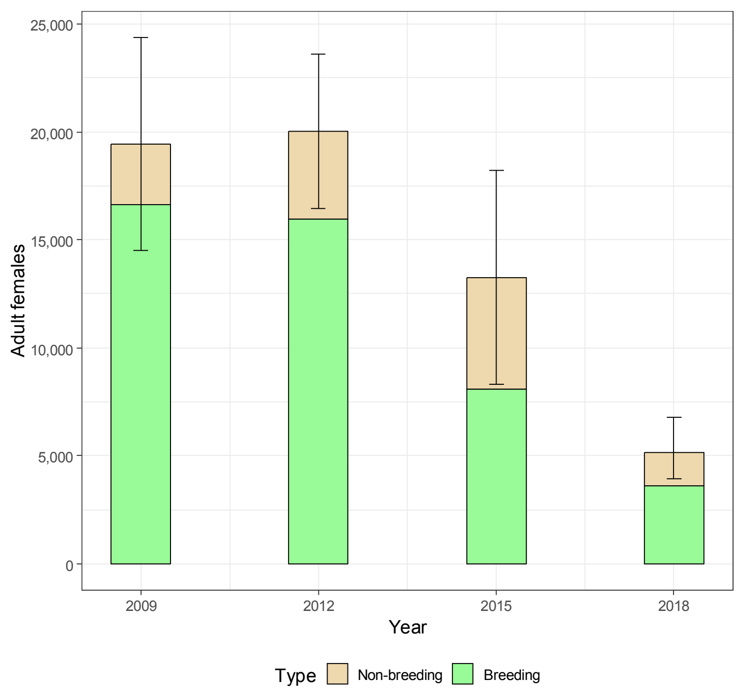


Figure 25: Estimates of the number of breeding females (green), non-breeding females (light brown) and adult females (summed bars) in the Bathurst herd 2010-2018.

Demographic Analysis of Trends in the Bathurst Herd

The Bayesian state space model (Humbert et al. 2009, Kery and Royle 2016) was used to estimate longer term trends in the Bathurst data set. For this analysis, trend (log λ) was modeled as a random effect, therefore allowing assessment of variation in λ in intervals between surveys.

For breeding females, overall trends were significant (p=0.025) with an overall λ estimate for the entire data set (1985-2018) of 0.88 (0.79-0.98) (Figure 26).

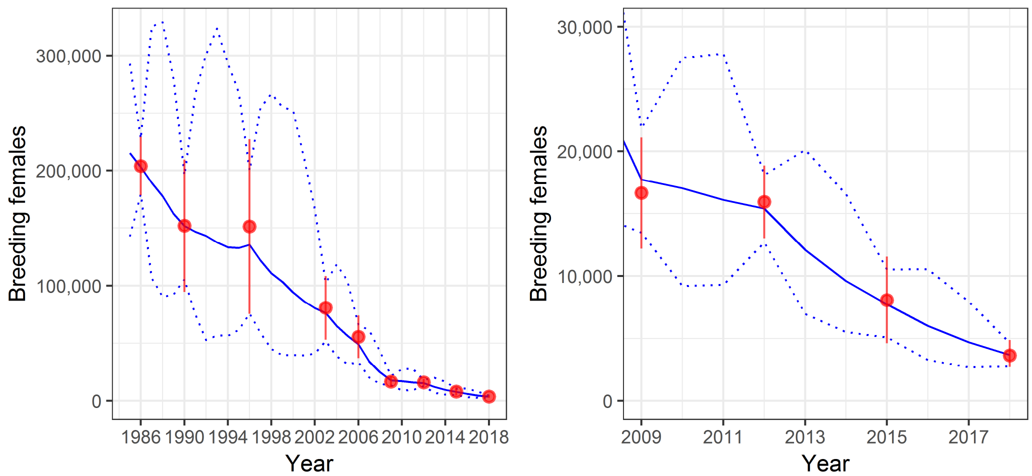


Figure 26: Trends in Bathurst breeding females 1986-2018, as estimated by the Bayesian state space model. The left graph is for the full extent of the data set and the right graph is zoomed into the period of 2009-2018. Field estimates are given as red dots (with confidence limits) and model predictions are shown as blue lines with confidence intervals as hashed lines.

Of greatest interest is trend since 2009, which suggested an initial increasing trend up to 2012, where the geometric mean of λ (3 year) was 0.95 (CI=0.87-1.06), before declining to 0.78 (CI=0.68-0.91) in 2018 (Figure 27). Trend of breeding females will be influenced both by abundance of adult females and pregnancy rate.

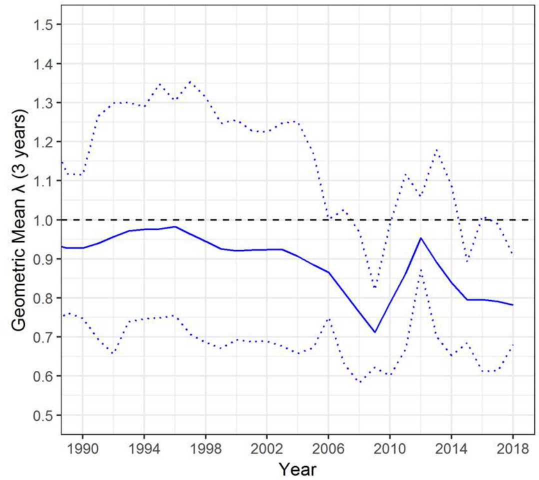


Figure 27: Estimate of λ for Bathurst breeding females 1989-2018, as estimated by the Bayesian space model analysis. Model predictions are shown as blue lines with confidence intervals as hashed lines. A λ of 1.0 indicates a stable population.

Trends in numbers of adult Bathurst females (Figure 28) were also significant for the entire data set (p=0.045) with an overall λ estimate of 0.88 (CI=0.80-0.99) for the entire (1985-2018) data set (Figure 29).

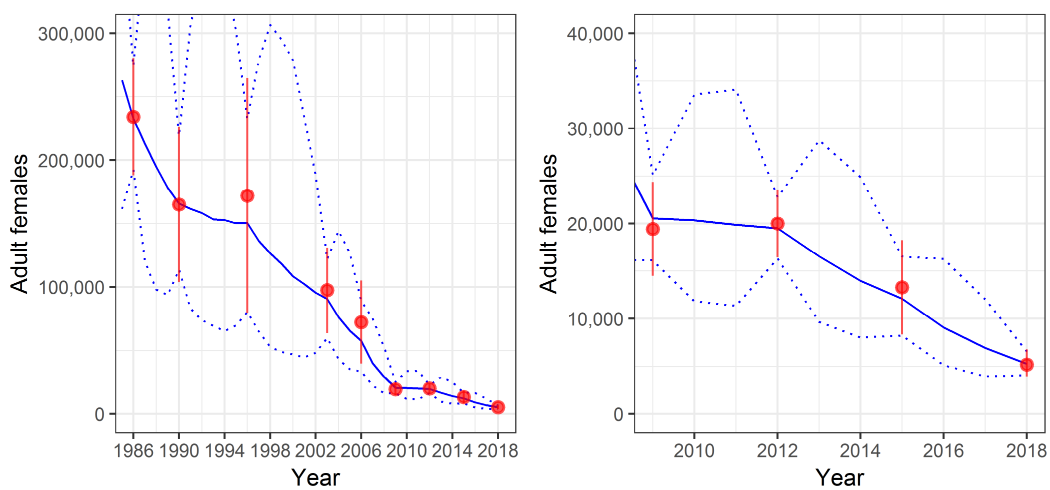


Figure 28: Trends in numbers of adult Bathurst females 1986-2018, as estimated by the Bayesian state space model. The left graph is for the full extent of the data set and the right graph is zoomed into the period of 2009-2018. Field estimates are given as red dots (with confidence limits) and model predictions are shown as blue lines with confidence intervals as hashed lines.

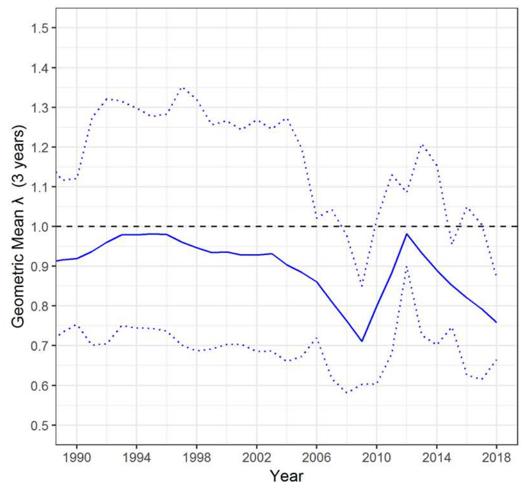


Figure 29: Estimates of λ for adult Bathurst females 1989-2018, as estimated by the Bayesian state space model. Model predictions are shown as blue lines with confidence intervals as hashed lines. A λ of 1.0 indicates a stable population.

Estimates of λ in adult Bathurst females were also relatively similar in trend to the breeding female estimates, with the exception of the 2012-2018 period where a trend of decreasing λ is evident, resulting in a three year geometric mean estimate of 0.76 (CI=0.66-0.7) in 2018 (Figure 29).

In general, densities of caribou in the core Bathurst area have decreased in parallel with overall trends since 2012. In 2012, densities in the core area did increase in unison with a smaller more aggregated core calving area. An analysis of trends in core calving ground area and related densities is given in Appendix 4.

Demographic analysis using multiple data sources

Survival analysis of collared cows

Collar data from adult Bathurst females were used to estimate annual survival rates 1996-2018. Of most interest was the interval 2009-2018 when management actions limited hunting mortality and collar sample sizes were increased after 2014. Estimates of monthly mortality, which is the ratio of collar mortalities to collars available, indicate higher mortality rates in the summer months of 2010-2014 followed by lower levels of mortality from 2014 to 2018 (Figure 30). A collar history plot that details individual collar fates is given in Appendix 2.

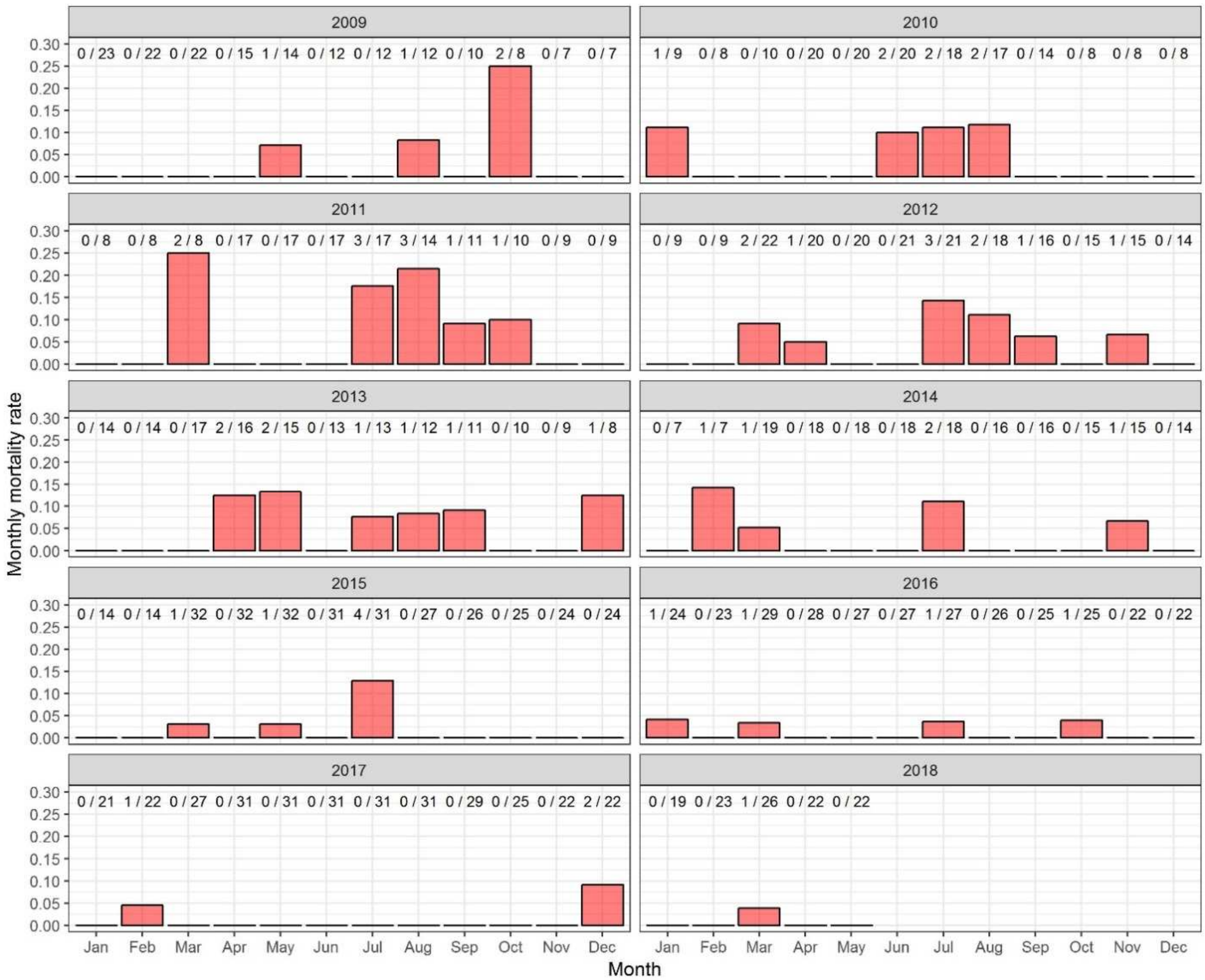


Figure 30: Summary of monthly collared cow mortality data for Bathurst herd 2009-2018. Individual collar histories for recent years (i.e. since 2016) are given in Appendix 2.

The total data set is summarized in Table 18 with corresponding cow survival rate estimates for each year. Initial collar sample sizes were very low in 1996 and 1997 (<10), then increased somewhat 1998-2014 (10-20) with an average of 25-26 in 2015-2017. As a result, annual survival estimates have a high variance and should be interpreted with caution.

Table 18: Summary of Bathurst collar sample sizes and survival estimates.

Caribou Year	Mortalities	Live collar sample sizes				Yearly survival estimates			
	Total	Collar months	Mean	Min	Max	Estimate	SE	Conf. Limit	
1996	2	101	8.4	7	10	0.79	0.13	0.44	0.95
1997	2	85	7.1	6	12	0.75	0.15	0.38	0.94
1998	7	174	14.5	5	21	0.52	0.14	0.27	0.76
1999	1	161	13.4	13	14	0.92	0.07	0.61	0.99
2000	3	158	13.2	12	15	0.79	0.11	0.51	0.93
2001	6	123	10.3	5	13	0.50	0.14	0.25	0.76
2002	2	136	11.3	9	15	0.86	0.09	0.58	0.97
2003	5	117	9.8	7	13	0.58	0.14	0.31	0.82
2004	4	136	11.3	6	22	0.66	0.14	0.35	0.87
2005	4	187	15.6	13	19	0.78	0.10	0.53	0.91
2006	3	199	16.6	15	22	0.85	0.08	0.62	0.95
2007	6	213	17.8	15	21	0.71	0.10	0.48	0.86
2008	2	210	17.5	12	23	0.87	0.09	0.59	0.97
2009	4	135	11.3	7	20	0.61	0.15	0.31	0.85
2010	8	151	12.6	8	20	0.53	0.13	0.29	0.76
2011	11	167	13.9	9	22	0.46	0.11	0.26	0.67
2012	11	196	16.3	14	21	0.51	0.10	0.31	0.70
2013	6	145	12.1	7	19	0.55	0.14	0.28	0.79
2014	5	236	19.7	14	32	0.78	0.09	0.55	0.91
2015	6	319	26.6	23	31	0.81	0.07	0.63	0.91
2016	3	306	25.5	21	31	0.88	0.06	0.69	0.96
2017	3	303	25.3	19	31	0.87	0.07	0.67	0.96

The annual cow survival rate estimates are plotted in Figure 31, which suggests an increasing trend in cow survival after 2014, albeit still with high variance due to limited collar numbers.

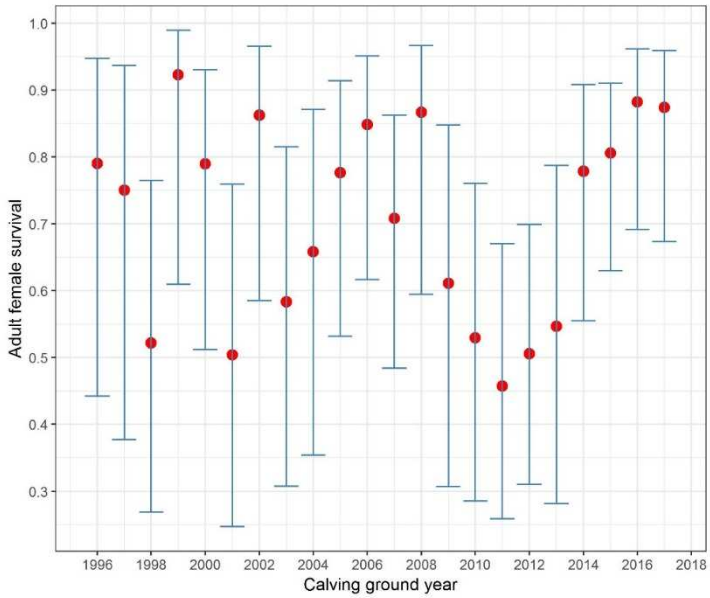


Figure 31: Annual survival rate estimates 1996-2018 for Bathurst adult females based on collared female caribou.

Bayesian state space integrated population model (Bayesian IPM)

The main objective of the Bayesian IPM was to provide refined estimates of demographic parameters using all available field data. For the Bathurst herd, temporal variation in main parameters (cow/yearling survival, calf survival) was modeled as random effects. A more detailed technical description of the model, including tests of model parameters and the associated *R* code, is given in Appendix 3.

The Bayesian IPM fit most field measurements adequately (Figure 32). The main exceptions were overestimates of cows and cows+bulls (compared to extrapolated estimates) in 2018, which is discussed later in the report. Also, in some cases the proportion of breeding females estimates did not align well with field estimates. Confidence in model predictions tended to be highest for the years in which there were field estimates.

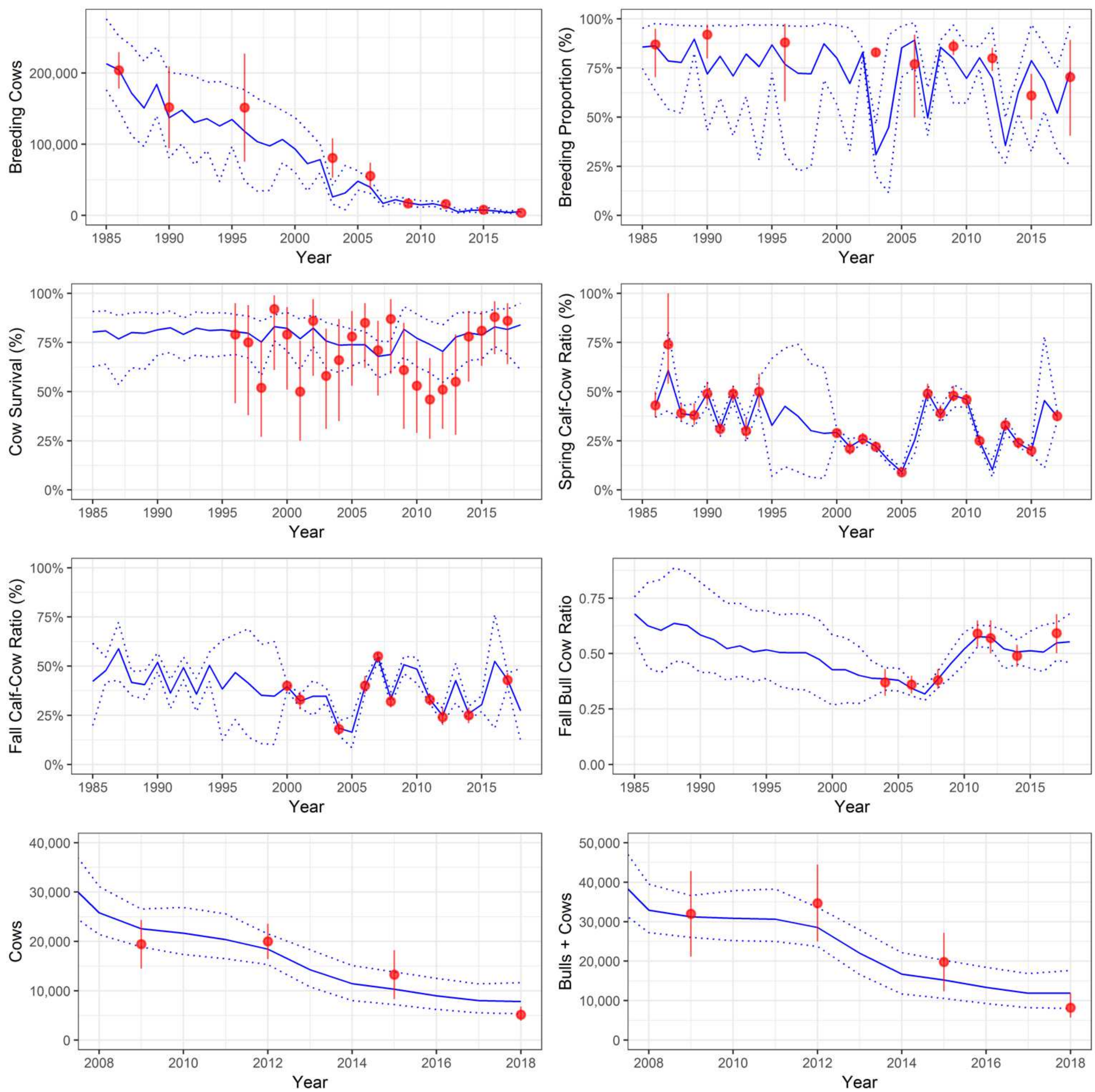


Figure 32: Predictions of demographic indicators from Bayesian model analysis compared to observed values, for Bathurst herd 1985-2018. The solid blue lines represent model predictions and confidence limits are shown as hashed blue lines. The red points are field estimates with associated confidence limits. Spring calf:cow ratios are flown in March or April and are also called late-winter surveys. Estimated numbers of cows and herd size (bulls+cows) show the more recent ten-year period to facilitate interpretation.

We modeled summer (June - late October) and winter (October - June) calf survival with the transition being the fall rut when fall composition surveys occur (Figure 33). This parameterization takes advantage of years where fall and spring calf cow surveys occur, therefore allowing assessment of change in proportion calves between June calving ground surveys, October fall surveys, and March/April late winter surveys and subsequent estimation of calf survival for each period. As found in previous studies (Gunn et al. 2005), summer survival is consistently lower than winter survival, when calves are larger. We note that the survival rates in the graphs below are expressed on the annual scale for comparison purposes. The actual rates will be different (slightly higher) given that summer or winter is shorter in time than a year.

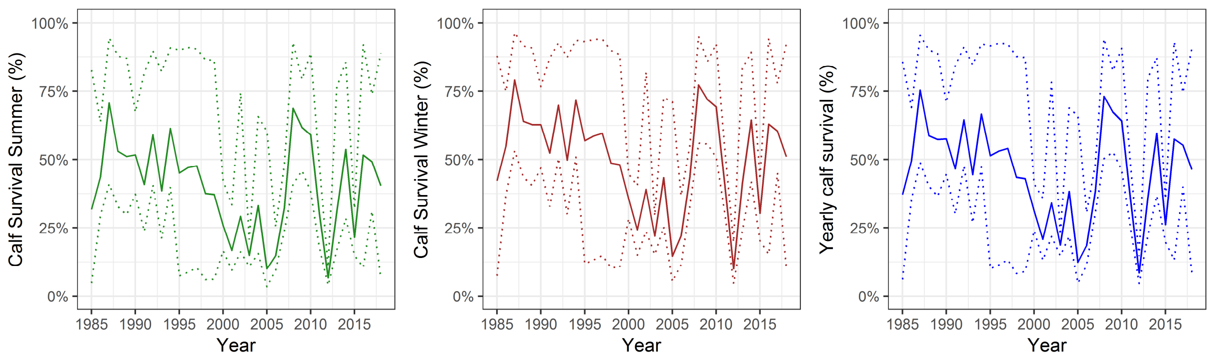


Figure 33: Trends in model-based summer and winter and overall calf survival for the Bathurst herd 1985-2018.

Overall calf productivity, which is basically the proportion of adult females that produce a calf that survives the first year of life, can be derived as the product of fecundity (from the previous caribou year) and calf survival (from the current year) (Figure 34). Estimates from Figure 34 suggest that productivity has not returned to levels observed prior to 1997 (mean productivity=0.46) in the 2011-2018 period (mean productivity=0.25). A potential negative trend in proportion of breeding females is evident as well as lower calf survival in the past ten years. As discussed later, environmental covariates and trend models will be used to further explore demographic trends and mechanisms affecting herd productivity.

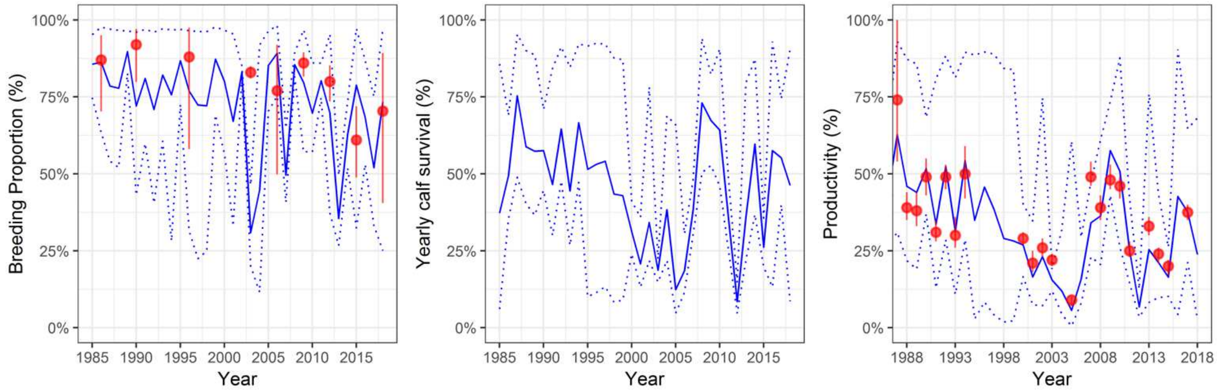


Figure 34: Trends in a) fecundity, b) annual calf survival and c) productivity (which is the product of the previous year's fecundity times the current year calf survival) for Bathurst herd 1985-2018. Spring calf cow ratios, which are lagged by one year, so that they correspond to the productivity/caribou year prediction of the model, are shown for reference purposes.

Spring calf-cow ratios, which are recorded in March or April, are overlaid in the productivity graph (Figure 34). Note that the spring calf-cow ratio is influenced by cow survival, calf survival as well as fecundity and therefore will not correspond directly to productivity. It will be greater than actual productivity because lower cow survival rates, which influence the count of cows in the spring, will inflate calf-cow ratios. The model predictions of spring calf-cow ratios, which account for cow survival, are shown in Figure 34. In addition, the model uses both calf cow ratios and proportion breeders (estimated during calving ground survey years) to estimate fecundity. In some cases, this results in poor model fit if calf cow ratios do not correspond well with the proportion of breeding cows estimated on the calving ground. In all cases the field estimates are within the confidence limits of the corresponding demographic model estimates.

One of the most important determinants of herd trend is adult cow survival since this directly influences the overall productivity of the herd. Collar-based point estimates and modeled annual and three-year average values for cow survival are shown in Figure 35. The dashed horizontal line indicates survival level needed for herd stability at mean productivity levels of 0.30 (2015-2018). The shaded region represents the range of cow survival levels needed for population stability across lowest observed levels of productivity (2015: 17%) to higher levels of productivity (2016:45%) during the 2015-2018 period (Figure 35). If productivity is at levels observed from 2015-2018 (0.31) then cow survival would need to be 0.88 for stability.

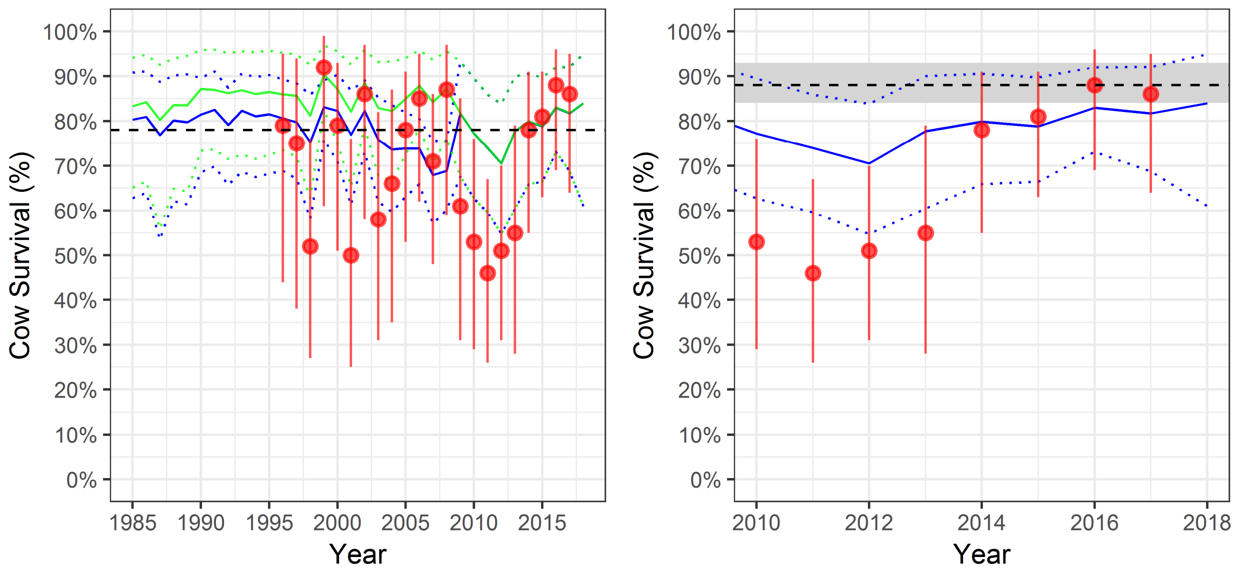


Figure 35: Trends in Bathurst cow survival 1985-2018 from Bayesian IPM analysis and collars. The solid blue lines represent model predictions and confidence limits are the hashed blue lines. A) The left graph shows the full time series with model estimates of survival denoted by blue lines, and "natural survival" with hunting mortality removed denoted by a green line. The red points are observed field estimates from collars with associated confidence limits. B) The right graph shows the empirical and modeled estimates of cow survival since 2010, when harvest restrictions were placed on the Bathurst herd. The dashed horizontal line indicates cow survival level needed (mean survival of 0.89) for herd stability at mean productivity levels of 0.30 (2015-2018). The shaded region represents the range of cow survival levels (0.85-0.93) needed for population stability across lowest observed levels of productivity (17%) to higher levels of productivity (45%) during the 2015-2018 period as shown in Figure 34c.

Model-based estimates of cow survival suggested an increasing trend in cow survival from 2012 to 2018 with a three-year average survival of 0.81 (CI=0.75-0.87) for the 2014-2017 calving year period. The model estimate of cow survival for the caribou year of 2017 (which spans from June 2017 to May 2018) was 0.82 (0.69-0.92). The estimate of cow survival in 2015 using the OLS model was 0.78 (CI=0.74-0.89) which compares to the Bayesian model estimate of 0.79 (CI=0.66-0.90) for 2015. While survival rates are potentially increasing, they still are below levels needed for herd stability as indicated by the grey zone in Figure 35.

Comparison of natural (green line) and observed survival rates (blue line) in Figure 35 illustrates the increasing impact of harvest on cow survival rates up to 2009 when harvest was reduced. In 2008, observed cow survival (including harvest) was 0.69 (CI=0,60-0.76) compared to a natural survival level of 0.87 (CI=0.76-0.96) during this time, assuming an annual cow harvest of 5,000. When harvest was reduced, observed and natural survival rates were similar. Future modeling will further consider variation in harvest rates and potential overall trends in natural survival when historic harvest is accounted for.

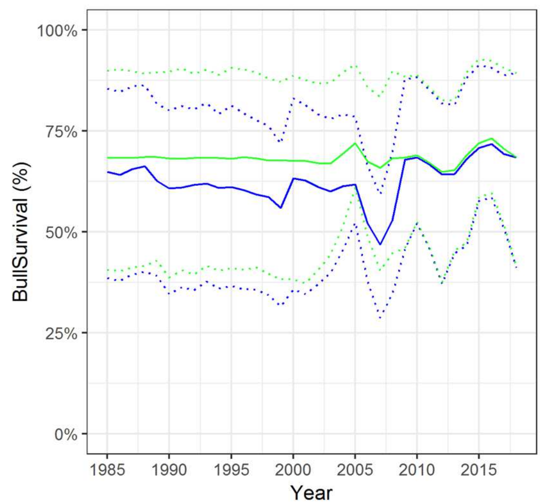


Figure 36: Estimates of bull survival for the Bathurst herd 1985-2018. The blue line represents observed survival whereas the green line represents natural survival with harvest mortality removed. Because harvest was very low 2010-2018, observed and natural mortality were similar.

Bull survival was estimated at 0.71 (0.52-0.91) in 2017 which is similar to the estimate in 2015 (0.72 (CI=0.59-0.92) (Figure 36).

Preliminary assessment of effects of emigration on estimate of Bathurst caribou

Population rates of change (λ) for cows suggest a rate of 0.92 (CI=0.83-0.99) 2015-2018 (Figure 37), which is higher than the rate indicated by adult cow estimates from the calving ground surveys of 0.76. The most likely reason for this difference is the direct impact of emigration of cows on the adult female calving ground survey estimate.

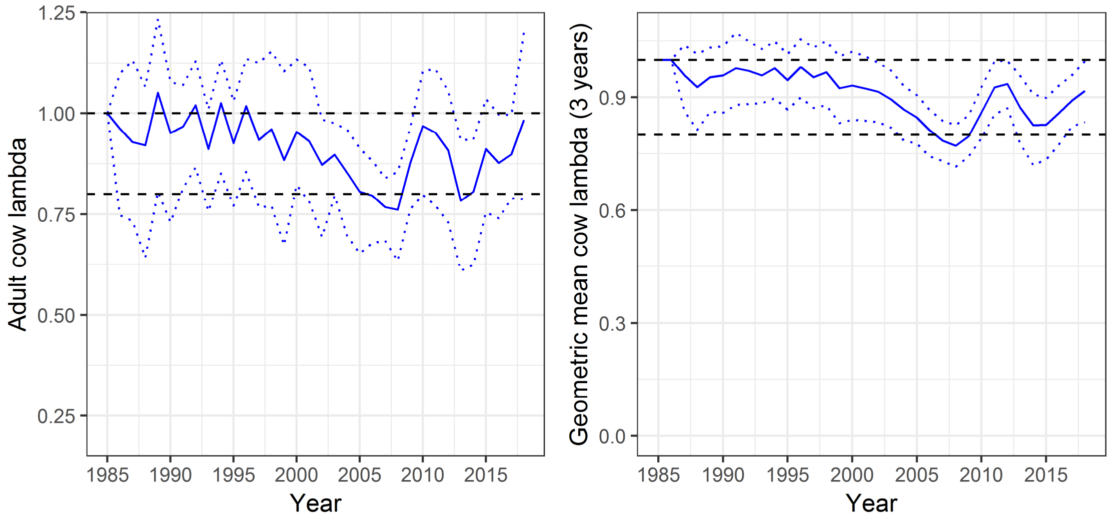


Figure 37: Overall trends (λ) in adult cows in the Bathurst herd 1985-2018 from the Bayesian model analysis. A value of 1.0 indicates stability.

Predicted numbers of breeding cows, adult cows, and bulls from the demographic model in 2018 were higher than calving ground estimates. For example, the estimate of breeding cows for the demographic model in 2018 was 5,551 (CI=1,935-9,591) compared to the calving ground-based estimate of 3,636 (CI=2,709-4,880). The demographic model estimate is 35% higher, although the confidence limits of the demographic model estimate overlap the field estimate. The likeliest reason for this is that the demographic information used in the model is based on caribou that were in the Bathurst herd up to the 2018 survey, and the 2018 breeding female estimate is only one of many data points used to inform the model. Basically, the model tolerates a slight lack of fit to the breeding female estimate in order to fit the other field estimates such as proportion breeding, calf-cow ratios, and cow survival rates. In this context, demographic predictions are less influenced by emigration of some Bathurst cows to the Queen Maud Gulf in 2018, which reduced breeding female estimates.

We conducted a sensitivity analysis of estimates to inclusion of the 2018 breeding female estimate, which was influenced by movements of cows to the Queen Maud Gulf. Estimates of cow survival when the 2018 adult female estimate were excluded were 0.85 (CI=0.74-0.93) for the 2017 calving ground year compared to 0.82 (CI=0.69-0.92) when the 2018 data point was included. The three-year average survival rate was 0.84 (CI=0.78-0.89) compared to 0.81 (CI=0.75-0.87) when the 2018 data point was included. Therefore, exclusion of the 2018 breeding female estimates boosted survival rates by 3%. Sensitivity analysis results for other parameters are given in Appendix 3.

The demographic model in this report will be further refined in the future. Potential refinements include more direct modeling of fidelity to the Bathurst calving ground using ratios of caribou that emigrate from the Bathurst calving ground. One of the challenges of this analysis is that we only had estimates of fidelity for collared cows with no estimates of fidelity for yearlings, calves, and bulls. It may be possible to partially estimate fidelity of bulls by proximity to calving grounds as well as get direct estimates of bull survival from the bull collars. In addition, harvest in the current version was modeled as a fixed rate which did not account for uncertainty in actual harvest particularly in the historic data set. Methods will be used to better incorporate uncertainty in harvest estimates which may help better refine estimates of natural survival. Finally, environment covariates will be used to model temporal trends in demographic parameters in unison with other trend models. The use of environmental covariates in previous demographic analyses up to 2016 (Boulanger and Adamczewski 2017) suggested possible linkages; however the recent 2017-2018 environmental data were not available for this analysis.

Estimation of Bathurst adult females, including emigration to the Queen Maud Gulf

The Lincoln-Petersen mark-recapture estimator (N_{LP}) based estimate of adult Bathurst cows that occurred both on the Bathurst calving ground and in the Queen Maud Gulf calving area was 7,098 (CI=4,432-11366, CV=23%), assuming that the proportion of known Bathurst collared cows (8/11) on the Bathurst calving ground was indicative of the overall distribution of cows in the entire herd. The corresponding estimate from the survey was 5,162 adult females in the Bathurst survey area, suggesting that 1,936 (CI=497-4,595) were in the Queen Maud Gulf coastal calving area. This estimate should be interpreted cautiously since it is based on only 11 collared caribou.

Estimates of adult females were generated using the demographic model for the Bathurst herd with and without the 2018 data point included (Figure 38). The demographic model attempted to balance the input from collared caribou, composition surveys, and previous survey estimates to estimate the number of adult females in 2018. The resulting estimate with the 2018 data point included was 7,833 adult females (CI=5,329-11,631, CV=21%), which was 35% higher than the corresponding observed estimate on the calving ground (5,162 CI=3,935-6,771, CV=13%). In addition, as discussed earlier, the demographic model estimate of adult females was less directly influenced by emigration of females to the Queen Maud Gulf coastal calving area in 2018 (which reduced the calving ground adult female estimate). Therefore, it would be expected that the demographic model estimate would be higher than the calving ground estimate, perhaps approaching the N_{LP} estimate of 7,098. Regardless, confidence intervals overlapped for the two estimates and therefore the difference could be expected by chance.

The demographic model was then run without the 2018 adult female estimate as part of the data set, therefore considering a scenario where all caribou occurred in the core Bathurst calving ground. The resulting estimate (11,423 CI=7,620-16,190) was 30% higher than when the 2018 adult female estimate was included in the demographic model run. The ratio of the estimates with and without the 2018 estimate included was 69% (CI=27-69%). This provides an alternative estimate of the proportion of Bathurst cows that remained on the traditional calving ground; this would mean that 31% of the cows had emigrated to the Queen Maud Gulf coastal calving area. This is relatively similar to the Lincoln-Petersen based estimates of 72% of the cows on the traditional Bathurst calving ground and 28% in the Queen Maud Gulf coastal calving area, based on collars. However, both estimates should be used with caution as one is based on model projections and the other on a limited number of collars.

The field and model-based estimates that include the Bathurst cows that appear to have emigrated to the east are still lower than the estimate of adult females on the calving ground in 2015 (13,264, CI=8,312-18,216) suggesting that substantial decline of the Bathurst herd has occurred even when emigration in 2018 to the Queen Maud Gulf/Beverly calving ground is considered. More exactly, the collar-based estimate (7,098, CI=4,432-11,366) was 46% of the 2015 adult cow estimate resulting in an annual rate of decline of 23%. The estimated annual rate of decline based on the demographic model estimate of 11,423 (CI=7,620-

16,190) was 5%, however, this estimate should be treated cautiously given limitations in directly comparing field estimates with demographic model estimates.

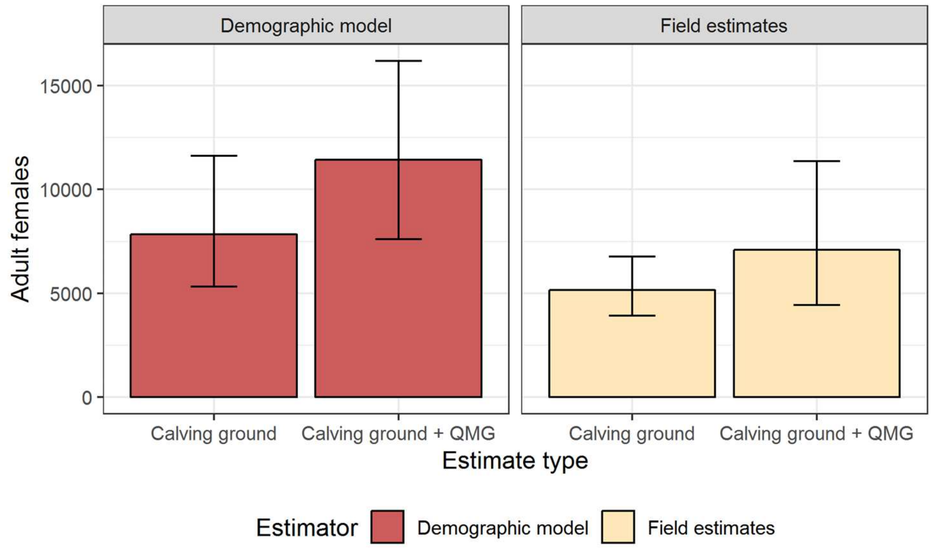


Figure 38: Field and model-based estimates of adult females on the Bathurst calving ground compared to estimates that were adjusted to include Bathurst females that calved on the Queen Maud Gulf coast calving area in 2018. Field estimates include the base estimate of adult females, and the base estimate of adult females divided by the proportion of collars that occurred on the Bathurst calving ground. Demographic model estimates include Bayesian IPM runs with the 2018 adult female estimate included and excluded.

Exploration of Potential Reasons for Decline in Herd Size

The apparent large decline in breeding and adult females in the Bathurst herd 2015-2018 could have resulted from (1) missing female caribou based on limited survey coverage or sightability, (2) movement of female caribou to adjacent calving grounds, and (3) demographic changes within the herd (low pregnancy rates, reduced calf survival, or reduced survival of adult caribou). We considered the likelihood of each factor contributing significantly to the estimated reduction in abundance.

Survey conditions and female caribou not occurring in strata

Survey conditions were challenging during the Bathurst 2018 survey; in particular, the snow conditions made caribou more difficult to see than on previous surveys with predominantly bare ground. It is possible that the counts from the two visual strata under-estimated true abundance due to poor sighting conditions. However, 96.9% of the estimated breeding females and 84.2% of the estimated adult females for the overall survey area were estimated from the photo stratum. The comparable figures in 2015 were a very similar 96.2% of breeding cows and 88.9% of adult females from the photo stratum (Boulanger et al. 2017). In the photo stratum for 2018, extra time spent counting caribou on photos and the double observer check on photos provided confidence that sightability was >84% and thus that caribou missed had been accounted for. In addition, the 17 active collared females in the Bathurst Inlet area were accounted for in the three survey strata. One collared cow was south of the visual and photo strata at the time of the aerial photography June 8-9, but reconnaissance flying in this area showed there were very few caribou in that area (see Figure 17). Extensive reconnaissance flying north, south and west of the three survey strata demonstrated that there were very few caribou in these areas.

There remains a possibility, based on very low densities of caribou observed by GN biologists (Figure 17) beyond the eastern boundary of the Bathurst East Visual block, that a few Bathurst cows were found further east. However, GN biologists observed caribou trails to the east of that block in the snow predominantly leading northeast to the main Beverly calving ground, and the Beverly collared cows continued to move north and east in the first and second weeks of June (M. Campbell, pers. comm.). The East Visual stratum contributed 6.3% of the estimated breeding females and 10.1% of the estimated adult females in the survey area; the photo stratum, as in previous Bathurst surveys, accounted for the vast majority of the female caribou. Overall, we believe that the June 2018 Bathurst estimates of breeding females, adult females and herd size are representative of the herd and that sightability and distribution issues had little influence on the survey outcome.

Movement to Adjacent Calving Grounds and Ranges

Figures 12-16 earlier in this report documented movements of collared Bathurst caribou in the vicinity of Bathurst Inlet in the spring of 2017 and particularly in the spring of 2018, as these collar movements affected the design of the survey and interpretation of the results.

In this section, collar fidelity is further assessed for 2018 with a comparison to previous years and neighbouring herds. Figure 39 displays movement in the mean location of calving for collared females that were monitored for successive years, for the Bathurst herd and its neighbours; annual fidelity is shown for 2009-2018. The head of the arrow is the mean location for the current year and the tail is the location for the previous year. In general, collared female caribou have shown reasonable fidelity to the Bathurst calving ground until 2018, when three collared caribou moved to the Beverly calving ground in the Queen Maud Gulf coastal calving area. Those three collared cows were monitored through the summer of 2018. One died in July and the other two continued to move with collared female Beverly caribou; i.e. there was no apparent return to the Bathurst herd.

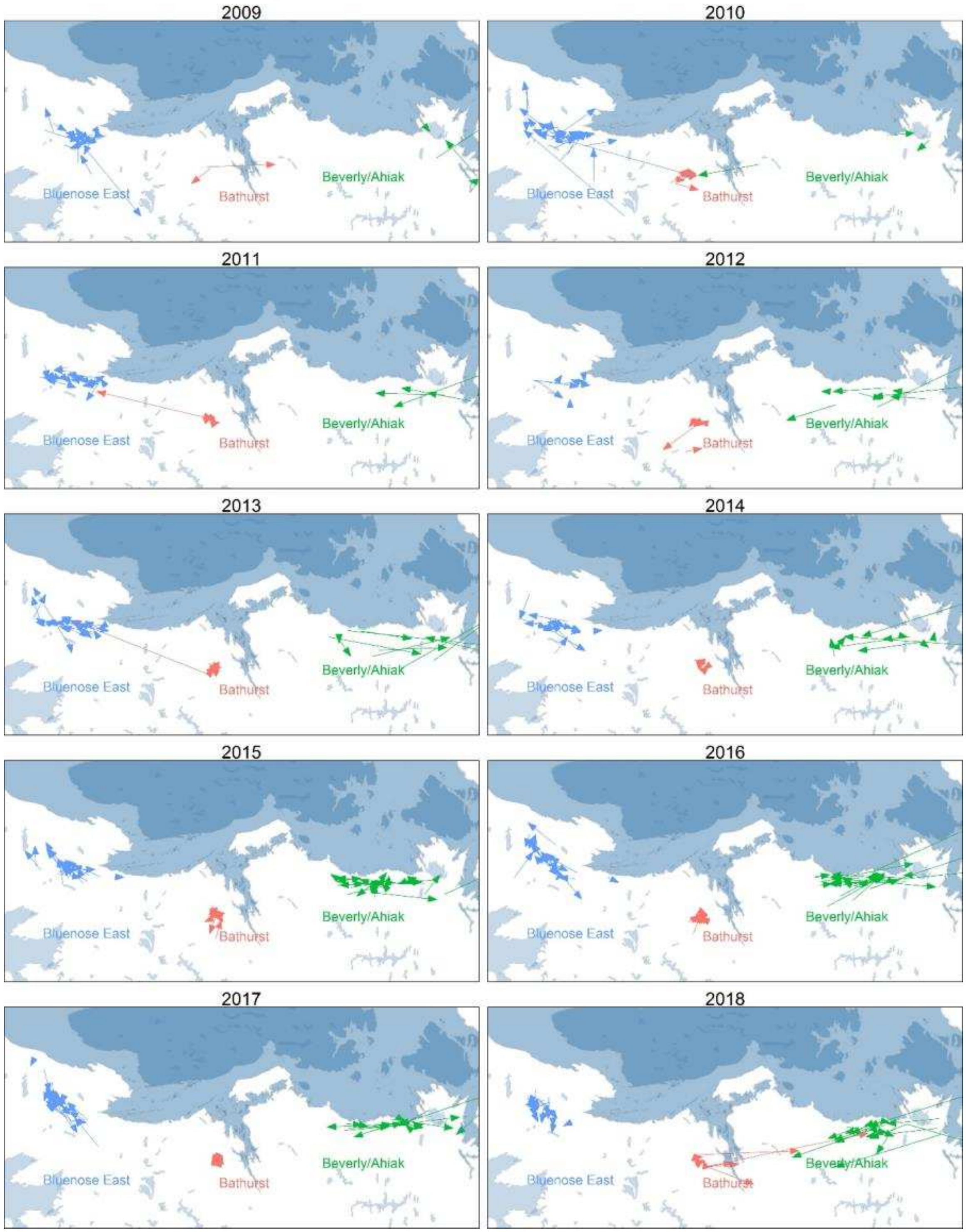


Figure 39: Yearly fidelity and movements to calving grounds in the Bluenose East (blue), Bathurst (red), and Beverly (green) herds 2009-2018. The head of the arrow indicates the current calving ground in the given year and the tail indicates the mean location from the previous year calving ground.

Frequencies of movement events between calving grounds for the Bathurst herd and neighbouring herds were assessed for collared female caribou monitored for consecutive years (Figure 40). A pair of consecutive June locations for a collared female was a single event or data point. Overall, the rates of switching were low 2010-2015 with 254 returns to the same calving ground and five switches for the three herds, indicating an overall 98% fidelity. Over the period 2016-2018, there were 174 returns to the same calving ground and three switches for the three herds, indicating again an overall fidelity of 98%. The low rate of switching of collared cows is consistent with previous estimates of about 3% switching and 97% fidelity in the Bathurst herd (Adamczewski et al. 2009) and similar fidelity in the Cape Bathurst, Bluenose-West and Bluenose-East herds (Davison et al. 2014). However, the only three switches between 2016 and 2018 were the three of 11 Bathurst collared females (27%) in June 2018. Movements of collared Bathurst bulls in spring 2018 (Figure 16) also suggested an unexpected degree of movement into the inland areas adjacent to the Queen Maud Gulf after collared males and females from the two herds were strongly mixed all winter (Figure 14).

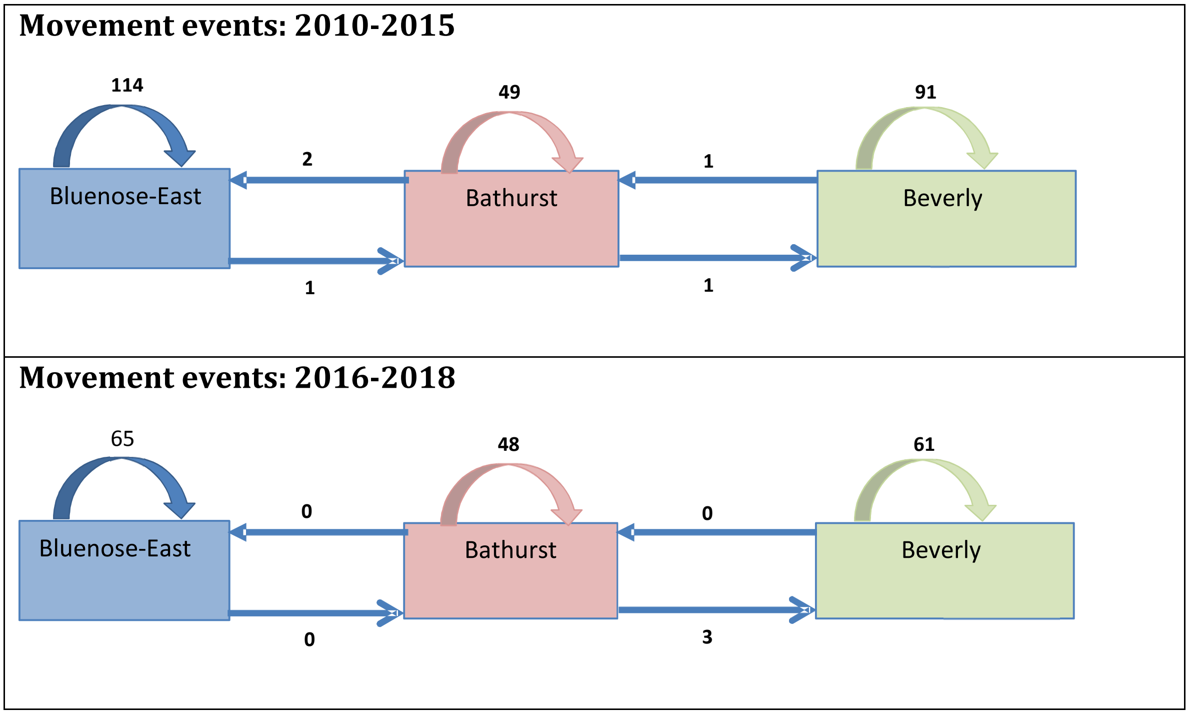


Figure 40: Frequencies of collared caribou movement events for the Bathurst and neighbouring Bluenose-East and Beverly herds 2010-2015 and 2016-2018 based on consecutive June locations. The curved arrows above the boxes indicated the number of times a caribou returned to the same calving ground in successive years. The straight arrows indicate movement of caribou to other calving grounds.

Demographic Change: Adult Survival, Calf Productivity and Calf Survival

Comparison of the 2015 and 2018 Bathurst June survey results shows declines by more than half in estimates of breeding females (55.0%), adult females (61.0%) and overall herd size (58.5%). Part of this decline is due to a proportion (approximately 27% based on three of 11 collared cows) of Bathurst cows calving on the Beverly/Queen Maud Gulf calving ground as discussed earlier (Figure 38). Demographic analysis described earlier indicates this decline is in part attributed to adult cow survival rates (estimated for 2017-2018 at 0.82) that have improved since 2015 (Figure 35) but continue to be below levels associated with stable populations (0.84 to 0.90). Calf survival has also been low overall in the past ten years (Figure 34). Overall calf productivity (the product of fecundity and one-year calf survival) in the 2011-2018 period (mean productivity of 0.25) was well below the levels observed prior to 1997 (mean productivity=0.46) and is well below levels associated with stable populations (Figure 34). Both productivity and cow survival would need to increase substantially to reach levels associated with a stable population. We note that demographic model estimates from a model that used the 2018 data point will be influenced by the emigration event in 2018. The three-year average survival rate was 0.84 (CI=0.78-0.89) with the 2018 adult female estimate excluded compared to 0.81 (CI=0.75-0.87) when the 2018 adult female estimate was included. Therefore, survival estimates are still on the lower level needed for herd recovery given current levels of productivity, regardless of model scenario considered.

Incidental Sightings of Other Wildlife

Sightings of other wildlife during the June 2018 calving ground surveys are listed in Table 19. Observations for both the Bathurst and the Bluenose-East surveys are included for convenience. Of particular interest are the sightings of wolves and grizzly bears as key predators of young caribou calves. There were 29 grizzly bear sightings and five wolf sightings on the Bathurst calving ground, and 44 grizzly bear sightings and eight wolf sightings on the Bluenose-East calving ground. In general this is consistent with previous calving ground surveys of these two herds, which have shown substantially more bears than wolves.

Table 19: Incidental sightings of other wildlife during June 2018 calving ground surveys from reconnaissance flying, visual blocks, and composition surveys. Note that some areas were flown more than once, thus some individuals may have been sighted more than once.

Species	**Bathurst calving ground**	**Bluenose-East calving ground**
Red fox	1	2
Arctic Fox	2	1
Eagles	4	2
Grizzly bears	29	44
Moose	4	4
Muskox	233	411
Wolverine	0	0
Wolves	5	8

DISCUSSION

Results from the Bathurst 2018 calving photo survey documented significant declines by more than half in estimates of breeding females (55.0%), adult females (61.0%) and overall herd size (58.5%) since 2015. The reduction in herd size indicates an annual rate of decline of 25.5% 2015-2018. The overall decline from peak numbers in 1986 of 470,000 is on the order of 98%. We suggest that the most recent decline cannot be attributed to poor survey methods or sampling. The caribou on the visual strata may have been under-estimated somewhat due to the patchy snow conditions and relatively low sightability, but 96.9% of the estimated breeding females and 84.2% of the estimated adult females for the overall survey area were estimated within the photo stratum, similar to the 2015 survey. Extra time spent searching photos and the double observer check suggested that a very high proportion of the caribou were found on the aerial photos.

An analysis of the herd's demography suggests that low calf survival rates and improved, but still low adult female survival rates both contributed to the continuing decline of the Bathurst herd. In 2018, fecundity of the Bathurst herd was relatively good, with 70.4% breeding females on the calving ground. However, by October 2018 the estimated calf:cow ratio of 21 calves: 100 cows (D. Cluff, unpublished data) indicated that calf survival through the first four to five months was poor and well below levels needed for a stable population.

An evaluation of spatial patterns of mortality in collared Bathurst cows resulted in two maps, one for 1996-2009 and one for 2010-2016 (Figure 41; Boulanger and Adamczewski 2017). Mortality risk for 1996-2009 was relatively dispersed, with some mortality on the winter range and some on the summer range. Some of the winter mortality in the winter may reflect hunter harvest, which over that period was not restricted. Mortality risk was lowest during calving 1996-2009. The overall geographic range of the Bathurst herd in the later period 2010-2016 was reduced, reflecting the herd's much reduced numbers. As in the earlier period, mortality risk was lowest during calving 2010-2016. This appears to support the longstanding view that caribou cows migrate to remote tundra calving grounds primarily to reduce predation risk (Bathurst herd: Heard et al. 1996; Porcupine herd: Griffith et al. 2002, Russell and McNeill 2005). In the later period, mortality risk was highest on the summer range. While this analysis did not include an assessment of the causes of mortality in collared caribou, the summer mortality of collared female caribou and the poor summer calf survival may point to predation on the summer range as contributing significantly to mortality of calves and adults. Summer mortality has decreased in the Bathurst herd from 2015 to 2017 resulting in an increased rate of cow survival (Figures 30, 31, and 35), however overall cow survival rates are still lower than needed for herd recovery, given current levels of productivity.

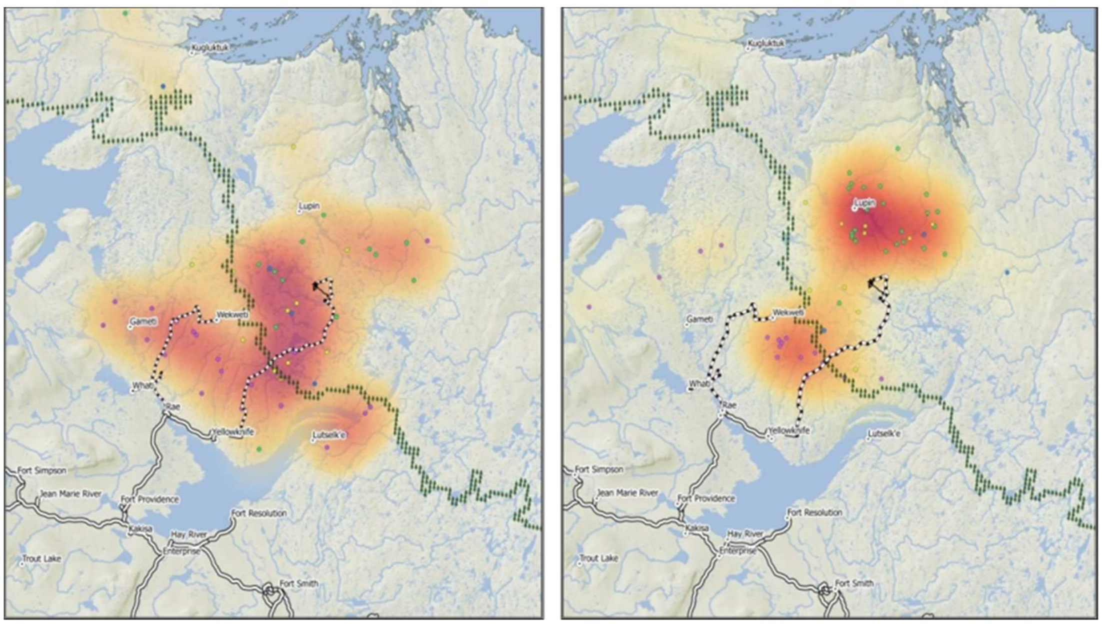


Figure 41: Relative likelihood of mortality in collared Bathurst female caribou shown as a "heat map" for 1996-2009 (left) and 2010-2016 (right). Darker colours (orange and red) indicate areas with an above-average probability of mortality, and lighter areas (yellow) indicate areas with a below-average probability of mortality. If mortalities were in proportion to live locations of collared caribou, all of the range would have the same colour. From Boulanger and Adamczewski (2017).

In 2018 some Bathurst collared cows were initially east of Bathurst Inlet and moved west across the Inlet at the time of the survey, but three of 11 (27%) Bathurst cows continued moving east into the Queen Maud Gulf coastal calving area with collared Beverly cows and remained there during the calving period. This is a limited sample and it is difficult to quantify the percentage of the herd that moved east with the three collared cows; assessment of collars and analyses through the demographic model suggest that roughly 30% of the herd's cows may have emigrated in 2018. Spring-time movements of collared Bathurst bulls (Figure 16) suggest that some of them also moved east into the Queen Maud Gulf area, south of the coastal calving grounds. These movements may in part reflect strong mixing of the Bathurst and Beverly herds in the winter of 2017-2018, as also happened in the winter of 2016-2017. There is a large disparity in size of the two herds. With the Bathurst estimate of 8,207 caribou (this survey) and the 2018 Beverly estimate of just over 100,000 (Campbell et al. 2019), the Beverly herd outnumbered the Bathurst by about 12:1. Caribou are gregarious animals and movement of collared Bathurst cows towards the calving grounds in the Queen Maud Gulf may indicate that they were drawn along by the northeast movement of the larger herd after sharing wintering ranges from November-December to April-May.

As described by Gunn et al. (2012), gregariousness of female caribou during calving is a strategy for reducing predation risk and is a principal reason for high densities of breeding females on a calving ground. For the Porcupine herd, Griffith et al. (2002) demonstrated that newborn calves on the interior of large calving aggregations on the calving ground had higher survival rates than calves on the periphery of these aggregations. However, as a population of migratory barren-ground caribou declines below a small threshold size, spatial fidelity to a calving area may start to break down, resulting in a partial or complete shift in use of a calving area. Heavy overlap on the winter range with a larger herd, as in the Bathurst herd's recent substantial overlap in recent winters with the much larger herd calving in the Queen Maud Gulf coastal lowlands, may also act as a factor predisposing a smaller declining herd to joining a much larger herd.

The observed switching of three of 11 known Bathurst collared cows to the Queen Maud Gulf lowland calving ground during the 2018 calving season presents at least two possibilities. The first is that the switching observed for three Bathurst cows in June 2018 was an isolated occurrence and spatial fidelity to the Bathurst calving ground, which has generally been 97-98% based on collared cows, is maintained. The second is that observed rates of switching by known Bathurst cows to the Queen Maud Gulf lowland calving ground in 2018 will continue and possibly increase in subsequent calving periods, especially if the Bathurst herd continues to decline. In June 2019, three of 17 (17.6%) collared cows that were on the Bathurst calving ground in June 2018 moved well east of Bathurst Inlet with Beverly collared females, suggesting that some eastward emigration of Bathurst cows had continued (Adamczewski et al. 2019). There was evidence from 2006-2009 of several collared caribou females using the inland Beverly calving ground, then switching to the coastal Queen Maud Gulf calving ground in a following year (Adamczewski et al. 2015). The management implication of continued or increased calving ground switching by Bathurst cows is that a combination of numerical decline and emigration may further reduce the likelihood of recovery for the Bathurst herd.

Harvest of the Bathurst herd has been closed in the NWT since early 2015 (see WRRB 2016), with a Mobile Core Bathurst Caribou Conservation Area (MCBCCA) applied as a no-harvest zone. The MCBCCA (i.e. mobile zone) was developed as a minimum convex polygon around Bathurst collared caribou locations (males and females) with a spatial buffer ranging from 20-60 km, depending on the degree of overlap with adjacent herds and recommendations from a technical committee. Limited numbers of Bathurst collars in some winters may mean that the herd's distribution was not fully defined, potentially leading to a limited harvest of Bathurst caribou outside the mobile zone. However, the heavy mixing of Bathurst and Beverly collars in recent winters and the 12:1 ratio of Beverly:Bathurst caribou, in addition to the Beverly collars generally found south and east of the mobile zone, would mean that the harvest in areas bordering on the mobile zone was predominantly comprised of Beverly caribou.

Results of the Bayesian state space model analysis of the Bathurst herd confirm earlier results (Crête et al. 1996 and Boulanger et al. 2011) and suggest that cow survival levels of 0.84-0.92 are needed for stability, given the recent range of calf productivity levels observed for this herd. Low natural survival rates may reflect significant predation by wolves and bears (Haskell and Ballard 2007), and the spatial concentration of collared cow mortalities 2010-2016 (Figure 41) suggests that summer was the time of greatest predation risk.

Summer mortality as estimated by collared caribou has decreased in recent years (Figure 30).

Overall calf productivity in the 2011-2018 period (mean productivity of 0.25) was well below the levels observed prior to 1997 (mean productivity=0.46) and far below levels needed for a stable herd. Cyclical patterns in abundance of migratory caribou herds may also reflect the influence of large-scale weather patterns on vegetation and range conditions (Joly et al. 2011); declines of multiple NWT caribou herds from 2000 to 2006-2008 in part reflected late calving and sustained low calf recruitment (Adamczewski et al. 2009, Adamczewski et al. 2015).

Boulanger and Adamczewski (2017) suggested that high summer drought and warble fly indices on the Bathurst and BNE ranges may in part have contributed to poor female condition and low pregnancy rates in some years. For example, very high drought and warble fly indices for both herds in 2014 were followed by low percentages of breeding females in both herds in June 2015 (Boulanger et al. 2016, 2017). These results are further supported by the Bayesian IPM analysis that found correlations between warble fly indices and calf survival, and June temperature and cow survival based upon estimates between 2008 and 2016.

A concurrent calving ground survey of the Beverly herd (Campbell et al 2019) estimated 84,705 (CI=73,636-88,452) adult females and a total herd size of 103,372 (CI=93,684-114,061) in the survey area as defined by the caribou calving in the coastal lowland Queen Maud Gulf area and the Adelaide Peninsula. Comparison with abundance of caribou estimated in 2011 in the Queen Maud Gulf coastal calving area and re-analyzed to include the Adelaide Peninsula indicates that this herd has declined from an estimated 136,608 at that time. The comparison suggests an annual rate of decline of 4-5% from 2011 to 2018. If our evaluations of the proportion of Bathurst caribou that emigrated to the Queen Maud Gulf coastal calving area (about 30%) are correct and a similar proportion of bulls emigrated in 2018, then approximately 3,000 Bathurst caribou may have added to the estimate for the Beverly herd calving in the Queen Maud Gulf, a number that would have had a very limited effect on the GN Beverly herd estimate for 2018 and was well within the confidence limits of the estimate.

Monitoring Recommendations

As a result of the significant declines in the Bluenose-East (Boulanger et al. 2019) and Bathurst (this report) herds documented by 2018 calving photo surveys, the Tłı̨chǫ Government and GNWT ENR submitted joint management proposals for each herd to the Wek'èezhìi Renewable Resources Board (WRRB) in January 2019. While the WRRB has yet to determine what management actions and monitoring it will recommend, we include here the revised and increased monitoring and research included in the two proposals.

1. Calving photo surveys every two years, an increase in survey frequency from the three-year interval that has been used since about 2006. Population estimates from these surveys are key benchmarks for management decisions.
2. Annual composition surveys in June, October and late winter (March/April) to monitor initial calf productivity, survival through the first four to five months, and survival to nine to ten months in late winter. Results in 2018 suggested that initial fecundity was moderately high for the Bathurst herd (70% breeding females) but by late October the calf:cow ratio had dropped to 21 calves:100 cows, far below recruitment and productivity needed for a stable population. Annual fall surveys will also allow monitoring of the bull:cow ratio.
3. An increase in numbers of collars on the Bathurst and Bluenose-East herds from 50 (30 cows, 20 bulls) to 70 (50 cows, 20 bulls). This will improve estimation of annual cow survival rates and improve monitoring of herd distribution and harvest management, along with many other uses for collar information. Assessment of collar fate is essential to obtain unbiased survival estimates.
4. Suspension of reconnaissance surveys on the calving grounds. Although reconnaissance surveys on the calving grounds in years between photo surveys generally tracked abundance of cows on the calving grounds, the variance on these surveys has been high. In particular, results of the June 2017 reconnaissance survey on the Bluenose-East calving ground suggested that the herd's decline had ended and the herd had increased substantially, while the 2018 photo survey showed that in

reality the herd's steep decline had continued. As noted above, however, annual composition surveys on the calving grounds of the two herds are planned, and were carried out in June 2019 (Adamczewski et al. 2019).

5. Increased support for studies of predator abundance and predation rates, as well as studies of factors affecting range condition, caribou productivity and health.
6. Increased support for on-the-land traditional monitoring programs like the Tłı̨chǫ Boots-on-the-Ground program (Jacobsen and Santomauro 2017) that provide insights into caribou health and the influence of weather and other factors on caribou.

ACKNOWLEDGEMENTS

We thank the following pilots for their expert and safe flying: Nigel Schatz and Kyle Newhook for Northwright Airways, Dan Hall for Air Tindi, and Ryan Mutz and Stefan Erber for Great Slave Helicopters. We thank the following individuals who assisted in counting caribou on the aerial survey: Stefan Goodman and Madison Hurst (ENR), Nicole Goodman and Melissa MacLellan (North Slave Métis Alliance), Roy Judas and Charlie Wetrade (Tłı̨chǫ Government), Jonas Modeste (Délı̨̂nę Renewable Resources Council), Noel Doctor (Yellowknives Dene First Nation), Earl Evans (Northwest Territories Métis Nation), Aimee Guile and Laura Meinert (WRRB), Albert Anavilok, Danny Zita, Braydon Pederson, and Regan Adjun (Kugluktuk HTO), and Elie Gurarie (visiting researcher). We thank the photo-survey crew of Marcel Joubert, Klark Salmon and Louise Rawlinson of GeodesyGroup Inc (Calgary, AB) for completing all aerial photos in one day. Mathieu Dumond flew with the survey crews on a number of days and recorded video for an educational video on calving photo surveys. Max Dupilka provided expert daily updates on survey weather every morning. Derek Fisher (president and lead photo interpreter with Green Link Forestry Inc.) was the lead on counting caribou from the photo survey and provided an over-and-above effort in making sure photos were counted reliably. Justin McPherson and Jason Shaw with Caslys Consulting Ltd. (Saanichton, British Columbia) developed software for the tablet computers. Joe Thorley (Poisson Consulting) greatly assisted in the development of the Bayesian state space model. Kerry and Irene Horn at the Coppermine Inn welcomed us throughout the survey and provided additional space for office work during the surveys. We greatly appreciated the hospitality of staff at the Ekati diamond mine and their support of one Caravan survey crew, including accommodation and meals for our staff and fuel for aircraft. We greatly appreciated the support provided by staff with the Department of Environment, Government of Nunavut in Kugluktuk. Collaboration and sharing of information during June 2018 with NU biologists flying in the Queen Maud Gulf area was excellent and helped shape the Bathurst survey design. This survey was primarily funded by Environment and Natural Resources, Government of Northwest Territories. Bruno Croft at ENR was unable to join the survey crew in 2018 but helped with various aspects of logistics and survey planning. Bonnie Fournier at

ENR was very helpful in supplying daily collared caribou locations throughout the survey. We thank Patricia Lacroix for formatting and finalizing the report to GNWT standards. Brett Elkin as ENR Wildlife Director helped secure necessary funding and resources for the surveys and provided cheerful support throughout the operation.

PERSONAL COMMUNICATIONS

Mitch Campbell, Regional Biologist, Government of Nunavut, Department of Environment, Arviat, NU.

Derek Fisher, President, Greenlink Forestry Inc., Edmonton, AB.

LITERATURE CITED

Adamczewski, J., J. Boulanger, B. Croft, H.D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont and C. Nicolson. 2009. Decline in the Bathurst caribou herd 2006-2009: A technical evaluation of field data and modeling. Draft report, Environment and Natural Resources, Government of Northwest Territories.

Adamczewski, J., A. Gunn, K.G. Poole, A. Hall, J. Nishi and J. Boulanger. 2015. What happened to the Beverly Caribou Herd after 1994? Arctic 68:407-421.

Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford and B. Tracz. 2017. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in northern Canada in 2010. Canadian Wildlife Biology and Management 6:4-30.

Adamczewski, J., J. Williams and J. Boulanger. 2019. June 2019 calving ground composition suryeys of Bathurst and Bluenose-East barren-ground caribou herds. Draft report, Environment and Natural Resources, Government of Northwest Territories.

Barker, R. 2008. Theory and application of mark-recapture and related techniques to aerial surveys of wildlife. Wildlife Research 35:268-274.

Bergerud, A.T. 1964. A field method to determine annual parturition rates for Newfoundland caribou. Journal of Wildlife Management 28:477-480.

Boulanger, J. and J. Adamczewski. 2017. Analysis of environmental, temporal, and spatial factors affecting demography of the Bathurst and Bluenose-East caribou herds: Draft report. Environment and Natural Resources, Government of Northwest Territories.

Boulanger, J., B. Croft, J. Adamczewski, H.D. Cluff, M. Campbell, D. Lee and N.C. Larter. 2017. An estimate of breeding females and analyses of demographics for the Bathurst herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. Manuscript report No. 267.

Boulanger, J., K.G. Poole, J. Williams, J. Nishi and B. Croft. 2010. Estimation of sighting probabilities from caribou calving ground surveys using double observer methods. Unpublished draft report, Governments of Northwest Territories and Nunavut.

Boulanger, J., A. Gunn, J. Adamczewski and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management 75:883-896.

Boulanger, J., M. Campbell, D. Lee, M. Dumond and J. Nishi. 2014. A double observer method to model variation in sightability of caribou in calving ground surveys. Unpublished manuscript.

Boulanger, J., B. Croft, J. Adamczewski, D. Lee, N.C. Larter and L.-M. Leclerc. 2016. An estimate of breeding females and analyses of demographics for the Bluenose-East herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of the Northwest Territories. Manuscript Report No. 260.

Boulanger, J., B. Croft, J. Adamczewski, D. Cluff, M. Campbell, D. Lee and N. Larter. 2017. An estimate of breeding females and analyses of demographics for the Bathurst herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. Manuscript report No. 267.

Boulanger, J., J. Adamczewski, J. Nishi, D. Cluff, J. Williams, H. Sayine-Crawford and L.-M. LeClerc. 2019. Estimates of breeding females & adult herd size and analyses of demographics for the Bluenose-East herd of barren-ground caribou: 2018 calving ground photographic survey. Environment and Natural Resources, Government of the Northwest Territories. Manuscript Report No. 278.

Buckland, S.T., D.R. Anderson, K.P. Burnham and J.L. Laake. 1993. Distance Sampling. Estimating Abundance of Biological Populations. Chapman & Hall, London.

Buckland, S.T.N., K.B., L. Thomas and N.B. Koesters. 2004. State-space models for the dynamics of wild animal populations. Ecological Modeling 171:157-175.

Burnham, K.P. and D.R. Anderson. 1998. Model selection and inference: A practical information theoretic approach. Springer, New York, New York, USA.

Cameron, R.D., W.T. Smith, S.G. Fancy, K.L. Gerhart and R.G. White. 1993. Calving success of female caribou in relation to body weight. Canadian Journal of Zoology 71:480-486.

Campbell, M., J. Boulanger and D. Lee. 2015. Estimating abundance of the Qamanirjuaq mainland migratory barren ground caribou sub-population; June 2014. Government of Nunavut, Department of Environment, Technical Report Series - No: 01-2016.

Campbell MW, DS Lee and J Boulanger. 2019. Abundance trends of the Beverly Mainland Migratory Subpopulation of Barren-ground caribou (*Rangifer tarandus groenlandicus*) June 2011 - June 2018 Government of Nunavut, Department of Environment, Technical Report Series No. 01-2018. Draft File Report, 30 May 2019.

Cluff, H.D., B. Croft and J. Boulanger. 2016. Calf Survival and Adult Sex Ratio in the Bathurst and Bluenose East Herds of Barren-Ground Caribou 2006-2015. Environment and Natural Resources, Government of the Northwest Territories. Unpublished Draft Report.

Crête, M.S., S. Couturier, J. Hearn and T.E. Chubbs. 1996. Relative contribution of decreased productivity and survival to recent changes in the demographic trend of the George River herd. Rangifer 9:27-36.

Dauphiné, T.C. 1976. Biology of the Kaminuriak population of barren ground caribou, Part 4: Growth, reproduction and energy reserves. Canadian Wildlife Service Report No. 38, Canadian Wildlife Service.

Davison, T., H. Sawada, P. Spencer, M. Branigan and R. Popko. 2014. Calving ground fidelity of the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West and Bluenose-East barren-ground caribou herds, Poster at North American Caribou Workshop, Whitehorse, YT.

Dumond, M. and D. S. Lee. Dolphin and Union caribou herd status and trend. Arctic 66: 329-337.

Gunn, A., J. Dragon and J. Nishi. 1997. Bathurst Calving Ground Survey 1996. Yellowknife: Department of Resources, Wildlife and Economic Development, Government of Northwest Territories. File Report No. 119.

Gunn, A., J. Nishi, J. Boulanger and J. Williams. 2005. An estimate of breeding females in the Bathurst Herd of the barren-ground caribou, June 2003. Environment and Natural Resources, Government of Northwest Territories. Manuscript Report No. 164.

Gunn, A., J. Boulanger and J. Williams. 2005. Calf survival and adult sex ratio in the the Bathurst Herd of barren ground caribou 2001-2004. Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Manuscript report No. 163.

Gunn, A., K.G. Poole and J.S. Nishi. 2012. A conceptual model for migratory tundra caribou to explain and predict why shifts in spatial fidelity of breeding cows to their calving grounds are infrequent. Rangifer Special Issue No. 20:259-267.

Gunn, A. and D.E. Russell, editors. 2008. Monitoring Rangifer herds (population dynamics): Manual. Circumarctic Rangifer Monitoring and Assessment Network (CARMA), www.carmanetwork.com.

Griffith, B., D.C. Douglas, N.E. Walsh, D.D. Young, T.R. McCabe, D.E. Russell, R.G. White, R.D. Cameron and K.R. Whitten. 2002. The Porcupine caribou herd. Pages 8-37 *in* D.C. Douglas, P.E. Reynolds and E.B. Rhode, editors. Arctic Refuge coastal plain terrestrial wildlife research summaries. U. S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD BSR-2002-0001.

Haskell, S.P. and W.B. Ballard. 2007. Modeling the Western Arctic caribou herd during a positive growth phase: Potential effects of wolves and radio collars. Journal of Wildlife Management 71:619-627.

Heard, D.C. 1985. Caribou census methods used in the Northwest Territories. Pages 229-238 *in* T.C. Meredith and A. M. Martell, editors. Caribou management - Census techniques - Status in Eastern Canada: Proceedings of the Second North American Caribou Workshop. McGill University, Val Morin, QC.

Heard, D.C. and J. Williams. 1991. Bathurst calving ground survey, June 1986. Government of Northwest Territories. Unpublished Report.

Heard, D.C. and M. Williams. 1990. Caribou project summary and review. Department of Resources, Wildlife, and Economic Development, Government of Northwest Territories. Unpublished Report.

Heard, D.C., T.M. Williams and D.A. Melton. 1996. The relationship between food intake and predation risk in migratory caribou and implications to caribou and wolf population dynamics. Rangifer Special Issue 2: 37-44.

Huggins, R.M. 1991. Some practical aspects of a conditional likelihood approach to capture experiments. Biometrics 47:725-732.

Humbert, J.Y., L.S. Mills, J.S. Horne and B. Dennis. 2009. A better way to estimate population trends. Oikos 118:1940-1946.

Innes, S., M.P. Heidi-Jorgensen, J.L. Laake, K.L. Laidre, H.J. Cleator, P. Richard and R.E.A. Stewart. 2002. Surveys of belugas and narwhals in the Canadian High Arctic. NAMMMCO Scientific Publications No. 3.

Jacobsen, P. and D. Santomauro. 2017. "We Watch Everything" A Methodology for Boots-on-the-Ground Caribou Monitoring. Dedats'eetsaa: Tłı̨chǫ Research and Training Institute. https://research.tlicho.ca/sites/default/files/we_watch_everything_a_methodology_for_boots_on_the_ground_caribou_monitoring.pdf

Jacobsen, P., G. Chocolate and R. Wetrade. 2016. Ekwò zò gha dzô nats'êdè - "We Live Here For Caribou"; Cumulative Impacts Study on the Bathurst Caribou. Dedats'eetsaa: Tłı̨chǫ Research and Training Institute. https://research.tlicho.ca/sites/default/files/ekwo_zo_gha_dzo_natsede_tk_study.pdf

Jolly, G.M. 1969. Sampling methods for aerial censuses of wildlife populations. East African Agricultural and Forestry Journal 34:46-49.

Joly, K., D.R. Klein, D.L. Verbyla, T.S. Rupp and F.S. Chapin. 2011. Linkages between large-scale climate patterns and the dynamics of Arctic caribou populations. Ecography 34:345-342.

Kery, M. and J.A. Royle. 2016. Applied hierarchichal modeling in ecology: Analysis of distribution, abundance, and species richness in BUGS. Academic Press, London, England.

Kery, M. and M. Schaub. 2012. Bayesian population analyses using WinBugs: A hierarchical perspective. Volume 1.Academic Press, Watham, Massachussets.

Krebs, C.J. 1998. Ecological Methodology (Second edition). Benjamin Cummins, Menlo Park, CA.

Laake, J., D.L. Borchers, L. Thomas, D. Miller and J. Bishop. 2012. Mark-recapture distance sampling (MRDS) 2.1.0. R statistical package program.

Laake, J., M.J. Dawson and J. Hone. 2008a. Visibility bias in aerial survey: mark-recapture, line-transect or both? Wildlife Research 35:299-309.

Laake, J., R.J. Guenzel, J.L. Bengtson, P. Boveng, M. Cameron and M.B. Hanson. 2008b. Coping with variation in aerial survey protocol for line-transect sampling. Wildlife Research 35:289-298.

Legat, A., G. Chocolate, B. Gon, S.A. Zoe and M. Chocolate. 2014. Caribou Migration and the State of their Habitat. Tłı̨chǫ Knowledge and Perspectives on Ekwǫ̀ (Barrenland Caribou). Submitted to the West Kitikmeot Slave Study Society, March 2001. October 2014: re-published by the Tłı̨chǫ Research and Training Institute, with spelling updates for Tłı̨chǫ (Dogrib) terms. https://research.tlicho.ca/sites/default/files/105-caribou_migration_report-web.pdf.

Manly, B.F.J. 1997. Randomization and Monte Carlo Methods in Biology. 2nd edition. Chapman and Hall, NY.

Nagy, J., D.L. Johnson, N.C. Larter, M. Campbell, A.E. Derocher, A. Kelly, M. Dumond, D. Allaire and B. Croft. 2011. Subpopulation structure of caribou (*Rangifer tarandus L.*) in Arctic and subarctic Canada. Ecological Applications 21:2334-2348.

Nishi, J., B. Croft, J. Boulanger and J. Adamczewski. 2010. An estimate of breeding females in the Bathurst herd of barren ground caribou, June 2009. Environment and Natural Resources, Government of Northwest Territories. File Report No. 144.

Norton-Griffiths, M. 1978. Counting Animals. 2nd edition. African Wildlife Leadership Foundation, Nairobi.

Peters, W., M. Hebblewhite, K.G. Smith, S.M. Webb, N. Webb, M. Russell, C. Stambaugh and R. B. Anderson. 2014. Contrasting aerial moose population estimation methods and evaluating sightability in west-central Alberta, Canada. Wildlife Society Bulletin 38:639-649.

Pollock, K.H., S.R. Winterstein, C.M. Bunck and P.D. Curtis. 1989. Survival analysis in telemetry studies: the staggered entry design. Journal of Wildlife Management 53:7-15.

QGIS_Foundation. 2015. QGIS: A free and open geographic information system (www.qgis.org).R_Development_Core_Team. 2009. R Foundation for Statistical Computing, Vienna, Austria.

Ramey, R.R., J.L. Thorley and A.S. Ivey. 2018. Local and population-level responses of Greater sage-grouse to oil and gas development and climatic variation in Wyoming. Peer J. 6: doi:10.7717/peerj.5417.

R_Development_Core_Team. 2009. R Foundation for Statistical Computing, Vienna, Austria.

Russell, D.E., K.L. Gerhart, R.G. White and D. Van de Wetering. 1998. Detection of early pregnancy in caribou: evidence for embryonic mortality. Journal of Wildlife Management 62:1066-1075.

Russell, D.E., G. Kofinas and B. Griffith. 2002. Barren-ground Caribou Calving Ground Workshop: Report of Proceedings. Technical Report No. 390, .

Russell, D.E. and P. McNeil. 2005. Summer ecology of the Porcupine caribou herd. Porcupine Caribou Management Board, 1st Edition December 2002, 2nd Edition March 2005. http://pcmb.ca/

Seber, G.A.F. 1982. The Estimation of Animal Abundance. 2nd edition. Charles Griffin and Company, London.

Thompson, S.K. 1992. Sampling. John Wiley and Sons, New York.

Thorley, J.L. and J. Boulanger. 2019. Bathurst caribou herd population analysis 2018. Unpublished contract report, Poisson Consulting.

Thorley, J.L.A., G.F. Andrusak. 2017. The fishing and natural mortality of large, piscivorous Bull Trout and Rainbow Trout in Kootenay Lake, British Columbia (2008–2013). Peer J. 5:doi 10.7717/peerj.2874.

White, G.C. and K. P. Burnham. 1999. Program MARK: Survival estimation from populations of marked animals. Bird Study Supplement 46:120-138.

White, G.C. and B. Lubow. 2002. Fitting population models to multiple sources of observed data. Journal of Wildlife Management 66:300-309.

Whitten, K.R. 1995. Antler loss and udder distention in relation to parturition in caribou. Journal of Wildlife Management 59:273-277.

Wickham, H. 2009. ggplot2: Elegant graphics for data analysis. Springer, New York.

WRRB (Wek'èezhìı Renewable Resources Board). 2016. Report on a public hearing held by the

Wek'èezhìı Renewable Resources Board 23-24 February 2016, Yellowknife, NT & Reasons for decisions related to a joint proposal for the management of the Bathurst ekwǫ̀ (barren-ground caribou) herd, Part A. www.wrrb.ca/sites/default/files/WRRB%20to%20ENR-TG%20-%20Final%20Bathurst%20Reasons%20for%20Decision%20Report%20-%20Part%20A%20-%2026may16.pdf.

Appendix 1: Double observer methods and results for visual survey strata

Methods and results described in this appendix include data from the Bathurst and Bluenose-East surveys in June 2018. One Cessna Caravan crew was based at the Ekati Mine and flew all of the Bathurst reconnaissance survey and most of the Bathurst two visual blocks. One Cessna Caravan based at Kugluktuk flew only on the Bluenose-East reconnaissance and two visual blocks, and the other Caravan based at Kugkuktuk flew primarily on the Bluenose-East survey but also flew part of the Bathurst visual survey. Snow conditions were generally similar across the two survey areas. Given the overlap in survey flying and the similar sightability conditions on both surveys, double observer data were combined in the analyses and results described in this appendix.

Visual surveys were conducted in two low density strata in June 2018 on the Bathurst survey, one west of Bathurst Inlet and one east of it. There were also two visual blocks in the Bluenose-East survey in June 2018, one north of the two photo blocks and one south of them. Each of the Caravans had two observers and a recorder on each side of the aircraft. The numbers of caribou sighted by observers were entered into the Trimble YUMA 2 tablet computers and summarized by transect and stratum.

A double observer method was used to estimate the sighting probability of caribou during visual surveys. The double observer method involves one primary observer who sits in the front seat of the plane and a secondary observer who sits behind the primary observer on the same side of the plane (Figure 1). The method followed five basic steps:

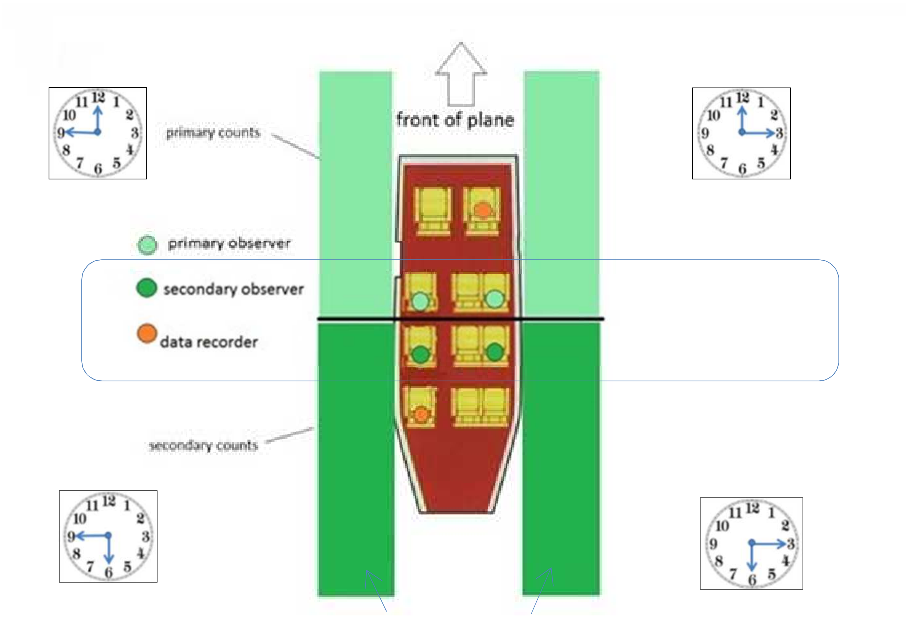
1 - The primary observer called out all groups of caribou (number of caribou and location) he/she saw within the 400 m wide strip transect before they passed about halfway between the primary and secondary observer. This included caribou groups that were between approximately 12 and 3 o'clock for right side observers and 9 and 12 o'clock for left side observers. The main requirement was that the primary observer be given time to call out all caribou seen before the secondary observer called them out.

2 - The secondary observer called out whether he/she saw the caribou that the first observer saw and observations of any additional caribou groups. The secondary observer waited to call out caribou until the group observed passed about half way between observers (between 3 and 6 o'clock for right side observers and 6 and 9 o'clock for left side observer).

3 - The observers discussed any differences in group counts to ensure that they were calling out the same groups or different groups and to ensure accurate counts of larger groups.

4 - The data recorder categorized and recorded counts of caribou groups into primary (front) observer only, secondary (rear) observer only, or both, entered as separate records.

5 - The observers switched places approximately half way through each survey day (i.e. on a break between early and later flights) to monitor observer ability. The recorder noted the names of the primary and secondary observers.



Counting strip (wheel to wing strut

Figure 1: Observer and recorder positions for double observer methods on June 2018 caribou survey of Bathurst caribou. The secondary observer confirmed or called caribou not seen by the primary observer after the caribou have passed the main field of vision of the primary observer. Time on a clock can be used to reference relative locations of caribou groups (e.g. “caribou group at 1 o’clock”). The recorder was seated behind the two observers on the left side, with the pilot in the front seat. On the right side the recorder was seated at the front of the aircraft and was also responsible for navigating in partnership with the pilot.

The statistical sample unit for the survey was groups of caribou, not individual caribou. Recorders and observers were instructed to consider individuals to be those caribou that were observed independent of other individual caribou and/or groups of caribou. If sightings of individuals were influenced by other individuals then the caribou were considered a group and the total count of individuals within the group was used for analyses.

The results were used to estimate the proportions of caribou that were likely missed, and numbers of caribou estimated on the two visual survey blocks east and west of Bathurst Inlet were corrected accordingly.

The Huggins closed mark-recapture model (Huggins 1991) in program MARK (White and Burnham 1999) was used to estimate and model sighting probabilities. In this context, double observer sampling can be considered a two sample mark-recapture trial in which some caribou are seen ("marked") by the ("session 1") primary observer, and some of these are also seen by the second observer ("session 2"). The second observer may also see caribou that the first observer did not see. This process is analogous to mark-recapture except that caribou are sighted and re-sighted rather than marked and recaptured. In the context of dependent observer methods, the sighting probability of the second observer was not independent of the primary observer. To accommodate this removal, models were used which estimated p (the initial probability of sighting by the primary and secondary observer) and c (the probability of sighting by the second observer given that it had been already sighted by the primary observer). The removal model assumed that the initial sighting probability of the primary and secondary observers was equal. Observers were switched midway in each survey day (on most days there were two flights with a re-fueling stop between them), and covariates were used to account for any differences that were caused by unequal sighting probabilities of primary and secondary observers.

One assumption of the double observer method is that each caribou group seen has an equal probability of being sighted. To account for differences in sightability we also considered the following covariates in the MARK Huggins analysis (Table 1). Each observer pair was assigned a binary individual covariate and models were introduced that tested whether each pair had a unique sighting probability. An observer order covariate was modeled to account for variation caused by observers switching order. If sighting probabilities were equal between the two observers, it would be expected that order of observers would not matter and therefore the confidence limits for this covariate would overlap 0. This covariate was modeled using an incremental process in which all observer pairs were tested followed by a reduced model where only the beta parameters whose confidence limits did not overlap 0, were retained.

Table 1: Covariates used to model variation in sightability for double observer analysis for Bathurst caribou survey in June 2018.

Covariate	Acronym	Description
observer pair	obspair	each unique observer pair
observer order	obsorder	order of pair
group size	size	size of caribou group observed
Herd/calving ground	Herd (h)	Calving ground/herd being surveyed.
snow cover	snow	snow cover (0, 25, 75, 100)
cloud cover	cloud	cloud cover (0, 25, 75, 100)
Cloud cover*snow cover	Cloud*snow	Interaction of cloud and snow cover

Data from both the Bluenose-East and Bathurst herd calving grounds surveys were used in the double observer analysis given that most planes flew the visual surveys for both calving grounds. It was possible that different terrain and weather patterns on each calving ground might affect sightability and therefore herd/calving ground was used as a covariate in the double observer analysis. Estimates of total caribou that accounted for any caribou missed by observers were produced for each survey stratum.

The fit of models was evaluated using the AIC index of model fit. The model with the lowest AIC_c score was considered the most parsimonious, thus minimizing estimate bias and optimizing precision (Burnham and Anderson 1998). The difference in AIC_c values between the most supported model and other models (ΔAIC_c) was also used to evaluate the fit of models when their AIC_c scores were close. In general, any model with a ΔAIC_c score of <2 was worthy of consideration.

Estimates of herd size and associated variance were estimated using the mark-recapture distance sampling (MRDS) package (Laake et al. 2012) in program R program (R_Development_Core_Team 2009). In MRDS, a full independence removal estimator which models sightability using only double observer information (Laake et al. 2008a, Laake et al. 2008b) was used. This made it possible to derive double observer strip transect estimates. Strata-specific variance estimates were calculated using the formulas of (Innes et al. 2002). Estimates from MRDS were cross checked with strip transect estimates (that assume sightability=1) using the formulas of Jolly (1969)(Krebs 1998). Data were explored graphically using the ggplot2 (Wickham 2009) R package and QGIS software (QGIS_Foundation 2015).

Double observer analysis

Data from both the reconnaissance and visual surveys were used in the double observer analysis, however, only the visual survey data was used to derive estimates of abundance for survey strata. Observers were grouped into pairs which were used for modeling the effect of observer on sightability. A full listing of observer pairs is given in Table 2. Frequencies of observations as a function of group size, survey, and phase suggested that approximately half of the single caribou were seen by both observers in most cases (Figure 2). In previous years approximately 70-80% of single caribou were seen by both observers. As group size increased the proportion of observations seen by both observers increased. This general pattern suggests low sightability compared to previous surveys, which generally had much less snow cover.

Table 2: Double observer pairings with associated summary statistics.

Observer information			Frequencies				Probabilities	
Pair No	Pooled Pair no.	notes	Secondary	Primary	Both	Total observations	Single ob p	Douple ob p
1	1	did not switch	5	6	14	25	0.80	0.96
2	2		6	3	16	25	0.76	0.94
3	2		0	0	1	1	1.00	1.00
4	3		1	4	11	16	0.94	1.00
5	3		6	10	16	32	0.81	0.96
6	4	did not switch	11	8	17	36	0.69	0.91
7	5	did not switch	14	17	48	79	0.82	0.97
8	6		18	19	46	83	0.78	0.95
9	6		17	20	38	75	0.77	0.95
10	7		16	4	23	43	0.63	0.86
11	7		5	6	8	19	0.74	0.93
12	8		0	2	3	5	1.00	1.00
13	8		20	3	20	43	0.53	0.78
14	9		5	1	7	13	0.62	0.85
15	9		20	18	42	80	0.75	0.94
16	9	pooled with 9	1	0	0	1	0.00	0.00
17	10		14	3	16	33	0.58	0.82
18	10		1	3	0	4	0.75	0.94
19	11	did not switch	10	9	41	60	0.83	0.97
20	12		0	0	1	1	1.00	1.00
21	12	pooled with 12	0	0	3	3	1.00	1.00
22	12		9	1	20	30	0.70	0.91

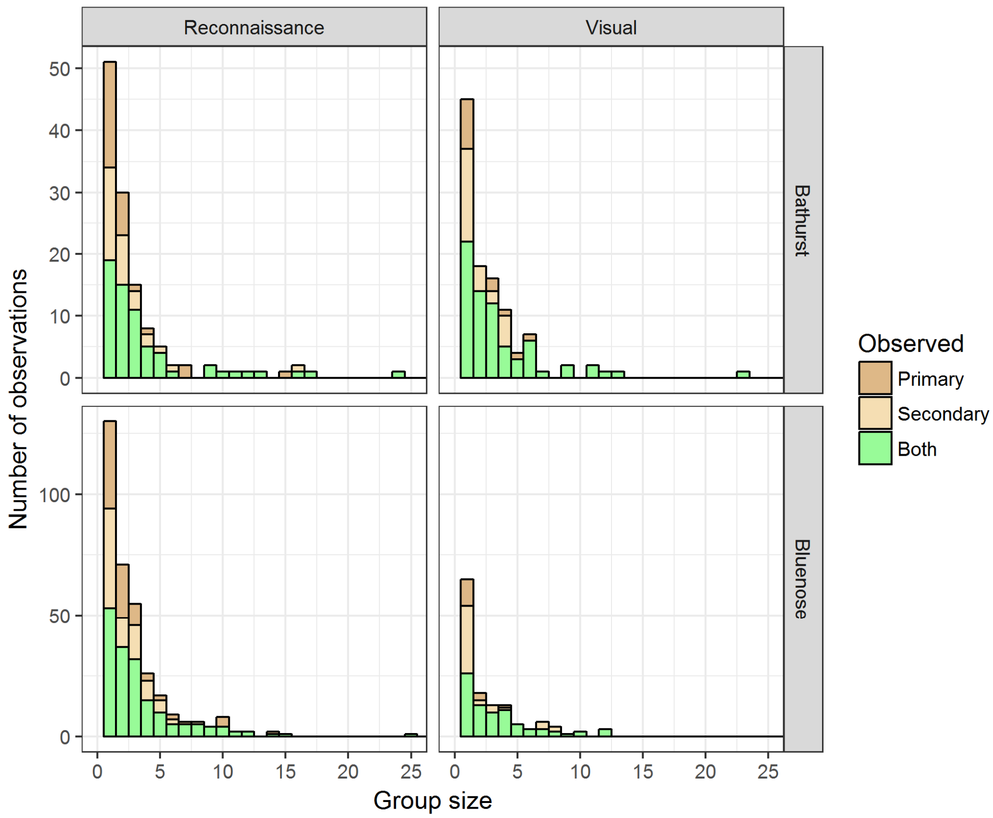


Figure 2: Frequencies of double observer observations by group size, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation is categorized by whether it was observed by the primary (brown), secondary (beige), or both (green) observers.

Snow and cloud cover also influenced sightability, however, the pattern depended on survey phase and herd surveyed (Figure 3). The most noteworthy trends occurred for higher snow cover (75%) for the Bathurst and higher cloud cover. Snow cover was evident in all surveys with few observations of 0 snow cover and most within the 25-75% range. This range corresponds to the "salt and pepper" patchy snow cover where sightability is lower. The lack of "effect size" of snow cover (i.e minimal 0 and 100% snow cover observations) potentially made it problematic to model the effect of increasing snow cover on observations. Instead, sightability was lower (as modeled by an intercept term) due to the poor survey conditions.

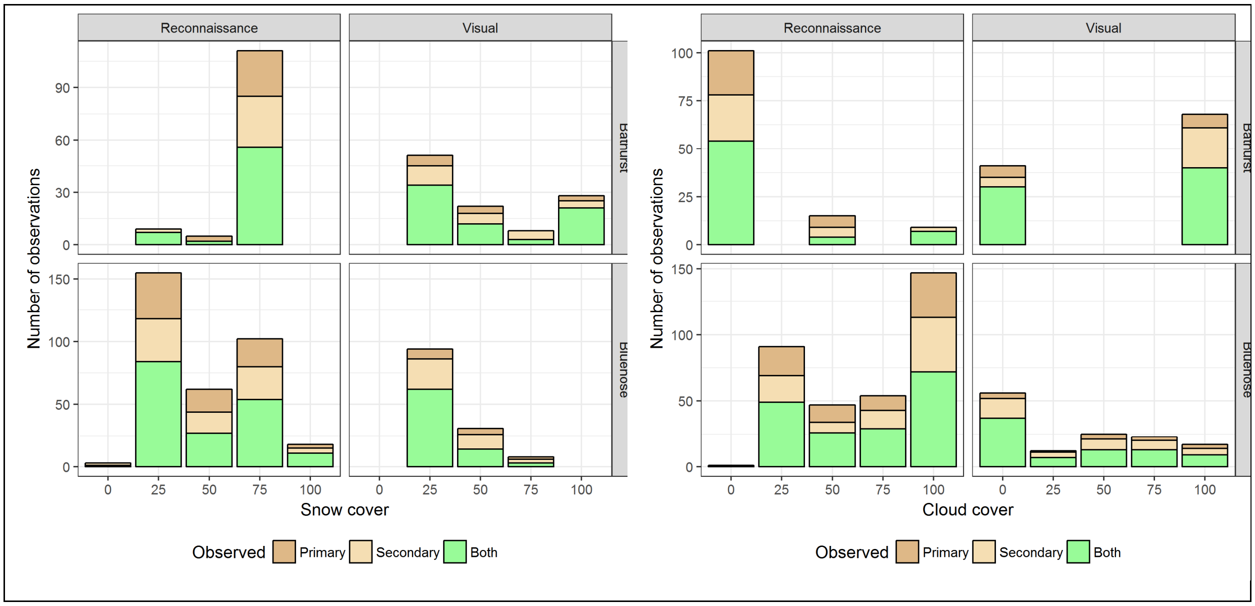


Figure 3: Frequencies of double observer observations by snow cover, cloud cover, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation was categorized by whether it was observed by the primary, secondary, or both observers.

Snow cover was modeled as a continuous (snow) or categorical covariate (snow25, snow50, snow75) based on the categorical entries in the tablets. Model selection identified a strong effect of the log of group size, observers, snow cover and the interaction of snow and cloud cover (Table 3). An additional effect of snow cover at 75% for the Bathurst herd was evident. Observer pairs were reduced to the pairs to those that showed substantial differences from the mean level of sightability in the survey.

Table 3: Double observer model selection using Huggins mark-recapture models in program MARK for Bluenose-East and Bathurst June 2018 caribou surveys. Covariates follow Table 1 in the methods section of the report. Reduced observer pairs are denoted as red_A and red_B. AIC_c, the difference in AIC_c values between the *i*th and most supported model 1 (ΔAIC_c), Akaike weights (w_i), and number of parameters (K), and deviance (Dev) are presented.

No	Model	AICc	ΔAIC_c	wi	K	Dev
1	log(group size)+obs(red_A)+order+herd*snow75+cloud+snow*cloud	764.99	0.00	0.33	8	748.9
2	log(group size)+obs(red_B)+order+herd*snow75+cloud+snow*cloud	767.02	2.03	0.12	9	748.9
3	log(group size)+obs(red_B)+order+snow75+cloud+snow*cloud	768.15	3.16	0.07	8	752.1
4	log(group size)+obs(red_B)+order+herd*snow75+cloud+snow+snow*cloud	768.32	3.33	0.07	10	748.2
5	log(group size)+obs(red_B)+order+herd*snow75+cloud	768.63	3.63	0.06	8	752.5
6	log(group size)+obs(red_B)+order+snow+cloud +snow*cloud	770.75	5.75	0.02	9	752.6
7	log(group size)+obs(red_B)+order+snow25+log(group)*snow25	772.54	7.55	0.01	8	756.4
8	log(group size)+obs(red_B)+order+snow(categorical)	773.52	8.52	0.00	10	753.4
9	log(group size)+obs(red_B)+order+snow+snow^2+cloud+cloud^2+snow*cloud	774.15	9.15	0.00	11	752.0
10	log(group size)	781.88	16.89	0.00	2	777.9
11	log(group size)+snow +cloud	782.04	17.05	0.00	4	774.0
12	group size	783.22	18.22	0.00	2	779.2
13	log(group size)+snow25+cloud0	784.31	19.31	0.00	4	776.3
14	log(group size)+snow25+sno50+snow75+snow100	784.84	19.95	0.00	6	772.8
15	log(group size)+obs(all))	785.96	20.97	0.00	13	759.7
16	constant	802.05	37.06	0.00	1	800.0

Plots of single and double observation probabilities show lower probabilities for individual or smaller group sizes especially in moderate snow cover and higher cloud cover, for Bluenose-East and Bathurst June 2018 caribou surveys (Figure 4). The mean detection probability (across all groups) was 0.66 (CI=0.60-0.72). This compares to a mean probability of 0.91 (CI=0.88-0.92) for the 2015 Bluenose and Bathurst surveys.

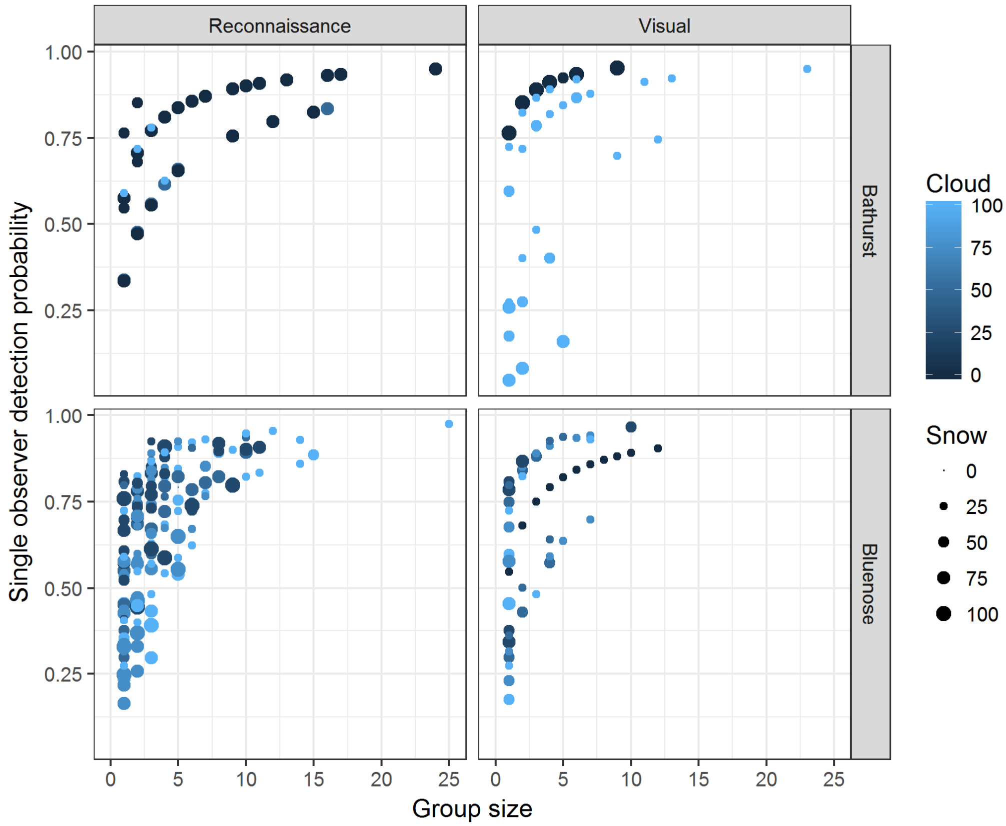


Figure 4: Estimated single observer probabilities from model 1 (Table 3) by snow cover, cloud cover, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation is categorized by whether it was observed by the primary, secondary, or both observers.

Double observer probabilities (the probability that at least one of the observers saw the caribou) were higher but still relatively low for single caribou especially for cases of higher cloud cover and snow cover (and for some observer pairs) (Figure 5).

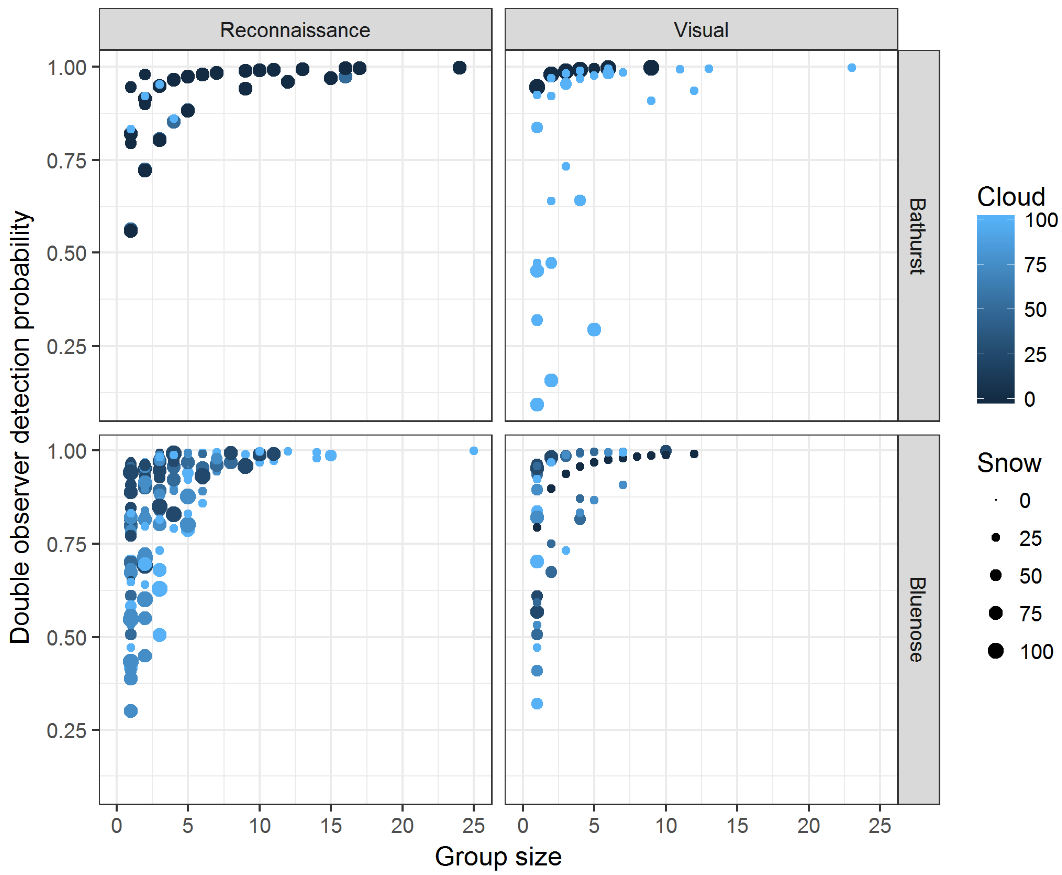


Figure 5: Estimated double observer probabilities from model 1 (Table 3) by snow cover, cloud cover, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation is categorized by whether it was observed by the primary, secondary, or both observers.

Estimates of total caribou in visual strata

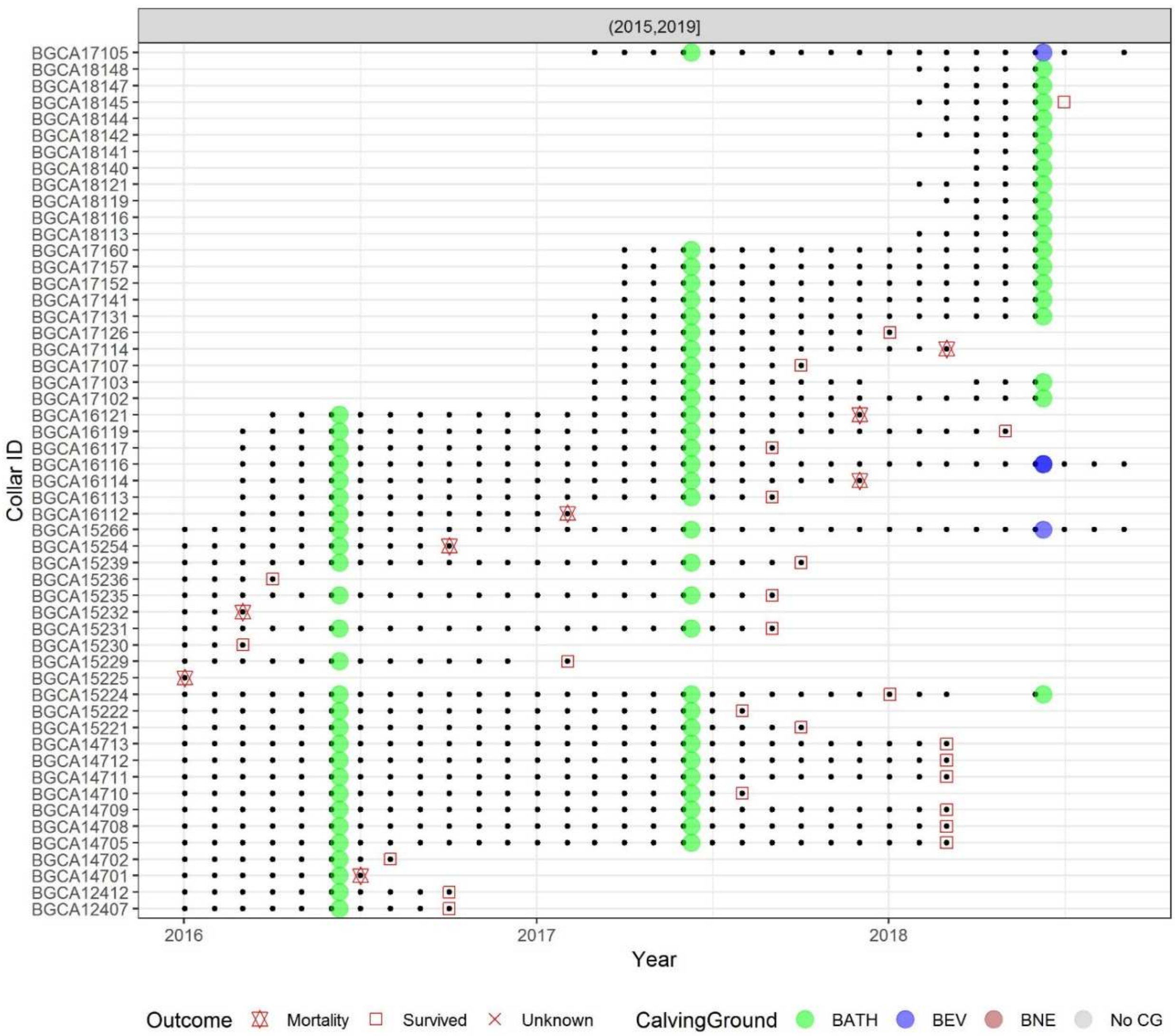
Double observer estimates (using the MRDS R package) were about 5% higher than non double observer estimates. Precision was lower than uncorrected count-based estimates but still acceptable (Table 4).

Table 4: Standard strip transect and double observer model estimates of caribou on Bathurst visual strata in 2018 from the MRDS package in R.

Strata	Caribou counted	Standard estimate: Estimate	SE	CV	Double observer estimate: Estimate	SE	Confidence interval		CV
West	88	551	132.1	24.0%	567	140.50	332	970	24.8%
East	220	1,244	286.7	23.0%	1,309	332.70	773	2,216	25.4%
Total	369	1,795	151.7	17.6%	1,877	360.9	1,265	2,783	19.2%

Appendix 2: Bathurst collared female caribou histories 2016-2018

This figure presents the collar histories for each cow caribou from 2016 to 2018. Each black point represents a monthly fix of a live caribou. Color larger dots represent presence on delineated calving grounds. Fates of caribou are delineated by a square if the collar released with the caribou being alive whereas stars denote mortalities.



Appendix 3: Bayesian State space population model details

This appendix details the development of the Bayesian IPM state space model. The primary state space model R coding was developed by Joe Thorley (Poisson Consulting, poissonconsulting.ca) in collaboration with John Boulanger (Thorley and Boulanger 2019). The demographic model used was similar to the previous OLS model used in previous analyses. The primary development was to evolve model fitting to a more robust Bayesian state space approach. The objective of this appendix is to provide a brief description of the model used in the analysis rather than a complete description of the Bayesian model approach. Readers interested in the Bayesian modeling approach should consult Kery and Schaub (2011) which is an excellent introduction to Bayesian analysis.

Data Preparation

The estimates of key population statistics with SEs and lower and upper bounds were provided in the form of an csv spreadsheet and prepared for analysis using R version 3.5.2 (R Core Team 2018).

Statistical Analysis

Model parameters were estimated using Bayesian methods. The Bayesian estimates were produced using JAGS (Plummer 2015). For additional information on Bayesian estimation the reader is referred to McElreath (2016).

Unless indicated otherwise, the Bayesian analyses used normal and uniform prior distributions that were vague in the sense that they did not constrain the posteriors (Kery and Schaub 2011, p. 36). The posterior distributions were estimated from 1500 Markov Chain Monte Carlo (MCMC) samples thinned from the second halves of three chains (Kery and Schaub 2011, pp. 38–40). Model convergence was confirmed by ensuring that the split potential scale reduction factor $\hat{R} \leq 1.05$ (Kery and Schaub 2011, p. 40) and the effective sample size (Brooks et al. 2011) ESS $\geq$ 150 for each of the monitored parameters (Kery and Schaub 2011, p. 61). In addition, trace plots of Markov Chains and the posterior distributions were inspected to further check convergence and symmetry of estimated parameter distributions.

The sensitivity of the estimates to the choice of priors was examined by multiplying the standard deviations of the normal priors by ten and using the split $\hat{R}$ (after collapsing the chains) to compare the posterior distributions (Thorley and Andrusak 2017). An unsplit $\hat{R} \leq 1.1$ was taken to indicate low sensitivity.

The parameters are summarized in terms of the point *estimate*, standard deviation (*sd*), the *z-score*, *lower* and *upper* 95% confidence/credible limits (CLs) and the *p-value* (Kery and Schaub 2011, p 37 and 42). The estimate is the median (50th percentile) of the MCMC samples, the z-score is mean/sd and the 95% CLs are the 2.5th and 97.5th percentiles. A p-value of 0.05 indicates that the lower or upper 95% CL is 0.

The results are displayed graphically in the main body of the report with 95% confidence/credible intervals (CIs, Bradford et al. 2005). Data are indicated by points (with lower and upper bounds indicated by vertical bars) and estimates are indicated by solid lines (with CIs indicated by dotted lines).

The analyses were implemented using R version 3.5.2 (R Core Team 2018) and the mbr family of packages.

Model Descriptions

The data were analyzed using state-space population models (Newman et al. 2014).

Population

The fecundity, breeding cow abundance, cow survival, fall bull cow, fall calf cow and spring calf cow ratio data complete with SEs were analyzed using a stage-based state-space population model similar to Boulanger et al. (2011). Key assumptions of the female stage-based state-space population model include:

- Calving occurs on the 11th of June (with a year running from calving to calving)

- Cow natural survival from calving to the following year varies continually and randomly by year.
- Bull natural survival from calving to the following year varies randomly by year.
- Cow and bull natural survival is constant throughout the year.
- Harvest of cows and bulls occurs on the 15th of January.
- Yearling survival to the following year is the same as cow natural survival.
- Calf survival varies between the summer and winter seasons and randomly by year.
- The calf sex ratio is 1:1.
- The proportion of breeding cows is the fecundity the previous year.
- Fecundity varies randomly by year.
- Female yearlings are indistinguishable from cows in the fall and spring surveys.
- The uncertainty in the number of breeding cows in the initial year is described by a positively truncated normal distribution with a mean of 200,000 and a standard deviation of 50,000.
- The number of cows in the initial year is the number of breeding cows in the intial year divided by the fecundity in a typical year.
- The number of bulls in the initial year is two thirds the number of cows in the initial year.
- The number of calves in the initial year is the number of breeding cows in the initial year.
- The number of yearlings in the initial year is the number of calves in the initial year multiplied the calf survival in a typical year.
- The uncertainty in each data point is normally distributed with a standard deviation equal to the provided SE.

Model Templates

The base R code used in the analysis is summarized below.

Population (R-code)

```
. model {
 bSurvivalCow ~ dnorm(0, 2^-2)
 bSurvivalBull ~ dnorm(0, 2^-2)
 bFecundity ~ dnorm(0, 2^-2)
 bSurvivalCalfSummerAnnual ~ dnorm(0, 2^-2)
 bSurvivalCalfWinterAnnual ~ dnorm(0, 2^-2)

 sSurvivalCowAnnual ~ dnorm(0, 1^-2) T(0,)
 sSurvivalBullAnnual ~ dnorm(0, 1^-2) T(0,)
 sFecundityAnnual ~ dnorm(0, 1^-2) T(0,)
 sSurvivalCalfAnnual ~ dnorm(0, 1^-2) T(0,)
 for(i in 1:nAnnual){
  bSurvivalCowAnnual[i] ~ dnorm(0, sSurvivalCowAnnual^-2)
  bSurvivalBullAnnual[i] ~ dnorm(0, sSurvivalBullAnnual^-2)
  bFecundityAnnual[i] ~ dnorm(0, sFecundityAnnual^-2)
  bSurvivalCalfAnnual[i] ~ dnorm(0, sSurvivalCalfAnnual^-2)

  logit(eSurvivalCow[i]) <- bSurvivalCow + bSurvivalCowAnnual[i]
  logit(eSurvivalBull[i]) <- bSurvivalBull + bSurvivalBullAnnual[i]
  logit(eFecundity[i]) <- bFecundity + bFecundityAnnual[i]
  logit(eSurvivalCalfSummerAnnual[i]) <- bSurvivalCalfSummerAnnual +
bSurvivalCalfAnnual[i]
  logit(eSurvivalCalfWinterAnnual[i]) <- bSurvivalCalfWinterAnnual +
bSurvivalCalfAnnual[i]
 }
 bBreedingCows1 ~ dnorm(200000, 50000^-2) T(0,)
 logit(eFecundity1) <- bFecundity
 logit(eSurvivalCalfSummerAnnual1) <- bSurvivalCalfSummerAnnual
 logit(eSurvivalCalfWinterAnnual1) <- bSurvivalCalfWinterAnnual

 bCows[1] <- bBreedingCows1 / eFecundity1
 bBulls[1]<- bCows[1] * 2 / 3
 bCalves[1] <- bBreedingCows1
 bYearlings[1] <- bCalves[1] * eSurvivalCalfWinterAnnual1^(154/365) *
eSurvivalCalfWinterAnnual1^(211/365)
 bSpringCalfCow[1] <- bCalves[1] / (bCows[1] + bYearlings[1] / 2)
 bCowHarvestRate[1] <- CowHarvestRate[2]
 bBullHarvestRate[1] <- BullHarvestRate[2]

 for(i in 1:nAnnual) {
  eJuneToFallCor[i] <-  FallCalfCowDays[i] / 365

  eFallCows[i] <- bCows[i] * eSurvivalCow[i]^eJuneToFallCor[i]
  eFallBulls[i] <- bBulls[i] * eSurvivalBull[i]^eJuneToFallCor[i]
```

```
    eFallYearlings[i] <- bYearlings[i] * eSurvivalCow[i]^eJuneToFallCor[i]
    eFallCalves[i] <- bCalves[i] * eSurvivalCalfSummerAnnual[i]^eJuneToFallCor[i]

    bFallBullCow[i] <- (eFallBulls[i] + eFallYearlings[i]/2) / (eFallCows[i] +
eFallYearlings[i]/2)
    bFallCalfCow[i] <- eFallCalves[i] / (eFallCows[i] + eFallYearlings[i]/2)
  }

  for(i in 2:nAnnual) {
    eFallToJanCor[i] <- (218 - FallCalfCowDays[i-1])/365
    eJanToSpringCor[i] <- (SpringCalfCowDays[i] - 218) / 365
    eSpringToJuneCor[i] <- (365 - SpringCalfCowDays[i]) / 365

    eJanCows[i] <- eFallCows[i-1] * eSurvivalCow[i-1]^eFallToJanCor[i]
    eJanBulls[i] <- eFallBulls[i-1] * eSurvivalBull[i-1]^eFallToJanCor[i]
    eJanYearlings[i] <- eFallYearlings[i-1] * eSurvivalCow[i-1]^eFallToJanCor[i]

    bCowHarvestRate[i] <- CowHarvestRate[i]
    bBullHarvestRate[i] <- BullHarvestRate[i]

    eSpringCows[i] <- eJanCows[i] * (1 - bCowHarvestRate[i]) * eSurvivalCow[i-
1]^eJanToSpringCor[i]
    eSpringBulls[i] <- eJanBulls[i] * (1 - bBullHarvestRate[i]) * eSurvivalBull[i-
1]^eJanToSpringCor[i]
    eSpringYearlings[i] <- eJanYearlings[i] * eSurvivalCow[i-1]^eJanToSpringCor[i]

    eSpringCalves[i] <- bCalves[i-1] * eSurvivalCalfSummerAnnual[i-1]^(154/365) *
eSurvivalCalfWinterAnnual[i-1]^((SpringCalfCowDays[i] - 154) / 365)

    bSpringCalfCow[i] <- eSpringCalves[i] / (eSpringCows[i] + eSpringYearlings[i]/2)

    bCows[i] <- (eSpringCows[i] + eSpringYearlings[i] / 2) * eSurvivalCow[i-
1]^eSpringToJuneCor[i]
    bBulls[i] <- eSpringBulls[i] * eSurvivalBull[i-1]^eSpringToJuneCor[i] +
eSpringYearlings[i] / 2 * eSurvivalCow[i-1]^eSpringToJuneCor[i]
    bYearlings[i] <- bCalves[i-1] * eSurvivalCalfSummerAnnual[i-1]^(154/365) *
eSurvivalCalfWinterAnnual[i-1]^(211/365)
    bCalves[i] <- bCows[i-1] * eSurvivalCow[i-1] * (1 - bCowHarvestRate[i]) * eFecundity[i-1]
  }

  for(i in SurvivalAnnual) {
    CowSurvival[i] ~ dnorm(eSurvivalCow[i] * (1 - bCowHarvestRate[i+1]),
CowSurvivalSE[i]^-2)
  }

  for(i in CowsAnnual) {
```

```
  BreedingProportion[i] ~ dnorm(eFecundity[i-1], BreedingProportionSE[i]^-2)
  eBreedingCows[i] <- bCows[i] * eFecundity[i-1]
  BreedingCows[i] ~ dnorm(eBreedingCows[i], BreedingCowsSE[i]^-2)
 }

 for(i in FallBCAnnual) {
  FallBullCow[i] ~ dnorm(bFallBullCow[i], FallBullCowSE[i]^-2)
 }

 for(i in FallAnnual) {
  FallCalfCow[i] ~ dnorm(bFallCalfCow[i], FallCalfCowSE[i]^-2)
 }

 for(i in SpringAnnual) {
  SpringCalfCow[i] ~ dnorm(bSpringCalfCow[i], SpringCalfCowSE[i]^-2)
 }
..
```

Parameter estimates

The Bayesian model estimated principal parameters pertaining to the mean estimates of fecundity, bull survival, calf survival and cow survival. In addition, temporal variation in calf survival, bull survival, fecundity, and cow survival were estimated as random effects (Table 1).

Table 1: Bayesian IPM state space model coefficients. Parameters are given on the logit scale (which are then transformed to the probability scale using a logit transform). Parameter significance is determined by overlap of confidence limits with 0. The parameters are summarized in terms of the point *estimate*, standard deviation (*sd*), the *z-score*, *lower* and *upper* 95% CI/CLs and the *p-value* (Kery and Schaub 2011, p 37 and 42). The estimate is the median (50th percentile) of the MCMC samples, the z-score is mean/sd and the 95% CLs are the 2.5th and 97.5th percentiles. A p-value of 0.05 indicates that the lower or upper 95% CL is 0.

term	estimate	sd	zscore	lower	upper	pvalue
Main effects						
bFecundity	1.018	0.269	3.837	0.524	1.567	0.000
bSurvivalBull	0.785	0.173	4.685	0.531	1.242	0.000
bSurvivalCalfSummerAnnual	-0.388	0.323	-1.135	-0.937	0.332	0.258
bSurvivalCalfWinterAnnual	0.072	0.272	0.304	-0.450	0.621	0.759
bSurvivalCow	1.650	0.127	13.104	1.441	1.946	0.000
Random effects						
sFecundityAnnual	1.042	0.220	4.850	0.708	1.571	0.000
sSurvivalBullAnnual	0.421	0.327	1.447	0.035	1.250	0.000
sSurvivalCalfAnnual	1.081	0.218	5.053	0.752	1.609	0.000
sSurvivalCowAnnual	0.554	0.175	3.274	0.291	0.969	0.000

Model fit was judged using R-hat value which suggested adequate model convergence. In addition, the distribution of parameter estimates was inspected to assess model convergence (Table 2).

Table 2: Model summary. N is the number of parameters, nchains is the number of Markov Chains used, nthin is the number of Markov Chain samples that were thinned, ess is the effective sample size, R-hat is the R-hat convergence metric and convergence is the score based on effective sample size and number of parameters in the model.

n	K	nchains	niters	nthin	ess	R-hat	converged
34	10	3	1000	200	1473	1.002	TRUE

Unsplit R-hat values were used to assess if choice of prior distribution influenced the posterior distribution of parameter estimates (Table 3).

Table 3: Split R-hat values indicating sensitivity of posterior distributions to the choice of priors.

term	R-hat
bBreedingCows1	1.019
bFecundity	1.023
bSurvivalBull	1.009
bSurvivalCalfSummerAnnual	1.005
bSurvivalCalfWinterAnnual	1.002
bSurvivalCow	1.002
sFecundityAnnual	1.032
sSurvivalBullAnnual	1.027
sSurvivalCalfAnnual	1.006
sSurvivalCowAnnual	1.011
bBreedingCows1	1.019

The Bayesian model generated yearly estimates of demographic parameters as well as field measurements which were used in the fitting of the model. These estimates are detailed in Table 4. Most of the actual estimates are shown in Figures 9 to 14 of the main report.

Table 4: Parameter descriptions for estimates generated by the model. Parameter estimates are shown in Figures 31 to 35 in the main report.

Parameter	Description
Annual	The year as a factor
bCows1	The number of cows in the initial year
bFecundity	The proportion of cows breeding in a typical year
BreedingCows[i]	The data point for the number of breeding cows in the i^{th} year
BreedingCowsSE[i]	The SE for BreedingCows[i]
BreedingProportion[i]	The data point for the proportion of cows breeding in the i^{th} year
BreedingProportionSE[i]	The SE for BreedingProportionSE[i]
bSurvivalBull	The log-odds bull survival in a typical year
bSurvivalCalfAnnual[i]	The random effect of the i^{th} Annual on bSurvivalCalfSummerAnnual and bSurvivalCalfWinterAnnual
bSurvivalCalfSummerAnnual	The log-odds summer calf survival if it extended for one year
bSurvivalCalfWinterAnnual	The log-odds winter calf survival if it extended for one year
bSurvivalCow	The log-odds cow (and yearling) survival in a typical year
bSurvivalCowAnnual[i]	The random effect of the i^{th} Annual on bSurvivalCow
BullHarvestRate[i]	The proportion of bulls harvested in January of the i^{th} year
CowHarvestRate[i]	The proportion of cows harvested in January of the i^{th} year
CowSurvival[i]	The data point for cow survival from the $i\text{-}1^{th}$ year to the i^{th} year
CowSurvivalSE[i]	The SE for CowSurvivalSE[i]
FallBullCow[i]	The data point for the bull cow ratio in the fall of the i^{th} year
FallBullCowSE[i]	The SE for FallBullCow[i]
FallCalfCow[i]	The data point for the calf cow ratio in the fall of the i^{th} year
FallCalfCowSE[i]	The SE for FallCalfCow[i]
SpringCalfCow[i]	The data point for the calf cow ratio in the spring of the i^{th} year
SpringCalfCowSE[i]	The SE for SpringCalfCow[i]
sSurvivalCalfAnnual	The SD of bSurvivalCalfAnnual
sSurvivalCowAnnual	The SD of bSurvivalCowAnnual

Figure 1 displays sensitivity of parameter estimates and trends in parameter estimates to inclusion of the 2018 breeding female estimate. It can be seen that inclusion or exclusion of this estimate affects both estimates of cows, breeding cows, and bull + cows, but also estimates of cow survival. In most cases, estimates of survival are lower as well as estimates of fecundity/productivity prior to the 2018 survey. In both cases reduction of these parameter values results in a lower estimate of caribou on the 2018 calving ground.

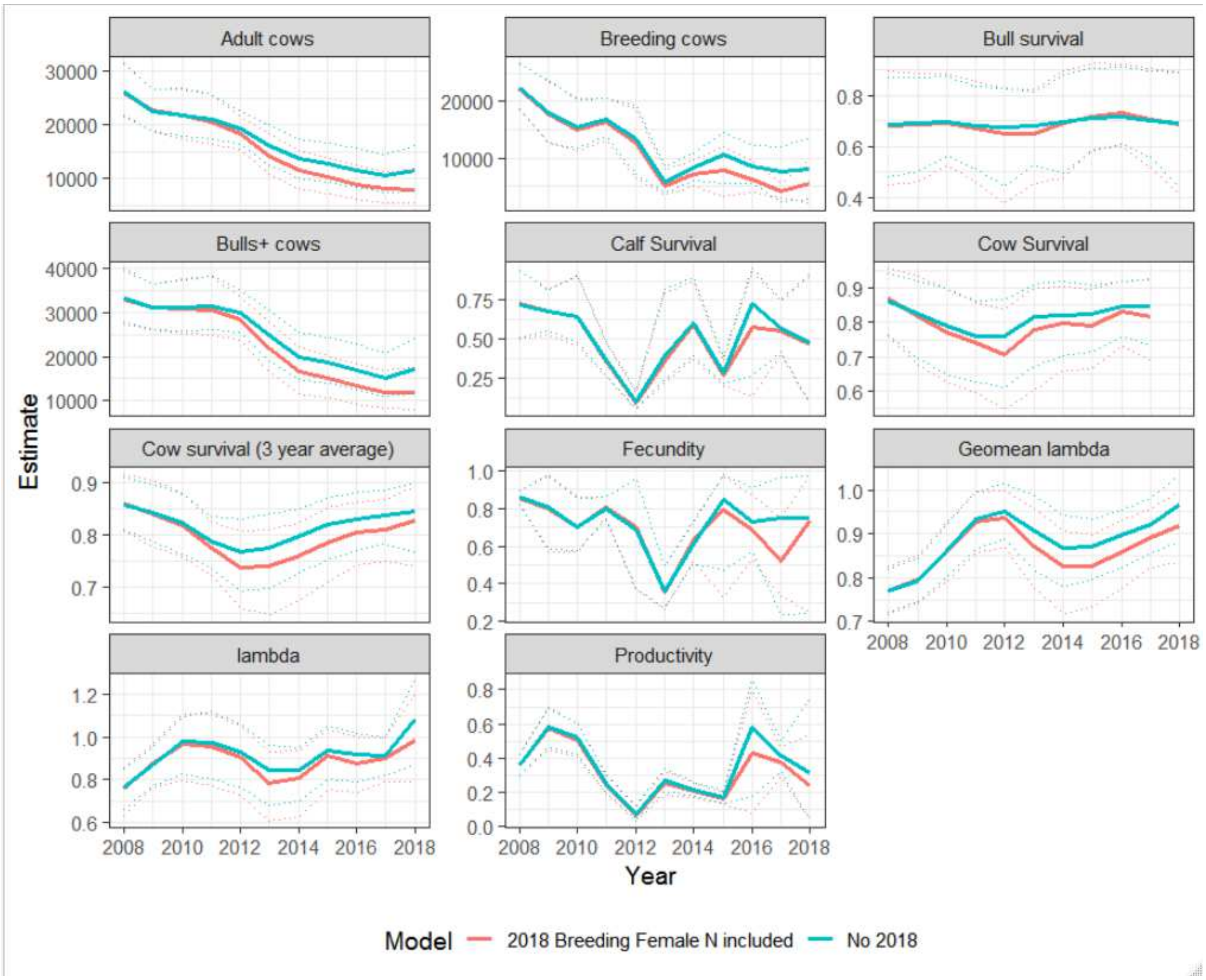


Figure 1: Estimates of principal demographic parameters from the IPM with the 2018 breeding female estimate included and excluded. Confidence limits are given as dashed lines around model predictions.

The harvest estimates used in the demographic model are given in Table 5.

Table 5: Harvest estimates and approximate harvest rates used in the demographic model. Rate is estimated harvest divided by estimate cow or bull abundance each year. Estimates based on Dogrib Harvest study, Boulanger et al. 2011, and approximate harvest levels estimated since 2010 (B. Croft, Unpublished).

Year	Harvest estimate		Harvest rate	
	cows	bulls	cows	bulls
1985	8380	7484	0.034	0.046
1986	8380	7484	0.036	0.050
1987	8380	7484	0.039	0.061
1988	8380	4606	0.043	0.042
1989	8380	3855	0.042	0.033
1990	8450	8970	0.045	0.086
1991	11626	10073	0.066	0.108
1992	9046	9685	0.051	0.103
1993	13107	7712	0.082	0.099
1994	8380	7484	0.053	0.092
1995	8380	7484	0.058	0.109
1996	8380	7484	0.058	0.103
1997	8380	7484	0.063	0.119
1998	8380	7484	0.068	0.132
1999	8380	7484	0.073	0.134
2000	8380	7484	0.081	0.176
2001	5000	2000	0.055	0.064
2002	5000	2000	0.064	0.071
2003	5000	2000	0.071	0.089
2004	5000	2000	0.086	0.102
2005	5000	2000	0.105	0.117
2006	5000	2000	0.130	0.142
2007	5000	2000	0.160	0.227
2008	5000	2000	0.193	0.289
2009	5000	2000	0.210	0.226
2010	5	70	0.000	0.008
2011	5	70	0.000	0.007
2012	5	70	0.000	0.007
2013	5	70	0.000	0.009
2014	5	70	0.000	0.014
2015	5	70	0.001	0.015
2016	5	70	0.001	0.017
2017	5	70	0.001	0.019
2018	5	70	0.001	0.019

LITERATURE CITED

Boulanger, J., A. Gunn, J. Adamczewski, and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. The Journal of Wildlife Management 75 (4): 883–96. https://doi.org/10.1002/jwmg.108.

Bradford, M. J., J. Korman, and P. S. Higgins. 2005. Using confidence intervals to estimate the response of salmon populations (Oncorhynchus Spp.) to experimental habitat alterations. Canadian Journal of Fisheries and Aquatic Sciences 62 (12): 2716–26. https://doi.org/10.1139/f05-179.

Brooks, S., A. Gelman, G. L. Jones, and X.-L. Meng, eds. 2011. Handbook for Markov Chain Monte Carlo. Boca Raton: Taylor & Francis.

Kery, M., and M. Schaub. 2011. Bayesian Population Analysis Using WinBUGS: A Hierarchical Perspective. Boston: Academic Press. www.vogelwarte.ch/bpa.html.

McElreath, R. 2016. Statistical Rethinking: A Bayesian Course with Examples in R and Stan. Chapman & Hall/CRC Texts in Statistical Science Series 122. Boca Raton: CRC Press/Taylor & Francis Group.

Newman, K.B., S.T. Buckland, B.J.T. Morgan, R. King, D.L. Borchers, D.J. Cole, P. Besbeas, O. Gimenez, and L. Thomas. 2014. Modeling Population Dynamics: Model Formulation, Fitting and Assessment Using State-Space Methods. http://dx.doi.org/10.1007/978-1-4939-0977-3.

Plummer, M. 2015. JAGS Version 4.0.1 User Manual. http://sourceforge.net/projects/mcmc-jags/files/Manuals/4.x/.

R Core Team. 2018. R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Thorley, J. L., and G. F. Andrusak. 2017. The fishing and natural mortality of large, piscivorous bull trout and rainbow trout in Kootenay Lake, British Columbia (2008–2013). PeerJ 5 (January): e2874. https://doi.org/10.7717/peerj.2874.

Thorley, J.L. and Boulanger, J. 2019. Bathurst Caribou Herd Population Analysis 2019. A Poisson Consulting Analysis Report. Unpublished Contract Report.

Appendix 4: Trends in Bathurst Calving Ground Size and Densities 2009-2018

Introduction

This document provides additional information on calving ground size, distribution of caribou on calving grounds, and core calving ground densities on the Bathurst herd calving grounds 2009-2018, based on reconnaissance survey and photo survey data. The core area has also been referred to as the "annual concentrated calving area" by Russel et al 2002. Information on the Bluenose-East herd's calving ground size and densities and spatial distribution of caribou was requested during the WRRB April 2019 Bluenose-East Caribou Hearing. A summary on the Bluenose-East herd's patterns 2010-2018 was included as an appendix in the 2018 survey report (Boulanger et al. 2019). Similar analyses were also carried out for the Bathurst herd 2009-2018 based on calving ground surveys, and the results are included here.

This document provides a summary of data from previous surveys as opposed to full documentation of methods used to define core calving areas. For full descriptions of survey methods and results, readers should refer to calving photo survey results for the Bathurst herd in 2009 (Nishi et al. 2010), 2012 (Boulanger et al. 2014), 2015 (Boulanger et al. 2017) and 2018 (main text of this report).

Methods

Trends in segment densities from reconnaissance surveys flown during calving photo surveys were initially assessed to infer distribution and aggregation of higher densities of caribou. Segments that were contained within core calving strata were included in the analysis. Data were plotted spatially and by segment density class. Core calving area was defined by the presence of breeding caribou in contiguous segments.

Estimates of density based on photo survey data and core calving ground size (based on the area of survey strata) were used to estimate numbers of adult and breeding females. One potential issue with this approach is that the degree of aggregation of adult and breeding females varies among years, and therefore changes in the core area will be due to both changes in abundance, aggregation, and survey coverage. For example, in years of high aggregation the core area might be surveyed primarily by photo survey methods whereas photo and visual survey methods would be used when aggregation is lower. Therefore, defining core areas as those just photo surveyed may not represent the true density and distribution of breeding females. To explore this issue, we derived a weighted core calving ground index based on the summation of the product of stratum areas and proportions of breeding and adult females. For example, if a 100 km^2 stratum had 20% breeding females, then the core calving ground index was estimated as 20 km^2. Each survey stratum area was scaled using this approach and summed for the survey year to provide the aggregate core calving ground index value. Density estimates using this approach will be more robust to differences in calving ground surveys where layout and types of strata (i.e., photographic and visual) would vary. For example, this approach avoids the subjective inclusion or exclusion of survey strata areas for estimation of core areas and uses all the survey strata to estimate core area. However, the actual core calving ground index will not directly pertain to a defined geographic area.

Results

Plots of segment densities for the Bathurst herd from calving ground surveys 2009-2018 suggest different levels of aggregation for each survey year, with the highest levels in 2012 (Figure 1). The core area in 2018 was reduced to only low and medium density segments with no high density segments. The annual concentrated calving area for the Bathurst herd in 2018 was to the west of Bathurst Inlet. Segments near Bathurst Inlet, which contained intermittent pockets of females, are shown for reference purposes. This pattern of low densities on either side of Bathurst Inlet included some collared caribou cows, and was not observed in previous years. Estimation of the core area based on the survey strata detailed in the next section provides further inference on the core area in 2018.

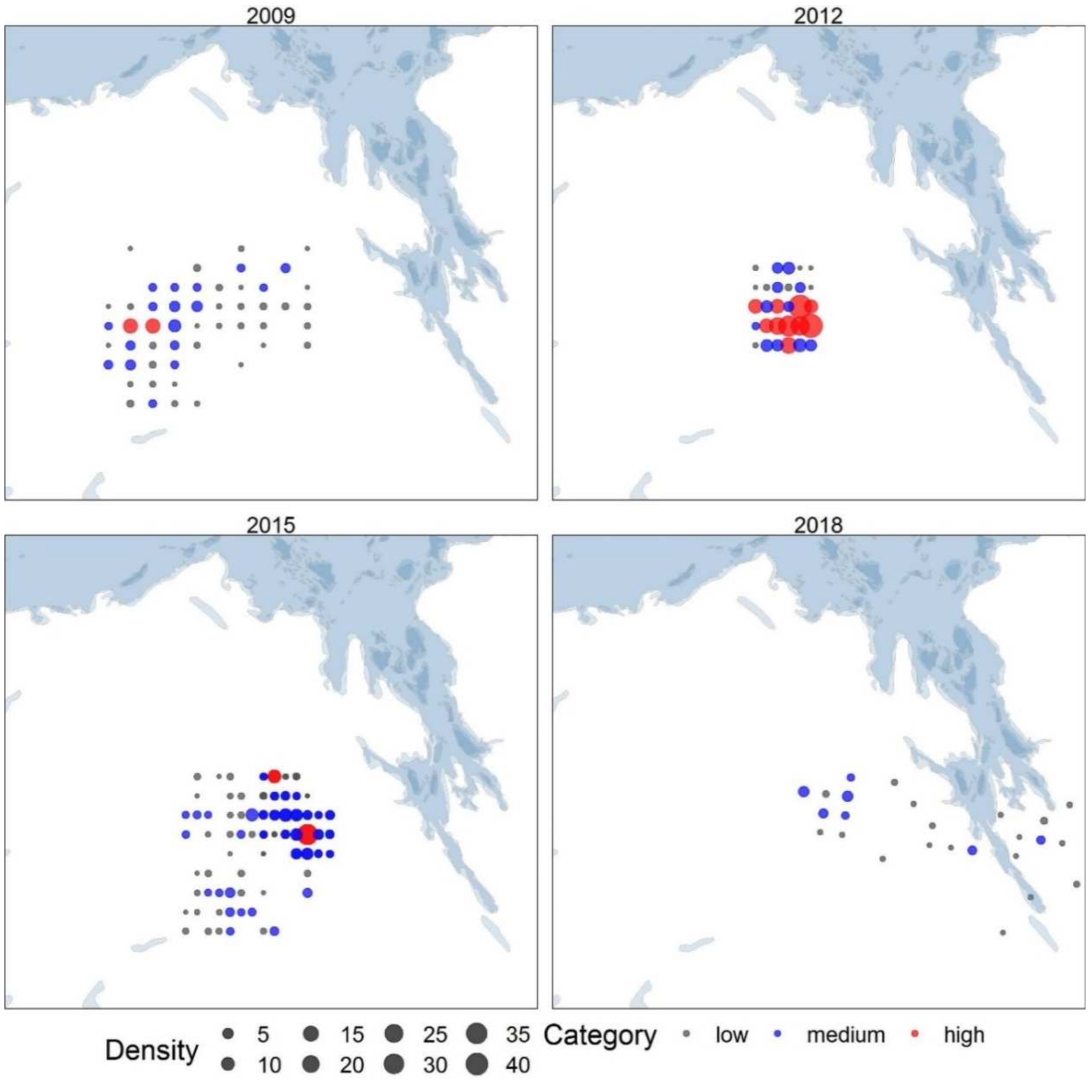


Figure 1: Maps of segment densities from reconnaissance surveys of the Bathurst caribou herd from calving ground surveys 2009-2018. Low density = <1 caribou/km^2, medium density = 1-9.9 caribou/km^2, and high density = at least 10 caribou/km^2.

Plots of segment densities also illustrate the higher level of aggregation in 2012 with fewer lower and medium density segments in comparison to high density segments (Figure 2).

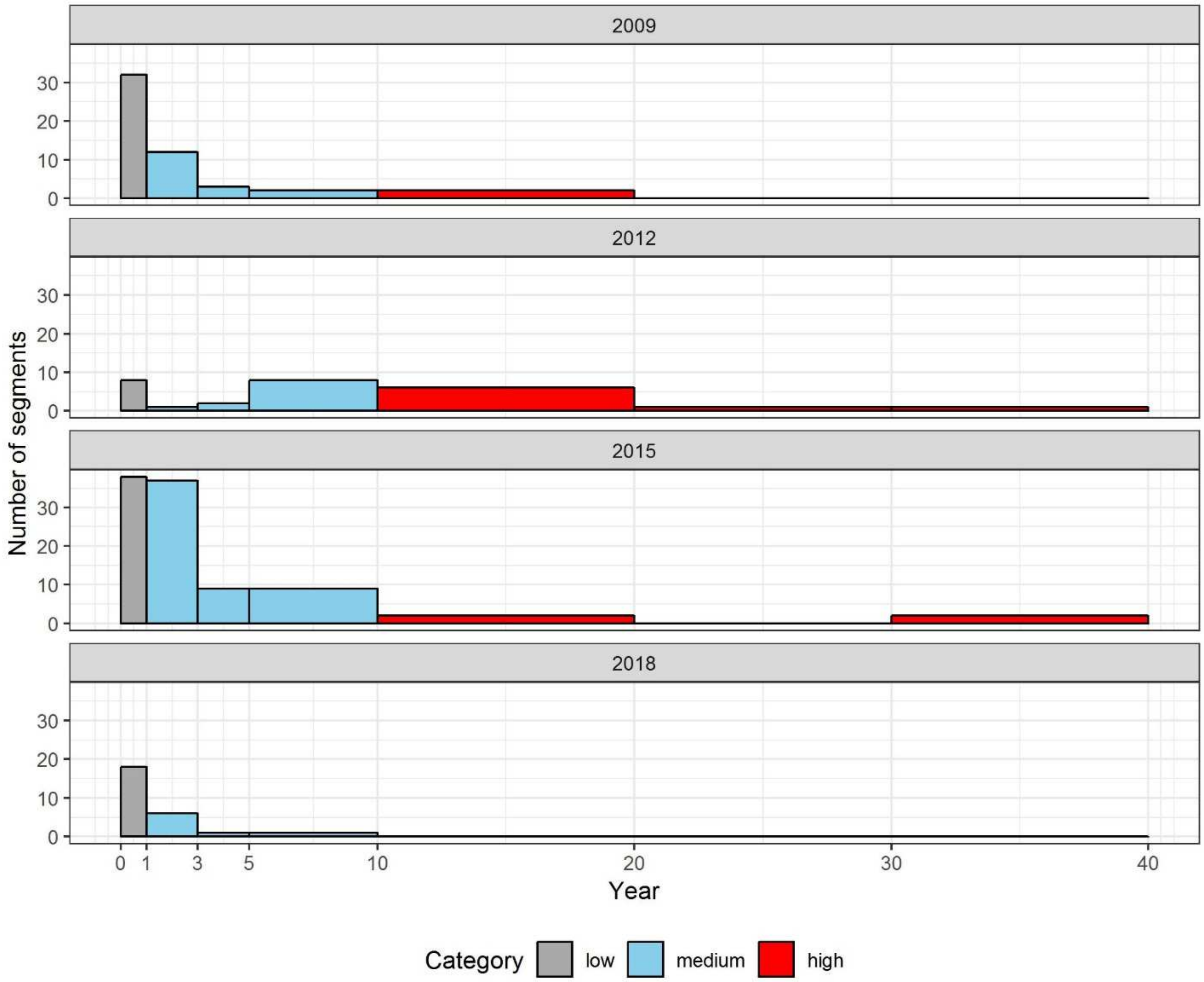


Figure 2: Segment densities in annual concentrated calving areas for the Bathurst caribou herd 2009-2018. Low density = <1 caribou/km^2, medium density = 1-9.9 caribou/km^2, and high density = at least 10 caribou/km^2.

Median segment densities were below 5 caribou per km^2 for all years except 2012 (Figure 3).

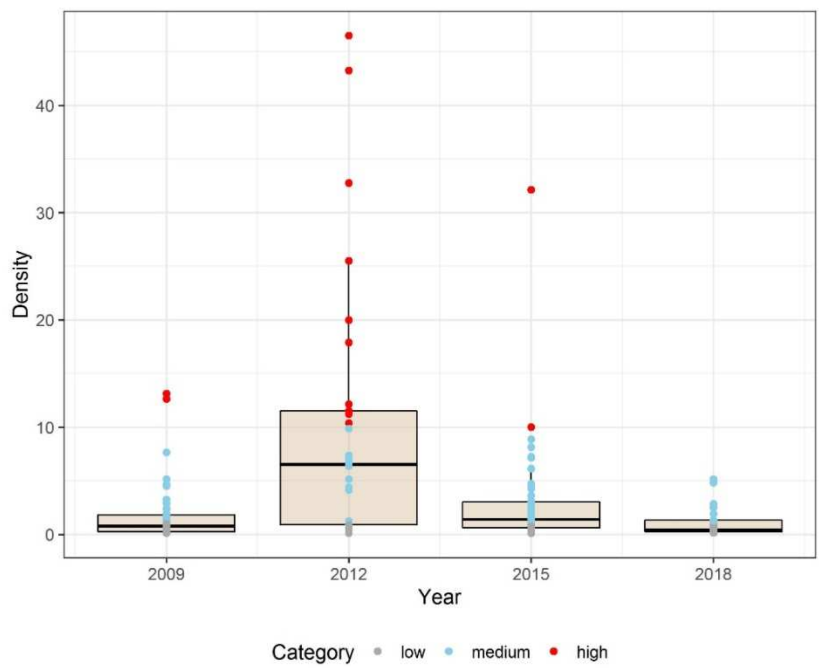


Figure 3: Boxplot of segment densities on calving ground surveys for the Bathurst herd 2009-2018.

A comparison of core areas further demonstrates the higher level of aggregation in 2012 with a smaller core area compared to other years (Figure 4).

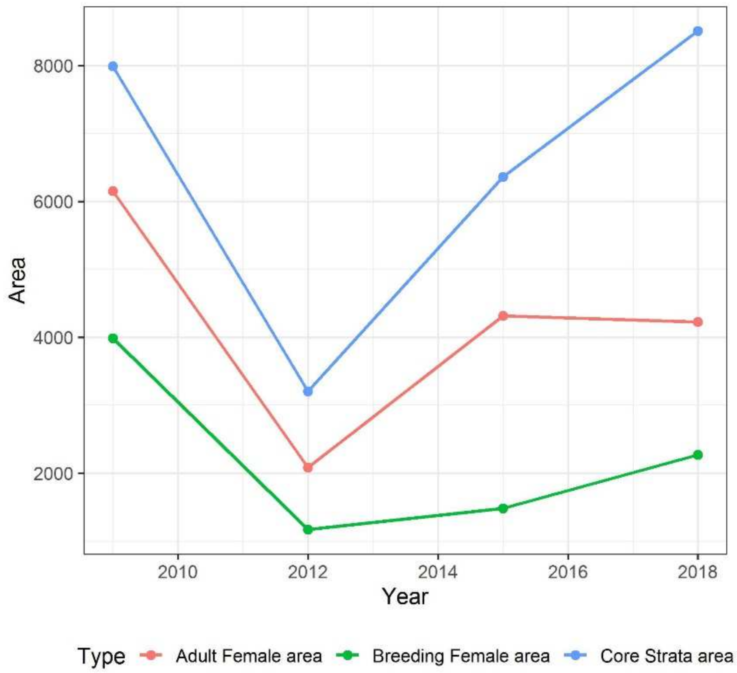


Figure 4: Area of core survey strata, area weighted by proportion of breeding females, and area weighted by proportion of adult females in survey strata by year for the Bathurst herd 2009-2018.

During this time, estimates of abundance of adult and breeding females stabilized from 2009-2012 followed by a decline from 2012-2018 (Figure 5).

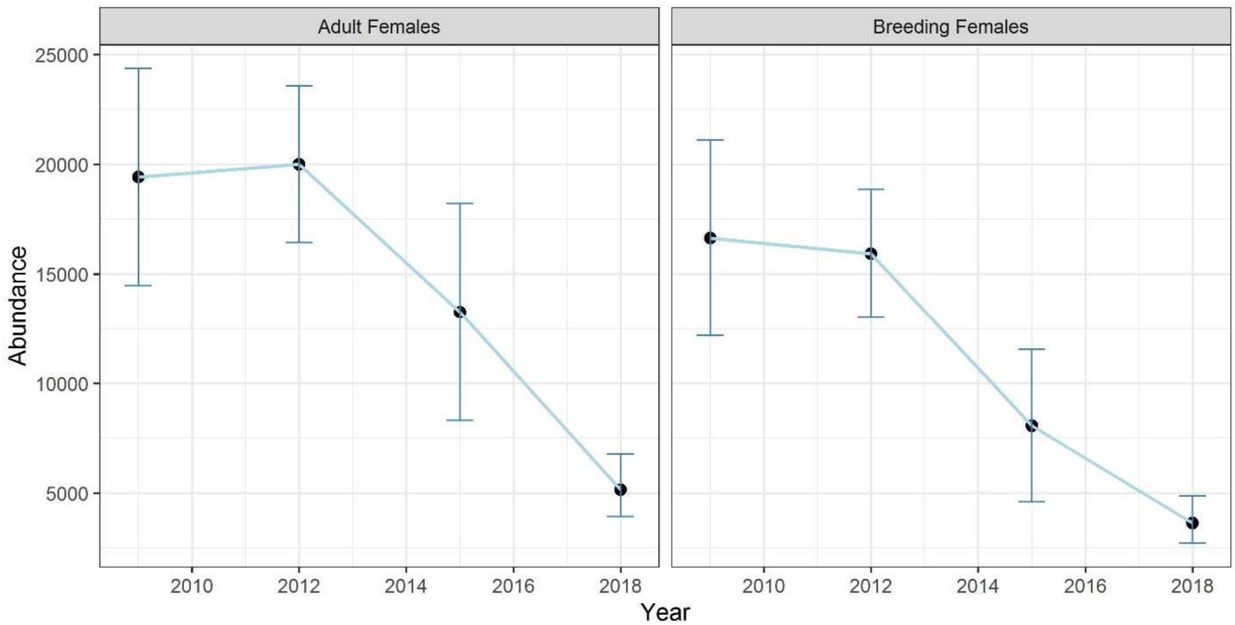


Figure 5: Estimates of abundance of adult and breeding females on core calving areas 2009-2018 for the Bathurst herd.

Density was estimated by dividing abundance (Figure 5) by core area (Figure 4). Plots of core densities suggest an increase from 2009-2012 followed by a decrease from 2012-2018 (Figure 5). The increase in density in 2012 was partially due to a decrease in core area of the calving ground rather than a substantive increase in overall abundance (Figure 6). Trends in density estimates using the core and weighted methods were reasonably similar.

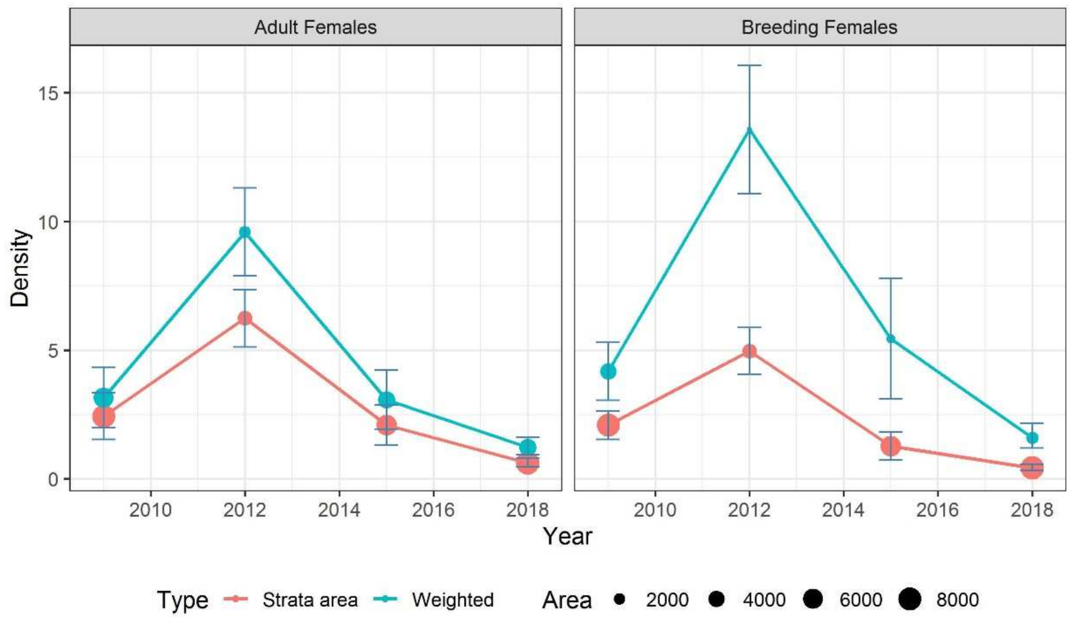


Figure 6: Densities (number/km^2) of adult females and breeding females in survey strata using total area (Strata area) and corresponding breeding female or adult female areas, for Bathurst calving ground 2009-2018. The size of symbols is proportional to the calving ground area used for density estimates.

Discussion

This report is based on Bathurst caribou calving photo surveys (2009-2018) and provides a summary of trends in caribou distribution, core calving ground area, and caribou densities in core calving ground areas. Defining the core calving area is challenging due to differences in levels of aggregation of caribou during each survey year. We describe a weighted method used to describe trends based on a calving ground core area index, which attempts to confront this issue by weighting the contribution of survey stratum to the overall estimate of core area by the proportion of adult and breeding females estimated in the given strata. The resulting core area index values are best used to infer trends rather than define an absolute area.

In general, aggregation of the Bathurst herd increased in 2012, as indicated by a reduced core calving ground area with increasing density, followed by a decline in density from 2012-2018 (Figure 6).

Alternative methods such as use of collared caribou locations could be used to further infer core areas. This type of analysis could be useful for the 2018 survey year when the core area was mainly defined in a single small area. This type of analysis is beyond the scope of this report but could be pursued in the future.

LITERATURE CITED – see main text

Kugluktuk Angoniaktit Katimayit ● Angoniaktit imalu Nanirgiaktukpaktunik Katimayit
PO Titikikvia 309, Kugluktuk NU X0B 0E0 ● Hivayaut: (867) 982-4908 Hivayaut Tuyuutinik
Titikgakhimayunik: (867) 982-5912
Titikikvia Karitauyakukgutinik: kugluktuk@krwb.ca

HIVULIUYUNIK TUNIYAKGAIKHIMAYUNIK TAHAPKUNUNGA NUNAVUT ANGUHIKIYIT HAVAKATIGIKPAKTUNIK
PUBLIC HEARING MARCH 5-6, 2020; CAMBRIDGE BAY, NUNAVUT

MIKHARUT

TUKIHIGIARUTINIK: XX **TIKUAKTAUYUKHANIK:**

Kingaokmiutanik Tuktu

Aah Tamatkiumayunik Angunahuaktautaaktunik Anguyaulutik 30 nik tuktunik havakhikhimayunik malikgakhanik uvani 2017 mi tuktutainik Kingaukmiutanik Tuktutainik ammihuakyuinik talvanitunik Kitikmeot Nunatuttukanik. Kitikmeot Nunatuttukat Anguhikiyit Katimayit tutkikhaaihimayunik tahapkuninga 30 nik pihimayunik malikgakhanik: Kugluktuk 10; Omingmaktok 10; Kingaok 10. Tahapkuat Kugluktuk Angoniaktit imalu Nanirgiaktukpaktunik Katimayit (HTO) tutkikhaihimayunik tahapkuninga nanaitkutauvaktunik atukgiakaktunik tuktunuut nungudjutilingnik ubluinik atugakhanik atuknianut tahapkununga ilaagiktunik nunagivaktanik ukiukpakgulluakhuni aihikpaanitpaktunik nunamiuplutik talvani Tahikyoak.

Tahapkuat Kavamat Nunatsiami Tunungani talvanilu Nunavut iniktikpakhimayunik havagiplugit aah kufiutilanginik nallautakgutauvaktunik uvani 2018 uvunalu nallautakgutauvaktunik mikharut uvuna 8,200 nirgitinik, aah ikiklivaliayunik talvanganit 2015 ihiviukhinikmun naunaiyainikmun naunaitkutakhanik uvuna 20,000 nirgitinik.

Tahapkuat Kavamat talvani Nunavut, Havakvit talvani Nunalikiyit katimakatigivakgaait tahapkunani tutkikhakhikariakaktunik talvanilu Kitikmeot HTOs uvani Hikutilikvia 7, 2019 talvani Ikaluktutiak. Tahapkuat havakvit Nunalikiyit pinnahuat uktukniaklutik aullaktikgutikhanik mikhilaaktauyukhanik uvanga uvunga 30 nik nirgitnik pilugit 0 nik paaiktaulutik hungnaamiklugit.

Aah ammigaitunik tikuaktauvaktunik avaatingnukpaktunik nikikhakhiukpaktunik nirgitinik nirgitit havagiyauvaktukhanik. Tadja nunalingni havakatauvaktunik mikharut amagoit niakuinik katitiktauvaktunik manikhakhautigiplugit havagiyauvaktunik tadja tahapkunanga Havakvit Nunalikiyit. Talvanganit tahapkunani havagiyauliktunik uvani ukiumi 2018/19, 101 nik amagonik angunnahuaktauvaktunik. Tahapkununa kufiutilanginik kilaminuak ammigaikhimayunik pidjutaugumik havakhikhimagumik $300/ihiviuktauyukhanik. Angunnahuakpaktunik ukaalukhimayunik mikharut akikhautikhanik piyauyukhanik akittukyumiyauyukhanik, tahapkuatlu pidjutivakniaktugulluit angunnahuakpaktukhauyugulluit amagokhiukpakniakgulluaktutlu pidjutivakhimayut taimani 101 nik angunnahuaktauvakhimayunik pidjutivaktukhanik angunnahuaktauvaktukhaniklu.

Tahapkuat HTO apikhukhimayunik tahapkuat Kavamat talvani Nunavut aah kufiuyunik apikuutauvaktunik talvanitunik uvani Hikutilikvia 7 katimadjutauvaktunik. Ilauhimayuniklu kanukgitunik havagiyauvaktukhaniklu Kavamat talvani Nunavutmi pilutik havagiplugit aahikuknikmunlu mikhitivaktunik tahapkununa TAH ima 0 nik paaiktaulutik hungnaamiklugit tahapkununalu aah amagonik havagiyauvaktunik havakhautikhanik, pinnahuaknikmun ungniguutinakpaktukhanik nauvulliafaakpaktukhaniklu nirgitinik, pihimayunik kiudjutinik havakhimayukhanik kiudjutaitunik havakhimayunik. Tahapkunanilu apikhuktauhimayuut kanuktun tahapkuat Kavamani Nunavutmi kinauyunit havaginiagulluakihiggit mikharut ilingaituukhanik ammihuakyunik. Havagiyaulimaitunik pilimaituniklu. Tahapkuat HTO pihimayut apikhukhimayunik kanuktun ihuigutivaktunit havakhikhimayunik aah TAH talvunalu 100 nik naliak 30 nik naliak 0 nik paaiktaulutik hungnaamiklugit pilakilutiklu tahapkunani ammihuakyunik uvunalu havagiyauyuitkumik taakuyauyuitkumik upikgiyaulimaituniklu.

Ikiikliyauhimayunik havakhikhimayunik tahapkununa TAH taimailiukgumayunik 0 nik paaiktaulutik hungnaamiklugit pipkaihunguyuk pilaakilutinilu aah ayuuknakhihunguyuk ihuikgutilutiklu tahapkunani ilaagiktunik nunagivaktanik ukiukpakgulluakhuni aihikpaanitpaktunik nunamiuplutik talvani Tahikyoak, mikharutlu pitkuhiktukpaktunik atukhugit havagiplugit nikikhakhiuknikmun huli ublumimuut atukhugit.

BHTO Translation for the Letter on the Burnside Tuktu.

Una titiratara ilinnut, naunaitkut Qinagaunmiutannit Inuit, atuyukkamikku tamnali miitikataunahuaqtuq Qingaunmiutaq Tuktuit nunaannit. Tapkuak tuktuit atulikpaktavut ukiagharaangat Tahiqhuamit Anguniaqtut angugaangamikkik niqqait tuyuliqpaktait Inungnut Qingaunmiutatnut angutaaraangamik. Ingilgaarnittat Inuit atuliqpakkamikkut hugadjat humiliqaaq niqighainnutlu, annuraannutlu, ilihimaliqtugut Inuutivut ayurhaliqpaktut tuktuiraangami kaaliqpaktut, kihimi ilihimayut utiqniaqtut Tuktuit qaiffaarumik qagugumi.

Hadja, tuktulliuqhutta niqiqiannaqtugut mikiugaluaqtitlugu, quanarhivaktut angunaighimayut, tuyuqtaugaangapta Inuingnut payuliqpaktugut, Inuit Qingaunmiuttat Tahiqyuamit tuktuhiulimaitmata ungahingmat, taimaa Qablunaat anguniaqpaktut, tuktuhiuraangamik Inuingnut tuyuliqpaktut, taima havaktut havangmatatlu maniliuqpaktut, ikayuqtuutighaanut inminut.

Taimaa utirama Qingaunmut ilihaguirama, tuktugiakpaktuq Qingauq amiyuaryunik, kihimi nutaranigama, angilivalliarnmata Tuktu ikivalliarliqpaktut, kihimi Ingutanikkama Tuktu utiqpallialiqtut amayuaqyuit, taimaa ilavut Inutkuat uqaliqpaktut hugadjat ikiligaangamik ilaani utiliqpalliarliqpaktut qagugunnuraangat, tamanalii takuvara, atuqparalu.

Naunaittiarumaliraangapta hunannuamik Inutkuutivut apiriliqpaktaqqut aturiangani kanuuyumik hunamut ilihimangitkupta, taimaa inutkudjat uqauhiqaramik atuliqpaktait igingalraangnittanik inugallittaangani nakuuyumik taima.

Niqautivut atuqtailigaptigit hadja, qanuq ilihimayugut, ihumaaluutiqatugut, qanuqtauq uqauhivut atuquyaungittut ilivuq, qanuqtauq niqautiqaqniaraptalu niqainnarmik, taimaa atuinaqtavutlu, nunamit pigaangapta, nunamut tuniffaartughauyugut inuugiangani nakuuyumik, taimaa atuliqpaktavut nunavut. Ilaani Inuit maniqlimainnamik niqiqalimaittut niuvrutighaittumik ayurnnarmat, kihimi tamna Qablunaat anguniaqpakkamik tuktunik, akayuutiliqpaktaqqut havaraptikkulu, taimaa tuktuit niqqaitlu atuliqpaktavut taimaa, qanuqtauq taimaquyaugamik, atuqtailinahuargunni tuktuit, qanuqtauq namaginiarngani?

Quana, Hatogina Kapolak

BHTO Ighivautaq

Kitikmeot Regional Wildlife Board
ᕿᑎᖅᒥᐅᑦ ᓄᓇᓕᖕᒋᓐᓄᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ
Kitikmeot Nunaliit Avikhimaniani Angutikhaligiyit Katimayit

Kitikmeot
ᕿᑎᕐᒥᐅᑦ
Kitikmeot

Cambridge Bay
ᐃᖃᓗᒃᑑᑦᑎᐊᖅ
Ikaluktutiak

Gjoa Haven
ᐅᖅᓱᖅᑑᖅ
Uqhuqtuuq

Kugaaruk
ᑯᒑᕐᔪᒃ
Kugaaruk

Kugluktuk
ᖁᕐᓗᒃᑐᖅ
Kugluktuk

Taloyoak
ᑕᓗᕐᔪᐊᖅ
Taloyoak

ᕿᑎᕐᒥᐅᑦ ᐊᕕᒃᑐᕐᓯᒪᓂᖏᓄᑦ ᐆᒪᔪᓕ11ᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᖏᑦᑕ
ᑐᓐᓂᓯᒪᔭᖏᑦ ᓈᓚᒃᓂᖅᑲᕐᑎᓗᒋᑦ
ᓄᓇᕗᑦ ᐆᒪᔪᓕᕐᕆᔨᕐᔪᐋᑯᑦ ᑲᑎᒪᔨᖏᑦ
ᐹᕐᑐ ᑐᒃᑐᖏᑦᑕ ᐃᓄᓕᒫᕐᑎᑎᓗᖏᑦ ᓈᓚᖕᓂᑯᑦ
ᐃᖃᓗᒃᑑᑦᑎᐋᕐᒥᑦ
ᒫᓯ 5-6, 2020

ᑐᓴᒃᓴᑐᐃᓐᓇᖅ: ᐃᓱᒪᓕᐆᕐᐱᑕᐅᔭᕐᓇᐋᓕᒃ: X

ᑐᕐᕌᖓᔪᖅ: ᓄᓇᕗᑦ ᑲᕙᒪᖏᑦᑕ ᐊᕕᑎᓕᕐᕆᔨᑯᑦᓂᑦ ᓄᖅᑎᑖᐅᓇᓱᖕᓂᖓ ᑎᑎᕋᕐᓯᒪᔭᖏᑕ ᓄᓇᕗᑦ ᐆᒪᔪᓕᕐᕆᔨᕐᔪᐋᑯᓄᑦ ᐃᓱᒪᓕᐅᕐᑯᔨᓗᑎᒃ ᑐᒃᑕᐅᔪᖕᓇᕐᓂᖏᑦ ᐹᕐᑐᓯ ᑐᒃᑐᖏᓂᑦ 11130ᖑᒪᑦᑕ 0 ᖑᕐᑯᔨᑎᓗᒋᑦ (TAH)ᒧᑦ.

ᖃᐅᔨᒪᓂᒫᑦ: ᐹᑐᓯ ᑐᕐᑐᖏᑦ ᑐᒃᑐᓱᐅᕐᑖᕗᒃᑐᑦ ᓄᓇᓚᖕᓂᑦ ᖁᕐᓗᕐᑑᖅ, ᐅᒥᖕᒪᒃᑑᖅ ᕿᖕᒑᐅᒃ ᐊᒪᓗ ᐃᖃᓗᒃᑑᑦᑎᐋᒥᐅᓂᑦ ᐃᓚᖅᑲᕐᓗᑎᒃ ᐃᓄᖕᓂᑦ ᓄᓇᖅᑲᕐᑐᓂᑦ ᑕᓯᕐᔪᐋᖑᓂᕐᕿᕐᑖᔪᒥᑦ (Contwoyto Lake). ᐹᑐᓯ ᑐᒃᑐᖏᑦ ᑕᐃᒪᓐᓇᑐᐃᓐᓇᕐᑖᖅ ᑑᒃᑑᒥᔪᑦ ᓄᖑᔩᒥᕙᒃᓗᑎᒃ ᐊᒪᓗ ᐊᒥᓱᖑᕐᔪᒥᕙᒃᓗᑎᒃ ᑐᒃᑐᐃᑦ ᐃᓕᕐᑯᓯᕐᑲᕐᒪᑕ ᑕᒪᑐᒥᖕᒐᑦ ᐊᒥᓱᖑᕐᐸᒃᓗᑎᒃ ᓄᖑᔩᒥᕙᒃᓗᑎᓗ. ᐅᒃᐱᕐᕆᔭᕐᑲᕐᐳᒧᑦ ᑕᒪᑯᐋᑦ ᑐᒃᑐᐃᑦ ᐊᒥᓱᖑᕐᐹᓕᕐᕈᒫᕐᓂᖏᑦ ᐅᑭᐅᖑᓂᐋᕐᑐᒥᑦ ᓇᓚᐋᓂᑦ ᓯᕗᓂᒃᑲᒥᑦ. ᖃᐅᔨᒪᔮᖕᒥᔪᖅ ᐊᒥᓱᓂᑦ ᑐᒃᑐᐃᑦ ᓂᕿᖅᑲᕐᔩᒥᔪᒧᑦ ᐊᐅᓚᕐᐸᖕᒪᑕ ᐊᒪᓗ ᓇᔫᕐᑕᒥᓂᑦ ᓂᕿᖏᑦ ᓄᖑᔩᒥᔭᕐᕌᖕᒐᑕ ᕿᒪᒃᐸᒃᓗᓂᔪᑦ. ᑕᒪᓐᓇ ᐊᒥᓱᓂᑦ ᐅᖃᐅᓯᐅᓯᒪᔪᖅ ᐅᑭᐅᕐᑕᕐᑐᓕᒫᕐᒥᐅᓂᑦ ᑭᒃᓕᖅᑲᕐᓗᒍ ᔫᓈᓐᒥᑦ ᑯᐸᐃᒥᐅᓄᑦ ᓄᓇᖕᒐᓄᑦ. ᐹᑐᓯ ᑐᒃᑐᖏᑦ ᐊᑐᕐᑖᕙᕐᑐᑦ ᐊᒪᓗ ᐊᐅᓚᑖᓗᑎᒃ ᐃᓚᖕᒐᓗᐋᕐᑕᐃᓕᔭᐅᓗᑎᒃ ᐊᖑᓇᓱᒃᑎᓂᑦ ᐊᒪᓗ ᓄᖅᑎᑖᒃᐸᑦ ᑐᒃᑐᓯᐅᕐᓂᖅ ᐃᓐᓄᐃᑦ ᐊᒃᑐᕐᑕᐅᓯᒪᓕᕐᓂᐋᕐᑐᑦ ᐊᒃᓯᕐᕈᕐᓇᕐᑐᒥᑦ ᖁᕕᐋᓇᖕᕆᑐᒥᓗ.

ᐊᑐᕐᕈᒥᕆᔭᑫᑦ: ᕿᑎᕐᒥᐅᑦ ᐊᕕᒃᑐᕐᓯᒪᓂᖏᑦ ᐆᒪᔪᓕᕐᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᕐᑯᔨᒐᓗᐋᕐᐳᑦ ᑐᒃᑐᓱᐅᕐᑕᐅᔪᖕᓇᕐᓗᑎᒃ ᑭᒃᓕᖅᑲᕐᓗᒍ 30ᓂᒃ ᐊᒪᓗ ᓱᕐᑯᓯᕐᑕᐅᖕᒋᓗᓂ TAHᖕᒐ. ᐱᔪᑎᒋᔭᕗᑦ ᑕᒪᑯᐋᑦ ᑐᒃᑐᑖᕐᕿᑕᕐᑯᔨᓗᑕ ᐃᓄᖕᓂᑦ ᓂᕿᑎᔭᐆᒪᕐᕆᖕᒪᑕ (ᑕᐃᒪᖕᒐᑦ ᓂᕿᑎᔭᐆᖕᒪᑕ ᐃᓄᖕᓂᑦ). ᐃᓱᒪᒃᓴᕐᓯᐆᕐᑯᔨᖕᒥᔪᒧᑦ ᓄᓇᓕᕐᐸᕐᑕᕐᑲᕐᒪᑦ ᑕᓯᕐᔪᐋᒥᑦ ᐃᓄᖅᑲᕐᓗᓂᓗ ᑐᒃᑐᓂᒃ ᓂᕿᖅᑲᕐᓗᑎᒃ ᐊᒪᓗ ᐊᓐᓂᐆᒪᔭᕐᓇᐋᖅᑲᕐᓗᑎᒃ ᑕᓯᕐᔪᐋᒥᓂᕐᒥᓂᑦ. ᕿᑎᕐᒥᐅᑦ ᐊᕕᒃᑐᕐᓯᒪᓂᖏᑦ ᐆᒪᔪᓕᕐᕆᓂᕐᒧᑦ ᑲᑎᒪᔨᖏᑦ ᐅᖅᑲᕐᔪᐋᕐᕿᓱᑲᓗᐋᕐᐳᑦ ᑐᓴᕐᑖᔪᒪᓗᑕᓗ ᑐᒃᑐᑕᐅᔪᖕᓇᕐᑐᑦ ᓄᖅᑲᕐᑯᖕᒋᓇᑎᒧᑦ ᐃᓄᕐᑯᑎᑉᑎᓄᑦ ᐊᒪᓗ ᑐᒃᑐᑖᐅᔪᖕᓇᕐᑐᑦ 0ᖑᕐᑯᖕᒋᓇᑉᑎᒧᑦ.

ᐅᒃᐱᕈᓱᒃᑐᒍᑦ ᐊᒥᓱᖑᕐᕈᒫᓂᖏᑦ ᑐᒃᑐᑕᕐᓇᔭᐆᔪᖕᓇᖅᓂᖏᑦ
ᓄᕐᑲᑎᑕᐅᖕᒋᑲᓗᐋᕐᑎᓗᒋᑦ.

ᐃᓚᒋᐋᕐᓯᔪᒪᔪᒍᑦ ᑐᒃᑐᑕᕐᓇᔭᐅᔪᖕᓇᓂᖏᑦ ᓱᕐᑯᓱᕐᑕᐆᖏᐸᑦᑕ,
ᓄᕐᑲᕐᑎᑕᐅᕐᑯᓇᔭᕐᑕᕗᑦ ᐊᒃᓗᐋᑐᕐᔪᐋᓂᑦ ᑐᒃᑐᓱᐆᕐᑎᑎᓂᒧᑦ ᐊᒪᓗ ᐃᓄᖕᓄᑦ
ᓂᕐᑭᒋᔭᐆᑐᐋᓐᓇᓕᕐᓗᑎᒃ ᐃᓄᕐᑯᑎᑉᑎᓐᓄᑦ.

ᓄᕐᑲᕐᑎᑕᐆᒃᐸᑕ ᑐᒃᑐᓱᐆᕐᓂᖅ ᐃᓄᕐᑯᑎᒋᔭᕗᑦ ᐊᕐᓱᕐᕈᕐᓇᒃᑐᑰᕐᑎᑕᐆᓂᐋᕐᒪᑦᑕ
ᓂᕐᑭᕐᑲᓂᕐ ᐊᔪᕐᓇᕈᑕᐅᓕᑲᓂᕐᓗᓂᓗ. ᑐᑭᓱᐆᒪᒐᓗᐋᕐᑐᒍᑦ ᑕᒪᓐᓇ
ᐃᓚᖕᒐᓗᐋᕐᑕᐃᓕᕐᓂᕐᒧᑦ ᐱᔪᑎᒋᔭᐅᔪᕐ ᑐᒃᑐᓱᐆᕐᑯᔨᖕᒋᓕᕐᓂᑦ ᑲᕙᒪᑯᓄᑦ ᑭᓱᐋᓂ
ᐃᓱᒪᕐᑲᕐᑐᒍᑦ ᓄᕐᑲᕐᑎᑕᐆᒃᐸᑦ ᐃᓄᐄᑦ ᐊᑭᓛᓱᒪᓐᓂᐋᕐᑐᑦ ᑲᕙᒪᑯᓄᑦ
ᐊᒃᓱᕐᕈᕐᓇᕐᑐᒥᑦ ᐊᒥᓱᖑᕐᓂᐋᑐᐋᓐᓇᕐᑎᓗᖏᑦ ᐹᑐᓯ ᑐᒃᑐᖏᑦ.

ᕐᑯᔭᓕᕗᒍᑦ,

ᐹᐱ ᑭᓕᖕᑭᖕᐴᑦ
ᐃᒃᓯᕙᐆᑕᖅ

Kitikmeot Inuit Association

Submission to the NWMB for the GN Bathurst Caribou TAH Proposal

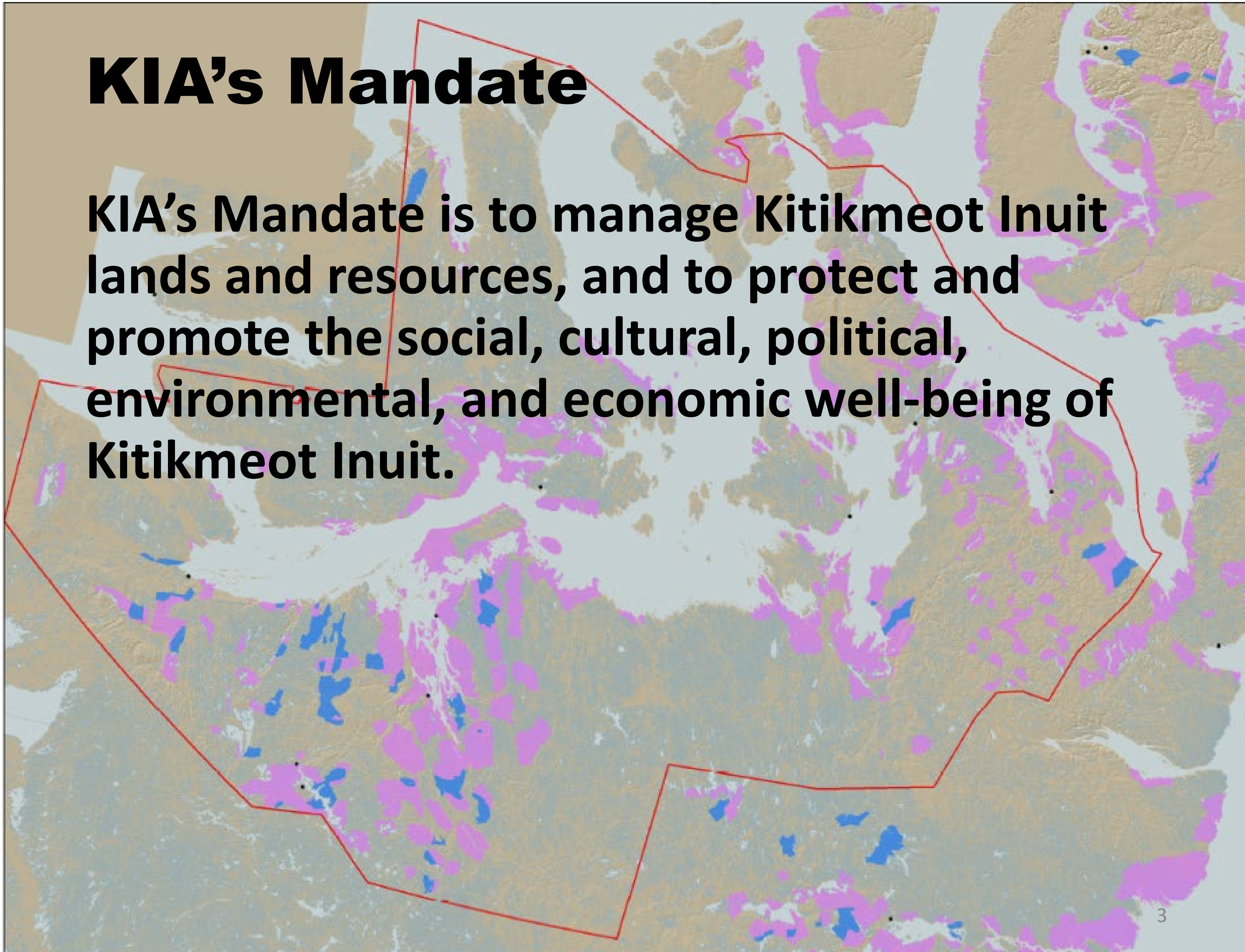
March 5-7, 2020

P.O. Box 18
Cambridge Bay, Nunavut
X0B 0C0
Telephone: 1 867 983 2458
Fax: 1 867 983 2701

Purpose of Presentation

- Present a summary of KIA's views of the Proposal for a Total Allowable Harvest (TAH) of 0 for Bathurst Caribou requested by the Government of Nunavut (GN) to the Nunavut Wildlife Management Board (NWMB).

KIA’s Mandate



KIA’s Mandate is to manage Kitikmeot Inuit lands and resources, and to protect and promote the social, cultural, political, environmental, and economic well-being of Kitikmeot Inuit.

Background to KIAs Submission

- KIA is working with the Kugluktuk and Ekaluktutiak Hunters and Trappers Organizations (HTOs), the Kitikmeot Regional Wildlife Board and Nunavut Tunngavik Inc. (NTI).
- Caribou are of central important to Inuit culture

KIAs Position on the TAH

- KIA opposes the GN TAH proposal.

Reasons:

  - The Inuit family at Contwoyto Lake should be permitted to maintain a subsistence lifestyle and contribute to caribou management
  - GN needs a balanced approach that minimally infringes on Inuit rights
  - GN proposal does not include TK or IQ

Analysis and Argument: Continuity of Inuit Culture and Subsistence

- TAH of 0 will
  - impact continuity of Inuit culture
  - impose undue hardship on Inuit family living at Contwoyto Lake
  - eliminate the caribou monitoring and conservation role currently performed by this family
  - not accelerate or measurable change the decline of the Bathurst herd

Analysis and Argument: Minimal Infringement and Inuit Management

- The *Nunavut Agreement* and the *Constitution* require that conservation action minimally infringe on Inuit rights
- October 7, 2019 meeting with HTOs, HTOs requested predator management for wolves and grizzly bears
- GN proposing to eliminate harvesting without managing other threats (i.e. predators)
- GN should support creation and implementation of Inuit led conservation management plan

Analysis and Argument: Need to Include TK and IQ

- GN conducted limited community meetings
- Comments from the community are not reflected in the proposal
- Proposal does not appear to include any TK or IQ

Summary

- Conservation of Bathurst caribou requires a balanced approach, including predator management
- Conservation management should be Inuit led and utilize TK and IQ, with support from GN for developing and implementing the approach
- Conservation must be consistent with Inuit rights, including minimal infringement on Inuit harvesting rights
- The TAH should be set at 10, allocated to the family at Contwoyto Lake for subsistence harvesting

Thank You

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

Kugluktuk

Bathurst Inlet
Kingaok

Bay Chimo
Umingmaktok

Cambridge Bay
Ikaluktutiak

Gjoa Haven
Okhoktok

Taloyoak

Kugaaruk

February 14, 2020

Jason Akearok
Executive Director
Nunavut Wildlife Management Board
Iqaluit, Nunavut
X0A 0H0

Kitikmeoni Inoet Katimayit Tonihiyota Nonavomi Omayolikiyit Katimayenot omiga Atoligomayaoyomik Ataotimot Agoyakhanik Kigaokmi Toktonik.

Hivonikhiyotikhamik: Ihomaleogot: X

Ihomagiyaoyok: Kavamat Nonavomi Atoligomayat Ihomaleogotikhamik okonoga Nonavomi Omayolikiyit Katimayenot kiniktot Ikiklivaligeagani Ataotimot Agoyakhat Kigaokmi Toktonik 30-nit 0-mot.

HIVONIKHIYOTIT NALONAEKTAOYONIKLO

Kavamat Nonavomi ("GN") tokhiktot Nonavomi Omayolikiyit Katimayenit ("NWMB") ikikligeaklogit Tamaeta Agoyaoyokhat ("TAH") Kigaokmi Toktonik Nonavomi 30-nit 0-mot.

NWMB-kot nalaktitinahoat March 5-mit 7-mot 2020-mi Ikaloktoteami ihomagiyagani GN-kot tokhiktoktat.

NWMB-kot agikhimayot Kitikmeoni Inoet Katimayenik ("KIA") ilaoyagani ilitagiyaonignik omiga piyotaoyomik.

KIA-kot Nonami Inoet Katimayet Kitikmeoni. KIA-kot kivgakteoyot ihomagiyaenik Kitikmeoni Inoet monaginigagot atokpaligeaganilo inoyoheni, ilitkoheni, maligalikiyoheni, avatilikiyoheni manikhakheogotenilo inoteaknignik. KIA-kot ihivgeoknigani GN-kot tokheotanik opalogaeyakniganilo oma tonihiyotip, KIA-kot okakatikakhimayot Kogloktomi Ekaloktoteamilo Angonahoaktinik Nanigeaktoktiniklo Timeoyonik, Kitikmeoni Nonami Omayolikiyit Katimayenik ("KRWB"), Nonavot Tongavik Timeoyoklo ("NTI").

KIA-kot havaktikaktot Takti Anne Gonn-mik ihigeogeagani GN-kot notaonikhanik hivonikhiyotaenik atoligomayaoyomi TAH-mik. Takti Gonn toktonik ilitokhaeyi kaoyimanikakhoni kanoginiganik monagiyotiniklo toktot monaginigagot havanik okeoktaktomi kavamani ihomakhakheokgotivlogilo monagikatigektot katimayit omayonik monaginigagot avataoyomiklo aktoknignik ilitokhaotinik piyotikaktonik

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

toktonik. Okaohet ilitokhagakhani naonaeyaotinik GN-kolo atoligomayaenik ilaleotihimayot ovani tonihiyotimi Oegoanilo A-mi.

Toktot ilomi atoknikateaktot Inoet ilitkoheni. Atogeagani toktot kayaknaktok Inoet nikikhakateaknigani ilitkohikmiklo atokhimageagani. Omayonik agonahoaknik ilagiteakta inoheni Inoet nonagiyaeni.

GN-kot pipkaeyot okoniga makpiganik ikayoktogeagani atoligomayanik ikikligeaknigani TAH-mi 0-mot:

1 GN-konit Naetomik Itkaeyotikhamik Kigaokmi toktot amigaeniganik nalaotaganik 2018-mi nogivikni piksaleokhimayonik naonaeyaonmit agoyakhaniklo atoligomayaoyonik;

2 okaohik 2018-mi amigaeniginik nalaotagaoyonik Kigaokmi toktot amihoakyoet;

3 HTO-kot okakatigeknikot Onipkaga Kigaokmi Toktot Monaginigagot Atolikoyaenik;

4 Onipkat Kigaokmi Toktot Amihoakyoet 2018-mi Nalaotagonmik, Nonavomi;

5 Nalaotagotit Nogiyonik Aknaloknik Iniknigoktoniklo Ataotimi Amigaenigit ilitokhakniganiklo Nogaet Inikneoyolo Kigaokmi Ataotimeoyot Manikameoyot Toktot: 2018-mi Nogiveoyok Nona Piksaleotikot Ilitokhaot.

Tikoaktotikagitok Igilgat Kaoyimayaenik (“IK”) Inoelonet Kaoyimayaenik (“IQ”) GN-kot tonihiyotaeni. Okaohikagitoli aktokniganik oma atoligomayoayot Inoet ilitkohenik, aneaginiganik, ihomakhotiniklo agiktaohimayonik *Nonavomi Agikatigegonmi, Maligakyoamilo*.

ILITOKHAKNIGA AKIGAKTOTAOYOKLO

KIA-kot kagikhimayot Kigaokmi toktot amihoakyoet ikiklivaleaniginik piyageagaliktoklo atoligeagani nogogitagani pigeagotimik. Kiheani, nogogitagani pigeagot mikiyomik ihoeliyotaoyageakaktok Inoet ihomakhotaenik ilagani Nonavot Agikatigegonmi, Maligakyoamilo ataotikot pipkaeniganik kagikhiyotimik tamat atoligomayaoyomik GN-kot monagiyotimik pigeagotanik Kigaokmi toktot amigaeniganik kagikhiteageagani aktoknigilaktaet Inoenaknot, ihomakhotaenolo.

KIA-kot tonihiyotaet inikhimayot aleoyoni ihoakhakhimayolo ilagani okoa okaoheoyot:

1. Inoet katangotiget Tahikyoami pilaktokhaogaloet atokhimageagnae nonamit inoyohikmiknik ikayoktoklotiklo toktot monaginiganik;
2. GN-kot piyageakaktot ihoaktomik pigeagotimik Kigaokmi toktonik nogogitagani monagiyaganilo ilakaktomik ikayoktigilogit ilitagilogilo atoknikateaktomiklo ilaoniginik Inoet, Angonahoaktit Nanigeaktoktilo Timigiyaet (“HTO”);
3. GN-kot atoligomayat ilakagitok TK-mik IK-miklonet;

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

4. Keoyotit NWMB-konit Tokhigaoyonik Tonihiyotaenik

KIA-kot atoligomayaenik NWMB-konot ihoanetot tonihiyotipta.

1. <u>KIA-kot Tokhiktot TAH-mi kolinik, Piyakhaenik Katangotiget Tahikyoami.</u>
GN-kot atogomayanik TAH-mi 0-mik ihoetomik aktokneakmagit atokhimakniginik Inoet ilitkohenik igilgalo pigeagotaenik. Piyotaoneakmalo atogeakagitomik ayokhaonmik Inoenaknit katangotigenit inoyot Tahikyoami atoktonik nogogitaagani atoktaoyot inoyohikmik toktoniklo nikikhanik piyageakaktilogit. TAH-mi kolit kilamik nalonaeyakniginilonet ikikliyotilimaginmata Kigaokmi amihoakyoet.

KIA-kot tokhiktot NWMB-kot ihoakhageagani TAH-mi kolinik, tamaeta atataoyok toniyaolotik katangotigenot Tahikyoami atogeagani inoyotit agonahoaknikmit.

KIA-kot okpigohoktot ona ihoakniganik tokhigaoyok piyotikakhoni ihageaginiganik atokhimageagani Inoet ilitkohet igilgalo pigeagotaenik, ikayoktoknigit okoa katangototoget amiginiganik nogogitaganilo toktot, ihomagiyaogitoklo nonameota aktokniginik ahivageagani kolit Kigaokmi toktot amihoakyoet.

Atokhimakniga Ilitkohik Igilgalo Pigeagotaet

Pipkageagani Inoet katangotiget agopkakatageagani kolinik Kigaokmi toktonik aepagotoagagat pivaligotaoneakmat amigiyotinik ilipkamayaganilo nogogitagani akhogotinik Kigaokmi toktonik. Katangotiget taya havaktot Kamgit Manikami Havami okonanga Tłįchǫ Kavamanit ("TG"). Katangotiget agonahoakniganit atoknigaelo toktonik, katangotiget pipkaeyot atoknikaktonik amiginigagot hivonikhiyotinik okonoga Kamgit Manikami havami aneaginigit homeniginiklo Kigaokmi toktot amihoakyoet.

Katangotiget, akhogotimigot inoyami manikami, ikayoktoklogilo nogogitagani ahogotaoyonik amakot tokotiktaonignit. Amakot kaoyimayaoyot nikikakniginik toktonik. Atokhimayok okeomi, katangotiget agohimayot 50-nik amakonik, ikiklitikhogit nikikaktot Kigaokmi toktonik amihoakyoknik.

Nonameotat Aktoknigit

TAH-goyok kolinik hatkigotaolaetonakhiyok naonaeyalaktomik aktokniganik Kigaokmi amihoakyoknik.

Ihoaktomik toktonik nikikaktot monaginiganik amigenaknigilo Kigaokmi toktot amigaenigit, pikagitok hok Katimayit pipkaelimagitmaga ikitonik agoyakhanik TAH-mi kolinik Kigaokmi amihoakyoknit.

TAH-mi kolit pilimaetonakhiyok naonaetomik kilamik ikikligeakniginik pipkaekilonilonet otikniginik Kigaokmi amihoakyoet. Ihomagivlogit kavamanit naonaeyaotinik atoktaenik

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

naonaepkotinilo alaganigit, kavlonat naonaeyaotaenit ayoknakneaktok ilitogiyagani alagoknigit Kigaokmi toktot amigaenigit ikinikhanik kolinik toktonik.

2. Ihageaginiga Pigeagot Nogogitagani Piyotaoyonik Mikiyomik ihoeliyotinik Inoet Ihomakhotaenik ovani Nonavomi Agikatigegonmi, Maligakyoamilo Ilaleotivlogili Inoet Monagiyohet.

KIA-kot tokhiktot NWMB-kot pikoeyagani GN-konik atogeagani pigeagonmik nogogitagani piyotinik monagiyotiniklo Kigaokmi toktonik takopkaeyonik atogeakaktonik *Nonavomi Agikatigegonmik*, *Maligakyoamiklo* ayikotakagitoklo monagikatigetok kanoginiga inikhimayok Nonavomi.

Nonavomi Agikatigegot, Apikyoeyilo naonaetot pikageakakniganik nogogitagani piyotaoyonik, nogogitagani pigeagotinik, opiyotit mikiyomik ihoeliyotaoyokhat Inoet ihomakhotaenik. 1

Atokat nalonaektot toniyaoyok, GN-kot pigeagota atogoektitagani Inoet agonahoaknignik Kigaokmi amihoakyoknik. GN-kot nalonaektaet ovani nalaktitivikmi ilakagitok hivonikhiyotinik GN-kot havaginik monagiyotikhanik alanik kayaknaktonik Kigaokmi toktonik amigaekpaleaniginiklonet amihoakyoet. Opalogaeyaotikagitok ikiklivaligeaganilo toktonik manikami nikikaktot.

Amihoakhoet agitilagit aktoktaoloaktot toktot tokotaoniginik nikikaktonik okoniga, agonahoaktonit ahenilo piyotaoyonik ila aneagotinik piyagiyaogiyotinilo. GN-kot kinigeakaktotk tamaenik tokoyotaoyonik hanalotiklo opalogaeyaonmik ihoakhaotinik okoniga piyotaoyonik tokoyotinik hanalotiklo opalogaeyaonmik ihoakhaotaoyomik okoniga piyotaoyonik ihoakhimaenageagani amihoakhoet agitilagit mikinikhaoyaganilo aktoknigit Inoet ihomakhotaenik ilitkoheniklo. Nakogotaoyok opalogaeyaot nikikaktot toktoik monaginigagot ilagiteakta monagiyagani amihoakyoet agitilagit ikiklivaligeaganilo toktot tokogaktot.

2017-mi onipkagani Tlicho Kavamat ilitakhiyot aktokniginik amakonit toktoni. 2017-mi onipkak ilakaktok hivonikhiyotinik okaohigiyaenik Inoet katangotiget nonakaktot Tahikyoami ila "…kaganoak okeoni, amigaenikhat Kigaokmi amihoakyoet tonoganeginaktot napaktokaknikmit manigaenakmi tamakni aoyami okeomilo, hivoganogitotik hivogani napaktokaknikmot. Toktokaknigit manigaenakmi, kigoanilo nogivikni nonani okeogalok piyotaoyok piyaoyokhanik atokhimaktokhaniklo nikikhaenik amakot nonami, taemaeginmat hivoani. Okeotoagagat, John F. Kaodloak agovaktok 30-nit 50-not amakonik talvani nonamit. John agoneakpaktok haneani nonagiyamini amigaetokmata amakot talvani nonami."2

GN-kot makpigagit ilakaktot naetomik okaohikmik DOE-kot katimaniganik Octobeg 7-mi 2019-mi Kugluktuk-mi, Ekaloktoteak-mi, Ayapakpaktokvik-milo HTO-ginik Ikaloktuteamilo nonakaktonik. HTO-kot nonagiyaoyonilo okateaktot TAH-ni 0-gokpat

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

nikikhakateagotaolaetok ilitkohikmiklo GN-kolo ilitokhaeyageakaktot aheagogotikhamik nogogitagani ihoakhaotaoyonik. Atoktilogo ona katimanik nonagiyaoyonetot tokhiktot ilageagotikhanik atoligomayoayonik nikikhakheoktot monagiyaoniginik akitotkiyanik iKIAnaepkotinik amakot agoyoanignik ikayotaoyagani nogoginiginik toktot. HTO-kot okakhimayolo ihomalotinik amigaekpaleaniginik kaveonignik akhaet, monagiyageakaknigilo aktoknigit akhaknit nikigiyaoyot toktot amihoakyokni.3

Ilageagotikhat opalogaeyaotinik nikikhakheoktot monaginiganik okaotaohimaliktoklo atogeakakniganik Kigaokmi toktonik Wek'eezhii-mi Agohikiyit Katimayinit ("WGGB"). 2019-mi Onipkami, WGGB-kot okaktot nogogitagani monagiyotinik opalogaeyaotinik Kigaokmi toktonik ilakageakaktok katitigeagani hivonikhiyotikhat takoyaovakniginik toktonik nikikaktot naonaeklogilo kaveonikhaenik nigivaktot toktonik tokotiktaovageagani okeotoagagat. 4 (akhogotaoyok)

GN-kot atolikoekmata "nonagiyaoyonit monagiyotinik havaoheoyonik pivaligotaoyok amihoakyoet amigaenigik otigeagani amigaeniginik naonaeyaotinik natkagat malgok -

1 G v Spaggow-goyok [1990] 1 SCG 1075, [1990] SCJ No 49. Takologo Kadlak akigaktoeyok Nonavot-mik (Ministaoyok Nogogitaagani Pivaleanikot) 2001 NOCJ 1.

2 Tłįchǫ-kot Ilitokhaeyit Ayoehayotiniklo Havakveoyok (TGTI). 2017 Kongeaktavot Honalika: Pigeagotaoyok Bootson-mi Manikami Toktot amiginiginik, Tłįchǫ-kot Kavamat.

3 HTO-konik Okakatigeknikot Onipkak Kigaokmi Toktot Monaginigagot Atolikoyoayonik

4 WGGB-kot Hok Ihomaleogotaoyok Kigolikmi Onipkami – Kigaokmi Toktot Amihokayoet oploani Octobeg 4-mi 2019-mi

Okeot, nogivik nona oeakhamilo kanoginiginik naonaeyaot okeotoagagat".

5 Kiheani, okateakhimagitok GN-kot tonihiyotani okoniga havanik kanoklo ikayolakmaga toktok nogogitagani piyotinik.

GN-kot ikayogeakaktot Kogloktomi Agonahoaktit Nanigeaktoktilo Timigiyanik ("KHTO") ikayoklogilo KHTO-kot inikhiyagani okateakhimayhomik Inoenaknit nogogitagani monagiyotimik opalogaeyaonmik, naonaetonik monagiyinit havaoheoyonik amigoyotiniklo ilitokhaenikolo havanik. GN-kot okagektokhat ikayogeagani atolikniganik opalogaeyaotip. Katimayit okaktot akhogonmik GN-konit kigoani kigolikmik Kigaok-mik nalaktitiveop.

3. Ilaoyageakakniga TK-goyok IQ-lo

Atokata titikat pipkagaoyok, GN-kot ikitonik nonagiyaoyot katimapkaktaet. Takokhaoyoyagitok GN-kot ihomagiyakakniganik TK-mik IK-milonet ihoakhaknigani atoligomayaoyok toniyaeni NWMB-konot.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

4. **Keoyot NWMB-kot Tokheotaenik Tonihiyotinik**

Titikiyotimikni Febgoagy 4-mi 2020-mi, NWMB-kot tokhiktot ilaoyot pipkaeyagani keoyotinik titigakhimayonik naonaetonik ihomagiyaoyonik. Naetomik okaohea KIA-kot keoyotani okoniga ihomagiyaonik titigakhimayot aleoyoni. Amigaetkiyat keoyotit Oegoani A-metot.

1 Keoyotit tohaktaoyolo notaonikhanik naonaeyaotinik amigaeniganik amihoakyoet nalaotagaoyot Kigaokmi toktonik, okonanikloak:

a) kaganoak ikiklivaleanigit amigaeniginik amihoakyoet nalaotagaoyot 19,769-mit 2015-mi 8,207-mot 2018-mi tohaktaoyolo ihomagiyaoniginik piyotikaktot kaveoniginik atoktonik nalaotageami taja amigaenigit amihoakyoet.

b) nona ihivgeoktaoyok hivitonigalo tikmeakot naonaeyaknigit
KIA-kot Keoyota: Atoktilogo June-mi 2018-mi nogivik nona naonaeyaktaonigani, agiyogalok nona ihivgeoktaoyok, kigovageagitok naonaeyaeniklo nogitilogit aolavalagitilogit pihimayot

c) kanogalok Inoet ilaonigit ilitokhaonmi atokniginiklo Kaoyimayatokaginik amigaeniginik
ilitokhaonmi.
KIA-kot Keoyota: Hitamat Inoet ilaohimayot kongeakhotik atoktilogo naonaeyaenik kiheani pikaginmat atokniganik Inoet Kaoyimayatokaginik ilitokhakniganik amihoakyoet agitilaginik.

2 Honalika hivonikhiyotit atoktaoyot honaonignik atoktot okoalo naonaegotit aknaloknik nogiyolo anakhimayot, kogohiktaotilgilo aolanignik naonaeptotinik.

KIA-kot Keoyota: Honaonignik atoktok ilaopkaeyok manikami naonaepkotinik inikneoyonik aknaloknik nogaelo anakniginik, iniknigoktot agohaloet/aknaloet kanoginiknik, kaveoniginik nogiyokhanik aknaloknik nalaotagaoyolo agoyaoyokhanik kaveoniginik.

3 Nonagiyaet kanoginiginik aktoknigiyotaolaktolo inoknit holiyonik hakoveni Kigaop toktoenit
amihoakyoknit.
KIA-kot Keoyota: Hivonikyiyotit nonagiyaenik kanoginiginik aktokgotaolaktoniklo inoet holiyotaenik ilaogitot TAH-mi tonihiyotimi.

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

4 Hivonikhiyotit okoniga kanoginiginik avataoyop alagoknignik aneaknigilo Kigaokmi toktot.

KIA-kot Keoyota: Hivonikhihyotit pilaknikat kanoklo avataoyop alagokniga aktokhilakmaga Kigaokmi toktonik aneaginigaloaganik ilaogitok

5 Kavamat Nonavomi atoligomayat TAH-mi aheaniklonet atolikoyaoyonik, pikakat, hoklo.

KIA-kot Keoyota: Atoligomayaoyok TAH-mi 0-mik toniyaohimagitok aheanik atolikoyoayonik pikagitoni GN-kot kagikhigaloakhotik nonagiyaoyot atolikoekmata ahenik monagiyotinik opiyotikhanik ila nikikaktot toktonik monagiyaolakniginik.

6 Inoet Kaoyimayatokaginik Kigaop toktoenik, piyotikaktonik okonoga:

a) Inoet pigeagotaet toktonik monagiyotinik ikiklivaleanigini

b) inohikmi manikhakheogotinilo ilitkohikmilo atokniginik Kigaokmi toktot amihoakyoet Inoenaknit

c) kaoyimanignik toktot kanogileoknignik, okonaniloak homenignik nogiveoyok nonat alagoknigniklo okeotoaga

KIA-kot Keoyota: GN-kot December-mi 2019-mi naetomik okaohet NWMB-konot okaohikagitok IK-mik. Ona akliknaktok ihomagivlogit kanogalok hivonikhiyotit kahakniginik

7 Avanmot ataniktoeyotinik ihomagiyaoniginik ihoakhaetilogit monagiyotikhanot opiyotikhanik avanmot atoktaoyonik amihoakyoknik.

d) **KIA-kot Keoyota**: Kanogalok avanmot ataniktoeyotit atokniginik Kigaokmi amihoakhoet agiyok talimalo Itkilgit alatket, pigahot kavamaoyot malgoklo monagikatigektokmonagikatigektokmonagikatigektokmonagikatigektok katimayit

KIA-KOT ATOLIGOMAYAENIK

Takovlogit naonaektot ihomagivlogilo akigaktoeyotit koleoyoni, KIA-kot ihomagiteakhogo tokhiktot okoa NWMB-kot pikoeyavot ima:

1. Nogogitagani ihomalotikaktok Kigaokmi toktonik amihoakyoknik;

2. Nogogitagani pigeagot Kigaokmi toktonik amihoakyoknik ihoaktokhak ilakaklonilo agonahoatok atogeakagitaenik, omayot toktonik nikikaktot monaginiginik, ahenik omayonik agoyakhanik (ihoaknikat), naonaeyaonik

P.O. Box 360
Kugluktuk, NU X0B 0B0
Telephone: (867) 982-3310
Fax: (867) 982-3311
www.kitia.ca

amigenaknigilo ilitokhaotit taya amigaeniginik (okoalo aknaloet nogaelo), nonagiyaet, hilaoyoklo, pivaleayotilo aktoknignik. GN-kot havakatikageakaktot Inoenaknik pivaleayagani ihoaktomik pigeagotikhamik pipkaklogilo ikayotokhaenik HTO-kot atoliknigagot;

3. Nogogitagani pegeagot nalaomayokhak ihomakhotaenik Inoet ilagani Nonavot Agikatigegonmi Maligakyoamilo. Ona ilakaktok mikiyonik ihoeliyotimik Inoet agonahoaknikot ihomakhotaenik ilitagiyaoniganiklo akhogotilo agonahoakhimaginageagani ilitkohikmiklo oktokhimaginageagani piyotinik toktonik;

4. Nogogitagani pegeagot ilitakhiyokhak toktot atoknikateaktomik ilaoyok ilitkohikmi okaohikmi, nikikhakateaknikmilo;

5. GN-kot pigeagotat ovani nalakvikmi, atokoevlotik TAH-mik talvatoak ahenik nogogitagani monagiyotinik, namaginmat. GN-kot havakatikakneaktot HTO-nik, NTI-konik, KIA-konik, GNWT-konik, TG-konik aheniklo ihoakhaeyagani ihoaktomik nogogitagani monagiyotinik toktonik pigeagonmik kinigotimik notkageagani ikiklivaleaniginik Kigaokmi toktot amihoakyoet ihomagiteaklogilo Inoet Itkilgilo ihomakhotaenik;

6. GN-kot nalonaegotaet omiga piyotaoyomik ilaopkaeginmat honaniklika TK-mit IK-milonet okoalo hivonikhiyotit atokloageakaktot nakogotaonigani monagiyotikatigegonmi Kigaokmi toktonik ilaoyageakaktolo hivonikhami atoligomayaoyonik okonoga NWMB-konot;

7. TAH-goyok ihoakhiyokhak kolinik, atoktaoyagani katangotigenit Tahikyoami inoyotikhanik talvatoak.

TAMAETA OKOA IHOMAGITEAKHOHI TONIYAOYOK:

TALVANI 14-GOYOMI OPLOANI FEBGOAGY-MI 2020-MI

KIA Technical response to NWMB's issues relevant to the Government of Nunavut's proposal to modify the TAH for Bathurst caribou

To address NWMB's issues, on behalf of KIA, I reviewed GN's briefing note and presentation for NWMB's December 2019 regular meeting and given that the submission was a summary, I also reviewed GNWT's information specifically the 2018 calving ground survey report which was provided to NWMB[1]. Relevant information is available through the WRRB proceedings and so I also reviewed the technical information summarized in the WRRB's Reasons for Decision reports[2] as well as using the NWMB's public registry to find relevant information and documents for the June 2016 public hearings[3] and regular meeting December 2019.

Abbreviations and Acronyms

ENR-GNWT	Department of Environment and Natural Resources, Government of Northwest Territories
GN	Government of Nunavut
KHTO	Kitikmeot Hunters' and Trappers' Organization
KIA	Kitikmeot Inuit Association
SRRB	Sahtu Renewable Resource Board
TAH	Total Allowable Harvest
TG	Tłı̨chǫ Government
WRRB	Wek'èezhìi Renewable Resource Board

1. Responses and feedback on the most recent science population abundance estimate for Bathurst caribou, particularly about:

1.1. The recent decline in the population abundance estimates from 19,769 in 2015 to 8,207 in 2018 feedback on the assumptions associated with the statistical models used to estimate the current population abundance.

Summary: The methods and analyses to estimate the Bathurst herd size in 2018 were standardized and meet an assumption of accuracy and precision: the assumption that all breeding cows return to a single calving ground was partially supported.

Comment: The Bathurst herd declined 59% between 2015 and 2018 which is a higher rate of decline than between the 40% between 2012 and 2015. The estimate in 2018 was 8,207 caribou 2+ years with its statistical confidence limits were 6,218-10,831.

The 2018 estimate of herd size is based on extrapolating from the number of caribou estimated during a systematic aerial survey of the calving ground using visual and aerial photography methods that have become standardized since 1996. The fieldwork is counting the caribou on the higher density part of the calving ground from high altitude photography. Caribou on the lower density areas are fewer and are visually counted from survey aircraft. Ground counts are used to determine the percentage of breeding cows among the caribou counted on the calving ground based on their appearance. In subsequent data analyses, there

---

[1] https://www.nwmb.com/en/public-hearings-a-meetings/meetings/regular-meetings/2019/rm-004-2019-kugluktuk-december-4-2019/english-9

[2] https://www.wrrb.ca/public-information/public-registry

[3] https://www.nwmb.com/en/public-hearings-a-meetings/public-hearings-1/2016-1/nwmb-public-hearing-to-consider-total-allowable-harvest-for-bathurst-caribou

are two steps as firstly, the estimated number of caribou is extrapolated to estimate the number of breeding cows and then in a second extrapolation, to the total number of 2 year and older caribou in the herd.

The two main assumptions are that all the breeding cows migrate to the calving ground and that the counts are both accurate (minimal bias) and precise. The assumption that all breeding cows return to the previously used calving ground was only partially supported. The distribution of the collared cows revealed marked changes as 3 of 11 cows that had in June 2017 calved west of the Inlet then in 2018 moved east and calved within the calving grounds of the Beverly/Ahiak herd. Previously between 2010 and 2015, the fidelity of the collared Bathurst cows to their traditional calving rather than the neighboring Bluenose East or Bevely/Ahiak calving grounds had been high (98%).

In support of the assumption about accuracy although patchy snow cover meant caribou were not easy to see, double counting with paired observers was used to estimate and correct levels of accuracy. The allocation of survey effort and the photo coverage were reasonable and lead to conventional levels of precision. The estimate of breeding females was reasonably precise (13.9%).

1.2. The area covered and the duration of the aerial surveys

Summary: During the June 2018 Bathurst calving ground survey, an extensive area was covered, there were no delays and the survey was timed for the peak of calving when movements are minimal.

Comment: There were no weather-caused delays during the 2018 survey that could have influenced the survey efforts. The area covered was large with extensive reconnaissance flights. The calving area including the high density area has shifted east compared to previous years although this shift was not analysed. Overall, the area covered in June 2018 differed markedly from other calving ground surveys since 1996 because calving extended east of Bathurst Inlet. The area east of the Inlet was included in the survey and its eastern boundary was coordinated with GN's survey of the Beverly/Ahiak herd calving grounds.

The unusual calving distribution immediately east of the Inlet was accommodated as an additional survey area and thus is unlikely to have changed the outcome. GNWT based its estimate of herd size on the caribou counted on the Bathurst Inlet calving ground which leaves the emigration of 3/11 collared cows (27%) as the explanation for part of the decline between 2015 and 2018. It can be assumed that the 27% emigration of the collared cows may also represent 27% of the Bathurst cows. A lower rate of emigration was also recorded in June 2019 when 3 of 17 collared cows moved to the Beverly/Ahiak calving ground.

1.3. The level of Inuit involvement in the study and use of Inuit Qaujimajatuqangit in the population assessment.

Summary: Four Inuit were involved as observers during the survey but there is no evidence for the use of Inuit Qaujimajatuqangit in the assessment of herd size.

Comment: The 2018 Bathurst calving ground report acknowledges that four Kugluktuk HTO representatives were involved in the survey.

I did not find how GN used Inuit Qaujimajatuqangit for either the 2018 Bathurst calving ground survey or its interpretation relative to a TAH, although it is available. IQ would be useful in assessing the significance of the emigration of breeding cows.

Inuit IQ is shared through the Tlicho Government's monitoring program for the Bathurst herd. Inuit work with the Tlicho Government's Boots on the Ground monitoring program based at Contwoyto Lake which in 2019, described that:.

> "However, in recent years, most of the Bathurst herd had remained north of the treeline and on the barrenlands through both summer and winter, instead of travelling south to the southern boreal forest. The presence of caribou on the barrenland, and specifically on the post-calving range throughout the year provides a secure and steady supply of available meat for the wolves in the area, like never before." . . . "Every year, John harvests between 30 and 50 wolves in this area. John only hunts in the direct vicinity of his camp as there is a high wolf population in the area."[4]

2. Any information which is used in demographic models including indices of cow and calf productivity/survival, and collar movement data.

Summary: The demographical model integrates field data on adult cow and calf survival, adult sex ratio, number of breeding females and an assumed harvest rate.

Comment: The computer demographic model was developed from a model that was published in 2012 in a peer-reviewed journal. The model uses the field data on adult cow and calf survival, adult sex ratio and number of breeding females and integrates them to generate estimated rates. The model has a useful strength as it incorporates trends in the field data. Details for the field data are summarized in the GNWT calving ground survey reports.

The estimated survival rates include an assumed and constant harvest level since 2010 of 5 cows and 70 bulls although the basis for these harvest levels is not related to the 2016 TAH.

The field data for the calf cow ratios are relatively standardized although detailed reports are not available from GNWT. Unlike the neighboring Bluenose East herd, for the Bathurst herd, the model-based estimates of cow survival are an increasing trend in cow survival averaging survival of 0.81 (CI=0.75-0.87) for the 2014-2017. The analysis also suggested a decline in the number of adult cows dying during the summer. At least in 2017, calf cow ratios in spring and fall appeared to be an improvement over previous years. Although GNWT annually monitor adult and calf survival rates, analyses typically lag until a presented in a calving ground report which means the 2018 and 2019 survival rates are not yet available.

3. Habitat conditions and potential impacts from human activities in the range of the Bathurst caribou herd.

Summary: Information on habitat conditions and potential impacts from human activities were not included in the TAH submission.

---

[4] Tłı̨chǫ Research and Training Institute (TRTI). 2017 We Watch Everything: A Methodology for Boots-on-the-Ground Caribou monitoring. Tłı̨chǫ Government.

Comment: GN in their December 2019 submission did not provide information on or need for management actions on habitat and human activities. However, concerns for habitat and human activities especially for calving and summer ranges were the basis for recommendations in the 2019 WRRB's Reasons for Decision report. Additionally, in recognition of concerns about habitat changes especially from forest fires and human activities, for the NWT portion of Bathurst herd's range, GNWT, after extensive consultation, recently released a Range Plan for the Bathurst herd.

4. Information regarding the relationship between environmental variables and health of Bathurst caribou.

Summary: Information on if and how environmental variables could affect Bathurst caribou especially their health was not included.
Comment: GN in their December 2019 submission did not offer information on if and how environmental variables could affect Bathurst caribou especially their health. While the GNWT 2018 calving ground report did not include information other GNWT reports have examined the correlation between climate variables and adult and calf survival[5] .

5. The Government of Nunavut's proposed TAH and any alternative recommendations, if any, and why.

Summary: The proposed TAH of 0 was not submitted with alternative recommendations although GN acknowledged that the communities were recommending other management actions such as predator control.
Comment: In the December 2019 NWMB regular meeting, GN recommended support for GNWT's herd-wide 0 TAH. The TAH recommendation for 0 is based on the continued decline in herd size. However, previously in the 2016 NWMB public hearings, after the GNWT had imposed a moratorium on hunting Bathurst caribou, GN had recommended a TAH of 30 male caribou for Nunavut in recognition of the importance of harvesting for economic and cultural continuity during the hearings:

> "So at this declining rate, biologically, the herd cannot sustain any harvest. It would just push down farther the declining of that herd; however, on NLCA there is recognition for key economic importance to this herd for Bay Chimo and the outpost camp, the cultural maintenance of their skill practice; and, therefore, the GN was recommended a harvest, negligible harvest of 0.15 percent, which would represent 30 caribou. And that will be male caribou." (public transcript day 14 June 2016 p.32)

However, with the further decline of the Bathurst herd, I did not find evidence for an independent analysis of, for example, the impact of a negligible harvest including whether it would be detectable. GN has not provided analyses to demonstrate that a TAH will, at this stage in the decline, play a role in halting the decline and starting recovery.

---

[5] Boulnger report and Range Plan

In terms of alternative recommendations relative to a TAH, I did not find evidence as to how GN (or GNWT) had analysed the role of predation or other possible contributions to the continued decline. GN did not recommend further actions although they reported that the communities were requesting additional management recommendations to be considered such as predator control with higher incentives.

In 2019, GN did not include a recommendation for wolf management although in the 2019 KHTO submission to NWMB, reference was made to GN's 2018/2019 wolf skull collection which provided an incentive for wolf harvest. Despite the evidence for the decline despite the 2016 harvest restrictions, it is unclear if and how GN has moderated its position on wolf management since 2016. During the 2016 NWMB hearings, the KHTO asked GN about wolf culling:

> "Drikus Gissing from the Department of Environment.
> At this time, no, we have no intention of initiating any wolf cull or grizzly cull or incentive programs. The issue has been discussed within the department, and there's a lot of examples in other places in the country where these initiatives do not work. They actually result in more wolves than actually addressing the issue, unless you put in a lot of money and a lot of time . . . and at this stage we are not considering that I'm not saying that we won't consider it in future. It all depend on requests from communities to government and what pressure is put on government." (transcripts p.46)

6. Inuit Qaujimajatuqangit of the Bathurst caribou, related to:

- o Inuit approaches to caribou management in times of decline
- o the socio-economic and cultural value of the Bathurst caribou herd to Inuit
- o knowledge of caribou behaviour, especially about the location of calving grounds and changes over time

Summary: GN in its December 2019 briefing to NWMB did not reference IQ which is surprising given the amount of information available.

Comment: IQ is outside my field although considerable information has been compiled on these topics especially by the KHTO. GN in its December 2019 briefing to NWMB did not reference IQ which is surprising given the amount of information available. GN did refer to a natural cycle in numbers but not to how that may influence distribution which has been monitored by Inuit over the decades.

7. Inter-jurisdictional considerations when setting management actions for shared herds.

Summary: The degree of inter-jurisdictional sharing of the Bathurst herd is high with five First Nations, three governments and two co-management boards.

Comment: The winter spring, summer and fall ranges of the Bathurst herd are largely in the NWT where the Bathurst herd falls under the jurisdictions of two governments: TG, and GNWT; a co-management board WRRB and First Nations: Łutsel K'e Dene First Nation, Yellowknives Dene First Nation, NWT Métis Nation, North Slave Métis Alliance and Athabasca Denesuline. In

2020, Łutsël K’é Dene First Nation released their caribou stewardship plan (Yúnethé Xá ʔetthën Hádi). The plan states that LKDFN members will not harvest caribou from the Bathurst herd for 2 years in LKDFN’s traditional territory and LKDFN respectfully requests that other Indigenous peoples will not harvest caribou from the Bathurst caribou herd for 2 years in LKDFN’s traditional territory. In Nunavut, the Bathurst herd is under the jurisdiction of GN and NWMB.

Completed by:
Anne Gunn Ph.D.
Salt Spring Island, BC
10 February 2019

www.tunngavik.com

ᕕᕝᕗᐃᓇ 11, 2020

ᑖᓂᐅᕐ ᓱᕌᒃ
ᐃᒃᓯᕗᐅᑕᖅ
ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔾᔪᐊᑦ ᑲᑎᒪᔾᑦ
P.O. Box 1379, ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ
X0A 0H0

ᐅᓪᓗᒃᑯᑦ ᑖᓂᐅᕐ,

ᐱᔾᔪᑎᓕᒃ: ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔾᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᒃᑎᑦᑎᓂᖏᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑎᒃᓴᑦ ᐋᖅᑭᒃᓯᒋᐊᕐᓂᕐᒥᑦ ᐅᑯᓂᖓ ᖃᐅᑕᒫᑦ ᐱᑕᖅᑕᐅᔪᓐᓇᖅᑐᑦ ᓄᓇᓕᖕᓄᑦ ᐅᑯᓄᖓ ᐅᒥᖕᒪᒃᑑᑉ ᑐᒃᑐᖏᓐᓂᒃ

ᓄᓇᕗᑦ ᑐᓐᖓᕕᒃ ᑎᒥᖓᑦ ᖁᔭᓐᓇᒦᖅᑐᑦ ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔾᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐱᕕᒃᓴᖃᕐᓂᕐᒥᑦ ᐃᓚᐅᓪᓗᑎᒃ ᑕᒪᑦᓱᒎᖓ ᑲᔪᓯᓂᐅᔪᓄᑦ.

ᐅᖃᐅᓯᑐᐃᓐᓇᐃᑦ:

- ᓄᓇᕗᑦ ᐊᖏᕈᑎᖏᑦ ᐃᓕᑕᖅᓯᔪᑦ ᐃᓄᐃ ᐊᖑᓇᓱᒍᑎᐃᓐᓂᒃ ᐊᒻᒪᓗ ᐃᓱᒪᓕᐅᕆᓂᕐᒧᑦ–ᐋᖅᑭᒃᓱᐃᓂᕐᒥᑦ ᐱᔪᓐᓇᐅᑎᓂᒃᓗ ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᐊᖅᑭᐅᒪᑎᑕᖏᑦ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᑦ ᑐᓂᓯᔪᑦ ᒪᑯᓄᖓ ᐆᒪᔪᓄᑦ ᐊᓇᒃᑐᕐᓂᕐᒥᑦ.
- ᓄᓇᕗᑦ ᐊᖏᕈᑎᖏᑦ ᓱᓕ ᐃᓕᑕᖅᓯᔪᑦ ᓴᖏᔪᓂᒃ ᐱᔪᓇᐅᑎᓂᒃ ᓴᖏᓗᑎᒃ ᓇᖕᒥᓂᖅ ᒪᓕᒐᒃᓴᓂ ᐅᑯᓄᖓ ᐊᖑᓇᓱᒃᑎᓄᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᖅᑎᓄᑦ ᑲᑎᒪᔾᑦ ᐆᒪᔪᓕᕆᔾᐊᑮᑦ ᑲᑎᒪᔨᖏᑦ ᐊᒻᒪ ᐊᕕᒃᑐᖅᓯᒪᔪᓂ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ ᑲᑎᒪᔾᑦ (RWOs).
- ᓇᓪᓕᐊᑐᐃᓐᓇᖅ ᐊᖏᓂᖏᑦ ᐅᕝᕙᓗ ᐊᖏᓂᖏᑦ ᐃᓱᓕᕝᕕᖃᖏᑦᑐᑦ ᐃᓄᐃᑦ ᑐᒃᑐᒐᓱᐊᖃᑦᑕᕐᓂᕐᒥᑦ ᐊᓯᕙᖅᐳᑎᒃ ᐊᒃᑐᖅᓯᔪᓐᓇᖅᑐᑦ ᑕᐅᕗᖓ ᐅᖓᓱᒃᑐᒧᑦ ᐊᒃᑐᕐᓱᓗᑎᒃᓗ ᓴᐳᒥᓇᓱᐊᕐᓂᕐᒧᑦ ᐃᓱᒫᔾᔪᑎᐅᔪᑦ.
- ᐱᔾᔪᑎᐅᑎᓪᓗᒋᑦ ᐆᒪᔪᓂᒃ ᓴᐳᒥᓂᕐᒥᑦ ᐊᓇᒃᑐᐃᓗᓂ, ᐅᕝᕙᓗ ᐱᒪᑐᒃᑕᐅᑎᑦᐊᖅᑎᓪᓗᒋᑦ ᐱᒻᒪᕆᐅᔪᑦ ᐊᒻᒪᓗ ᐊᓂᐊᖃᖏᑦᑎᐊᕐᓗᑎᒃ ᐆᒪᔪᐃᑦ ᐅᓄᕐᓂᖏᑦ ᐱᔪᓇᑦᑎᐊᖅᑐᑦ ᐊᓇᒃᑐᐃᓂᕐᒥᑦ ᐃᓄᐃᑦ ᐊᖑᓇᓱᖕᓂᕐᒧᑦ ᐱᕙᓕᐊᖃᑉᐸᑕ, ᐱᕙᒃᓴᓕᕙᖏᑦ ᐅᑯᖓ ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔾᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᐊᒻᒪᓗ ᒐᕙᒪᒃᑯᑦ ᐊᑐᖏᓐᓂᕐᓂᒥᑦ ᐃᓱᓕᕝᕕᖃᖅᑎᑦᑎᓂᕐᒥᑦ ᐃᓄᐃᑦ ᐊᖑᓇᓱᒍᓐᓇᕐᓂᖏᓐᓂᒃ ᑕᒪᒃᑯᐊᓗ ᐅᖓᑖᓄᑦ ᐱᕙᓕᐊᖃᑉᐸᑕ. ᐃᓄᐃᑦ ᑕᐃᒪᓐᖓᓂᒃ

ᑐᑭᓯᐊᔪᑦ--ᐊᒻᒪᓗ ᐊᑐᖅᐸᒃᑯᑎᒃ--ᑕᒪᒃᑯᐊ ᐊᓐᓇᒃᑐᐃᓂᕐᒧᑦ ᐊᖑᓇᓱᖕᓂᑦ ᑐᖓᑎᓂᒃ ᑐᑭᖏᓐᓂᒃ ᐊᑐᓗᐊᖅᑕᐃᓕᒪᓂᕐᒥᑦ ᐱᑕᓗᐊᖅᑕᐃᓕᒪᓂᒃᑯᑦ.

- ᓄᓇᕗᓕᒫᒥ, ᓄᓇᓕᑦ–ᐃᓕᖓᔪᓕ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᑦ ᐅᓄᒃᓯᕙᓪᓕᐊᔪᑦ ᐃᓕᑕᕆᔭᐅᓂᖏᑦ ᐊᐅᓚᑦᑎᓪᓗᑎᒃ ᑐᑭᖃᑦᑎᐊᖅᑐᓂᒃ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑎᖃᖅᓯᒪᓪᓗᑎᒃ ᒪᑯᓂᖓ *ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖓᖏᓐᓂᒃ* ᐆᒪᔪᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒥᑦ ᐊᐅᓚᓕᖏᑦᑎᒍᑦ. ᐃᓱᒪᓕᐅᕆᓂ–ᐋᖅᑭᒃᓱᐃᓂᒃᑯᑦ *ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ ᐆᒪᔪᓂᒃ ᐊᐅᓚᑦᑎᓂᖅ ᐊᐅᓚᓂᖏᑦ ᓯᕗᒻᒧᑦ*, ᐃᓱᒪᓕᐅᕆᓂᑦ–ᐊᖅᑭᒃᓱᐃᓗᑎᒃ ᐊᒻᒪᓗ ᓴᖅᑭᑎᑕᐅᓂᖏᑦ

- ᐊᒃᓱᕈᕐᓇᖅᑐᓂᑦ ᓵᑕᐅᓯᒪᔾᔭᑎᖏᑦ ᐅᑯᓄᖓ ᓄᓇᖃᖅᑳᖅᓯᒪᔪᑦ ᐃᓄᖏᓐᓄᑦ ᓄᓇᑦᓯᐊᒥᑦ ᑕᐅᕗᓇᓕᒫᖅ ᐅᒥᖕᒪᔫᑉ ᑐᒃᑐᖏᑦ ᐊᓯᐊᓯᒪᖏᑦᑐᑦ ᐃᓄᖕᓄᑦ. ᑭᓯᐊᓂ, ᐃᓅᓯᓕᕆᓂᕐᒧᑦ ᐱᖅᑯᓯᓕᕆᓂᒃᑯᓪᓗ ᐃᑲᔫᑏᑦ ᐊᒃᑐᐊᔪᑦ ᐊᒥᓱᓗᐊᖏᑦᑐᓂᒃ ᐊᖑᖃᑦᑕᕐᓂᕐᒥᑦ ᐱᑕᕐᓗᑎᑦ ᐱᕝᕕᒃᓴᑦ ᐃᑲᔪᖅᑐᕈᑕᐅᓗᑎᒃ ᒪᑯᐊ *ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ* ᐱᓪᒪᕆᐊᓗᐃᑦ ᐊᑐᖅᑕᐅᓗᑎᒃ ᐱᓗᐊᖅᑐᒥᑦ ᐃᓄᖕᓄᑦ ᑲᔪᓯᔪᑦ ᐃᓅᔾᔪᑎᒋᓪᓗᒋᑦ ᑐᒃᑐᐃ ᓇᒦᖏᓐᓂᖏᑦ. ᓄᓇᕗᑦ ᑐᓐᖓᕕᒃ ᑎᒥᖓᑦ ᑐᓵᖅᓯᒪᔪᑦ ᑕᒪᓐᓇ ᐃᓅᓯᓕᕆᓂᕐᒧᑦ ᐱᖅᑯᓯᓕᕆᓂᕐᒧᓪᓗ ᐅᔾᔮᖅᑐᕐᑯᔭᐅᓪᓗᑎᒃ, ᖃᐅᔨᓴᓂᑦ ᑐᓂᕐᕈᑕᐅᖃᑦᑕᕐᓂᖏᑦ ᐊᓯᒧᑦ ᔭᖓᑦᑐᑦ ᐊᒻᒪᓗ ᓂᕿᖃᑦᑎᐊᖏᓐᓇᓂᕐᒧᑦ ᐊᒃᓱᐊᓗ ᐊᒻᒪᓗ ᐅᖓᓯᒃᑐᑦ ᐊᒃᑐᖅᓯᓯᔪᑦ ᐃᓄᐃᑦ ᑐᒃᑐᓐᓇᐃᓕᑎᑕᐅᑲᓐᓇᖅᐸᑕ ᑕᒪᓐᓇ ᐃᓕᔭᐅᓗᓂᓗ.

- ᓄᓇᕗᑦ ᑐᓐᖓᕕᒃ ᑎᒥᖓᑦ ᐃᑲᔪᖅᑐᐃᔪᑦ ᐃᓂᒥᑦ ᐅᑯᓄᖓ ᐅᐊᖕᓇᖓᓂ ᕿᑎᕐᒥᐅᑦ ᐃᓄᐃᑦ **ᐃᑲᔪᖅᑐᐃᖏᑦᑐᑦ** ᓄᖅᑲᖓᑎᑦᑎᖅᑲᐃᓐᓇᕐᓂᕐᒥᑦ ᑐᒃᑐᓐᓇᖏᓐᓂᕐᒥᑦ ᑕᐅᕙᓂ ᐅᒥᖕᒪᔫᑉ ᑐᒃᑐᖏᑦᑕ ᐃᓚᖓᒍᑦ ᐊᒥᓱᓂᖏᓐᓂᒃ ᒫᓐᓇ.

ᓇᓗᓇᐃᖅᓯᒪᑦᑎᐊᖅᑐᑦ ᐅᖃᐅᓯᑦ:

- ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᖏᑦ ᐃᒪᓐᓇᐃᓕᕐᓂᖏᑦ ᐊᒻᒧᒃᓯᒪᓕᕐᓂᖏᑦ ᐊᒥᓲᓂᖏᑦᑕ ᑐᒃᑐᐃᑦ ᑕᐃᒪᓐᖓᓂᑦ ᐅᑭᐅᑦ 2000s.

- ᓄᓇᕗᑦ ᑐᓐᖓᕕᒃ ᑎᒥᖓᑦ ᐃᑲᔪᖅᑐᐃᔪᑦ ᐱᕙᓪᓕᐊᑎᑦᑎᓂᖏᓐᓂᒃ ᓴᖅᑮᓗᑎᒃ ᓄᓇᓕᖕᓂ–ᑐᖓᔪᒥᑦ ᑐᒃᑐᓕᕆᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᐅᔪᓂᒃ ᐸᕐᓇᐅᑎᒃᑯᑦ ᑕᒪᑦᓱᒧᖓᓗ ᐊᓐᓇᒃᑐᐃᓂᐃᒥᑦ ᓴᐳᒻᒥᔾᔪᑎᒃᓂᒃ ᐅᒥᖕᒪᒃᑑᑉ ᑐᒃᑐᖏᓐᓄᑦ.

- ᑐᑭᓯᓇᓗᐊᖏᒻᒪᑦ ᐅᕝᕙᓗ ᑕᑯᒃᓴᐅᓇᑦᑎᓇᑎᒃ ᖃᓄᖅ ᐊᖑᓇᓱᒍᓐᓇᕐᓂᖏᑦ 30–ᓂᒃ ᐸᖕᓂᐊᓗᖕᓂᑦ ᓈᒻᒪᖏᑦᑐᓂᑦ ᐊᒃᑐᖅᓯᓂᖅᑲᕐᓂᐊᑦ ᐃᒻᒪᖄᓗ ᐅᑎᕐᓗᑎᒃ ᐅᓄᕐᓂᖏᑦ ᒪᓕᒃᑯᒋᑦ ᑐᑭᓯᒍᑎᒃᓴᑦ ᑐᓂᕐᕿᑕᐅᓯᒪᔪᑦ ᐅᑯᓄᖓ ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔩᔪᐊᒃᑯᑦ ᑲᑎᒪᔩᖏᓐᓄᑦ:

  - “ᖃᐅᔨᓇᓱᐊᖅᑕᐅᓯᒪᓂᖏᑦ ᑐᒃᑐᐃᑦ ᐅᓄᕐᓂᖏᑦᑕ ᓄᓇᒃᑯᑦ ᐅᖃᖅᑐᑦ ᐊᒥᓲᖏᓐᓂᖏᓐᓂᒃ ᓄᕐᕋᐃᑦ ᐊᓐᓇᒃᑐᕐᓂᖏᑦᑕ ᐅᓄᕐᓂᖏᑦᑕ ᐊᒻᒪᓗ ᐊᑦᑎᓗᐊᖅᑐᖅ ᐊᕐᓇᓪᓗᐃᑦ ᐊᓐᓇᒃᑐᕐᓂᖏᑦ ᐊᒥᓲᓂᖏᑦᑕ ᑕᒪᒃᑮᒃ ᑐᓂᓯᔪᑦ ᑕᐃᒪᓐᓇ ᑲᔪᓯᓂᕐᒥᑦ ᐊᒻᒧᒃᐸᓪᓕᐊᓂᖑᓐᓂᑦ ᐅᓄᕐᓂᖏᑦᑕ ᐅᒥᖕᒪᒃᑑᑉ ᑐᒃᑐᖏ” (ᓄᓇᑎᐊᑉ ᖓᕙᒪᒃᑯᖏᑦᑕ ᐅᓂᒃᑳᖏᑦ: ᒪᒃᐱᒐᖓ 76). ᖃᐅᔨᓴᕐᓂᖏᑦ ᐅᖃᖅᑐᑦ ᓱᓕᓂᖏᓐᓄᑦ ᐱᔾᔪᑎᑦ ᐅᑎᖅᑎᑦᑎᕙᓪᓕᐊᓂᕐᒥᑦ ᒪᑯᓂᖓ ᐊᕐᓇᓪᓗᐃᑦ ᐃᓐᓇᐃᑦ

ᐊᓐᓇᒍᓐᓇᕐᓂᖅᑎᓐᓂᒃ ᐊᒻᒪᓗ ᓄᕐᖃᖅᑎᑦ, ᑭᓯᐊᓂ ᐊᖑᓇᓱᒍᓐᓇᖅᑎᑦᑎᖅᑎᓐᓂᖅ ᐊᕐᓇᓪᓗᓂ ᑐᒃᑐᓂᑦ ᑐᒃᓯᖃᐅᑎᑦ.

- ᐅᕙᓂ ᓄᓇᕕᐊᐸ ᑲᕙᒪᒃᑯᖅᑎᓐᓂ ᓇᓅᓐᓂᖅᑎᓐᓄᑦ ᖃᐅᔨᓴᕐᓂᑦ, ᐊᔾᔨᐊ ᑕᐅᑦᑐᐊᑕ ᐃᓚᓕᐅᑎᓯᒪᔪᖅ ᐊᒻᒪᓗ ᐋᖅᑕᐅᓂᖅᑎᑦ 70 ᐸᖕᓃᑦ ᐅᑭᐅᑕᒦᑦ (ᓄᓇᕕᐊᐸ ᑲᕙᒪᒃᑯᖅᑎᑦᑕ ᐅᓂᒃᑳᖅᑎᑦ: Table 5, ᒪᒃᐱᑲᖅᑲᓂ 116). ᓇᓗᓇᐃᖅᓯᓯᒪᖅᑎᑦᑐᑦ ᑕᒃᑯᓴᐅᔪᒃᑯᑦ ᐋᖅᑕᐅᓂᖅᑎᓐᓂᒃ ᒪᑯᐊ ᐸᖕᓂᑦ ᐊᑲᐅᖅᑎᑦᑐᓂᒃ ᐊᒃᑐᖅᓯᓂᖅᑲᕐᓂᐊᖅᑐᑦ ᐅᑎᕈᓐᓇᖃᔭᕐᓂᖅᑎᓐᓂᒃᓗ ᐃᓗᐊᓂ ᐅᓄᕐᓂᖅᑎᑦ ᑐᒃᑐᐃᑦ.

ᐋᖅᑭᒃᓱᖅᑕᐅᔪᑦ ᐅᑯᓄᖅᑲ: ᐱᓕᕆᕕᐊᓐᓂ ᐆᒪᔪᓕᕆᔨᒃᑯᑦ ᐊᒻᒪᓗ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᕘᑦ ᑐᓐᖑᕕᒃ ᑎᒥᖑᓄᑦ.

ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑎᑭᓯᒪᓗᑎᒃ ᓄᓇᓕᖕᒧᑦ ᑐᓴᕐᕕᖃᐊᖅᑐᕐᓂᖏᑦ ᐃᓱᒪᒃ ᓴᖅᓯᐅᕈᑕᐅᔭᕆᐊᖃᖅᑐᓂᒃ ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ ᐱᒋᐊᖅᑎᑕᐅᖁᔭᖏᓐᓂᒃ ᐊᒥᒃ ᔫᔭᓐᓂᖅᑎᑕᐅᖁᔭᖏᓐᓂᒃ ᑕᒪᐃᓐᓂᒃ ᑲᑎᓪᓗᒋᑦ ᑐᒃᑐᑕᐅᔭᓐᓇᖏᓐᓂᖅ ᕿᙵᐅᒻᒥ ᑐᒃᑐᖅ 30-ᖏᓐᓂᑦ ᑐᓂᒃ 0-ᒧᑦ ᐱᑕᖃᖅᑐᓄᑦ

ᐅᖃᐅᓯᒃᓴᐃᑦ ᖃᐃᑕᐅᓯᒪᔪᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᓐᖑᑦ (ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ) ᐃᖃᓇᐃᔭᕐᕕᖓᓐᓂᒃ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥ ᐅᑕᑯᖃᑦᑕᐃᑎᓕᕆᔨᒃᑯᓪᓗ

ᓇᐃᓇᖅᑕᐅᓪᓗᑎᒃ: ᐅᑯᐊ ᑎᑎᖃᐃᑦ ᓇᐃᓈᖅᓯᒪᔭᓂᒃ ᖃᐅᔨᒪᑎᑦᑎᔾᔪᑎᒃᓴᖅᑐᑦ ᖃᓄᐃᓕᖓᓂᖏᓐᓂᒃ ᕿᙵᐅᒻᒥ ᓇᐹᖅᑐᖃᕐᓂᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃᑐᐃᑦ, ᒪᓐᓇᓵᖑᔪᒪᔪᖅ ᓗ ᐱᒋᐊᖅᑎᑕᐅᔪᒪᓕᖅᑐᓂᓗ ᐊᐅᓚᑕᐅᓂᖏᓐᓂ ᑐᒃᑐᐃᑦ ᓄᓇᑦᓯᐊᕐᒥ (ᓄᓇᑦᓯᐊᕐᒥ) ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐊᑐᓕᖅᑯᔭᖏᓐᓂᒃ ᑐᒃᑐᓯᐅᕐᕕᐅᔪᓐᓇᕐᓂᖏᓐᓂ ᕿᙵᐅᒻᒥᒃ ᓇᐹᖅᑐᖃᕐᓂᕐᒥᒃ ᑐᒃᑐᓂᒃ. ᐅᓂᒃ ᑳᖅᓯᒪᑦᑎᐊᒃ ᑲᓐᓂᖅᑐᓂᒃ ᖃᐅᔨᑎᑦᑎᑦᑎᒋᐊᕈᑎᒃ ᓴᖃᔮᑦ ᑐᒃᑐᓂᒃ ᐊᓯᖏᓐᓂ ᐃᑲᔪᖅᓯᐃᓗᑕᐅᔪᓂ ᑎᑎᖃᓂ. ᑕᒪᓂ ᐊᕐᕌᒍᒥ 1986-ᖑᑎᓪᓗᒍ ᕿᙵᐅᒻᒥ ᑐᒃᑐᖅ ᐊᒥᖅᑯᓂᖅᐸᑦ ᑎᐊᖑᓚᐅᖅᐳᑦ ᓅᑦ ᑕᖅᑐᓂ ᓇᐹᖅᑐᖃᕐᑐᕐᒥᐅᑕᐅᔪᓂ ᑐᒃᑐᖅᑲᐅᕐᓂᖅ ᑲᓇᑕᐅᑉ ᐅᐊᖕᓇᖕᓂ, ᓇᓚᐅᑖᖅᑕᐅᓯᒪᓚᐅᖅᑐᓂ ᑖᓐᓇᓚᐅᕐᓂᖅ 470,000 ᑐᒃᑐᖅ. ᑕᐃᒪᙵᓂ ᑐᒃᑐᐃᑦ ᐊᒥᖅᑯᔭᓐᓃᖅᓯᒪᑎᑦᓕᖅᐳᑦ ᖃᓂᒋᔭᖏᓐᓂ 98% ᐳᓴᓐᑎᓂᒃ, ᓇᓚᐅᑖᖅᑕᐅᓯᒪᓕᖅᓱᑎᒃ ᐊᒥᖅᑯᓂᖅ ᐅᖓᑖᓂ ᑎᐊᖕᖏᓕᓂᖅ 8,200 ᐱᒋᐊᓂᒃ ᓯᒪᓂᖅ ᑐᒃᑐᐃᑦ, ᐊᕐᕌᒍᒥ 2018. ᓇᓚᐅᑖᖅᑕᐅᓯᒪᓂᖅ ᐊᑖᓂᑦ ᑐᑦ ᑕᐃᒃ ᑯᓇᖑᔪ ᓇᐸᖕᓂᖅ ᓂᒃ ᐊᒥᖅᑯᓂᖅ ᓂᒃ ᓇᓚᐅᑖᖅᑕᐅᓚᐅᖅᑐᓂ ᑖᓐᓇᓚᐅᖅᑐᓂᒃ 19,800 ᐊᕐᕋᒎᓚᐅᖅᑐᖅ 2015-ᒥ. ᑕᒪᕐᒥᒃ ᑐᒃᑐᐃᑦ ᐊᒥᖅᑯᓂᖅ ᓂᒃ ᓇᓚᐅᑦ ᑖᖅᑕᐅᓯᒪᓂᖅ ᑕᐃᒪᙵᑦ 1986-ᒥᓂᒃ ᑐᑭᓕᐅᖅᑕᐅᓯᒪᔪᑦ ᐊᑉᓯᓕᐅᖅᑕᐅᖃᑦ ᑕᐃᓇᕐᓂᖅ ᓂᒃ ᖃᐅᔨᓴᖅᑕᐅᓪᓗᑎᒃ ᓈᓴᖅᑕᐅᖃᑦᑕᕐᓂᖅ ᓂᒃ ᓄᕐ ᕆᕕᖅ ᓄᓇᖅ.

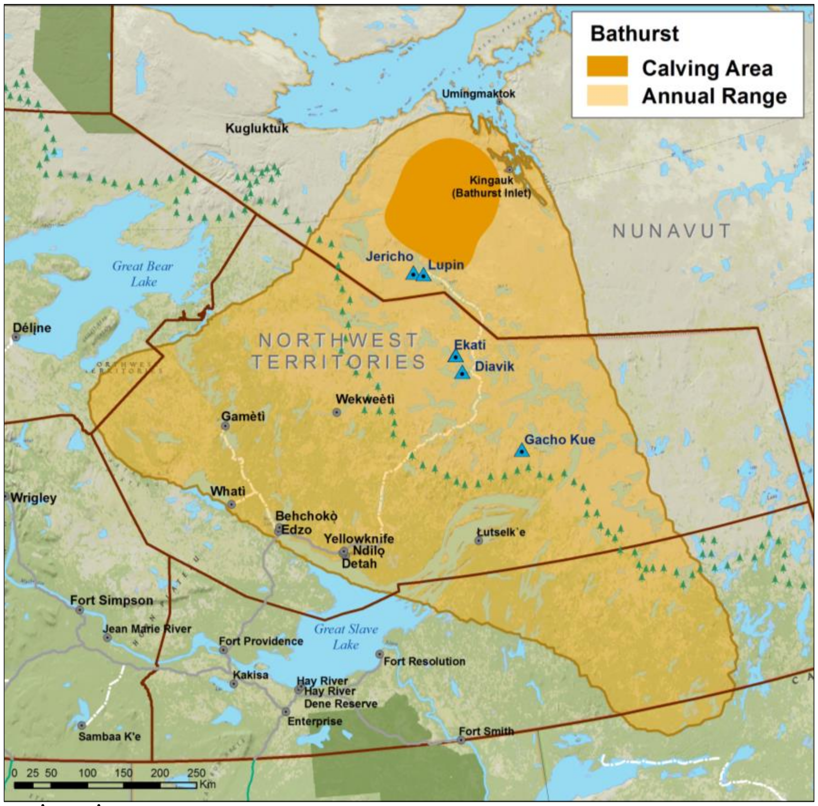
ᑐᒃᑐᐃᑦ ᒫᓐᓇᓵᒥᒃ ᐆᒪᐃᓐᓇᕈᓐᓇᕐᓂᖅ (ᐊᕐᓇᓪ ᔫᓂᖅ ᓂ, ᓄᕐᕋᖅ ᓂ ᐊᒻᒪᓗ ᐃᓪ ᓕᐊᖅᑲᕐᓂᖅ ᓂ ᐊᒥᖅᓂᖅ) ᐃᓱᒪᓇᖅᑐᑦ ᓱᓕᒃ ᑲᓂᖅ ᐊᒥᖅᑯᔭᓐᓂᖅᓯᒪᓪᓚᖏᓐᓂᖅ ᓂᒃ. ᐅᐱᕐᖑᖅ ᑯᑦ ᓇᒧᖕᐅᖃᑦᑕᕐᓂᖅ ᖁᖕᖑᕈᑦᑎᖅᑕᐅᓯᒪᔪᑦ (ᐅᔭᒥᓃᑦ) ᐊᕐᓇᓪᓗᐃᑦ ᑐᒃᑐᐃᑦ ᔪᐊ 2018-ᒥ ᐊᒻᒪᓗ ᔪᐊ 2019-ᒥ ᐃᓱᒪᓇᖅᑐᑦ ᐃᓚᖏᑦ ᓅᐸᓪᓕᐊᖃᑦᑕᕐᓂᖅ ᓂᒃ ᕿᙵᐅᒻᒥ ᓴᓂᓕᕆᔭᖅ ᓄᑦ ᑐᒃᑐᖃᕐᕕᐅᕙᒃ ᑐᓄᑦ ᐊᒻᒪᓗ ᐊᒥᖅ ᓯᓂᖅᓴᓪᓕᒪᕆᐅᓂᖅ ᓄᑦ ᑎᐸᔭᓕᖕᒥ ᑐᒃᑐᓄᑦ ᓅᐸᓪᓕᐊᖃᑦᑕᖅᓯᒪᓪᓗᑎᒃ. ᑐᒃᑐᓯᐅᕐᕕᐅᔪᓐᓇᕐᓂᖅ ᓂ ᐊᐅᓚᑕᐅᓂᖅ ᓄᓇᑦᓯᐊᕐᒥ 2010-ᖑᓚᐅᖅᑐᖅ ᐱᖃᓯᐅᑉ ᓯᓯᒪᓚᐅᖅᑐᖅ ᑕᐃᒃ ᑯᓂᖓ ᓄᖃᖅᑎᑕᐅᓂᖏᖕᖏᓐᓂᒃ ᐃᓄᖕ ᓄᑦ ᓂᕿᒃ ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᓂᐅᕐ ᕈᑎᒃ ᓴᓇᔭᐅᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᐊᒥᖅ ᔫᔭᓐᓂᖅᑎᑕᐅᓂᖏᓐᓂᒃ ᓄᓇᓕᖅᑯᕐ ᓄᑦ ᑐᒃᑐᓯᐅᕐᕕᐅᔪᓐᓇᕐᓂᖅ ᓇᓚᐅᑖᖅᑕᐅᓯᒪᔪᓂᒃ ᐃᒪᓐᓇᑎᒋ 4,000-6,000 ᑐᒃᑐᓂᒃ /ᐊᕐᕌᒍᑖᖅ, ᐱᓗᐊᖅᑐᓂᒃ ᐊᕐᓇᓪᓗᕐᓂᒃ ᐃᓱᖅᑎᑕᐅᔪᓂᒃ ᐊᒥᖅ ᓯᓂᖕᓂᒃ 300-ᓂᒃ ᑐᒃᑐᓂᒃ /ᐊᕐᕌᒍᑖᖅ ᑖᓂᑦ ᑕᐅᓪᓗᑎᒃ 80% ᐳᓴᓐᑎᖏ ᐸᖕᓃᑦ ᐱᔭᐅᔪᓐᓇᕐᓂᖅ. ᐊᕐᕌᒍᒥ 2015, ᐊᒥᖅ ᔫᔭᓐᓂᖅᑎᑕᐊᒃ ᑲᓐᓂᕐ ᒪᑕ ᑐᒃᑐᐃᑦ, ᓄᓇᓕᖅᑯᖃᐃᑦ ᑐᒃᑐᓯᐅᕈᓐᓇᕐᓂᖅ ᒪᑐᔭᐅᓚᐅᖅᑐᑦ ᓄᖃᖅᑎᑕᐅᓪᓗᑎᒃ ᓄᓇᑦᓯᐊᕐᒥ.

ᐊᐅᓚᑕᐅᓂᖅ ᓂᒃ ᐊᓯᒃ ᑲᓐᓂᖅ ᓂᒃ ᑕᐅᖅ ᐊᑐᓕᖅᑎᑦ ᑎᕙᓚᐅᕆᕗᑦ ᐱᕙᓪᓕᐊᓂᕐ ᒧᑦ ᑕᒪᐃᓐᓂᒃ ᑲᑐᑉ ᔨᖃᑎᒌᓪ ᓗᑎᒃ ᐸᕐ ᓇᐅᑕᐅᓂᖅ ᓂᒃ, ᐅᑉ ᔨᖅ ᑐᑦ ᑎᐊᕈᒪᓂᕐ ᒧᑦ ᑐᒃᑐᖅ ᓈᒪᔭᓂᒃ ᓄᓇᖃᕈᖅᓇᖅᑎᐊᖃᕐ ᓂᖅ ᓂᒃ ᓂᖅᔪᒃ ᓴᖅᑐᓂᒃ ᓇᔭᒐᖅᑯᑉ ᑕᑐᖃᖅ ᓂ, ᐊᒻᒪᓗ ᐊᐅᓚᑕᐅᒋᐊᓕᖅᓯᑎᒃ ᐊᒪᕈᖅᓯᐅᖅᑕᐅᖃᑦᑕᖁᔭᐅᓂᖅ, ᑕᐃᒫᒃ ᐊᒥᓂᖅᓴᐅᓂᐊᕐᒪᑕ ᑐᒃᑐᐃᑦ ᓄᕐᕋᐃᑦ ᐊᒻᒪᓗ ᐱᕈᐊᓂᒍᓇᕐᓂᖅᓄᑦ ᐆᒪᐃᓐᓇᕈᓐᓇᕐᓗᑎᒃ. ᑕᒪᐃᓐᓂᒃ ᐊᐅᓚᑦᑎᔨᑎᒃ ᓴᐃᑦ ᐸᕐᓇᐅᑎᑦ ᑐᒃᑐᓂᒃ ᓴᓇᔭᐅᓂᓚᐅᖅᑐᑦ 2004-ᒥ ᐊᒻᒪᓗ ᓄᑖᕈᕆᐊᖅᑕᐅᕙᓪᓕᐊᓕᖅᓱᑎᒃ ᓴᓇᔭᐅᕙᓪᓕᐊᔪᑦ ᑕᒪᓂ ᐊᕐᕌᒍᒥ 2020-ᒥ ᐊᑖᒍᑦ ᕿᙵᐅᒻᒥ ᑐᓕᕆᓂᕐ ᒧᑦ ᐅᖃᐅᔨᕆᐊᖅᑎᑦ ᑲᑎᒪᔨᕋᑎᒍᑦ. ᐊᓯᖏᑦ ᑎᑎᖃᐃᑦ ᐊᒥᐊᒃ ᑯᐃᑦ ᖃᐅᔨᑎᑦᑎᑦ ᑎᒋᐊᕈᑎᖃᑦ ᐳᑦ ᒪᑯᓂᖓ ᐱᔭᕆᐊᖃᖅᑐᓂᒃ: (1) ᕿᙵᐅᒻᒥ ᑐᒃᑐᐃᑦ ᐊᒥᖅᑯᓂᖅ ᓂᒃ ᖃᐅᔨᓴᖅᑕᐅᓂᖅ ᓂ, (2) ᐊᐅᓚᑦᑕᐅᓂᖅ ᓂᒃ ᐱᔭᕆᐊᖃᖅᑐᓂᒃ ᕿᙵᐅᒻᒥ ᑐᒃᑐᓂᒃ, ᐊᒻᒪᓗ (3) ᐊᐅᓚᑕᐅᓂᖅ ᕿᙵᐅᒻᒥ ᓇᐹᖅᑐᖃᕐᓂᖅ ᑐᒃᑐᓯᐅᕐᕕᐅᔪᓐᓇᕐᓂᖅ ᓄᓇᑦᓯᐊᕐᒥ, 2009-2019, ᐊᒻᒪᓗ (4) ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐃᓱᒪᒋᔭᐅᖁᔭᖅ ᕿᙵᐅᒻᒥ ᓇᐹᖅᑐᖃᕐᓂᖅ ᑐᒃᑐᐃᑦ ᑐᒃᑐᓯᐅᕐᕕᐅᔪᓐᓇᕐᓂᖅ ᓂᒃ ᓄᓇᕗᒻᒥ. ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐃᑲᔪᖅᓯᐃᔪᕗᑦ ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ ᐊᑐᓕᖅᑯᔭ ᓕᐊᕆᓯᒪᔭ ᓂᒃ ᒪᑐᔭᐅᖁᔨ ᓂᖅ ᓄᖃᖅᑎᑕᐅᓗᑎᒃ ᕿᙵᐅᒻᒥ ᓇᐹᖅᑐᖃᕐᒥ ᑐᒃᑐᐃᑦ ᑐᒃᑐᓯᐅᕐᕕᐅᔪᓐᓇᕐᓂᖅ ᓂᒃ ᓄᓇᕗᒻᒥ, ᐃᓱᒪᒃ ᓴᖅᓯᐅᕈᑕᐅᓯᒪᓕᒥᒃ ᑐᒃᑐᐃᑦ ᐅᖓᑖᓂᖅᑐᒥᒃ 98% ᐳᓴᓐᑎᓂᒃ ᐊᒥᖅᑯᔭᓐᓃᖅᓯᒪᓂᖅ ᓂᒃ, ᑕᐃᒪᙵᓂᒃ 1986-ᒥᒃ, ᐊᒻᒪᓗ ᐅᔾᔨᖅᑐᑦ ᑎᐊᕆᐊᖃᖅᓂᖅ ᓄᑦ ᐊᔾᔨᒋᒃ ᑐᓂᒃ ᐊᑐᖅᑐᐃᓐᓇᐅᔭ ᕆᐊᖃᖅᓂᖅ ᑕᒪᒃ ᑯᓄᖓᑐᒃ ᑐᒃᑐᕕᐅᕙᒃᑐᓂ ᓄᓇᓂ.

1. ᕿᙵᐅᒻᒥ ᑐᒃᑐᐃᑦ ᐊᒥᖅᓯᓂᖅ ᓂ ᖃᐅᔨᓴᖅᑕᐅᓂᖅ

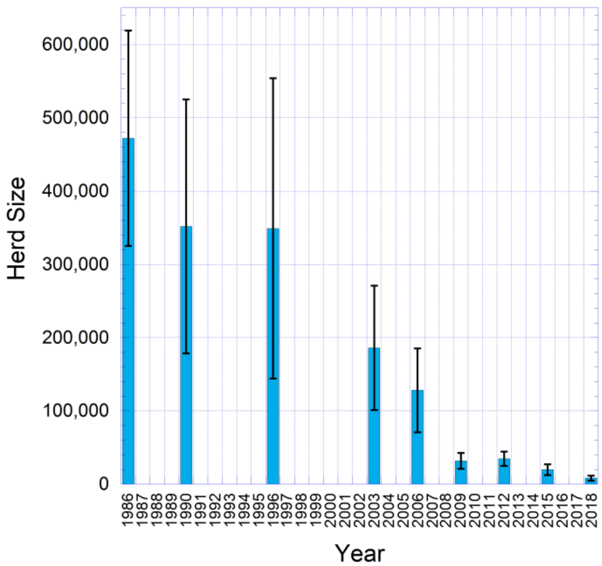
ᕿᙵᐅᒻᒥ ᑐᒃᑐᐃᑦ ᑕᐃᒪᙵᑦ ᓇᐹᖅᑐᖃᕐᓂᖅ ᑐᒃᑐᖅᓂ ᑐᑭᓯᔭᐅᓯᒪᕙᒥᒃ ᖁᖕᖑᕈᑦᑎᖅᑕᐅᓯᒪᓂᖅ ᓂᒃ ᐅᔭᒥᖅᑐᓂᒃ ᐊᑐᖃᑦᑕᖅᓱᑎᒃ, ᓇᐹᖅᑐᖃᕐᓂᖅ ᒦᓐᓂᖅ ᓂᒃ ᑕᐃᒪᙵᑦ 1996-ᒥᒃ ᓄᓇᖅ ᓅᓯᖑᕗᑦ ᐊᖏᓂᖅ ᓂᒃ ᓴᓂᒧᓗ ᑐᑭᒧᓗ ᑭᐸᖕᓂᒃ ᑐᒥᒃ 350,000 ᑭᓚᒥᑕᖕᒥᒃ km² (ᑕᑯᒃ ᔭᓴᖅ 1). ᑐᒃᑐᖅ ᑖᒃ ᑯᐊ ᓄᕐ ᕆᕕᖅ ᐳᑦ ᑕᐃᒪᙵᑦ 1996-ᒥᒃ ᑕᐅᕙᓂ ᐱᖑᖓ ᓇᖅᐸᓯ ᐊᓂ ᕿᙵᐅᑦ ᐊᒻᒪᓗ ᐊᖑᐊᓗᖕᒥ

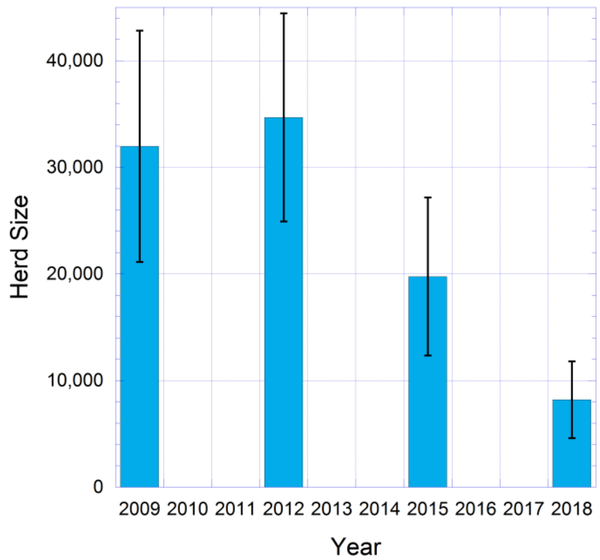
ᓄᓇᖏᓐ ᓇᔪᖅᐸᒃᑕᖏᓐ ᐊᐅᔭᒃᑯᑦ ᓄᓇᕚᒻᒦᑦᑐᑦ. ᐊᒥᐊᒃᑯᖏᓐ ᑐᒃᑐᓄᑦ ᑎᑭᑕᐅᓯᒪᕝᑐᑦ ᓇᔪᖅᑕᐅᓪᓗᑎᒃ ᓄᓇᐃᑦ ᐅᑭᐅᓕᒫᑲᓴᖓ, ᓄᓇᑦᓯᐊᕐᒦᑦᑐᑦ; ᐃᓛᓐᓂᒃᑯᑦ ᐃᓚᖏᓐ ᕿᓐᖑᒻᒥ ᑐᒃᑐᖏᓐ ᐅᑮᖃᑦᑕᖅᓯᒪᓕᕗᑦ ᐅᖑᔾᖓᓂᖅᓴᑦᑎᐊᒻᒪᓇᖓ ᑕᐅᕙᓂ ᓴᒃᑳᑦᓯᐋᓐ ᐅᐊᖕᓇᖕᓂ. ᑕᐃᒪᖕᖓᓂᒃ ᐊᒥᒃᓯᖕᖏᓂᖅᓴᐅᓕᕆᒥᒃ ᐊᒥᔩᐊᓗᖕᓂᒃ ᑭᖑᓂᐊᒍᑦ 2006-ᒥ ᐊᕐᕋᒍᒥ, ᑐᒃᑐᐃᑦ ᓅᖃᑕᖅᓯᒪᓕᖅᑐᑦ ᐅᐊᖕᓇᖅᐸᓯᖕᒎᑦ ᐅᑮᕕᑎᕝ ᑕᖏᖅᓗ ᐊᖕᕿᔩᓐᓂᖅᓯᑎᒃ, ᐊᑐᖅᑕᐅᕙᔪᐃᓐᓂᖅᓴᐅᓕᖅᓯᑎᒃ ᐊᕙᑎᐊᓃᑦᑐᑦ ᓄᓇᐃᑦ ᑕᐅᕙᓂ ᓂᒋᖅᐸᓯᖕᑕᑲᓇᖕᓇᖕᓂ ᐊᒻᒪᓗ ᓂᒋᖅᐸᓯᖕᑕ ᐱᖕᖒᓇᖕᓂ.



ᑕᑯᔭᒃᓴᖅ 1: ᐊᕐᖄᒍᑕᒫᖅ ᓇᔪᖅᐸᒃᑕᖏᓐ ᐊᒻᒪᓗ ᓄᕐᓇᕕᑦ ᕿᓐᖑᐅᑦ ᑐᒃᑐᖏᓐ, 1996-2009, ᖃᐅᔨᔭᐅᓯᒪᔪᑦ ᑐᖕᖃᖅᑐᓂᒃ ᐃᓕᓯᕕᐅᖃᑦᑕᖅᓯᒪᓂᖏᓐᓂᒃ ᓈᓚᐅᑎᓕᖕᓂ ᖁᖓᔾᖃᑎᓂᒃ ᐅᔭᒥᖕᓂᒃ ᐊᕐᓇᓕᓗᐃᑦ ᑐᒃᑐᐃᑦ. ᓄᕐᓇᕕᖏᓐ ᐃᓚᖏᓗ ᐊᐅᔭᒃᑯᑦ ᓇᔪᖅᐸᒃᑕᖏᓐ ᓄᓇᕚᒻᒦᑦᑐᑦ, ᐊᒥᐊᒃᑯᖏᓗ ᓇᔪᖅᐸᒃᑕᖏᓐ ᓄᓇᐃᑦ ᓄᓇᑦᓯᐊᕐᒦᒃᓯᑎᒃ. ᐊᒥᔩ ᔫᕙᓚᐅᖅᑎᓕᓗᒋᑦ, ᑐᒃᑐᖏᓐ ᐃᓛᓐᓂᒃᑯᑦ ᑎᑭᑉᐸᓚᐅᖅᑐᑦ ᓴᒃᑳᑦᓯᐋᓐ ᐅᐊᖕᓇᖕᓂ ᓄᓇᖏᓄᑦ.

ᑕᒫᓂ ᔩᓐ 2018-ᖑᑎᓪᓗᒍ ᓄᕐᓇᕖᑦ ᓄᓇᒥᒃ ᐊᔾᓷᓕᐅᖅᑕᐅᓚᐅᖅᑐᑦ ᓴᕿᑎᑦᑎᓚᐅᖅᐳᑦ ᑐᑭᓯᓇᖅᑐᓂᒃ ᓇᓚᐅᑖᖅᑕᐅᔪᓂᒃ ᐊᒥᒃᓰᖏᓂᓕᖕᓂᒃ 8,207 ± 2,624 ᕿᓐᖑᒻᒥ ᑐᒃᑐᖏᓂᒃ, ᐊᑕᓅᑦᑐᓂᒃ ᐊᕐᕙᑎᓚᐅᖅᑕᖏᓂᒃ 2015 ᐊᒥᓯᓂᖃᓚᐅᖅᑐᑦ 19,769 ± 7,420 (ᐋᑕᒻ ᔩᔅ ᑭᒃᑯᓐᓂᒃ -Adamczewski et al. 2019). ᖃᐅᔨᓴᖅᑕᐅᕙᒥᒃ ᓴᕿᑦᑎᑦᑎᓚᐅᖅᑐᑦ ᑐᒃᑐᐃᑦ ᐊᒥᔩᔪᓐᓅᓇᐊᒃ ᑲᓐᓂᖅᓯᒪᓂᖏᓐᓂᒃ ᐊᒻᒪᓗ ᑐᒃᑐᖏᓐ ᐊᕐᕋᒍᒥ 2018-ᒥᓂᒃ ᐊᒥᔩᔫᓐᓅᖅᓯᒪᓪᓗᑎᒃ ᐅᖓᑖᓂᒃ 98% ᐳᓴᓐᑎᓂᒃ ᐊᒥᒃᔩᓂᖅᐹᓇᓚᐅᖅᓯᒪᔭᖏᓐᓂᒃ ᑕᐃᔅᓯᒪᓂᒃ 1986 ᑕᒫᓂᑎᒋ ᖃᓂᒋᔭᖏᓐᓂᒃ 470,000 (ᑕᑯᔭᒃᓴᖅ 2). ᓯᑲᓕᓂᖅᐹᖑᔪᒥᒃ ᐊᒥᔩᔫᓐᓅᓚᐅᖅᑐᑦ ᐊᕐᕋᒍᓂᒃ 2006-ᒥᓗ 2009-ᒥᓗ, ᐊᒥᒃᔩᔫᓐᓂᖅᑎᒋᓚᐅᖅᑐᓂᒃ ᑕᒫᓂ 100,000-ᓂᒃ ᐃᒪᓐᓇᐃᓕᖕᖢᐅᖅᑐᓂᒃ 32,000. ᑐᒃᑐᐃᑦ ᖃᓄᐃᖕᖏᓂᖅᓴᐅᓚᐅᖅᑐᑦ ᐊᕐᕋᒍᒥ 2009 ᐊᒻᒪᓗ 2012-ᒥ, ᑭᓯᐊᓂ ᖃᐅᔨᓴᖅᑕᐅᓕᕐᒥᒐᒥᒃ ᑕᒫᓂ 2015 ᐊᒻᒪᓗ 2018-ᒥ, ᖃᐅᔨᔭᐅᓚᐅᖅᑐᑦ ᐊᒥᒃᔩᔫᓐᓅᓇᐊᒃᑲᓐᓂᓚᐅᕐᓂᖏᓐᓂᒃ. ᑕᒪᕐᒥᒃ ᑐᒃᑐᐃᑦ ᐊᒥᒃᔩᓂᖏᓐ ᖃᐅᔨᓴᖅᑕᐅᕙᒥᒃ ᑕᐃᒪᖕᖎ 1980-ᖏᓐᓂᒃ, ᑕᐃᒃᑯᓂᖕᖔᓐᓇᖅ ᐊᑐᖃᑦᑕᖅᓯᒪᕗᑦ ᐊᔾᓷᓕᐅᓇᕙᖕᓂᖅ ᓄᕐᓇᕕᖕᓂᒃ ᓇᓚᐅᑖᕆᑕᐅᓂᕐᒨᑦ ᐊᒥᒃᔩᓂᖏᓐᓂᒃ ᐊᕐᓇᓪᓗᐃᑦ ᓄᕐᓇᕕᖕᓅᓂᖏᓐ. ᓇᓚᐅᑦᑖᖅᑕᐅᓂᖏᓐ ᐊᕐᓇᐃᓪᓗ ᐊᑐᖅᑕᐅᔫᑦ ᓇᓚᐅᑖᕆᓐᓇᕐᓂᖅ ᐊᒥᒃᓯᓂᖏᓂ ᑐᒃᑐᐃᑦ ᐃᓚᔭᐅᕙᖕᒪᑕ ᐸᖕᓅᑦ ᐊᒥᒃᓯᓂᖏᓐᓄᑦ, ᓄᕐᓇᕕᖕᓂᒐᔪᐃᒻᒪᑕ, ᑐᖕᖃᐅᕝᓯᑎᒃ ᐅᑭᐅᒃᔫᒃᑯᑦ ᐊᒥᒃᓯᓂᖏᓐ ᓇᓚᐅᑖᕆᑕᐅᓂᕐᒨᑦ ᐸᖕᓅᑦ ᐊᖑᓴᓪᓗᐃᑦ ᐊᕐᓇᐃᓪᓗ ᐊᒥᔩᓂᖏᓄᑦ. ᑕᒪᒃᑯᐊ ᐅᓂᒃᑳᖅᑕᐅᓯᒪᑦᑎᐊᒃᑲᓐᓂᖅᐳᑦ ᐊᑐᓂ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᓂᖏᓐᓂᒃ ᐅᓂᒃᑳᓕᐊᓂ ᑕᒪᐃᓐᓂᓪᓗ ᐅᓂᒃᑲᖅᑕᐅᓂᖏᓐᓂᒃ ᖃᓄᐃᓕᐅᕈᑕᐅᔫᖑᓂᖏᓐᓂᒃ ᐱᓕᕆᐊᖑᓪᓗᐊᖅᑐᑦ ᐋᑕᒻ ᔩᔅ ᑭᒃᑯᓐᓄᑦ Adamczewski et al. (2017).



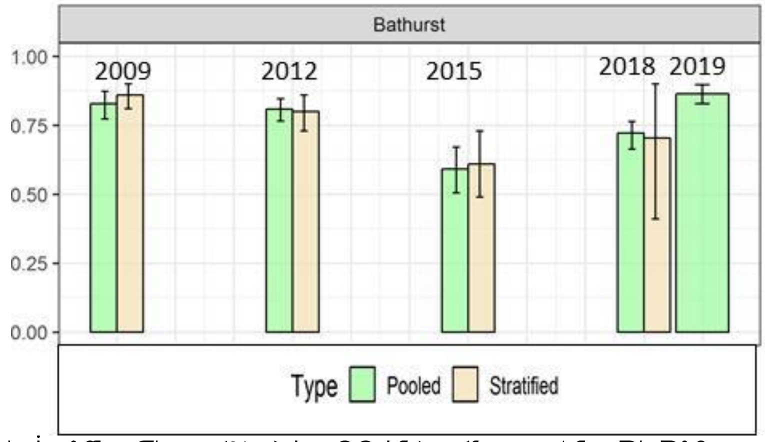


ᑕᑯᕗᒃᓴᖅ **2.** ᓇᓚᐅᑦ ᑖᓚ ᐃᑦ ᕿᙵᐅᒻᒥ ᑐᒃ ᑐᐃᑦ ᐊᒥᓲᓂᖏᓐᓂᒃ ᐊᕐᕌᒍᓂᒃ 1986-2018 (ᓴᐅᒥ ᐊᓂ),ᑐᙳᕝᕙᑐᓂᒃ ᓄᕐ ᑎᕕᖕᓂ ᓄᓇᒦᖕᓂᖏᓐ ᐊᔾᔨᓕᐅᖅᑕᐅᔪᑦ ᔫᒥ. ᑐᑭᓯᓇᑦ ᑎᐊᒃ ᑲᖕᓂᕐᑯᓗᒍ, ᓯᑕᒪ ᐃᖅᑕᐅᓪᓗᑎᒃ ᓇᓚᐅᑖᖅᑕᐅᓯᒪᔪᑦ ᑕᐃᒪᙱᑦ 2009-ᒥ ᑕᑯᒃᓴᐅᕙᑦ ᑕᓕᖅᐱᐊᓂ ᐊᔾᔨᙳᐊᕐᓂ ᒥᑭᖕᓂᖅᓴᐅᔪᓂ. ᑕᒻ ᒪᖅᓯᒪᑎᕆᔪᖓᖅᐳᑦ ᑖᒥᓂ 95% ᓇᓗᓇᕐᓂᖏᓐ.

ᐊᓯᖏᓐᓂᒃ ᓄᓇᒥ ᓇᓗᓇᐃᒃ ᑯᑕᐃᑦ ᑕᐅᖅ ᖁᕐ ᓗᖅᑑᐸ-ᑲ ᓇᖕᓇᖕᓂ ᑐᒃ ᑐᓂᒃ ᒪᓇᕚᖅ ᒪᓕᖕᒥᔪᑦ ᓱᑲᓕᔪ ᐊᓗᖕᒥᒃ ᐊᒥᓲᔪᖕ ᓅᖅᐸᓕ ᓕᐊᓂᖏᓐ ᓂᒃ ᐊᕐᕌᒍᓚᓴᐅᔪᓂ 2015-2018-ᒥ. ᐱᙳ ᐃᓕᖅᖠ ᓂᒃ ᓄᓇᒥᒃ ᓇᓗᓇᐃᒃ ᑯᑕᖅᓱᕐ ᖑᕗᑦ ᑐᒃ ᑐᐃᑦ ᖃᓄᐃᖕᖏᓐᖏᓐ ᓂᒃ ᑐᙳᕝᕙᑐᓂᒃ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᐆᒪᔭᓇᕐ ᓂᖏᓐ ᓂᒃ, ᐃᑉ ᓚᐅᖅᓱᕗ ᖑᓂᖏᓐ ᓂᒃ ᐊᒻ ᒪᓗ ᓄᕐ ᕋᖏᑕ ᐆᒪ ᐃᓇᕿᓇᕐ ᓂᖏᓐ ᓂᒃ. ᐆᒪᔪᓕᕆᔾᔪᑦ ᐅᖃᐅᓯᕐ ᓂᒃ ᐊᑐᖅᐸᒃ ᑐᑦ ᑕᒪᒃ ᑯᓂᙶᑕᐃᒍ ᐃᓂᖅ ᑐᒃ ᑐᐃᑦ ᐆᒪᔭᓇᕐ ᓂᖏᓐ ᓂᒃ.

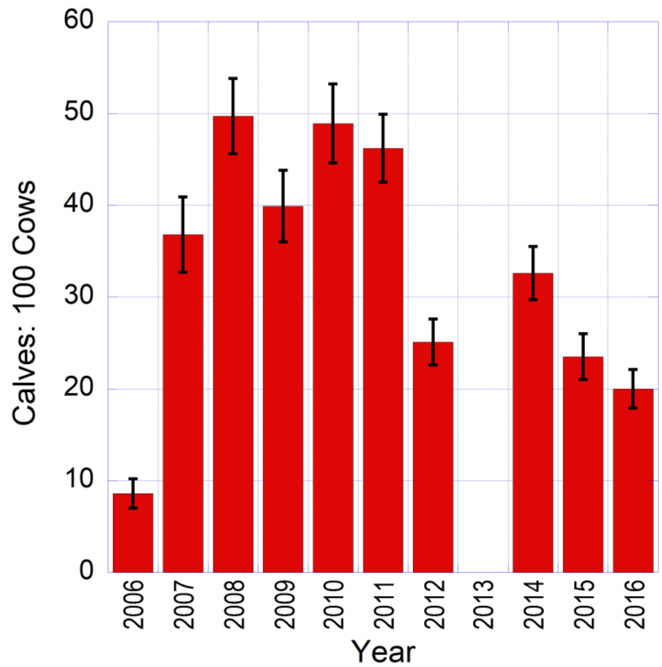
ᑕᒪᒃ ᑯᓇᙱᑦ ᓇᓗᓇᐃᒃ ᑯᑕᑎᔭ ᐅᕙᒃ ᑐᓂᒃ, ᐱᒻ ᒪᑭᐅᓂᑉᐹᙶᕙᒃ ᑐᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᑐᒃ ᑐᐃᑦ ᐆᒪᔭᓇᕐ ᓂᖏᓐ; ᐊᒥᓱᓚᓴᖕ ᓂᒃ ᑐᑭᓯ ᓂᐊᕿᑕᐅᖃᑦ ᑕᖅᓯᒪᕙᑦ (ᐋᒃ ᑑᑎᕆ ᓗᒍ Bᐅᒑᔾᔨᒃᑯᓐ ᓄᑦ ᐃᓚᖏᓐ ᓄᓪ ᓗ-Boulanger et al. 2011-ᒥ) ᓴᕿᑦᑎᓯᒪᖕᒪᑕ ᐊᑯᓐ ᓂᖏᓐ ᓃᑦ ᑕᑎᐊᖃᕐ ᓂᖏᓐ ᓂᒃ ᓈᓴᐅᑎᓕᖕ ᓂᒃ 84% ᐳᓴᓐ ᑎᓂᒃ ᐊᒻ ᒪᓗ 90% ᐳᓴᓐ ᑎᖏᓐ ᓂᒃ ᖃᓄᐃᖕᖏᓂᕋᖅᑕᐅᔪᓐ ᓇᕐ ᓂᐊᕿᑎᒃ ᑐᒃ ᑐᐃᑦ. ᖃᐅᔨᒋᐊᖅᑕᐅᙱᒃ ᐆᒪ ᐃᓐ ᓇᕿᓐ ᓇᕐ ᓂᖏᓐ ᖁᙵ ᕿᑦ ᑎᖅᑕᐅᓯᒪᔪᑦ ᐅᔭᒥᓃᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ, ᓄᓇᒦᓐ ᓂᖏᓐ ᓗ ᑐᑭᓯᓇᓲ ᖑᕙᑦ ᕿᙵᐅᒻᒥ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᑐᒃ ᑐᐃᑦ ᐆᒪ ᖃᑕᖅᓯᒪᓂᖏᓐ ᓂᒃ ᐊᔾᔨᒌᖕᖏᓐ ᑑᑎᐅᖃᑦ ᑕᖅᓯᒪᔪᓂᒃ ᐊᑯᓂᖏᓐ ᓂᒃ ᓇᓴᐅᑎᓕᖕᓂ ᑖᒥᙱᑦ 78% ᐳᓴᓐ ᑎᓂᒃ ᐊᒻ ᒪᓗ 82% ᐳᓴᓐ ᑎᖏᓐ ᓄᑦ, ᐊᕐᕌᒍᓂᒃ ᑖᒥᓂ 2015-ᒥ ᐊᒻ ᒪᓗ 2018 ᐊᒻ ᒪᓗ ᐱᐅᓂᖅᐹᖑᔪᓂᒃ ᓇᓚᐅᑖᕿ ᑕᐅᓚᐅᕆᓪ ᓗᑎᒃ ᐊᕐᕌᒍᒥ 2017-2018-ᒥ ᑖᒥ ᓃᓚᐅᖅᑐᑦ 82% ᐳᓴᓐ ᑎᖏᓐ ᓂ (ᐋᑕᒻ ᔪᔅ ᑭᒃ ᑯᑦ-Adamczewski et al. 2019-ᒥ). ᐱᕚᓪ ᓕᐊᔪᔮ ᕋᓗᐊᖅᑎᓪ ᓗᕆᑦ ᐱᐅᓯ ᕚᓪ ᓕᐊᔪᔮᕐ ᓂᖏᓐ ᓂᒃ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᐆᒪ ᐃᓐ ᓇᕿᓇᕐ ᓂᖏᓐ ᐊᕐᕌᒍᐃᑦ ᐊᑯᓐ ᓂᖅᓯᕐ ᓂᖏᓐ ᓂ 2015-ᒥ ᐊᒻ ᒪᓗ 2018-ᒥ, ᓯᓚ ᐳᖅᑐᓂᖅᓴᕐ ᒥᑦ ᑕᑎᐊᖅᑎᙵᑦ, ᐅᙱᑖᓂᖏᓐ ᓇᕐ ᓗᑎᒡ ᓗ ᑖᙱᑦ 80% ᐳᓴᓐ ᑎᖏᓐ ᑦ ᑐᓂᒃ ᖃᓄᐃᖏᑐᓐ ᓇᕐ ᓂᖏᓐ ᓄᑦ ᑐᒃ ᑐᐃᑦ.

ᐱᐅᓂᖅᐹᖑᔪᓐ ᓇᖅᑐᑦ ᖃᐅᔨᒪᔾ ᔪᑎᒃ ᓴᐃᑦ ᐊᑐᐃᓐ ᓇᐅᔪᑦ ᐃᑉ ᓕᐊᖃᕐ ᓂᖏᓐ ᓂ ᑕᒃ ᑯᓇᓂ ᑐᒃ ᑐᓂᒃ ᑲᑎᖅᓱᖅᑕᐅᔪᓐ ᓇᖅᑐᑦ ᔫᒥ ᖃᓄᐃᓕᙶᖏᓐ ᓂᒃ ᖃᐅᔨᓴᕐ ᑕᐅᓂᖏᓐ ᓂ, ᓇᓚᐅᑦ ᑖᕐ ᓇᕐ ᒪᑕ ᐃᓚᖏᓐ ᓂᒃ (% ᐳᓴᓐ ᑎᑦ ᑎᒍᑦ) ᓄᓕᐊᕐ ᓂᖏᓐ ᓂ ᐊᕐ ᓇᓪ ᓗᐃᑦ. ᐃᑉ ᓚᐅᓖᑦ ᐊᒥᓲᓂᖏᓐ ᐊᔾᔨᒃ ᑲᓪ ᓚᐅᑦ ᑐᑦ ᑕᒪᒃ ᑯᐊᓗ ᐊᒥᔅ ᓲᖏᓐ ᓂᖅᓴᐅᓚᐅᖅᓯᑎᒃ 2015-ᒥ, ᖃᓂᕆᔭᖏᓐ ᓂᑐᓂᒃ 60% ᐳᓴᓐ ᑎᓂᒃ ᐊᓯᖏᓐ ᓄᑦ ᐊᒥᔅ ᓲᓂᖅᓴᐅᖃᑦ ᑕᓪ ᓚᐅᖅᑐᓄᑦ ᖃᓂᕆᔭᖏᓐ ᓂ 80% ᐳᓴᓐ ᑎᒦ ᓚᐅᖅᑐᓂ ᐊᕐᕌᒍᒥ 2013-ᒥ ᐊᒻ ᒪᓗ 2018-ᒥ ᐊᒻ ᒪ ᓯᓚ ᐊᒥᔅ ᓲᓂᖅᓴᐅᓚᐅᕐ ᒥᔪᓂᒃ 86.0% ᐳᓴᓐ ᑎᖏᓐ ᓃᓚᐅᖅᑐᓂᒃ ᔫᒥ 2019-ᒥ (ᑕᑯᕗᒃᓴᖅ 3). ᑕᐃᒪ ᐃᓕᙶᓚᐅᕐ ᓂᖏᓐ ᑕᒪᒃ ᑯᐊ ᐃᓱᒪᓇᖅᐳᑦ ᐊᒥᔅ ᓲᖏᓐ ᓂᖏᓐ ᓄᑦ ᐃᑉ ᓚᐅᖃᓚᐅᖅᑐᑦ ᐱᔾ ᔪᑕᐅᖕᒥᔪᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥᔅ ᓲᔪᓐ ᓃᕐ ᓂᖏᓐ ᓄᑦ ᐃᓚᖏᓐ ᓂ ᐊᕐᕌᒍᓂᒃ, ᐳᓴᓐ ᑎᑎᒍᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᓄᓕᐊᕿᓐ ᓇᖅᑐᔫᕐ ᓂᖏᓐ ᓄᑦ ᑖᒥ ᓂᑐᓐ ᓇᕿᑎᒡ ᓗᓐ ᓃᑦ 80% ᐳᓴᓐ ᑎᖏᓐ ᓂ ᖃᓄᐃᖏᓐ ᓂᕿᖅᑕᐅᔪᓐ ᓇᕐ ᒪᑕ ᑐᒃ ᑐᖏᓐ.



ᑕᑯᔭᒃᓴᖅ 3. ᐊᒥᔅᓲᓂᖏᑦ ᑕᒡᕙ (% ᐳᓴᓐᑎᑎᒍᑦ) ᐊᕐᓇᓪᓗᐃᑦ ᑐᒃᑐᖏᓐᓂ ᖁᕐᓱᖅᑑᑉ-ᑲ ᓇᖕᓇᖕᓂ ᓄᕐᑎᕚᖏᓐᓂ ᑕᐃᔭ ᐅᕙᒃᑐᑦ ᓄᓕᐊᕈᓐᓇᕐ ᓂᕋᖅᑕᐅᔪᓂᒃ ᔫᓐᒥ ᐊᒥᔅᓲᓂᖅᐸᑎᓚᐅᖅᑕᖏᓐᓂ ᓄᕐᑎᕙᓪ ᓕᐊᓚᐅᕐᓂᖏᓐᓄ ᐊᕐᕌᒍᒥ 2009-2019-ᒥ. ᑲᑎᑕᐅᓯᒪᓂᖏᑦ ᐊᒻᒪᓗ ᑐᑭᓕᐅᕈᑕᐅᓂᖏᑦ ᓈᓴᖅᑕᐅᖃᑦᑕᕐᒪᑕ ᐊᑐᖅᐸᒃᓱᑎᒃ ᐊᔾᔨᒌᖏᑦᑐᓂᒃ ᓈᓴᐅᓯᓇᔾᔪᑎᓂᒃ, ᑕᐃᒪ ᐃᑲᔪᐊᖅᑎᓪᔪᒍ ᓱᓕ ᐊᔾᔨᒌᒃᑐᐃᓐᓇᑲᓴᐅᔪᓂᒃ ᓴᕿᑎᑦᑎᖃᑦᑕᓚᐅᖅᐳᑦ ᐊᒥᔅᓲᓂᖏᓂᒃ.

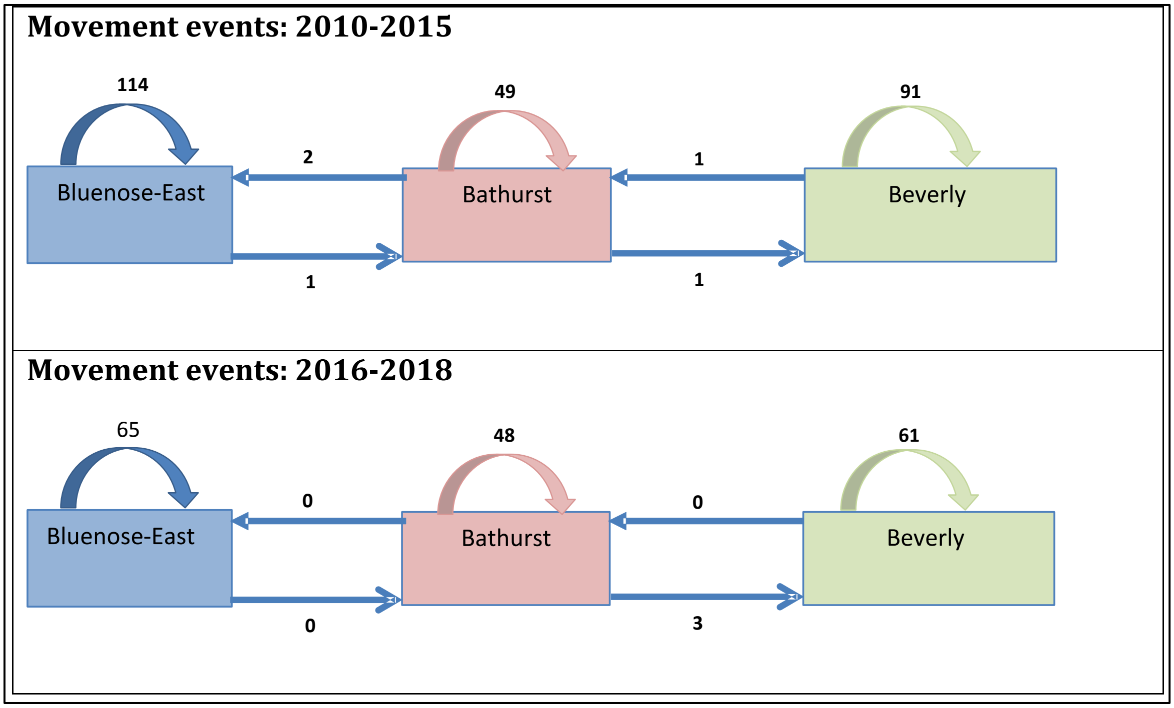
ᐅᑭᐅᒻᒪᓇᒃᑯᑦ ᓄᕐᕋᖃᕐᓂᖏᑦ: ᐊᕐᓇᓪᓗᐃᑦ ᐊᒥᔅᓯᓂᖏᑦ ᑐᑭᓯᓇᕈᑕᐅᕙᒃᑐᑦ ᐊᒥᔅᓲᓂᖏᓂᒃ ᐊᑐᖅᓯᑎᒃ ᓯᕗᓂᐊᒍᑦ ᐊᐅᔭᖕᓂ ᔫᓐᖑᓚᐅᖅᑐᒥᒃ, ᐆᒪᐃᓐᓇᕈᓐᓇᓚᐅᕐᓂᖏᓂᒃ ᓯᕗᓪᓕᕐᒥᓂᒃ ᑎᑭᐅᒪᓗᒍ ᑕᖅᑭᓄᑦ 9-ᖑᓚᐅᖅᑐᓄᑦ ᖁᓕᓂᓪᓗᓐᓃᑦ 10 ᑕᖅᑭᐅᓚᐅᖅᑐᓄᑦ, ᑕᐃᒪᖓᑦ ᓄᕐᑎᔭᐅᒐᒥᒃ. ᓇᓗᓇᐃᒃᑯᑕᓪᓚᑎᖃᑦᑕᕐᒪᑕ ᐱᕆ ᐊᕐᕚᖅᑳᖑᓪᓗᑎᒃ ᐊᒥᔅᓲᓂᖏᓂ 30-ᓂᒃ ᓄᕐᕋᖃᓚᐅᖅᑐᑦ:100-ᖏᓐᓂᑦ ᑐᓂᒃ ᐊᕐᓇᓪᓗᕐᓂᒃ ᐊᒥᔅᓲᓂᓪᓂᒃ ᐊᑐᖃᑕᖅᓯᑎᒃ ᓈᓴᐅᓯᕿᓂᕐᒧᑦ, ᓇᓗᓇᐃᒃᑯᑕᑎᔭᐅᓂᕐᒧᑦ ᖃᓄᐃᖏᓐᓂᖏᓐᓄᑦ ᐊᒥᔅᓲᓂᖏᓄᑦ ᑐᒃᑐᐃᑦ; ᑭᓯᐊᓂᓪᓕᑦ ᑕᐅᖅ, ᑕᒪᓐᓇ ᓇᓗᓇᐃᒃᑯᑕᑎᔭᐅᕙᖕᓂᖕᒐᐊᑐᖅᑕᐅᓲᖑᕆᕗᖅ ᑕᒪᐃᓐ ᓄᑲᓴᒃ ᑐᒃᑐᓄᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐆᒪᐃᓐᓇᕈᓐᓇᕐᓂᖏᑦ ᖃᓄᐃᖏᓐᖏᓐᓄᑦ ᑐᑭᓕᐅᕈᑕᐅᕙᖕᓂᕐᒧᑦ (85-90% ᐳᓴᓐᑎᖏᓐᓂᒍᑎᒃ). ᐊᕐᓇᓪᓗᐃᑦ ᐊᒥᔅᓲᖕᒥᓪᓗᕆᑦ, ᓲᕐᓗ ᑕᐃᒃᑯᓇᓂ ᕿᓐᖒᒻᒥ ᑐᒃᑐᖏᓐᓂ ᐊᕐᕌᒍᓂᒃ ᑕᓖᖓᑦ 2009-ᒥᒃ 2018-ᒧᑦ, ᓄᕐᕋᓅᑦ:ᐊᕐᓇᓪᓗᐃᓪᓗ ᐊᑐᓂ ᐊᒥᔅᓲᓂᖏᑦ ᐊᒥᔅᓯᓂᖅᓴᒻᒪᓇᐊᓘᔭ ᓇᐊᖅᑲᖅᐳᑦ (45-50-ᖏᓐᓪᓗᑎᒃ ᓄᕐᓇᔭᐅᓂᖏᑦ:100-ᓄᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐊᒥᔅᓲᓂᖏᓂ ᐅᖕᒫᓃᓗᑎᓪᓘᓐᓃᑦ) ᑐᑭᓯᓇᕐᓂᐊᕈᑎᒃ ᖃᓄᐃᖏᓐᖏᓐᓄᑦ ᑐᒃᑐᐃᑦ. ᐅᑭᐅᒃᑯᑦ ᓄᕐᕋᓅᑦ:ᐊᕐᓇᓪᓗᐃᓪᓗ ᐊᒥᔅᓯᓂᖏᑦ ᐊᑐᓂ ᐃᒪᓐᓇᐃᓕᖕᖁᔪᓚᐅᖅᐳᑦ 25.4ᖏᓐᓃᔅᓯᑎᒃ ᓄᕐᕋᖏᑦ:100-ᖏᓐᓃᔅᓯᑎᒃ ᐊᕐᓇᓪᓗᖏᑦ ᕿᓐᖒᒻᒥ ᑐᒃᑐᓂᒃ ᐊᕐᕌᒍᓂᒃ 2014-2016 (ᑕᑯᔭᒃᓴᑦ 4). ᐅᑭᐅᒻᒪᓇᖕᒥ ᐊᒥᔅᓯᓂᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᓐᖏᑦᑐᑦ ᐊᕐᕌᒍᓂ 2017, 2018 ᐊᒻᒪᓗ 2019-ᒥ ᑖᒃᑯᐊ ᑐᒃᑐᖏᑦ ᐃᓚᓕᐅᑎᓯᒪᓚᐅᕐᓂᖏᓐᓄᑦ ᖁᕐᓱᖅᑑᑉ-ᑲ ᓇᖕᓇᖕᒪᓄᑦ ᑐᒃᑐᓄᑦ, ᐅᕝᕙᓗᓐᓃᑦ ᑎᑉᔭᓕᖕᒥ ᑐᒃᑐᓄᑦ, ᑕᒪᐃᓐᓂᓪᓗᓐᓃᑦ ᐃᓚᕐᒋᒃᑐᐃᓐᓇᐅᓪᓗᑎᒃ, ᑕᐃᒪ ᐃᓂᖏᓄᓪᓗ ᐊᔾᔨᕐᓇᓚᐅᕐᒪᑕ ᐊᑐᓂ ᐊᒥᔅᓲᓂᖏᑦ ᓇᓕᐊᖑᖕᒪᖕᑖ ᓈᓴᖅᑕᐅᑦᑎᐊᕈᓐᓇᕐᓂᖅ.



ᑕᑯᓯᒃᓴᖅ 4. ᐅᑭᐅᒻᒪᓇᒃᑯᑦ ᓄᕐᕋᐃᑦ-ᐊᕐᓇᓪᓗᐃᓪᓗ ᐊᒥᔅᓰᓂᖅᑦ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᓂᒃ, 2006-ᒥᒃ 2016-ᒧᑦ.

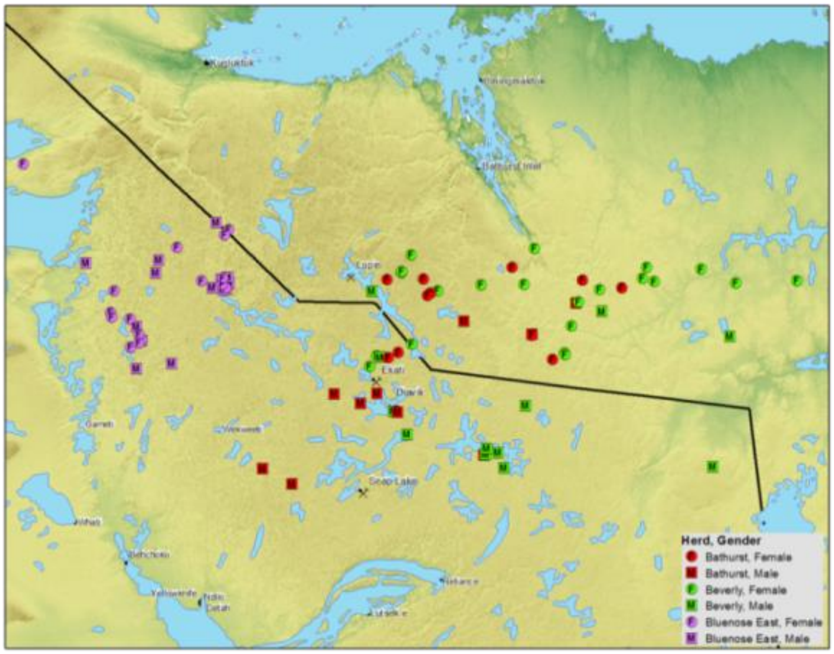
ᐊᑕᐅᑎᒃᑯᑦ, ᖃᐅᔨᓴᐅᔪᑦ ᑕᒪᒃᑯᓂᖓ ᕿᓐᖑᐅᓂᖅᑦ ᑐᒃᑐᐃᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐆᒪᐃᓐᓇᕈᓐᓇᕐᓂᖅᓂᒃ, ᐊᒥᔅᓰᓂᖅᓂᓗ ᓄᓪᓕᐊᕈᓐᓇᓚᐅᖅᑐᑦ ᐊᕐᓇᓪᓗᐃᑦ ᔫᖕᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐅᑭᐅᒻᒪᓇᒃᑯᑦ ᐊᒥᔅᓰᓂᖅᑦ ᓄᕐᓇᐅᖅᑕᐅᔪᑦ: ᐊᕐᓇᓪᓗᕐᓄᑦ ᖃᐅᔨᒪᓇᕈᑕᐅᓂᕐᒧᑦ ᐊᒥᔅᓰᖏᓗᐊᕐᓂᖅᓂᒃ ᑕᒪᐃᓐᓂᒃ ᐱᖑᕆᓂ ᐊᑐᖅᑕᐅᓚᖕᓂᖅᓂ ᑕᒪᒃᑯᐊ ᐆᒪᐃᓐᓇᕈᓐᓇᕐᓂᖅᓂᒃ ᓈᔅᓴᐅᑎᖅᑦ ᐱᔾᔪᑕᐅᓪᓗᑎᒃ ᑐᒃᑐᐃᑦ ᐊᒥᔅᓰᔪᓐᓃᖅᓯᒪᓂᖅᓄᑦ. ᐊᕐᓇᓪᓗᐃᑦ ᐆᒪᐃᓇᕈᓐᓇᓚᐅᕐᓂᖅᑦ ᓇᓚᐅᑦ ᑖᖅᑕᐅᓯᒪᓪᓕᖅᑐᑦ ᐊᕐᕋᒍᓂᒃ 2015-ᒥᒃ 2018-ᒧᑦ ᐱᐅᓂᖅᓴᐅᓪᓕᖅᐳᑦ ᓴᓂᐊᓂ ᓯᕗᓂᐊᒍᑦ ᐊᕐᕋᒎᓚᐅᖅᑐᓂ, ᑭᓯᐊᓂ ᓯᓪᓕ ᐊᑦᑎᓗᐊᖅᑐᑦ ᐊᒥᔅᓰᓂᖅᓂ ᖃᓄᐃᓐᖏᓂᕋᖅᑕᐅᔪᓐᓇᕐᓂᖅᓄᑦ. ᓄᕐᕋᐃᑦ ᐆᒪᐃᓐᓇᕈᓐᓇᓚᐅᕐᓂᖅᑦ ᐊᑯᓐᓂᖅᓂᒃ ᐊᕐᕋᒍᓂ 2014 ᐊᒻᒪᓗ 2016 ᐊᒥᔅᓰᖏᓗᐊᓚᐅᕐᒥᔪᑦ ᖃᓄᐃᖕᓂᕋᖅᑕᐅᔪᓐᓇᕐᓂᖅᓄᑦ.

ᒪᓕᒃ ᑕᐅᖃᑕᕈᓐᓇᕐᓂᖅᑦ ᕿᓐᖑᐅᒻᒥ ᐊᕐᓇᓪᓗᐃᑦ ᖁᖓᔪᕈᑦᑎᖅᑕᐅᓯᒪᓂᖅᑦ ᐊᕐᕋᒍᖏᓂᒃ 2010-2015-ᒥ ᐊᒻᒪᓗ 2016-2018-ᒥ ᑐᑭᓯᓇᖅᑐᔫᖅᐳᑦ ᐊᒥᓲᖃᑦᑕᖅᓯᒪᓐᖏᓂᖅᑦ ᑭᐳᑎᕙᒃᑐᑦ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᐃᑦ ᐊᕐᓇᓪᓗᖅᑦ ᓄᕐᓇᕕᒋᓂᐊᖅᑕᖏᓐᓂ ᕿᓐᖑᐅᒻᒥ, ᓴᓂᓕᓇᔭᖏᓂᓗ ᖁᕐᓗᖅᑑᑉ-ᑲᓇᖕᓇᖔᓂ ᓄᕐᓇᕕᖏᓂᒃ ᐊᒻᒪᓗ ᑎᑉᔭᓕᐅᑉ ᑐᒃᑐᐃᑦ ᓄᕐᓇᕕᖏᓂᒃ, ᐊᒥᓲᖃᑦᑕᖅᓯᒪᖏᓇᒥᒃ ᓴᖑᕙᒃᑐᑦ ᐊᓯᖏᓄᑦ, ᐊᕐᕋᒍᓂ 2010-ᒥ 2017-ᒧᑦ ᑎᑭᓪᓗᒍ (ᑕᑯᓯᒃᓴᖅ 5). ᓴᖑᔪᔮᖃᑦᑕᖅᑐᑦ ᐊᓯᖏᓄᑦ ᓄᕐᓇᕕᖕᓄᑦ ᓇᓕᒧᕆᒃ ᐸᓐᖏᑐᓂᒃ ᑕᒪᐃᓐᓂᒃ ᐊᑐᖃᑦᑕᐅᑎᕙᖕᓂᖅᓂᒃ ᐊᓯᖏᓂᒃ. ᑕᒪᐃᓐᓂ ᐊᒥᓲᓪᓗᐅᖅᑐᑦ 254-ᖏᓐᓂᑦᑐᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐱᖑᓯᓂᒃ ᑖᒃ ᑯᓇᖑᑦ ᑐᒃᑐᖃᕐᕕᐅᔪᓂᒃ ᐅᑎᖅᐸᒃᑐᑦ ᑕᐃᒃ ᑯᓄᖑᑦᓴᐃᓐᓇᖅ ᓄᕐᓇᕕᓯᕙᒃᑕᐅᖃᑎᔅᓯᒥᓄᑦ ᐊᕐᕋᒍᓂ 2010-2015-ᒥ ᐊᒻᒪᓗ ᑕᓕᒪ ᐅᓪᓗᖅᓯᑎᒃ ᑮᐳᑎᓪᓗᖅᑐᑦ ᓄᕐᓇᕕᑐᖃᕆᓐᓇᖅᑕᖏᓐᓄᑦ (1.9% ᐳᓴᓐᑎᖅ). ᐊᒥᔅᓯᓪᓗᖅᑐᑦ 174 ᐊᕐᓇᓪᓗᐃᑦ ᐅᑎᖅᐸᓪᓗᖅᑐᑦ ᓄᕐᓇᕕᑐᖃᕐᓂᖅᑕᒥᓄᑦ ᐊᕐᕋᒍᓂ ᑖᓂ 2016-2018-ᒥ ᐱᖑᔫᓪᓗᖅᑐᑦ ᐊᓯᐊᓄᐊᖅᑕᓪᓗᖅᑐᑦ ᓄᕐᓇᕕᖕᓄᑦ (1.7% ᐳᓴᓐᑎᖏᓐᓂᑦᑐᑦ). ᑕᒪᓐᓇ ᐃᓯᒪᓇᖅᑐᖅ ᓅᖃᑦᑕᕐᓂᖅᑦ ᐊᓯᖏᓄᑦ ᓴᓂᓕᓇᔭᒥᓄᑦ ᑐᒃᑐᖃᕐᕕᐅᔪᓄᑦ ᐱᔾᔪᑕᐅᓲᓐᖏᑦᑐᑦ ᐊᒥᔅᓰᔪᓐᓃᖃᑕᐅᔪᓐᓇᕐᓂᖅᓄᑦ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᓄᑦ ᑖᓂ ᐊᕐᕋᒍᖏᓂ 2015-2017-ᒥ.

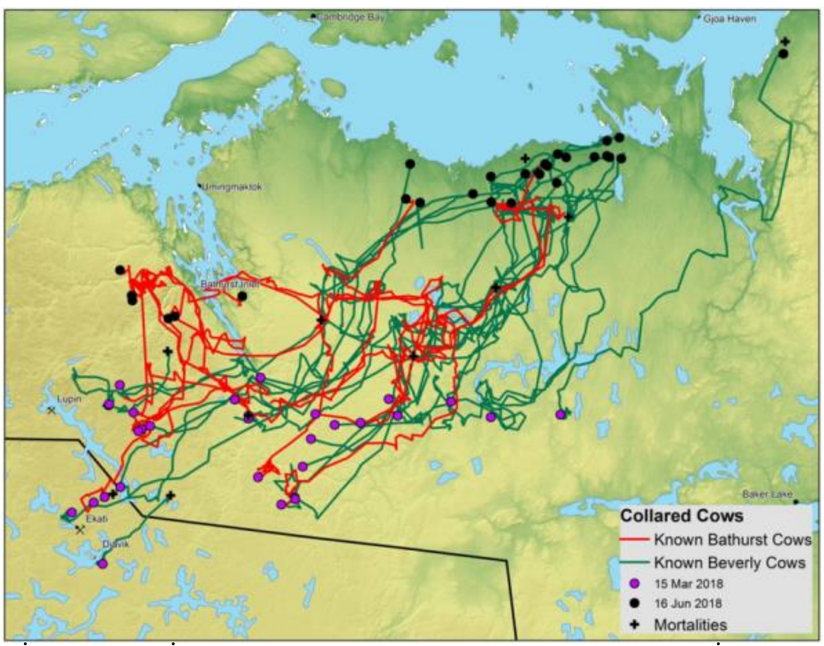


ᑕᑯᔭᒃᓴᖅ 5. ᐊᒥᕐᓱᐃᖅᑕᖅᑎᑦᑎᕙᓐᓂᖏᑦ ᖁᖓᔪᑦᑎᖅᑕᐅᓯᒪᔪᑦ ᐊᕐᓇᓪᓗᐃᑦ ᓅᖅᑕᕐᓂᖏᑦ ᖃᓐᖑᐅᒻᒥᒃ, ᓴᓂᓕᕆᔭᖏᓐᓄᓪᓗ ᖁᕐᓗᖅᑑᑉ-ᑲᓇᖕᓇᖕᒪᓐ, ᑎᑉᔭᓕᖕᒧᓪᓗ ᑐᒃᑐᖏᑦ ᑕᖃᓄᐃᓕᖕᓚᐅᕐᓂᖏᑦ ᐊᕐᕋᒍᓂᒃ 2010-2015-ᒥ ᐊᒻᒪᓗ ᐊᕐᕋᒍᓂᒃ 2016-2018-ᒥ ᑐᖕᕕᖅᑐᓂᒃ ᑭᖑᓕᕈᒃᑐᓂᒃ ᔫᒥ ᓇᓃᓚᐅᕐᓂᖏᓐᓂᒃ ᐊᑐᖅᓯᑎᒃ. ᑐᕌᕈᑎᓖᑦ ᐱᑎᒃᓯᖑᐊᕐᓂᒃ ᐊᖕᒪᓗᖅᑐᓂᒃ ᖁᓛᓂ ᕿᔪᖁᑎᖑᐊᕐᓂᒃ ᓇᓗᓇᐃᔭᐃᕙᑦ ᑐᒃᑐᐃᑦ ᐅᑎᖃᑦᑕᐃᓐᓇᕐᓂᖏᓐᓂᒃ ᑕᐃᒃᑯᓄᖕᖁᓴᐃᓐᓇᖅ ᓄᕐᓇᔭᖅᑐᕐᕕᕆᕗᑦ ᑕᑐᖃᓇᔭᖏᓐᓄᑦ ᐊᕐᕋᒍᓚᓴᖕᓂ ᑭᖑᓕᕈᒃᑐᓚᓴᖕᓂ. ᑐᑭᒧᐊᒃᑐᑦ ᑐᕌᕈᑎᖏᑦ ᐱᑎᒃᓯᖑᐊᖏᑦ ᓇᓗᓇᐃᔭᐃᔦᑦ ᓇᒨᕐᕗᖕᓂᖏᓐᓂᒃ ᑐᒃᑐᐃᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐊᓯᐊᓄᖕᐅᓪᓗᑎᒃ ᓄᕐᓇᕕᖕᓄᑦ. ᐱᔭᐅᓯᒪᔪᑦ ᑐᑭᓯᓂᐊᕈᑏᑦ ᑖᒃᑯᐊ ᐋᑕᒻᔫᔅᑭᒃᑯᓐᓂᒃ -Adamczewski et al. (2019).

ᑭᓯᐊᓂᓕᑦ ᑕᐅᖅ, ᐱᖕᖑᑦ ᖁᖓᔪᑦᑎᖅᓯᒪᔪᑦ ᐊᕐᓇᓪᓗᐃᑦ ᑮᓐᑎᕗᖕᓂᖏᑦ ᐊᓯᖕᒋᓄᐊᕐ ᓱᖑᓂᖅ ᑕᒫᓂ ᐊᕐᕋᒍᓂ 2016-2018-ᒥ ᖃᓐᖑᐅᒻᒥ ᓄᕐᓇᕕᖕᓂᒃ ᑕᐅᕝᕙᖕ ᑎᑉᔭᓕᐅᑉ ᐊᕐᓇᓪᓗᐃᑦ ᓄᕐᓇᕕᖏᓐᓄᑦ ᐊᑐᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᒫᓂ ᐅᐱᕐᖔᖕᒪᓂ 2018-ᒥ. ᐅᑭᐅᒃᑯᑦ ᐊᕐᕋᒍᒥ 2017-2018-ᒥ, ᖃᓐᖑᐅᒻᒥ ᐊᕐᓇᓪᓗᐃᑦ ᖁᖓᔪᑦᑎᖅᑕᐅᓯᒪᔪᑦ ᐊᒻᒪᓗ ᐸᖕᓃᑦ ᐊᑯᓯᒪᕈᔫᔭᓚᐅᖅᑐᑦ ᖁᖓᔪᑦᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᐊᕐᓇᓪᓗᕐᓄᑦ ᐊᒻᒪᓗ ᐸᖕᓃᑦ ᑐᒃᑐᖏᓐᓂᒃ ᑎᑉᔭᓕᖕᒥ (ᑕᑯᔭᒃᓴᖅ 6). ᐊᒥᕐᓱᐊᓗᖕᓂᒃ ᐊᔾᔩᕆᖕᖏᓐᓂᖅᑕᓚᐅᖅᑐᑦ ᒪᕐᕉᖕᓂᒃ ᑐᒃᑐᖅᑲᕐᕖᖕᓂᒃ ᑖᒃᑯᓂᖕᖑ ᖃᓐᖑᐅᒻᒥ ᑐᒃᑐᖏᑦ ᐊᒥᕐᓲᓂᖅᑲᕐᓯᕆᔭᐅᓪᓗᑎᒃ ᐊᕐᕋᒍᒥ 2018-ᒥ ᖃᓂᒋᔭᖏᓐᓂ 8,200-ᓂᒃ (ᐋᑕᒻᔫᔅᑭᒃᑯᓐᓂᒃ -Adamczewski et al. 2019) ᐊᒻᒪᓗ ᑎᑉᔭᓕᖕᒥ ᐊᒥᓲᓂᖅᑲᕐᓯᕆᔭᐅᓪᓗᑎᒃ ᐊᕐᕋᒍᒥ 2018 ᖃᓂᒋᔭᖏᓐᓂ 103,000-ᓂᒃ (ᑳᒻᐸᓪᑯᓐᓂᒃ -Campbell et al. 2019), ᐊᕕᒃᑐᖅᓯᒪᓗᑎᒃ ᐊᑐᓂ ᐊᒥᓲᓂᖅᑲᖅᓯᑎᒃ ᐃᒪᓐᓇᑎᒋ 12:1. ᐅᐱᕐᖔᒃᑯᑦ ᓅᑉᐸᓪᓕᐊᓕᕋᒥᒃ ᐅᐊᓇᖅᐸᓯᖕᒧᑦ ᐅᑭᐅᖅᑕᖅᑑᓂᕐᒧᑦ, ᐱᖕᖑᑦ ᓲᓚᐅᖅᐸᑦ ᑖᒃᑯᓇᖕᖑᑦ 11-ᖑᓚᐅᖅᑐᓂ ᑲᑎᓪᓗᕆᑦ (27% ᐳᓴᓐᑎᖏᑦ) ᖃᐅᔨᒪᔭᐅᔦᑦ ᖃᓐᖑᐅᑉ ᑐᒃᑐᖏᑦ ᖁᖓᔪᑦᑎᖅᑕᐅᓯᒪᔪᑦ ᐊᕐᓇᐃᓪᓗᑦ (ᖃᐅᔨᒪᔭᐅᓚᐅᖅᑐᑦ ᖃᓐᖑᐅᑦ ᑐᒃᑐᖏᓐᓄᑦ ᐃᓚᒋᔭᐅᓂᖅ ᔫᒥ 2017-ᒥ ᖃᓐᖑᐅᒥᓗ ᓄᕐᓇᕕᖕᖏᓚᐅᕐᓂᖏᓐᓄᑦ) ᓅᓚᐅᖅᑐᑦ ᐅᐊᖕᓇᖕᒪᓐ ᐊᒻᒪᓗ ᑲᓇᖕᓇᖕᒪᓐ ᑕᐅᕝᕙᖕ ᑎᑉᔭᓕᐅᑉ ᖁᖓᔪᑦᑎᖅᓯᒪᔪᑦ ᐊᕐᓇᓪᓗᖏᓐᓄᑦ, ᐅᑎᕈᓐᓃᓚᐅᖅᑐᑦ ᓄᕐᓇᕕᑐᖃᕐᒥᓄᑦ (ᑕᑯᔭᒃᓴᖅ 7). ᑕᐃᒪ ᐃᓕᐅᕐᓯᕆᔭᐅᕙᑦ ᖃᓄᐃᖕᖏᓐᓴᐅᔪᔫᕐᓂᖏᓐᓄᑦ ᓴᖕᖏᓐᓴᐅᔫᕐᓂᖏᓐᓄᓪᓗ ᑐᒃᑐᐃᑦ ᑕᐃᒃᑯᐊ ᐅᐸᒃᑕᖏᑦ ᐊᒻᒪᓗ ᓴᖕᖏᓐᓴᓂᒃ ᓄᕐᓇᕈᒪᓂᕐᔫᔭᒃᓴᐅᔭᖅ (ᓚᓐᑯᓐᓂᒃ -Gunn et al. 2012). ᑕᒪᒃᑯᐊ ᑐᑭᓕᐅᖅᑕᐅᓗᑎᒃ ᐊᒥᕐᓲᖕᖏᓐᓂᒃ ᖁᖓᔪᑎᖅᑐᓂᒃ ᖃᐅᔨᔭᐅᓯᒪᔪᑦ ᐊᒥᕐᓲᖏᑦ ᑑᓚᓗᐊᖅᓯᑎᒃ, ᐃᓱᒪᒋᔭᐅᔪᑦ ᐊᒥᕐᓲᓂᖅᓴᐅᖃᑦᑕᕋᓯᕆᔭᐅᓂᖏᑦ ᖃᓐᖑᐅᒻᒥ ᑐᒃᑐᖏᑦ ᓅᓯᒪᔪᑦ ᑲᓇᖕᓇᖅᐸᓯᐊᓄᑦ, ᑕᐃᒪ ᐃᓂᖏᓄᓪᓗ ᐱᔾᔪᑕᐅᔪᓐᓇᓯᕆᔭᐅᓪᓗᑎᒃ ᐊᒥᕐᓲᖏᑦ ᑐᓚᓇᐅᓂᖏᓐᓂᒃ ᓇᓚᐅᑖᖅᑕᐅᓯᒪᓂᖏᓐᓂᒃ ᑐᒃᑐᖏᑦ ᐊᕐᕋᒍᒥ 2018-ᒥ.



ᑕᑯᓯᒃᓴᖅ 6. ᐅᑮᕕᐅᕙᓐᓂᖏᓐ (ᒫᑦᓯ 15, 2018) ᑕᐃᒃ ᑯᓗᖓ ᖁᕐ ᓗᖅᑰᑉ-ᑲ ᓇᓐᓇᖕᓂ ᖁᖓᔪᕈᑎᖃᖅᑐᑦ ᐊᕐᓇᓪᓗᐃᑦ ᑐᒃᑐᖏᓐᓄᑦ (18) ᐊᒻᒪᓗ ᐸᓐᓂᖏᓐᓄᑦ (18) ᐸᐅᕐᖕᙵᐅᓯᕐ ᒦᓚᐅᖅᑐᑦ/ᑭᒍᑕᖏᖕ ᓇᐅᓯᕐᒥᒃ ᑕᖅᓴᓕᓐᓂ ᐊᒻᒪᓗ ᕿᓐᖕᙵᐅᒻᒥ ᐊᕐᓇᓪᓗᐃᑦ ᑐᒃᑐᖏᖕ ᖁᓖᑦ (10) ᐸᓐᓂᓪᓗ ᖁᓖᑦ (10) ᐊᐅᐸᓗᒃ ᑐᓃᓚᐅᖅᑐᑦ ᐊᒻᒪᓗ ᑎᑉᓯᓕᓐᒥ ᑐᒃᑐq ᑦ ᐊᕐᓇᓪᓗᐃᑦ (23) ᐸᓐᓅᓪᓗ (12). ᕿᓐᖕᙵᐅᒻᒥ ᐊᒻᒪᓗ ᑎᑉᓯᓕᓐᒥ ᑐᒃᑐᐃᑦ ᐊᑯᓯᒪᕙᓚᐅᖅᑐᑦ ᐃᓚᓕᐅᑎᓯᒪᓪᓗᑎᒃ ᑲᑎᖕᖒᑦ ᑕᓚᐅᕐ ᒪᑕ ᐅᑭᐅᖑᓂᖕᓂ 2017-2018.



ᑕᑯᓯᒃᓴᖅ 7. ᐅᐱᕐ ᖕᙶ ᑯᑦ ᓇᐅᕐ ᑰᕐ ᕕᐅᕙᓚᐅᕐ ᓂᖏᓐ ᐅᐊᓐ ᓇᖅᐸᓯᖕ ᖕᒪᖕᙵᐅᓗᑎᒃ ᒫᑦᓯ 15-ᒥᒃ - ᔫᓐ 16, 2018-ᒧᑦ, 11-ᖏᓐᓚᐅᖅᑐᑦ ᖃᐅᔨᒪᔭᐅᔪᑦ ᕿᓐ ᖕᙵᐅᒻ ᒥ ᖁᖓᔪᕈᑎᖃᖅᑐᑦ ᐊᕐᓇᓪᓗᐃᑦ (ᐊᐅᐸᓗᒃᑐᑦ) ᐊᒻᒪᓗ 19-ᖑᓪᓗᑎᒃ ᖃᐅᔨᒪᔭᐅᔪᑦ ᑎᑉᓯᓕᐅᑉ ᑐᒃᑐᖏᓐᓂ ᐊᕐᓇᓪᓗᐃᑦ (ᑕᖅᓴᓕᑦ ᐃᕕᐅᓯᕐᒥᒃ). ᐸᐅᕐ ᖕᙵᐅᓯᕐ ᒥᒃ/ᑭᒍᑕᖏᖕ ᓇᐅᓯᕐ ᒥᒃ ᑕᖅᓴᓖᑦ ᒫᑦᓯ 15-ᒥ ᑕᑯᒃᓴᐅᔪᑦ ᓇᓃᓚᐅᕐ ᓂᖏᓐᓂᒃ ᐊᒻᒪᓗ ᐅᑮᕕᑎ ᓚᐅᖅᑕᖏᓐ; ᕿᕐ ᓂᖅᑐᑦ ᑕᖅᓴᖏᓐ ᑕᑯᒃᓴᐅᔪᑦ ᔫᓐ 16-ᒥ ᓇᓃᓚᐅᕐ ᓂᖏᓐᓂᒃ.

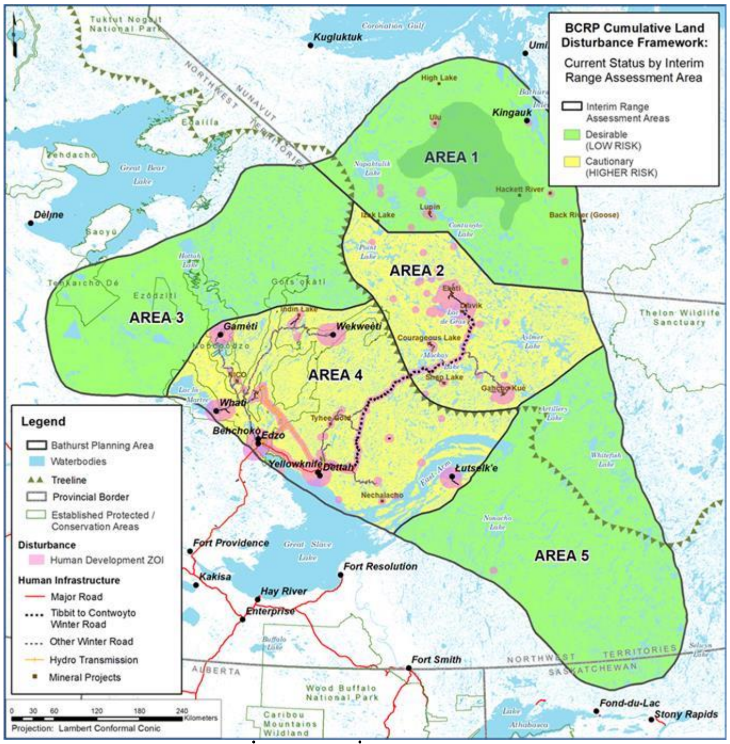
ᓴᓂᐊᓂ ᖁᖓᔪᕈᑦ ᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᐅᔨᒪᔾ ᔪᑕᐅᓂᖏᓐ ᓂ, ᓄᓇᐃᑦ ᓄᓇᖑᐊᓪᓗ ᐊᑐᖅᑕᐅᕙᖕ ᒥᔪᑦ ᕿᓐ ᖕᙵᐅᒻ ᒥ ᑐᒃ ᑐᓪᓚᓂᕐ ᒧᑦ ᑕᒫ ᓂ 2018-ᖑᑎᓪᓗᒍ ᖃᐅᔨᓴᕐ ᓂᕐ ᒧᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥᓲ ᓂᖏᓐ ᓂᒃ

ᖃᓄᐃᓕᖕᒃ ᕆᐊᖃᓚᐅᕐᓂᖓᓂᒃ 2018-ᒥ, ᒪᓕᒃ ᑕᐅᓪᓗᑎᒃ ᑕᐃᒃ ᑯᐊᖓ ᓇᐃᑦ ᑐᒃᑐᖅᕕᖕᓂ ᐆᒪ ᐃᓐᓇᓚᐅᕐᓂᖏᑦ, ᐊᑐᖏᓪᓚᐅᕐᑐᑦ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᔪᓂᒃ ᓇᓚᐅᑖᖅᑕᐅᓚᐅᕐᓂᖓᓂᒃ ᐊᕐᕌᒍᒥ 2018-ᒥ. ᑕᒪᒃ ᑯᐊ ᐊᑐᖅᑕᐅᓂᖏᑦ ᐃᓱᒪᓇᖅᑐᑦ ᑐᒃᑐᐃᑦ ᐊᒥᓲᓂᖏᓂᒃ ᓇᓚᐅᑖᖅᑕᐅᓂᖏᑦ ᐊᕐᕌᒍᒥ 2018-ᒥ, 30% ᐳᓴᓐᑎᓂᒃ ᐊᒥᓲᓂᖅᓴᐅᔭᕆᐊᓕᕕᓂᐅᓚᓗᐊᑦ ᖃᐅᔨᓴᕋᑕᐅᓂᖏᓗ ᐆᒃ ᑑᑎᑐᐃᓐᓇᐅᓚᓗᐊᖅᓯᑎᒃ ᐊᑐᖅᑕᐅᓂᖓᓂ, ᐃᑲᔪᕈᑕᐅᕆᐊᓪ ᓚᓚᐅᕆᕗᑦ ᓈᐸᓪᓕᐊᓂᖓᓂᒃ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᐃᑦ ᔫᓐᖑᓚᐅᖅᑐᒥ 2018-ᒥ. ᐅᑭᐅᒃᑯᑦ ᐊᕐᕌᒍᒥ 2018-2019-ᒥ, ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᖏᑦ ᐊᒻᒪ ᑎᑉᓯᓕᕐᒥ ᑐᒃᑐᖏᑦ ᓯᓕᒃ ᑲᓐᓂᖅ ᐊᑯᓯᒪ ᐃᓐᓇᓚᐅᕐᒥᔪᑦ ᐅᑭᐅᓕᒫᖅ, ᐊᒻᒪ ᐅᐱᕐᖑᑯᑦ, ᐱᖑᕚᓚᐅᖅᑐᑦ ᑕᐃᒃᑯᓇᖕᒋ 17-ᖑᔪᓚᐅᖅᑐᓂᒃ (18% ᐳᓴᓐᑎᖏᑦ) ᖃᐅᔨᒪᔭᐅᔪᑦ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᐃᑦ ᐊᕐᓇᓪᓗᐃᑦ ᖁᖕᒐᕈᑦ ᑎᖅᓯᒪᔪᑦ (ᓄᕐᕆᕕᖃᓚᐅᖅᑐᑦ ᖃᐅᔨᒪᔭᐅᔪᑦ ᕿᓐᖑᐅᒪᒥ ᔫᓐᓂ 2018-ᒥ) ᓅᓚᐅᖅᑐᑦ ᑲᓐᓇᖅᐸᓯᖕᒍᑦ ᐅᐱᕐᖑᑯᑦ ᐃᓚᓕᐅᑎᓗᑎᒃ ᑎᑉᓯᓕᐅᑉ ᐊᕐᓇᓗᖏᓄᑦ, ᐅᑎᓚᐅᕈᓃᖅᓯᑎᒃ. ᑕᒪᒃ ᑯᐊ ᐆᒃᑐᑕᐅᓂᖏᑦ ᐊᒥᑦ ᓲᖕᖃᓗᐊᖅᑎᓪᓗᒋᑦ, ᐃᓱᒪᓇᖅᐳᑦ ᓅᐸᓪᓕᐊᓯᒪᓂᖏᑦ ᕿᓐᖑᐅᒥᒃ ᑐᒃᑐᐃᑦ ᐅᐱᕐᖑᑰᑦ 2018-ᒥ ᓗ 2019-ᒥ ᓗ ᐊᒥᓲᓂᖅᓴᐅᔪᓐᓇᖅᑐᑦ ᑕᐃᒃᑯᓇᖕᒋ 1-2% ᐳᓴᓐᑎᖏᓐᓃᑦ ᑐᓂᒃ ᑎᑎᕋᕈᑕᐅᒐᔪᖓᓂᖏᓂᒃ ᑭᐳᒃ ᐸᓪᓕᐊᖃᑕᓕᕐᓂᖏᓂᒃ /ᓅᐸᓪᓕᐊᕚᓕᕐᓂᖏᓂᒃ ᐊᓯᖏᓄᑦ ᑐᒃᑐᓄᑦ, ᓴᓂᓕᕆᔭᖏᓄᑦ ᓄᕐᕆᕕᕆᔭᐅᕙᒃᑐᓄᑦ, ᓯᕗᓂᐊᒍᑦ ᑕᐃᒪᖕᒋ 2018-ᒥᒃ. ᑕᐃᒪ ᐃᓂᖕᒪᓄᑦ ᓯᕗᓂᒃ ᓴᒥ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᖏᑦ ᐅᓗᕆᐊᓇᖅᑐᑏᑉᐳᑦ ᐊᒥᕐᓲᖕᓂᖏᑦ ᓄᑐᐃᓇᐅᔪᓐᓃᖅᑐᖅ ᓈᓴ ᐅᑎᑎᒍᑦ, ᑭᓯ ᐊᓂᓕᑦ ᑕᐅᖅ ᓅᐸᓪᓕᐊᔪᓐᓇᕐᓂᖏᓄᑦ ᑲᓐᓇᖅᐸᓯᐅᓂᕐᒍᑦ.

2. ᐊᐅᓚᑦ ᑕᐅᓂᖏᓂᒃ ᐱᔾᔪᑎᖃᖅᑐᑦ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᓂᒃ

<u>ᑕᒪ ᐃᓐᓂᒃ ᑕᑯᓪᓗᒋᑦ ᐊᐅᓚᑕᐅᓂᖏᑦ</u>: ᑕᒪ ᐃᓐᓂᒃ ᐊᐅᓚᑎᔾᔪᑎᒃ ᓴᐃᑦ ᐸᕐᓇᐅᑏᑦ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᓂᒃ ᐱᕆᐊᖅᑎᑕᐅᓕᓚᐅᖅᑐᑦ ᑲᑐᔾᔨᖃᑎᒌᓕᖅᓯᑎᒃ ᑲᑎᒪᔨᕋᓛᑦ ᐊᒻᒪ ᐱᔭᓇᖅᑕᐅᓚᐅᖅᓯᑎᒃ ᑖᓂ 2004-ᒥ ᑕᐃᒃ ᑯᐊ (ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑏᑦ ᑲᑎᒪᔨᕋᓛᖑᓄᑦ 2004). ᑖᒃ ᑯᐊ ᐸᕐᓇᐅᑏᑦ ᓯᕗᓂᑐᖃᒧᑦ ᐱᕆᐊᖅᑎᑕᐅᓚᐅᖅᑐᑦ ᑐᒃᑐᐃᑦ ᓯᓕ ᐊᒥᓲᓂᖅᖃᑎᓪᓗᒋᑦ ᑖᓂ 100,000-ᓂ; ᑐᒃᑐᐃᑦ ᖃᓄᐃᓕᖕᒪᖏᑦ ᐊᓯᔾᔨᖅᓯᒪᓕᖅᐳᑦ ᑕᐃᒪᖕᒋ; ᓄᑖᓂᒡᓗ ᐸᕐᓇᐅᑎᖃᕆᐊᖃᓕᖅᓯᑎᒃ. ᑲᑐᔾᔨᖅᑎᕐᑦ ᑕᐃᔭᐅᔪᑦ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᓕᕆᓂᕐᒧᑦ ᐅᖃᐅᔾᔨᒋᐊᖅᑏᑦ ᑲᑎᒪᔨᕋᓛᖏᑦ ᑲᑎᒪᖃᑦᑕᖅᓯᒪᓕᖅᑐᑦ ᐊᒥᓱᐃᖅᓯᑎᒃ ᑕᐃᒪᖕᒋ 2017-ᒥ ᓗ 2020-ᒥ ᓗ. ᐃᓚᒋᔭᐅᓗᑎᒡ ᓗ 18-ᖑᔪᓄᑦ ᑲᑐᔾᔨᖅᑎᖅᓄᑦ ᓄᓇᑦᓯᐊᕐᒥ, ᓄᓇᕗᒻᒥ ᐊᒻᒪ ᓵᕝᑳᑦᓯᐊᓐ ᐅᐊᖕᓇᖕᒥᓂᒃ, ᐃᓚᒋᔭᐅᔪᒪᔪᓂ ᐅᕝᕙᓗᓐ ᓅᑦ ᑲᒪᔨ ᐅᖃᖅᑕᐅᔪᓂ ᑎᑭᑕᐅᓯᒪᕚᓂᖏᓄᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᑐᒃᑐᖏᓂᒃ. ᑎᑎᕋᖅᑕᐅᓵᖅᓯᒪᓕᖅᑐᑦ ᐸᕐᓇᐅᑎᒃ ᓴᐃᑦ ᓂᕆᐅᒋᔭᐅᕗᑦ ᐊᕐᕌᒍᒥ ᑕᒪᑐᒪᓂ 2020-ᒥ ᐱᔭᓇᖅᑕᐅᓯᒪᓂᐊᕐᓂᖅ. ᑕᐃᒃ ᑯᑎᑐᓇ ᓯᕗᓂᐊᒍᑦ ᐸᕐᓇᐅᑎᑎᑐᑦ, ᑐᒃᑐᖅᕕᐅᓗᖅᑐᓄᑦ ᑐᕋᖑᔪ ᓂᐊᕆᕗᑦ ᐸᓇᐅᑎᖏᑦ, ᑕᒪᒃ ᑭᕆᐊᖅᓯᑎᒃ ᐸᕐᓇᐅᑏᑦ ᖃᓄᐃᓕᐅᕈᑕᐅᓂᐊᕐᓂᐊᕐᒥᖕᒪᑕ ᖃᐅᔨᓴᖅᑕᐅᕙᓪᓕᐊᖏ ᓇᕆᐊᖅᑲᕐᓂᖏᓄᑦ, ᑐᒃᑐᓯ ᐅᕐᕕᐅᔪᓐᓇᕐᓂᖏᓄᑦ, ᐆᒪᔪᑦ ᑐᒃᑐᓯ ᐅᖅᐸᖕᓂᖏᓂᒃ ᑕᒪᒃ ᑯᓂᖕᒐ ᐸᑉᕕᓴᒃ ᑕᐅᖃᑦᑕᕐᑯᓐᓇᕐᓂᖏᓄᑦ, ᓇᔪᒐᕆᕙᒃᑖᖏᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᔭᕆᐊᖃᕐᓂᖏᓄᑦ ᐊᒻᒪ ᓗ ᐃᓕᓐᓂᐊᕈᑕᐅᔭᕆᐊᖃᕐᓂᖏᓄᑦ

<u>ᓄᓇᐃᑦ ᓇᔪᒐᕆᕙᒃᑖᖏᓄᑦ ᐸᕐᓇᐅᑏᑦ ᐊᒻᒪ ᓄᓇᐃᑦ ᐊᑐᖅᑕᐅᕙᖕᓂᖏᑦ</u>: ᐱᒪᕆᐅᓂᖏᓄᑦ ᑐᒃᑐᓄᑦ ᓇᔪᖅᑕᐅᕙᖕᓂᖏᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᔭᕆᐊᖃᖏᑦ ᐊᒻᒪ ᐊᐅᓚᑕᐅᔭᕆᐊᖃᖏᑦ, ᐃᓱᒪᒋᓪᓗᒋᓪᓗ ᓖᓐᓇᐅᔪᖅ ᐊᒻᒪ ᐱᕆᐊᖅᑎᑕᐅᔪᒪᓂᐊᖅᑐᑦ ᐱᕚᓪᓕᕈᑎᒃ ᓴᐃᑦ ᕿᓐᖑᐅᒪᒥ ᑐᒃᑐᐃᑦ ᐊᕐᕌᒍᑖᖅ ᓇᔪᒐᕆᕙᒃᑖᖏᑦ, ᐱᓕᕆᐊᒃ ᓴᐃᑦ ᑕᒪ ᐃᓐᓄᑦ ᑲᑐᔾᔨᖅᑎᒌᑉᓗᑎᒃ ᓇᔪᒐᕆᕙᒃᑖᖏᓄᑦ ᐸᕐᓇᐅᑏᑦ ᕿᓐᖑᐅᒪᒥ ᑐᓕᕆᓂᕐᒧᑦ ᑲᔪᓯᑦᐊᖅᑎᑕᐅᓚᐅᖅᑐᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᓄᑦ ᑖᓂ 2013-ᒥ ᐊᒻᒪ ᐸᕐᓇᐅᑏᑦ ᐱᔭᓇᖅᑕᐅᓚᐅᖅᓯᑎᒃ 2019-ᒥ. ᑕᒪᕐᒥᒃ ᑲᑎᒡᓯᒥᑦ ᐃᓚᒋᔭᐅᓕᖅᑐᑦ 21-ᖑᔪᓄᑦ ᑲᑐᔾᔨᖅᑏᖑᔪᓄᑦ, ᓄᓇᑦᓯᐊᕐᒥ, ᓄᓇᕗᒻᒥᒃ ᐊᒻᒪ ᓵᕝᑳᑦᓯᐊᓐ ᐅᐊᖕᓇᖕᒥᓂᒃ (ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖏᑦ ᑕᐃᒪᖕᒥᓂᒃ 2019-ᒥᒃ). ᓄᓇᐃᑦ ᓇᔪᖅᑕᐅᕙᖕᓂᖏᓄᑦ ᐸᕐᓇᐅᑎᓕᕆᓂᕐᒧᑦ ᑎᒥᖁᑎᖏᑦ ᐅᖃᐅᔾᔨᕆᐊᖅᑎᐅᕗᑦ ᐃᓚᖁᖅᓯᑎᓪᓗ ᐱᒪᕆᐅᔪᓂᒃ ᐊᓯᖏᓂᒃ ᓯᕐᓗ ᑕᒪᒃ ᑯᓂᖓ ᓄᓇᓂᒃ ᓴᐳᓐᓂᐊᖅᑕᐅᖁᔨᓂᕐᒥᒃ, ᓄᕐᕆᕕᐅᔪᓂᒃ ᐊᒻᒪ ᓗ ᓄᕐᕆᐊᓂᒃ ᓯᒪᓕᖅᑎᓪᓗᒋᑦ ᓇᔪᖅᐸᒃᑖᖏᓂᒃ, ᐃᒪᒃᑯᓪᓗ ᐃᑳᕆᐊᖅᑐᕐᕕᒋᕙᒃᑖᖏᓂᒃ ᐊᒻᒪ ᓗ ᐱᒪᕆᐅᔪᓂᒃ ᐃᑯᐊᓪᓚᒃᓯᒪᓐᖏᑦᑐᓂᒃ ᐅᑮᕕᐅᕙᖕᓂᖏᓄᑦ ᑐᒃᑐᓄᑦ; ᓇᐅᒃ ᑰᕐᕕᕆᕙᒃᑖᖏᓂᒃ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴᐅᔭᓐᓇᖅᑐᓂᒃ ᓲᕐᓗ ᓅᐸᓪᓕᐊᕙᖕᓂᖏᓂ ᐊᖅᑯᑎᕆᕙᒃᑖᖏᓂᒃ ᖃᓄᐃᓕᐅᕈᑎᖃᕐᓇᕐᓂᖅ, ᐊᖅᑯᓯᐅᖅᑕᐅᔪᓐᓇᖅᑐᓂᒃ ᐸᕐᓇᐅᑎᓕᕆᓂᖅ, ᐱᐅᓯᕆᐊᖅᑕᐅᔭᕆᐊᖃᖏᓄᑦ ᐋᕿᕆᐊᖅᑕᐅᓗᑎᒃ ᐱᐅᓯᑐᖃᖏᓄᑦ ᓄᓇᐃᑦ ᐅᑎᖅᑎᑕᐅᕆᐊᕐᓂᖏᑦ; ᐊᒻᒪ ᓗ ᐃᑲᔪᖅᓯᖅᑕᐅᓂᖏᑦ ᓄᓇᓕᖕᓂ ᓇᐅᑦᑎᖅᑐᐃᔨ ᐅᖃᖅᑕᐅᓂᖏᓄᑦ ᐊᑐᖅᑕᐅᕙᖕᓂᖏᑦ (ᑕᑯᔭᒃᓴᖅ 8).



ᑕᑯᔭᒃᓴᖅ 8. ᑭᓪᓕᐅᑦ ᑐᒃ ᑐᐃᑦ ᐊᕐ ᕋᒍᑕᒦᖅ ᓄᓇᒥᐟᕕᒋᕙᒃ ᑕᖏᓐ ᑕᐃᒪᖕᒋ ᖃᐅᔨᓴᖅᑕᐅᒐᒥᒃ 1996-ᒥ ᐱᔅᔪᑎᖃᖅᑐᓂᒃ ᒫᓐᓇᐅᔪᖅ ᐊᖅᑯᑎᖃᕐ ᕕᐅᔪᓂᒃ, ᐅᔭᕋᖕᓂᐊᕐ ᕕᖕᓂᓪᓗ, ᖃᐅᔨᒪᔭᐅᓂᖏᓐ ᓂᓗ ᐱᔪᒪᔭᐅᕙᒃ ᑐᓂᒃ ᐅᔭᕋᖕᒥᐅᑕᖃᕐ ᓂᖏᓐ ᓂᒃ. ᐊᕐ ᕋᒍᑕᒦᖅ ᓇᓃᖃᑦᕐ ᓂᖏᖅ ᑐᒃ ᑐᓄᑦ ᐊᕕᒃ ᑐᖅᑕᐅᓚᐅᖅᓯᒪᔪᑦ ᑖ ᑕᓕᒪᓄᑦ ᓄᓇᓄᑦ, ᑕᒪᐃᓐᓂ ᐸᓪ ᕕᓴᒃ ᑕᐅᖃᑦᕐ ᓂᖏᖅ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᓱᑎᒃ ᑖᓂ 2019-ᒥ ᐊᑐᓂ ᓄᓇᐃᑦ ᑕᐃᔭᐅᓪ ᓗᑎᒃ ᖃᓄᐃᖏᑦ ᑎᐊᕐ ᓂᖅ (ᐃᕕᐅᔭᕐ ᓂᒃ ᑕᖅᓴᓖ ᑖᓪ ᕙᓂ), ᐅᔾ ᔨᖅᑐᖅᑕᐅᑦ ᑎᐊᓇᐊᖃᖅᑐᓂᒃ (ᖁᖅᓯᖅᑐᓂᒃ ᑕᖅᓴᓖᑦ ᑖᓪ ᕙᓂ) ᐊᒻᒪᓗ ᐊᐅᐸᓗᒃ ᑐᓂᒃ (ᐅᓗᕆᐊᓇᖅᑐᒥᓐ ᓂᕐ ᒍᑦ). ᓄᓇᐃᑦ ᐊᕕᒃ ᑐᖅᓯᒪᓂᖏᖅ 2-ᒥ ᐊᒻᒪᓗ 4-ᒥ ᐊᒃ ᑐᖅᑕᐅᓯᒪᓂᖅᐹᖑᔪᑦ ᐸᓪ ᕕᓴᒃ ᑕᐅᓯᒪᓂᖏᓐ ᓄᑦ, ᓇᓗᓇᐃᒃ ᑯᑎᖅᑕᐅᓚᐅᖅᑐᑦ ᐅᔾ ᔨᖅᑐᖅᑕᐅᑦ ᑎᐊᓇᐊᖃᕐ ᓂᕐ ᒥᒃ. ᖃᐅᔨᒪᑎᑦ ᑎᔅ ᔫᑦ ᐱᔭᐅᓯᒪᔪᑦ ᑕᒪᒃ ᑯᐊ ᓄᓇᑦ ᓯᐊᑉ ᑲᕙᒪᒃ ᑯᖏᓐ ᓂᒃ. (2019-ᒥ).

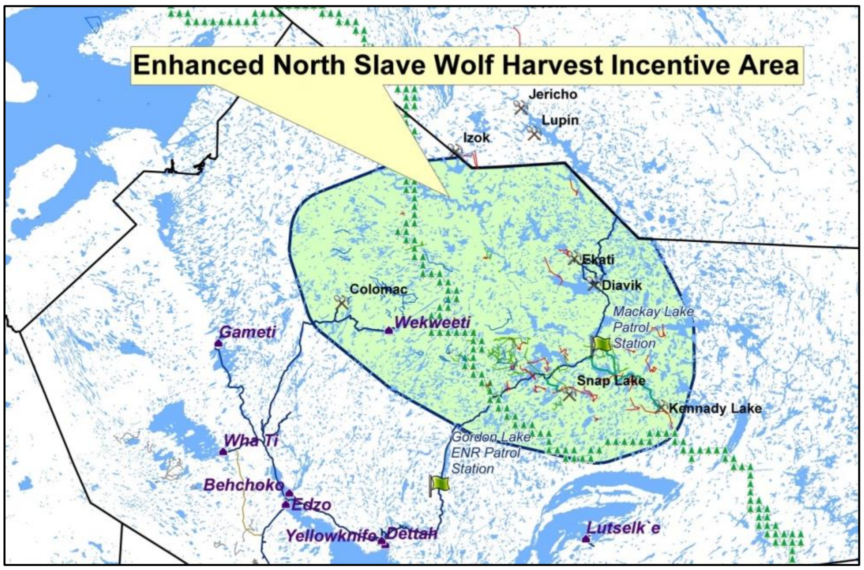
ᑲᕙᒪᒃ ᑯᑦ ᐊᕙᑎᓕᕆᔨᒃ ᑯᖏᓐ ᓄᓇᒥ ᐅᑕᓕᕆᔨᒃ ᑯᓪᓗ ᒫᓐᓇᓴᖅ ᑕᒪ ᐃᓐᓂᒃ ᐊᕙᑎᓕᕆᓂᕐ ᒥᒃ ᖃᐅᔨᓴᓚᐅᖅᑐᑦ ᕿᓐᖒᓪ ᒥ ᑐᒃ ᑐᖃᕐ ᕕᐅᕙᒃ ᑐᓂᒃ ᓄᓇᑦ ᓯᐊᕐ ᒥ (ᓲᕐ ᓗ ᑳᑦ ᓲᒃ -ᑯᐃ-ᒥ-Gahcho Kue, ᐊᒻᒪᓗ ᔭᐃᒥ ᐱᓕᕆᐊᖑᓂᖕᒋ ᓂ-Jay Project-ᓂᒃ) ᐅᔅ ᔨᖅᑐᑦ ᑎᐊᕈᒪᓂᕐ ᔫᑦ ᐊᒃ ᑐᖅᑕᐅᓯᒪᔪᓐ ᓇᕐ ᓂᖏᖅ ᕿᓐᖒᓪ ᒥ ᑐᒃ ᑐᐃᑦ ᐃᓱᒪᒃ ᓴᖅᓯ ᐅᕈᑕᐅᔭ ᓇᐊᖃᕐ ᓂᖏᓐ ᓄᑦ ᐊᒻᒪᓗ ᐊᒃ ᑐᖅᑕᐅᓗᐊᓈᒃ ᑯᑎᒃ ᓴᖃᓇᐊᖃᕐ ᓂᖏᓐ ᓄᑦ ᐊᔨᕐ ᓇᖏᖅ ᑕᕐᔫᖕᒋ. ᐊᕙᑎᓕᕆᔨᒃ ᑯᑦ ᑕᐅᖅ ᐃᓚᐅᑎᑦ ᑎᓚᐅᕐ ᒥᔪᑦ ᐊᕙᑎᓕᕆᓂᕐ ᒥᒃ ᖃᐅᔨᓴᖃᑦ ᑕᕐ ᓂᕐ ᒥᒃ ᓄᓇᕗᒻ ᒥᐅᓄᑦ ᐱᓕᕆᕕᐅᔪᓐ ᓇᕐ ᓂᖏᖅ ᓂᒃ, ᐊᒃ ᑐᖅᓯᓯᒪᔪᓐ ᓇᖅᑐᓂ ᑭᓪ ᓕᖃᕐ ᕕᐅᑎᑕᐅᒋᓪ ᓗᑎᒃ ᕿᓐᖒᓪ ᒥ ᓄᓇᐃᑦ ᓇᔪᑲᓇᕙᒃ ᑕᖏᓐ ᓂ ᓄᕐ ᓇᕕᐅᕙᒃ ᑐᓂ ᐊᒻᒪᓗ ᐊᐅᔭᒃ ᑯᑦ ᓄᓇᒦᑦ ᕕᒋᕙᒃ ᑕᖏᓐ ᓂ (ᓲᕐ ᓗ ᑕᐃᒃ ᑯᓄᖕᑲ ᓴᐱᓇᒃ ᑯᑦ-Sabina ᐅᔭᕋᖕᓂᐊᖅᑎᖏᓐ ᓂᒃ). ᐊᒥᓯᑲᓴᐃᑦ ᓄᓇᓕᑐᖃᐃᑦ ᑲᕙᒪᖕᒋ ᐊᓯᖏᓐ ᓗ ᓄᓇᑦ ᓯᐊᕐ ᒥ ᑲᑐᔅ ᔨᖃᑎᒌᖕᔪᑦ ᑕᐅᖅ ᐃᓚᐅᖃᑦ ᑕᐅᕙᓚᐅᖅᑐᑦ ᐊᕙᑎᓕᕆᓂᕐ ᒥᒃ ᖃᐅᔨᓴᕐ ᓂᖏᓐ ᓂᒃ ᓄᓇᑦ ᓯᐊᕐ ᒥ, ᓄᓇᕘᒻ ᒥᓗ. ᑲᕙᒪ ᐃᑦ ᐊᕙᑎᓕᕆᔨᒃ ᑯᑦ ᓄᓇᒥ ᐅᑕᓕᕆᔩᑦ ᓗ ᐃᓚᐅᖃᑦ ᑕᖅᓯᒪᔪᑦ ᐊᒥᓯᑲᔅ ᓴᖕᓂᒃ ᑲᑎᒪᔪᓂᒃ ᐃᓕᓐ ᓂᐊᖅᑎᑕᐅᔪᓂᒃ ᓄᓇᕗᒻ ᒥ ᐱᔅᔪᑎᖃᖅᑐᓂᒃ ᓴᐳᓐ ᓂᐊᖅᑕᐅᓯᒪᔭᓇᐊᖃᕐ ᓂᖏᓐ ᓂᒃ ᑐᒃ ᑐᖃᕐ ᕕᐅᕙᒃ ᑐᑦ ᓄᓇᖕᒋ.

<u>ᐆᒪᔪᐃᑦ ᑐᒃ ᑐᓯ ᐅᖅᐸᒃ ᑐᑦ ᐊᐅᓚᑕᐅᓂᖕᒋ</u>: ᐱᔅᔪᑕᐅᓪ ᓗᑎᒃ ᐊᒥᓲᔪᓐ ᓅᖅᐸᓪ ᓕᐊᕐ ᔪᐊᕐ ᓂᖕᒋ ᑐᒃ ᑐᖕᒋ ᖁᕐ ᓗᖅᑑᑉ-ᑲᓇᖕᓇᖕᓕᓂ ᐊᒻᒪᓗ ᕿᓪ ᓕᐅᓪ ᒥ, ᓄᓇᑦ ᓯᐊᑉ ᑲᕙᒪᒃ ᑯᖕᒋ ᓯᕗᓕᐅᖅᑎᐅᖃᑦᖅᓯᒪᓕᖅᑐᑦ ᐃᑲᔪᖅᓱᐃᔾ ᐅᓗᑎᓪ ᓗᓐ ᓅᑦ ᐊᒥᓯᑲᓴᖕᓂᒃ ᖃᓄᐃᓕᐅᕈᑕᐅᕆᐊᖅᑐᓂᒃ ᐊᒪᕈᖅᓯ ᐅᖅᑕᐅᖃᑦ ᑕᖁᓪ ᓗᕆᑦ ᐊᒥᓲᓂᖅᓴᐅᓕᕈᑕᐅᔭᓐ ᓇᕐ ᓂᐊᕐ ᒪᑕ ᑐᒃ ᑐᐃᑦ ᐱᕈᐊᓂᒎᓐ ᓇᕐ ᓗᑎᒃ ᐊᒻᒪᓗ ᓄᕐ ᕋᐃᑦ ᐆᒪᑯᑖᒎᓐ ᓇᕐ ᓂᐊᕐ ᒪᑕ. ᑕᒪᒃ ᑯᐊ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴᓂᒃ ᒪᑯᓂᖕᒐᐊᑐᑲᒃ ᓴᖅᖅᐳᑦ.

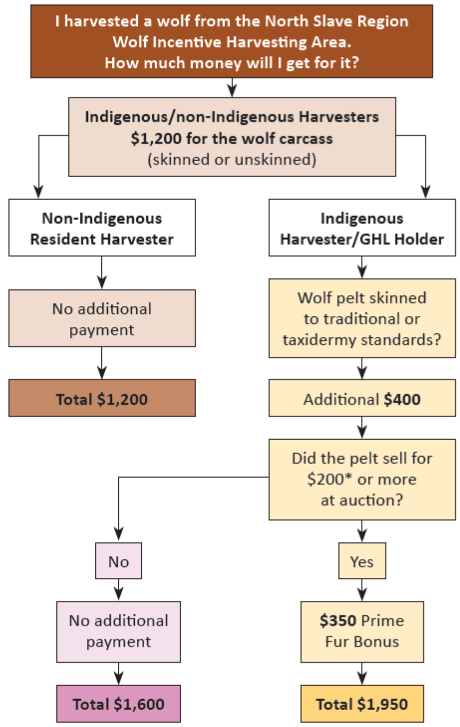
ᑕᒪ ᐃᓐ ᓄᑦ ᑲᑐᔅ ᔨᖅᑎᕐ ᒍᑕᐅᔪᓂᒃ ᐊᑐᖅᑕᐅᔪᓐ ᓇᕐ ᓂᖏᓐ ᓂᒃ ᐊᔪᕐ ᓇᕋᔭᖕᒋ ᒪᖕᒌᓚ ᑐᑭᓯᓂᐊᕈᑕᐅᓚᐅᖅᑐᑦ ᐊᒪᕈᖅᓯ ᐅᕈᑕᐅᔪᓐ ᓇᖅᑐᑦ, ᑲᒪᒋᔭ ᐅᓚᐅᖅᑐᑦ 2016-2017-ᒥ, ᐃᓱᒪᒃ ᓴᖅᓯ ᐅᕈᑕᐅᓂᖕᒋ ᓄᑦ ᐊᑐᓕᖅᑎᑕᐅᔪᓐ ᓇᕐ ᓂᖕᒋ, ᐊᒻᒪᓗ ᐊᑭᖃᓚᖕᓕᓂᖕᒋ, ᐊᑑᑎᖃᕈᓐ ᓇᕐ ᓂᖕᒋ ᓗ ᐊᒥᔅ ᓲᔪᓐ ᓅᕈᑕᐅᔪᓐ ᓇᕐ ᓂᕐ ᒨᑦ ᐊᒪᕈᕐ ᓄᑦ. ᐅᐊᒌᓯᒥ ᓄᓇᒥ ᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔩᖕᒋ, ᑕᐃᒃ ᑯᐊᓗ ᒃ ᓖᑦ ᓲᑉ ᑲᕙᒪ ᐃᑦ, ᐊᒻᒪᓗ ᑲᕙᒪᒃ ᑯᑦ

ᐊᕙᑎᓕᕆᔨᒃ ᑯᖏᓐ ᓯᕗᓕᐅᖅᑎᐅᓚᐅᖅᑐᑦ ᖃᐅᔨᓴᖅᑕᐅᓂᖏᓂᒃ ᐊᔪᕐ ᓇᕋᔭᖏ ᒪᖔᑕ ᐊᑐᓕᖅᑎᑕᐅᔪᓐᓇᕐᓂᖅ. ᐱᓗᐊᖅᑐᒥᒃ ᐃᓱᒪᒋᔭᐅᓚᐅᖅᑐᑦ ᕿᓐᖑᐃᒻ ᒥ ᑐᒃ ᑐᐃᑦ, ᑭᓯᐊᓂ ᐊᑐᖅᑕᐅᔪᓐᓇᕆᓗᑎᒃ ᐊᓯᖏᓐ ᓄᑦ ᑐᒃ ᑐᓕᕆᓂᕐ ᒧᑦ.

2019-ᖑᑎᓪ ᓗᒍ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒃ ᑯᖏᓐ ᐱᔪᒥᓇᕈᑎᒃ ᓴᓂᒃ ᓯᒪᓚᐅᖅᑐᑦ ᐊᒪᕈᖅᓯᐅᕈᑎᒃ ᓴᐅᔪᓐᓇᖅᑐᓂᒃ ᓄᓇᒥ ᑐᒃ ᑐᓄᑦ ᐅᑮᕝ ᕕᐅᕙᓂᖏᓐᓂ ᐱᓗᐊᖅᑐᒥᒃ ᖁᕐ ᓗᖅᑑᑉ-ᑲᓇᖕ ᓇᖕᓂ ᐊᒻ ᒪᓗ ᕿᓐᖑᐅᒻ ᒥ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐ ᒥᐅᑕᓂ ᑐᒃ ᑐᖃᕐ ᕕᐅᓂᖏᓐᓂᒃ, ᐱᖓᔪ ᐃᓕᖃᖕᖓᔪ ᓂᒃ ᐊᑐᒐᒃ ᓴᓂᒃ ᑕᐅᓗᑎᒃ (ᑕᑯᔭᒃ ᓴᖅ 9a). ᑕᒪᒃ ᑯᐊ ᐃᓚᖃᓚᐅᖅᐳᑦ ᐊᑐᖅᑕᐅᖑᕈᓐᓇᕐᓂᖏᓐᓂᒃ ᐊᖑᓇᓱᒃ ᑎᑦ ᑮᓇᐅᔭᓕᐅᕈᓐᓇᕐᓂᖏᓐᓂᒃ $900-ᓂᒃ, ᐊᒥᔭᖅᓯᒪᖏᓐ ᑐᓂᒃ, ᐃᓗᐃᑲᐅᔪᓂᒃ ᐊᒪᕈᕐ ᓂᒃ, ᐊᒻ ᒪᓗ ᐱᔫᒥᓇᕈᑎᒃ ᓴᖃᖅᑐᓂᒃ ᑮᓇᐅᔭᖅᑕᒃ ᑲᓐ ᓂᕈᓐ ᓇᕐ ᓂᖅ $400-ᓂᒃ ᐊᒪᕈᕐ ᓄᑦ ᐊᒥᔭᖅᑕᐅᓯᒪᔪᓂᒃ ᐃᓄᐃᑦ/ᐊᓪ ᓚᐃᑦ ᐱᐅᓯᑐᖃᖏᓐᓂᒃ ᐊᑐᕐ ᓗᑎᒃ ᐊᒥᓕᓇᔭᐅᓗᑎᒃ ᐊᒻ ᒪᓗ ᓯᓕᒃ ᑲᓐ ᓂᖅ ᐊᑭᓕᖅᑕᐅᔪᓐᓇᕐ ᓂᖅ $350-ᓂᒃ ᐱᐅᔪᓂᒃ ᐊᒥᔭᖅᑕᐅᓯᒪᑦ ᑎᐊᖅᑐᓂᒃ ᒪᓕᒡ ᓗᑎᒃ ᐊᒥᔭ ᐃᔨ ᐅᕙᒃ ᑐᑦ ᖃᓗᓈᑦ ᓄᓇᖏᓐ ᓂ ᒪᓕᒐᕙᒃ ᑕᖏᓐ ᓂᒃ ᒪᓕᒡ ᓗᑎᒃ. ᖃᓂᒋᔭᖏᓐ ᓂ 60-ᓂᒃ ᐊᒪᕈᖅᑐᖃᓚᐅᖅᑐᑦ ᐅᑭᐅᒃ ᑯᑦ 2019-ᒥ ᐱᐅᓯᒋᐊᖅᑕᐅᓯᒪᔪᑦ ᓯᓚᐃᕙᐅᑉ ᐅᐊᖕ ᓇᖕᓂ ᓄᓇᖁᑎᖏᓐ ᓂ ᐊᒪᕈᖅᓯᐅᕈᑎᒃ ᓴᖏᓐ ᓂ ᑕᒪᒃ ᑯᐊ ᐱᔫᒥᓴᐅᑏᑦ ᑲᔪᓯᓂᐊᖅᑐᑦ ᐅᑭᐅᒃ ᑯᑦ 2019-2020-ᒥ, ᐊᑭᑦ ᑐᓇᐊᖅᑕᐅᓂᐊᖅᓯᑎᒃ ᐱᔫᒥᓴᐅᑎᒃ ᓴᐃᑦ (ᑕᑯᔭᒃ ᓴᖅ 9b).



ᑕᑯᔭᒃ ᓴᖅ 9a. ᐱᐅᓯᒋᐊᖅᑕᐅᓯᒪᔪᑦ ᓯᓚᐃᕙᐅᑉ ᐅᐊᖕ ᓇᖕᓂ ᓄᓇᖁᑎᖏᓐ ᓂ ᐊᒪᕈᖅᓯᐅᕈᑎᒃ ᓴᐃᑦ, ᕿᑎᐊᓃᑦ ᑐᑦ ᖁᖕᖁᕈᑦ ᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᑐᒃ ᑐᓂᒃ ᖃᐅᔨᒪᔭᐅᓂᖏᓐ ᕿᓐᖑᐅᒻ ᒥ ᐊᒻ ᒪᓗ ᖁᕐ ᓗᖅᑑᑉ-ᑲᓇᖕ ᓇᖕᓂ ᑐᒃ ᑐᓂᒃ ᐅᑮᕝ ᖏᓐ ᓂ 2018-2019-ᒥ, ᐱᐅᓯᒋᐊᖅᑕᐅᓯᒪᔪᓂᒃ ᐱᔫᒥᓴᐅᑎᓂᒃ ᐊᑐᒐᒃ ᓴᖅ ᑲᖅ ᑎᑕᐅᓕᖅ ᑐᑦ ᐊᒪᕈᖅᓯᐅᖃᑦᕐ ᓂᕐ ᒧᑦ.



* If the pelt sells for more than $400 at auction, you will get the difference above the $400 advance.

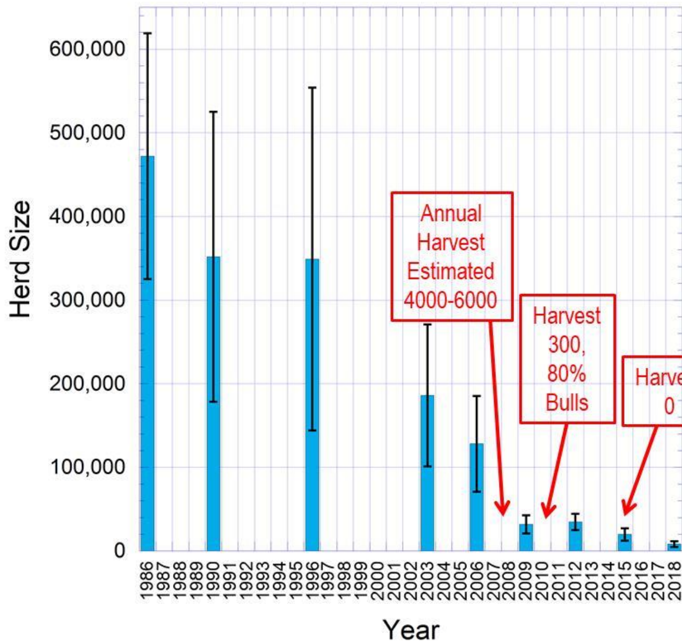
ᑕᑯᔭᒃᓴᖅ 9b. ᐱᔩᒥᓴᐅᑏᑦ ᐊᒪᕈᐃᑦ ᐊᒥᖕᒋᓂᒃ ᐱᔭᒪᓂᕐᒥᒃ ᐃᑲᔩᑎᒃᓴᐃᑦ ᐊᑐᐃᓐ ᓇᐅᓕᖅᑐᑦ ᐊᒪᕈᖅᓯᐅᖅᐸᒃ ᑐᓄᑦ ᐊᑐᕈᓐᓇᕐᒪᑕ ᐱᐅᓯᕆᐊᖅᑕᐅᓯᒪᔪᓂᒃ ᓯᓚᐃᕙᐅᑉ ᐅᐊᙵᓂ ᓄᓇᕐᑯᑎᖕᒋᓂ ᐊᒪᕈᖅᓯᐅᕈᑎᒃᓴᓂᒃ ᓄᓇᑦᓯᐊᕐᒥ, ᐅᑭᐅᒃᑯᑦ 2019/2020-ᒥ.

ᑲᑉᐱᒪᒃᑯᑦ ᐊᑉᐱᑎᓕᕆᔨᖏᑕᐅᖅ ᐱᓕᕆᖃᑎᖃᖅᓯᒪᔪᑦ ᖁᕐ ᔪᖅᑑᑉ ᐊᖑᓇᓯᒃ ᑏᑦ ᑲᑐᔾᔨᖃᑎᒌᖕᒋᓂᒃ ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᑲᑉᐱᒪᒃᑯᖕᒋᓂᒃ ᐆᒪᔪᓕᕆᔨᓂᒃ ᖁᕐ ᔪᖅᑑᕐᒥ ᐃᑲᔪᖅᓯᖅᑕᐅᓂᖕᒋᓄᑦ ᖁᕐ ᔪᖅᑑᕐᒥ ᐊᒪᕈᖅᓯᐅᕈᑏᑦ ᐊᒪᕈᖅᓯᐅᕈᓐᓇᕐᓂᖕᒋᓂᒃ ᓄᓇᕗᑦ/ᓄᓇᑦᓯᐊᑉ ᑭᒡ ᓕᖅᑲᕐ ᕙᖕᒋᓂ ᓄᓇᒥ, ᐃᓗᐊᓃᑦ ᑐᓂ ᓄᓇᙱᑕ ᑭᒡ ᓕᖅᑲᕐ ᕙᖕᒋ ᐃᓚᖃᕐ ᒪᑕ ᐃᓚᖕᒋᓂᒃ ᓄᓇᑦᓯᐊᑉ ᓄᓇᕐᑯᑎᖕᒋᓂ.

ᐊᒻᒪᑕᐅᖅ ᓱᓕ, ᒃᓈᑦᓵᑉ ᑲᑉᐱᒪᑯᖕᒥ ᐃᑲᔪᖅᓯᖅᑕᐅᓚᐅᖅᑐᑎᒃ ᓄᓇᑦᓯᐊᑉ ᑲᑉᐱᒪᒃᑯᖕᒋᓄᑦ ᐱᕆᐊᖅᑎᑦ ᑎᓚᐅᖅᑐᑦ ᓯᕗᓪ ᓕᕆᔭᐅᔪᓂᒃ ᓄᓇᓕᖕᓄᑦ-ᐊᐅᓚᑕᐅᔪᓂᒃ ᐊᒪᕈᖅᓯᐅᖅᑎᑦ ᑎᓂᕐᒥᒃ ᐊᑐᖅᑕᐅᔪᓂᒃ ᓄᓇᓕᖕᖏᓂ ᒃᓈᑦᓵᒥᐅᑦ, ᐃᓚᖅᑲᕐ ᓂᐊᖅᑐᓂᒃ ᐊᔪᕈᓐᓃᖅᓴᐃᕝᖓᓂᕐᒥᒃ ᐊᒻᒪᓗ ᐃᑲᔪᖅᓯᐃᕝᖓᓂᕐᒥᒃ ᐊᒪᕈᖅᓯᐅᕈᓐᓇᕐᓂᕐᒥᒃ ᐅᑮᕙᐅᕝᖓᓂᖕᒋᓂᒃ ᖄᖑᐆᒻᒥ ᑐᒃᑐᓄᑦ, ᒪᓪᓗᒃ ᓗᑎᒃ ᐊᓪᓚᐃᑦ ᐃᓕᖅᑯᓯᑐᖃᖕᒋᓂᒃ ᓈᒻᒪᕆᔭᐅᔪᓂᒃ. ᐅᑭᐅᒃᑯᑦ ᓄᓇᒦᖕᕙᒃᓴᖕᒥ ᐊᒪᕈᖅᓯᐅᖅᑎᓄᑦ ᐋᕿᐅᒪᔭᐅᓂᐊᖅᑐᑦ 2020-ᒥ ᐃᑲᔫᑕᐅᓗᑎᒃ ᐊᑐᖅᑕᐅᔪᓐᓇᕐᓂᖕᒥ ᑕᒪᒃᑯᐊ.

3. ᐊᐅᓚᑕᐅᓂᖕᒥ ᖃᓐᖑᐆᒻᒥ ᓇᐹᖅᑐᖃᖕᒥ ᑐᕐᒥᐅᑦ ᑐᒃᑐᓯᐅᕐ ᕕᐅᔪᓐᓇᕐᓂᖕᒥ ᓄᓇᑦᓯᐊᕐᒥ, 2009-2019

ᑐᒃᑐᓯᐅᕐ ᕕᐅᔪᓐᓇᕐᓂᖕᒥ ᖃᓐᖑᐆᒻᒥ ᓇᐹᖅᑐᖃᖕᒥ ᑐᕐᒥᐅᑕᓂᒃ ᑐᒃᑐᖕᒋᓂ ᑕᒫᓂ ᓄᓇᑦᓯᐊᕐᒥ ᐊᒥᓱᓂᖅᓴᐅᓕᓚᐅᖅᑐᑦ ᐊᕐᕌᒍᒥ 2009-ᒥ ᐊᒻᒪᓗ ᐃᓚᖃᓚᐅᖅᓯᑎᒃ ᑐᒃᑐᑕᐅᓯᒪᕙᖕᓂᖕᒋᓂᒃ ᓄᓇᓕᑐᖃᐃᑦ ᐃᓄᕐᑯᑎᖕᒋᓄᑦ, ᓄᓇᓕᖕᓄᑦ ᐊᖑᓇᓯᒃᑎᓄᑦ ᐊᒻᒪᓗ ᐊᑭᓖᕝᑐᓂᒃ ᑐᒃᑐᓯᐅᕈᔾᔨᕝᑐᓂᒃ. ᑐᒃᑐᓯᐅᖅᑕᓚᐅᕐᓂᖕᒥ ᐊᕐᕌᒍᒥ 2007-2008 ᐊᒻᒪᓗ 2008-2009-ᒥ ᑎᑎᕋᖅᑕᐅᓯᒪᓪᓗ ᒪᓇᓚᐅᖕᖢᑕ ᑭᓯᐊᓂ ᓇᓚᐅᑦ ᑖᖅᑕᐅᓯᒪᓚᐅᖅᑐᑦ ᐅᖃᓕᐊᖅᑐᕈᑕᐅᕝᖓᓂᖕᒋᓂ, ᓄᓇᓕᖕᓂᓗ ᓇᐅᑦ ᑎᖅᑐᐃᔨᐅᕝᑐᓂᒃ, ᐊᒻᒪᓗ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᖕᒋᓂᒃ ᐆᒪᔪᓕᕆᔩᑦ ᐅᖃᐅᑎᑕᐅᕙᓚᐅᕐᓂᖕᒋᓂᒃ ᑐᒃᑐᓯᒪᕚᐅᓚᐅᕐᓂᖕᒋᓂ ᑕᒫᓂ 4,000-6,000-ᖕᒋ ᓂᑐᓂᒃ /ᐊᕐᕌᒍᑕᒫᖅ (ᐋᑕᐅᓯᒃ ᔩᔅ ᑭᒃ ᑯᓐᓂᒃ-Adamczewski et al. 2009). ᑭᖑᓂᐊᒍᑦ ᔩᓐ 2009-ᒥ ᓄᕐ ᓇᕙᐅᕝᑐᑦ ᐊᔾ ᔨᓕᐅᖅᑕᐅᓂᖕᒋᓂᒃ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ ᓲᒃ ᑲᓕᔪᓪ ᒪᓇᐊᓗᖕᒥᒃ ᐊᒥᔅ ᓲᔭᓐ ᓂᖅᓯᒪᓚᐅᖅᑐᑦ ᐅᖕᓚᑖᓚᐅᖅᑐᓂᒃ 100,000-ᓂᒃ ᑕᒪ ᐅᖕᒐ ᐊᒥᔅ ᓲᓂᓕᖕ ᓂᒃ 32,000-ᓂᒃ ᐱᖕᖠᓂᒃ ᐊᕐᕌᒍᓂᒃ ᓈᔭᓂᒃ, ᐱᓕᕆᐊᖑᕝᓕ ᓕᐊᓕᓚᐅᖅᑐᑦ ᐊᒥᔅ ᓲᔭᓐ ᓅᕆᐊᖅᑎᑕᐅᓗᑎᒃ ᓄᓇᑦᓯᐊᕐᒥ ᑐᒃᑐᑕᐅᓯᒪᔭᓐᓇᕐᓂᖕᒥ (ᑕᑯᔭᒃᓴᖅ 10).



ᑕᑯᓯᒃᓴᖅ 10. ᑐᒃᑐᐃᑦ ᐊᒥᓲᓂᖏᑦ ᖁᓇᖕᐅᒻᒥ ᐊᕐᕋᒍᒥ 1986-2019 ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᕐᒥ ᑐᒃᑐᑕᐅᔪᓐᓇᕐᓂᖏᑦ ᐊᐅᓚᑕᐅᒋᐊᕐᓂᖏᑦ.

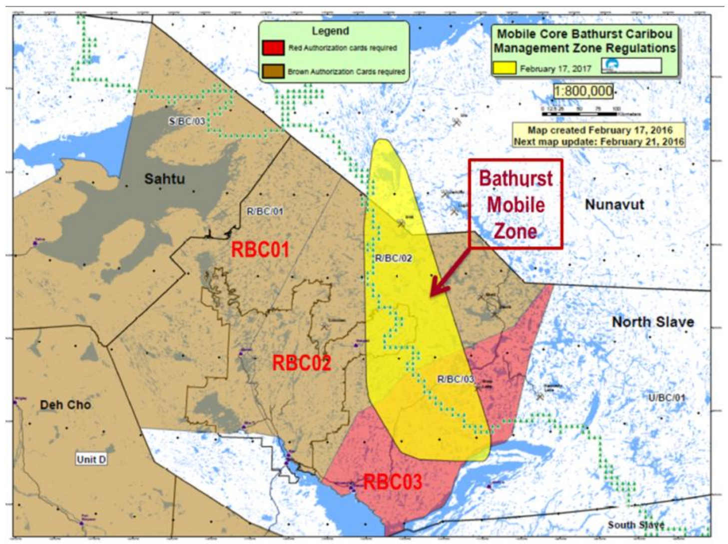
ᑎᓯ ᐱᖓᒥ 2009-ᒥ, ᒥᓂᔅ ᑕᖕᑰ ᒐᕙᒪᒃᑯᑦ ᐊᕙᑎᓕᕆᔨᖏᓐᓂ ᓄᓇᒥ ᐅᑕᓕᖓᔨᖏᓐᓂᓗ ᓄᖃᖅᑎᑦᑎᓚᐅᖅᑐᖅ ᒪᑐᔭᐅᓪᓗᑎᒃ ᑕᒪᕐᒥᒃ ᖁᓇᖕᐅᒻᒥ ᑐᒃᑐᓯᐅᕐᐅᔪᓐᓇᕐᓂᖏᑦ ᓄᓇᑦᓯᐊᕐᒥ (ᐃᓄᖕᓄᑦ/ᐊᓪᓚᓄᑦ ᓂᖅᑭᒃᓴᖓᔭᐅᓂᐊᖅᑐᓂᒃ, ᕿᓇᐅᔭᓕᐅᕈᑎᒃᓴᐅᓂᐊᖅᑐᓂᒃ ᐊᒻᒪᓗ ᓄᓇᓕᑐᖃᐃᑦ ᑐᒃᑐᓐᓇᓇᖅᑕᖏᓐᓂᒃ, ᐱᒋᐊᖅᑎᑕᐅᓚᐅᖅᓯᒪᔪᓂᒃ ᔭᓄᐊᕆ 2010-ᖑᓚᐅᖅᑐᖅ, ᒪᕐᑭᕐᖓᓂᒃ ᐊᖏᔪᐊᓘᖓᓂᒃ ᐊᐅᓚᑦᑎᕝᕙᐅᓂᖏᓐᓂᒃ (ᓄᓇᖏᓐᓂ ᓇᓗᓇᐃᒃᑯᑕᓕᖓᓂ R/BC/02 ᐊᒻᒪᓗ R/BC/03); ᑕᒪᒃᑯᐊ ᖃᓄᐃᓕᐅᕈᑕᐅᓂᖏᑦ ᐊᑐᖅᑕᐅᖏᓐᓇᓕᓚᐅᖅᑐᑦ ᑎᑭᓪᓗᒍ ᑭᓯᐊᓂ ᖁᒥᕐᕈᐊᖅᑕᐅᕝᕕᒃᓴᖏᓄᑦ ᓈᒻᒪᒃᓯᖕᒥᒐᒥᒃ ᐊᒻᒪᓗ ᐊᑐᓕᖁᔭᐅᓕᐅᓚᐅᕐᓗᑎᒃ ᐅᐊᑮᓯᒥᐅᑦ ᓄᓇᒥ ᐅᑕᓕᖓᓂᕐᒧᑦ ᑲᑎᒪᔩᖏᓐᓄᑦ ᑕᒫᓂ 2010-ᒥ.

ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᒋᐊᖅᑎᑕᐅᔪᒪᔪᑦ ᑕᒪ ᐃᓐᓂᖕᒎᖅᑐᑦ ᒃᓅᑦᓲᑉ ᒐᕙᒪᖕᑯᖏᓐᓂᒃ ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᓐᓂᒃ ᐊᕙᑎᓕᕆᔨᓂᒃ ᓄᓇᒥ ᐅᑕᓕᖓᔨᖏᓐᓂᓪᓗ ᑐᒃᑐᓂᒃ ᐊᐅᓚᑦᑎᔅᔪᑎᒃᓴᐃᑦ ᑐᓂᔭᐅᓚᐅᖅᓯᒪᔪᑦ ᐅᐊᑮᓯᒃᑯᑦ ᓄᓇᒥ ᐅᑕᓕᖓᔨᑦ ᑲᑎᒪᔩᖏᓐᓄᑦ ᑕᒫᓂ ᒪᐃ 2010-ᒥ. ᐱᓗᐊᖅᑐᒥᒃ ᐊᑐᓕᖁᔭᓕᐅᓚᐅᖅᐳᑦ ᑐᒃᓯᕐᐅᑎᖏᓐᓂᒃ ᐱᔅᔪᑎᖃᖅᑐᓂᒃ ᓴᖅᑭᑦᑎᖁᔨᓂᖅ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᓂᒃ ᐊᕐᕋᒍᑕᒫᖅ ᓄᓇᓕᑐᖃᕐᓄᑦ ᑐᒃᑐᓯᒪᕝᕙᐅᔪᓐᓇᕐᓂᖏᓐᓂᒃ 300 ± ᐃᓚᖃᖃᓂᕈᓐᓇᖅᑐᑦ/ᐊᒥᖕᑰ ᓂᖃᕈᓐᓇᖅᑐᑦ 10% ᐳᓴᓐᑎᖕᖏᑦᑐᓂᒃ ᖁᓇᖕᐅᒻᒥ ᑐᒃᑐᓂᒃ 80% ᐳᓴᓐᑎᖕᖏᓪᓗᑎᒃ ᐸᖕᓃᑦ ᐱᔭᐅᔪᓐᓇᕐᓂᖏᑦ, ᐅᖃᐅᓯᖃᑦᑕᐃᓐᓇᕐᑯᔭᐅᓪᓗᑎᒃ ᐃᓄᖕᓄᑦ ᓂᖅᑭᒃᓴᖓᔭᐅᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᕿᓇᐅᔭᓕᐅᕈᑕᐅᓂᐊᖅᑐᑦ. ᐅᐊᑮᓯᒥ ᓄᓇᒥ ᐅᑕᓕᖓᔩᑦ ᑲᑎᒪᔩᖏᑦ ᐃᓄᓕᒫᓂᒃ ᑐᓴᕐᕙᖃᓇᐊᖅᑐᓚᐅᖅᑐᑦ ᑕᒫᓂ ᐋᒍᓯ 2010-ᒥ, ᓴᖅᑭᑦᑎᓪᓗᑎᓪᓗ ᐅᓂᒃᑳᓕᐊᖏᓐᓂᒃ ᐊᒃᑐᐱᖓ 2010-ᒥ, ᐃᑲᔪᖅᓯ ᐃᓚᐅᖅᑐᓂᒃ ᐊᑐᓕᖁᔭᓕᐊᖓᔭᐅᓚᐅᖅᑐᓂᒃ ᑐᒃᑐᓯᐅᕐᕙᐅᓂᖏᓐᓂᒃ ᐃᓯᖃᖅᑎᑕᐅᔪᒪᔪᓂᒃ, ᐊᓯᒃᑲᓐᓂᖏᓐᓂᓪᓗ ᐊᑐᓕᖁᔭᓕᐅᓚᐅᖓᓪᓗᑎᒃ (ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔩᑦ 2010).

ᐊᒃᑑᐱᖓ 2010-ᒥ, ᒐᕙᒪᒃᑯᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᖏᑦ ᓄᓇᒥ ᐅᑕᓕᖓᔩᓪᓗ ᐊᑎᓕᐅᓚᐅᖅᑐᑦ ᐊᖏᕈᑎᓂᒃ ᐃᓚᒋᓪᓗᓂᒋᑦ ᔭᓗᓇᐃᕝ ᒥ ᐊᓪᓚᐃᑦ ᓄᓇᓕᑐᖃᐃᑦ (YKDFN-ᑯᑦ) ᐃᓚᖃᖅᓯᑎᒃ ᑐᒃᑐᒍᓐᓇᐅᑎᓂᒃ ᐊᑐᒐᒃᓴᖏᓐᓂᒃ ᑐᒃᑐᑦᑐᓐᓇᕐᓂᖏᓐᓄᑦ 150-ᓂᒃ ᖁᓇᖕᐅᒻᒥ ᑐᒃᑐᓂᒃ, ᑕᐃᒫᑦᓴᐃᓐᓇᖅ ᑐᒃᑐᑕᐅᔪᓐᓇᖅᑐᓂᒃ ᐸᖕᓂᕐᓂᒃ ᑕᒫᓂ 80% ᐳᓴᓐᑎᖕᖏᑦᑐᓂᒃ.

ᐅᐱᕐᖑᑰ ᑯᑦ 2013-ᒥ, ᐅᐊᑮᓯᒃᑯᑦ ᓄᓇᒥ ᐅᑕᓕᖓᔩᑦ ᑲᑎᒪᔩᖏᑦ ᐊᑐᓕᖁᔭᓕᐅᓚᐅᖅᑐᑦ ᖃᓚᒥ ᐅᓂᐊᖅᑐᒥᒃ ᑐᒃᑐᓯᐅᕐᕙᐅᔪᓐᓇᕐᓂᖏᓐᓂᒃ ᖁᒻᖕᐅᒻᒥᒃ ᑐᒃᑐᓂᒃ ᐃᓯᖃᖅᑎᑕᐅᔪᓂᒃ 300-ᓂᒃ ᑕᒫᓂᑦ ᑕᖓᐊᖅᑲᖅᓯᑎᒃ 80% ᐳᓴᓐᑎᖏᓐᓂ ᐸᖕᓂᑦ ᑐᒃᑐᑕᐅᔪᓐᓇᕐᓂᖏᑦ ᐊᒻᒪᓗ ᐅᖕᒐᕙᓇᐊᖅᑕᐅᓗᑎᒃ ᑕᐃᒃᑯᐊ 2010-ᖑᑎᓪᓗᒍ ᐊᑐᓕᖁᔭᓕᐊᖓᔭᐅᓚᐅᖅᑐᑦ ᖁᓇᖕᐅᒻᒥ ᑐᒃᑐᓕᖓᔪᑦ, ᐊᑐᖅᑕᐅᕐᑯᓪᓗᒋᑦ ᐊᕐᕋᒍᒥ 2013-2014-ᒥ ᑐᒃᑐᓯᐅᕐᕙᐅᓂᖕᒐᓄᑦ.

ᔭᓄᐊᕆ 2015-ᒥ, ᒐᕙᒪᒃᑯᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᖏᓐ ᓄᓇᒥ ᐅᑕᓕᕆᔩᓪᓗ ᑐᓂᓯᓚᐅᖅᑐᑦ ᐱᒋᐊᖅᑎᑕᐅᖁᔭᒥᓂᒃ ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᐊᐅᓚᑦᑎᔅᔪᑕᐅᑲᐃᓐᓇᕐᓂᐊᖅᑐᓂᒃ ᕿᓐᖑᐅᒻᒥ ᓇᐹᖅᑐᖃᖕᓂᑐᕐᒥᐅᑕᓂᒃ ᑐᒃᑐᓕᕆᓂᕐᒧᑦ. ᐱᒋᐊᖅᑎᑕᐅᖁᔭᖕᓂ ᐊᑐᓕᖁᔨᓚᐅᖅᑐᑦ ᑐᒃᑐᐃᑦ ᓇᔪᒐᕆᕙᒃᑕᖏᓐᓂᒃ ᖃᖓᑐᐃᓇᖅ ᓴᐳᓐᓂᐊᕈᑎᒃ ᓴᖕᓂ ᕿᑎᐊᓃᓐᓂᐊᖅᓯᑎᒃ ᓄᓇᖏᓐᓂ ᖁᖓᔾᕈᑦᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᕿᖑᐅᒻᒥ ᓇᐹᖅᑐᖃᖕᓂᑐᕐᒥᐅᑦ ᑐᒃᑐᐃᑦ ᐅᑭᐅᒋᕚᒃᑕᖏᓐᓂ ᐊᕐᕋᒍᒥ 2014-2015 (ᑕᑯᔭᒃᓴᖅ 11), ᑐᒃᑐᓯᐅᕐᕓᐅᑦ ᑕᐃᓕᒪᓗᑎᒃ ᑕᒪᒃᑯᓇᓂ ᓇᔪᒐᕆᕙᒃᑕᖏᓐᓂ ᓄᓇᓂ. ᔭᓄᐊᕆ 2015-ᒥ, ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔨᖏᓐ ᐊᖏᕈᑎᖃᓚᐅᖅᑐᑦ ᐱᒋᐊᖅᑎᑕᐅᔪᒪᓂᖏᓐᓂᒃ ᐊᑐᖅᑕᐅᑲᐃᓐᓇᓚᖕᒋᓂᒃ, ᐊᕐᕋᒍᖏᓐᓂ ᓯᓕᐊᑐᕐᓂᖏᓐᓂ 2014-2015 ᑐᒃᑐᓯᐅᕐᕓᕐᓂᕐᒥ. ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔨᖏᓐ ᐃᓄᒃᓂᒃ ᑐᓴᕐᕓᖃᓐᓂᐊᖅᑐᓚᐅᖅᑐᑦ ᐃᓯᒪᕆᔭᖏᓐᓂᒃ ᖃᐅᔨᔪᒪᓂᖅ ᑕᒫᓂ 2016-ᒥ ᐊᐅᓚᑦᑕᐅᓂᖏᓐᓂᒃ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᐃᑦ, ᑐᑭᓕᐅᓚᐅᖅᓯᑎᒃ ᐱᑕᖃᖁᔨᔪᓐᓅᕐᓂᖅ 0-ᒦ ᖁᔨᓕᖅᓯᑎᒃ ᐱᐦᕓᐅᔪᓐᓇᕐᓂᖏᓐ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᓂᒃ ᑐᒃᑐᓯᐅᕈᓐᓇᕐᓂᖏᓐ ᑲᔪᓯᖁᔭᐅᓪᓗᑎᒃ (ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔨᖏᓐ 2016).



ᑕᑯᔭᒃᓴᖅ 11. ᐆᒃᑑᑎᒋᓪᓗᒍ ᓄᓇᖏᓐ ᓇᔪᖅᑕᐅᕚᒃᑐᑦ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᓄᑦ ᐊᖑᓇᓱᒃ ᕓᐅᑦ ᑕᐃᓕᒪᓂᖏᓐᓄᑦ ᑕᒡᕙ ᑭᒡᓕᖅᑲᕐᕓᐅᔪᑦ (ᖁᖅᓯᖅᑐᓂᒃ) ᕖᕝᕗᐊᕆ 2016-ᒥ. ᑕᒪᒃᑯᐊ ᑐᒃᑐᓄᑦ ᓇᔪᖅᑕᐅᕙᖕᓂᖏᓐᓂ ᕿᓐᖑᐸ ᑐᒃᑐᖏᓐᓄᑦ ᐅᖓᕙᓐᓂᐊᖅᑕᐅᓯᒪᓕᒋᐳᑦ ᓄᓇᖏᓐᓄᑦ ᓄᓇᐳᒻᒧᑦ ᐲᔪᑕᐅᓂᕐᒧᑦ ᐃᓚᖏᑦ ᖁᖓᔾᕈᑎᖅᑕᐅᓯᒪᓚᐅᕐᒥᒃ ᓄᓇᐳᒻᒦᓂᖏᓐᓂ, ᑭᓯᐊᓂ ᑕᒪᓐᓇ ᑭᒡᓕᖅᑲᕐᕓᐅᓂᖓ ᐊᐅᓚᑦᑕᐅᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕐᕓᐅᔪᓐᓇᓂᕆᐳᖅ ᓯᓚᑖᓂᖓᓂᑦ ᓄᓇᑦᓯᐊᑉ ᑭᒡᓕᖅᑲᖓᑦ. ᓄᓇᖏᓐ ᓇᓗᓇᐃᒃᑯᑕᖅᑐᑦ R/BC/02-ᒥ ᐊᒻᒪᓗ R/BC/03-ᒥ ᒪᕐᕿᖓᒪᑎᒃ ᐊᖏᓂᖅᐸᖓᔪᒃ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᓂᒃ ᑐᒃᑐᓯᐅᕐᕓᐅᔪᓐᓇᖅᑐᑦ ᑭᓯᐊᓂ ᐊᒥᒃᓵᓂᓕᖕᓂᒃ 300-ᓂᒃ, ᑕᐃᒪᖓᓂ ᐊᕐᕋᒍᑖᖅᑐᓂ 2010-2014-ᒥ ᐊᑐᓕᓚᐅᖅᑐᓂᒃ.

ᔭᓄᐊᕆ 2019-ᒥ, ᒃᓕᑦ ᓃᑮᒥᐅᑦ ᒐᕙᒪᐃᑦ ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᖏᓐ ᓄᓇᒥ ᐅᑕᓕᕆᔩᓪᓗ ᑐᓂᓯᔭᐃᓐ ᓇᐅᓚᐅᖅᑑᒃ ᑕᒪᐃᓐ ᓂᖖᖅᑐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᒋᐊᖅᑎᑕᐅᖁᔭᖏᓐᓂᒃ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᓕᕆᓂᕐᒥᒃ, ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔩᖏᓐᓄᑦ ᑕᐃᑯᐊᓗ ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔩᖏᓐ 2019-ᒥ ᑐᑭᓕᐅᓚᐅᖅᑐᑦ ᑐᒃᑐᓯᐅᕐᕓᔭᐃᓕᑦᑎᑦᑎᓪᓗᑎᒃ ᑕᒫᓂᖁᔨᓪᓗᑎᒃ 0-ᒥᒃ ᐱᑕᖃᖏᑦᑐᓂᒃ ᑐᒃᑐᑕᐅᔭᓐᓇᕐᓂᖏᓐᓂ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᖏᑦ ᓄᓇᑦᓯᐊᕐᒥ ᑲᔪᓯᖁᔭᐅᓪᓗᑎᒃ (ᐅᐊᑮᓯᒃᑯᑦ ᑲᑎᒪᔩᖏᓐ 2019).

4. ᐱᒋᐊᖅᑎᑕᐅᔪᒪᔪᑦ ᑐᒃᑐᓯᐅᕐᕓᔭᓐᓇᕐᓂᖏᓐᓂᒃ ᐊᐅᓚᑕᐅᓂᖏᑦ ᕿᓐᖑᐅᒻᒥ ᑐᒃᑐᐃᑦ ᓄᓇᕗᒻᒥ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᖏᑦ ᐱᒋᐊᖅᑎᑦᑎᖁᔨᕗᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᑐᒃᑐᓯᐅᕐᕓᖃᑦᑕᖁᔨᔪᓐᓅᕐᓂᖅ 0-ᒦ ᖁᔨᓪᓗᑎᒃ ᐱᑕᖃᖏᑦᑐᓂᒃ ᑐᒃᑐᑕᐅᔭᓐᓇᕐᓂᖏᓐᓂᒃ ᕿᓐᖑᐅᒻᒥ ᓇᐹᖅᑐᖃᖕᓂᑐᕐᒥᐅᑕᐃᑦ ᑐᒃᑐᖏᓐᓂᒃ. ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ ᐃᑲᔪᖅᓯᐃᕗᑦ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ ᐱᒋᐊᖅᑎᑕᐅᖁᔭᖏᓐᓂᒃ ᒪᑯᓂᖓᐱᑦ ᔪᑎᑲᖅᓯᑎᒃ:

1. ᑐᒃᑐᖏᑦ ᐊᒥᖅᓱᔪᓐᓂᖅᓯᒪᑎᒋᖕᒪᑕ ᑖᑐᒪᐅᑉ ᐅᖓᑖᓂ 98% ᐳᓴᓐᑎᓂᒃ ᑕᐃᒪᖓᓂᒃ 1986-ᒥᒃ; ᑕᒪᓐᓇ ᑕᐃᒪᐃᓕᖓᓗᓂ ᐱᒻᒪᕆᐅᓂᖅᐸᖕᔪᒥᒃ ᐊᒥᓱᔪᓐᓂᕐ ᕓᐅᖕᒪᑦ ᑕᒪᐃᓐᓂᒃ ᓇᐹᖅᑐᖃᖕᓂᑐᕐᒥᐅᑕᐅᔪᓂ ᑐᒃᑐᓂᒃ ᓄᓇᑦᓯᐊᕐᒥᓗ ᓄᓇᕗᒻᒥᓗ. ᐱᓗᐊᑕᐃᑦ ᐊᒥᖅᓱᓂᖏᓐᓂᒃ ᓇᓗᓇᐃᒃᑯᑕᖏᑦ ᓱᕐᓗ ᐅᑭᐅᖑᓗᐊᓕᖅᑐᒥ ᓄᕐᕋᓕᓕᐊᕙᓂᖏᑦ; ᐊᕐᓇᐃᓪᓗ ᐊᒥᖅᓯᓂᖏᑦ ᐃᖕᒥᒍᑦ, ᓇᓚᐅᑖᖅᑕᐅᓂᖏᓗ ᐊᕐᓇᓕᓗᐃᑦ ᑐᒃᑐᖏᑦ ᐆᒪᐃᓐᓇᕈᓐᓇᕐᓂᖏᑦ, ᐊᒻᒪᓗ ᐃᑉᐱᐊᖅᑲᓕᕈᓐᓇᕐᓂᖏᑦ ᐊᒥᖅᑯᕙᓂᖏᑦ ᐃᓯᒪᓇᕐᒪᑕ ᓯᓕ ᐊᒥᖅᓱᓐᓂᕆᐊᒃ ᑳᓂᓕᖕᓂᖏᓐᓂᒃ. ᑐᒃᑐᐃᑦ ᐊᒥᖅᓯᓂᖏᑦ

ᓇᓚᐅᑖᖅᑕᐅᓚᐅᖅᑐᑦ 2018-ᒥ ᐊᒥᕐᓲᙱᖅᓴᐅᖕᒥᓯᑦ ᐊᕝ ᕙᓪ ᓕᐊᖕᓂ ᓂᒃ ᓇᓚᐅᑖᖅᑕᐅᓚᐅᖅᓯᒪᓯᓂᒃ ᐊᕐᕋᒍᒥ 2015-ᖑᓚᐅᖅᑐᒥ.

2. ᕿᓐᖑᐅᒻᒥ ᖁᖕᖑᕈᑦᑎᖅᑕᐅᓯᒪᓂᖏᑦ ᑐᒃᑐᐃᑦ ᓅᖃᑦᑕᓚᐅᕐᓂᖏᑦ ᐅᐱᕐᖒᑦ 2018-ᒥᓗ 2019-ᒥᓗ ᓇᓗᓇᕈᓐ ᓈᖅᑐᑦ ᑐᒃᑐᐃᑦ ᓯᕗᓂᒃ ᓴᒥ ᐅᓗᕆᐊᓇᖅᑐᒦ ᓚᖕᒪᓂᖕᓂᒃ, ᑕᒪ ᓂᒎᖕᒥ ᒥᔪᖅ ᐊᒥᕐᓱᓂᖕᓂᒃ ᓈᓴᐅᑎᑎᒍᑦ, ᑭᓯ ᐊᓂᓕᑦ ᑕᐅᖅ ᐱᔾ ᔪᑎᖃᕐᒥᖕᒪᑕ ᓅᖃᑦᑕᓕᕐ ᓂᖕᓂᒃ ᕿᓐᖑᐅᒻᒥ ᑐᒃ ᑐᖕᖏᐃᑦ ᓄᓇᖕᓄᑦ ᓴᓂᓕᕆᔭᖕᓄᑦ ᐊᔪᖕᓄᑦ ᑐᒃ ᑐᖃᕐ ᕼᐅᔪᓄᑦ, ᐊᒥᓲᓂᖅᓵᓗᕐᓄᑦ ᑎᑉᔭᓕᕐᒥᒃ ᑐᒃ ᑐᕐᑯᑎᖕᓄᑦ.

3. ᒪᓕᒃ ᑕᐅᕙᓕᐊᓕᕐ ᑐᑦ ᓄᖅᑲᖅᑎᑕᐅᓯᒪᓂᖏᑦ ᑕᒪ ᐃᓐ ᓂᒃ ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᔪᓐᓇᕐ ᓂᖕᓂ ᓂ ᐊᔪᖕᓂ ᓂᒃ ᑐᒃ ᑐᓂᒃ ᐊᒥᕐᓲᖕᑯᐊᓕᖅᓯᒪᔪᓂ:

- ᑕᒪᕐ ᒥᒃ ᐊᕙᖅᒥ-Cape Bathurst-ᒥ ᑐᒃ ᑐᖕᖏᑦ ᑐᒃ ᑑᔮᖅᑑᐸ-ᐅᐊᓕᓂᕐ ᒥᐅᓪ ᓗ-Dᐃᐅᓪ ᑕᖕᒪᓂ ᐊᕕᒃ ᑐᖅᓯᒪᓂᕐ ᒥ ᓄᓇᖕᓂ ᓂ ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᔪᓐ ᓇᐃᓪ ᓕᓯᒪᕗᑦ ᑕᐃᒪ ᖑᓚ ᐊᕐ ᕌᒍᒥᒃ 2007-ᒥ ᐱᔾ ᔪᑕᐅᓂᕐ ᒍᑦ ᐊᒥᕐᓲᖕᑯᐊᓕᕐ ᓂᖏᑦ ᑐᒃ ᑐᐃᑦ ᑖᒪ ᓂ ᐊᕐ ᕋᒍᒥ 2006-ᒥ, ᑖᒪ ᓅᓐ ᓂᖕᓂ ᓄᑦ ~3,000-ᖕᓂ ᓂ ᑐᒃ ᑐᖕᖏᑦ, ᐊᒥᕐᓲᔪᓐ ᓅᕐ ᔪᐊᖅᑐᐊᔫᓚᐅᖅᓯᑎᒃ ᐅᑯ ᓇᖕᖑᑦ ~13,000-ᓂᒃ 2000-ᓄᑦ. (ᐆᒪ ᔪ ᓕᕆᔩᑦ ᐊᐅᓚᑦ ᑎᔩ ᖕᓂ ᓄᑦ ᐅᖅᑲᐅᔾ ᔨ ᕿ ᐊᖅᑏᑦ ᑲ ᑎᒪ ᔨᕐ ᔪ ᐊᖕᖏᑦ (ᓄᓇᑦ ᓯ ᐊᕐ ᒥ) ᐊᑐᓕᕐᑯᔩ ᓚᐅᖅᑐᑦ, ᐊᑐᓕᖅᑎᑕᐅᓚᐅᖅᑐᓂᒃ ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪ ᒃ ᑯ ᖕᓂ ᓄᑦ). ᑖᒃ ᑯᓇᓂ, ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᔪᓐ ᓇᕐ ᓂᖏᑦ ᓄᖅᑲᖅᑎᑕᐅᓚᐅᖅᑐᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥᕐᓲ ᓂᖏᑦ ᑎᑭᒻ ᒪᑕ 10% ᐳᓴ ᓐ ᑎᖕᓂ ᓄᑦ ᐊᒥᕐᓲ ᓂᓕᕐ ᓄᑦ ᓈᓴ ᖅᑕᐅᓯᒪᔪᓂ.
- ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᔪᓐ ᓇᕐ ᓂᖕᓂ ᓂᒃ ᐊᐅᓚᑦ ᑎᓂᕐ ᒧᑦ ᐸᕐ ᓇᐅᑏᑦ ᑕᐃᒃ ᑯ ᓂᖕᒐ ᐳᐊᑭ ᐸᐃᓐ ᒥᒃ Porcupine-ᒥᒃ ᑕᐃᔭ ᐅᔪᑦ ᐊᓚᕐ ᑲ ᒥ ᐅᓪ ᓗ ᔫ ᑲᓐ ᒥ ᐅᓪ ᓗ ᑐᒃ ᑐᖕᖏᑦ ᐱᔭ ᕉᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᕐ ᕋᒍᒥ 2010-ᒥ (PCMB 2010-ᒥ) ᐃᓚᔭ ᐅᓯ ᒪᓕᖅᑐᑦ "ᐊᐅᐸᒃ ᑑᓂᕐ ᒦ ᓕᖕ ᓂᒃ ᑭᑉ ᓕᖅᑲᕐ ᕼᐅᔪ ᓂᒃ" ᑐᒃ ᑐᖕᓂ ᓂ ᐊᒥᕐᓲ ᓂᖅᑲᕐ ᓂᖕᓂ ᓄᑦ 45,000-ᓂᒃ ᐊᑦ ᑕᓅᓕᕈ ᑎᒃ ᑕᐃᒫᒃ ᐊᒥᕐᓲ ᑎᕆ ᓂᖕᓂ ᓂ, ᑕᒪᕐ ᓂᒃ ᓄᖅᑲᖅᑎᑕᐅᓂᐊᖅᑐᑦ ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᔪᓐ ᓇᕐ ᓂᖏᑦ ᑖᒃ ᑯ ᓇᖕᖑᑦ. ᖃᐅᔨ ᓴ ᖅᑕᐅᓚᐅᖅᑐᓂ ᑕᐃᒪ ᖕᒪᓂᒃ 1970-ᖕᓂ ᓂ, ᓇᓗᓇᐃᖅᑕᐅᓯᒪᕗᑦ ᑕᐃᒃ ᑯᐊ ᑐᒃ ᑐᖕᖏᑦ ᓱᓕ ᐅᖕᒪᓂ ᓂᖕᓂ ᓂ 200,000-218,000-ᓂᒃ ᐊᒥᕐᓲ ᓂᖅ ᐹᓕᔭ ᖕᓂ ᓂ. ᑖᒃ ᑯᓇᓂ ᐊᐅᐸᓗᒃ ᑑᒦ ᓕᕈ ᓐ ᓇᕕ ᖕᖏᑦ ᐋᕿᐅᒪ ᔭ ᐅᕗᑦ ᖃᓂᕆ ᔭ ᖕᖏᓐ ᓂᖅ 21% ᐳᓴ ᓐ ᑎᖕᓂ ᓂᒃ ᐊᒥᓱ ᓂᖅ ᐹᓕᔭ ᖕᓂ ᓂᒃ ᓇᓴ ᐅᑎᖅᑲᖅᑎᑕᐅᓪ ᓗᑎᒃ.
- ᓴ ᓂᐊᓂᓕ, ᕿᓐ ᖑᐅᒻ ᒥ ᑐᒃ ᑐᖕᖏᑦ ᑖᒪ ᓅᒻ ᒪᑕ ᖃᓂᕆ ᔭ ᖕᓂ ᓂ 2% ᐳᓴ ᓐ ᑎᖕᖏᓐᓂᑦ ᑐᓂᒃ ᐊᒥᓱ ᓂᖅ ᐹᓕᖅᑲᑦ ᑕᖅᓯᒪ ᔭ ᖕᓂ ᓂᒃ ᐊᕐ ᕋᒍᒥ 1986-ᒥ ᐊᒻ ᒪᓗ ᐊᒥᕐᓲ ᔪ ᓐ ᓅᖅ ᐸᓪ ᓕᐊᑲ ᓐ ᓂᕐ ᓂᐊᕋᓱ ᒋ ᔭ ᐅᓪ ᓗᑎᒃ.

4. ᐊᒥᕐ ᓱᒐ ᓴ ᐃᑦ ᓄᓇᓕᑐᖅᑲᐃᑦ ᑎᒥ ᖁᑎᖏᑦ ᓄᓇᑦ ᓯ ᐊᕐ ᒥ ᐅᖅᑲᐅᓯ ᖃᖅᑲᑦ ᑕᖅ ᓯᒪ ᓕᖅ ᑐᑦ ᐃᓯ ᒫ ᔫᑎᖅᑲᕐ ᓂᖕᓂ ᓂᒃ ᓯᓕ ᐊᑐᖅᑕᕐ ᓂᖕᓂ ᓂᒃ ᑮ ᓇᐅᔭ ᐃᖅ ᐸᒃ ᑐᓂᒃ ᐊᑭ ᓖᕙᒃ ᑐᓂᒃ ᑐᒃ ᑐᓯ ᐅᓇᐊᕈ ᔾ ᔨ ᕙᒃ ᑐᓂᒃ ᕿᓐ ᖑᐅᒻ ᒥᒃ ᑐᒃ ᑐᖕᓂ ᓂᒃ ᓄᓇᕗᒻ ᒥ, ᑕᐃᒃ ᑯᐊ ᓄᓇᑦ ᓯ ᐊᕐ ᒥ ᑕᒪ ᐃᓐ ᓂᒃ ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᑦ ᑕᐃᓕᒪ ᑎᑕᐅᓂᖕᓂ ᓂ, ᓄᓇᓕᑐᖅᑲᐃᓗᓐ ᓅᑦ, ᑕᐃᒪ ᖑᓚ ᐊᕐ ᕋᒍᒥ 2015-ᒥ. ᓄᖅᑲᖅᑎᑕᐅᔪᑎᒃ ᓄᓇᕗᒻ ᒥ ᕿᓐ ᖑᐅᑦ ᑐᒃ ᑐᖕᓂ ᓂᒃ ᑐᒃ ᑐᓯ ᐅᕐ ᕼᐅᔪᓐ ᓇᕐ ᓂᖕᓂ ᓂᒃ ᐅᔾ ᔨ ᖅᑐᖅᑕᐅᑦ ᑎᐊᑲ ᓐ ᓂᕐ ᓂᐊᖅᑐᖅ ᐊᔾ ᔨ ᒌ ᒃ ᑐᐃ ᓐ ᓇᐅᔪ ᓂᒃ ᐱᓇᓱ ᐊᖅᑐᐃ ᓐ ᓇᐅᔪ ᓐ ᓇᕐ ᓂᖕᓂ ᓂᒃ ᕿᓐ ᖑᐅᒻ ᒥ ᑐᒃ ᑐᖅᑲᕐ ᕼᐅᒃ ᑕᒪ ᐃᓐ ᓂᒃ.

ᓂᖕᓂ ᓂ

ᑐᑭᓯᓂᐊᕐᕕᐅᓯᒪᔪᑦ:

ᐋᑕᒻᔪᒃᑭ-Adamczewski, J., J. Bᐅᓛᓐᔭᐃ-Boulanger, B. ᑯᕋᕝᑦ-Croft, H.D. ᒃᓚᕝ-Cluff, B. ᐃᐊᓪᑭᓐ-Elkin, J. ᓂᓯ-Nishi, A. ᑭᐊᓕ-Kelly, A. ᑎ-Hᐋᓐᑦ-D'Hont, ᐊᒻᒪᓗ C. ᓂᑰᓪᓴᓐ-Nicolson. 2009. ᐊᒥᕐᓱᐊᓂᕐᓂᖏᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖏᑦ 2006–2009: ᐱᓕᕆᐊᕐᒍᓯᒪᓂᖏᓐᓂ ᖃᐅᔨᓴᕈᑎᑦ ᓄᓇᒥᓂᖏᓐᓂ ᖃᐅᔭᐅᔪᓂᒃ ᐊᒻᒪᓗ ᐊᑐᓕᖅᑎᑕᐅᔫᓇᕐᓂᖏᓐᓂᒃ. ᐊᕙᑎᓕᕆᔩᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᓪᓗ, ᓄᓇᕗᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ.

ᐋᑕᒻᔪᒃᑭ-Adamczewski, J., J. Bᐅᓛᓐᔭᐃ-Boulanger, B. ᑯᕋᕝᑦ-Croft, T. ᑎᕕᓴᓐ-Davison, H. ᓴᐃᔩᓐ-ᑯᕌᕗᑦ Sayine-Crawford ᐊᒻᒪᓗ B. ᑐᕋᒃ-Tracz. 2017. ᐊᔾᔨᒋᖏᓐᓂᖏᑦ ᓄᕐᙳᕕᐅᕙᒃᑐᓪᓗ ᓄᕐᙳᓯᒪᓕᖅᑎᓪᓗᒋᓪᓗ ᓄᓇᖏᑦ ᐊᔾᔨᓕᐅᕈᑎᒃᑯᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ ᖁᕐᓗᖅᑑᑉ-ᑲᓇᓐᓇᖓᓂ ᑐᒃᑐᖏᑦ ᓇᐸᖅᑐᖃᖏᑦᑐᕐᒧᑦ ᑲᓇᑕᐅᑉ ᐅᐊᓐᓇᖓᓂ 2010. ᑲᓇᑕᒥᐅᑦ ᐆᒪᔪᓕᕆᓂᖏᓐᓂ ᐊᐅᓚᑦᑎᓂᖏᓐᓂᓗ 6(1): 4-30.

ᐋᑕᒻᔪᒃᑭ-Adamczewski, J., J. Bᐅᓛᓐᔭᐃ-Boulanger H. ᓴᐃᔩᓐ-ᑯᕌᕗᑦ-Sayine-Crawford J. ᓂᓯ-Nishi, D. ᒃᓚᕝ-Cluff, J. ᐅᐃᓕᔭᒻᔅ-Williams ᐊᒻᒪᓗ L.M. ᓚᒃᑳᒃ-LeClerc. 2019. ᓇᓚᐅᑖᖅᑕᐅᓂᖏᑦ ᓄᓕᐊᕈᓇᕐᓂᖏᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐊᒻᒪᓗ ᐱᕈᐊᓂᒃᓯᒪᔪᑦ ᑐᒃᑐᐃᑦ ᐊᒥᓲᓂᖏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᑕᐅᓂᖏᑦ ᓄᓇᒥ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᐃᑦ ᓇᐹᖅᑐᖃᖏᑐᕋᒥᐅᑕᓂ ᑐᒃᑐᖏ 2018. ᓄᕐᙳᕚᑦ ᓄᓇᖏᑦ ᐊᔾᔨᓕᐅᖅᑕᐅᓪᓗᑎᒃ ᖃᐅᔨᓴᖅᑕᐅᓂᖏᑦ. ᐊᕙᑎᓕᕆᔩᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᓪᓗ, ᓄᓇᕗᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ. ᑎᑎᖅᑯᑎᖏᓐᓂ ᐅᓂᒃᑳᓕᐊᖏᑦ 279.

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖏᓐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᖏᓐᓄᑦ ᑲᑎᒪᔨᖏᑦ. 2004. ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖏᓐᓂᒃ, ᓄᕕᐱᕆ 4, 2004. ᐸᐸᑕᐅᓪᓗᑎᒃ ᐊᕙᑎᓕᕆᔩᒃᑯᓐᓄᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᖏᓐᓄᓪᓗ, ᓄᓇᕗᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ.

Bᐅᓛᓐᔭᐃ-Boulanger, J., A. ᒐᓐ-Gunn, J. ᐋᑕᒻᔪᒃᑭᒃ-Adamczewski ᐊᒻᒪᓗ ᑯᕋᕝᑦ-Croft. 2011. ᖃᐅᔨᒪᔾᔪᑎᒃᓴᓂᒃ ᐊᑐᖅᓯᑎᒃ ᓄᓇᒥᒃ ᖃᐅᔨᓴᕈᑎᒃᓴᐃᑦ ᑐᑭᓯᓂᐊᕈᓇᕐᓂᖅ ᐊᒥᕐᓱᐋᓃᕈᑕᐅᓂᖏᓐᓄᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖏᑦ. ᐅᖃᓖᒐᖏᑦ ᐅᖃᐅᓯᖃᖅᑐᑦ ᐆᒪᔪᓕᕆᓂᕐᒥᒃ ᐊᐅᓚᑦᑎᓂᖅ 75: 883-896.

ᑳᒻᐳᓪ-Campbell M.W., D.S. ᓖ-Lee ᐊᒻᒪᓗ J. Bᐅᓛᓐᔭᐃ-Boulanger. 2019. ᐊᒥᓲᓂᖏᓐᓂᒃ ᖃᓄᐃᓕᕙᓪᓕᐊᓂᖏᑦ ᑎᑉᔭᓕᖓ ᓄᓇᖅᐱᐅᓂᕐᒥᒃ ᓅᐸᓐᓂᖏᓐᓂᒃ ᓇᐸᖅᑐᖃᖏᑦᑐᕐᒥᐅᑦ ᑐᒃᑐᖏᑦ (*Rangifer tarandus groenlandicus*) ᔫᓐ 2011 - ᔫᓐ 2018 ᓄᓇᕘᑦ ᒐᕙᒪᖏᓐᓂ, ᐃᖃᓇᐃᔭᕐᕕᖓᑦ ᐊᕙᑎᓕᕆᓂᕐᒧᑦ, ᓴᓇᔭᐅᓯᒪᓂᖏᓐᓂᒃ ᐅᓂᒃᑳᓕᐊᑦ ᑭᖑᓪᓕᕆᒃᑐᑦ ᓇᓴᐅᑎᖓᑦ 01-2018. ᑎᑎᕋᖅᑕᐅᕙᓪᓕᐊᓕᓂᖏᑦ ᑎᑎᖅᑯᑎᒃᓴᖏᓐᓄᑦ ᐅᓂᒃᑳᓕᐊᑦ.

ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ. 2019. ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᐃᑦ ᓇᔪᒐᕆᕙᒃᑕᖏᓐᓄᑦ ᐸᕐᓇᐅᑏᑦ. ᐊᕙᑎᓕᕆᔩᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᓪᓗ, ᓄᓇᕗᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ. 86pp.

ᒐᓐ-Gunn, A., K.G. ᐿᓪ-Poole ᐊᒻᒪᓗ J.S. ᓂᓯ-Nishi. 2012. ᐃᓱᒪᓕᐅᕈᑕᐅᓯᒪᓕᖅᑐᑦ ᐊᑐᒐᒃᓴᐅᔫᓇᖅᑐᑦ ᓅᖃᑦᑎᓂᖏᓐᓂᒃ ᓇᐹᖅᑐᖃᖏᓐᓂᕐᒥ ᑐᒃᑐᐃᑦ ᐅᓂᒃᑳᖅᑕᐅᓂᖏᓐᓄᓪᓗ ᓇᓚᐅᑖᕈᓐᓇᕐᓂᕐᒧᓪᓗ ᓘᖅ ᓴᖑᕙᓐᓂᖏᓐᓄᑦ ᐊᓯᐊᓄᐊᖅᐸᓐᓂᖏᑦ ᓄᓕᐊᖅᐸᒃᑐᑦ ᐊᕐᓇᓪᓗᐃᑦ ᓄᕐᙳᕚᑦ ᐊᓯᖏᓐᓄᑦ ᐊᒥᕐᓲᕙᖏᓂᖏᑦ. ᑐᒃᑐᓕᕆᓂᖅ/ᑐᒃᑐᕋᔭᕐᓂᒃ/ᑐᑐᒃᑐᕙᓐᓂᒃ ᐅᖃᓕᒫᒐᐃᑦ ᓇᓴᐅᑎᓖᑦ. 20:259-267.

ᐊᓖᕐᑲᒥᓗ ᔩᑲᒥᓗ ᐳᐊᑭᐸᐃᓐ ᑐᒃᑐᖏᓐᓂᒃ ᐊᐅᓚᑦᑎᔩᑦ ᑲᑎᒪᔨᖏᑦ. 2010. ᑐᒃᑐᓯᐅᕐᕕᐅᕙᓐᓂᖏᓐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑏᑦ ᐳᐊᑭᐸᐃᓐ ᑐᒃᑐᖏᓐᓂᒃ ᐊᓖᕐᑲᒥᓗ ᔩᑲᒥᓗ ᑲᓇᑕᒥ (ᑭᖑᓪᓖᑦ). www.pcmb.ca/PDF/general/Plan/Harvest%20Management%20Plan%202010.pdf

ᐅᐊᐏᓯᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ. 2010. ᐅᓂᒃᑳᓕᐊᑦ ᐃᓄᓕᒫᓂᒃ ᑐᓴᕐᕕᖃᕆᐊᖅᑐᕐᓂᖏᓐᓂ ᐅᐊᐏᓯᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ 22-26 ᒪᔾᔨ 2010 ᐊᒻᒪᓗ 5-6 ᐋᒐᓯᒥ 2010, Bᐋᑦᓯᑯᒥ, ᓄᓇᕗᓯᐊᕐᒥ ᐱᔾᔪᑕᐅᓂᖏᓪᓗ ᐃᓱᒪᓕᐅᕈᑕᐅᓂᖏᓐᓄᑦ ᑕᐃᑯᓄᖓ ᑕᒪᐃᓐᓂᖓᖅᑐᓂᒃ ᐱᕆᐊᖅᑎᑕᐅᖁᔭᐅᔪᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ. ᐊᒃᑑᐱᕆ 8, 2010. wwwWRRP.ca/public-information/archives?f%5B0%5D=field_proceeding%3A4279

ᐅᐊᐏᓯᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ. 2016. ᐱᔾᔪᑕᐅᓂᖏᑦ ᐃᓱᒪᓕᐅᕈᑕᐅᓂᕐᒧᑦ ᑭᖑᓪᓕᕐᒥ ᐅᓂᒃᑲᓕᐊᑦ ᑎᑎᖃᐃᑦ ᐃᓚᒃᑲᓂᖏᑦ A - ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖏᓐᓂᒃ. ᒪᐃ 26, 2016. www.WRRP.ca/public-information/archives?f%5B0%5D=field_proceeding%3A7598

ᐅᐊᑮᓯᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕇᑦ ᑲᑎᒪᔨᖏᑦ. 2019. ᐱᕝᕙᑕᐅᓂᖏᓪᓗ ᐃᓱᒪᓕᐅᕈᑕᐅᓂᖏᓐᓄᑦ ᑕᐃᑯᓐᖓ ᑕᒪᐃᓐᓂᖓᖅᑐᓂᒃ ᐱᒋᐊᖅᑎᑕᐅᕐᑯᔭᐅᕙᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ. ᐋᒎᐱᕆ 4, 2019. www.WRRP.ca/public-information/public registry?f%5B0%5D=field_proceeding%3A8290&f%5B1%5D=field_category%3A23.

ᓄᓇᕗᒻᒥ ᐅᒪᔪᓕᕆᓂᐲᑦᔪᐊᒃᑯᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ ᑐᓴᕐᕕᖃᕆᐊᕐᓂᐊᖅᑐᑦ
ᒫᔾᔨ 5 ᐊᒻᒪ 6, 2020, ᖁᕐᓗᖅᑑᖅᒥ

ᐅᓂᒃᑳᓕᐊᖏᑦ ᓄᓇᙱᐊᑉ ᒐᕙᒪᐃᑦ ᐊᕙᑎᓕᕆᓂᐲᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᓃᑦᓗ

Government of
Northwest Territories

ᐅᓂᒃᑳᓚᐊᖑᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᖑᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᓪᓗ

ᕿᓐᖓᐅᒥ ᑐᒃᑐᓂᒃ ᐅᓂᒃᑳᕐᓂᕐᒧᑦ ᐋᕿᐅᒪᓂᖑᑦ

1. ᕿᓐᖓᐅᒥ ᑐᒃᑐᐃᑦ ᐊᒥᕐᔪᓂᖏᓐᓂ ᖃᓄᐃᓚᖓᓂᖑᑦ
2. ᐊᐅᓚᑦᑕᐅᓂᖏᓐᓂᒃ ᐱᔾᔪᑎᖃᖅᑐᑦ
3. ᒫᓐᓇᓵᖅ ᑐᒃᑐᑕᐅᕙᖕᓂᖑᑦ ᐊᐅᓚᑕᐅᓂᖏᓪᓗ ᓄᓇᑦᓯᐊᕐᒥ
4. ᐊᑐᓕᕐᑯᔭᓚᐊᑦ ᑐᒃᑐᑕᐅᖃᑕᕈᓐᓇᕐᓂᖏᓐᓂ ᓄᓇᕗᒻᒥ

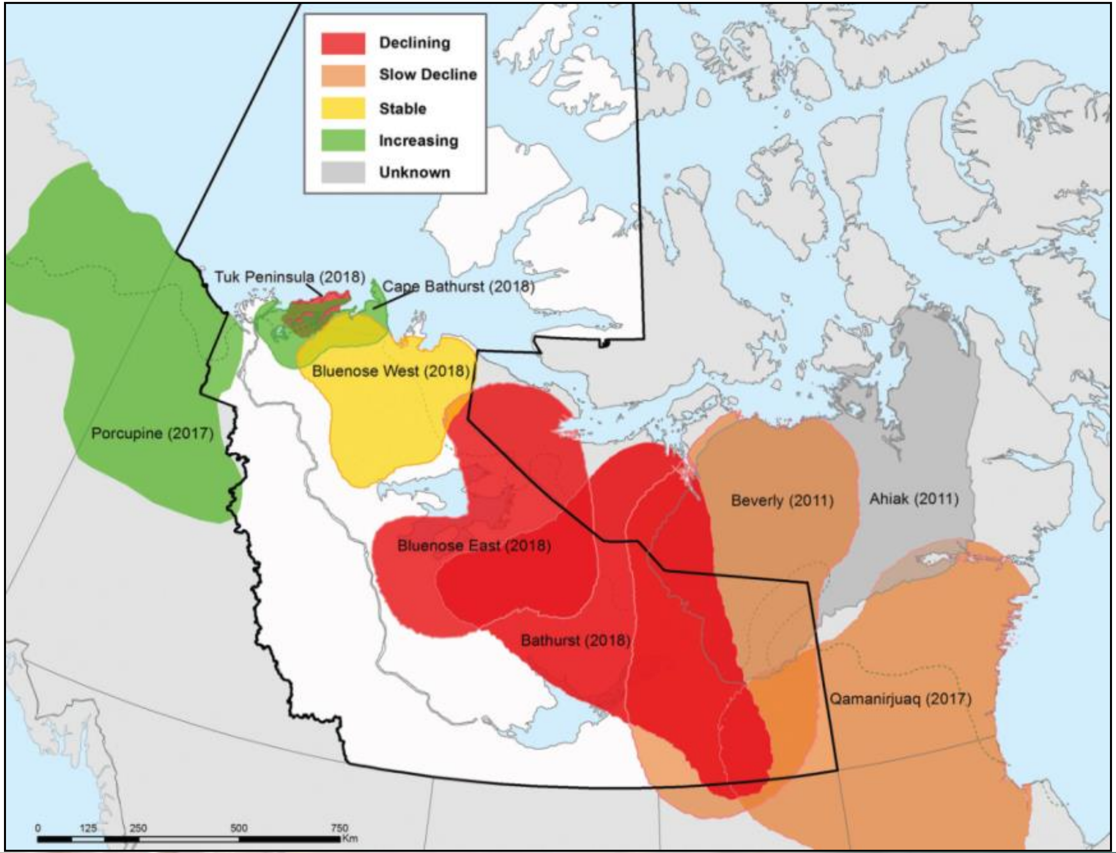
ᐊᔾᔨᓕᐊᖓ J. Adamczewski ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᓇᐹᖅᑐᖃᖕᒋᑐᕐᒥᐅᑦ ᑐᒃᑐᖃᕐᕕᐅᓂᖕᒋᑦ ᓄᓇᔅᓯᐊᕐᒥ:

9-ᖑᔪᑦ ᑐᒃᑐᖃᕐᕕᐅᓂᖕᒋᑦ ᓯᑕᒪᓂ 4 ᓄᓇᑖᕈᑎᖃᖅᑐᓂ

ᓄᓇᖑᐊᖅ B, Fournier ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᓇᐹᖅᑐᖃᖕᒋᑐᕐᒥᐅᑦ ᑐᒃᑐᖃᕐᕕᐅᓂᖕᒋᑦ ᓄᓇᕐᓯᐊᕐᒥ: ᖃᓄᐃᓕᖓᓕᐊᓚᐅᕐᓂᖕᒋᑦ ᐊᕐᕋᒍᒥ 2018



ᓄᓇᖑᐊᖅ B, Fournier ᐊᖓᑎᓕᓂᔾᒃᑯᑦ

ᓇᐹᖅᑐᖃᖕᒋᑦᑐᕐᒥᐅᑦ ᑐᒃᑐᐃᑦ ᐊᒥᔅᔫᖕᒋᓗᐊᓕᕐᓂᖕᒋᓐᓄᑦ ᖃᓄᐃᓕᐅᕈᑕᐅᕙᖕᓂᖕᒋᑦ

COSEWIC = ᑲᓇᑕᒥ ᑲᑎᒪᔨᕋᓛᑦ ᖃᓄᐃᓕᖕᒐᓂᖕᒋᓐᓄᑦ ᐊᒥᔅᔫᖕᒋᓗᐊᕐᓂᖕᒋᓐᓄᑦ ᐆᒪᔪᐃᑦ
SARA = ᐆᒪᔪᐃᑦ ᐊᒥᔅᔫᖕᒋᓗᐊᓕᕐᓂᖕᒋᓄᑦ ᒪᓕᒐᐃᑦ (ᑲᓇᑕᒥ)
SARC = ᐆᒪᔪᐃᑦ ᐊᒥᔅᔫᖕᒋᓗᐊᓕᕐᓂᖕᒋᓐᓄᑦ ᑲᑎᒪᔨᕋᓛᑦ (ᓄᓇᑦᓯᐊᕐᒥ)
CMA = (ᓄᓇᑦᓯᐊᕐᒥ) ᑲᑎᒪᔨᖕᒋᑦ ᐊᐅᓚᑦᑎᔨᐅᖃᑕᐅᔪᑦ

- **ᑲᓇᑕᒥ**
  COSEWIC-ᑯᑦ ᑲᑎᒪᔨᕋᓛᖕᒋᑦ (2016): ᐅᓗᕆᐊᓇᖅᑐᒦᓐᓂᕋᐃᔪᑦ

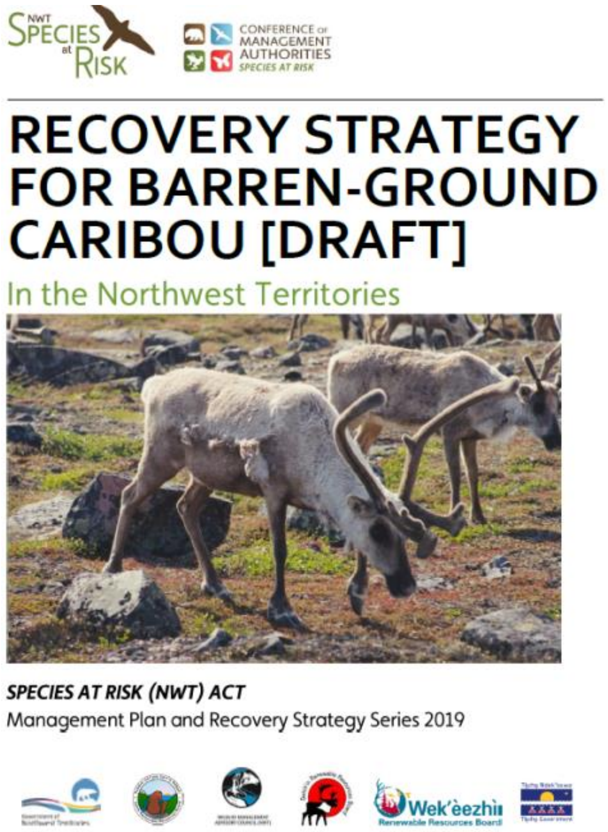
  SARA - ᐆᒪᔪᐃᑦ ᐊᒥᔅᔫᖕᒋᓗᐊᓕᕐᓂᖕᒋᓐᓄᑦ ᒪᓕᒐᐃᑦ (ᓱᓕ ᑐᑭᓕᐅᖅᑕᐅᓯᒪᓐᖕᒋᑐᑦ)

- **ᓄᓇᑦᓯᐊᕐᒥ**
  SARC-ᑯᑦ ᑲᑎᒪᔨᕋᓛᖕᒋᑦ (2017): ᐅᓗᕆᐊᓇᖅᑐᒦᓐᓂᕋᐃᔪᑦ

  CMA-ᑯᑦ (2018): ᐅᓗᕆᐊᓇᖅᑐᒦᓐᓂᕋᐃᔪᑦ

(ᑎᑎᕋᖅᑕᐅᕙᓪᓕᐊᓂᖏᑦ)
ᐊᒥᕆᕈᖅᔩᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕈᑎᒃᓴᐃᑦ
ᓇᐹᖅᑐᖃᖏᑦᑐᕐᒥᐅᑦ ᑐᒃᑐᖏᓐᓂᒃ
ᓄᓇᑦᓯᐊᕐᒥ 2020

ᑕᒪᐃᓐᓂᒃ ᖃᓄᐃᓕᐅᕈᑎᒃᓴᐃᑦ
ᑕᒪᐃᓐᓂᒃ ᑐᕐᑐᖃᕐᕕᐅᓂᖏᓐᓂ

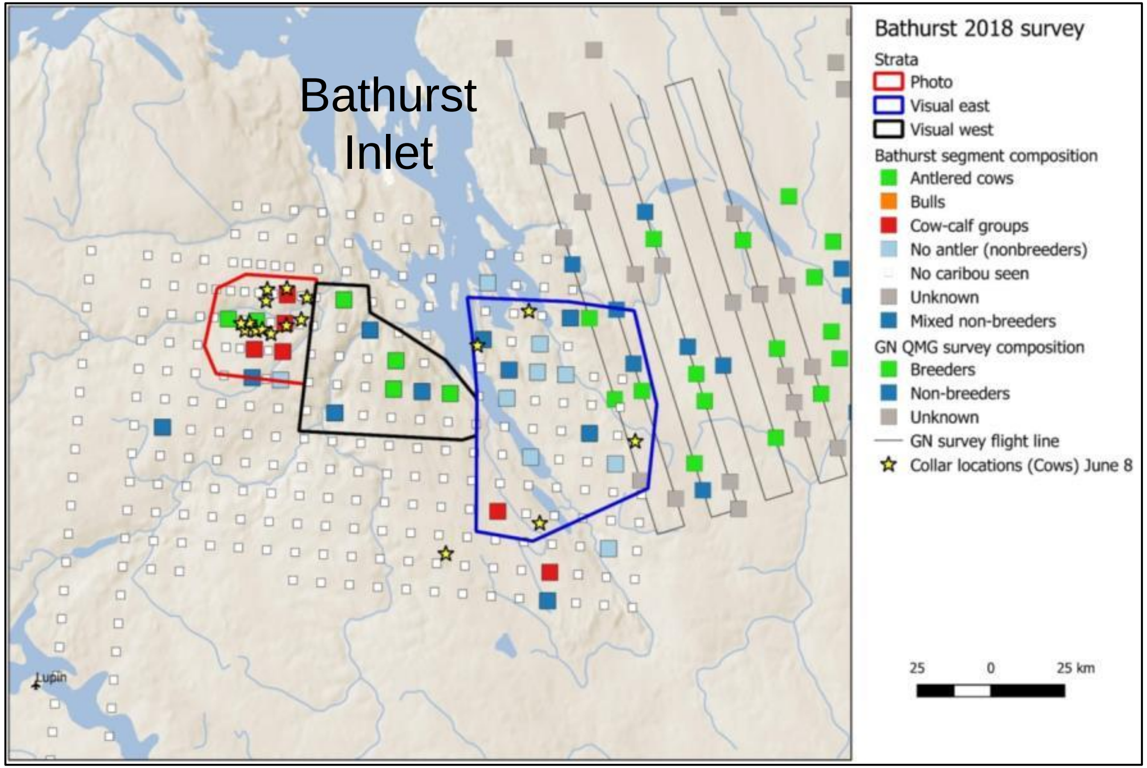


ᕿᓐᖅᑲᐅᒻᒥ ᑐᒃᑐᖃᕐᕕᖕᓂᑦ ᐊᒻᒪᓗ ᓄᕐᓇᕕᖕᓂᑦ ᓄᓇᕗᒻᒥ ᓄᓇᑦᓯᐊᕐᒥᓗ

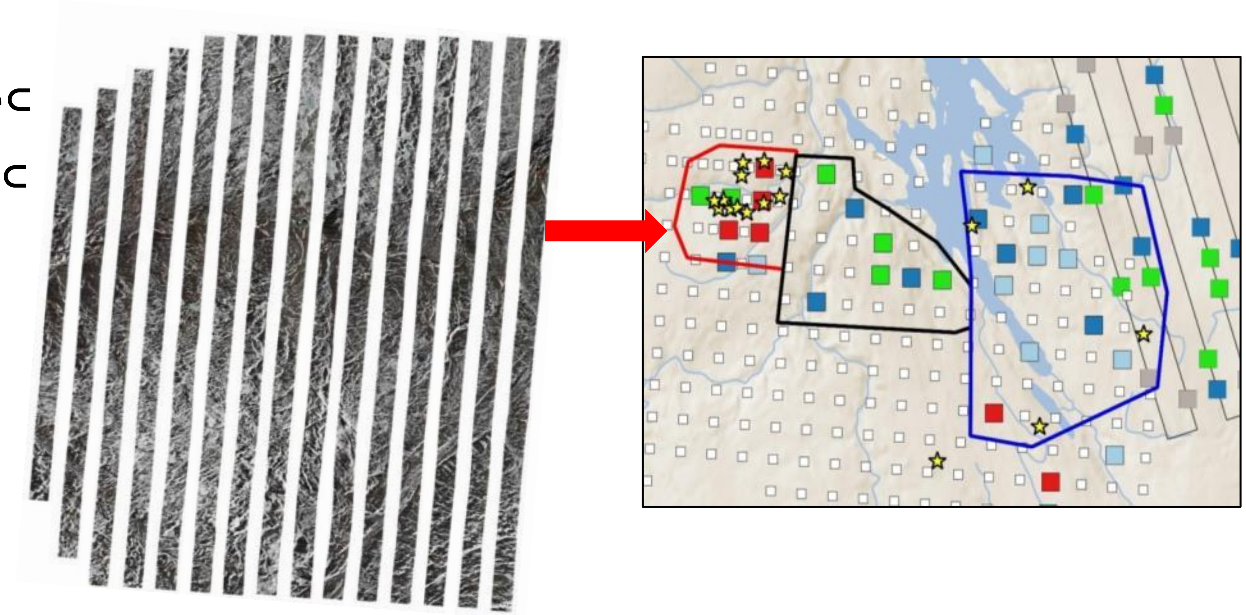
ᐊᔾᔨᓕᐊᖓ J. Adamczewski ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᓄᓇᖑᐊᓕᐊᖓ B. Fournier, ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᕿᓐᖓᐅᒻᒥ ᓄᕐᓂᕕᖕᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᒫᓂ ᔫᓐ 2018



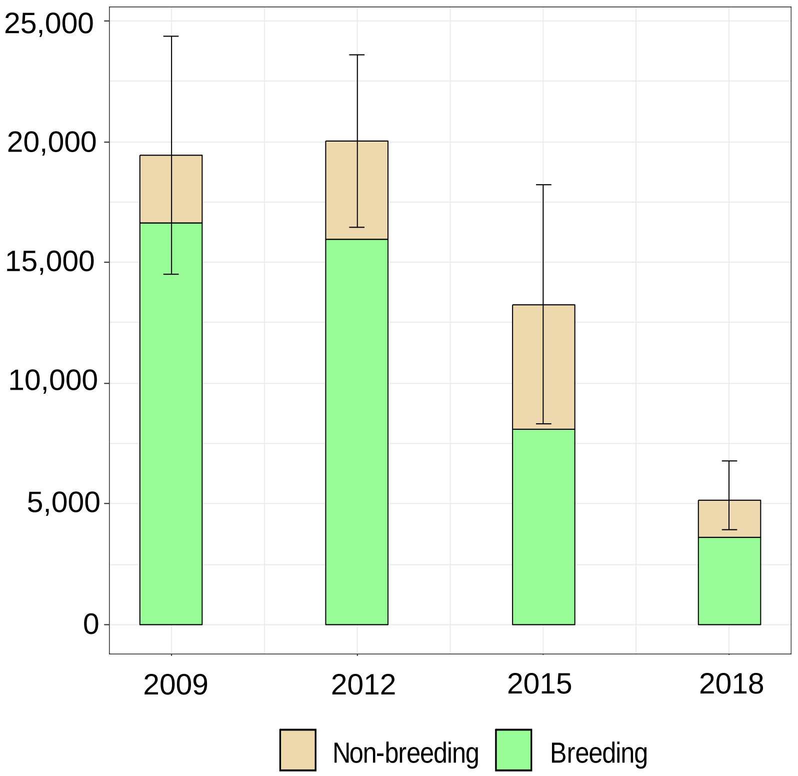
ᕿᓐᖕᒐᐅᒻᒥ ᓄᕐᓇᕕᖕᒋᑦ
ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ
ᑕᒫᓂ 2018-ᒥ:
ᐊᔾᔨᒌᖕᒋᑦᑑᑎᑦ
ᑲᑎᑕᐅᓯᒪᓗᑎᒃ
ᐊᔾᔨᓕᐅᖅᑕᐅᔪᑦ
ᑎᖕᒥᔫᕐᒥᒃ



ᕿᓐᖕᒐᐅᒻᒥ ᑐᒃᑐᐃᑦ
ᓄᖅᓇᕕᖕᒋᑦ
ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ
2018-ᒥ:
ᐆᒃᑑᑎᒋᔭᐅᓪᓗᑎᒃ
ᑎᖕᒥᓲᖅᒥᒃ
ᐊᔾᔨᓕᐅᖅᑕᐅᔪᑦ

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᐃᑦ ᓇᓚᐅᑖᖅᑕᐅᓯᒪᓂᖏᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐊᒥᕉᓂᖏᑦ ᐊᕐᕋᒍᓂᒃ 2009-2018-ᒧᑦ

ᐊᔾᔨᓕᐊᖓ J. Adamczewski, ᐊᕙᑎᓕᕆᔨᒃᑯᑦ



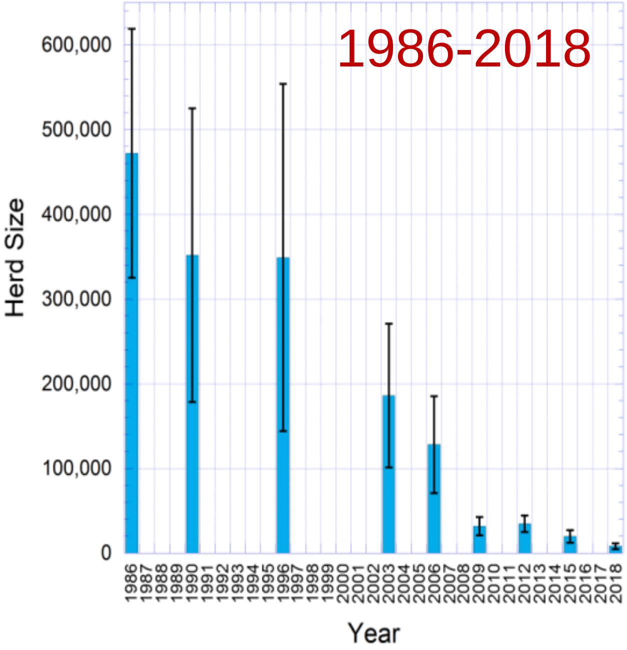
ᑐᒃᑐᐃᑦ ᐊᒥᕐᓲᓂᖏᑦ: ᐊᕐᓇᓪᓗᐃᑦ ᐸᖕᓃᓪᓗ

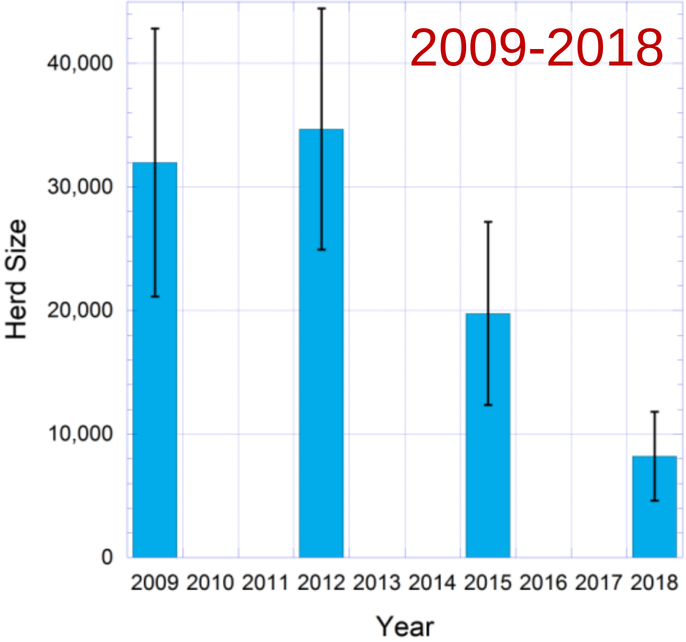
- ᓄᕐᕆᐋᑦ ᓄᓇᒥ ᖃᐅᔨᓴᖅᑕᐅᓂᖏᑦ: ᐊᒥᓲᓂᖏᑦ ᐊᕐᓇᓪᓗᐃᑦ
  - ᐸᖕᓃᑦ ᓄᕐᕆᐊᖕᓃᓐᖏᑦᑐᑦ
- ᐅᑭᐊᒃᓵᒃᑯᑦ ᖃᐅᔨᓴᖅᑕᐅᓚᒥᒃ (ᐊᒃᑑᐱᑎᒥ) ᐊᕐᓇᓪᓗᐃᑦ: ᐸᖕᓃᓪᓗ ᐊᒥᕐᓲᓂᖏᑦ ᐊᑐᓂ
  - ᐃᓚᔭᐅᒍᑎᒃ ᐸᖕᓃᑦ ᐊᕐᓇᓪᓗᕐᓄᑦ: ᑐᒃᑐᐃᑦ ᐊᒥᕐᓲᓂᖏᑦ ᓇᓚᐅᑖᖅᑕᐅᔪᑦ

ᐊᔾᔨᓕᐊᖓ: J. Adamczewski, ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᕿᓐᖓᐅᒻᒥ ᑑᒃᑐᐃᑦ ᓇᓚᐅᑖᖅᑕᐅᓯᒪᔪᑦ ᐊᒥᔅᓲᓂᖏᑦ ᐊᕐᕋᒍᓂᒃ 1986-ᒥᒃ 2018-ᒧᑦ

ᐊᔾᔨᓕᐊᖓ J. Adamczewski, ᐊᕙᑎᓕᓇᔩᒃᑯᑦ





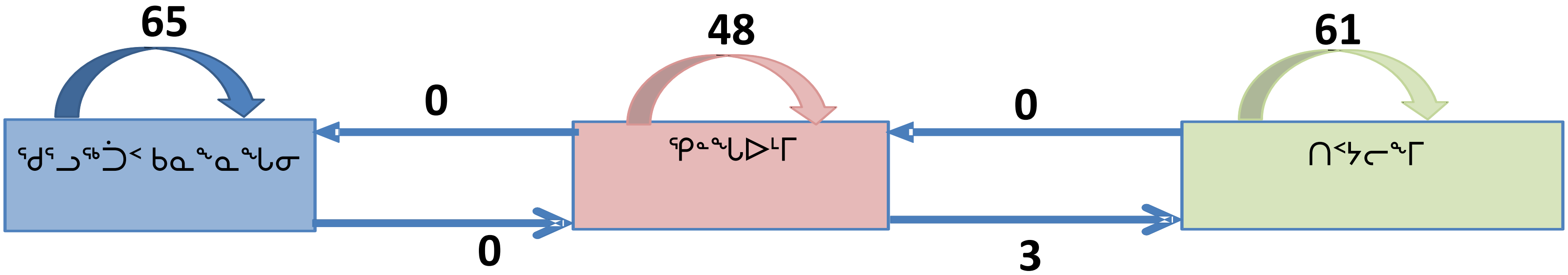
ᕿᓐᖓᐅᒥ ᑐᒃᑐᖏᑦ: ᐆᒪᕙᖕᓂᖏᑦ 2015-2018-ᒧᑦ

ᐊᔾᔨᓕᐊᖓ J. Adamczewski, ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

1. ᐊᕐᓇᓪᓗᐃᑦ ᐆᒪᕙᖕᓂᖏᑦ: 84-90% ᐳᓴᓐᑎᓂᒃ ᖃᓄᐃᖏᓂᖏᑦ ᑐᒃᑐᐃᑦ
   ᓇᓚᐅᑖᖅᑕᐅᓂᖏᑦ: 78-82% ᐳᓴᓐᑎᓂᒃ 2015-ᒥᒃ 2018-ᒧᑦ
2. ᓄᕐᕋᐃᑦ ᐆᒪᕙᖕᓂᖏᑦ: 30-50:100-ᖏᓂᑦᑐᑦ ᖃᓄᐃᖏᓂᖏᑦ ᑐᒃᑐᐃᑦ *ᖃᓄᐃᓕᖓᒐᔪᖕᓂᖏᑦ 25:100 ᑕᒫᓂ 2014-ᒥᒃ 2016-ᒧᑦ*
3. ᐃᑉᓚᐅᓖᑦ: ᑕᒫᓃᑉᐸᑕᓗᓐᓃᑦ 80% ᐳᓴᓐᑎᓂᒃ ᖃᓄᐃᖏᓂᖏᑦ ᑐᒃᑐᐃᑦ *ᓇᓚᐅᑖᖅᑕᐅᓯᒪᔪᑦ 60% ᐳᓴᓐᑎᓂᒃ 2015-ᒥ, 70% ᐳᓴᓐᑎᓂᒃ 2018-ᒥ, 86.0% ᐳᓴᓐᑎᓂᒃ 2019-ᒥ*

ᓅ<ᐸᓐᓂᖏᑦ ᕿᓐᖓᐅᒥ ᖃᓂᒋᔭᖏᓂᓗ ᐊᓯᖏᑦ ᑐᒃᑐᐃᑦ

ᖁᖓᓯᕈᕐᑎᖅᑕᐅᓯᒪᔪᑦ ᐅᔭᒥᓖᑦ ᐊᕐᓇᖕᓗᐃᑦ 2016-2018-ᒧᑦ



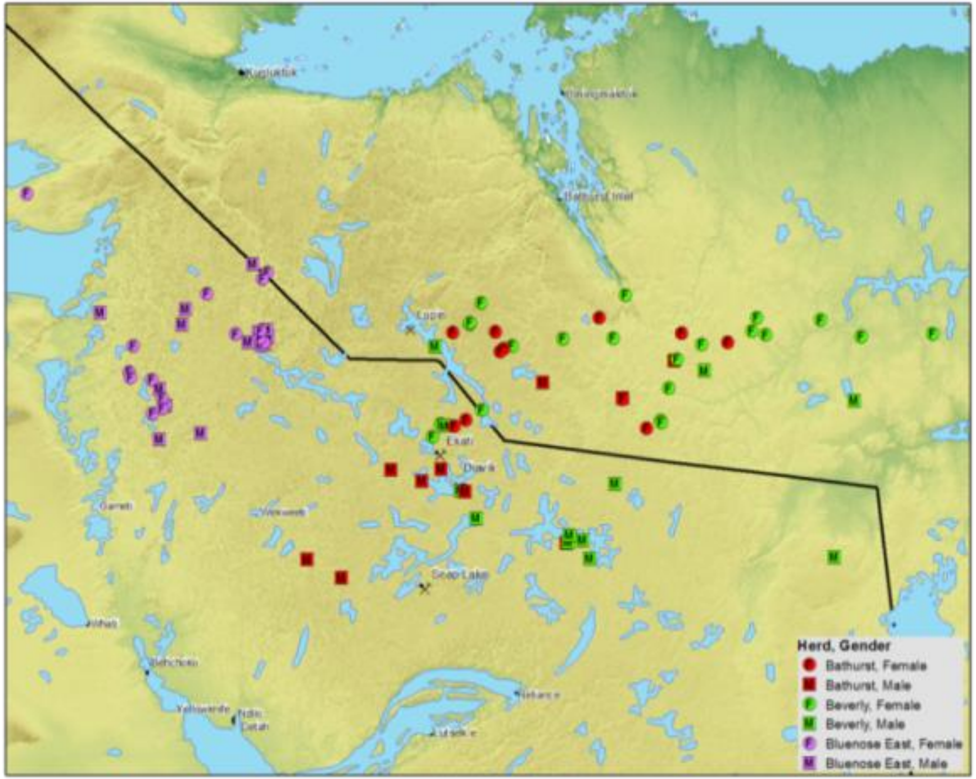
177 ᒪᕐᕉᖃᑦᑕᓚᐅᖅᑑᒃ ᑭᖑᓕᕆᒃᓯᑎᒃ ᔩᓐᓂᒥ ᑕᑯᔭᐅᕙᓚᐅᖅᑐᑦ

174 ᐅᑎᖅᐸᓚᐅᖅᑐᑦ ᑕᐃᒃᑯᓄᖓᑦᓴᐃᓐᓇᖅ ᓄᕐᓇᕕᖕᑐᖃᕐᒥᓄᑦ

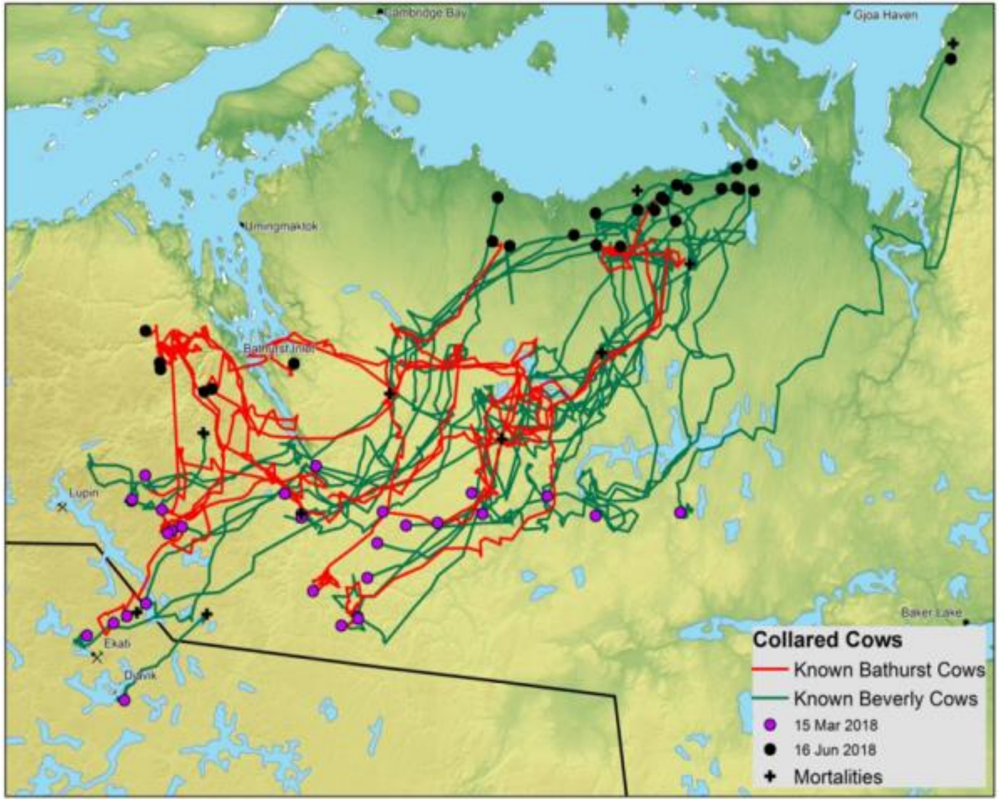
3 ᑮᕗᑎᔪᑦ ᐊᓯᐊᓄᐊᖅᓱᑎᒃ **(ᑕᒪᕐᒥᒃ 2018-ᒥ)**

98.3% ᐳᓴᓐᑎᑦ ᑕᐃᑯᖓᐅᖏᓇᖅᑐᑦ ᓄᕐᓇᕕᑐᖃᕐᒥᓄᑦ

ᕿᓐᖓᐅᒻᒥ,
ᕐᑯᕐᓗᖅᑰᑉ-
ᑲᓇᖕᓇᖕᒐᓂ &
ᑎᑉᓕᔭᓕᖕᒥᓗ
ᐅᑮᕕᖕᒋᑦ
ᒫᔾᔪ 15, 2018

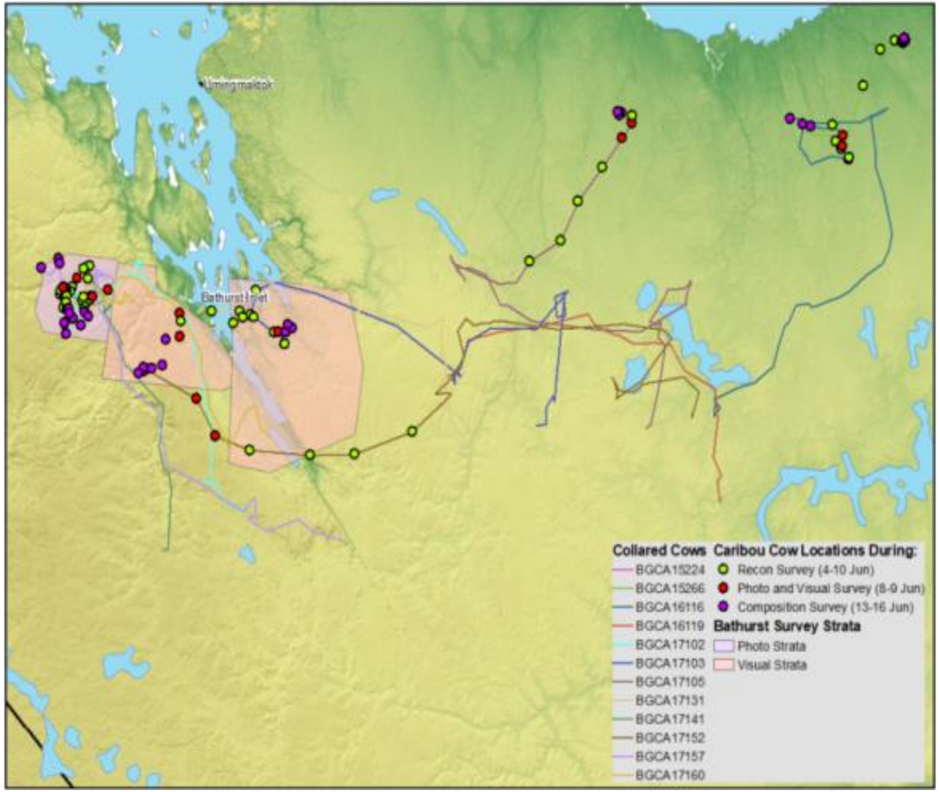


ᖁᓐᖓᐅᒻᒥ & ᑎᑉᓕᔭᓕᖕᒥᓗ
ᐊᕐᓇᓪᓗᐃᑦ
ᓇᐅᑰᕐᓂᖏᑦ/ᓇᓅᓐᓂᖏᑦ
ᐅᐱᖕᓛᒃᑯᑦ
ᒫᔾᔨ 15-ᒥᒃ – ᔫᓐ 16-ᒧᑦ, 2018-ᒥ



ᕿᓐᖓᐅᒻᒥ (ᖃᐅᔨᒪᔭᐅᓂᖏᑦ)
ᖁᖓᓯᕈᑎᖅᑕᐅᓯᒪᔪᑦ ᐊᕐᓇᓪᓗᐃ ᓇᓃᓐᓂᖏᑦ
ᔫᓐ 4-16, 2018:
11 (73% ᐳᓴᓐᑎᑦ) ᐊᕐᓇᓪᓗᐃᑦ ᖃᓂᒋᔭᖏᓐᓂ
ᐱᖓᖕᓇᖓᓂᓗᓐᓃᑦ ᕿᓐᖓᐅᑦ
3 ᐱᖓᓱᑦ (27% ᐳᓴᓐᑎᑦ) ᐊᕐᓇᓪᓗᐃᑦ
ᓅᓚᐅᖅᑐᑦ ᑲᓇᖕᓇᖅᐸᓯᐊᓄᑦ
ᐃᓚᓕᐅᑎᕐᓗᑎᑦ ᑎᑉᔭᓕᖕᒥ ᐊᕐᓇᓪᓗᕐᓄᑦ
ᐅᑎᖏᑕᐃᓐᓇᓚᐅᖅᑐᑦ

ᔫᓐ 2019-ᒥ: ᐱᖓᓱᑦ 3 ᑖᑯᓇᖓᑦ 17-ᖑᔪᓂᒃ
(18% ᐳᓴᓐᑎᖏᑦ) ᖃᐅᔨᒪᔭᐅᔪᑦ ᕿᓐᖓᐅᒻᒥ
ᐊᕐᓇᓪᓗᐃᑦ ᓅᓚᐅᖅᑐᑦ ᑲᓇᖕᓇᖓᓄᑦ
ᑎᑉᔭᓕᐅᑉ, ᐅᑎᖏᑕᐃᓐᓇᓚᐅᖅᑐᑦ



ᕿᓐᖕᒐᐅᒻᒥ ᑐᒃᑐᓂᒃ
ᐊᐅᓚᑦᑎᓂᕐᒧᑦ
ᐸᕐᓇᐅᑏᑦ
2004

A MANAGEMENT PLAN FOR THE BATHURST CARIBOU HERD

PREPARED BY
THE BATHURST CARIBOU MANAGEMENT PLANNING COMMITTEE

BATHURST CARIBOU MANAGEMENT PLANNING COMMITTEE

NOVEMBER 4, 2004

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ
ᐸᕐᓇᐅᑏᑦ
ᓴᓇᔭᐅᕙᓪᓕᐊᔪᑦ

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓕᕆᓂᕐᒧᑦ
ᐅᖄᐅᔾᔨᕆᐊᑎᑦ ᑲᑎᒪᔨᕋᓛᖕᒋᑦ
18-ᖑᔪᑦ ᑲᑐᔾᔨᖃᑎᒌᖕᒋᑦ ᓄᓇᑦᓯᐊᕐᒥ,
ᓄᓇᕗᒻᒥᒃ, ᓴᔅᑳᑦᓯᐊᓐᒥᓗ

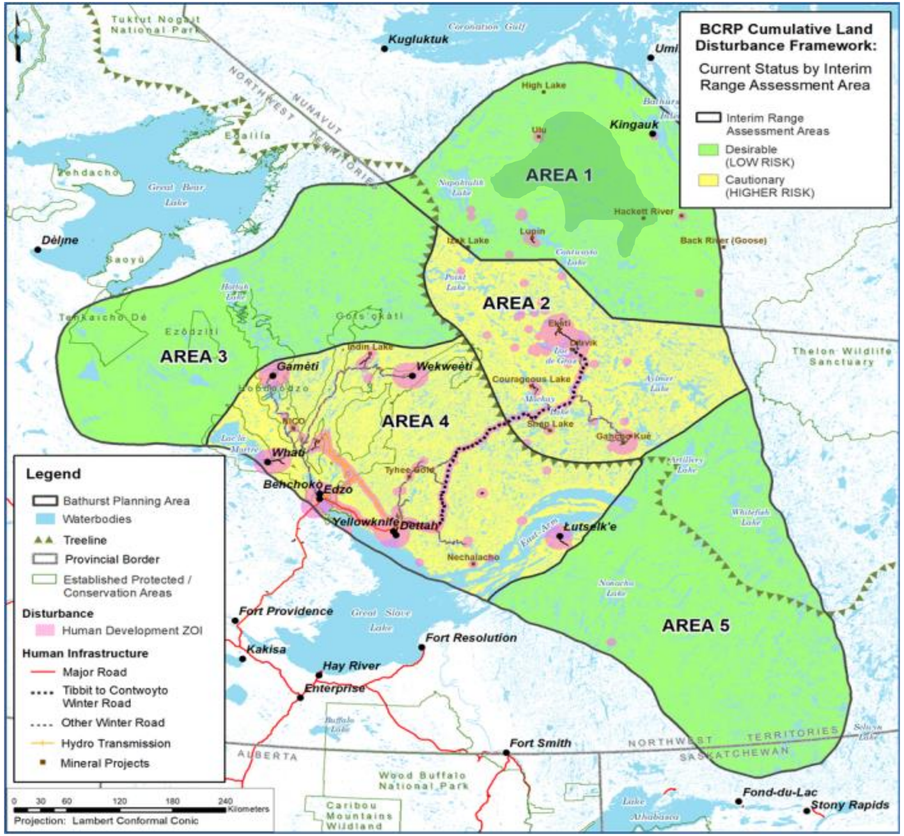
ᐊᔾᔨᓕᐊᖓ J. Adamczewski ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᐃᑦ: ᐊᒥᓱᓄᑦ ᐊᐅᓚᑦᑕᐅᖃᑕᐅᔪᑦ

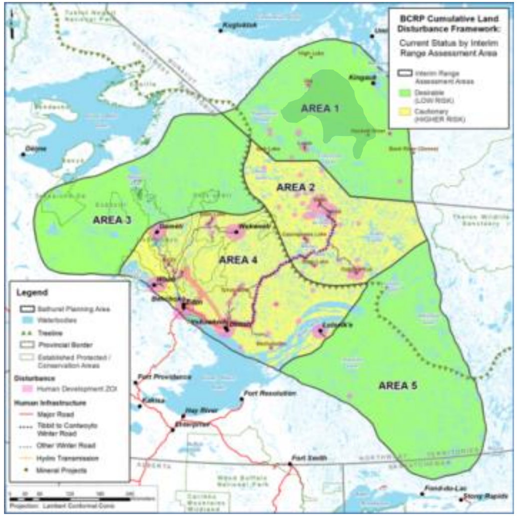
GNWT - ᓄᓇᑦᓱᐊᑉ ᒐᕙᒪᐃᑦ
TG - ᑭᓵᑦᓲᑉ ᒐᕙᒪᐃᑦ
WRRB - ᐅᐊᑮᓱᒥ ᐊᓪᓚᐃᑦ ᓄᓇᖏᓐᓄᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᒐᕙᒪᐃᑦ,
ᓄᓇᓖᑦ

GN - ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ
NWMB - ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ
ᓄᓇᕗᒻᒥ ᓄᓇᓖᑦ

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ
ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑏᑦ
ᑭᖑᓪᓖᑦ ᐱᓴᖅᑕᐅᔪᑦ 2019
21 ᑲᑐᔾᔨᖃᑎᒌᓐᓄᑦ
ᓄᓇᑦᓯᐊᕐᒥ, ᓄᓇᕗᒻᒥ &
ᓴᔅᑳᑦᓯᐋᓐᒥᓗ



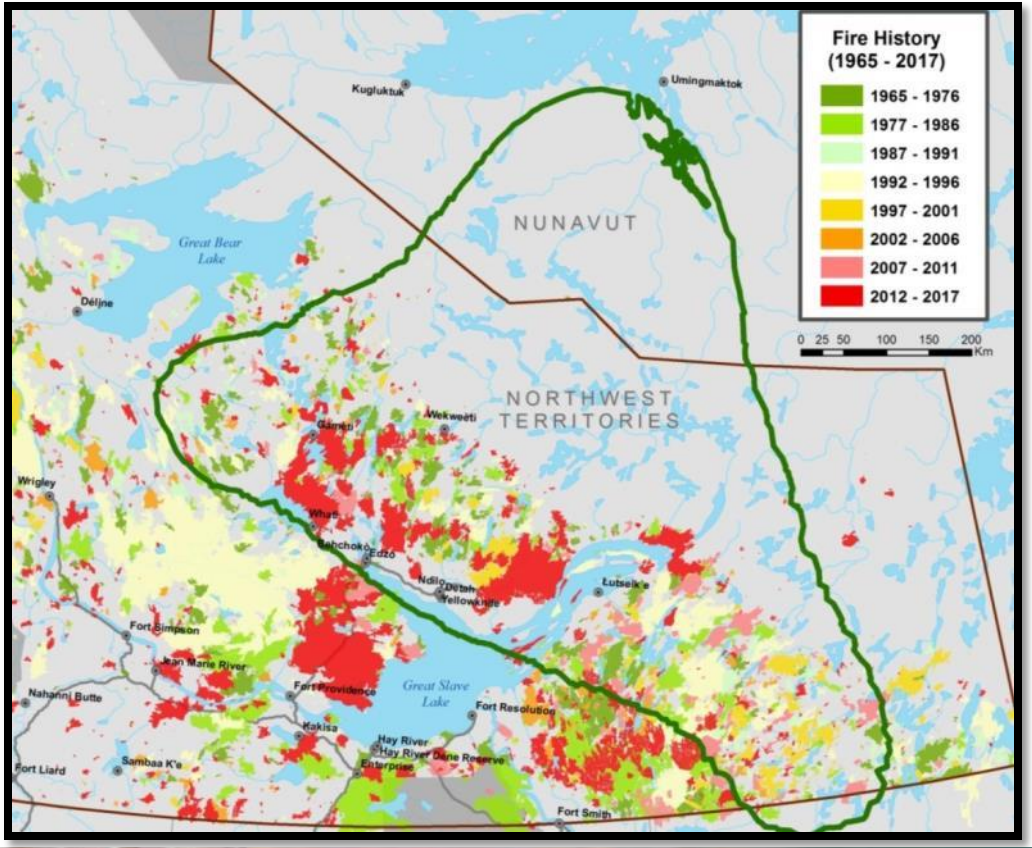
ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᐃᑦ ᓇᓃᓰᖑᓂᖏᓐᓂᒃ ᐸᕐᓇᐅᑎᒃᓴᐃᑦ ᐊᑐᓕᖁᔾᐅᓂᖏᑦ



1. ᐱᕙᓪᓕᐊᔪᒥᒃ ᓄᓇᐃᑦ ᐸᕐᕕᓴᐃᕕᐅᕙᓂᖏᑦ ᑐᖓᕕᒃᓴᐃᑦ
2. ᐃᑲᔪᖅᓯᐃᓂᖅ ᓄᓇᓖ ᐃᓄᐃᑦ ᒥᐊᓂᕆᔭᐅᖃᑕᐅᓂᖏᓐᓂᒃ
3. ᑐᒃᑐᖃᕐᕖᑦ ᓇᔪᒐᓇᔭᐅᕙᒃᑐᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖏᑦ - ᐃᒪᐃᑦ ᐃᑳᓇᐊᖅᑐᕐᕖᑦ ᓄᓇᐃᓪᓗ ᓇᐅᒃᑰᕐᕕᒋᕙᒃᑕᖏᑦ
4. ᑐᒃᑐᖃᕐᕖᑦ ᓇᔪᒐᓇᔭᐅᕙᒃᑐᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖏ –ᓄᕐᓇᕖᓪᓗ ᓄᕐᖁᖃᓕᖅᑎᓪᓗᒋᓪᓗ ᓇᔪᖅᐸᒃᑕᖏᑦ
5. ᑐᒃᑐᑦ ᓇᓂᖃᑕᕐᓂᖏᓐᓂ ᓴᐳᓐᓂᐊᖅᑕᐅᒋᐊᕐᕖᑦ
6. ᐊᑑᑎᖃᕐᓂᐊᖅᑐᓂᒃ ᐊᖅᑯᓯᐅᕈᓐᓇᕐᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᑦ ᐊᐅᓚᑕᐅᓂᖏᓪᓗ
7. ᓇᓪᓕᐅᒃᑯᒫᒃᓴᓂᒍᑎᒃᓴᐃᑦ ᐊᒃᑐᖅᑕᐅᓂᕐᓗᒃᓯᒪᓂᕐᒧᑦ
8. ᐃᑯᐊᓪᓚᒃᑐᑲᖅᐸᑦ ᓄᓇᒥ ᐊᐅᓚᑦᑎᓂᕐᒥᒃ ᐱᐅᓯᕆᔭᐅᔪᒃᓴᐃᑦ
9. ᖃᓇᑕᐅᔭᒃᑯᑦ ᓄᓇᓂᒃ ᓄᓇᖁᑎᖃᕐᓂᕐᒥᒃ ᓇᓗᓇᐃᒃᑯᑦᑎᖅᑐᐃᕙᖕᓂᖅ

ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᖏᑦ:
ᓄᓇᐃᑦ ᐃᑯᐊᓪᓚᖃᑕᕐᓂᖏᑦ ᐅᐲᕕᕆᕙᒃᑕᖏᓐᓂ

ᖃᓇᑕᐅᓯᒥᒃ ᐊᔾᔨᖁᑎ

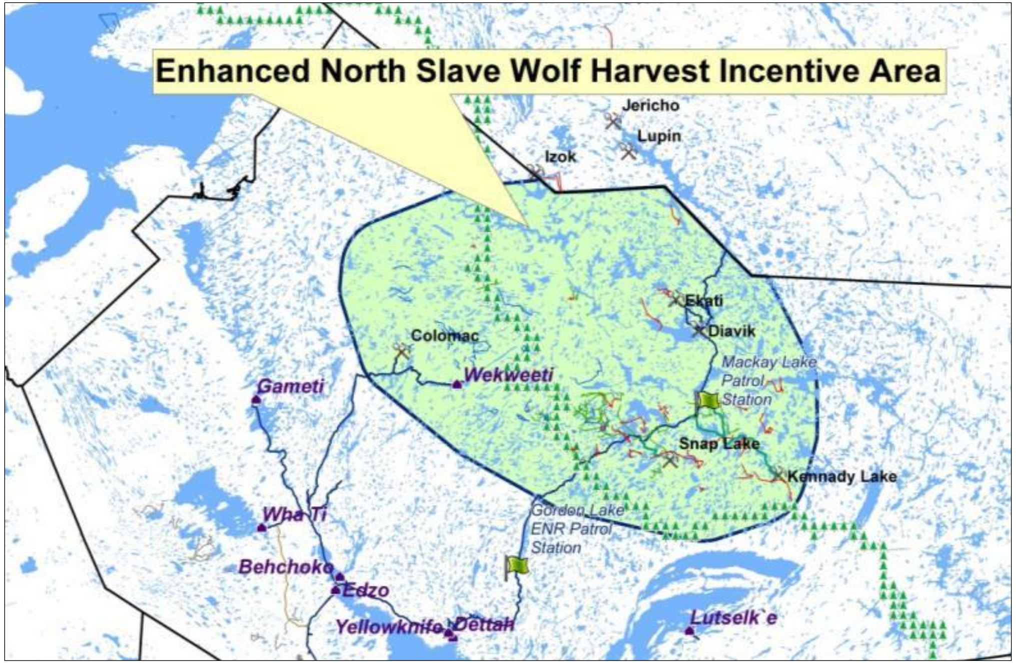


ᑫᓐᖓᐅᒻᒥ ᑐᒃᑐᖃᕐᕕᖕᓂ: ᐊᒪᕈᐃᑦ ᐊᐅᓚᑕᐅᓂᖏᑦ

- ᑲᑐᔾᔨᖃᑎᒋᒡᓗᑎᒃ ᐊᒪᕈᓕᕆᓂᕐᒥᒃ ᖃᓄᐃᓕᐅᕈᑎᒃᓴᐃᑦ ᐊᔪᕐᓇᖏᓂᖏᓐᓂᒃ ᖃᐅᔨᓴᕐᓂᖅ 2017
- ᐊᒥᓱᕈᓇᐊᖅᑕᐅᓂᖏᑦ ᐱᔫᒥᓴᐅᑏᑦ ᐊᒪᕈᖅᓯᐅᕈᓐᓇᕐᓂᕐᒧᑦ 2019-2020
- ᒃᑳᑦᓲᒥ ᐊᒪᕈᖅᓯᐅᑏᑦ ᐅᑭᐅᒃᑯᑦ ᓄᓇᖏᑦ 2020
- ᐱᓕᕆᖃᑎᖃᕐᓂᖅ ᕐᑯᕐᓗᖅᑑᕐᒥ ᐊᒪᕈᖅᓯᐅᑏᑦ ᐊᖑᓇᓱᒃᑎᖏᓐᓂᒃ 2019-2020

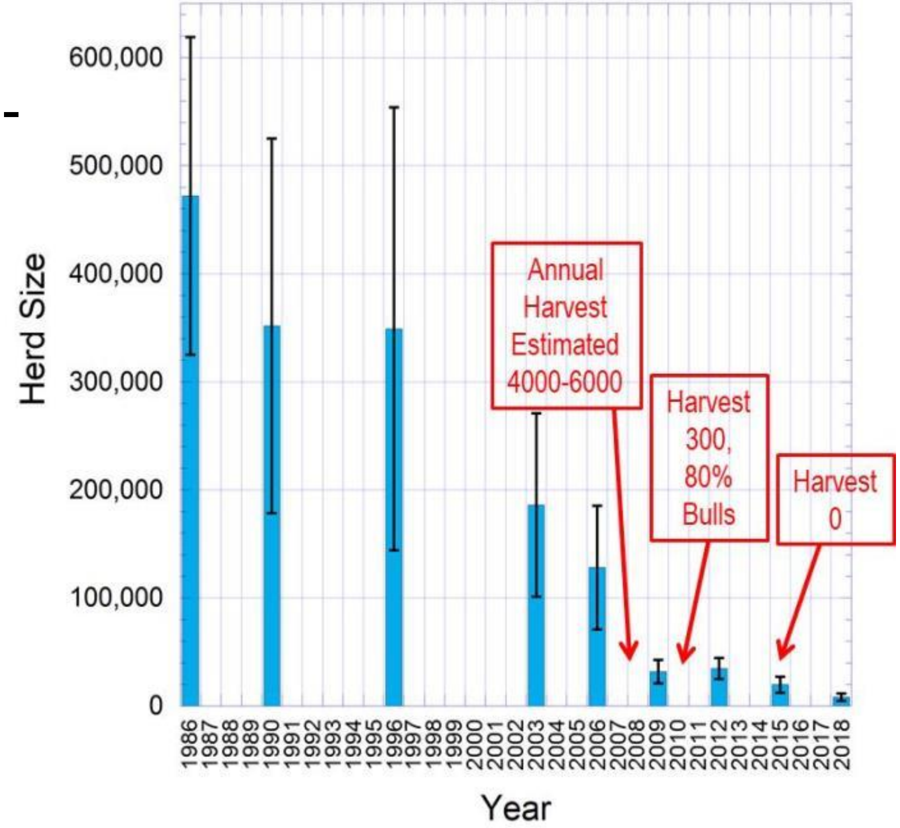
ᐱᐅᓯᕆᐊᖅᑕᐅᓂᖏᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ ᓯᓚᐃᓇᐅᑉ ᐅᐊᖕᓇᖕᒐᓂ ᐊᒪᕈᖅᓯᐅᕈᑎᒃᓴᐃᑦ (2019)

ᐊᒪᕈᖅᓯᐅᕐᕕᐅᕐᑯᔨᓂᕐᒧᑦ ᐅᒃᑐᕈᒥᓇᕈᑏᑦ ᕿᓐᖓᒐᐅᒻᒥᓗ ᕐᑯᕐᓗᖅᑑᑉᓗ-ᑲᓇᖕᓇᖕᒐᓂ ᑐᒃᑐᓄᑦ ᐅᑭᕕᐅᕙᒃᑐᓂ



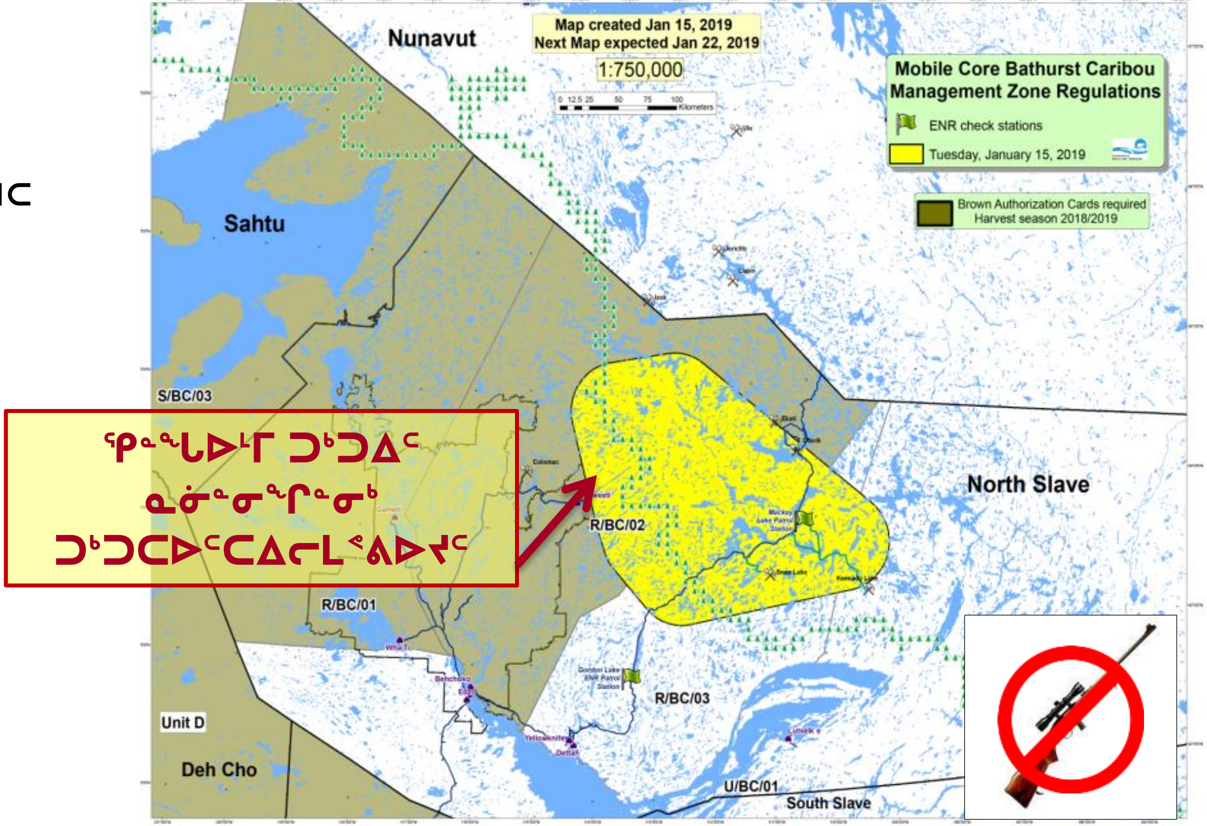
ᓄᓇᑦᓯᐊᕐᒥ ᕿᓐᖓᐅᑦ ᑐᒃᑐᖏᓐᓂᒃ ᑐᒃᑐᕕᐅᔪᓐᓇᕐᓂᖏᓐᓂᒃ ᐊᐅᓚᑦᑎᓂᖅ 2010-2019

- ᐃᓄᖕᓄᑦ ᑮᓇᐅᔭᓕᐅᕐᓂᕐᒧᓪᓗ ᑐᒃᑐᑕᐅᔪᓐᓇᕐᓂᖏᑦ ᒪᑐᔭᐅᓯᒪᔪᑦ
- 2010: ᓄᓇᓕᑐᖃᐃᑦ ᑐᒃᑐᑐᓐᓇᕐᓂᖏᑦ ᐃᓱᖃᖅᑎᑕᐅᔪᑦ 300-ᓂᒃ, 80% ᐳᓴᓐᑎᓂᑦᑐᑦ ᐸᖕᓃᑦ ᐱᔭᐅᔪᓐᓇᕐᓂᖏᑦ
- 2015: ᓄᓇᓕᑐᖃᐃᑦ ᑐᒃᑐᑦᑐᓐᓇᕐᓂᖏᑦ ᒪᑐᔭᐅᓯᒪᔪᑦ
- ᒃᓛᑦᓰᑉ ᒐᕙᒪᐃᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐊᑕᐅᑎᒃᑯᑦ ᑐᒃᓯᕋᐅᓯᐊᖕᒋᑦ ᐱᒋᐊᖅᑎᑕᐅᕐᑯᔭᖕᒋᑦ 2010, 2016, 2019
- ᐅᐊᑮᓯᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔩᖕᒋᑦ ᐃᓄᖕᓂᒃ ᑐᓴᕆᐊᖅᑐᖃᕐᕕᖃᕐᓂᖏᑦ ᐊᕐᕌᒍᓂ 2010 ᐊᒻᒪᓗ 2016, ᐃᓱᒪᓕᐅᕈᑕᐅᓪᓗᑎᒃ 2010, 2015, 2016, 2019

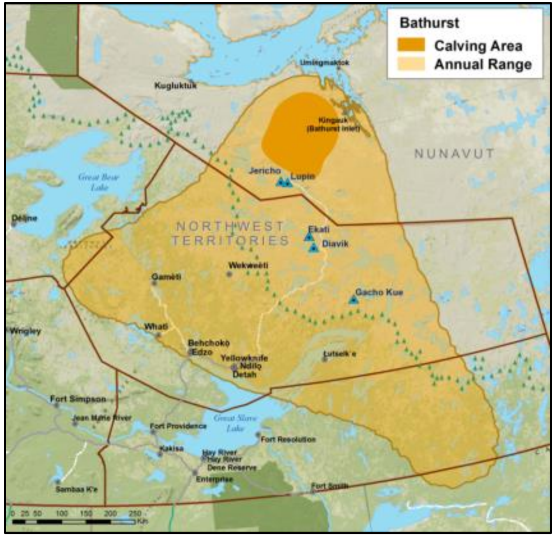


ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓄᑦ ᓈᓯᒪᕝᕕᐅᕚᒃᑐᓂ ᐊᖑᓇᓱᒡᕕᐅᑦᑕᐃᓕᒪᔪᑦ (ᔮᓄᐊᕆ 15, 2019):

- ᐊᑐᖅᑕᐅᓕᖅᑐᑦ ᑕᐃᒪᖕᒐᑦ 2015-ᒥᒃ
- ᑐᖕᒐᕕᖃᖅᑎᑕᐅᔪᑦ ᖁᖕᒐᓯᕈᑦᑎᖅᑕᐅᓯᒪᔪᓂᒃᑐ (ᐅᔭᒥᓕᖕᓂᒃ) ᑐᒃᑐᐃᑦ ᓇᓈᓐᓂᖕᒋᓐᓂᒃ
- ᒪᓕᒃᑕᖅᑐᑦ ᓇᓈᓐᓂᖕᒋᓐᓂᒃ ᑐᒃᑐᐃᑦ



0-ᓂᒃ ᐱᑕᖃᙱᑦᑐᓂᒃ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᑕᐅᔪᓐᓇᕐᓂᖏᑦ



1. ᑐᒃᑐᐃᑦ ᐊᒥᓲᔪᓐᓃᕐᓂᖏᑦ > 98% ᐳᓴᓐᑎᓂᒃ ᑕᐃᒪᙵᑦ 1986-ᒥ
2. ᑐᒃᑐᐃᑦ ᐅᓗᕆᐊᓇᑐᒦᑦᑐᑦ ᐊᒥᔅᓲᔪᓐᓃᒃᑲᓂᕈᓐᓇᕐᓂᖅ ᐊᒻᒪᓗ ᐊᓯᐊᓄᑦ ᓅᑦᑐᓐᓇᕐᓂᖅ
3. ᓯᕗᓪᓕᖕᒥᒃ ᑐᒃᑐᑕᐅᔪᓐᓇᐃᓕᑎᑕᐅᔪᑦ ᐊᒥᓲᖏᓗᐊᓕᖅᑎᓪᓗᒋᑦ:
   - ᐊᕙᖅᒥ ᐊᖑᓇᓱᒻᕕᐅᔪᓐᓇᐃᓕᓚᐅᖅᑐᑦ ᑕᐃᒪᙵᑦ 2007-ᒥ; ᑐᒃᑐᓕᖕᓂ ~13,000 ᑕᒫᓂ ᐊᕐᕋᒍᒥ 2000 ᐊᒻᒪᓗ ~3,000ᓂᒃ ᑕᒫᓂ ᐊᕐᕋᒍᒥ 2005-ᒥ (ᐆᒪᔪᕐᓂᒃ ᐊᐅᓚᑎᓂᕐᒧᑦ ᐅᖃᐅᔾᔨᒋᐊᖅᑏᑦ - ᑲᑎᒪᔨᖏᑦ ᓄᓇᑦᓯᐊᕐᒥ)
   - ᔫᑳᓐᒥᓗ ᐊᑖᓪᑲᐅᓪᓗ ᓂᒋᐊᓂ ᑐᒃᑐᐃᑦ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᐸᕐᓇᐅᑏᑦ: ᑕᒪᕐᒥᒃ ᑐᒃᑐᑕᐅᔪᓐᓇᕐᓂᖏᑦ ᒪᑐᔭᐅᓯᒪᔪᑦ ᑐᒃᑐᐃᑦ ᐊᒥᓲᖏᓂᖅᓴᐅᓕᕈᑎᒃ ᐅᑯᓇᙵᑦ < 45,000 (ᑐᒃᑐᖏᓂᒃ ᐊᐅᓚᑦᑎᔩᑦ ᑲᑎᒪᔨᖏᑦ)
4. ᓄᓇᑦᓯᐊᕐᒥ ᓄᓇᓕᑐᖃᐃᑦ ᐃᓱᒪᔫᑎᒋᔭᖏᑦ:
   ᑕᒪᕐᒥᒃ ᑐᒃᑐᕕᐅᔪᓐᓇᕐᓂᖏᑦ ᓄᓇᑦᓯᐊᕐᒥ ᒪᑐᔭᐅᒪᐅᖅᑐᑦ 2015-ᒥᒃ, ᑕᐃᒃᑯᐊᓗ ᑐᒃᑐᓯᐅᕈᔾᔨᕙᒃᑐᑦ ᓱᓕ ᑲᔪᓯᓗᑎᒃ ᓄᓇᕗᒻᒥ

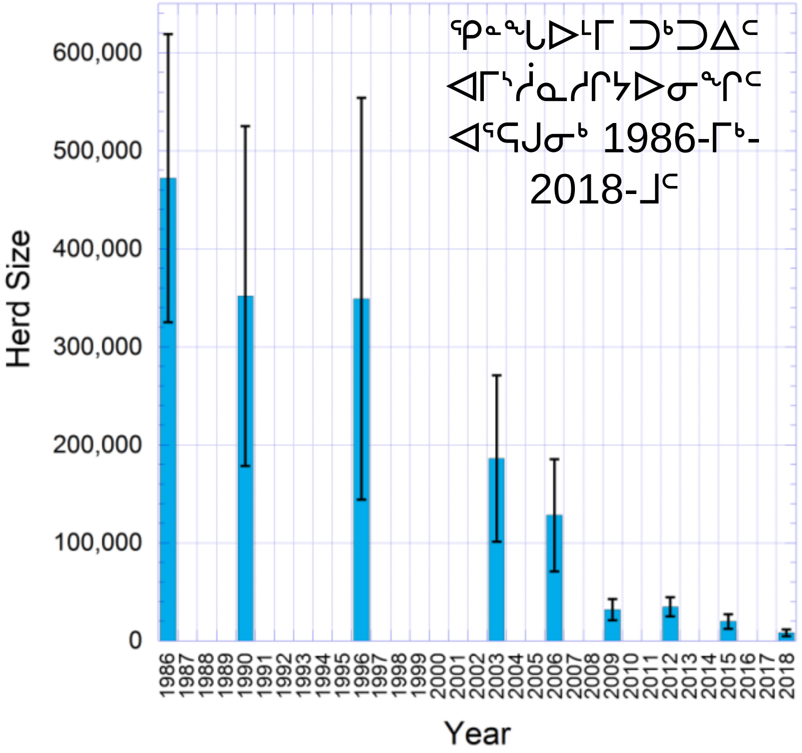
ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᒃᑯᖏᑦ ᐃᓚᓕᐅᑎᓂᖏᑦ ᕿᓐᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ ᐅᖃᐅᓯᖃᕐᓂᕐᒧᑦ ᑐᑭᓯᓂᐊᕈᑕᐅᓂᖏᓐᓄᓪᓗ 2018-2019-ᒥ: ᑕᒪᐃᓐᓂᒃ

- ᑕᐃᓕᓇᐃᒥ ᓄᓇᒥᐅᑕᓕᖓᔫᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ, ᑎᓯᐱᖓ 11 & 12, 2018
- ᐅᐊᒃᐅᐊᑏᒥᓗ ᑖᒪᑎᒥᓗ ᔭᓄᐊᕆ. 21, 2019, ᐅᐊᑏᒥ ᔭᓄᐊᕆ 22, 2019-ᒥ, Bᐄᑦᓱᑰᒥ, ᔭᓄᐊᕆ. 23, 2019
- ᔭᓗᓇᐃᒥ ᐊᓪᓚᐃᑦ ᓄᓇᓕᑐᖃᐃᑦ ᐊᖓᔪᖄᖏᑦ ᐃᓐᓇᐃᓪᓗ ᑲᑎᒪᔩᖏᑦ, ᔭᓄᐊᕆ 24, 2019
- ᑰᖏᐅᑕᐃᑦ ᓄᓇᓕᑐᖃᐃᑦ, ᕗᐊᑦ ᓱᒥᑦᒥ ᐊᓪᓚᖓᔪᐃᑦ ᑲᑎᒪᔩᖏᑦ, ᓱᒥᑦᒥ ᓄᓇᓕᑐᖃᐃᑦ, ᔭᓄᐊᕆ 29, 2019
- ᑐᓖᑕᒥ ᓄᓇᒥᐅᑕᓕᖓᔪᑦ ᑲᑎᒪᔩᖏᑦ ᐊᒻᒪᓗ ᓵᑑᒥᐅᑦ ᓄᓇᒥᐅᑕᓕᖓᔫᑦ ᑲᑎᒪᔩᖏᑦ, ᔭᓄᐊᕆ 30, 2019
- ᑦᓱᓪ ᑮᒥ ᓄᓇᓕᑐᖃᐃᑦ, ᕕᕗᐊᕆ 6 2019
- ᓯᓚᐸᐃᕕᐅᑉ ᐅᐊᖕᓇᖕᒐᓂ ᐊᓪᓚᖓᔪᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᒃᔪᐊᖏᑦ, ᕗᕕᐊᕆ 18, 2019
- ᖁᖅᓗᖅᑑᕐᒥ ᐊᖑᓇᓱᒃᑏᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ, ᕕᕗᐊᕆ. 20, 2019
- ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᐃᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᒐᕙᒪᐃᑦ ᒥᓂᔅᑕᖏᑦ ᑲᑎᒪᓂᖏᑦ, ᖁᖅᓗᖅᑑᖅ, ᐄᐳ 15 & 16, 2019

ᐊᔾᔨᓕᐊᖓ J. Adamczewski, ᐊᕙᑎᓕᕆᔨᒃᑯᑦ

ᖁᓯᓐᓇᒦᒃ. ᐊᐱᖁᑎᒃᓴᐃᑦ?

ᐊᔾᔨᓕᐊᖓ J. Adamczewski, ᐊᕙᑎᓕᕆᔨᒃᑯᑦ



ᓇᓚᐅᑦ ᑖᕈ ᑎᑦ ᓄᓕᐊᖅᐸᓐᓂᑦ ᐊᕐᓇᐃᓪᓗ ᐊᒻᒪᓗ ᐱᕈᐊᓂᒃᓯᒪᔪᑦ ᑐᒃᑐᐃᑦ ᐊᒥᓲᓂᖏᑦ ᐊᒻᒪᓗ ᑐᑭᓕᐅᖅᑕᐅᓂᖏᑦ ᓇᓃᖃᑦᑕᕐᓂᖏᑦ ᐊᒥᓲᓂᖏᓪᓗ ᕿᙵᐅᒻᒥ ᑐᒃᑐᐃᑦ ᓇᐹᖅᑐᖃᖏᑦᑐᒥ: 2018-ᒥ ᓄᕐᕆᐋᑦ ᓄᓇᖏᓐᓂ ᐊᔾᔨᓕᐅᖅᑕᐅᓯᒪᔪᑦ

ᔮᓐ ᐊᑕᔾ ᔩᔅ ᑭ -Jan Adamczewski, ᔮᓐ ᐳᓛᓐ ᔾ -John Boulanger, Hᐃᑐᓴ ᐃᔾᓐ -ᑯ ᕌᕗᑦ -Heather Sayine-Crawford, ᔮᓐ ᓂᔅ ᓯ -John Nishi, Dᐄᓐ ᒃ ᓚᕝ -Dean Cluff, ᔩᑎ ᐅᐃᓕᔭᒻᔅ -Judy Williams, ᐊᒻ ᒪᓘᓴ -ᒪᕆ ᓕᒃ ᓘᒃ -Lisa-Marie Leclerc. ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪ ᐃᑦ ᐊᕙᑎᓕᕆᔾᒃ ᑯᑦ ᓄᓇᒥ ᐅᑕᑐᖃᓕᕆᔾᓪᓗ, ᑎᑎᖃᕐᑯᑎᖏ ᓂ ᐅᓂᒃ ᑳᓕᐊᖏ ᓂᖓᖅᑐᑦ 279-ᒥᒃ.

ᓇᐃᓈᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐅᓂᒃ ᑳᓕᐊᑦ

ᐅᑯᐊ ᐅᓂᒃ ᑳᑦ ᐅᖃᐅᓯ ᖃᖅᑐᑦ ᓴᕿᑕᐅᓚᐅᖅᑐᓂᒃ ᓄᕐ ᕆᐋᓐ ᓂᒃ ᓄᓇᓂᒃ ᐊᔾ ᔨ ᓕᐅᖅᑕᐅᓚᐅᖅᑐᓂᒃ ᕿᙵᐅᒻ ᒥ ᑐᒃ ᑐᓂᒃ ᑕᒫ ᓂ ᔩᓐ 2018-ᒥ ᖃᓂᒋᔭ ᖓᓂ ᕿᙵᐅᑦ ᖃᓂᒋᔭ ᖏ ᓂ, ᓄᓇᕗᒻ ᒥ. ᐱᓗᐊᖅᑐᒥᒃ ᑐᕌᒐ ᖃᓚᐅᖅᑐᑦ ᓇᓚᐅᑖᕈᒪ ᓂᖅ ᐊᒥ ᓯ ᓂᖏ ᓂᒃ ᓄᓕᐊᕈᓐ ᓇᖅᑐᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ, ᑕᐃᒃ ᑯᐊᓗ ᐊᒥ ᓲ ᓂᖏᑦ ᐱᕈᐊᓂᒃ ᓯᒪ ᔪᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ, ᐊᒻ ᒪᓗ ᐱᕈᐊᓂᒃ ᓯᒪᔪ ᐃᓐ ᓇᐃᑦ ᑲ ᑎᖕᐅᖅᑐᓂ ᑐᒃ ᑐᐃᑦ ᑕᒪ ᐃᓐ ᓂ, ᓴ ᓂᐊᓂᒃ ᑕᐃᒃ ᑯᓇᖔ ᓴᕿᑎᑕᐅᓚᐅᖅᓯᒪᔪᓂᒃ ᖃᐅᔨ ᔪᒪᓗᒋᑦ ᓯᕗᓂᐊᒍᑦ ᓄᕐ ᕆᐋᑦ ᐊᔾ ᔨ ᓕᐅᖅᑕᐅᓚᐅᕐ ᓂᖏᑦ, ᑭ ᖑᓕ ᓕᐅᓚᐅᖅᑐᑦ ᑕᒫ ᓂ 2015-ᒥ. ᑎᖕ ᒥ ᔪᒃ ᑰᖅ ᐸᓚᐅᖅᑐᒍᑦ ᐊᕕᒃ ᑐᖅ ᓯᒪ ᔪᓂᒃ ᖃᐅᔨ ᓴᖃᒃ ᓴᓂᒃ ᓯᒪᕙᒌᖅ ᓯ ᑕ ᓄᓇᒥᒃ ᒪᓕᒃ ᑐᓂᒃ ᐱᓗᐊᖅᑐᒥᒃ ᕐᑯᖓᔪᕈᑦ ᑎᖅᑕᐅᓯᒪ ᔪᓂᒃ ᐊᕐ ᓇᓪ ᓗᖅᑐᓂᒃ ᑐᒃ ᑐᖃᕐ ᕕᐅᔪ ᓂᒃ. ᐊᑭ ᐊᓂᒃ ᑕᐅᖅ ᑎᖕ ᒥ ᔪᒃ ᑰᕐ ᕕᐅᓚᐅᖅᑐᑦ ᐅᔾ ᔨᖅᑐᑦ ᑎᐊᕈᒪ ᓂᕐ ᒧᑦ ᑕᐃᒃ ᑯᓂᖓᓇᓐᓐ ᓂᖏᓐ ᑕᒪᕐ ᒥᒃ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᐱᑕᖃᕐ ᓂᖏᓐ ᑐᑭ ᓯᔭ ᐅᔪ ᒪᓪ ᓗᑎᒃ. ᓴᕿᑎᑕᐅᔪᑦ ᐊᑐᖅ ᑕᐅᓕᓚᐅᖅᐳᑦ ᖃᐅᔨ ᔪᓐ ᓇᕐ ᓂᕐ ᒧᑦ ᖃᓄᑎᒋ ᓄᕐ ᕆᕕᖃᓕᕐ ᒪᕐᓚᑦ, ᓇᓗᓇᕈ ᓅᕐᑯᓪ ᓗᒋᑦ ᖃᐅᔨ ᓴᕐ ᕙᐅᖃᑕᕈᓐ ᓇᕐ ᓂᖏᓐ ᑐᒃ ᑐᖃᕐ ᕙᐅᕚᒃ ᑐᑦ ᐊᒻ ᒪᓗ ᓇᒻ ᒪᓈᕐᑯᓪ ᓗᒋᑦ ᑎᖕ ᒥ ᔪᒃ ᑯᑦ ᐊᔾ ᔨ ᓕᐅᖅᑕᐅᔪᓐ ᓇᕐ ᓂᖏᓐ ᓄᕐ ᕆᕙᓪ ᓕᐊᓕᖅᑎᓪ ᓗᒋᑦ. ᖃᐅᑕᒫᖅ ᓄᑉᐸᖕ ᓂᖏᓐ ᓂᒃ ᒪᓕᒃ ᓯᑎᒃ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᕐᑯᖓᔪᕈᑦ ᑎᖅᑕᐅᓯᒪᔪᑦ (ᐅᔭᒥᒃ ᑕᐅᓯᒪᔪᑦ) ᐊᐅᓚᕙᓚᐅᕐ ᓂᖏᓐ ᓂᒃ ᑕᓪ ᓕᒪ ᓂᒃ ᑐᖕᓃ 5 ᑭᓛᒥ ᑕᓂᑉ ᐸᓚᐅᖅᑐᑦ km/ᖃᐅᑖᖅ, ᑖᓂ ᔩᓂ 8-ᒥ, ᐊᒻ ᒪᓗ ᑕᑯᔭ ᐅᖃᑕᖅᓯᑎᒃ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᓄᕐ ᓇᔪᑦ ᑎᖕ ᒥ ᔪᒃ ᑯᑦ, ᑐᑭ ᓯ ᓇᖅᑑᔭ ᓚᐅᖅᑐᖅ ᓄᕐ ᓇᓗᐊᓕᖃᑕᖅᑑᔭᕐ ᓂᖏᓐ ᑖᓂ ᑭᕚᓂᑦ ᑎᐊᖕᒍᑦ ᔫᓐ 8-ᖕᒍᓚᐅᖅᑐᒥᒃ. ᓯᓚᑦ ᑎᐊᕝ ᒪᓇᐅᑎᓪ ᓗᒍ ᐊᔾ ᔨ ᓕᐅᓇᓚᐅᖅᑐᑦ ᑎᖕ ᒥ ᔪᒃ ᑯᑦ ᔪᓐ 8-ᒥ. ᐊᔾ ᔨ ᓕᐅᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᒥ ᓲ ᓂᖅᐸᖅᑕᖅᑕᕐ ᓂᖏᓐ ᓂ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᑕᑯᔭ ᐅᖃᑕᓚᐅᕐ ᓂᖏᓐ, ᐊᒥ ᓲ ᓂᖃᖅᐸᓚᐅᖅᑐᓂᒃ 12-ᓂᒃ ᕐᑯᖓᔪᕈᑦ ᑎᖅᑕᐅᓯᒪ ᔪᓂᒃ 17-ᖕᒍᔪ ᓂᒃ ᐊᕐ ᓇᓪ ᓗᕐ ᓂᒃ ᓄᕐ ᕋᓕᖕ ᓂᒃ, ᐅᐊᖕ ᓇᖅ ᐸᓯ ᖕᒐ ᕿᖕᐅᑦ. ᔫᓐ 8-ᒥ ᓗ 9-ᒥ ᓗ, ᖃᐅᔨ ᓴᓚᐅᕐ ᒥ ᔪᒍᑦ ᑕᑯᔭ ᖅᑐᖅ ᓯ ᕆᑦ ᒪᕐ ᕉᒃ ᐊᓯ ᖕᒋ ᐊᒥ ᓲ ᖕᖏᖅᓴ ᖃᖅᑐᑦ ᐊᕐ ᓇᓪ ᓗᕐ ᓂᒃ ᑐᒃ ᑐᓂᒃ ᐊᒻ ᒪᓗ ᑕᓪ ᓕᒪ ᓂᒃ ᕐᑯᖓᔪᕈᑦ ᑎᖅᑕᐅᓯᒪ ᔪᓂᒃ ᓄᕐ ᕋᓕᖕ ᓂᒃ ᐊᕐ ᓇᓪ ᓗᕐ ᓂᒃ, ᐃᓪ ᓗᒃ ᑐᑦ ᐊᑭ ᐊᓅᒃ ᑐᓂᒃ ᕿᙵᐅᒻ ᒥ ᖃᐅᔨ ᓴᖅ ᕕᐅᓚᐅᖅᑐᓂ. ᐊᐳᑎᒥᒃ ᐊᐱᓯᒪ ᓂᖕᒥᓄᑦ ᐃᓚᐃᓐ ᓇᖕᐅᑦ, ᑕᑯᔭ ᐅᔪᓐ ᓇᑦ ᑎᐊᖃᑦ ᑕᓚᐅᓐ ᖕᒋᑦ ᑐᑦ, ᑕᐃᒪ ᐃᓐ ᓂᖕᒪᓄᑦ ᐊᑐᓚᐅᖅᑐᒍᑦ ᒪᕐ ᕈ ᐃᓕᖅᖕᑭᐟ ᖕ ᓂᒃ ᖃᐅᔨ ᓴᕈᑏᖕ ᓂᒃ ᑕᐃᒃ ᑯᓂᖕᒪᓇᓚᐅᑦ ᑖᑦ ᑎᐊᕐ ᓂᖅᓴ ᐅᔪᓐ ᓇᖅᑐᓂᒃ ᐊᒻ ᒪᓗ ᑕᒻ ᒪᖅᓯᒪᖕ ᓂᖅᓴ ᐅᔪᓐ ᓇᖅᑐᓂᒃ ᑕᑯᔭ ᐅᔪᓐ ᓇᑦ ᑎᐊᖕᖏᖕ ᓄᑦ ᑐᒃ ᑐᐃᑦ ᐊᐳᑎᖅᑕᕐ ᓂᕐ ᒧᑦ. ᒪᕐ ᕈ ᐃᓕᖅᖕᑭᐟ ᖕ ᓂᒃ ᖃᐅᔨ ᓴᕈᑏᖕ ᓂᒃ ᐊᑐᓚᐅᕐ ᒥᔪᑦ ᓇᓚᐅᑦ ᑖᑦ ᑎᐊᕐ ᓂᖅᓴ ᐅᓂᐊᖅᑐᓂᒃ ᐊᒻ ᒪᓗ ᑕᒻ ᒪᖅᓯᒪᖕ ᓂᖅᓴ ᐅᔪᓐ ᓇᖅᑐᓂᒃ ᑕᑯᔭ ᐅᔪᓐ ᓇᑦ ᑎᐊᖕᖏᖕ ᑐᒃ ᑐᐃᑦ ᖃᖕᒋᔫᒃ ᑯᑦ ᐊᔾ ᔨ ᓕᐅᖅᑕᐅᓚᐅᕐ ᓂᖏᓐ. ᐊᒻ ᒪᑕᐅᖅ, ᐊᑯ ᓂᐅᓂᖅᓴ ᖅ ᐱᕕᒃ ᓴᖅᓇᐊᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᖕᕿᑎᑎᒍᑦ ᐱᓕᕆᔾ ᐅᑎᑕᐅᔪᑦ ᓈᓴ ᐃᔾ ᐅᕙᓚᐅᖅᑐᑦ ᐊᔾ ᔨ ᓕᐅᖅᑕᐅᔪ ᓂᒃ ᐊᔾ ᔨ ᕐᑯᑎᖏ ᓂᒃ ᐅᔾ ᔨᖅᑐᑦ ᑎᐊᕆᐊᖅᑕᕐ ᓂᕐ ᒧᑦ ᐊᖕᕋᒥᒃ ᐳᓴᓐ ᑎᑎᒧᑦ ᐊᒥ ᓲ ᓂᖏᓐ ᑐᒃ ᑐᐃᑦ ᓇᓂᔭ ᐅᓯᒪᔭ ᕆᐊᖅᑕᕐ ᓂᖕᒋ ᓄᑦ.

ᓇᓚᐅᑖᖅ ᑕᐅᓯᒪ ᓕᖅ ᐳᑦ ᐊᑕᐅᓯᐅᑉ ᐅᖕᓖᓂ ᐅᑭᐅᖑᑦ 1+ ᑐᒃ ᑐᐃᑦ ᓄᕐ ᕆᕕᖕ ᓃᓚᐅᖅᑐᑦ ᑕᒪ ᓅᓐ ᓂᖏᓐ ᓇᓴ ᐅᑎᓕᖕ ᓂ 6,919 (95% ᐳᓴᓐ ᑎᓂᒃ ᓇᓗᓇᕐ ᓂᓖᑦ (CI) = 5,415-8,843) ᑐᒃ ᑐᖏᓐ. ᐃᓚᔭ ᐅᓕ ᓗᑎᒃ ᑕᒪᒃ ᑯᐊ ᓈᓴ ᐅᑎᑦ ᓴᕿᑎᑕᐅᓚᐅᖅᑐᓄᑦ ᖃᐅᔨ ᓴᖅ ᑕᐅᕌᓂᓚᐅᖅᑐᓄᑦ, ᓇᓚᐅᑖᖅ ᑕᐅᓯᒪ ᓕᖅ ᑐᑦ ᐊᕐ ᓇᐃᓪ ᓗ ᐊᒥ ᓲ ᓂᖏᓐ ᓄᓕᐊᕈᓐ ᓇᕐ ᓂᖏᓐ ᑕᒪ ᓅᓐ ᓂᖏᓐ 3,636 (ᓇᓗᓇᕐ ᓂᓖᑦ = 2,709-4,880). ᓇᓚᐅᑖᖅ ᑕᐅᓂᖏᓐ ᑐᑭ ᓕᐅᑐᐃᓐ ᓇᑦ ᑎᐊᖅᓯᑎᒃ ᑕᒻ ᒪᖅᓯᒪᔾᔪᖏᑦᑐᑦ ᐊᔾ ᔨ ᕆᖕ ᓂᖅᑲᕈᓐ ᓇᑦ ᑐᑦ (CV) 13.9% ᐳᓴᓐ ᑎᓂᒃ. ᓇᓚᐅᑕᖅ ᑕᐅᓚᐅᖅᑐᑦ ᐃᓐ ᓇᐅᓂᖏᓐ ᐱᕈᐊᓂᒃ ᓯᒪᔪᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᑐᒃ ᑐᐃᑦ ᖃᐅᔨ ᓴᕐ ᕙᐅᓚᐅᖅᑐᓅᑦ ᑐᑦ ᐃᒪᓐ ᓇᑎᕆ ᐊᒥ ᓲ ᓂᖅᖅᑐᑦ 5,162 (ᓇᓗᓇᕐ ᓂᓖᑦ = 3,935 - 6,771). ᐊᒥᔅ ᓲ ᓂᖏᓐ ᐱᕈᐊᓂᒃ ᓯᒪᔪᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᓄᓕᐊᖅᑐᑦ ᐊᒥ ᓲ ᓂᖅᓴ ᐅᓚᐅᖅᑐᑦ (70.4% ᐳᓴᓐ ᑎᖕᖏᓐ ᑐᑦ) ᑕᐃᔅ ᓱᒪ ᓂᐅᓚᐅᖅᑐᒥᒃ 2015 (60.9% ᐳᓴᓐ ᑎᓂᒃ). ᑐᒃ ᑐᐃᑦ ᑲᑎᖕᖓᑦ ᐊᒥ ᓲ ᓂᖏᓐ ᓇᓚᐅᑖᖅ ᑕᐅᓚᐅᖅᑐᑦ ᐊᑐᖅ ᑕᐅᓪ ᓗᑎᒃ ᓈᓴ ᐅᑏᑦ ᐊᒥ ᓲ ᓂᖏᓐ ᓂᒃ ᐱᕈᐊᓂᒃ ᓯᒪᔪᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᓄᓇᒥ ᖃᐅᔨ ᓴᕐ ᕙᐅᓚᐅᖅᑐᓂ, ᐊᕕᒃ ᑕᐅᓯᒪ ᓗᑎᒃ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᑕᒪ ᐃᓐ ᓂᒃ ᐊᒥ ᓲ ᓂᖏᓐ ᑐᒃ ᑐᓂ ᑕᒪ ᐃᓐ ᓂᒃ ᑕᐃᑲ ᖕᒑ ᐊᕐ ᕋᒎ ᓚᐅᖅᑐᒥᒃ ᓇᓚᐅᑖᖅ ᑕᐅᓚᐅᖅ ᓯᒪᔪ ᓂᒃ 2017-ᖕᒍᑎᓪ ᓗᒍ, ᐅᑭ ᐊᑉ ᔮᒃ ᑯᑦ ᓈᓴ ᖅ ᓴ ᑕᐅᓚᐅᖅ ᓯᒪᔪ ᓂ, ᑕᐃᒪ ᐃᓂᖕᒪᓂᓪ ᓗ ᓈᓴ ᖅ ᑕᐅᖃᑕᐅᓯᒪ ᓪ ᓗᑎᒃ ᐸᖕ ᓂᑦ. ᑐᑭ ᓯᔭ ᐅᓕᓚᐅᖅᑐᑦ ᓇᓚᐅᑖᖅ ᑕᐅᓂᖏᓐ ᐊᒥ ᓲ ᓂᖏᓐ ᓂᒃ ᕿᙵᐅᒻ ᒥ ᑐᒃ ᑐᓂᒃ ᐊᕐ ᕋᒍ ᒥ 2018-ᒥ, ᐃᒪᓐ ᓇᐃᓕᖕᒐᓚᐅᖅᑐᑦ ᓈᓴ ᐅᑎᖏᓐ ᐊᒥ ᓲ ᓂᖏᓐ ᓂ ᑐᒃ ᑐᐃᑦ 8,207 ᐅᑭ ᐅᓕᑦ ᒪᕐ ᕉᖕ ᓂᒃ ᐅᖕᓖᓅᓗᓐ ᓅᑦ (ᓇᓗᓇᕐ ᓂᓖᑦ = 6,218 - 10,831), ᓴᓂᐊᓂ ᐊᒥ ᓲ ᓂᖃᓚᐅᖅᑕᖏᓐ ᓂ ᐃᒪᓐ ᓇᐃᓕᖕᒐᓚᐅᖅᑐᓂᒃ 19,769 (ᓇᓗᓇᕐ ᓂᓖᑦ = 12,349 - 27,189) ᐊᕐ ᕋᒍ ᒥ 2015-ᒥ. ᐊᒥᔅ ᓲ ᖕᖏᖅᓴ ᐅᓕᖅᑐᑦ ᐊᕐ ᕋᒍ ᓂᒃ ᑕᐃᒪ ᖕᒑ 2015-ᒥᒃ - 2018-ᒧᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᓄᓕᐊᕈᓐ ᓇᕐ ᓂᖏᓐ ᑐᑭ ᓯᔭ ᐅᓚᐅᖅᑐᑦ ᑖᓐ ᓂᓐ ᓂᖅ 55.0% ᐳᓴᓐ ᑎᓂᒃ, ᑕᐃᒃ ᑯᐊᓗ ᐱᕈᐊᓂᒃ ᓯᒪᔪᑦ ᐊᕐ ᓇᐃᓪ ᓗ ᑕᒪ ᓅᓐ ᓂᖅ 61.0% ᐳᓴᓐ ᑎᓂᒃ ᐊᒻ ᒪᓗ ᑕᒪ ᐃᓐ ᓂᑦ ᑎᐊᖅ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓲ ᓂᖏᓐ ᓂᒃ ᐃᒪᓐ ᓇᐃᓕᖕᒐᓚᐅᖅᑐᑦ 58.5% ᐳᓴᓐ ᑎᒥᓐ ᓂᒃ. ᐊᒥᓲ ᔪᓐ ᓅᓯᒪ ᓂᖏᓐ ᑐᒃ ᑐᐃᑦ ᑕᒪ ᕐ ᒥᒃ ᑲᑎᓪ ᓗᒋᑦ

ᑐᑭᓯᓇᖅᑐᔮᖅᑐᑦ ᐊᕐᕌᒍᑕᒫᖅ ᑲᑕᒃᓯᒪᓂᖅ ᐃᒪᓐᓇᑎᒋ 25.5% ᐳᓴᓐᑎᓂᒃ ᐊᕐᕌᒍᒥᒃ 2015-ᒥᒃ 2018-ᒧᑦ. ᑕᒡᕘᓇ ᐊᒥᓲᔪᓐᓃᖅᓯᒪᓂᖏᑦ ᐱᔾᔪᑕᐅᔪᓐᓇᖏᓕᑦ ᐃᓱᒪᓘᑕᐅᕙᓐᓂᖏᓐᓄᑦ ᓈᓴᖅᑕᐅᖃᑦᑕᕐᓂᖏᓐᓂᒃ ᐱᐅᓯᕆᔭᐅᕙᒃᑐᑦ. ᓄᓇᒥ ᓇᓅᓐᓂᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᖃᑦᑕᕐᓂᖏᑦ ᑐᑭᓯᓇᖅᑐᑦ ᐱᕈᐊᓂᒃ ᓯᒪᔪᓂᖏᑦ ᐊᕐᓇᓪᓗᐃᑦ ᐆᒪᔪᓐᓇᕐᓂᖏᑦ (ᓇᓚᐅᑖᖅᑕᐅᓯᒪᔪᓂᒃ ᑕᒪᓅᓚᐅᕐᓂᖏᑦ 0.82-ᒥ ᐊᕐᕌᒍᒥ 2017-2018 ᐊᑐᖅᑕᐅᓂᖏᓐᓂ ᖃᐅᔨᓴᕈᓯᑦ ᑕᐃᔭ ᐅᔪᑦ BᐃᔮᓯᐊᓐBayesian ᓄᓇᓕᓐᓂ ᔪᑏᑦ ᐊᑐᓚᒃ ᓴᐃᑦ) ᐱᐅᓂᖅᓴᐅᓕᓚᐅᕐ ᒪᑕ ᑕᐃᒪᓐᓂᒃ 2015-ᖑᓚᐅᖅᑐᒥᒃ ᐊᑐᖅᑕᐅᓕᕋᒥᒃ ᑭᓯᐊᓂᓕ ᓱᓕ ᐊᑕᓅᖃᑕᓚᐅᖅᑐᑦ ᑕᐃᒃ ᑯᓇᖓᓂ ᖃᐅᔨᒪᔭᐅᑎᐊᕐ ᓂᖏᓐᓂᒃ ᐊᒥᓲᓂᖃᕐ ᓂᖏᓐᓂᒃ (0.84-0.90-ᒥᑦ ᑐᓂᒃ). ᑕᒪ ᐃᓐᓂ ᓄᕐ ᓇᕙᓕ ᓕᐊᓂᖏᑦ (ᓄᕐ ᓇᔪᓐ ᓇᕐ ᓂᖏᓐ ᓂ ᐊᓪᓚᑦ ᓄᕐᓴᐃᑦ ᐆᒪ ᐃᓐ ᓇᕈᓐ ᓇᕐ ᓂᖏᓐ ᓂ) ᓯᕗᓂᐊᓂ ᐊᕐᕌᓘᑉ 1997 ᑕᒪ ᓅᓚᔪᒃ ᐸᓚᐅᖅᑐᑦ ᓇᓴ ᐅᑎᑎᒍᑦ ᐊᒥᓱᓂᖏᑦ 0.46-ᒥ, ᑕᒪ ᓅᓚᔪᒃ ᐸᓚᐅᓇᓕ ᓗᑎᒃ ᐊᕐᕌᒍᒥ 2011-ᒥᒃ 2018-ᒧᑦ ᓈᓴᐅᑎᖏᑦ 0.25-ᒦᑦ ᓱᑎᒃ, ᐊᑕᓅᑦ ᑎᐊᓚᐅᖅᑐᑦ ᖃᐅᔨᒪᔭᐅᓂᖏᓐ ᓂᒃ ᐱᑕᖃᕐ ᓂᖏᑦ ᑐᒃ ᑐᐃᑦ. ᑕᒪᒃ ᑯᐊ ᐊᑦ ᑎᒃ ᑐᒥᓐ ᓂᖏᑦ ᐊᒥᓲ ᓂᖏᑦ ᐱᔾ ᔪᑕᐅᓗᐊᖅᑐᒃ ᓴᐅᕝᕙᑦ ᐊᒥᓲᔪᓐ ᓃᕈᑕᐅᓂᖏᓐ ᓄᑦ ᑐᒃ ᑐᓄᑦ ᐊᕐᕌᒍᓂᒃ 2015-ᒥᒃ 2018-ᒧᑦ.

ᖃᐅᔨᑭᐊᖅᑕᐅᓚᒥᒃ ᓅᖃᑦᑕᕐ ᓂᖏᑦ ᖁᖓᔾᔨᑦ ᑎᖅᑕᐅᓯᒪᓂᖏᑦ ᐊᕐ ᓇᓕ ᓗᐃᑦ ᑐᒃ ᑐᖏᓐ ᓂ ᕿᖑᐅᑦ ᐊᓪ ᓚᓗ ᓴᓂᓕᓇᕙᒃ ᑕᖕᑕ ᖁᕐ ᓗᖅᑑᑉ ᓄᓇᖅ ᐱᖕᑕ ᑲᓇᖕ ᓇᖕᖓᓂ-Bluenose East-ᒥ ᐊᓪᓚᓗ ᑎᑉ ᔭᓕᖕᒥ Beverly ᑐᒃ ᑐᖏᑦ 2010-ᒥᒃ 2017-ᒧᑦ ᐊᕐᕌᒍᓂᓴ ᕿᑎᑦ ᑎᓚᐅᖅᑐᑦ ᓅᖃᑦᑕᖅ ᓯᒪᖏᖏᓐ ᓂᒃ ᐊᕐ ᓇᐃᓕ ᓗ ᑕᐃᒃ ᑯᓄᖕᖓ ᑕᐅᕗᖕᒍᓕ ᓗᓐ ᓅᑦ ᓴᓂᓕᓇᕙᒃ ᑕᖏᓐ ᓂᒃ ᑐᒃ ᑐᖃᕐ ᕝᕕᐅᕙᒃ ᑐᓂᒃ. ᑭᓯᐊᓂᓕᑦ ᑕᐅᖅ, ᑭᖕᖑᒪ ᒥ ᑐᒃ ᑐᖏᑦ ᐊᑯᓯᒪᔪᓪ ᒪᓇᐅᓕᓚᐅᓇᕗᑦ ᐊᓯ ᖏᓐ ᓄᑦ ᑕᒫ ᓂ ᐅᑭ ᐅᖑᓂᖕᓂ 2017-2018-ᒥ, ᐊᒥᓲᓂᖅᓴᐠ ᒪᓇᐅᓕ ᓗᑎᒃ ᑎᑉ ᓕᔭ ᓕᖕᒥ ᑐᒃ ᑐᓂᒃ ᓄᕐ ᓇᕙᓚᐅᖅᑐᓂᒃ ᓯᒡ ᔭᖅ ᐸᓯ ᐅᓂᖏᓐ ᓂ ᐆᔪ ᓕᖕᒥ/ᐊᕼᐃᐊᖅᒥ - Queen Maud Gulf-ᒥ, ᐊᒥᔅ ᓲᓂᖅᓴᐅᓕ ᓗᑎᒡ ᓗ ᑕᐃᒃ ᑯᐊ ᑐᒃ ᑐᖏᑦ ᑕᐅᕙᖕᖑᖅᓯᒪᔪᑦ ᐃᒪᓐᓇᑎᒋ ᓴᓂᓕᓇᒃ ᑐᓂᒃ ᐊᒥᓱᓂᖕᖑᖕ ᓂᒃ 12:1 ᑕᒫᓂ ᐊᕐᕌᒍᒥ 2018-ᒥ. ᑕᐃᒃ ᑯᓇᖕᖓ 11-ᖑᔪᓂᒃ ᕿᖑᐅᑉ ᑐᒃ ᑐᖏᓐ ᓂᒃ ᖁᖓᔾᔨᑦ ᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᓂᒃ ᓄᕐ ᓇᓚᐅᕐ ᓂᖏᓐ ᓂ ᕿᖑᐅᒪ ᓄᕐ ᓇᕝᕙᓂ ᓄᓇᒥ ᑕᒫᓂ ᔫᓂ 2017-ᖑᑎᓕ ᓗᒍ, ᐱᖓᔪᑦ ᐊᕐ ᓇᓕ ᓗᐃᑦ ᓅᑐᕝᕙᓂᐅᓚᐅᖅᑐᑦ ᐅᐱᕐ ᖑᐃ ᑯᑦ ᐊᕐᕌᒍᒥ 2018-ᒥ ᓯᒡ ᔭᖅ ᐸᓯ ᖕᖓᓄᑦ ᓄᕐ ᓇᕝᕙᖏᓐ ᓄᑦ ᐆᔪ ᓕᖕᒥ/ᐊᕼᐃᐊᖅᒥ ᐊᓪ ᓚᓗ ᐅᑎᕈᓐ ᓃᓚᐅᖅᓱᑎᒃ ᐊᕐᕌᒍᒥ ᑭᖑᐊᒍᑦ. ᐊᒥᔅ ᓲᖕᒋᓗᐊᕐ ᓂᖏᓐ ᓄᑦ ᐆᒃ ᑐᕋᐅᑎᑦ ᑕᒡ ᕙᓂ, ᑐᑭ ᓕᐅᖅᑕᐅᔭ ᓇᐊᖅᖅᑐᑦ ᐅᔾ ᔮᖅᑐᖅᑕᐅᑦ ᑎᐊᕐ ᓗᑎᒃ ᑭᓯᐊᓂ ᐃᓱᒪᓇᖅᐳᖅ ᐃᓚᖏᑦ (27% ᐳᓴᓐᑎᖏᑦ) ᑐᒃ ᑐᐃᑦ ᐊᕐ ᓇᓕ ᓗᐃᑦ ᓅᑦ ᑎᕝᕕᓂᐅᓇᓱᑭᔭ ᐅᓕᖅᑐᑦ ᐃᓚᓕᐅᑎᓯᒪᓕᖅᓱᑎᒃ ᑎᑉ ᔭᓕᐅᑉ ᑐᒃ ᑐᖏᓐ ᓄᑦ, ᑕᐃᒃ ᑯᐊᓗ ᐊᓯᖏᑦ 73% ᐳᓴᓐᑎᖏᑦ ᑕᐅᕝᕗᖏᓐ ᓇᖅᓱᑎᒃ ᕿᖑᐅᒥ ᓄᕐ ᓇᔭᖅᑐᕐ ᕝᕕᐅᖃᑦ ᑕᐃᓐ ᓇᕐ ᓂᖅᐹᖕ ᓂᖕᖓ. ᐊᓪ ᓚᑕᐅᖅ, ᖃᐅᔨᓴᕈᑎᑦ ᑕᐃᔭ ᐅᔪᑦ Bᐊᐃᔮᓯᐊᓂᒃ -Bayesian ᓄᓇᓕᓐᓂ ᔪᑏᑦ ᓇᓅᓐ ᓂᖏᓐ ᓂᓪ ᓗ ᐊᑐᖅᑕᐅᓚᐅᖅᐳᑦ ᓇᓚᐅᑖᕈᑕᐅᓂᕐ ᒧᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥᓱᓂᖏᓐ ᓂᒃ ᑕᒫᓂ 2018-ᖑᑎᓕ ᓗᖑ, ᒪᓕᒃ ᑕᐅᓕ ᓗᑎᒃ ᓄᓇᓕᓐᓂ ᔪᑎᖏᑦ, ᐊᑐᖅᑕᐅᓗᑎᒃ ᐊᑐᖅᑕᐅᙱᓕ ᓗᒥᑦ ᓗᓐ ᓅᑦ 2018-ᒥ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᓂᒃ ᓴᕿᑎᑕᐅᓚᐅᖅᑐᑦ. ᑕᒪᓐᓇ ᐃᓱᒪᓇᕈᑕᐅᔪᖅ ᑕᐃᒪᓐᓃᓐ ᓂᖏᓐ ᓂᒃ ᖄᓂᑭᔭᖏᓐ ᓂ 31% ᐳᓴᓐᑎᖏᓐᓂᑦ ᑐᑦ ᐊᕐ ᓇᓕ ᓗᐃᑦ ᓄᕐ ᓇᓚᐅᖅᑐᑦ ᓅᑦ ᑐᕝᕕᓂᐅᓚᐅᕐ ᓂᖏᓐ ᓂᒃ ᐆᔪ ᓕᖕᒧᑦ/ᐊᕼᐃᐊᖅᒧᑦ ᓯᒡ ᔭᖅ ᐸᓯ ᐅᓂᖕᖓᓄᑦ ᓄᕐ ᓇᕝᕙ ᓄᑦ ᐊᓪ ᓚᓗ ᑕᒫᓃᓐ ᓂᖏᓐ ᓂᒃ 69% ᐳᓴᓐᑎᖏᓐ ᓂ ᐊᒥᐊᒃ ᑯᖏᑦ ᑕᐅᓄᖕᖑᐅᖃᑦᑕᖅᑐᑦ ᓄᓇᖏᓐ ᓄᑦ ᓄᕐ ᓇᕝᕙᐅᖃᑦ ᑕᐃᓐ ᓇᖅᑐᑐᖃᐅᔪ ᓄᑦ ᕿᖑᐅᒥ. ᑖᒃ ᑯᐊᒃ ᒪᕐ ᕉᒃ ᓇᓚᐅᑖᕈᑏᒃ ᐃᓱᒪᓇᖅᐳᑦ ᖃᓂᒋᔭᖕᖏᓐᓂᖅ ᑕᒫᓂ 70% ᐳᓴᓐᑎᖏᑦ ᕿᖑᐅᒥ ᐊᕐ ᓇᓕ ᓗᐃᑦ ᓄᕐ ᓇᕙᒃ ᑐᑦ ᑕᐅᕗᖑᐅᖃᑕᐃᓐ ᓇᖅᑐᑦ ᑕᐃᒪᖕᖓᓂᒃ ᐊᑐᖅᐸᓚᐅᕐ ᓂᖏᓐ ᓂᒃ ᐊᕐᕌᒍᒥ 1996-ᖑᑎᓕ ᓗᒍ ᓱᓕ ᐊᑐᖃᑕᖅᐳᑦ ᑕᐃᒃ ᑯᓂᖕᖑᓴᐃᓐ ᓇᖅ ᐊᕐᕌᒍᒥ 2018-ᒥ, ᑭᓯᐊᓂᓕ ᑕᒪᓐᓇ ᑐᙵᕕᖃᖅᐳᖅ ᐃᓚᒃᑐᔪᓂᒃ ᐊᒥᔅ ᓲᖑᑎᓂᓪ ᓗᓐ ᓅᑦ ᖃᐅᔨᔭᐅᓯᒪᔪᓂᒃ ᐊᓪ ᓚᓗ ᖃᓄᐃᓕᕙᓕ ᓕᐊᔪᔾᔪᕐ ᓂᖏᓐ ᓂᒃ ᓇᓚᐅᑖᕈᑕᐅᔪᓂᒃ, ᑐᑭ ᓕᐅᖅᑕᐅᑦ ᑎᐊᕋᓱᑭᐊᖅᖅᐳᑦ ᑕᐃᒪᓐ ᓇᐃᓂᖕᖓᓐᓂᑦ ᐅᔾ ᔮᖅᑐᑦ ᑎᐊᕐ ᓗᑎᒃ. ᑕᒫᓂᓕ ᔫᓐ 2019-ᒥ, ᐱᖓᔪᑦ ᑕᐃᒃ ᑯᓇᖕᖓ ᑲᑎᓕ ᓗᒋᑦ ᑕᒪ ᐃᓐᓂᒃ 17-ᖑᓚᐅᖅᑐᓂᒃ (17.6% ᐳᓴᓐᑎᖕᖑᓂᑦ ᑐᑦ) ᖁᖓᔾᔨᑦ ᑎᖅᑕᐅᓯᒪᔪᑦ ᐊᕐ ᓇᓕ ᓗᐃᑦ ᕿᖑᐅᒥ ᓄᕐ ᓇᕝᕙᓃᓚᐅᖅᑐᑦ ᔫᓐᓂᒥ 2018-ᖑᓚᐅᖅᑐᖅ ᓅᓚᐅᖅᐳᑦ ᑲᓇᖕ ᓇᓪ ᒪᓇᖕᖓᓄᑦ ᕿᖑᐅᑉ, ᑕᐃᒃ ᑯᓂᖕᖓᐃᓚᓕᐅᑎᓗᑎᒃ Beverly-ᒥ ᑎᑉ ᔭᓕᖕᒥ ᖁᖓᔾᔨᑦ ᑎᖅᑕᐅᓯᒪᔪᓂᒃ ᐊᕐ ᓇᓕ ᓗᕐ ᓂᒃ, ᐃᓱᒪᓇᖅᓱ ᓗᑎᒃ ᐃᓚᖏᑦ ᓅᑉ ᐸᓕ ᓕᐊᓱᒪᔪᑦ ᑲᓇᖕ ᓇᖕᖓᓄᑦ ᕿᖑᐅᒥᒃ ᐊᕐ ᓇᐃᓕ ᓗᑲᔪᓯᕙᓕ ᓕᐊᑐᐃᓐ ᓇᖅᑕᓕᕐ ᓂᖏᓐ ᓂᒃ. ᐃᓱᒪᒋᔭᐅᖁᔭᕗᑦ ᖃᐅᔨᓴᖅᑕᐅᔾ ᒪᓇᐊᓘᖁᔭ ᐅᓂᖅ ᐊᒡ ᒋᖅᑐᓂ ᐊᕐᕌᒎᓂᐊᓕᖅᑐᓂ, ᓈᓴᖅᑕᐅᒋ ᐊᖃᑦᕐ ᓗᑎᒡ ᓗ ᒪᕐ ᕈᑖᒃ ᐊᕐᕌᒍᑖᒃ, ᐊᕐᕌᒍᑖᕐ ᓗ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ ᐊᕐ ᓇᐃᓕ ᓗ ᐆᒪ ᐃᓐ ᓇᕈᓐ ᓇᕐ ᓂᖏᑦ, ᓄᕐ ᓇᕙᓕ ᓕᐊᖃᑦᕐ ᓂᖏᓐ ᓗ ᐊᓪ ᓚᓗ ᓄᕐ ᖃᖏᑦ ᐆᒪ ᐃᓐ ᓇᕈᓐ ᓇᕐ ᓂᖏᑦ, ᑖᒃ ᑯᓇᓂ ᑐᒃ ᑐᓂ, ᐊᓪ ᓚᓗ ᐊᒥᓲᓂᖅᓴᐅᓕᖅᑎᑕᐅᓗᑎᒃ ᖁᖓᔾᔨᑦ ᑎᖅᑕᐅᓯᒪᓂᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᓇᕐ ᓂᐊᕐ ᒪᑕᒪᓕᒃ ᑕᐅᔭᕐ ᓗᑎᒃ, ᐊᐅᓚᑕᐅᓂᖏᓐ ᓂ.

Government of Northwest Territories Gouvernement des Territoires du Nord-Ouest

ESTIMATES OF BREEDING FEMALES & ADULT HERD SIZE AND ANALYSES OF DEMOGRAPHICS FOR THE BATHURST HERD OF BARREN-GROUND CARIBOU: 2018 CALVING GROUND PHOTOGRAPHIC SURVEY

Jan Adamczewski[1], John Boulanger[2], Heather Sayine-Crawford[1], John Nishi[3], Dean Cluff[1], Judy Williams[1], and Lisa-Marie LeClerc[4]

[1] Environment and Natural Resources, Government of Northwest Territories

[2] Integrated Ecological Research, Nelson, BC

[3] EcoBorealis Consulting Inc., Millarville, AB

[4] Department of Environment, Government of Nunavut

2019

Manuscript Report No. 279

ABSTRACT

This report describes the results of a calving ground photo survey of the Bathurst caribou herd conducted in June of 2018 near Bathurst Inlet in Nunavut (NU). The main objectives were to estimate the numbers of breeding females, adult females, and adults in the herd, to compare with results of previous calving ground surveys of this herd, the last of them in 2015.

We flew a systematic reconnaissance survey with transects at ten km intervals over an area defined primarily by locations of collared female caribou. Adjacent areas were also flown to ensure that the distribution of females was fully defined. The results were used to assess how far calving had progressed, allocate survey effort to geographic strata of similar caribou density, and time the aerial photography to coincide with the peak of calving. Based on average daily movement rates of collared females falling below a threshold of 5 km/day on June 8, and observed proportions of cows with calves from fixed-wing flying, it appeared that the peak of calving would occur on or soon after June 8. The photo plane survey was flown with excellent field conditions (blue skies) on June 8. We delineated one photographic stratum where most of the cows were seen and which contained 12 of the 17 active cow collars, west of Bathurst Inlet. On June 8 and 9 we also conducted visual surveys of two other strata with lower densities of female caribou and five collared cows, on either side of Bathurst Inlet.

Snow cover was patchy in much of the survey area, which made caribou more difficult to see. For the visual surveys, we used a double observer method to estimate and correct for sightability of caribou. A double observer method was also used to estimate and correct for sightability of caribou on the aerial photographs. In addition, extra time was taken by the contract staff who counted the aerial photos to make sure that a very high percentage of caribou were found.

The estimate of 1+ year old caribou on the core calving ground was 6,919 (95% confidence interval (CI) =5,415-8,843) caribou. Combining these numbers with the results of the

composition survey, the estimate of breeding females was 3,636 (CI=2,709-4,880). This estimate was reasonably precise with a coefficient of variation (CV) of 13.9%. The estimate of adult females in the survey area was 5,162 (CI=3,935-6,771). The proportion of adult females classified as breeding was higher (70.4%) than in 2015 (60.9%). Herd size was estimated as the number of adult females on the survey area divided by the proportion of females in the herd from a 2017 fall composition survey, thus accounting for the bulls in the herd. The resulting estimate of Bathurst herd size in 2018 was 8,207 caribou at least two years old (CI=6,218-10,831), compared to 19,769 (CI=12,349-27,189) in 2015.

Reductions from 2015-2018 in estimates of breeding females were 55.0%, in adult females 61.0% and in overall herd size 58.5%. The reduction in herd size indicates an annual rate of decline of 25.5% 2015-2018. This decline could not be attributed to issues with survey methods. Demographic analysis indicates that adult female survival rates (estimated at 0.82 for 2017-2018 using a Bayesian demographic model) had improved from 2015 but continued to be below levels associated with stable populations (0.84-0.90). Overall calf productivity (the product of fecundity and calf survival) prior to 1997 averaged 0.46 while the average for 2011-2018 was 0.25 and was well below levels associated with stable populations. These low vital rates likely account for much of the decline 2015-2018.

Assessment of movement of collared females between the Bathurst and neighbouring Bluenose-East and Beverly calving grounds 2010-2017 showed minimal movement of cows to or from neighbouring herds. However, the Bathurst herd was heavily mixed throughout winter 2017-2018 with the much larger Beverly herd that calves in the coastal lowlands along the Queen Maud Gulf, and was outnumbered by that herd by a ratio of about 12:1 in 2018. Of 11 Bathurst collared cows that were known to have calved on the Bathurst calving ground in June 2017, three moved in the spring of 2018 to the coastal calving ground along the Queen Maud Gulf and did not return later in the year. This is a limited sample and should be interpreted cautiously, but it suggests that a portion (27%) of the herd's cows may have emigrated and joined the Beverly herd while 73% remained on the main Bathurst calving ground. In addition, the Bayesian demographic model was used to project the herd's likely size in 2018 based on its demographics, including or not including the 2018 survey results.

This suggested that about 31% of the cows might have emigrated to the Queen Maud Gulf coastal calving area and about 69% remained on the main Bathurst calving ground. The two estimates suggest that roughly 70% of the Bathurst cows remained on the Bathurst calving ground that the herd has used since 1996 in 2018, but this is based on limited data and model projections, and should be interpreted with caution. In June 2019, three of 17 (17.6%) collared cows that were on the Bathurst calving ground in June 2018 moved well east of Bathurst Inlet with Beverly collared females, suggesting that some eastward emigration of Bathurst cows had continued.

We suggest close monitoring of the herd in the next few years, including population surveys every two years, annual monitoring of cow survival, calf productivity and calf survival for this herd, and increased collar numbers for monitoring and management.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The Bathurst herd's calving grounds have been found since 1996 west of Bathurst Inlet (Figure 1). The herd's summer range includes the calving ground as well as areas south of it. The winter range is primarily in the Northwest Territories (NWT) and in some years has extended as far south as Saskatchewan.

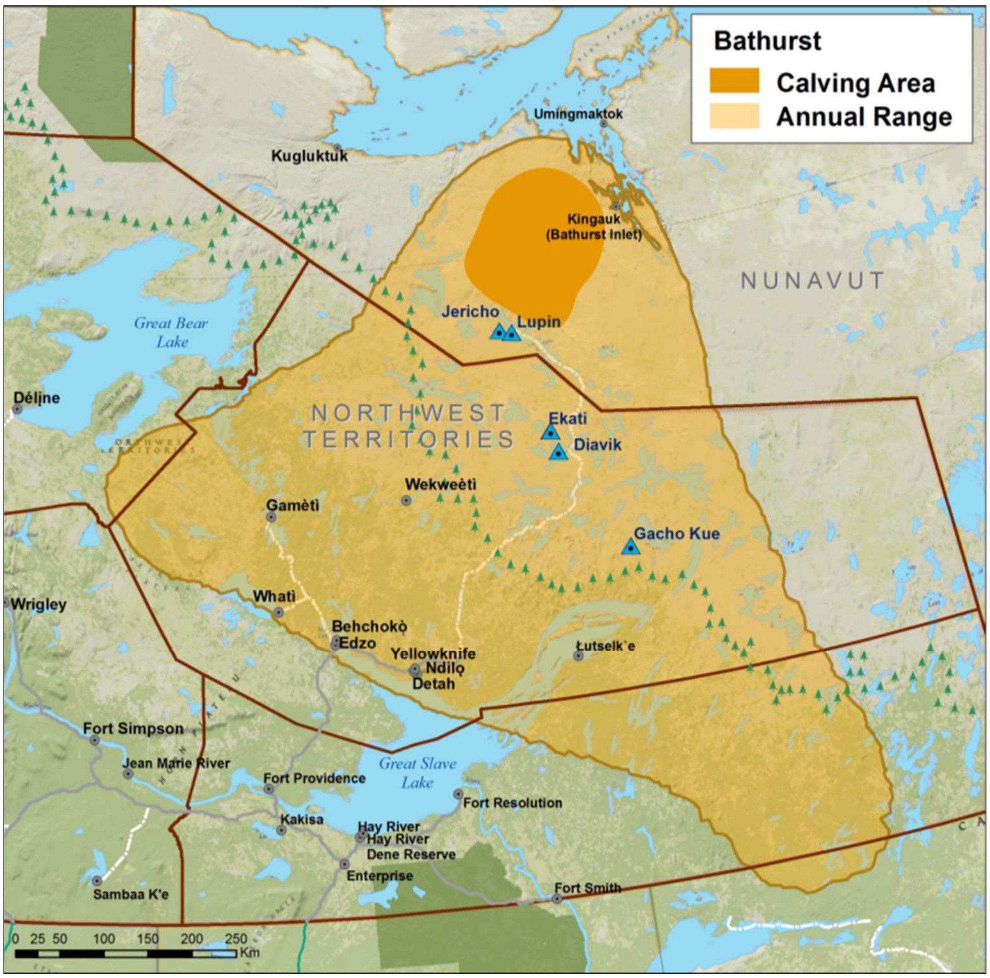


Figure 3: Annual range and calving grounds for the Bathurst herd, 1996-2009, based on accumulated radio collar locations of cows (Nagy et al. 2011). The calving area and a portion of the summer range are in Nunavut (NU) and the rest of the range is mostly in the NWT. At high numbers the herd has occasionally wintered as far south as Saskatchewan. The Gahcho Kué, Ekati and Diavik mines were in active production in 2018 and the Jericho and Lupin mine-sites were under care and maintenance with minimal maintenance staff.

In recent years (2009-2018) the herd's range has contracted as the herd has declined to low numbers, and the herd has wintered near tree-line or on the tundra since 2014. This herd has long been a key country food and cultural resource for Indigenous cultures in the NWT (e.g. Legat et al. 2014, Jacobsen et al. 2016), and the decline and associated harvest restrictions (e.g. WRRB 2016) have resulted in hardships in several communities. In addition, this herd was harvested by big-game outfitters and by NWT resident hunters until 2010 (Adamczewski et al. 2009, Boulanger et al. 2011).

This report describes results of a calving ground photo-survey of the Bathurst caribou herd conducted during June of 2018. A survey of the Bluenose-East herd's calving grounds west of Kugluktuk (Figure 2) was carried out at the same time and the results are reported separately (Boulanger et al. 2019). A survey of the Beverly calving grounds in the Queen Maud Gulf area was also carried out by biologists with the Government of NU (GN) in June 2018 and those results will also be reported separately (Campbell et al. 2019). The Beverly systematic survey transects began next to the Bathurst survey transects east of Bathurst Inlet, and transects were also flown between the Bathurst and Bluenose-East calving grounds, resulting in continuous coverage of the three calving grounds and areas between them.

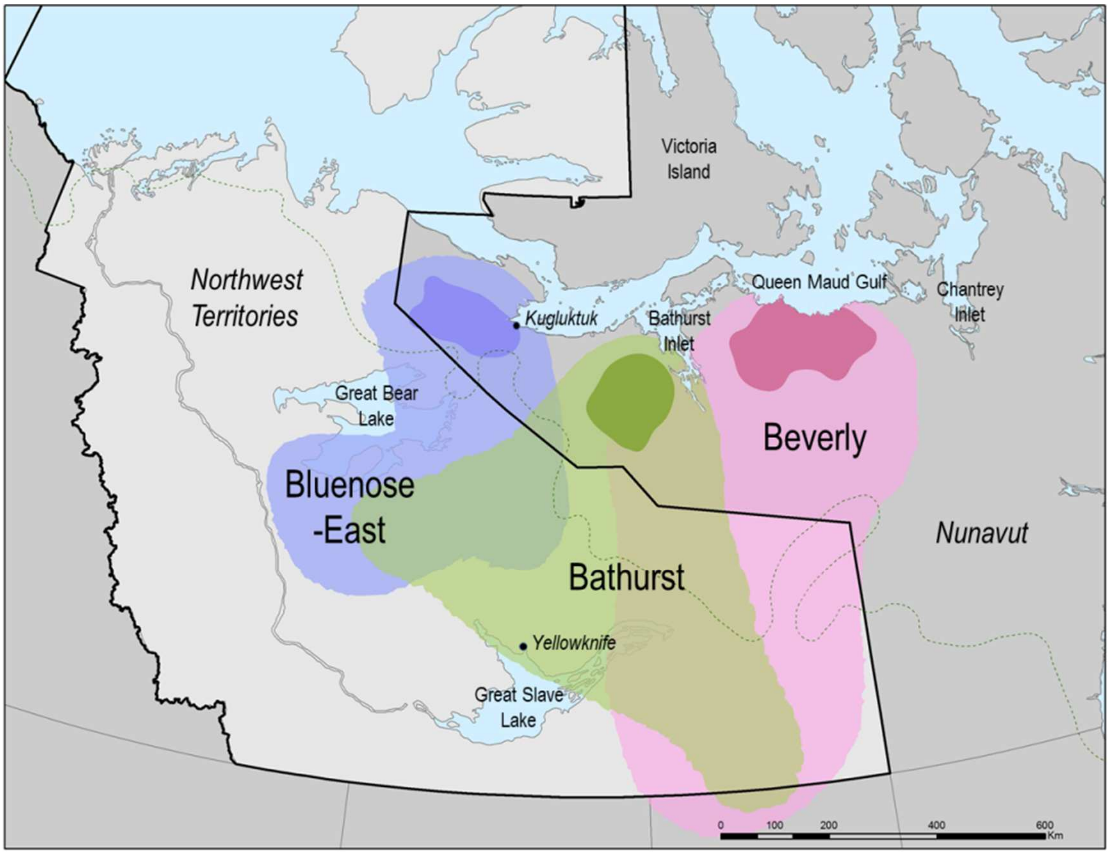


Figure 2: Annual ranges and calving grounds of the Bluenose-East, Bathurst, and Beverly[1] herds, based on accumulated radio collar locations of cows (Nagy et al. 2011). Other herd ranges west and east of these three herds were omitted for simplicity.

Calving ground photo surveys of the Bathurst herd have been carried out since the 1980s and the herd reached peak numbers estimated at 472,000 in 1986 (Figure 3). Surveys have been carried out at 3-year intervals since 2003 when a substantial decline in the herd was detected. The herd initially declined slowly in the 1990s and then at a more rapid pace after 2003. The most rapid decline was between 2006 and 2009 when the herd decreased from over 100,000 to just 32,000 in three years. A demographic evaluation of the herd's decline until 2009, including the role of harvest in the accelerated decline 2006-2009, was carried

[1] The Beverly herd described in this report is the herd defined by the GN as calving in the central and western Queen Maud Gulf. This herd does not correspond exactly to the Beverly herd defined prior to 2009 with an inland calving ground south of Garry Lakes (Adamczewski et al. 2015).

out by Boulanger et al. (2011). The last calving photo survey of the Bathurst herd in 2015 was described by Boulanger et al. (2017).

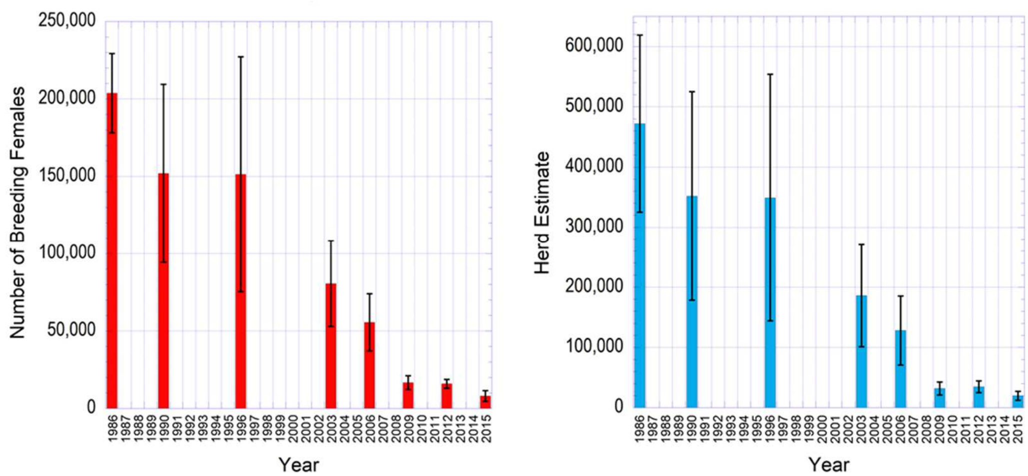


Figure 3: Estimates of breeding females on the left (red) and extrapolated herd size on the right (blue) from 1986-2015, based on calving ground photo surveys of the Bathurst caribou herd. Estimates are shown with 95% Confidence Intervals.

METHODS

Basic Methodology

The calving ground photographic survey was conducted as a sequence of steps described briefly below, then in greater detail in following text.

1. Locations of collared female caribou and prior surveys of this herd's calving grounds were used to define the main area for the survey. Outlying adjacent areas were also flown.

2. A systematic reconnaissance survey was carried out before the peak of calving with transects spaced at 10 km intervals. The same 10 km grid system used to locate transects has been used since 2009. These allowed us to delineate areas where breeding and non-breeding females, bulls and yearlings were found on or near the calving ground. Timing of calving was assessed by evaluating the relative proportion of cows with newborn calves seen during the reconnaissance survey, and from reduced movement rates of collared cows associated with calving.

3. Using information on caribou density and composition derived from the reconnaissance survey, we defined strata (or survey blocks) that would be surveyed again at higher rates of coverage by photographic or visual transects. We allocated aerial photography to one stratum with the highest densities of breeding cows and the bulk of the collared cows. Two visual strata with lower densities of cows were also defined and flown east and west of Bathurst Inlet.

4. We initiated the helicopter-based composition survey soon after the photographic and visual surveys of the calving area. The composition survey crew classified larger groups (i.e. more than about 30-50 caribou) on the ground and classified smaller groups primarily from the air. Groups of caribou in each stratum were classified to determine the proportions of breeding and non-breeding cows, as well as bulls and yearlings.

5. We derived an estimate of breeding females using the estimates of total caribou at least one year old within each stratum, and the proportion of breeding females within that stratum. The total number of adult females was estimated from the proportion of females and the estimate of caribou at least one year old in the survey area.

6. The adult female estimate was used to extrapolate the total size of the Bathurst herd (caribou at least two years old) by accounting for males, using an estimate of the bull:cow ratio from a fall composition survey flown in October 2017.

7. Demographic data for the herd, the new estimates and collar movement data were used in trend analyses and population modeling to further evaluate population changes from 2015-2018 and their likely causes.

Analysis of Collared Caribou Data

Twenty-four collared female caribou were initially considered during the Bathurst June 2018 survey. Two of these reported rarely or erratically and were not considered in survey planning. A further two collars were well south of the survey area in June and not associated with any calving ground, and were also not considered in survey planning. Of the remaining 20 collars, three moved in May-June to the Queen Maud Gulf coastal calving ground with collared Beverly cows, and did not return. This left 17 active cow collars in the Bathurst Inlet area in June 2018. Of these 17, 12 were found within the eventual high density photo block, four in the eventual visual east block and one was just south of the eventual visual west block. Movement rates of these collared caribou females were monitored daily to help identify the timing of the peak of calving. Previous experience (e.g. Gunn et al. 2005, Boulanger et al. 2019) had shown that average daily movement rates of collared cows dropping below 5 km/day were a reliable indicator of the peak of calving.

Systematic Reconnaissance Survey to Delineate Strata

Kugluktuk was the main survey base of operations with two Cessna Caravans dedicated mostly to the Bluenose-East survey and to support the Bathurst survey; a third Cessna Caravan was based at the Ekati diamond mine (Figure 1). The Ekati Caravan flew most of the Bathurst reconnaissance survey and the visual strata, because the Caravans in Kugluktuk were grounded June 2-5 by poor weather. One of the two Caravans based at Kugluktuk flew part of the Bathurst visual survey strata.

Based on a systematic 10 km grid, reconnaissance transects were spaced at 10 km intervals to provide 8% coverage across the main calving area and in adjacent areas. Strip transects were 800 m in width, and caribou were counted within a 400 m strip on each side of the survey plane (Gunn and Russell 2008). For each side of the plane, strip width was defined by the wheel of the airplane on the inside, and a single thin rope attached to the wing strut that became horizontal during flight, served as the outside strip marker. Planes were flown at an average survey speed of 160 km/hour at an average altitude of 120 m above the ground to ensure that the strip width of the plane remained relatively constant.

Transects were spaced at 5 km intervals across the concentrated calving area to provide a more fine-grained assessment of the distribution and density of caribou. The initial focus was on delineating the annual concentrated calving area based primarily on the distribution of collared caribou cows. Once the main calving area had been covered, additional survey transects were flown adjacent to the concentrated calving area (north, west and south) to make sure that no substantial numbers of female caribou were missed. Using the systematic 10 km grid, transects were extended at least one 10 km segment past the last caribou seen.

The GN Beverly caribou survey started on June 5 and coverage started east of Bathurst Inlet and immediately adjacent to our systematic reconnaissance survey of the Bathurst calving ground (Campbell et al. 2019). We communicated daily with the GN survey crew during the Bathurst calving ground survey. We also flew survey transects west of the main Bathurst survey area at 20 km spacing to extend coverage to the Bluenose-East systematic survey area near Kugluktuk (Boulanger et al. 2019).

Two observers, one seated in front of the other, and a recorder were used on each side of the airplane to minimize the chance of missing caribou. Previous research (Boulanger et al. 2010) demonstrated that two observers usually saw more caribou than a single observer. In addition, analysis of the sighting patterns of observer pairs allowed for assessment of what was likely missed (Boulanger et al. 2010). Double observer methods have been used on other recent Bathurst calving ground photographic surveys (e.g. Boulanger et al. 2017). The two observers on the same side communicated to ensure that groups of caribou were not double counted.

On the reconnaissance survey, caribou groups were classified by whether they contained breeding females. Breeding females were cows with hard antlers or cows with newborn calves. A mature female with hard antlers is an indicator that the female has yet to give birth or has just given birth, as cows usually shed their antlers within a week after birth (Whitten 1995). Caribou groups were classified as non-breeders based on the absence of breeding females and newborn calves, and substantial representation of yearlings (identified by a short face and a small body), bulls (identified by thick, dark antlers in velvet and a large body), and non-antlered or females with short antlers in velvet. The speed of the fixed-wing aircraft and observer experience did not allow all caribou to be classified. Thus, the focus was on identifying breeding cows if they were present, and otherwise on the most common types of caribou present. In most cases, each group was recorded individually, but in some cases groups were combined if the numbers were larger and distribution was more continuous. Data were recorded on Trimble YUMA 2 tablets (Figure 4).

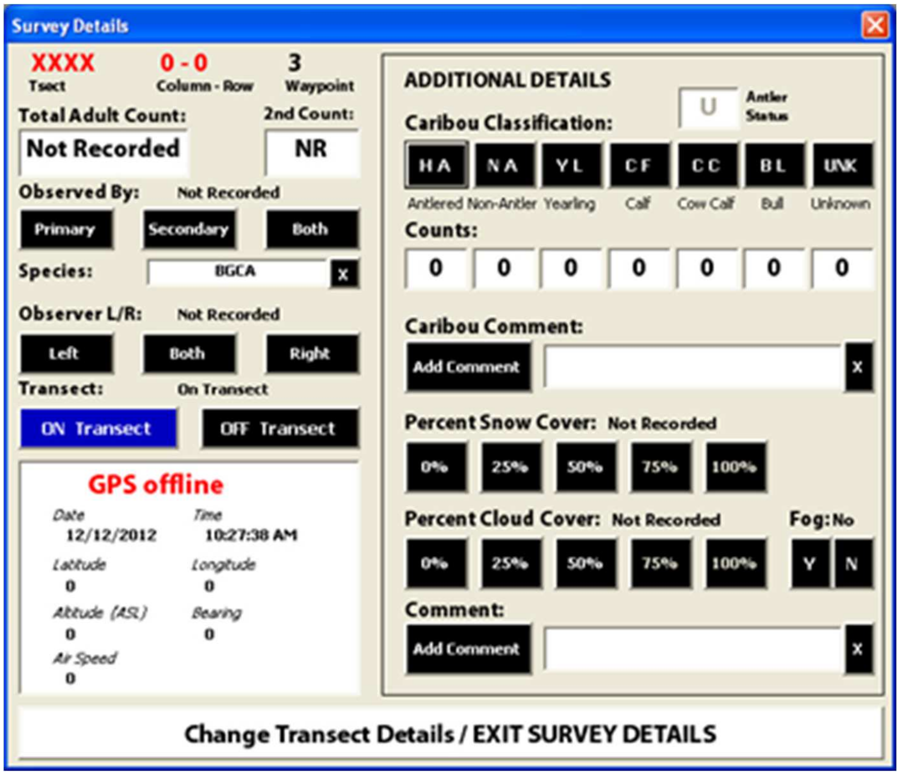


Figure 4: The tablet data entry screen used during reconnaissance and visual survey flying on the Bathurst June 2018 survey. A GPS waypoint was recorded for each observation. The unique segment unit number was also assigned by the software for each observation to summarize caribou density and composition along transect lines.

As each data point was entered, a real-time GPS waypoint was generated, allowing geo-referencing of the survey observations. Other large animals like moose, muskoxen and carnivores were also recorded with a GPS location.

North-south oriented transects were divided into 10 km segments to summarize the density and distribution of geo-referenced caribou counts. The density of each segment was estimated by dividing the count of caribou by the survey area of the segment (0.8 km strip width x 10 km = 8 km^2). The segment was classified as a breeder segment if at least one breeding female caribou or newborn calf was identified. Segments were then displayed spatially and used to delineate strata within the annual concentrated calving area based on the composition and density of the segments. During the survey, daily weather briefings were provided by Dr. Max Dupilka (Beaumont, AB) to assess current and future survey conditions.

Stratification and allocation of survey effort for photographic and visual estimates

The main objectives of the survey were to obtain precise and accurate estimates of breeding and adult female caribou on the calving ground, and to estimate overall adult herd size. To achieve this, the survey area was stratified using the results of the systematic reconnaissance survey, which is a process of grouping areas with similar densities into discrete strata. The stratum with the greatest caribou density was surveyed by the photo plane, with lower-density areas designated for visual surveys using a double observer method.

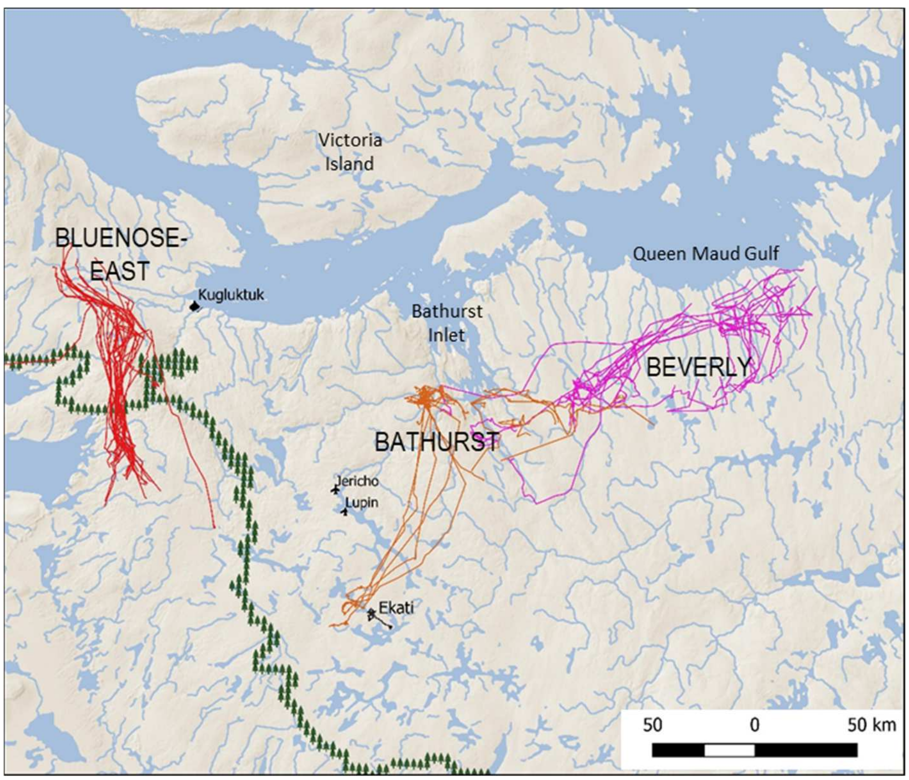


Figure 5: The northward paths of collared females (May 15 - June 11, 2018) from the Bluenose-East (red), Bathurst (orange), and Beverly (violet) caribou herds to their 2018 calving grounds.

In this survey, one photo stratum was defined west of Bathurst Inlet where most of the cows and most of the collared females (12 of 17) were observed. This was similar in size and location to the photo stratum in the June 2015 calving ground survey (Boulanger et al. 2017).

Five of the collared Bathurst female caribou showed an unusual movement in the spring that included a northward movement east of Bathurst Inlet and then a westward shift towards the Inlet and west of it at the beginning of June (Figure 5). As a result, a few Bathurst collared cows were found east and west of Bathurst Inlet at the time of the survey. The reconnaissance survey showed low numbers of caribou just west and east of Bathurst Inlet, with a majority of the caribou east of the Inlet being bulls and yearlings. We defined two low-density visual survey blocks, one east of Bathurst Inlet and one west of it.

Once the three survey strata were defined, an estimate of caribou numbers (animals at least 1+ year old) was derived from the reconnaissance data (Jolly 1969). The relative caribou numbers (and estimated variances) in each stratum were used to allocate survey effort and determine the numbers of transects to sample within each stratum.

Two approaches for allocation were considered for the aerial survey. First, optimal allocation was used to assign more effort to strata with higher densities, given that the amount of variation in counts is proportional to the relative density of caribou within the stratum. Optimal allocation was estimated using estimates of population size and variance for each stratum.

If strata were small, allocation was adjusted to ensure an adequate number of transect lines. For example, empirical results of previous surveys suggested that there should be a minimum of 10 transects per stratum to have good survey precision; in comparison, about 20 transects has been optimal for higher density areas. In general, coverage should be at least 15% with higher levels of coverage for higher density strata, for adequate precision. As populations become more clustered, a higher number of transect lines is required to achieve adequate precision (Thompson 1992, Krebs 1998).

Photographic Survey of High-density Stratum

GeodesyGroup Inc. aerial survey company (Calgary, AB) was contracted for the aerial photography in the 2018 June surveys. They used two survey aircraft, a Piper PA46-310P Jet-prop and a Piper PA31 Panther (Figure 6), each with a digital camera mounted in the belly of the aircraft. Survey altitude above ground level (AGL) to be flown for photos was determined at the time of stratification based on cloud ceilings and desired coverage. To ensure timely completion, both aircraft were used for the Bathurst photo block and all photos (Bathurst and Bluenose-East) were taken on June 8 with excellent survey conditions (blue skies). Coverage on each photo transect was continuous and overlapping so that stereo viewing of the photographed areas was possible.

Figure 6. Piper PA31 Panther aircraft used on Bathurst photo survey in June 2018 by GeodesyGroup Inc.

Caribou on the aerial photos were counted by a team of photo interpreters and supervised by Derek Fisher, president of GreenLink Forestry Inc., (Edmonton, AB) using specialized software and glasses that allowed three dimensional (3D) viewing of photographic images. Two of the authors (J. Boulanger and J. Adamczewski) visited the GreenLink office in Edmonton to gain greater familiarity with this process in fall 2018. The number of caribou counted was tallied by stratum and transect.

The exact survey strip width of photo transects was determined using the geo-referenced digital photos by GreenLink Forestry. Due to differences in topography, the actual strip width varied slightly for each transect flown. Population size (number of caribou at least one year old) within a stratum is usually estimated as the product of the total area of the stratum (A) and the mean density ($\overline{D}$) of caribou observed within the strata ($\widehat{N} = \overline{D}A$) where density is estimated as the sum of all caribou counted on transect divided by the total area of transect sampling ($\overline{D}$=caribou counted/total transect area). An equivalent estimate of mean density can be derived by first estimating transect-specific densities of caribou ($\widehat{D}_i = caribou_i/area_i$) where $caribou_i$ is the number of caribou counted in each transect and $area_i$ is the transect area (as estimated by transect length X strip width). Each transect density is then weighted by the relative length of each transect line (w_i) to estimate mean density ($\overline{D}$) for the stratum. More exactly, $\overline{D} = \sum_i^n \widehat{D}_i w_i / \sum_i^n w_i$ where the weight (w_i) is the ratio of the length of each transect line (l_i) to the mean length of all transect lines($w_i = l_i/\overline{l_i}$) and n is the total number of transects sampled. Using this weighting term accommodates for different lengths of transect lines within the stratum, ensuring that each transect line contributed to the estimate in proportion to its length. Population size is then estimated using the standard formula ($\widehat{N} = \overline{D}A$) (Norton-Griffiths 1978).

When survey aircraft first flew north to Kugluktuk on June 1, snow cover on the survey area was 90% or greater, and in some areas nearly 100%. Over the following ten days, however, snow melted rapidly and in many areas on June 8, snow cover was highly variable and patchy. This made spotting caribou by observers in the Caravans challenging, and also made complete counting of caribou on the aerial photos more difficult. Caribou on snow-free ground were easy to see, but caribou on small snow patches or on their edges required extra effort to find. Two approaches were used to address this with the aerial photos: (1) observers took extra time to search all photos carefully, approximately doubling the time these counts usually take, and (2) a double observer method was used to estimate sightability of the caribou on photos for a subset of photos.

The double observer approach used was to systematically resample a subset of photos to estimate overall sightability in the stratum using a second independent photo interpreter. This 2-stage approach to estimation, where one stage is used to estimate detection rates that are then used to correct estimates in the second stage, has been applied to a variety of wildlife species (Thompson 1992, Barker 2008, Peters et al. 2014). The basic principle was to systematically resample the photo transects to allow an unbiased estimate of sightability from a subset of photos that were sampled by two independent observers. Systematic samples were taken by overlaying a grid over the photo transects and sampling photos that intersected the grid points.

This cross-validation process was modeled as a two-sample mark-recapture sample with caribou being "marked" in the original count and then "re-marked" in the second count for each photo resampled. Using this approach avoids the assumption that the second counter detects all the caribou on the photo. The Huggins closed N model (Huggins 1991) in program MARK (White and Burnham 1999) was used to estimate sightability. A session-specific sighting probability model was used, allowing unique sighting probabilities for the first and second photo interpreter to be estimated. Model selection methods were then used to assess whether there were differences in sightability for different strata sampled. The fit of models was evaluated using the Akaike Information Criterion (AIC) index of model fit. The model with the lowest AIC_c score [2] was considered the most parsimonious, thus minimizing estimate bias and optimizing precision (Burnham and Anderson 1998).

Non-independence of caribou counted in photos most likely caused over-dispersion of binomial variances. The over-dispersion parameter (c-hat) was estimated as the ratio of the bootstrapped (photo-based) and simple binomial variance. Sightability-corrected estimates of caribou were then generated as the original estimate of caribou on each stratum divided by the photo sightability estimate for the stratum. The delta method (Buckland et al. 1993) was used to estimate variance for the final estimate, thus accounting for variance in the original stratum estimate and in the sightability estimate.

Visual Surveys of Low-density Strata

Visual surveys were conducted in two low density strata, one west of Bathurst Inlet and one east of it. The Caravans were used with two observers and a recorder on each side of the aircraft. The numbers of caribou sighted by observers were entered into the Trimble YUMA 2 tablet computers and summarized by transect and stratum.

A double observer method was used to estimate the sighting probability of caribou during visual surveys. The double observer method involves one primary observer who sits in the

[2] The subscript "c" indicates an AIC score that is corrected for small sample sizes.

front seat of the plane, a secondary observer who sits behind the primary observer, and a recorder on the same side of the plane. Analysis of the caribou seen by each of the two observers in each pair allows for an assessment of caribou that were likely missed, and how sighting probabilities are affected by snow cover, cloud condition and the abilities of individual observers. A detailed description of the double observer methods, analyses and results is given in Appendix 1. The methods have also been described in detail in other calving photo survey reports (e.g. Boulanger et al. 2019). The results were used to estimate the proportions of caribou that were likely missed, and numbers of caribou estimated on the two visual survey blocks east and west of Bathurst Inlet were corrected accordingly.

Composition Survey of Caribou on the Calving Ground

The composition survey was carried out June 13-16. Caribou were classified in strata that contained significant numbers of breeding females (based on the reconnaissance transects) to estimate proportions of breeding females and other sex and age classes. This survey was based on aerial and ground-based observations of caribou groups, which provided a more accurate and representative sampling procedure for caribou composition compared to the coarse classification criteria applied to caribou groups observed during the reconnaissance survey. For the composition survey, a helicopter (Aerospatiale A-Star 350 BA) was used to systematically sample groups of caribou throughout the photographic stratum and the two visual strata.

Search effort (i.e. helicopter flight hours) was allocated primarily to the high-density photographic stratum and was distributed within the stratum by developing a predetermined flight route that systematically covered the stratum, and which was subsequently loaded in to a portable GPS unit. Caribou groups encountered during the flight route were classified and their locations stored. The most recent caribou collar locations were also stored as waypoints in the GPS unit, which permitted the navigator/observer to ensure that those general areas were searched. By comparing the actual flight track to the planned route and collar locations, the navigator/observer maintained a systematic search pattern through the stratum and ensured that a caribou group was classified only once. Search effort was also distributed within the visual survey strata in a similar manner, but fewer hours were flown within those two strata.

Caribou groups that comprised ~<50 individuals were classified from the air by a front-seat observer using motion-stabilized binoculars. Classified caribou counts were called out to a rear-seat data recorder who entered the data into a computer tablet. Caribou groups that were generally greater than 50-100 animals were classified on the ground to minimize potential disturbance. The pilot landed the helicopter a few hundred meters from the main group of caribou, upon which the survey team would walk to a suitable position to observe and sample the animals. Using binoculars or a spotting scope, the observer scanned across the group(s) to avoid double counting and called out classified caribou to the data recorder. In larger groups, classification did not include the entire group; the focus was on a representative sample of each group and on limiting disturbance to caribou.

Caribou were classified following the methods of Gunn et al. (1997) (and see Bergerud 1964, Whitten 1995) where antler status, presence/absence of an udder, and presence of a calf are used to categorize breeding status of females (Figure 7). Presence of a newborn calf, presence of hard antlers signifying recent or imminent calving, and presence of a distended udder were all considered as signaling a breeding cow that had either calved, was about to calve, or had likely just lost a calf. Cows lacking any of these criteria and cows with new (velvet) antler growth were considered non-breeders. Newborn calves, yearlings and bulls were also classified.

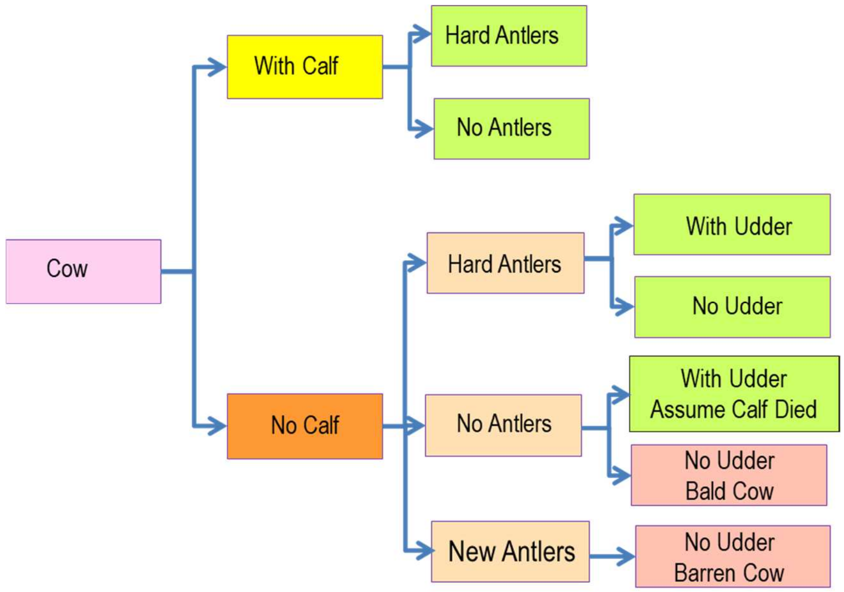


Figure 7: Classification of females used in composition survey of Bathurst caribou in June 2018. Green-shaded boxes were all classified as breeding females (diagram adapted from Gunn et al. 1997). Udder observation refers to a distended udder in a cow that has given birth. Hard antlers are from the previous year, and are distinct from new antlers growing in velvet.

The number of caribou in each group was summed as well as the numbers of bulls and yearlings (calves of the previous year) to estimate the proportion of breeding caribou on the calving ground. Bootstrap resampling methods (Manly 1997) were used to estimate standard errors (SEs) and percentile-based confidence limits for the proportion of breeding caribou.

Estimation of Breeding Females and Adult Females

The numbers of breeding females were estimated by multiplying the estimate of total (at least one year old) caribou on each stratum by the estimated proportion of breeding females in each stratum from the composition survey. This step basically eliminated the non-breeding females, yearlings, and bulls from the estimate of total caribou on the calving ground.

The number of adult females was estimated by multiplying the estimate of total (at least one year old) caribou on each stratum by the estimated proportion of adult females (breeding and non-breeding) in each stratum from the composition survey. This step basically eliminated the yearlings and bulls from the estimate of total caribou on the calving ground.

Each of the field measurements had an associated variance, and the delta method was used to estimate the total variance of breeding females under the assumption that the composition surveys and breeding female estimates were independent (Buckland et al. 1993).

Estimation of Adult Herd Size

Total herd size was estimated using two approaches. The first approach, which had been used in earlier calving ground surveys, assumed a fixed pregnancy rate for adult females, whereas the second approach avoided this assumption.

Estimation of Herd Size Assuming Fixed Pregnancy Rate and Estimated Sex Ratio

As a first step, the total number of adult females (at least two years old) in the herd was estimated by dividing the estimate of breeding females on the calving ground by an assumed pregnancy rate of 72% (Dauphiné 1976, Heard and Williams 1991). This pregnancy rate was based on a large sample of several hundred Qamanirjuaq caribou in the 1960s (Dauphiné 1976). The estimate of total females was then divided by the estimated proportion of females in the herd based on a bull:cow ratio from a fall composition survey conducted in October of 2017, to provide an estimate of total adult caribou in the herd (original methods described in Heard 1985, Heard and Williams 1991). This accounts for the bulls in the herd, very few of which are on the calving grounds in June. This estimator assumes that all breeding females were within survey strata areas during the calving ground survey and that the pregnancy rate of Bathurst caribou was 72% for 2017-2018. Note that this estimate corresponds to adult caribou at least two years old and does not include yearlings because yearling female caribou are not considered sexually mature.

Estimation of Herd Size Based on Estimates of Adult Females and Estimated Sex Ratio

An alternative extrapolated herd size estimator was developed to account for the effect of variable pregnancy rates as part of the 2014 Qamanirjuaq caribou herd survey (Campbell et al. 2015), and has been used in other recent calving photo surveys for the Bathurst herd (Boulanger et al. 2017), as well as the Bluenose-East herd (Adamczewski et al. 2017, Boulanger et al. 2019). This estimator first uses data from the composition survey to estimate the total proportion of adult females (breeding and non-breeding) and the numbers of adult females in each of the survey strata. The estimate of total adult females is then divided by the proportion of adult females (cows) in the herd from one or more fall composition surveys. This accounts for the bulls in the herd, very few of which are on the calving grounds in June. Using this approach, the fixed pregnancy rate is eliminated from the estimation procedure. Pregnancy rates do vary depending on cow condition (Cameron et al. 1993, Russell et al. 1998). This estimate assumes that all adult females (breeding and non-breeding) were within the photographic and visual survey strata during the calving ground survey. It makes no assumption about the pregnancy rate of the females and does not include the yearlings.

In calving ground photographic surveys since the 2014 Qamanirjuaq survey (Campbell et al. 2015), the estimate of females based on total adult females on the calving ground survey area, and adjusted for the bull:cow ratio from a recent fall survey, has become the preferred way for Government of the NWT (GNWT) Department of Environment and Natural Resources (ENR) of estimating herd size from these surveys. With the current sample of collared cows and extensive flying, it has become possible to reliably define the full distribution of the females in the Bathurst herd. Using survey-specific estimates of breeding and non-breeding cows, together with a recent estimate of herd sex ratio, is considered a more robust method of extrapolating to herd size, rather than assuming a constant pregnancy rate that ignores this source of variation. This method also increases the precision of the overall herd estimate.

Trends in Numbers of Breeding and Adult Females

As an initial step, a comparison of the estimates from the 2015 and 2018 surveys was made using a t-test (Heard and Williams 1990), with gross and annual rates of changes estimated from the ratio of estimates.

Longer term trends 2010-2018 were estimated using Bayesian state space models, which are similar to previously used regression methods (Ordinary Least Squares, OLS, as described in Boulanger et al. 2011). However, hierarchical Bayesian models allow more flexible modeling of variation in trend through the use of random effects (Humbert et al.

2009, Kery and Royle 2016). This general approach is described further in the demographic model analysis in the next section. An underlying exponential rate of change was assumed with estimates of λ (where $\lambda = N_{t+1}/N_t$). If λ=1 then a population is stable; values > or <1 indicate increasing and declining populations. The rate of decline was also estimated as 1-λ.

Survival Rate Analyses from Collared Cows

Collar data for female caribou 1996-2018 were compiled for the Bathurst caribou herd by GNWT ENR staff. Fates of collared caribou were determined by assessment of movement of collared caribou, with mortality being assigned to collared caribou based on lack of collar movement that could not be explained by collar failure or device drop-off. The data were then summarized by month as live or dead caribou. Caribou whose collars failed or were scheduled to drop off were censored from the analysis. Data were grouped by "caribou years" that began during calving of each year (June) and ended during the spring migration (May). The Kaplan-Meier method was used to estimate survival rates, accounting for the staggered entry and censoring of individuals in the data set (Pollock et al. 1989). This approach also ensured that there was no covariance between survival estimates for the subsequent demographic model analysis.

Demographic Analyses: Bayesian State Space Integrated Population Model (IPM)

One of the most important questions for the Bathurst herd was whether the adult female segment of the population had declined since the last survey in 2015. The most direct measure that indicates the status of breeding females is their survival rate, which is the proportion of breeding females that survive from one year to the next. This metric, along with productivity (proportion of calves produced per adult female each year that survive their first year of life) largely determines the overall population trend. For example, if breeding female survival is high then productivity in previous years can be relatively low and the overall trend in breeding females can be stable. Alternatively, if calf productivity is consistently high, then slight reductions in adult survival rate can be tolerated. The interaction of these various indicators can be difficult to interpret and a population model can help increase understanding of herd demography.

We used a Bayesian state space IPM (Buckland et al. 2004, Kery and Schaub 2012) based upon the original (OLS) model (White and Lubow 2002) developed for the Bathurst herd (Boulanger et al. 2011) to further explore demographic trends for the Bathurst herd. This work was in collaboration with a Bayesian statistician/modeller (Joe Thorley-Poisson Consulting) (Thorley 2017, Ramey et al. 2018, Thorley and Boulanger 2019). We note that the underlying demographic model used for the hierarchical Bayesian state space model is identical to the previous OLS model. However, the Bayesian IPM method provides a much more flexible and robust method to estimate demographic parameters that takes into account process and observer error. One of the biggest differences is the use of random effects to model temporal variation in demographic parameters. A random effect flexibly and efficiently captures the variation in a parameter by assuming it is drawn from a particular underlying distribution. This contrasts with the OLS method where temporal variation was often not modeled or modeled with polynomial terms which assumed an underlying directional change over time. Appendix 2 provides details on the Bayesian IPM state space modeling, including the base R code used in the analysis.

We used breeding female estimates, as well as calf-cow ratios, bull-cow ratios (Cluff et al. 2016, Cluff unpublished data), estimates of the proportion of breeding females, and adult female survival rates from collared caribou to estimate the most likely adult female survival values that would result in the observed trends in all of the demographic indicators for the Bathurst herd. Calf-cow ratios were recorded during fall (late October) and spring (late March - April) composition surveys whereas proportion of breeding females was measured during June composition surveys conducted on the calving ground. Proportion of females breeding was estimated as the ratio of breeding females to adult females from each calving ground survey.

The Bayesian IPM is a stage-based model that divides caribou into three age-classes, with survival rates determining the proportion of each age class that makes it into the next age class (Figure 8); this structure is identical to the OLS modeling (Boulanger et al. 2011) used previously on the Bathurst and Bluenose-East herds.

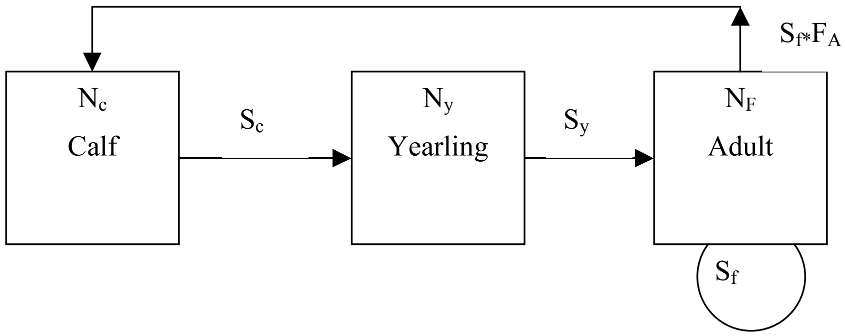


Figure 8: Underlying stage matrix life history diagram for the caribou demographic model used for Bathurst caribou. This diagram pertains to the female segment of the population. Nodes are population sizes of calves (N_c), yearlings (N_y), and adult females (N_F). Each node is connected by survival rates of calves (S_c), yearlings (S_y) and adult females (S_f). Adult females reproduce dependent on fecundity (F_A) and whether a pregnant female survives to produce a calf (S_f). The male life history diagram was similar with no reproductive nodes.

We used the entire Bathurst demographic data set that started in the 1980s (Boulanger et al. 2011, Boulanger 2015) for the analysis but focused modeling efforts and inference on the more recent years, i.e., since 2014. The timeline of recruitment relative to survey years is illustrated in Table 1. It was assumed that a calf born in 2010 would not breed in the fall after it was born, or the fall of its second year, but it could breed in its third year (see Dauphiné 1976 for age-specific pregnancy rates). It was considered a non-breeder until 2013. Calves born in 2014 and 2015 had the most direct bearing on the number of new breeding females on the 2018 calving ground that were not accounted for in the 2015 breeding female estimate.

Table 1: A schematic of the assumed timeline 2011-2018 in the Bayesian IPM analysis of Bathurst caribou in which calves born are recruited into the breeding female segment (green boxes) of the population. Calves born prior to 2013 were counted as breeding females in the 2013 and 2015 surveys. Calves born in 2014 and 2015 recruited to become breeding females in the 2018 survey.

Calf Born	Survey years 2011	2012	2013	2014	2015	2016	2017	2018
2010	yearling	non-breeder	breeder	breeder	breeder	breeder	breeder	breeder
2011	calf	yearling	non-breeder	breeder	breeder	breeder	breeder	breeder
2012		calf	yearling	non-breeder	breeder	breeder	breeder	breeder
2013			calf	yearling	non-breeder	breeder	breeder	breeder
2014				calf	yearling	non-breeder	breeder	breeder
2015					calf	yearling	non-breeder	breeder
2016						calf	yearling	non-breeder

One potential issue with comparison of survival rates across years was that the Bathurst herd had significant harvest until 2010, which reduced survival rates. We therefore added harvest rate to the model based on harvest estimates compared to estimate cow and bull abundance each year. Figure 9 shows the rates used which show an increasing harvest rate up to 2010, when harvest was reduced significantly. The harvest numbers, estimated cow and bull population sizes are given in Appendix 2.

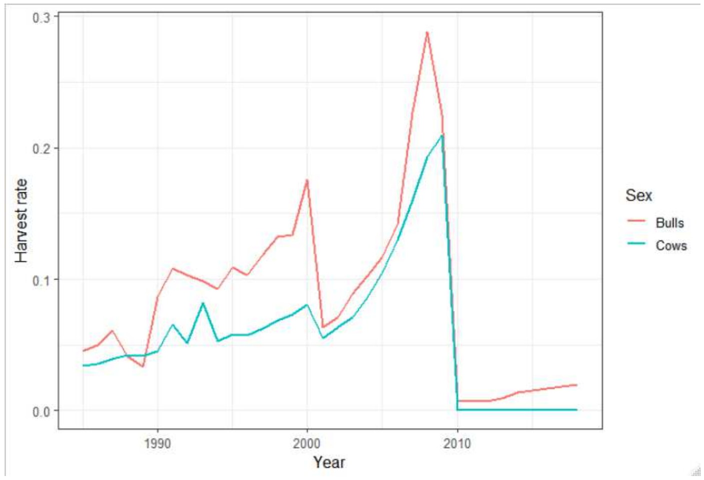


Figure 9: Harvest rates used as inputs into the demographic model. See Appendix 2 for actual harvest numbers and rates used in the model.

In 2018, three of 11 known Bathurst cow collars calved on the Queen Maud Gulf/Beverly calving ground which likely reduced the estimates of Bathurst breeding females used as an input of the model. The demographic model defines the Bathurst caribou herd as the population of caribou that utilized the Bathurst calving ground in the previous year (i.e. 2017). Collared caribou are included in the survival analysis if they utilized the Bathurst calving ground previously or if they were collared in 2018 in the vicinity of known Bathurst cows. In this context, the estimated survival rates from the demographic model are potentially influenced by emigration to the Queen Maud Gulf of adult cows. More precisely, the observed survival of cows is a function of both true survival and fidelity of cows to the calving ground. Low sample sizes of known Bathurst collared cows (11 in 2018) as well as high historic fidelity of caribou to the Bathurst calving ground challenged modeling of cow fidelity. We conducted a sensitivity analysis where the demographic model was run with and without the 2018 estimate to determine how much the 2018 emigration event might have affected demographic parameters. Of most interest was the estimate of cow survival, however of additional interest was the resulting estimate of adult cows when the 2018 estimate and emigration event were not part of the input data set, as described in the next section. As discussed later, more elaborate methods to model fidelity of caribou will be considered in future modeling efforts.

Estimation of Bathurst herd, including caribou that emigrated to Queen Maud Gulf

The estimates of adult females and herd size for the Bathurst herd in 2018 were influenced by movement of known Bathurst cows to the Queen Maud Gulf/Beverly calving ground. Of interest was the potential size of the Bathurst herd if this emigration event had not occurred. We used three approaches to initially assess how emigration of Bathurst cows to the Queen Maud Gulf coastal calving area may have influenced the Bathurst herd estimate.

1) The ratio of known Bathurst collared caribou calving in the Bathurst Inlet calving ground to total known Bathurst collars (8/11=0.727) provides a simple estimate of fidelity to the calving ground. Dividing the adult female estimate for the Bathurst calving ground by fidelity is therefore one estimate of total Bathurst adult females, including those occurring in the Queen Maud Gulf.

2) The Lincoln-Petersen mark-recapture estimator (N_{LP}) has been applied using proportion of collars in the survey area to estimate herd size for the Dolphin Union herd (Dumond and Lee 2013). The Lincoln-Petersen formula is N_{LP}= (((M+1)*(C+1))/(R+1))-1. In this case, M equals the number of known female collared caribou (11), R equals the number of known collared female caribou detected in the calving ground area (8), and C equals the estimate of total adult cows (N_{AF};) (Seber 1982, Krebs 1998). We used a variance estimator proposed by Innes *et al.*, (2002) that considers both variance in the proportion collars and the adult female estimate ($var(\ N_{LP}) = N_{LP}^2(\ CV^2(p_{LP}) + CV^2(N_{AF}))$ where CV^2=(var(x)/x^2). The variance of the Lincoln-Petersen estimate of capture probability (p_{LP}) was estimated based on the hypergeometric probability distribution, which is assumed with the Lincoln Petersen estimator (Thompson 1992). This estimator is a variation on the first estimator above.

3) The Lincoln-Petersen estimator of adult females was challenged by the low sample size of known Bathurst herd collared caribou (11) and therefore results should be interpreted cautiously. An alternative estimate of caribou was derived using the demographic model with the 2018 breeding female estimate not included in the input

data set. This amounts to a projection of likely herd size if no emigration had occurred and all Bathurst cows calved on the traditional Bathurst calving ground. In this case an extrapolated herd estimate was only influenced by collar survival rates, previous survey estimates, and composition survey results, thus the estimate was not influenced by emigration of adult cows to the Queen Maud Gulf coastal calving area. This estimate was compared to the demographic model's projected 2018 estimate of cows.

RESULTS

Survey conditions

Weather conditions were challenging due to the late spring with higher than normal snow cover in most of the annual concentrated calving area (Figure 10). At the beginning of the survey on June 1, snow cover was more than 90% in most areas but snow melted rapidly during the first 10 days of June. On June 8 and 9, snow cover varied between ten and 80%. Most areas had about 50% snow cover and much of it was a "salt-and-pepper" patchy mosaic. This made caribou more difficult to see. We reasoned, however, that aerial photo coverage of the one main concentration of calving cows would still provide an accurate estimate that would account for at least 80% of the female caribou in the survey area. The rationale was that caribou would still be reliably seen on high-resolution photos that could be searched carefully and repeatedly with a 3D projection. In addition, the sightability of caribou on photos could be estimated using independent observers.

Figure 10: Photos of variable Bathurst survey conditions during visual surveys near Bathurst Inlet on June 9, 2018, the day after photo surveys were conducted (photos J. Adamczewski). Snow cover in most areas was patchy and ranged from about 80% (top right) to about 10% (bottom right). A view of Bathurst Inlet is shown at top left.

Movement Rates of Collared Female Caribou

The locations of 17 collared female caribou that occurred in or around the Bathurst survey area were monitored throughout the June survey to assess movement rates. The peak of calving is considered close when the majority of collared female caribou exhibit movement rates of less than 5 km/day (Gunn and Russell 2008). Using this parameter, we surmised that the peak of calving was near on June 8, when mean daily movement rates were on average below 5 km for the radio collared caribou (Figure 11). Movement rates remained below 5 km/day for the next week. The peak of calving was further verified from observations of substantial numbers of cows with calves from the visual survey flying on June 8 and 9.

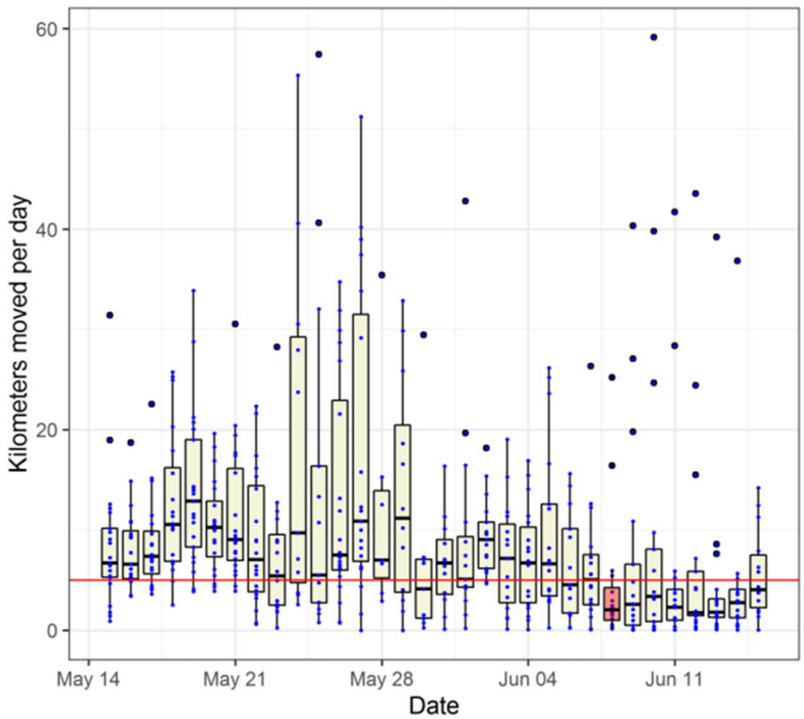


Figure 11: Movement rates of female collared caribou (n=17) on or around the Bathurst calving ground before and during calving in June 2018. The boxplots contain the 25th and 75th percentile of the data with the median shown by the central bar in each plot. The ranges up to the 95th percentile are depicted by the lines with outlier points shown as larger dots. The red line indicates a movement rate of 5 km/day. The movement rates of collared cows on June 8, the date of the photo survey, are highlighted in red. Visual strata were surveyed on June 8 and 9.

Collared Caribou Movements Leading up to June 2018 Survey

Our objectives for the reconnaissance survey were to map the distribution of adult and breeding females and define the concentrated calving area for the Bathurst herd. Collar movements and initial reconnaissance flying demonstrated an unusual distribution of caribou in the Bathurst Inlet area, which affected the way in which the Bathurst survey was designed and flown. An explanation of these collar movements with a sequence of maps is given here to explain the survey design.

In most years, Bathurst collared cows are largely moving northward from wintering areas, and by early June the Bathurst cows are well separated from Bluenose-East cows that calve west of Kugluktuk and Beverly cows that calve well east of Bathurst Inlet (Figure 12). In 2015 and 2016 the Bathurst herd showed these typical patterns. In 2017 the Bathurst herd was well mixed with the Bluenose-East herd, as shown by the southern ends of the collar trails that diverged in May and June, but cows separated well by the beginning of June. There was also substantial winter mixing of the Bathurst collared cows with Beverly collared cows, most Bathurst cows wintered on the tundra, and some wintered east of Bathurst Inlet. In spring 2017, 5 collared Bathurst cows whose 2016 June locations were on the usual Bathurst calving ground were initially east of Bathurst Inlet, but all 5 cows moved west of Bathurst Inlet in early June 2017 (Figure 13).

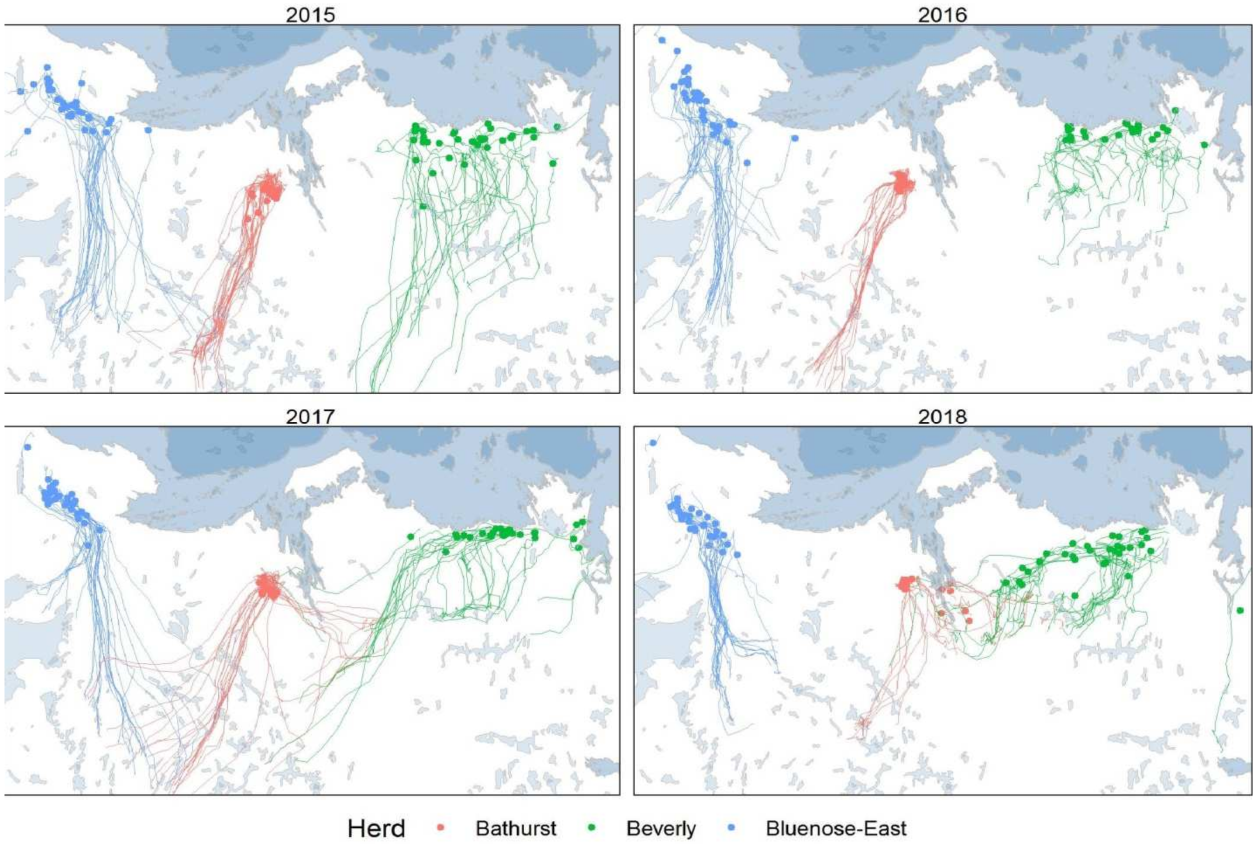


Figure 12: Spring migration paths of collared females from the Bluenose-East (blue), Bathurst (red) and Beverly (green) herds in 2015, 2016, 2017 and 2018 May 1 - June 10 of each year. The circles represent mean collared locations in the first two weeks of June for each year. Note that in June 2018 three of the known Bathurst collars (red dots) were in the main cluster of Beverly collars (blue dots); these are more easily seen in Figure 15b. Collar data are from GNWT and GN.

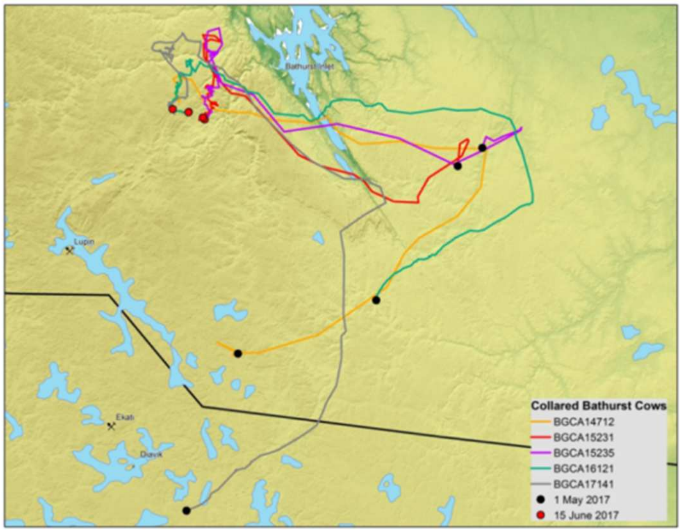


Figure 13: Spring migration paths of five collared Bathurst cows May 1 - June 15, 2017. All five cows were known to have been on the traditional Bathurst calving ground in June 2016. All wintered on the tundra and three wintered south or east of Bathurst Inlet with Beverly collared cows. Beverly collars are omitted for clarity.

In winter 2017-2018, collared Bluenose-East caribou wintered well separated from the Bathurst herd but Bathurst collared cows and bulls were well mixed with Beverly cows and bulls all winter (Figure 14). Bathurst collared cows all wintered on the tundra and some were east of Bathurst Inlet through the winter. In the spring, migration paths of Bathurst and Beverly collared cows showed continued mixing, with some Bathurst cows moving north into the main Beverly calving area (Figures 15a and 15b). Further south, collared Bathurst and Beverly bulls in the spring of 2018 also showed continued mixing and some movement into the Queen Maud Gulf area (Figure 16).

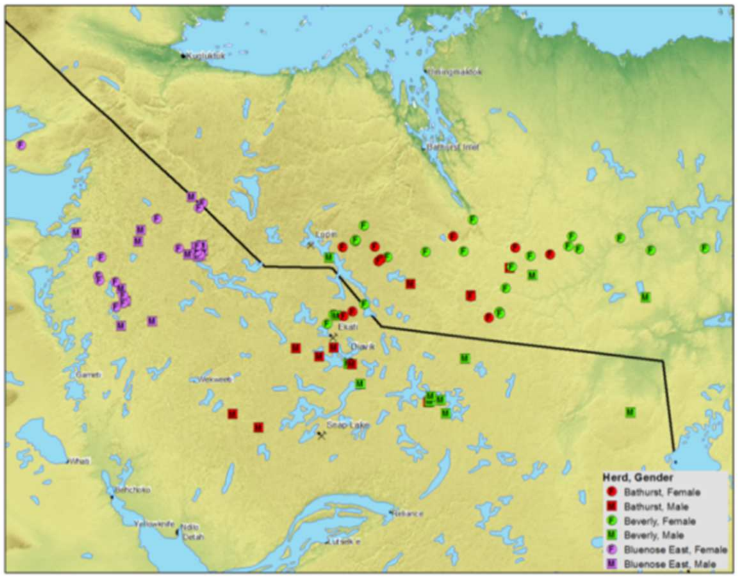


Figure 14: Winter locations (March 15, 2018) of Bluenose-East collared cows (18) and bulls (18) in purple, Bathurst cows (10) and bulls (10) in red, and Beverly cows (23) and bulls (12). The Bathurst and Beverly herds were mixed throughout winter 2017-2018.

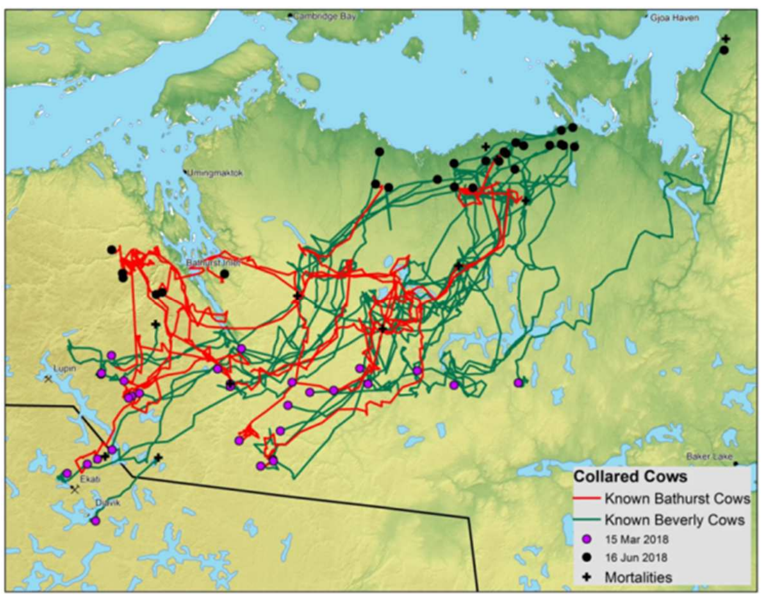


Figure 15a: Spring migration paths northward March 15 - June 16, 2018 of 11 known Bathurst collared cows (red) and 19 known Beverly cows (green). Purple dots are March 15 locations and indicative of wintering areas; black dots are June 16 locations.

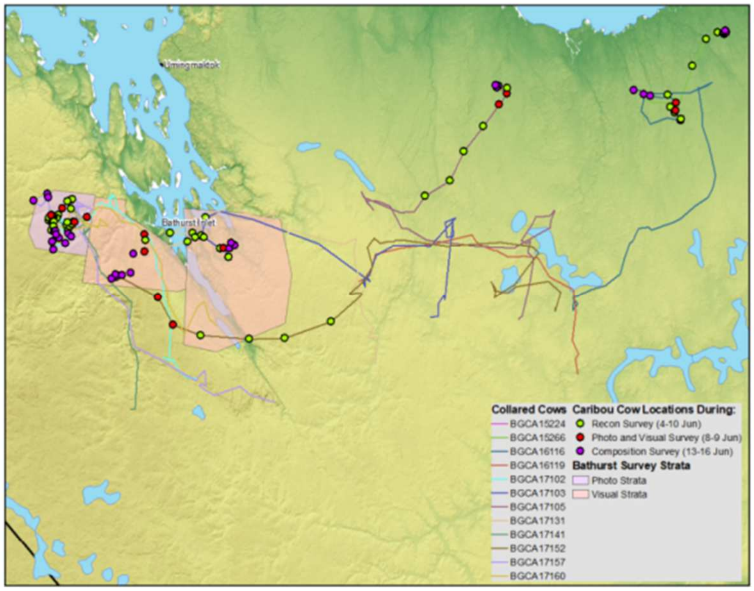


Figure 15b: Spring migration paths May 1 - June 16, 2018 of 11 known Bathurst collared cows, in relation to June 2018 Bathurst calving ground survey area. Eight collared Bathurst cows were within the Bathurst strata during the survey, while three were in the Queen Maud Gulf coastal calving area. Beverly collars are omitted for clarity. Light green dots were during the June 4-10 reconnaissance survey, red dots were at time of photo and visual flying, and purple dots were during the composition survey June 13-16.

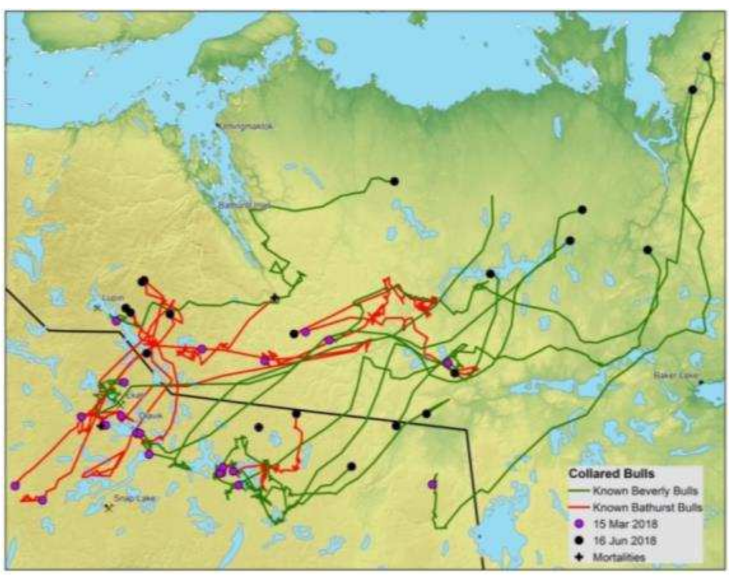


Figure 16: Spring movements (March 15 - June 16) of eight known Bathurst collared bulls and 11 known Beverly collared bulls in 2018.

For clarity, the movements of the 11 known Bathurst collared females are shown separately (Figure 15b). Of the 11 collared cows that were known to have calved on the Bathurst calving ground in 2017 or earlier, three moved well east of Bathurst Inlet and into the main calving area of the Beverly herd based on collared cows and the GN survey in June 2018. These three did not return to the calving ground that the Bathurst herd has used consistently since 1996, in June or thereafter. The remaining eight known collars were either west of Bathurst Inlet in the area the herd has calved in since 1996, or in the Bathurst Inlet area during the June survey period. There were an additional nine newly collared cows (collared winter 2017-2018) that were in the Bathurst Inlet area, thus 17 collared cows total in the Bathurst Inlet area. Of these 17, 12 were west of Bathurst Inlet in the traditional Bathurst calving area and five were east and west of the Inlet on June 8 (the day of the photo survey). These five showed a general westward movement during the initial two weeks of June (Figure 15b).

A further consideration in designing the Bathurst survey area was the observations from GN biologist M. Campbell and NU Tunngavik Incorporated (NTI) biologist D. Lee (pers. comm.) east of Bathurst Inlet, that showed consistent caribou trails in the snow from their first two survey lines with those trails moving westward. Further east, by contrast, all the caribou trails were more heavily used and led in a northeast direction, which followed the movements of the known Beverly cows to the central and eastern Queen Maud Gulf coastal calving area (Figure 15a).

Reconnaissance Survey to Delineate Strata

One Caravan based at the Ekati diamond mine flew the entire Bathurst reconnaissance survey June 4-10, 2018. The initial focus was on the areas with collared cows, and thereafter outlying areas were flown. Two other Caravans were based in Kugluktuk but these aircraft were unable to fly June 2-5 due to fog and low cloud in the Kugluktuk area. June 6-8 these two Caravans were primarily occupied with the Bluenose-East survey. A single day of clear weather with blue skies occurred on June 8, and on this day the Bathurst (one) and Bluenose-East photo blocks (two) were flown. The two Bathurst visual strata were surveyed on June 8 and 9, with one of the Kugluktuk Caravans assisting with covering the Visual East stratum. A summary of the fixed-wing flying on the Bathurst June 2018 survey is given in Table 2.

Table 2: Summary of reconnaissance and visual survey flying on the June 2018 Bathurst calving ground survey.

Date	Caravan 1 (Ekati)	Caravan 2 (Kugluktuk)
June 1	Arrive Ekati	Arrive Kugluktuk
June 4	Recon of core area at 10 km spacing	Grounded (weather)
June 5	Recon of core and surrounding area	Grounded (weather)
June 6	Recon of areas south and east of core area	Bluenose-East survey
June 7	Grounded (weather)	Grounded (weather)
June 8	Bathurst visual west block survey	Bluenose-East survey
June 9	Bathurst visual east block survey	Bathurst visual east block survey & lines between Bathurst and BNE
June 10	Recon lines to the west of Ekati & return to Yellowknife	Recon lines to the East of Kugluktuk & return to Yellowknife

Considering the collar movements of Bathurst and Beverly collared cows, the results of the Bathurst reconnaissance survey and the reconnaissance survey observations of the NU biologists, we reasoned that the Bathurst herd's main calving concentration as in past years was west of Bathurst Inlet with most of the collared Bathurst cows (12 of 17 in the Bathurst Inlet area) and that area should be the focus of the aerial photography. We reasoned further from the locations and movement patterns (generally westward) of the other 5 collared Bathurst cows just east and west of Bathurst Inlet, along with the westward-moving caribou trails reported by NU biologists, that a smaller portion of the Bathurst herd's cows were east and west of Bathurst Inlet, in much lower numbers, and these areas should be visual strata for the Bathurst survey. All known Beverly collared cows were by June 8 far east of Bathurst Inlet (Figure 15a), so it appeared there had been a separation of the two herds just east of Bathurst Inlet. The movement of three of the 11 known Bathurst cows to the main Beverly calving concentration in the Queen Maud Gulf, while based on a limited sample, suggested that a portion of the Bathurst herd's cows may have emigrated to join that herd (Figures 15a and 15b).

Reconnaissance flying included the areas west and east of Bathurst Inlet and all collared cows in the area (Figures 17a and 17b). Areas north, west and east were also flown extensively to make sure that no significant numbers of cows were missed. In the east, our reconnaissance lines adjoined the easternmost lines of the GN Beverly survey.

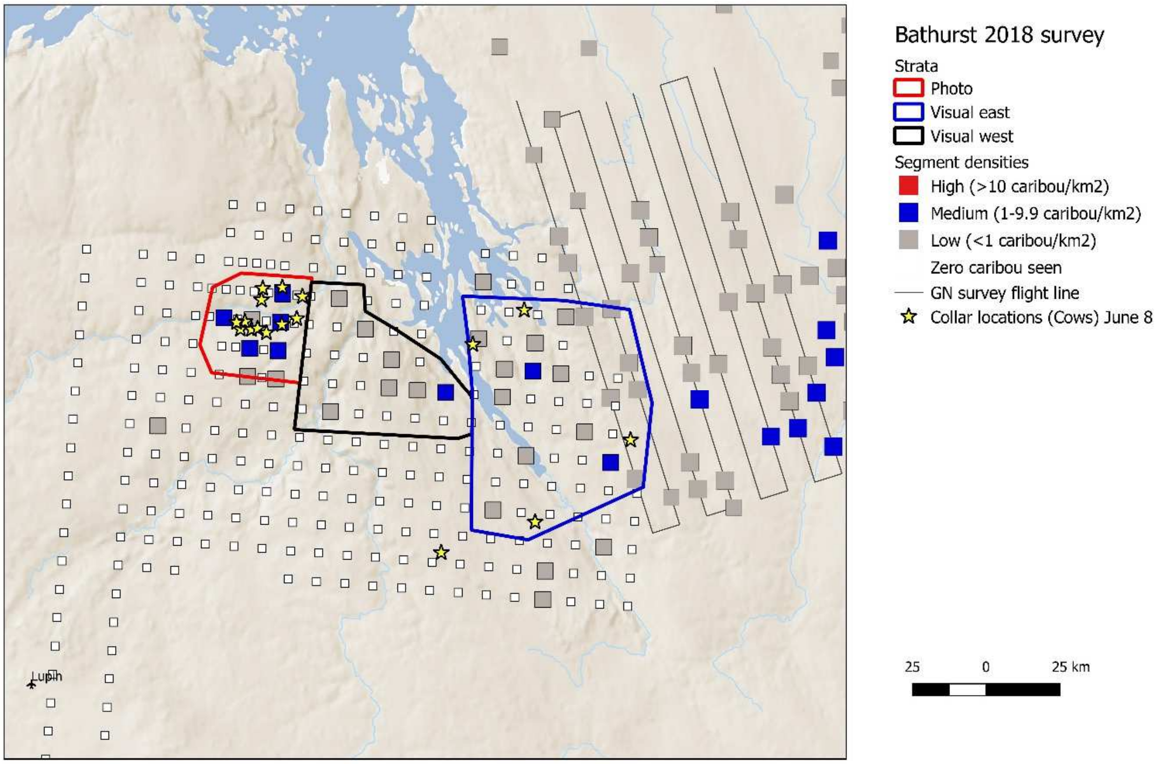


Figure 17a: Reconnaissance survey of the Bathurst calving ground in June 2018 with densities of caribou seen. White squares are from areas where no caribou were seen, grey squares are from low-density areas (< 1 caribou/km^2), and blue squares are from medium density areas (1-9.9 caribou/km^2). Gold stars show locations of collared female caribou on June 8. One caribou in the lower visual east did not return a location for June 8 and the June 7th location is shown. Full movement paths of collared caribou during the survey are shown in later sections of the report. Transects east of Bathurst Inlet were from the first day of flying on the GN Beverly survey in June 2018, courtesy of M. Campbell and D. Lee.

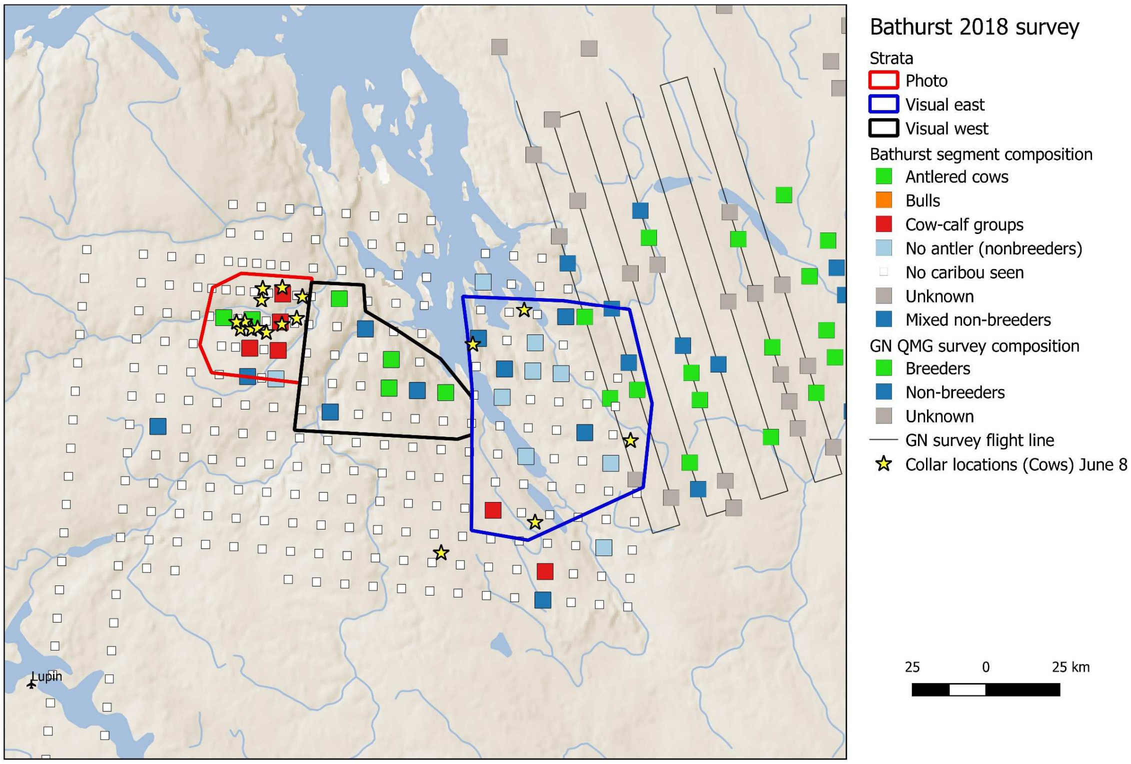


Figure 17b: Reconnaissance survey of the Bathurst calving ground in June 2018 with composition of caribou seen. Areas with cow-calf groups are red, areas with antlered cows are light green, and areas with non-breeders (non-breeding cows, bulls and yearlings) are blue. Gold stars are collared female caribou. Transects east of Bathurst Inlet were from the first day of flying on the GN Beverly survey in June 2018, courtesy of M. Campbell and D. Lee.

Stratification: Photo Stratum and Visual Strata

One photo stratum was defined for the Bathurst 2018 survey (Figures 17a and 17b), which included the majority of adult and breeding females and 12 of 17 collared cows in the survey area. This block was similar in size and location to the Bathurst photo block in June 2015 (Boulanger et al. 2017). Two lower density visual blocks were also defined: a Visual West block west of Bathurst Inlet and a Visual East block east of Bathurst Inlet.

Photo Stratum

With photo planes using high-resolution digital cameras, it is possible for the planes to fly at different altitudes. Flying at a higher altitude increases the strip width and reduces the number of pictures but also reduces the resolution of the pictures as indexed by ground sample distance (GSD). GSD is a term used in aerial photography to describe the distance between pixels on the ground for a photo sensor. In practical terms, the GSD for the aerial photos used in this survey translates into strip width and elevation AGL as follows (Table 3).

Table 3: GSD for photo sensor used on Bathurst June 2018 caribou survey, along with associated elevation AGL and photographed ground transect strip width. Typical elevation and strip width used in earlier film photo surveys are included for reference.

GSD (cm)	Elevation AGL (feet)	Strip width in m
4	2,187	692
5	2,734	866
6	3,281	1,039
7	3,828	1,212
8	4,374	1,385
9	4,921	1,558
10	5,468	1,731
Film Photos	2,000	914.3

With blue skies on June 8, the Bathurst photo stratum was flown at GSD 7 (average elevation 3,828 ft. (1,167 m) AGL) and a total of 1,715 photos were taken (Table 4, Figure 18).

Table 4: Stratum dimensions, transect dimensions, photo numbers and ground coverage for Bathurst photo survey block in June 2018. Actual coverage and photo numbers are in bold and underlined.

Photographic stratum dimensions				Photos at GSD (Elevation AGL in feet)			Coverage at GSD		
Area (km^2)	Average Transect Width (km)	Transects Sampled	Total transect length (km)	5 (2,734)	6 (3,281)	7 (3,828)	5	6	7
1,159	35	15	525	2,389	2,003	**<u>1,715</u>**	40%	48%	**<u>56%</u>**

Figure 18: Composite photo block west of Bathurst Inlet flown on June 8, 2018. The Hood River valley can be seen in an east-west direction in the upper half of the survey block.

Visual strata

The Bathurst reconnaissance survey was flown June 4-10 by a single plane based at Ekati. Given forecasted weather conditions for June 8 and 9, visual survey flying was designed to allow strata to be flown within two days, with one plane for the Visual West stratum and two planes for the Visual East stratum. Estimates of density from the reconnaissance data suggested that each stratum had relatively equal low densities of caribou (0.15 and 0.13 caribou/km^2 for west and east strata respectively) and therefore allocation of effort was similar for the two strata. Based on logistics 12 and 18 transects were flown in the west and east strata with resulting levels of coverage of 16 and 18% respectively. Dimensions of photo and visual strata are in Table 5.

Table 5: Final dimensions of photo and visual strata for the 2018 Bathurst calving photo survey.

Stratum	Total Transects Possible	# Sampled Transects	Area of stratum (km^2)	Average Strip width (km)	Transect area (km^2)	Coverage
Photo	27	15	1,227.3	1.29^A	682.7	56%
West Visual	12	12	2,305.6	0.8	368.3	16%
East Visual	18	18	4,661.9	0.8	824.5	18%

Movements of collared caribou within and between reconnaissance and photo/visual blocks

As described earlier, 17 active cow collars were in the Bathurst Inlet area during the June 2018 survey, transmitted locations daily, and were used for survey planning. Twelve of these were in the photo stratum for the duration of the visual/photo survey (Figure 19). One collared cow moved from the Visual West to the Visual East stratum during the survey period, two were contained within the Visual East stratum and two moved out of the Visual East stratum during the visual survey. There was no location given for one of the caribou on June 8, however, it occurred in the stratum on June 7 but was out of the stratum on June 9. It was likely in the stratum during the survey based on the midpoint of the June 7 and June 9 locations (Figure 19). We note that reconnaissance flying to the south of the three survey blocks showed extremely low numbers of caribou present. Three additional collared cows had moved into the main Beverly calving ground far to the east and are not shown on this map.

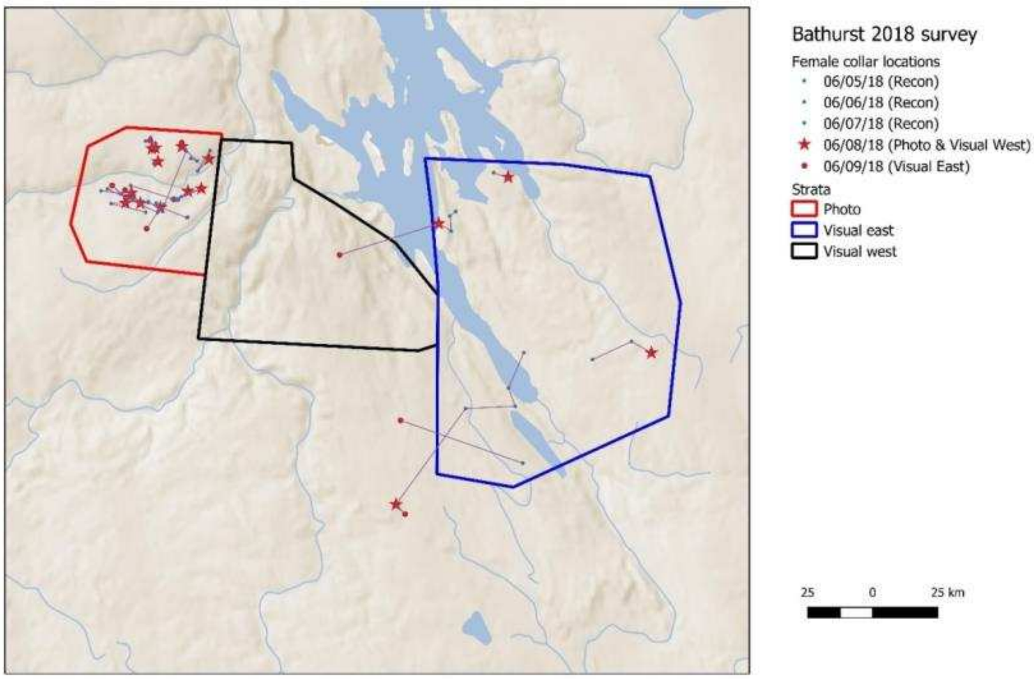


Figure 19: Locations of collared Bathurst female caribou and movements from the reconnaissance phase (June 5-7), photo survey (June 8th) and visual survey of the east stratum on June 9th. One collar near the south end of the Visual East block did not report a location on June 8, so no star is shown.

Collared caribou that had movement rates of greater than 5 km/day were mainly located within the central regions of strata, suggesting that the strata contained the range of caribou movements as indicated by collared caribou. The one collared cow south of the visual strata during the survey was in an area where almost no caribou were seen during the reconnaissance flying (see Figure 17).

In general, the observations of caribou in the Visual East and Visual West blocks confirmed the low numbers found during the reconnaissance survey (Figure 20).

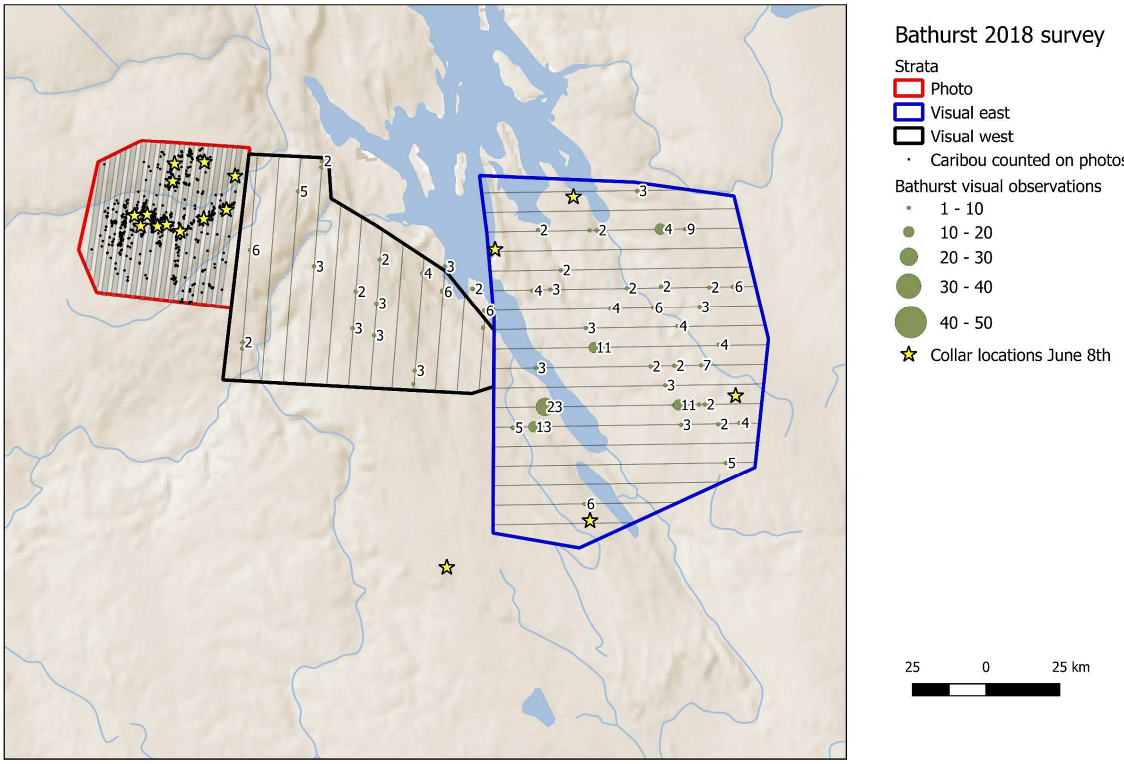


Figure 20: Map of Bathurst June 2018 survey blocks showing the locations of caribou groups seen in the photo block from photos and in the visual blocks from observations June 8 and 9. Relative group sizes for the visual blocks are shown as varying sizes of circles, but not for the groups seen in the photo block (too many).

Estimates of Caribou on Photo Stratum: Sightability

Photo interpreters found that the sightability of caribou on photos was influenced by snow cover. If the ground was bare caribou were readily visible (Figure 21), however, caribou were not as easy to see with patchy snow, particularly when caribou were at the edges of snow patches. Overall, it took nearly twice as long to count the 2018 aerial photos (Bathurst and Bluenose-East) as in the last photo surveys in 2015 when the ground was predominantly bare (D. Fisher, GreenLink Forestry Inc., pers. comm.), to allow for comprehensive searching of all photos.

Figure 21: A zoomed-in portion of one of the Bathurst aerial photos from June 2018 survey. Most caribou and their shadows are readily visible. A caribou on the edge of a snow patch in bottom left corner is less clearly visible. There are 23 caribou on this photo.

Initial quality control of photo counting was carried out by D. Fisher re-counting several hundred of the Bathurst and Bluenose-East photos counted by his staff. In addition, sightability of caribou on photos was estimated by having a 2nd observer from GreenLink Forestry independently re-count caribou on a subset of photos, without knowing what the first observer had found. The second observer was Derek Fisher, who is the most experienced observer of aerial photographs at the company.

The photo survey transect lines were resampled systematically using transects perpendicular to the original photo-plane transects. Two phases of sampling were conducted. In the first phase, transects were sampled regardless of whether caribou were detected in the original counts. In the second phase, photos closest to the first phase transect line that contained caribou in the first phase were resampled. Using this approach, we tested whether all caribou were detected on photos even when they were not detected originally. The second phase still was a systematic sample but increased the sample size of photos with caribou counts, which were most useful for cross validation purposes. Figure 22 shows the photo resampling design.

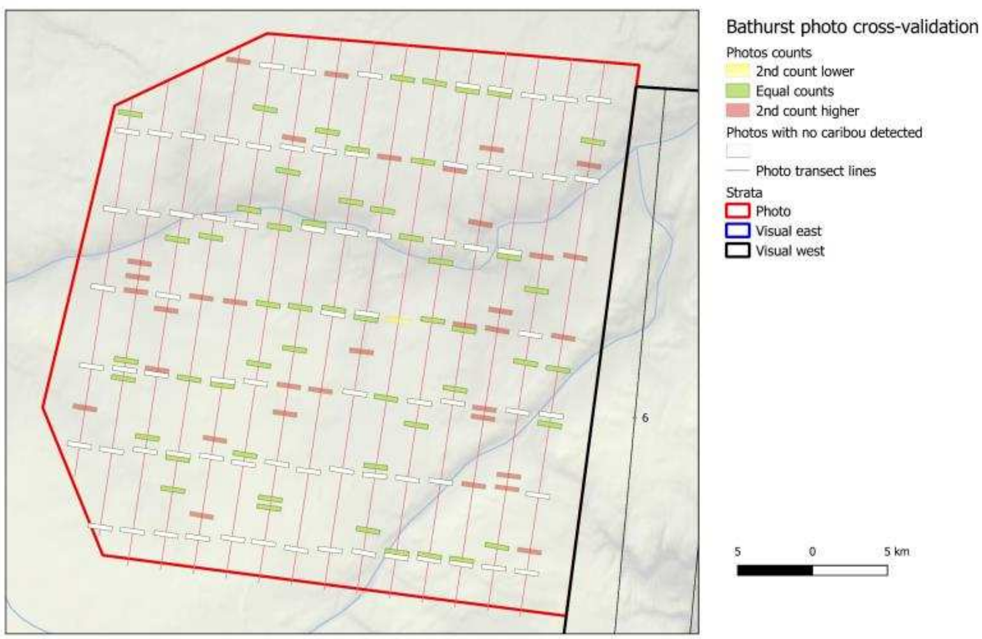


Figure 22: Systematic sampling design for cross validation of photos for the Bathurst June 2018 calving ground survey.

Overall, 161 photos were recounted, of which 87 contained caribou. Seventy-four additional caribou were counted in the second count, with a corresponding ratio of original to second count of 0.842 (Table 6). One assumption in this comparison is that the first and second counter were counting the same caribou on a given photo. To test this assumption the distances between points of counted caribou in the first and second count was measured in GIS to identify any counted caribou that were a further distance from the original counts.

This process did not identify any new caribou. One caribou was counted on a photo during the original counts but not counted in the second count. An additional 228 photos were re-sampled by similar means as part of the Bluenose-East June 2018 survey, with similar results (Boulanger et al. 2019).

Table 6: Summary of photo cross validation data set for Bathurst June 2018 aerial photos. The ratio of the original count to second count is an estimate of photo sightability.

Original count	Second count	New caribou counted in second count	Caribou not detected in second count	Original count/second count
393	467	74	1	0.842

This cross-validation process can be modeled as a two sample mark-recapture sample with caribou being "marked" in the original count and then be "re-marked" in the second count. Using this approach avoids the assumption that the second counter detects all the caribou on the photo. The Huggins closed N model (Huggins 1991) in program MARK (White and Burnham 1999) was then used to estimate sightability. Table 7 below gives the results with the sightability from the first counter being very close to the ratio of the original to second count. The reason for this is that the second counter only missed one caribou not originally counted and therefore his sightability score was very high.

Table 7: Estimates of sightability for the first and second counters on the Bathurst June 2018 aerial photos, from the Huggins closed N model.

Counter	Estimate	SE	LCI	UCI	CV
First	0.841	0.017	0.805	0.872	2.01%
Second	0.997	0.003	0.982	1.000	0.25%

The variance estimate from program MARK assumes that all caribou counted are independent, which is likely violated given that in many cases caribou occurred in larger groups. The violation of this assumption leads to over-dispersion of binomial variances and a resulting negative bias. To confront this issue, we used a bootstrap method (Manly 1997) that bootstrapped based on caribou counted on photos. The assumption in this case is that counts of caribou on each photo are independent rather than all caribou counted being independent. The resulting estimate of SE was 0.042 with a coefficient of variation (CV) of 4.7% which is more realistic, and this was used for subsequent calculations. Future photo counting efforts should classify counted caribou in groups to allow more focused methods of estimating sightability variance.

Estimates of Total Caribou in Photo Stratum

Table 8 below gives the initial estimates of caribou in the photo stratum and the estimates adjusted for photo sightability. We also corrected the initial estimates for differential strip widths, as was done in the 2015 surveys. The photo-sightability estimate was calculated as the initial estimate divided by photo sightability. Variance for the photo sightability was calculated using the delta method (Buckland et al. 1993). The resulting estimate was about 800 caribou (16%) higher than the non-adjusted estimate.

Table 8: Initial estimates of abundance in survey strata, estimated photo sightability and corrected estimates of abundance with photo sightability for Bathurst June 2018 calving photo survey.

Initial estimate of N (not corrected)			Photo sightability			Photo-sightability corrected N estimate		
N	SE	CV	p	SE	CV	N	SE	CV
4,245.7	580.34	0.136	0.842	0.042	0.050	5,043.4	734.5	0.146

Double Observer Analysis and Estimates of Total Caribou in Visual Strata

Detailed descriptions of the double observer methods and results are provided in Appendix 1. Data from both the Bathurst and Bluenose-East surveys were combined as some survey crews flew portions of both surveys. Overall, double observer corrected estimates (using the MRDS R package) were about 5% higher than non-double observer estimates. Precision was lower than for uncorrected count-based estimates but still acceptable (Table 9).

Table 9: Standard strip transect and corrected double observer model estimates of caribou on Bathurst visual strata in 2018.

Stratum	Caribou	Standard estimate			Double observer corrected estimate				
	counted	Estimate	SE	CV	Estimate	SE	Confidence interval		CV
Visual West	88	551	132.1	24.0%	567	140.50	332	970	24.8%
Visual East	220	1,244	286.7	23.0%	1,309	332.70	773	2,216	25.4%
Total	369	1,795	151.7	17.6%	1,877	360.9	1,265	2,783	19.2%

Estimates of Total Caribou on the Calving Ground

The estimate of total caribou at least one year old on the calving ground (6,919) is given in Table 10 below. The CV was slightly high due to the aggregation of caribou (clumped distribution) in the photo stratum as well as the added variance from estimating sightability of caribou on the photos.

Table 10: Estimates of caribou numbers (at least one year old) in photo and visual Bathurst strata in June 2018. These are corrected for sightability.

Strata	N	SE N	Conf. Limit		CV	Density
Photo	5,043	734.5	3,696	6,881	0.146	4.11
West Visual	567	140.5	332	970	0.248	0.24
East Visual	1,309	332.7	773	2,216	0.254	0.27
Total	**6,919**	**818.5**	**5,415**	**8,843**	**0.118**	

Composition Survey in June 2018

A composition survey was conducted in the Bathurst survey area June 13-16, which was five to eight days after the photo and visual survey. Review of the locations of collared females suggested that minimal movement occurred during this time with collared females inside the photo stratum on June 8 remaining within it (Figure 23). One additional collared cow that was south of the photo stratum on June 8 moved into this stratum, thus the composition survey results were still representative of the distribution of Bathurst caribou females. In addition, daily movement rates for Bathurst collared cows were below 5km/day on June 8 and remained there the following week (Figure 11).

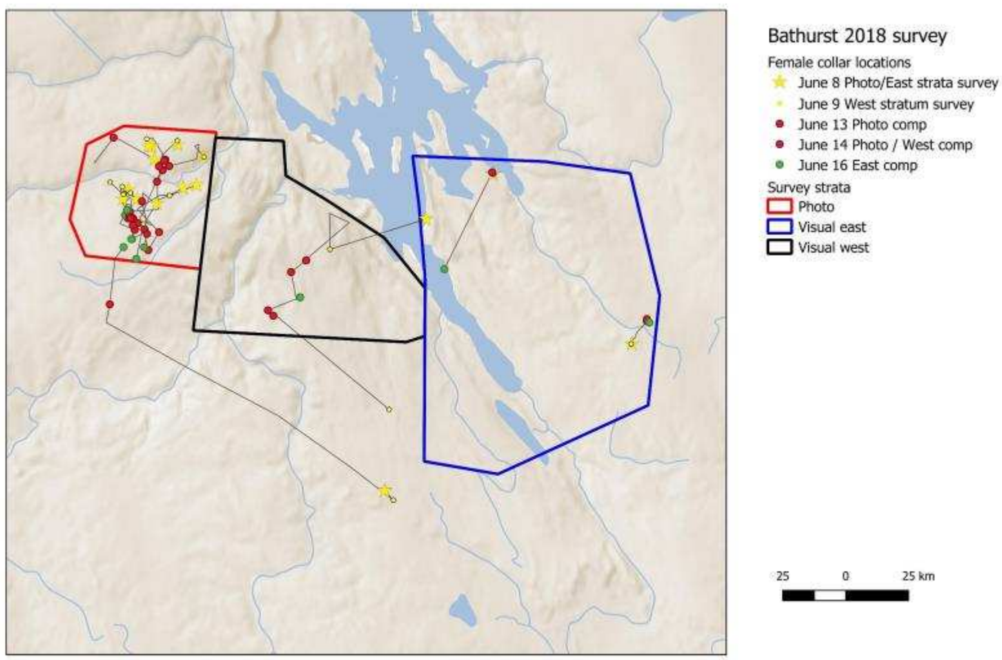


Figure 23: Locations of collared females between the dates of the Bathurst photo and visual strata flown June 8 and 9, and the composition survey flown June 13-16.

The composition survey systematically covered the photo stratum (Figure 24), which confirmed stratum boundaries and showed that most breeding cows were contained within this stratum. The Visual West block had some cow-calf groups and a higher proportion of non-breeding cows than the photo block. The Visual East stratum mainly contained bulls, yearlings and a few non-breeding cows. The numbers of breeding cows, non-breeding cows, yearlings and bulls within each stratum are listed in Table 11.

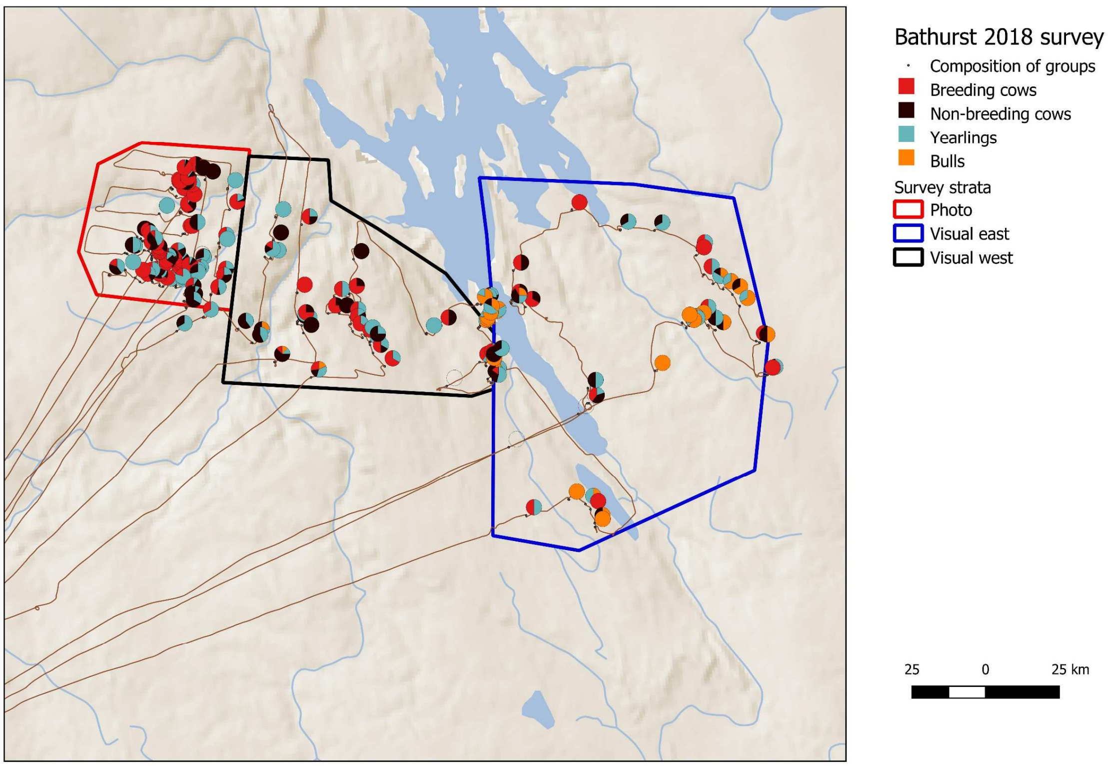


Figure 24: Helicopter flight paths and caribou groups classified during calving ground composition survey of Bathurst caribou, June 13-16, 2018. The size of the pie charts is proportionate to the number of caribou classified in a group. Proportions of age-sex classes make up the individual pie sections.

Table 11: Summary of composition survey results on Bathurst calving ground June 2018 in photo and visual strata.

Stratum	# groups	Adult females			Yearlings	Bulls	Total caribou (1 yr+)
		Total	breeding	non-breeding			
Photo	80	1,517	1,134	383	242	0	1,759
Visual East	38	46	20	26	33	36	115
Visual West	52	135	72	63	94	34	263

Estimates of the proportions of adult females and breeding females were then derived with variance and confidence limits estimated via bootstrap methods (Table 12).

Table 12: Proportions of breeding females and adult females from composition survey on Bathurst calving ground June 13-16, 2018. Proportions are expressed as percentages of caribou at least one year old.

Stratum	Estimated Proportion	SE	Confidence Limit (Upper and Lower)	
Breeding females				
Photo	0.645	0.029	0.581	0.695
Visual west	0.274	0.043	0.185	0.354
Visual east	0.174	0.044	0.098	0.266
Adult females				
Photo	0.862	0.020	0.814	0.896
Visual West	0.513	0.041	0.429	0.593
Visual East	0.400	0.059	0.284	0.524

Estimates of Breeding and Adult Female Caribou

Estimates of the numbers of breeding females (Table 13) were derived by the product of caribou at least one year old (Table 10) and the proportion of breeding females in each stratum (Table 12). Estimates of the numbers of adult females (Table 14) were similarly derived from the product of caribou at least one year old (Table 10) and the proportion of adult females in each stratum (Table 12).

Table 13: Estimates of number of breeding females based upon initial abundance estimates and composition surveys on Bathurst calving ground June 2018.

Stratum	Caribou		Proportion of breeding cows		Number of Breeding Females				
	N	CV.N	pb	CV	N	SE	Conf. Limit		CV
Photo	5,043	0.146	0.645	0.045	3,253	495.8	2,350	4,502	0.152
West Visual	567	0.248	0.274	0.157	155	45.6	82	292	0.294
East Visual	1,309	0.254	0.174	0.253	228	81.7	110	474	0.358
Total	**6,919**				**3,636**	**504.6**	**2,709**	**4,880**	**0.139**

Table 14: Estimates of numbers of adult females based upon initial abundance estimates and composition surveys on Bathurst calving ground June 2018.

Stratum	Caribou		Proportion of adult cows		Number of Adult Females				
	N	CV.N	pa	CV	N	SE	Conf. Limit		CV
Photo	5,043	0.146	0.862	0.023	4,347	641.1	3,174	5,954	0.147
West Visual	567	0.248	0.513	0.080	291	75.7	166	511	0.260
East Visual	1,309	0.254	0.400	0.148	524	153.9	286	960	0.294
Total	**6,919**				**5,162**	**663.7**	**3,935**	**6,771**	**0.129**

The ratio of breeding females to adult females was 70.4%, suggesting a fair-good proportion of pregnant females compared to previous survey years. The proportion of breeding females in June 2015 was lower (60.9%; Boulanger et al. 2017).

Fall Composition Survey October 2017

A composition survey was conducted 23-25 October 2017 to estimate the bull-cow ratio of the Bathurst herd. Overall there were 39 groups observed with totals of bulls, cows and calves summarized in Table 15. Bootstrap methods were used to obtain SEs on estimates (Table 16).

Table 15: Summary of observations from fall composition survey on Bathurst herd October 23-25, 2017.

Cows	Bulls	Calves	Groups
940	532	431	39

Table 16: Estimates of the bull-cow ratio, proportion cows, and calf-cow ratio from the fall composition survey on Bathurst herd October 2017.

Indicator	Estimate	SE	Conf. Limits		CV
Proportion cows	0.629	0.017	0.596	0.666	2.7%
Bull-cow ratio	0.592	0.044	0.501	0.678	7.4%
Calf-cow ratio	0.429	0.018	0.399	0.466	4.1%

Extrapolated Herd Estimates for Bathurst Herd

Estimates of adult herd size (caribou at least two years old) for the Bathurst herd in 2018 are presented in Table 17. The estimate based on an assumed fixed pregnancy rate uses a value of 0.72 (Dauphiné 1976) while the estimated proportion of breeding females in June 2018 was 0.704, which resulted in relatively similar extrapolated herd estimates (8,207 vs 8,029; Table 17). The preferred estimate uses the proportion of females, which is simply the estimate of adult females (5,162) divided by the proportion of cows in the herd (0.629) from the fall 2017 survey. Log-based confidence limits, which were used for other estimates as well as traditional symmetrical confidence limits (estimate ± t*SE) are given. In most cases log-based limits give better representation of confidence estimates than traditional symmetrical methods because the distribution of estimates has a slight positive skew. However, previous analyses have used the symmetrical method. The actual difference in CI's is relatively minor.

Table 17: Extrapolated herd size estimates for the Bathurst herd in 2018 based on two estimators. The estimate based on proportion of adult females is the preferred one and has a smaller variance.

Method	N	SE	Log-based CI		Symmetric Traditional CI		CV
Proportion of adult females	8,207	1079.0	6,218	10,831	5,920	10,494	13.1%
Constant pregnancy rate (0.72)	8,029	1390.9	5,565	11,583	5,064	10,993	17.3%

Trends in Numbers of Breeding and Adult Females and Herd Size 2010-2018

Estimates of breeding cows, nonbreeding cows and (total) adult cows in the Bathurst herd are shown in Figure 25 for surveys 2009-2018. A roughly stable trend 2009-2012 was followed by significant declines to 2015 and 2018. Reductions from 2015 to 2018 in estimates of breeding females were 55.0%, in adult females 61.0% and in overall herd size 58.5%. The reduction in herd size indicates an annual rate of decline of 25.5% 2015-2018. These reductions consider only the numbers of caribou found on the June 2018 Bathurst survey area (and associated extrapolated herd sizes), and do not consider the apparent loss of some of the herd to the Queen Maud Gulf calving ground. The proportion of adult females classified as breeding was higher (70.4%) in 2018 than in 2015 (60.9%).

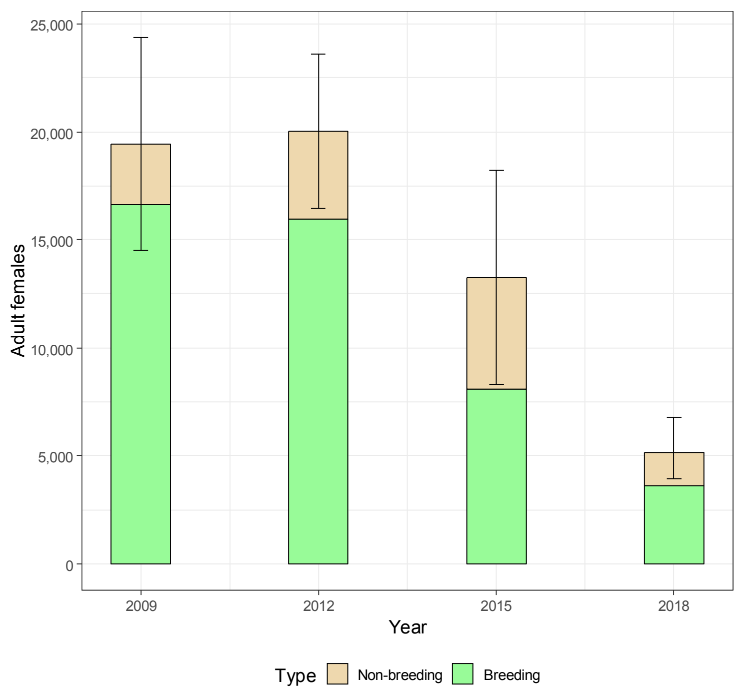


Figure 25: Estimates of the number of breeding females (green), non-breeding females (light brown) and adult females (summed bars) in the Bathurst herd 2010-2018.

Demographic Analysis of Trends in the Bathurst Herd

The Bayesian state space model (Humbert et al. 2009, Kery and Royle 2016) was used to estimate longer term trends in the Bathurst data set. For this analysis, trend (log λ) was modeled as a random effect, therefore allowing assessment of variation in λ in intervals between surveys.

For breeding females, overall trends were significant (p=0.025) with an overall λ estimate for the entire data set (1985-2018) of 0.88 (0.79-0.98) (Figure 26).

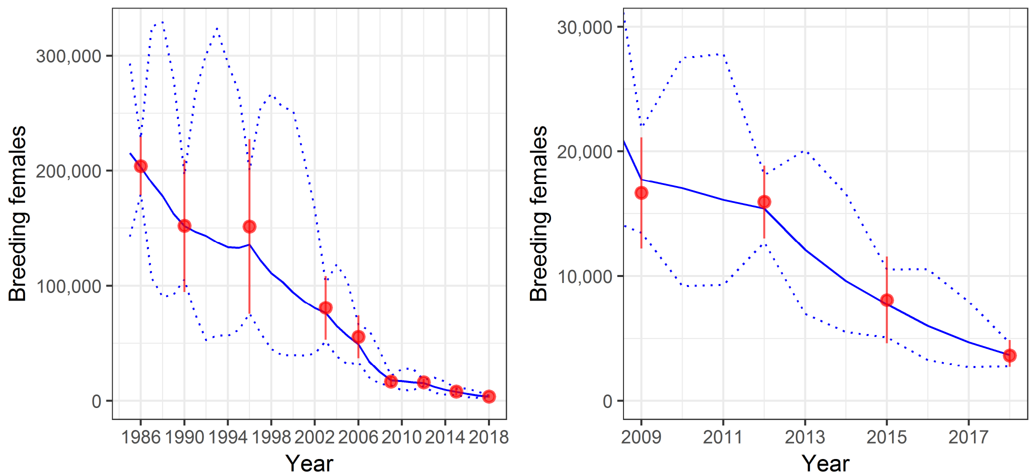


Figure 26: Trends in Bathurst breeding females 1986-2018, as estimated by the Bayesian state space model. The left graph is for the full extent of the data set and the right graph is zoomed into the period of 2009-2018. Field estimates are given as red dots (with confidence limits) and model predictions are shown as blue lines with confidence intervals as hashed lines.

Of greatest interest is trend since 2009, which suggested an initial increasing trend up to 2012, where the geometric mean of λ (3 year) was 0.95 (CI=0.87-1.06), before declining to 0.78 (CI=0.68-0.91) in 2018 (Figure 27). Trend of breeding females will be influenced both by abundance of adult females and pregnancy rate.

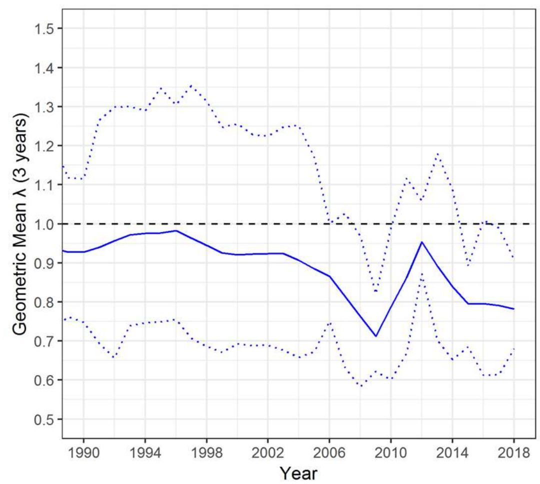


Figure 27: Estimate of λ for Bathurst breeding females 1989-2018, as estimated by the Bayesian space model analysis. Model predictions are shown as blue lines with confidence intervals as hashed lines. A λ of 1.0 indicates a stable population.

Trends in numbers of adult Bathurst females (Figure 28) were also significant for the entire data set ($p=0.045$) with an overall λ estimate of 0.88 (CI=0.80-0.99) for the entire (1985-2018) data set (Figure 29).

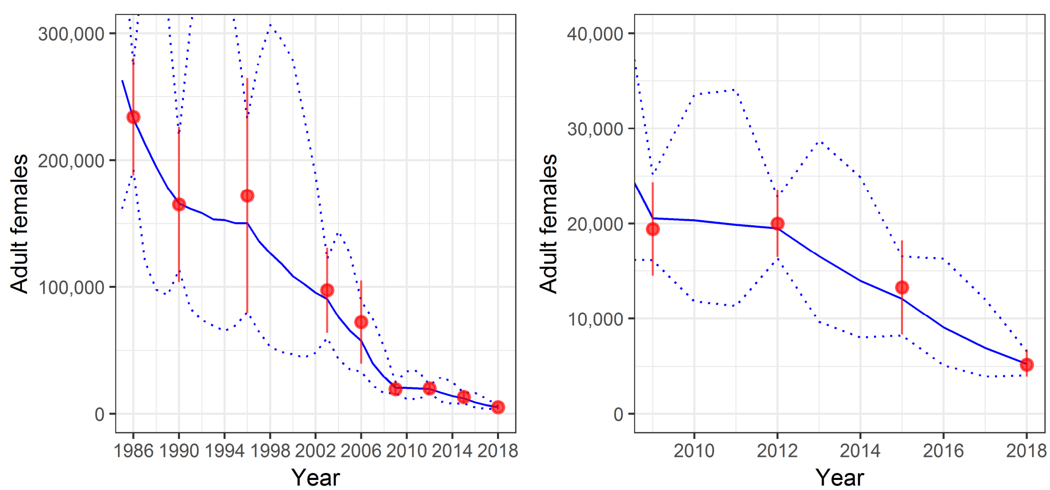


Figure 28: Trends in numbers of adult Bathurst females 1986-2018, as estimated by the Bayesian state space model. The left graph is for the full extent of the data set and the right graph is zoomed into the period of 2009-2018. Field estimates are given as red dots (with confidence limits) and model predictions are shown as blue lines with confidence intervals as hashed lines.

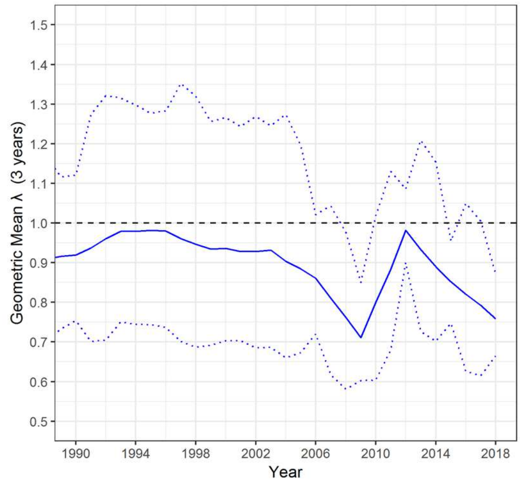


Figure 29: Estimates of λ for adult Bathurst females 1989-2018, as estimated by the Bayesian state space model. Model predictions are shown as blue lines with confidence intervals as hashed lines. A λ of 1.0 indicates a stable population.

Estimates of λ in adult Bathurst females were also relatively similar in trend to the breeding female estimates, with the exception of the 2012-2018 period where a trend of decreasing λ is evident, resulting in a three year geometric mean estimate of 0.76 (CI=0.66-0.7) in 2018 (Figure 29).

In general, densities of caribou in the core Bathurst area have decreased in parallel with overall trends since 2012. In 2012, densities in the core area did increase in unison with a smaller more aggregated core calving area. An analysis of trends in core calving ground area and related densities is given in Appendix 4.

Demographic analysis using multiple data sources

Survival analysis of collared cows

Collar data from adult Bathurst females were used to estimate annual survival rates 1996-2018. Of most interest was the interval 2009-2018 when management actions limited hunting mortality and collar sample sizes were increased after 2014. Estimates of monthly mortality, which is the ratio of collar mortalities to collars available, indicate higher mortality rates in the summer months of 2010-2014 followed by lower levels of mortality from 2014 to 2018 (Figure 30). A collar history plot that details individual collar fates is given in Appendix 2.

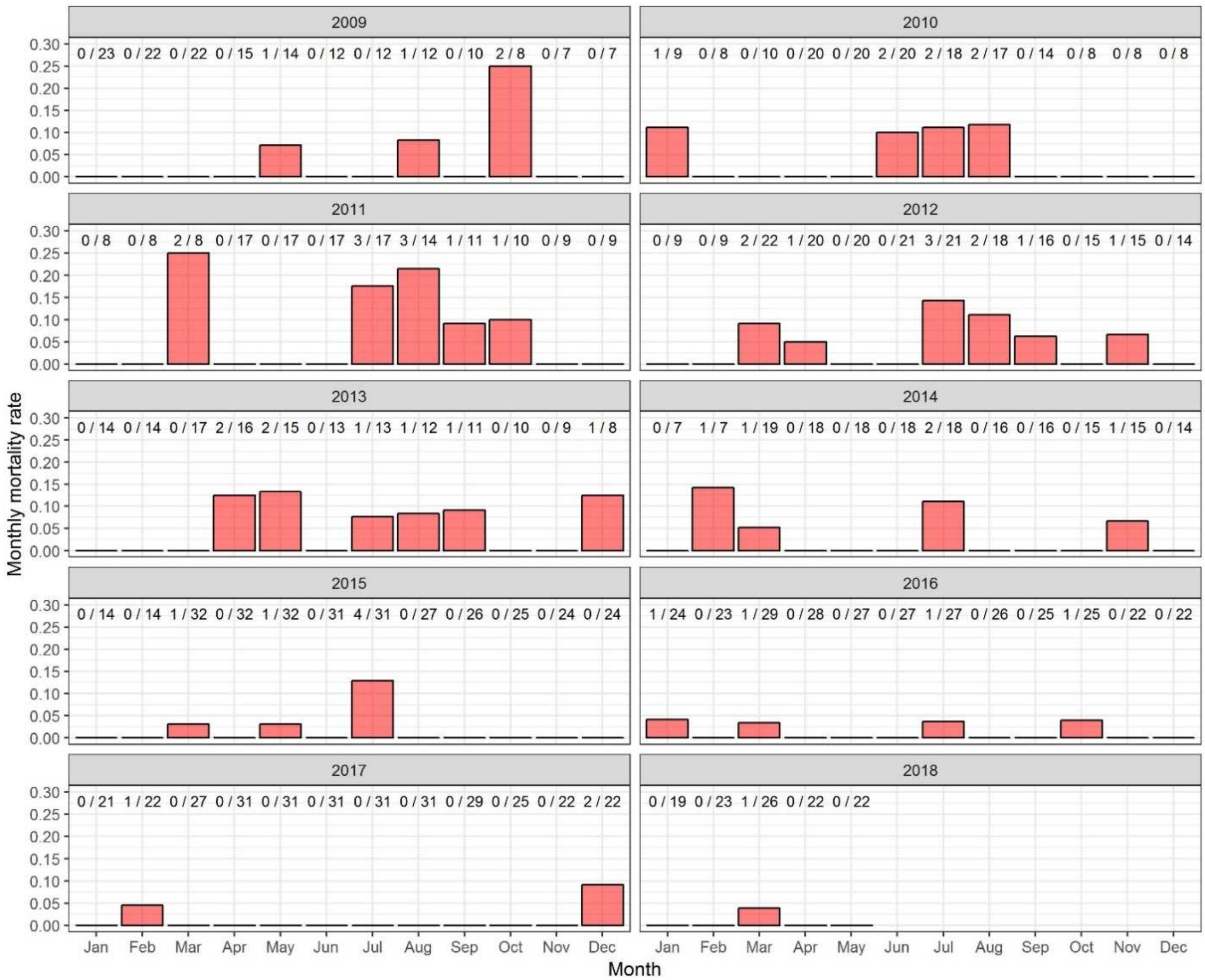


Figure 30: Summary of monthly collared cow mortality data for Bathurst herd 2009-2018. Individual collar histories for recent years (i.e. since 2016) are given in Appendix 2.

The total data set is summarized in Table 18 with corresponding cow survival rate estimates for each year. Initial collar sample sizes were very low in 1996 and 1997 (<10), then increased somewhat 1998-2014 (10-20) with an average of 25-26 in 2015-2017. As a result, annual survival estimates have a high variance and should be interpreted with caution.

Table 18: Summary of Bathurst collar sample sizes and survival estimates.

Caribou Year	Mortalities	Live collar sample sizes				Yearly survival estimates			
	Total	Collar months	Mean	Min	Max	Estimate	SE	Conf. Limit	
1996	2	101	8.4	7	10	0.79	0.13	0.44	0.95
1997	2	85	7.1	6	12	0.75	0.15	0.38	0.94
1998	7	174	14.5	5	21	0.52	0.14	0.27	0.76
1999	1	161	13.4	13	14	0.92	0.07	0.61	0.99
2000	3	158	13.2	12	15	0.79	0.11	0.51	0.93
2001	6	123	10.3	5	13	0.50	0.14	0.25	0.76
2002	2	136	11.3	9	15	0.86	0.09	0.58	0.97
2003	5	117	9.8	7	13	0.58	0.14	0.31	0.82
2004	4	136	11.3	6	22	0.66	0.14	0.35	0.87
2005	4	187	15.6	13	19	0.78	0.10	0.53	0.91
2006	3	199	16.6	15	22	0.85	0.08	0.62	0.95
2007	6	213	17.8	15	21	0.71	0.10	0.48	0.86
2008	2	210	17.5	12	23	0.87	0.09	0.59	0.97
2009	4	135	11.3	7	20	0.61	0.15	0.31	0.85
2010	8	151	12.6	8	20	0.53	0.13	0.29	0.76
2011	11	167	13.9	9	22	0.46	0.11	0.26	0.67
2012	11	196	16.3	14	21	0.51	0.10	0.31	0.70
2013	6	145	12.1	7	19	0.55	0.14	0.28	0.79
2014	5	236	19.7	14	32	0.78	0.09	0.55	0.91
2015	6	319	26.6	23	31	0.81	0.07	0.63	0.91
2016	3	306	25.5	21	31	0.88	0.06	0.69	0.96
2017	3	303	25.3	19	31	0.87	0.07	0.67	0.96

The annual cow survival rate estimates are plotted in Figure 31, which suggests an increasing trend in cow survival after 2014, albeit still with high variance due to limited collar numbers.

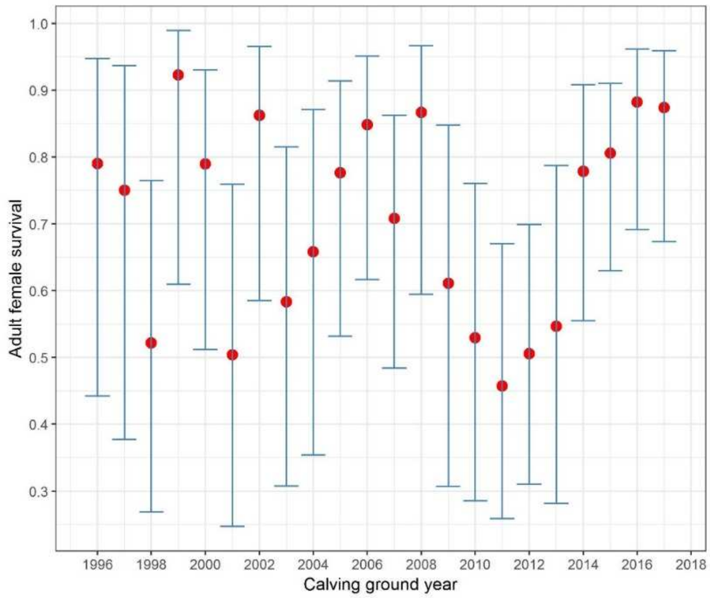


Figure 31: Annual survival rate estimates 1996-2018 for Bathurst adult females based on collared female caribou.

Bayesian state space integrated population model (Bayesian IPM)

The main objective of the Bayesian IPM was to provide refined estimates of demographic parameters using all available field data. For the Bathurst herd, temporal variation in main parameters (cow/yearling survival, calf survival) was modeled as random effects. A more detailed technical description of the model, including tests of model parameters and the associated *R* code, is given in Appendix 3.

The Bayesian IPM fit most field measurements adequately (Figure 32). The main exceptions were overestimates of cows and cows+bulls (compared to extrapolated estimates) in 2018, which is discussed later in the report. Also, in some cases the proportion of breeding females estimates did not align well with field estimates. Confidence in model predictions tended to be highest for the years in which there were field estimates.

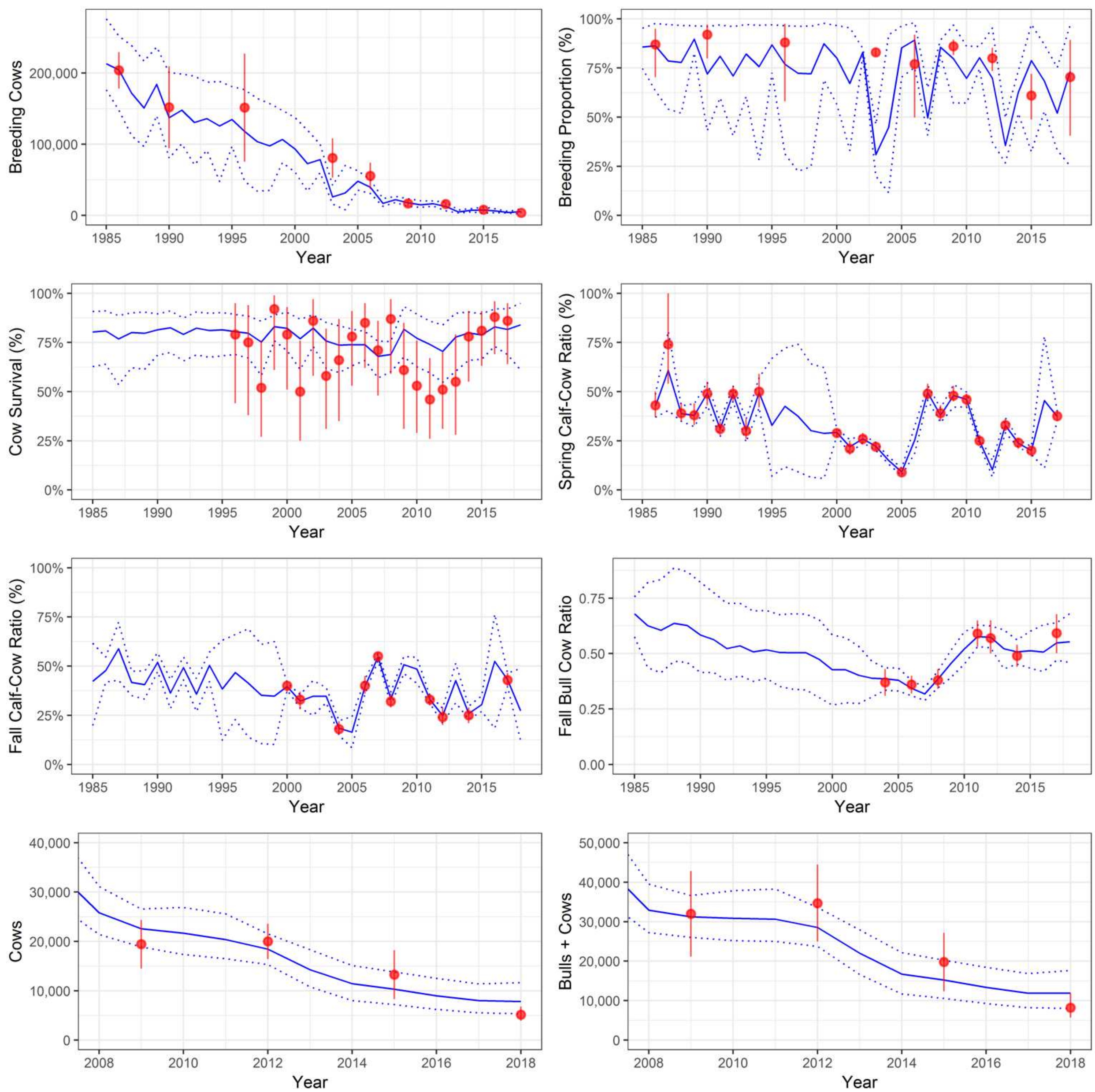


Figure 32: Predictions of demographic indicators from Bayesian model analysis compared to observed values, for Bathurst herd 1985-2018. The solid blue lines represent model predictions and confidence limits are shown as hashed blue lines. The red points are field estimates with associated confidence limits. Spring calf:cow ratios are flown in March or April and are also called late-winter surveys. Estimated numbers of cows and herd size (bulls+cows) show the more recent ten-year period to facilitate interpretation.

We modeled summer (June - late October) and winter (October - June) calf survival with the transition being the fall rut when fall composition surveys occur (Figure 33). This parameterization takes advantage of years where fall and spring calf cow surveys occur, therefore allowing assessment of change in proportion calves between June calving ground surveys, October fall surveys, and March/April late winter surveys and subsequent estimation of calf survival for each period. As found in previous studies (Gunn et al. 2005), summer survival is consistently lower than winter survival, when calves are larger. We note that the survival rates in the graphs below are expressed on the annual scale for comparison purposes. The actual rates will be different (slightly higher) given that summer or winter is shorter in time than a year.

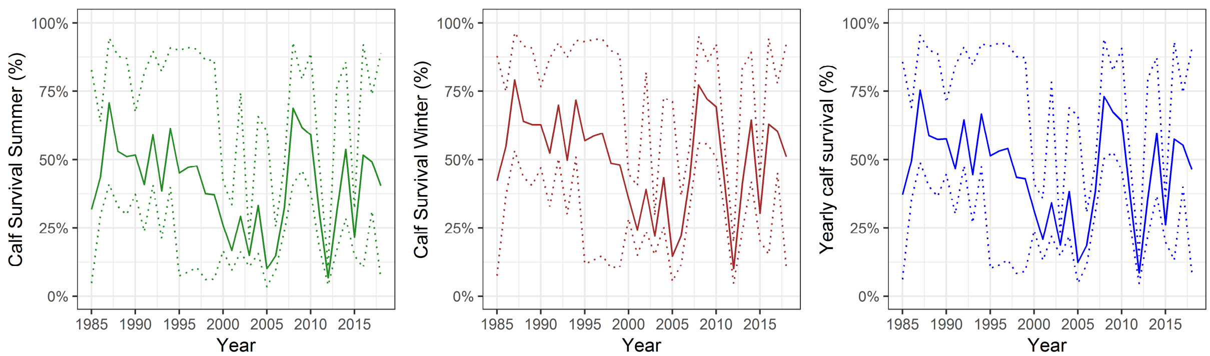


Figure 33: Trends in model-based summer and winter and overall calf survival for the Bathurst herd 1985-2018.

Overall calf productivity, which is basically the proportion of adult females that produce a calf that survives the first year of life, can be derived as the product of fecundity (from the previous caribou year) and calf survival (from the current year) (Figure 34). Estimates from Figure 34 suggest that productivity has not returned to levels observed prior to 1997 (mean productivity=0.46) in the 2011-2018 period (mean productivity=0.25). A potential negative trend in proportion of breeding females is evident as well as lower calf survival in the past ten years. As discussed later, environmental covariates and trend models will be used to further explore demographic trends and mechanisms affecting herd productivity.

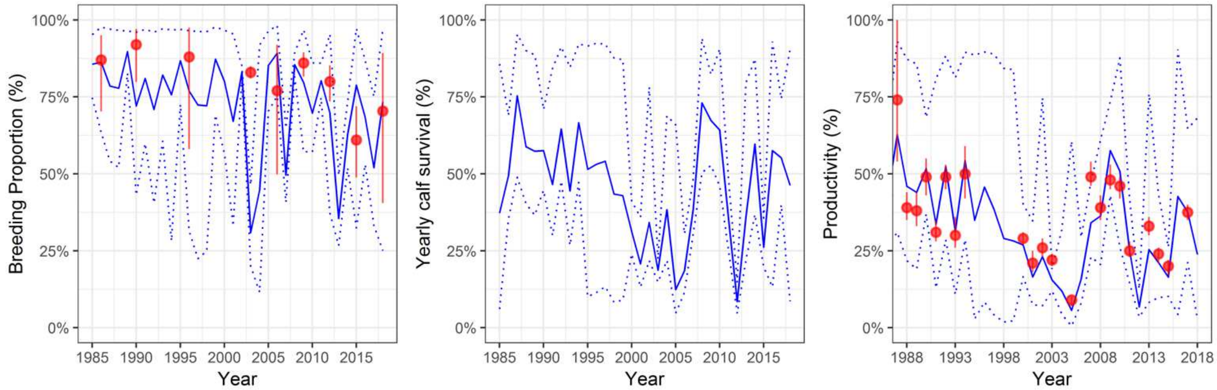


Figure 34: Trends in a) fecundity, b) annual calf survival and c) productivity (which is the product of the previous year's fecundity times the current year calf survival) for Bathurst herd 1985-2018. Spring calf cow ratios, which are lagged by one year, so that they correspond to the productivity/caribou year prediction of the model, are shown for reference purposes.

Spring calf-cow ratios, which are recorded in March or April, are overlaid in the productivity graph (Figure 34). Note that the spring calf-cow ratio is influenced by cow survival, calf survival as well as fecundity and therefore will not correspond directly to productivity. It will be greater than actual productivity because lower cow survival rates, which influence the count of cows in the spring, will inflate calf-cow ratios. The model predictions of spring calf-cow ratios, which account for cow survival, are shown in Figure 34. In addition, the model uses both calf cow ratios and proportion breeders (estimated during calving ground survey years) to estimate fecundity. In some cases, this results in poor model fit if calf cow ratios do not correspond well with the proportion of breeding cows estimated on the calving ground. In all cases the field estimates are within the confidence limits of the corresponding demographic model estimates.

One of the most important determinants of herd trend is adult cow survival since this directly influences the overall productivity of the herd. Collar-based point estimates and modeled annual and three-year average values for cow survival are shown in Figure 35. The dashed horizontal line indicates survival level needed for herd stability at mean productivity levels of 0.30 (2015-2018). The shaded region represents the range of cow survival levels needed for population stability across lowest observed levels of productivity (2015: 17%) to higher levels of productivity (2016:45%) during the 2015-2018 period (Figure 35). If productivity is at levels observed from 2015-2018 (0.31) then cow survival would need to be 0.88 for stability.

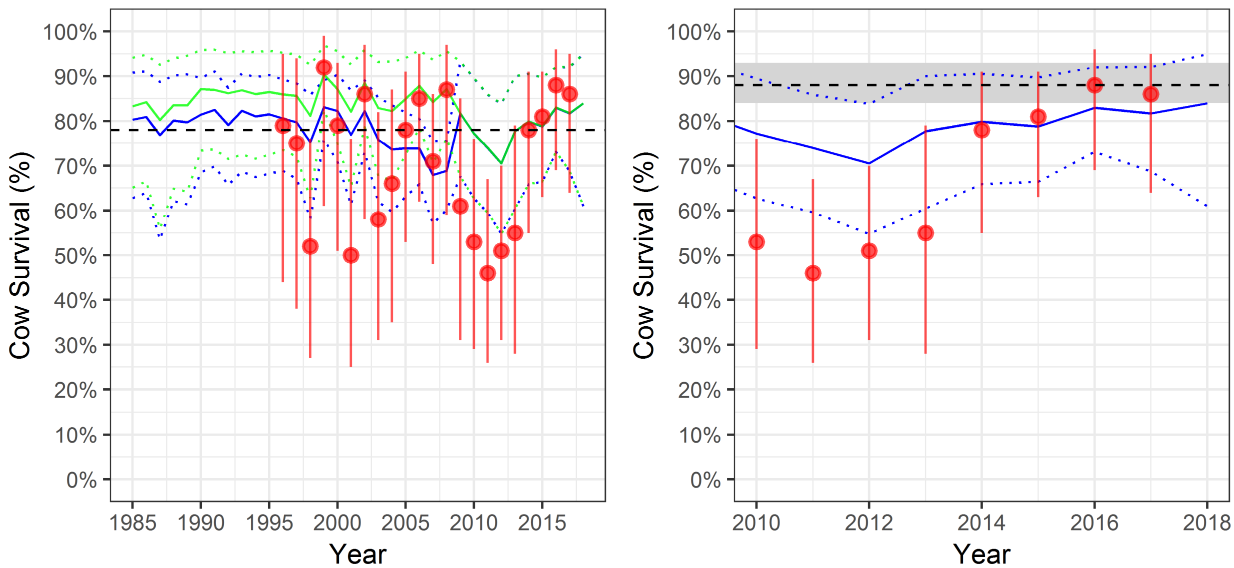


Figure 35: Trends in Bathurst cow survival 1985-2018 from Bayesian IPM analysis and collars. The solid blue lines represent model predictions and confidence limits are the hashed blue lines. A) The left graph shows the full time series with model estimates of survival denoted by blue lines, and "natural survival" with hunting mortality removed denoted by a green line. The red points are observed field estimates from collars with associated confidence limits. B) The right graph shows the empirical and modeled estimates of cow survival since 2010, when harvest restrictions were placed on the Bathurst herd. The dashed horizontal line indicates cow survival level needed (mean survival of 0.89) for herd stability at mean productivity levels of 0.30 (2015-2018). The shaded region represents the range of cow survival levels (0.85-0.93) needed for population stability across lowest observed levels of productivity (17%) to higher levels of productivity (45%) during the 2015-2018 period as shown in Figure 34c.

Model-based estimates of cow survival suggested an increasing trend in cow survival from 2012 to 2018 with a three-year average survival of 0.81 (CI=0.75-0.87) for the 2014-2017 calving year period. The model estimate of cow survival for the caribou year of 2017 (which spans from June 2017 to May 2018) was 0.82 (0.69-0.92). The estimate of cow survival in 2015 using the OLS model was 0.78 (CI=0.74-0.89) which compares to the Bayesian model estimate of 0.79 (CI=0.66-0.90) for 2015. While survival rates are potentially increasing, they still are below levels needed for herd stability as indicated by the grey zone in Figure 35.

Comparison of natural (green line) and observed survival rates (blue line) in Figure 35 illustrates the increasing impact of harvest on cow survival rates up to 2009 when harvest was reduced. In 2008, observed cow survival (including harvest) was 0.69 (CI=0,60-0.76) compared to a natural survival level of 0.87 (CI=0.76-0.96) during this time, assuming an annual cow harvest of 5,000. When harvest was reduced, observed and natural survival rates were similar. Future modeling will further consider variation in harvest rates and potential overall trends in natural survival when historic harvest is accounted for.

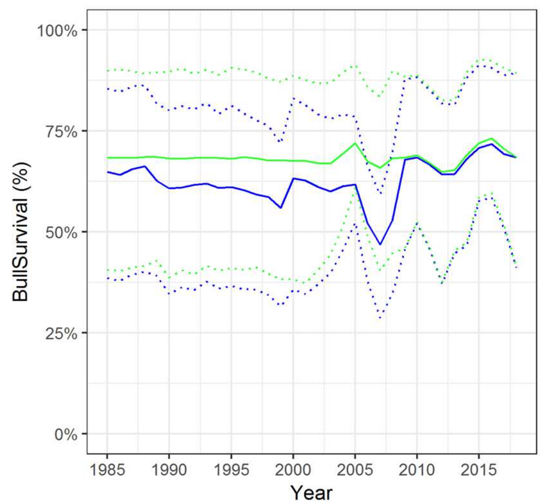


Figure 36: Estimates of bull survival for the Bathurst herd 1985-2018. The blue line represents observed survival whereas the green line represents natural survival with harvest mortality removed. Because harvest was very low 2010-2018, observed and natural mortality were similar.

Bull survival was estimated at 0.71 (0.52-0.91) in 2017 which is similar to the estimate in 2015 (0.72 (CI=0.59-0.92) (Figure 36).

Preliminary assessment of effects of emigration on estimate of Bathurst caribou

Population rates of change (λ) for cows suggest a rate of 0.92 (CI=0.83-0.99) 2015-2018 (Figure 37), which is higher than the rate indicated by adult cow estimates from the calving ground surveys of 0.76. The most likely reason for this difference is the direct impact of emigration of cows on the adult female calving ground survey estimate.

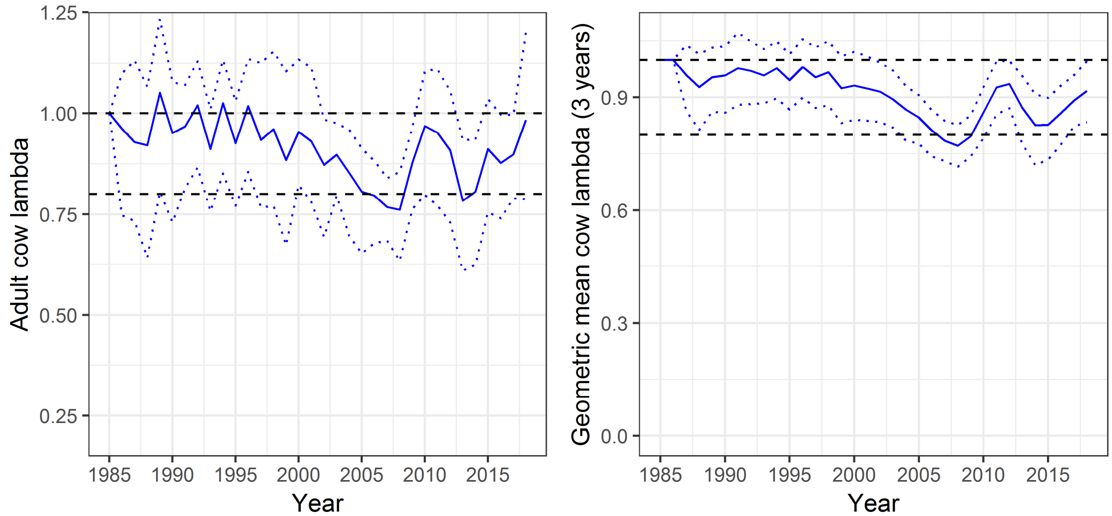


Figure 37: Overall trends (λ) in adult cows in the Bathurst herd 1985-2018 from the Bayesian model analysis. A value of 1.0 indicates stability.

Predicted numbers of breeding cows, adult cows, and bulls from the demographic model in 2018 were higher than calving ground estimates. For example, the estimate of breeding cows for the demographic model in 2018 was 5,551 (CI=1,935-9,591) compared to the calving ground-based estimate of 3,636 (CI=2,709-4,880). The demographic model estimate is 35% higher, although the confidence limits of the demographic model estimate overlap the field estimate. The likeliest reason for this is that the demographic information used in the model is based on caribou that were in the Bathurst herd up to the 2018 survey, and the 2018 breeding female estimate is only one of many data points used to inform the model. Basically, the model tolerates a slight lack of fit to the breeding female estimate in order to fit the other field estimates such as proportion breeding, calf-cow ratios, and cow survival rates. In this context, demographic predictions are less influenced by emigration of some Bathurst cows to the Queen Maud Gulf in 2018, which reduced breeding female estimates.

We conducted a sensitivity analysis of estimates to inclusion of the 2018 breeding female estimate, which was influenced by movements of cows to the Queen Maud Gulf. Estimates of cow survival when the 2018 adult female estimate were excluded were 0.85 (CI=0.74-0.93) for the 2017 calving ground year compared to 0.82 (CI=0.69-0.92) when the 2018 data point was included. The three-year average survival rate was 0.84 (CI=0.78-0.89) compared to 0.81 (CI=0.75-0.87) when the 2018 data point was included. Therefore, exclusion of the 2018 breeding female estimates boosted survival rates by 3%. Sensitivity analysis results for other parameters are given in Appendix 3.

The demographic model in this report will be further refined in the future. Potential refinements include more direct modeling of fidelity to the Bathurst calving ground using ratios of caribou that emigrate from the Bathurst calving ground. One of the challenges of this analysis is that we only had estimates of fidelity for collared cows with no estimates of fidelity for yearlings, calves, and bulls. It may be possible to partially estimate fidelity of bulls by proximity to calving grounds as well as get direct estimates of bull survival from the bull collars. In addition, harvest in the current version was modeled as a fixed rate which did not account for uncertainty in actual harvest particularly in the historic data set. Methods will be used to better incorporate uncertainty in harvest estimates which may help better refine estimates of natural survival. Finally, environment covariates will be used to model temporal trends in demographic parameters in unison with other trend models. The use of environmental covariates in previous demographic analyses up to 2016 (Boulanger and Adamczewski 2017) suggested possible linkages; however the recent 2017-2018 environmental data were not available for this analysis.

Estimation of Bathurst adult females, including emigration to the Queen Maud Gulf

The Lincoln-Petersen mark-recapture estimator (N_{LP}) based estimate of adult Bathurst cows that occurred both on the Bathurst calving ground and in the Queen Maud Gulf calving area was 7,098 (CI=4,432-11366, CV=23%), assuming that the proportion of known Bathurst collared cows (8/11) on the Bathurst calving ground was indicative of the overall distribution of cows in the entire herd. The corresponding estimate from the survey was 5,162 adult females in the Bathurst survey area, suggesting that 1,936 (CI=497-4,595) were in the Queen Maud Gulf coastal calving area. This estimate should be interpreted cautiously since it is based on only 11 collared caribou.

Estimates of adult females were generated using the demographic model for the Bathurst herd with and without the 2018 data point included (Figure 38). The demographic model attempted to balance the input from collared caribou, composition surveys, and previous survey estimates to estimate the number of adult females in 2018. The resulting estimate with the 2018 data point included was 7,833 adult females (CI=5,329-11,631, CV=21%), which was 35% higher than the corresponding observed estimate on the calving ground (5,162 CI=3,935-6,771, CV=13%). In addition, as discussed earlier, the demographic model estimate of adult females was less directly influenced by emigration of females to the Queen Maud Gulf coastal calving area in 2018 (which reduced the calving ground adult female estimate). Therefore, it would be expected that the demographic model estimate would be higher than the calving ground estimate, perhaps approaching the N_{LP} estimate of 7,098. Regardless, confidence intervals overlapped for the two estimates and therefore the difference could be expected by chance.

The demographic model was then run without the 2018 adult female estimate as part of the data set, therefore considering a scenario where all caribou occurred in the core Bathurst calving ground. The resulting estimate (11,423 CI=7,620-16,190) was 30% higher than when the 2018 adult female estimate was included in the demographic model run. The ratio of the estimates with and without the 2018 estimate included was 69% (CI=27-69%). This provides an alternative estimate of the proportion of Bathurst cows that remained on the traditional calving ground; this would mean that 31% of the cows had emigrated to the Queen Maud Gulf coastal calving area. This is relatively similar to the Lincoln-Petersen based estimates of 72% of the cows on the traditional Bathurst calving ground and 28% in the Queen Maud Gulf coastal calving area, based on collars. However, both estimates should be used with caution as one is based on model projections and the other on a limited number of collars.

The field and model-based estimates that include the Bathurst cows that appear to have emigrated to the east are still lower than the estimate of adult females on the calving ground in 2015 (13,264, CI=8,312-18,216) suggesting that substantial decline of the Bathurst herd has occurred even when emigration in 2018 to the Queen Maud Gulf/Beverly calving ground is considered. More exactly, the collar-based estimate (7,098, CI=4,432-11,366) was 46% of the 2015 adult cow estimate resulting in an annual rate of decline of 23%. The estimated annual rate of decline based on the demographic model estimate of 11,423 (CI=7,620-

16,190) was 5%, however, this estimate should be treated cautiously given limitations in directly comparing field estimates with demographic model estimates.

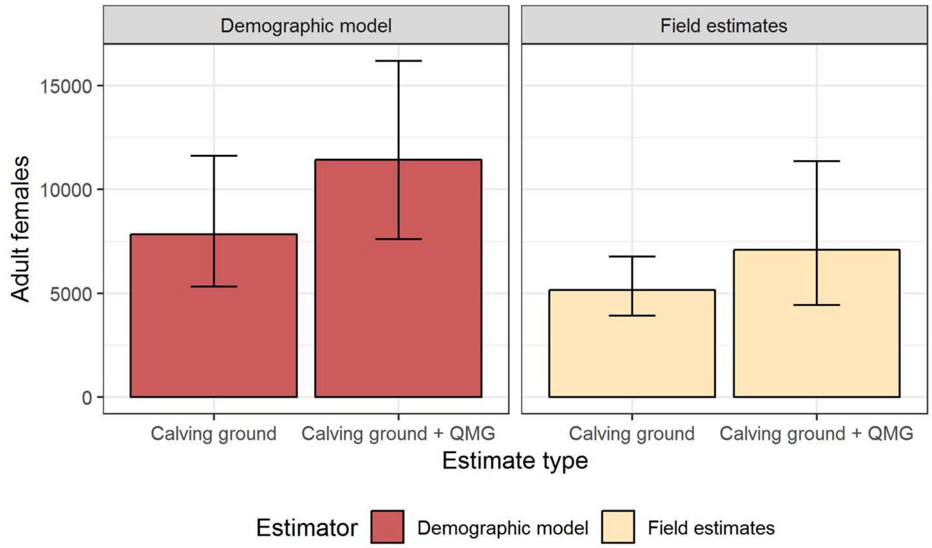


Figure 38: Field and model-based estimates of adult females on the Bathurst calving ground compared to estimates that were adjusted to include Bathurst females that calved on the Queen Maud Gulf coast calving area in 2018. Field estimates include the base estimate of adult females, and the base estimate of adult females divided by the proportion of collars that occurred on the Bathurst calving ground. Demographic model estimates include Bayesian IPM runs with the 2018 adult female estimate included and excluded.

Exploration of Potential Reasons for Decline in Herd Size

The apparent large decline in breeding and adult females in the Bathurst herd 2015-2018 could have resulted from (1) missing female caribou based on limited survey coverage or sightability, (2) movement of female caribou to adjacent calving grounds, and (3) demographic changes within the herd (low pregnancy rates, reduced calf survival, or reduced survival of adult caribou). We considered the likelihood of each factor contributing significantly to the estimated reduction in abundance.

Survey conditions and female caribou not occurring in strata

Survey conditions were challenging during the Bathurst 2018 survey; in particular, the snow conditions made caribou more difficult to see than on previous surveys with predominantly bare ground. It is possible that the counts from the two visual strata under-estimated true abundance due to poor sighting conditions. However, 96.9% of the estimated breeding females and 84.2% of the estimated adult females for the overall survey area were estimated from the photo stratum. The comparable figures in 2015 were a very similar 96.2% of breeding cows and 88.9% of adult females from the photo stratum (Boulanger et al. 2017). In the photo stratum for 2018, extra time spent counting caribou on photos and the double observer check on photos provided confidence that sightability was >84% and thus that caribou missed had been accounted for. In addition, the 17 active collared females in the Bathurst Inlet area were accounted for in the three survey strata. One collared cow was south of the visual and photo strata at the time of the aerial photography June 8-9, but reconnaissance flying in this area showed there were very few caribou in that area (see Figure 17). Extensive reconnaissance flying north, south and west of the three survey strata demonstrated that there were very few caribou in these areas.

There remains a possibility, based on very low densities of caribou observed by GN biologists (Figure 17) beyond the eastern boundary of the Bathurst East Visual block, that a few Bathurst cows were found further east. However, GN biologists observed caribou trails to the east of that block in the snow predominantly leading northeast to the main Beverly calving ground, and the Beverly collared cows continued to move north and east in the first and second weeks of June (M. Campbell, pers. comm.). The East Visual stratum contributed 6.3% of the estimated breeding females and 10.1% of the estimated adult females in the survey area; the photo stratum, as in previous Bathurst surveys, accounted for the vast majority of the female caribou. Overall, we believe that the June 2018 Bathurst estimates of breeding females, adult females and herd size are representative of the herd and that sightability and distribution issues had little influence on the survey outcome.

Movement to Adjacent Calving Grounds and Ranges

Figures 12-16 earlier in this report documented movements of collared Bathurst caribou in the vicinity of Bathurst Inlet in the spring of 2017 and particularly in the spring of 2018, as these collar movements affected the design of the survey and interpretation of the results.

In this section, collar fidelity is further assessed for 2018 with a comparison to previous years and neighbouring herds. Figure 39 displays movement in the mean location of calving for collared females that were monitored for successive years, for the Bathurst herd and its neighbours; annual fidelity is shown for 2009-2018. The head of the arrow is the mean location for the current year and the tail is the location for the previous year. In general, collared female caribou have shown reasonable fidelity to the Bathurst calving ground until 2018, when three collared caribou moved to the Beverly calving ground in the Queen Maud Gulf coastal calving area. Those three collared cows were monitored through the summer of 2018. One died in July and the other two continued to move with collared female Beverly caribou; i.e. there was no apparent return to the Bathurst herd.

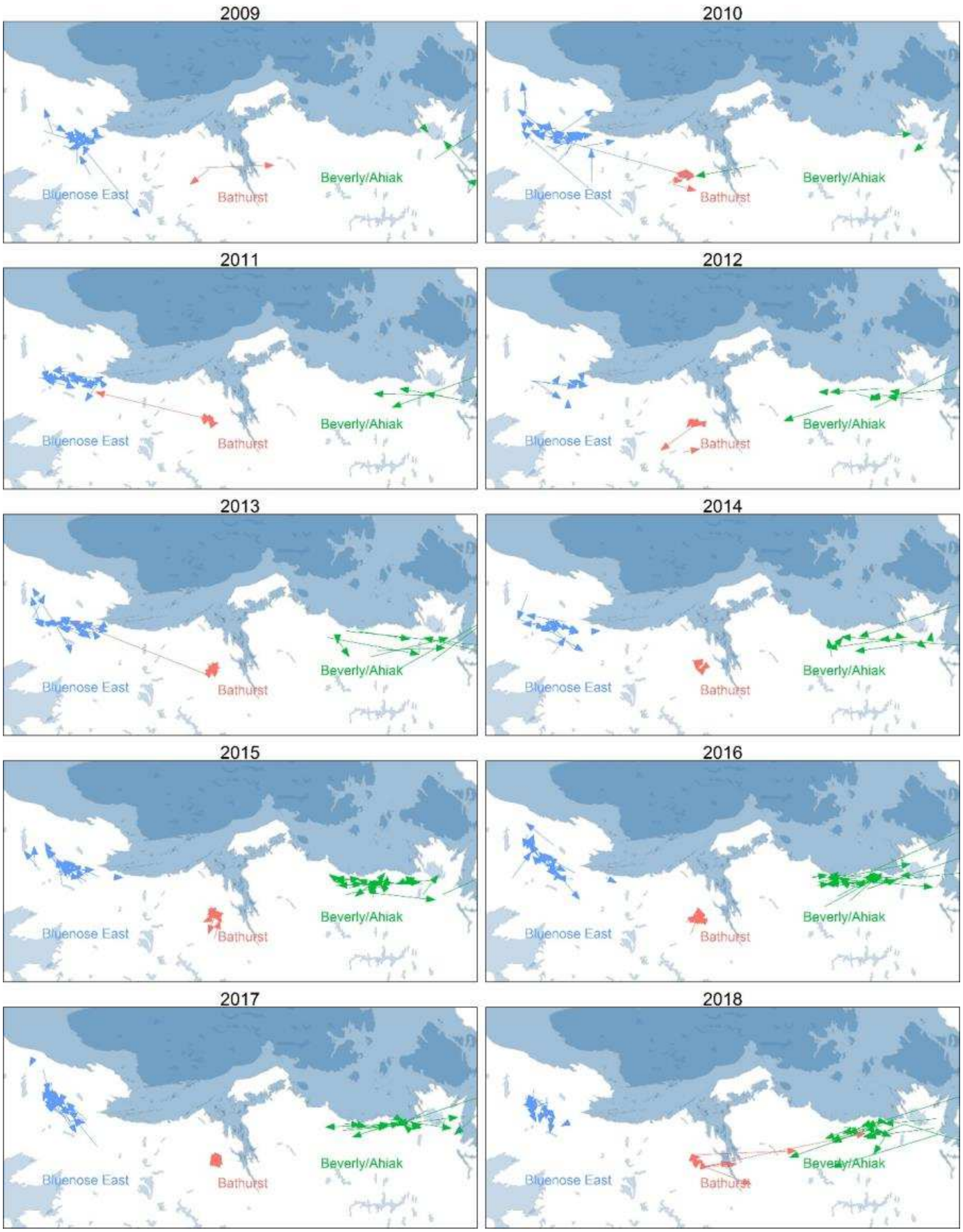


Figure 39: Yearly fidelity and movements to calving grounds in the Bluenose East (blue), Bathurst (red), and Beverly (green) herds 2009-2018. The head of the arrow indicates the current calving ground in the given year and the tail indicates the mean location from the previous year calving ground.

Frequencies of movement events between calving grounds for the Bathurst herd and neighbouring herds were assessed for collared female caribou monitored for consecutive years (Figure 40). A pair of consecutive June locations for a collared female was a single event or data point. Overall, the rates of switching were low 2010-2015 with 254 returns to the same calving ground and five switches for the three herds, indicating an overall 98% fidelity. Over the period 2016-2018, there were 174 returns to the same calving ground and three switches for the three herds, indicating again an overall fidelity of 98%. The low rate of switching of collared cows is consistent with previous estimates of about 3% switching and 97% fidelity in the Bathurst herd (Adamczewski et al. 2009) and similar fidelity in the Cape Bathurst, Bluenose-West and Bluenose-East herds (Davison et al. 2014). However, the only three switches between 2016 and 2018 were the three of 11 Bathurst collared females (27%) in June 2018. Movements of collared Bathurst bulls in spring 2018 (Figure 16) also suggested an unexpected degree of movement into the inland areas adjacent to the Queen Maud Gulf after collared males and females from the two herds were strongly mixed all winter (Figure 14).

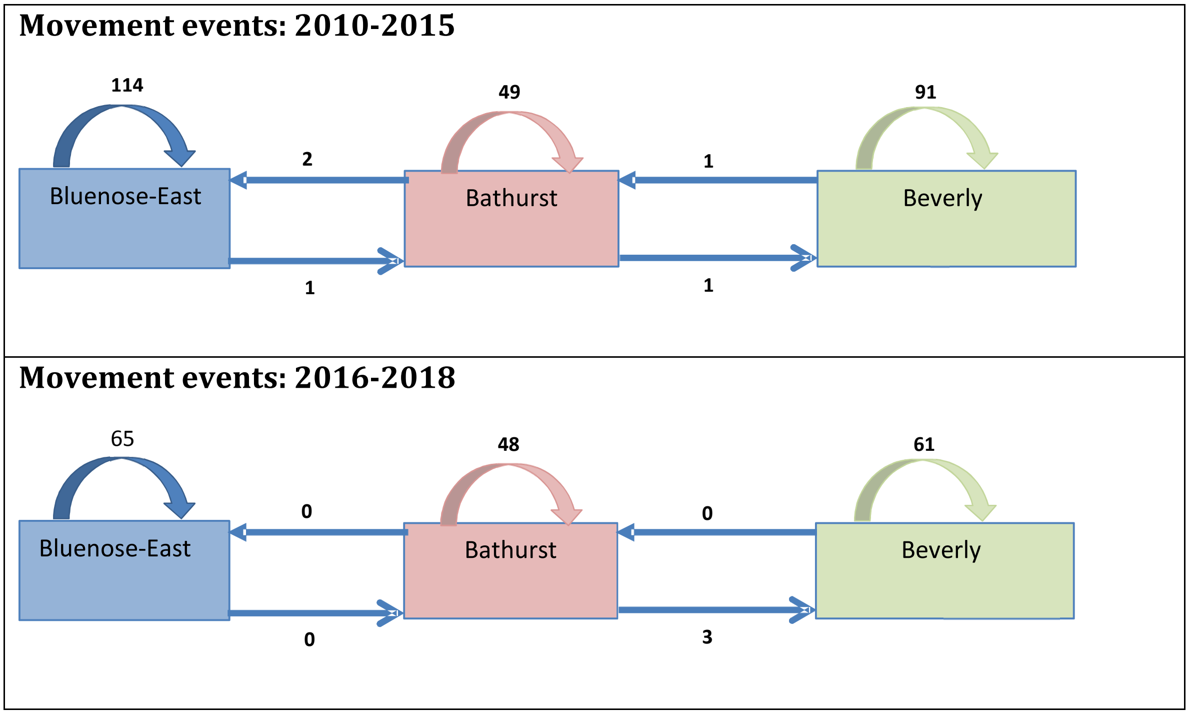


Figure 40: Frequencies of collared caribou movement events for the Bathurst and neighbouring Bluenose-East and Beverly herds 2010-2015 and 2016-2018 based on consecutive June locations. The curved arrows above the boxes indicated the number of times a caribou returned to the same calving ground in successive years. The straight arrows indicate movement of caribou to other calving grounds.

Demographic Change: Adult Survival, Calf Productivity and Calf Survival

Comparison of the 2015 and 2018 Bathurst June survey results shows declines by more than half in estimates of breeding females (55.0%), adult females (61.0%) and overall herd size (58.5%). Part of this decline is due to a proportion (approximately 27% based on three of 11 collared cows) of Bathurst cows calving on the Beverly/Queen Maud Gulf calving ground as discussed earlier (Figure 38). Demographic analysis described earlier indicates this decline is in part attributed to adult cow survival rates (estimated for 2017-2018 at 0.82) that have improved since 2015 (Figure 35) but continue to be below levels associated with stable populations (0.84 to 0.90). Calf survival has also been low overall in the past ten years (Figure 34). Overall calf productivity (the product of fecundity and one-year calf survival) in the 2011-2018 period (mean productivity of 0.25) was well below the levels observed prior to 1997 (mean productivity=0.46) and is well below levels associated with stable populations (Figure 34). Both productivity and cow survival would need to increase substantially to reach levels associated with a stable population. We note that demographic model estimates from a model that used the 2018 data point will be influenced by the emigration event in 2018. The three-year average survival rate was 0.84 (CI=0.78-0.89) with the 2018 adult female estimate excluded compared to 0.81 (CI=0.75-0.87) when the 2018 adult female estimate was included. Therefore, survival estimates are still on the lower level needed for herd recovery given current levels of productivity, regardless of model scenario considered.

Incidental Sightings of Other Wildlife

Sightings of other wildlife during the June 2018 calving ground surveys are listed in Table 19. Observations for both the Bathurst and the Bluenose-East surveys are included for convenience. Of particular interest are the sightings of wolves and grizzly bears as key predators of young caribou calves. There were 29 grizzly bear sightings and five wolf sightings on the Bathurst calving ground, and 44 grizzly bear sightings and eight wolf sightings on the Bluenose-East calving ground. In general this is consistent with previous calving ground surveys of these two herds, which have shown substantially more bears than wolves.

Table 19: Incidental sightings of other wildlife during June 2018 calving ground surveys from reconnaissance flying, visual blocks, and composition surveys. Note that some areas were flown more than once, thus some individuals may have been sighted more than once.

Species	**Bathurst calving ground**	**Bluenose-East calving ground**
Red fox	1	2
Arctic Fox	2	1
Eagles	4	2
Grizzly bears	29	44
Moose	4	4
Muskox	233	411
Wolverine	0	0
Wolves	5	8

DISCUSSION

Results from the Bathurst 2018 calving photo survey documented significant declines by more than half in estimates of breeding females (55.0%), adult females (61.0%) and overall herd size (58.5%) since 2015. The reduction in herd size indicates an annual rate of decline of 25.5% 2015-2018. The overall decline from peak numbers in 1986 of 470,000 is on the order of 98%. We suggest that the most recent decline cannot be attributed to poor survey methods or sampling. The caribou on the visual strata may have been under-estimated somewhat due to the patchy snow conditions and relatively low sightability, but 96.9% of the estimated breeding females and 84.2% of the estimated adult females for the overall survey area were estimated within the photo stratum, similar to the 2015 survey. Extra time spent searching photos and the double observer check suggested that a very high proportion of the caribou were found on the aerial photos.

An analysis of the herd's demography suggests that low calf survival rates and improved, but still low adult female survival rates both contributed to the continuing decline of the Bathurst herd. In 2018, fecundity of the Bathurst herd was relatively good, with 70.4% breeding females on the calving ground. However, by October 2018 the estimated calf:cow ratio of 21 calves: 100 cows (D. Cluff, unpublished data) indicated that calf survival through the first four to five months was poor and well below levels needed for a stable population.

An evaluation of spatial patterns of mortality in collared Bathurst cows resulted in two maps, one for 1996-2009 and one for 2010-2016 (Figure 41; Boulanger and Adamczewski 2017). Mortality risk for 1996-2009 was relatively dispersed, with some mortality on the winter range and some on the summer range. Some of the winter mortality in the winter may reflect hunter harvest, which over that period was not restricted. Mortality risk was lowest during calving 1996-2009. The overall geographic range of the Bathurst herd in the later period 2010-2016 was reduced, reflecting the herd's much reduced numbers. As in the earlier period, mortality risk was lowest during calving 2010-2016. This appears to support the longstanding view that caribou cows migrate to remote tundra calving grounds primarily to reduce predation risk (Bathurst herd: Heard et al. 1996; Porcupine herd: Griffith et al. 2002, Russell and McNeill 2005). In the later period, mortality risk was highest on the summer range. While this analysis did not include an assessment of the causes of mortality in collared caribou, the summer mortality of collared female caribou and the poor summer calf survival may point to predation on the summer range as contributing significantly to mortality of calves and adults. Summer mortality has decreased in the Bathurst herd from 2015 to 2017 resulting in an increased rate of cow survival (Figures 30, 31, and 35), however overall cow survival rates are still lower than needed for herd recovery, given current levels of productivity.

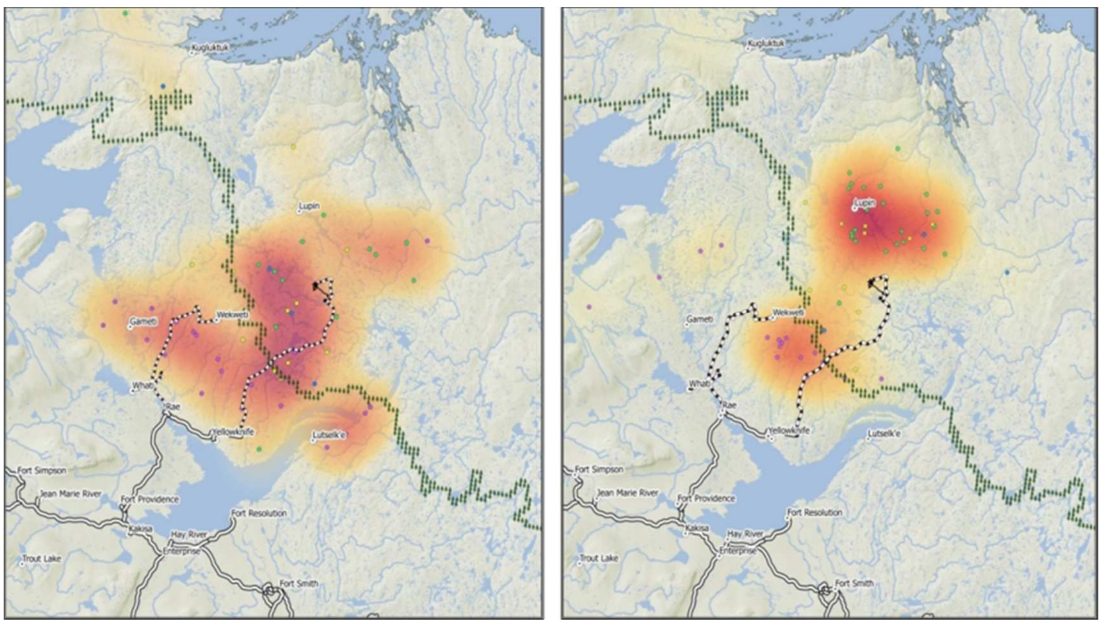


Figure 41: Relative likelihood of mortality in collared Bathurst female caribou shown as a "heat map" for 1996-2009 (left) and 2010-2016 (right). Darker colours (orange and red) indicate areas with an above-average probability of mortality, and lighter areas (yellow) indicate areas with a below-average probability of mortality. If mortalities were in proportion to live locations of collared caribou, all of the range would have the same colour. From Boulanger and Adamczewski (2017).

In 2018 some Bathurst collared cows were initially east of Bathurst Inlet and moved west across the Inlet at the time of the survey, but three of 11 (27%) Bathurst cows continued moving east into the Queen Maud Gulf coastal calving area with collared Beverly cows and remained there during the calving period. This is a limited sample and it is difficult to quantify the percentage of the herd that moved east with the three collared cows; assessment of collars and analyses through the demographic model suggest that roughly 30% of the herd's cows may have emigrated in 2018. Spring-time movements of collared Bathurst bulls (Figure 16) suggest that some of them also moved east into the Queen Maud Gulf area, south of the coastal calving grounds. These movements may in part reflect strong mixing of the Bathurst and Beverly herds in the winter of 2017-2018, as also happened in the winter of 2016-2017. There is a large disparity in size of the two herds. With the Bathurst estimate of 8,207 caribou (this survey) and the 2018 Beverly estimate of just over 100,000 (Campbell et al. 2019), the Beverly herd outnumbered the Bathurst by about 12:1. Caribou are gregarious animals and movement of collared Bathurst cows towards the calving grounds in the Queen Maud Gulf may indicate that they were drawn along by the northeast movement of the larger herd after sharing wintering ranges from November-December to April-May.

As described by Gunn et al. (2012), gregariousness of female caribou during calving is a strategy for reducing predation risk and is a principal reason for high densities of breeding females on a calving ground. For the Porcupine herd, Griffith et al. (2002) demonstrated that newborn calves on the interior of large calving aggregations on the calving ground had higher survival rates than calves on the periphery of these aggregations. However, as a population of migratory barren-ground caribou declines below a small threshold size, spatial fidelity to a calving area may start to break down, resulting in a partial or complete shift in use of a calving area. Heavy overlap on the winter range with a larger herd, as in the Bathurst herd's recent substantial overlap in recent winters with the much larger herd calving in the Queen Maud Gulf coastal lowlands, may also act as a factor predisposing a smaller declining herd to joining a much larger herd.

The observed switching of three of 11 known Bathurst collared cows to the Queen Maud Gulf lowland calving ground during the 2018 calving season presents at least two possibilities. The first is that the switching observed for three Bathurst cows in June 2018 was an isolated occurrence and spatial fidelity to the Bathurst calving ground, which has generally been 97-98% based on collared cows, is maintained. The second is that observed rates of switching by known Bathurst cows to the Queen Maud Gulf lowland calving ground in 2018 will continue and possibly increase in subsequent calving periods, especially if the Bathurst herd continues to decline. In June 2019, three of 17 (17.6%) collared cows that were on the Bathurst calving ground in June 2018 moved well east of Bathurst Inlet with Beverly collared females, suggesting that some eastward emigration of Bathurst cows had continued (Adamczewski et al. 2019). There was evidence from 2006-2009 of several collared caribou females using the inland Beverly calving ground, then switching to the coastal Queen Maud Gulf calving ground in a following year (Adamczewski et al. 2015). The management implication of continued or increased calving ground switching by Bathurst cows is that a combination of numerical decline and emigration may further reduce the likelihood of recovery for the Bathurst herd.

Harvest of the Bathurst herd has been closed in the NWT since early 2015 (see WRRB 2016), with a Mobile Core Bathurst Caribou Conservation Area (MCBCCA) applied as a no-harvest zone. The MCBCCA (i.e. mobile zone) was developed as a minimum convex polygon around Bathurst collared caribou locations (males and females) with a spatial buffer ranging from 20-60 km, depending on the degree of overlap with adjacent herds and recommendations from a technical committee. Limited numbers of Bathurst collars in some winters may mean that the herd's distribution was not fully defined, potentially leading to a limited harvest of Bathurst caribou outside the mobile zone. However, the heavy mixing of Bathurst and Beverly collars in recent winters and the 12:1 ratio of Beverly:Bathurst caribou, in addition to the Beverly collars generally found south and east of the mobile zone, would mean that the harvest in areas bordering on the mobile zone was predominantly comprised of Beverly caribou.

Results of the Bayesian state space model analysis of the Bathurst herd confirm earlier results (Crête et al. 1996 and Boulanger et al. 2011) and suggest that cow survival levels of 0.84-0.92 are needed for stability, given the recent range of calf productivity levels observed for this herd. Low natural survival rates may reflect significant predation by wolves and bears (Haskell and Ballard 2007), and the spatial concentration of collared cow mortalities 2010-2016 (Figure 41) suggests that summer was the time of greatest predation risk.

Summer mortality as estimated by collared caribou has decreased in recent years (Figure 30).

Overall calf productivity in the 2011-2018 period (mean productivity of 0.25) was well below the levels observed prior to 1997 (mean productivity=0.46) and far below levels needed for a stable herd. Cyclical patterns in abundance of migratory caribou herds may also reflect the influence of large-scale weather patterns on vegetation and range conditions (Joly et al. 2011); declines of multiple NWT caribou herds from 2000 to 2006-2008 in part reflected late calving and sustained low calf recruitment (Adamczewski et al. 2009, Adamczewski et al. 2015).

Boulanger and Adamczewski (2017) suggested that high summer drought and warble fly indices on the Bathurst and BNE ranges may in part have contributed to poor female condition and low pregnancy rates in some years. For example, very high drought and warble fly indices for both herds in 2014 were followed by low percentages of breeding females in both herds in June 2015 (Boulanger et al. 2016, 2017). These results are further supported by the Bayesian IPM analysis that found correlations between warble fly indices and calf survival, and June temperature and cow survival based upon estimates between 2008 and 2016.

A concurrent calving ground survey of the Beverly herd (Campbell et al 2019) estimated 84,705 (CI=73,636-88,452) adult females and a total herd size of 103,372 (CI=93,684-114,061) in the survey area as defined by the caribou calving in the coastal lowland Queen Maud Gulf area and the Adelaide Peninsula. Comparison with abundance of caribou estimated in 2011 in the Queen Maud Gulf coastal calving area and re-analyzed to include the Adelaide Peninsula indicates that this herd has declined from an estimated 136,608 at that time. The comparison suggests an annual rate of decline of 4-5% from 2011 to 2018. If our evaluations of the proportion of Bathurst caribou that emigrated to the Queen Maud Gulf coastal calving area (about 30%) are correct and a similar proportion of bulls emigrated in 2018, then approximately 3,000 Bathurst caribou may have added to the estimate for the Beverly herd calving in the Queen Maud Gulf, a number that would have had a very limited effect on the GN Beverly herd estimate for 2018 and was well within the confidence limits of the estimate.

Monitoring Recommendations

As a result of the significant declines in the Bluenose-East (Boulanger et al. 2019) and Bathurst (this report) herds documented by 2018 calving photo surveys, the Tłı̨chǫ Government and GNWT ENR submitted joint management proposals for each herd to the Wek'èezhìi Renewable Resources Board (WRRB) in January 2019. While the WRRB has yet to determine what management actions and monitoring it will recommend, we include here the revised and increased monitoring and research included in the two proposals.

1. Calving photo surveys every two years, an increase in survey frequency from the three-year interval that has been used since about 2006. Population estimates from these surveys are key benchmarks for management decisions.
2. Annual composition surveys in June, October and late winter (March/April) to monitor initial calf productivity, survival through the first four to five months, and survival to nine to ten months in late winter. Results in 2018 suggested that initial fecundity was moderately high for the Bathurst herd (70% breeding females) but by late October the calf:cow ratio had dropped to 21 calves:100 cows, far below recruitment and productivity needed for a stable population. Annual fall surveys will also allow monitoring of the bull:cow ratio.
3. An increase in numbers of collars on the Bathurst and Bluenose-East herds from 50 (30 cows, 20 bulls) to 70 (50 cows, 20 bulls). This will improve estimation of annual cow survival rates and improve monitoring of herd distribution and harvest management, along with many other uses for collar information. Assessment of collar fate is essential to obtain unbiased survival estimates.
4. Suspension of reconnaissance surveys on the calving grounds. Although reconnaissance surveys on the calving grounds in years between photo surveys generally tracked abundance of cows on the calving grounds, the variance on these surveys has been high. In particular, results of the June 2017 reconnaissance survey on the Bluenose-East calving ground suggested that the herd's decline had ended and the herd had increased substantially, while the 2018 photo survey showed that in

reality the herd’s steep decline had continued. As noted above, however, annual composition surveys on the calving grounds of the two herds are planned, and were carried out in June 2019 (Adamczewski et al. 2019).

5. Increased support for studies of predator abundance and predation rates, as well as studies of factors affecting range condition, caribou productivity and health.
6. Increased support for on-the-land traditional monitoring programs like the Tłįchǫ Boots-on-the-Ground program (Jacobsen and Santomauro 2017) that provide insights into caribou health and the influence of weather and other factors on caribou.

ACKNOWLEDGEMENTS

We thank the following pilots for their expert and safe flying: Nigel Schatz and Kyle Newhook for Northwright Airways, Dan Hall for Air Tindi, and Ryan Mutz and Stefan Erber for Great Slave Helicopters. We thank the following individuals who assisted in counting caribou on the aerial survey: Stefan Goodman and Madison Hurst (ENR), Nicole Goodman and Melissa MacLellan (North Slave Métis Alliance), Roy Judas and Charlie Wetrade (Tłįchǫ Government), Jonas Modeste (Délînę Renewable Resources Council), Noel Doctor (Yellowknives Dene First Nation), Earl Evans (Northwest Territories Métis Nation), Aimee Guile and Laura Meinert (WRRB), Albert Anavilok, Danny Zita, Braydon Pederson, and Regan Adjun (Kugluktuk HTO), and Elie Gurarie (visiting researcher). We thank the photo-survey crew of Marcel Joubert, Klark Salmon and Louise Rawlinson of GeodesyGroup Inc (Calgary, AB) for completing all aerial photos in one day. Mathieu Dumond flew with the survey crews on a number of days and recorded video for an educational video on calving photo surveys. Max Dupilka provided expert daily updates on survey weather every morning. Derek Fisher (president and lead photo interpreter with Green Link Forestry Inc.) was the lead on counting caribou from the photo survey and provided an over-and-above effort in making sure photos were counted reliably. Justin McPherson and Jason Shaw with Caslys Consulting Ltd. (Saanichton, British Columbia) developed software for the tablet computers. Joe Thorley (Poisson Consulting) greatly assisted in the development of the Bayesian state space model. Kerry and Irene Horn at the Coppermine Inn welcomed us throughout the survey and provided additional space for office work during the surveys. We greatly appreciated the hospitality of staff at the Ekati diamond mine and their support of one Caravan survey crew, including accommodation and meals for our staff and fuel for aircraft. We greatly appreciated the support provided by staff with the Department of Environment, Government of Nunavut in Kugluktuk. Collaboration and sharing of information during June 2018 with NU biologists flying in the Queen Maud Gulf area was excellent and helped shape the Bathurst survey design. This survey was primarily funded by Environment and Natural Resources, Government of Northwest Territories. Bruno Croft at ENR was unable to join the survey crew in 2018 but helped with various aspects of logistics and survey planning. Bonnie Fournier at

ENR was very helpful in supplying daily collared caribou locations throughout the survey. We thank Patricia Lacroix for formatting and finalizing the report to GNWT standards. Brett Elkin as ENR Wildlife Director helped secure necessary funding and resources for the surveys and provided cheerful support throughout the operation.

PERSONAL COMMUNICATIONS

Mitch Campbell, Regional Biologist, Government of Nunavut, Department of Environment, Arviat, NU.

Derek Fisher, President, Greenlink Forestry Inc., Edmonton, AB.

LITERATURE CITED

Adamczewski, J., J. Boulanger, B. Croft, H.D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont and C. Nicolson. 2009. Decline in the Bathurst caribou herd 2006-2009: A technical evaluation of field data and modeling. Draft report, Environment and Natural Resources, Government of Northwest Territories.

Adamczewski, J., A. Gunn, K.G. Poole, A. Hall, J. Nishi and J. Boulanger. 2015. What happened to the Beverly Caribou Herd after 1994? Arctic 68:407-421.

Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford and B. Tracz. 2017. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in northern Canada in 2010. Canadian Wildlife Biology and Management 6:4-30.

Adamczewski, J., J. Williams and J. Boulanger. 2019. June 2019 calving ground composition suryeys of Bathurst and Bluenose-East barren-ground caribou herds. Draft report, Environment and Natural Resources, Government of Northwest Territories.

Barker, R. 2008. Theory and application of mark-recapture and related techniques to aerial surveys of wildlife. Wildlife Research 35:268-274.

Bergerud, A.T. 1964. A field method to determine annual parturition rates for Newfoundland caribou. Journal of Wildlife Management 28:477-480.

Boulanger, J. and J. Adamczewski. 2017. Analysis of environmental, temporal, and spatial factors affecting demography of the Bathurst and Bluenose-East caribou herds: Draft report. Environment and Natural Resources, Government of Northwest Territories.

Boulanger, J., B. Croft, J. Adamczewski, H.D. Cluff, M. Campbell, D. Lee and N.C. Larter. 2017. An estimate of breeding females and analyses of demographics for the Bathurst herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. Manuscript report No. 267.

Boulanger, J., K.G. Poole, J. Williams, J. Nishi and B. Croft. 2010. Estimation of sighting probabilities from caribou calving ground surveys using double observer methods. Unpublished draft report, Governments of Northwest Territories and Nunavut.

Boulanger, J., A. Gunn, J. Adamczewski and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management 75:883-896.

Boulanger, J., M. Campbell, D. Lee, M. Dumond and J. Nishi. 2014. A double observer method to model variation in sightability of caribou in calving ground surveys. Unpublished manuscript.

Boulanger, J., B. Croft, J. Adamczewski, D. Lee, N.C. Larter and L.-M. Leclerc. 2016. An estimate of breeding females and analyses of demographics for the Bluenose-East herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of the Northwest Territories. Manuscript Report No. 260.

Boulanger, J., B. Croft, J. Adamczewski, D. Cluff, M. Campbell, D. Lee and N. Larter. 2017. An estimate of breeding females and analyses of demographics for the Bathurst herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. Manuscript report No. 267.

Boulanger, J., J. Adamczewski, J. Nishi, D. Cluff, J. Williams, H. Sayine-Crawford and L.-M. LeClerc. 2019. Estimates of breeding females & adult herd size and analyses of demographics for the Bluenose-East herd of barren-ground caribou: 2018 calving ground photographic survey. Environment and Natural Resources, Government of the Northwest Territories. Manuscript Report No. 278.

Buckland, S.T., D.R. Anderson, K.P. Burnham and J.L. Laake. 1993. Distance Sampling. Estimating Abundance of Biological Populations. Chapman & Hall, London.

Buckland, S.T.N., K.B., L. Thomas and N.B. Koesters. 2004. State-space models for the dynamics of wild animal populations. Ecological Modeling 171:157-175.

Burnham, K.P. and D.R. Anderson. 1998. Model selection and inference: A practical information theoretic approach. Springer, New York, New York, USA.

Cameron, R.D., W.T. Smith, S.G. Fancy, K.L. Gerhart and R.G. White. 1993. Calving success of female caribou in relation to body weight. Canadian Journal of Zoology 71:480-486.

Campbell, M., J. Boulanger and D. Lee. 2015. Estimating abundance of the Qamanirjuaq mainland migratory barren ground caribou sub-population; June 2014. Government of Nunavut, Department of Environment, Technical Report Series - No: 01-2016.

Campbell MW, DS Lee and J Boulanger. 2019. Abundance trends of the Beverly Mainland Migratory Subpopulation of Barren-ground caribou (*Rangifer tarandus groenlandicus*) June 2011 - June 2018 Government of Nunavut, Department of Environment, Technical Report Series No. 01-2018. Draft File Report, 30 May 2019.

Cluff, H.D., B. Croft and J. Boulanger. 2016. Calf Survival and Adult Sex Ratio in the Bathurst and Bluenose East Herds of Barren-Ground Caribou 2006-2015. Environment and Natural Resources, Government of the Northwest Territories. Unpublished Draft Report.

Crête, M.S., S. Couturier, J. Hearn and T.E. Chubbs. 1996. Relative contribution of decreased productivity and survival to recent changes in the demographic trend of the George River herd. Rangifer 9:27-36.

Dauphiné, T.C. 1976. Biology of the Kaminuriak population of barren ground caribou, Part 4: Growth, reproduction and energy reserves. Canadian Wildlife Service Report No. 38, Canadian Wildlife Service.

Davison, T., H. Sawada, P. Spencer, M. Branigan and R. Popko. 2014. Calving ground fidelity of the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West and Bluenose-East barren-ground caribou herds, Poster at North American Caribou Workshop, Whitehorse, YT.

Dumond, M. and D. S. Lee. Dolphin and Union caribou herd status and trend. Arctic 66: 329-337.

Gunn, A., J. Dragon and J. Nishi. 1997. Bathurst Calving Ground Survey 1996. Yellowknife: Department of Resources, Wildlife and Economic Development, Government of Northwest Territories. File Report No. 119.

Gunn, A., J. Nishi, J. Boulanger and J. Williams. 2005. An estimate of breeding females in the Bathurst Herd of the barren-ground caribou, June 2003. Environment and Natural Resources, Government of Northwest Territories. Manuscript Report No. 164.

Gunn, A., J. Boulanger and J. Williams. 2005. Calf survival and adult sex ratio in the the Bathurst Herd of barren ground caribou 2001-2004. Department of Resources, Wildlife and Economic Development, Government of the Northwest Territories. Manuscript report No. 163.

Gunn, A., K.G. Poole and J.S. Nishi. 2012. A conceptual model for migratory tundra caribou to explain and predict why shifts in spatial fidelity of breeding cows to their calving grounds are infrequent. Rangifer Special Issue No. 20:259-267.

Gunn, A. and D.E. Russell, editors. 2008. Monitoring Rangifer herds (population dynamics): Manual. Circumarctic Rangifer Monitoring and Assessment Network (CARMA), www.carmanetwork.com.

Griffith, B., D.C. Douglas, N.E. Walsh, D.D. Young, T.R. McCabe, D.E. Russell, R.G. White, R.D. Cameron and K.R. Whitten. 2002. The Porcupine caribou herd. Pages 8-37 *in* D.C. Douglas, P.E. Reynolds and E.B. Rhode, editors. Arctic Refuge coastal plain terrestrial wildlife research summaries. U. S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD BSR-2002-0001.

Haskell, S.P. and W.B. Ballard. 2007. Modeling the Western Arctic caribou herd during a positive growth phase: Potential effects of wolves and radio collars. Journal of Wildlife Management 71:619-627.

Heard, D.C. 1985. Caribou census methods used in the Northwest Territories. Pages 229-238 *in* T.C. Meredith and A. M. Martell, editors. Caribou management - Census techniques - Status in Eastern Canada: Proceedings of the Second North American Caribou Workshop. McGill University, Val Morin, QC.

Heard, D.C. and J. Williams. 1991. Bathurst calving ground survey, June 1986. Government of Northwest Territories. Unpublished Report.

Heard, D.C. and M. Williams. 1990. Caribou project summary and review. Department of Resources, Wildlife, and Economic Development, Government of Northwest Territories. Unpublished Report.

Heard, D.C., T.M. Williams and D.A. Melton. 1996. The relationship between food intake and predation risk in migratory caribou and implications to caribou and wolf population dynamics. Rangifer Special Issue 2: 37-44.

Huggins, R.M. 1991. Some practical aspects of a conditional likelihood approach to capture experiments. Biometrics 47:725-732.

Humbert, J.Y., L.S. Mills, J.S. Horne and B. Dennis. 2009. A better way to estimate population trends. Oikos 118:1940-1946.

Innes, S., M.P. Heidi-Jorgensen, J.L. Laake, K.L. Laidre, H.J. Cleator, P. Richard and R.E.A. Stewart. 2002. Surveys of belugas and narwhals in the Canadian High Arctic. NAMMMCO Scientific Publications No. 3.

Jacobsen, P. and D. Santomauro. 2017. "We Watch Everything" A Methodology for Boots-on-the-Ground Caribou Monitoring. Dedats'eetsaa: Tłı̨chǫ Research and Training Institute. https://research.tlicho.ca/sites/default/files/we_watch_everything_a_methodology_for_boots_on_the_ground_caribou_monitoring.pdf

Jacobsen, P., G. Chocolate and R. Wetrade. 2016. Ekwò zò gha dzô nats'êdè - "We Live Here For Caribou"; Cumulative Impacts Study on the Bathurst Caribou. Dedats'eetsaa: Tłı̨chǫ Research and Training Institute. https://research.tlicho.ca/sites/default/files/ekwo_zo_gha_dzo_natsede_tk_study.pdf

Jolly, G.M. 1969. Sampling methods for aerial censuses of wildlife populations. East African Agricultural and Forestry Journal 34:46-49.

Joly, K., D.R. Klein, D.L. Verbyla, T.S. Rupp and F.S. Chapin. 2011. Linkages between large-scale climate patterns and the dynamics of Arctic caribou populations. Ecography 34:345-342.

Kery, M. and J.A. Royle. 2016. Applied hierarchichal modeling in ecology: Analysis of distribution, abundance, and species richness in BUGS. Academic Press, London, England.

Kery, M. and M. Schaub. 2012. Bayesian population analyses using WinBugs: A hierarchical perspective. Volume 1.Academic Press, Watham, Massachussets.

Krebs, C.J. 1998. Ecological Methodology (Second edition). Benjamin Cummins, Menlo Park, CA.

Laake, J., D.L. Borchers, L. Thomas, D. Miller and J. Bishop. 2012. Mark-recapture distance sampling (MRDS) 2.1.0. R statistical package program.

Laake, J., M.J. Dawson and J. Hone. 2008a. Visibility bias in aerial survey: mark-recapture, line-transect or both? Wildlife Research 35:299-309.

Laake, J., R.J. Guenzel, J.L. Bengtson, P. Boveng, M. Cameron and M.B. Hanson. 2008b. Coping with variation in aerial survey protocol for line-transect sampling. Wildlife Research 35:289-298.

Legat, A., G. Chocolate, B. Gon, S.A. Zoe and M. Chocolate. 2014. Caribou Migration and the State of their Habitat. Tłı̨chǫ Knowledge and Perspectives on Ekwǫ̀ (Barrenland Caribou). Submitted to the West Kitikmeot Slave Study Society, March 2001. October 2014: re-published by the Tłı̨chǫ Research and Training Institute, with spelling updates for Tłı̨chǫ (Dogrib) terms. https://research.tlicho.ca/sites/default/files/105-caribou_migration_report-web.pdf.

Manly, B.F.J. 1997. Randomization and Monte Carlo Methods in Biology. 2nd edition. Chapman and Hall, NY.

Nagy, J., D.L. Johnson, N.C. Larter, M. Campbell, A.E. Derocher, A. Kelly, M. Dumond, D. Allaire and B. Croft. 2011. Subpopulation structure of caribou (*Rangifer tarandus L.*) in Arctic and subarctic Canada. Ecological Applications 21:2334-2348.

Nishi, J., B. Croft, J. Boulanger and J. Adamczewski. 2010. An estimate of breeding females in the Bathurst herd of barren ground caribou, June 2009. Environment and Natural Resources, Government of Northwest Territories. File Report No. 144.

Norton-Griffiths, M. 1978. Counting Animals. 2nd edition. African Wildlife Leadership Foundation, Nairobi.

Peters, W., M. Hebblewhite, K.G. Smith, S.M. Webb, N. Webb, M. Russell, C. Stambaugh and R. B. Anderson. 2014. Contrasting aerial moose population estimation methods and evaluating sightability in west-central Alberta, Canada. Wildlife Society Bulletin 38:639-649.

Pollock, K.H., S.R. Winterstein, C.M. Bunck and P.D. Curtis. 1989. Survival analysis in telemetry studies: the staggered entry design. Journal of Wildlife Management 53:7-15.

QGIS_Foundation. 2015. QGIS: A free and open geographic information system (www.qgis.org).R_Development_Core_Team. 2009. R Foundation for Statistical Computing, Vienna, Austria.

Ramey, R.R., J.L. Thorley and A.S. Ivey. 2018. Local and population-level responses of Greater sage-grouse to oil and gas development and climatic variation in Wyoming. Peer J. 6: doi:10.7717/peerj.5417.

R_Development_Core_Team. 2009. R Foundation for Statistical Computing, Vienna, Austria.

Russell, D.E., K.L. Gerhart, R.G. White and D. Van de Wetering. 1998. Detection of early pregnancy in caribou: evidence for embryonic mortality. Journal of Wildlife Management 62:1066-1075.

Russell, D.E., G. Kofinas and B. Griffith. 2002. Barren-ground Caribou Calving Ground Workshop: Report of Proceedings. Technical Report No. 390, .

Russell, D.E. and P. McNeil. 2005. Summer ecology of the Porcupine caribou herd. Porcupine Caribou Management Board, 1st Edition December 2002, 2nd Edition March 2005. http://pcmb.ca/

Seber, G.A.F. 1982. The Estimation of Animal Abundance. 2nd edition. Charles Griffin and Company, London.

Thompson, S.K. 1992. Sampling. John Wiley and Sons, New York.

Thorley, J.L. and J. Boulanger. 2019. Bathurst caribou herd population analysis 2018. Unpublished contract report, Poisson Consulting.

Thorley, J.L.A., G.F. Andrusak. 2017. The fishing and natural mortality of large, piscivorous Bull Trout and Rainbow Trout in Kootenay Lake, British Columbia (2008–2013). Peer J. 5:doi 10.7717/peerj.2874.

White, G.C. and K. P. Burnham. 1999. Program MARK: Survival estimation from populations of marked animals. Bird Study Supplement 46:120-138.

White, G.C. and B. Lubow. 2002. Fitting population models to multiple sources of observed data. Journal of Wildlife Management 66:300-309.

Whitten, K.R. 1995. Antler loss and udder distention in relation to parturition in caribou. Journal of Wildlife Management 59:273-277.

Wickham, H. 2009. ggplot2: Elegant graphics for data analysis. Springer, New York.

WRRB (Wek'èezhìı Renewable Resources Board). 2016. Report on a public hearing held by the

Wek'èezhìı Renewable Resources Board 23-24 February 2016, Yellowknife, NT & Reasons for decisions related to a joint proposal for the management of the Bathurst ekwǫ̀ (barren-ground caribou) herd, Part A. www.wrrb.ca/sites/default/files/WRRB%20to%20ENR-TG%20-%20Final%20Bathurst%20Reasons%20for%20Decision%20Report%20-%20Part%20A%20-%2026may16.pdf.

Appendix 1: Double observer methods and results for visual survey strata

Methods and results described in this appendix include data from the Bathurst and Bluenose-East surveys in June 2018. One Cessna Caravan crew was based at the Ekati Mine and flew all of the Bathurst reconnaissance survey and most of the Bathurst two visual blocks. One Cessna Caravan based at Kugluktuk flew only on the Bluenose-East reconnaissance and two visual blocks, and the other Caravan based at Kugkuktuk flew primarily on the Bluenose-East survey but also flew part of the Bathurst visual survey. Snow conditions were generally similar across the two survey areas. Given the overlap in survey flying and the similar sightability conditions on both surveys, double observer data were combined in the analyses and results described in this appendix.

Visual surveys were conducted in two low density strata in June 2018 on the Bathurst survey, one west of Bathurst Inlet and one east of it. There were also two visual blocks in the Bluenose-East survey in June 2018, one north of the two photo blocks and one south of them. Each of the Caravans had two observers and a recorder on each side of the aircraft. The numbers of caribou sighted by observers were entered into the Trimble YUMA 2 tablet computers and summarized by transect and stratum.

A double observer method was used to estimate the sighting probability of caribou during visual surveys. The double observer method involves one primary observer who sits in the front seat of the plane and a secondary observer who sits behind the primary observer on the same side of the plane (Figure 1). The method followed five basic steps:

1 - The primary observer called out all groups of caribou (number of caribou and location) he/she saw within the 400 m wide strip transect before they passed about halfway between the primary and secondary observer. This included caribou groups that were between approximately 12 and 3 o'clock for right side observers and 9 and 12 o'clock for left side observers. The main requirement was that the primary observer be given time to call out all caribou seen before the secondary observer called them out.

2 - The secondary observer called out whether he/she saw the caribou that the first observer saw and observations of any additional caribou groups. The secondary observer waited to call out caribou until the group observed passed about half way between observers (between 3 and 6 o'clock for right side observers and 6 and 9 o'clock for left side observer).

3 - The observers discussed any differences in group counts to ensure that they were calling out the same groups or different groups and to ensure accurate counts of larger groups.

4 - The data recorder categorized and recorded counts of caribou groups into primary (front) observer only, secondary (rear) observer only, or both, entered as separate records.

5 - The observers switched places approximately half way through each survey day (i.e. on a break between early and later flights) to monitor observer ability. The recorder noted the names of the primary and secondary observers.

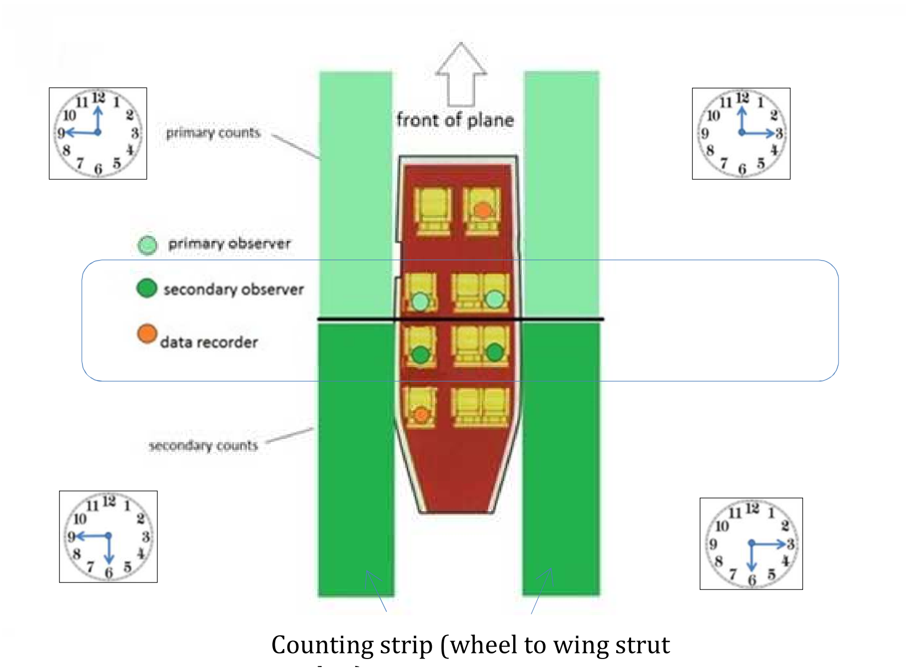


Figure 1: Observer and recorder positions for double observer methods on June 2018 caribou survey of Bathurst caribou. The secondary observer confirmed or called caribou not seen by the primary observer after the caribou have passed the main field of vision of the primary observer. Time on a clock can be used to reference relative locations of caribou groups (e.g. “caribou group at 1 o’clock”). The recorder was seated behind the two observers on the left side, with the pilot in the front seat. On the right side the recorder was seated at the front of the aircraft and was also responsible for navigating in partnership with the pilot.

The statistical sample unit for the survey was groups of caribou, not individual caribou. Recorders and observers were instructed to consider individuals to be those caribou that were observed independent of other individual caribou and/or groups of caribou. If sightings of individuals were influenced by other individuals then the caribou were considered a group and the total count of individuals within the group was used for analyses.

The results were used to estimate the proportions of caribou that were likely missed, and numbers of caribou estimated on the two visual survey blocks east and west of Bathurst Inlet were corrected accordingly.

The Huggins closed mark-recapture model (Huggins 1991) in program MARK (White and Burnham 1999) was used to estimate and model sighting probabilities. In this context, double observer sampling can be considered a two sample mark-recapture trial in which some caribou are seen ("marked") by the ("session 1") primary observer, and some of these are also seen by the second observer ("session 2"). The second observer may also see caribou that the first observer did not see. This process is analogous to mark-recapture except that caribou are sighted and re-sighted rather than marked and recaptured. In the context of dependent observer methods, the sighting probability of the second observer was not independent of the primary observer. To accommodate this removal, models were used which estimated p (the initial probability of sighting by the primary and secondary observer) and c (the probability of sighting by the second observer given that it had been already sighted by the primary observer). The removal model assumed that the initial sighting probability of the primary and secondary observers was equal. Observers were switched midway in each survey day (on most days there were two flights with a re-fueling stop between them), and covariates were used to account for any differences that were caused by unequal sighting probabilities of primary and secondary observers.

One assumption of the double observer method is that each caribou group seen has an equal probability of being sighted. To account for differences in sightability we also considered the following covariates in the MARK Huggins analysis (Table 1). Each observer pair was assigned a binary individual covariate and models were introduced that tested whether each pair had a unique sighting probability. An observer order covariate was modeled to account for variation caused by observers switching order. If sighting probabilities were equal between the two observers, it would be expected that order of observers would not matter and therefore the confidence limits for this covariate would overlap 0. This covariate was modeled using an incremental process in which all observer pairs were tested followed by a reduced model where only the beta parameters whose confidence limits did not overlap 0, were retained.

Table 1: Covariates used to model variation in sightability for double observer analysis for Bathurst caribou survey in June 2018.

Covariate	Acronym	Description
observer pair	obspair	each unique observer pair
observer order	obsorder	order of pair
group size	size	size of caribou group observed
Herd/calving ground	Herd (h)	Calving ground/herd being surveyed.
snow cover	snow	snow cover (0, 25, 75, 100)
cloud cover	cloud	cloud cover (0, 25, 75, 100)
Cloud cover*snow cover	Cloud*snow	Interaction of cloud and snow cover

Data from both the Bluenose-East and Bathurst herd calving grounds surveys were used in the double observer analysis given that most planes flew the visual surveys for both calving grounds. It was possible that different terrain and weather patterns on each calving ground might affect sightability and therefore herd/calving ground was used as a covariate in the double observer analysis. Estimates of total caribou that accounted for any caribou missed by observers were produced for each survey stratum.

The fit of models was evaluated using the AIC index of model fit. The model with the lowest AIC_c score was considered the most parsimonious, thus minimizing estimate bias and optimizing precision (Burnham and Anderson 1998). The difference in AIC_c values between the most supported model and other models (ΔAIC_c) was also used to evaluate the fit of models when their AIC_c scores were close. In general, any model with a ΔAIC_c score of <2 was worthy of consideration.

Estimates of herd size and associated variance were estimated using the mark-recapture distance sampling (MRDS) package (Laake et al. 2012) in program R program (R_Development_Core_Team 2009). In MRDS, a full independence removal estimator which models sightability using only double observer information (Laake et al. 2008a, Laake et al. 2008b) was used. This made it possible to derive double observer strip transect estimates. Strata-specific variance estimates were calculated using the formulas of (Innes et al. 2002). Estimates from MRDS were cross checked with strip transect estimates (that assume sightability=1) using the formulas of Jolly (1969)(Krebs 1998). Data were explored graphically using the ggplot2 (Wickham 2009) R package and QGIS software (QGIS_Foundation 2015).

Double observer analysis

Data from both the reconnaissance and visual surveys were used in the double observer analysis, however, only the visual survey data was used to derive estimates of abundance for survey strata. Observers were grouped into pairs which were used for modeling the effect of observer on sightability. A full listing of observer pairs is given in Table 2. Frequencies of observations as a function of group size, survey, and phase suggested that approximately half of the single caribou were seen by both observers in most cases (Figure 2). In previous years approximately 70-80% of single caribou were seen by both observers. As group size increased the proportion of observations seen by both observers increased. This general pattern suggests low sightability compared to previous surveys, which generally had much less snow cover.

Table 2: Double observer pairings with associated summary statistics.

Observer information			Frequencies				Probabilities	
Pair No	Pooled Pair no.	notes	Secondary	Primary	Both	Total observations	Single ob p	Douple ob p
1	1	did not switch	5	6	14	25	0.80	0.96
2	2		6	3	16	25	0.76	0.94
3	2		0	0	1	1	1.00	1.00
4	3		1	4	11	16	0.94	1.00
5	3		6	10	16	32	0.81	0.96
6	4	did not switch	11	8	17	36	0.69	0.91
7	5	did not switch	14	17	48	79	0.82	0.97
8	6		18	19	46	83	0.78	0.95
9	6		17	20	38	75	0.77	0.95
10	7		16	4	23	43	0.63	0.86
11	7		5	6	8	19	0.74	0.93
12	8		0	2	3	5	1.00	1.00
13	8		20	3	20	43	0.53	0.78
14	9		5	1	7	13	0.62	0.85
15	9		20	18	42	80	0.75	0.94
16	9	pooled with 9	1	0	0	1	0.00	0.00
17	10		14	3	16	33	0.58	0.82
18	10		1	3	0	4	0.75	0.94
19	11	did not switch	10	9	41	60	0.83	0.97
20	12		0	0	1	1	1.00	1.00
21	12	pooled with 12	0	0	3	3	1.00	1.00
22	12		9	1	20	30	0.70	0.91

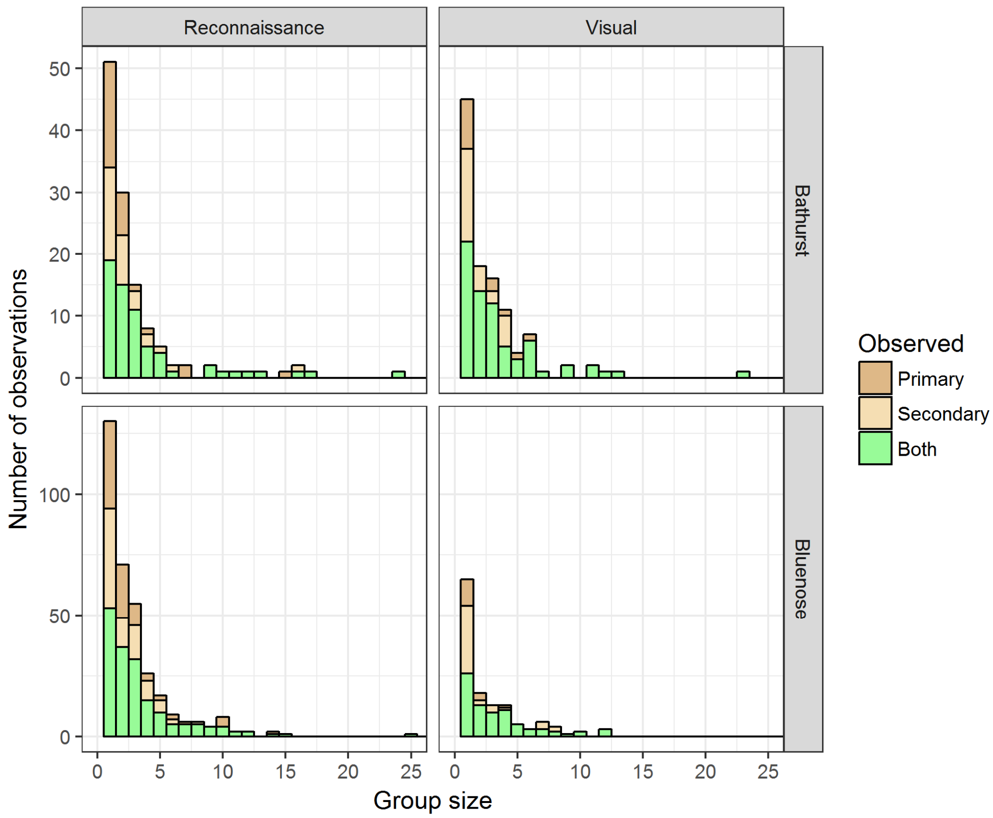


Figure 2: Frequencies of double observer observations by group size, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation is categorized by whether it was observed by the primary (brown), secondary (beige), or both (green) observers.

Snow and cloud cover also influenced sightability, however, the pattern depended on survey phase and herd surveyed (Figure 3). The most noteworthy trends occurred for higher snow cover (75%) for the Bathurst and higher cloud cover. Snow cover was evident in all surveys with few observations of 0 snow cover and most within the 25-75% range. This range corresponds to the "salt and pepper" patchy snow cover where sightability is lower. The lack of "effect size" of snow cover (i.e minimal 0 and 100% snow cover observations) potentially made it problematic to model the effect of increasing snow cover on observations. Instead, sightability was lower (as modeled by an intercept term) due to the poor survey conditions.

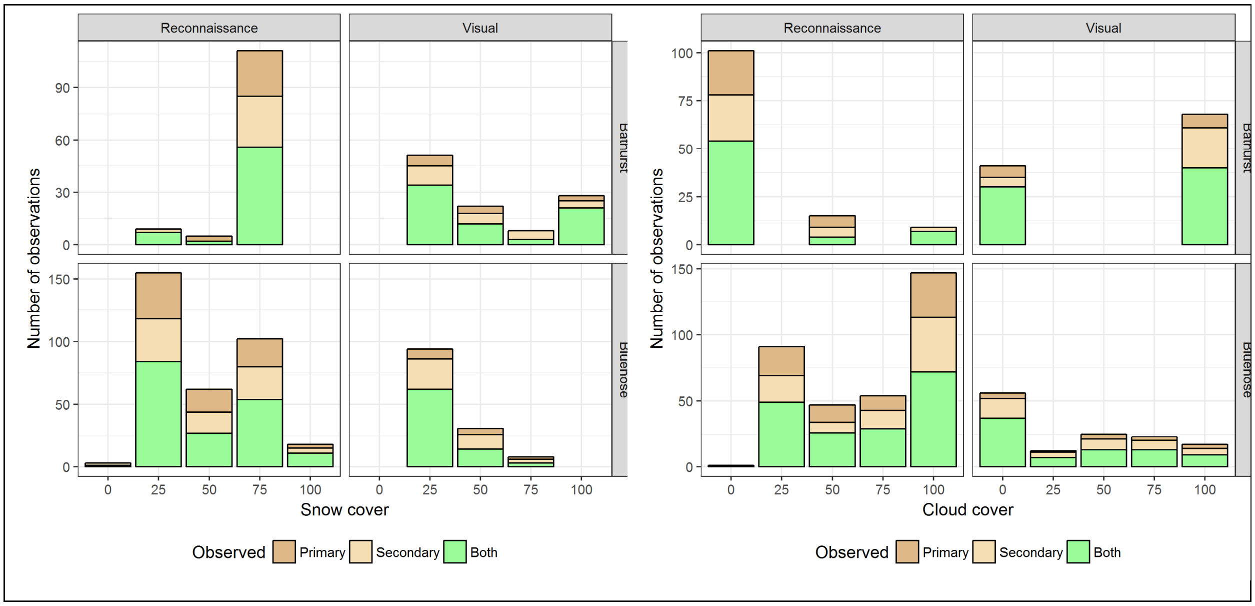


Figure 3: Frequencies of double observer observations by snow cover, cloud cover, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation was categorized by whether it was observed by the primary, secondary, or both observers.

Snow cover was modeled as a continuous (snow) or categorical covariate (snow25, snow50, snow75) based on the categorical entries in the tablets. Model selection identified a strong effect of the log of group size, observers, snow cover and the interaction of snow and cloud cover (Table 3). An additional effect of snow cover at 75% for the Bathurst herd was evident. Observer pairs were reduced to the pairs to those that showed substantial differences from the mean level of sightability in the survey.

Table 3: Double observer model selection using Huggins mark-recapture models in program MARK for Bluenose-East and Bathurst June 2018 caribou surveys. Covariates follow Table 1 in the methods section of the report. Reduced observer pairs are denoted as red_A and red_B. AIC_c, the difference in AIC_c values between the *i*th and most supported model 1 (ΔAIC_c), Akaike weights (w_i), and number of parameters (K), and deviance (Dev) are presented.

No	Model	AICc	ΔAIC_c	wi	K	Dev
1	log(group size)+obs(red_A)+order+herd*snow75+cloud+snow*cloud	764.99	0.00	0.33	8	748.9
2	log(group size)+obs(red_B)+order+herd*snow75+cloud+snow*cloud	767.02	2.03	0.12	9	748.9
3	log(group size)+obs(red_B)+order+snow75+cloud+snow*cloud	768.15	3.16	0.07	8	752.1
4	log(group size)+obs(red_B)+order+herd*snow75+cloud+snow+snow*cloud	768.32	3.33	0.07	10	748.2
5	log(group size)+obs(red_B)+order+herd*snow75+cloud	768.63	3.63	0.06	8	752.5
6	log(group size)+obs(red_B)+order+snow+cloud +snow*cloud	770.75	5.75	0.02	9	752.6
7	log(group size)+obs(red_B)+order+snow25+log(group)*snow25	772.54	7.55	0.01	8	756.4
8	log(group size)+obs(red_B)+order+snow(categorical)	773.52	8.52	0.00	10	753.4
9	log(group size)+obs(red_B)+order+snow+snow^2+cloud+cloud^2+snow*cloud	774.15	9.15	0.00	11	752.0
10	log(group size)	781.88	16.89	0.00	2	777.9
11	log(group size)+snow +cloud	782.04	17.05	0.00	4	774.0
12	group size	783.22	18.22	0.00	2	779.2
13	log(group size)+snow25+cloud0	784.31	19.31	0.00	4	776.3
14	log(group size)+snow25+sno50+snow75+snow100	784.84	19.95	0.00	6	772.8
15	log(group size)+obs(all))	785.96	20.97	0.00	13	759.7
16	constant	802.05	37.06	0.00	1	800.0

Plots of single and double observation probabilities show lower probabilities for individual or smaller group sizes especially in moderate snow cover and higher cloud cover, for Bluenose-East and Bathurst June 2018 caribou surveys (Figure 4). The mean detection probability (across all groups) was 0.66 (CI=0.60-0.72). This compares to a mean probability of 0.91 (CI=0.88-0.92) for the 2015 Bluenose and Bathurst surveys.

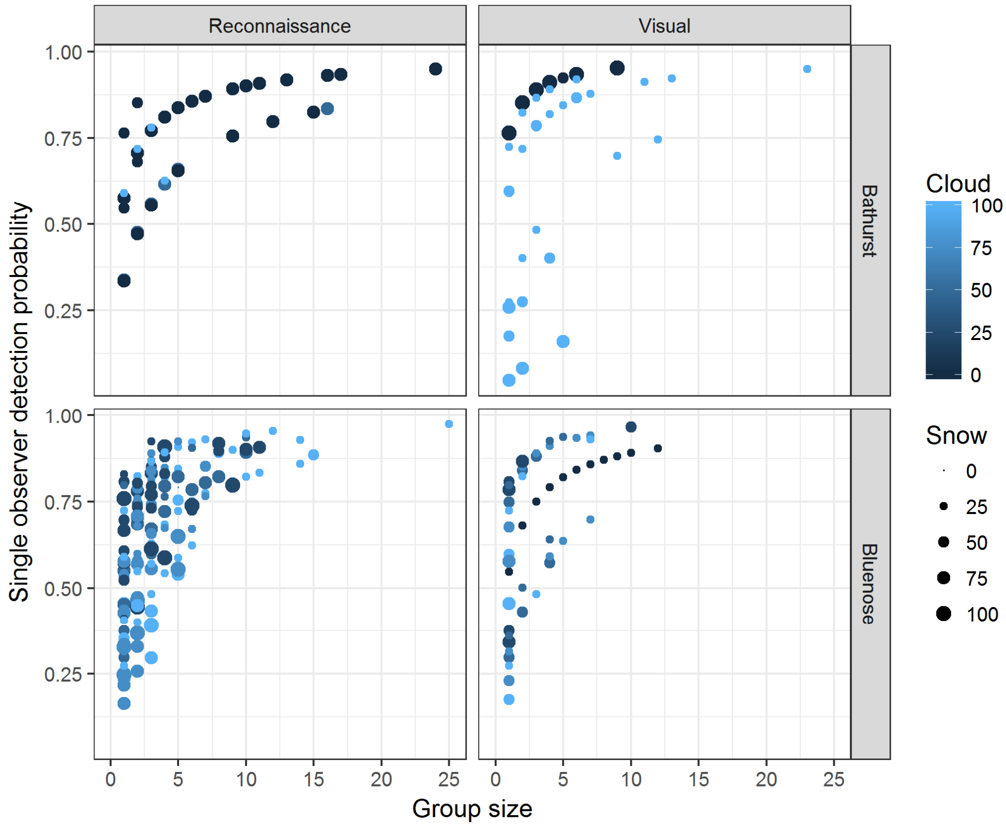


Figure 4: Estimated single observer probabilities from model 1 (Table 3) by snow cover, cloud cover, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation is categorized by whether it was observed by the primary, secondary, or both observers.

Double observer probabilities (the probability that at least one of the observers saw the caribou) were higher but still relatively low for single caribou especially for cases of higher cloud cover and snow cover (and for some observer pairs) (Figure 5).

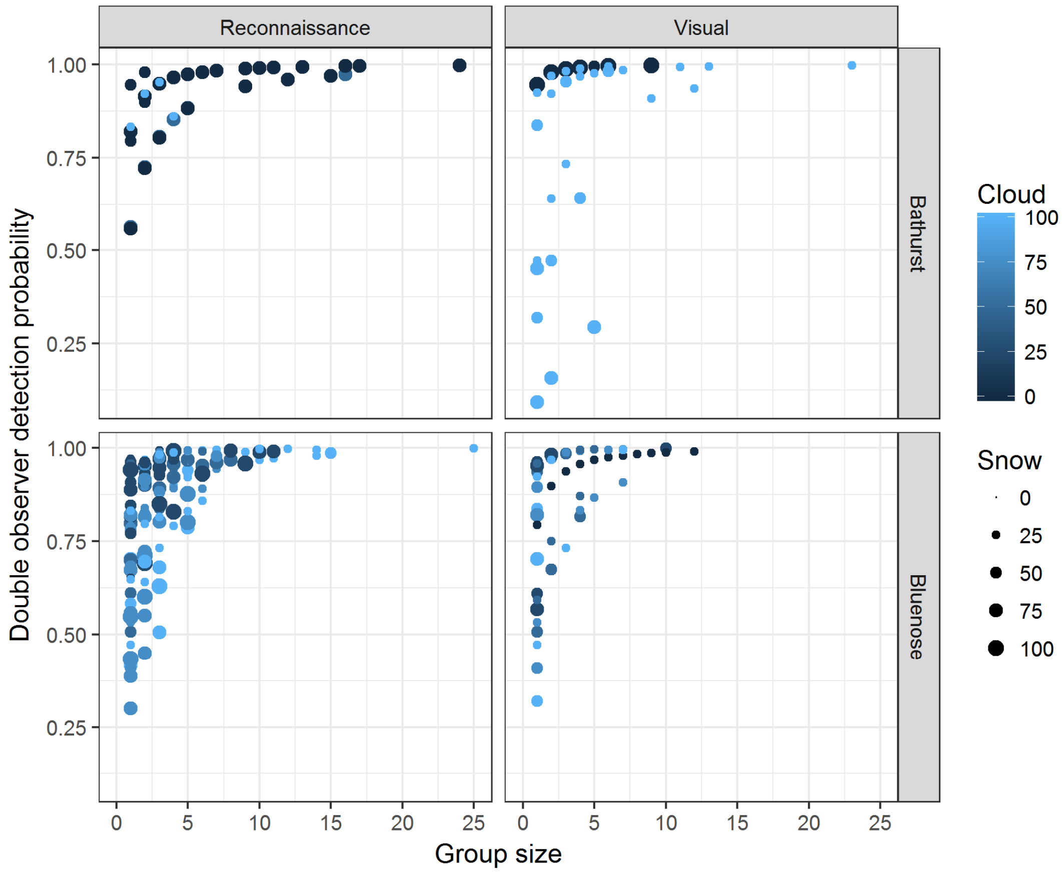


Figure 5: Estimated double observer probabilities from model 1 (Table 3) by snow cover, cloud cover, survey phase and survey for Bluenose-East and Bathurst June 2018 caribou surveys. Each observation is categorized by whether it was observed by the primary, secondary, or both observers.

Estimates of total caribou in visual strata

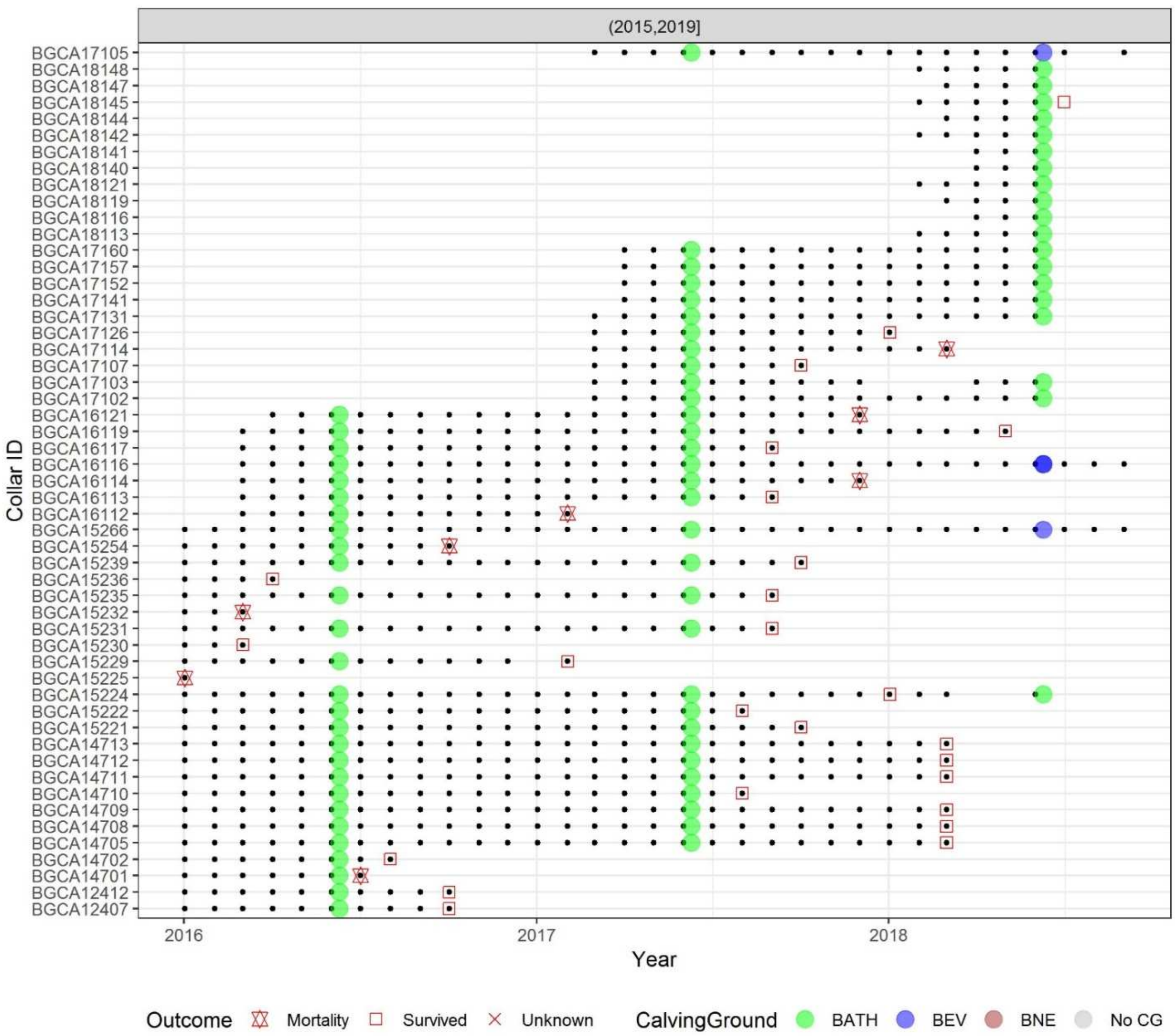
Double observer estimates (using the MRDS R package) were about 5% higher than non double observer estimates. Precision was lower than uncorrected count-based estimates but still acceptable (Table 4).

Table 4: Standard strip transect and double observer model estimates of caribou on Bathurst visual strata in 2018 from the MRDS package in R.

Strata	Caribou counted	Standard estimate			Double observer estimate				
		Estimate	SE	CV	Estimate	SE	Confidence interval		CV
West	88	551	132.1	24.0%	567	140.50	332	970	24.8%
East	220	1,244	286.7	23.0%	1,309	332.70	773	2,216	25.4%
Total	369	1,795	151.7	17.6%	1,877	360.9	1,265	2,783	19.2%

Appendix 2: Bathurst collared female caribou histories 2016-2018

This figure presents the collar histories for each cow caribou from 2016 to 2018. Each black point represents a monthly fix of a live caribou. Color larger dots represent presence on delineated calving grounds. Fates of caribou are delineated by a square if the collar released with the caribou being alive whereas stars denote mortalities.



Appendix 3: Bayesian State space population model details

This appendix details the development of the Bayesian IPM state space model. The primary state space model R coding was developed by Joe Thorley (Poisson Consulting, poissonconsulting.ca) in collaboration with John Boulanger (Thorley and Boulanger 2019). The demographic model used was similar to the previous OLS model used in previous analyses. The primary development was to evolve model fitting to a more robust Bayesian state space approach. The objective of this appendix is to provide a brief description of the model used in the analysis rather than a complete description of the Bayesian model approach. Readers interested in the Bayesian modeling approach should consult Kery and Schaub (2011) which is an excellent introduction to Bayesian analysis.

Data Preparation

The estimates of key population statistics with SEs and lower and upper bounds were provided in the form of an csv spreadsheet and prepared for analysis using R version 3.5.2 (R Core Team 2018).

Statistical Analysis

Model parameters were estimated using Bayesian methods. The Bayesian estimates were produced using JAGS (Plummer 2015). For additional information on Bayesian estimation the reader is referred to McElreath (2016).

Unless indicated otherwise, the Bayesian analyses used normal and uniform prior distributions that were vague in the sense that they did not constrain the posteriors (Kery and Schaub 2011, p. 36). The posterior distributions were estimated from 1500 Markov Chain Monte Carlo (MCMC) samples thinned from the second halves of three chains (Kery and Schaub 2011, pp. 38–40). Model convergence was confirmed by ensuring that the split potential scale reduction factor $\hat{R} \leq 1.05$ (Kery and Schaub 2011, p. 40) and the effective sample size (Brooks et al. 2011) ESS ≥ 150 for each of the monitored parameters (Kery and Schaub 2011, p. 61). In addition, trace plots of Markov Chains and the posterior distributions were inspected to further check convergence and symmetry of estimated parameter distributions.

The sensitivity of the estimates to the choice of priors was examined by multiplying the standard deviations of the normal priors by ten and using the split $\hat{R}$ (after collapsing the chains) to compare the posterior distributions (Thorley and Andrusak 2017). An unsplit $\hat{R} \leq 1.1$ was taken to indicate low sensitivity.

The parameters are summarized in terms of the point *estimate*, standard deviation (*sd*), the *z-score*, *lower* and *upper* 95% confidence/credible limits (CLs) and the *p-value* (Kery and Schaub 2011, p 37 and 42). The estimate is the median (50th percentile) of the MCMC samples, the z-score is mean/sd and the 95% CLs are the 2.5th and 97.5th percentiles. A p-value of 0.05 indicates that the lower or upper 95% CL is 0.

The results are displayed graphically in the main body of the report with 95% confidence/credible intervals (CIs, Bradford et al. 2005). Data are indicated by points (with lower and upper bounds indicated by vertical bars) and estimates are indicated by solid lines (with CIs indicated by dotted lines).

The analyses were implemented using R version 3.5.2 (R Core Team 2018) and the mbr family of packages.

Model Descriptions

The data were analyzed using state-space population models (Newman et al. 2014).

Population

The fecundity, breeding cow abundance, cow survival, fall bull cow, fall calf cow and spring calf cow ratio data complete with SEs were analyzed using a stage-based state-space population model similar to Boulanger et al. (2011). Key assumptions of the female stage-based state-space population model include:

- Calving occurs on the 11th of June (with a year running from calving to calving)

- Cow natural survival from calving to the following year varies continually and randomly by year.
- Bull natural survival from calving to the following year varies randomly by year.
- Cow and bull natural survival is constant throughout the year.
- Harvest of cows and bulls occurs on the 15th of January.
- Yearling survival to the following year is the same as cow natural survival.
- Calf survival varies between the summer and winter seasons and randomly by year.
- The calf sex ratio is 1:1.
- The proportion of breeding cows is the fecundity the previous year.
- Fecundity varies randomly by year.
- Female yearlings are indistinguishable from cows in the fall and spring surveys.
- The uncertainty in the number of breeding cows in the initial year is described by a positively truncated normal distribution with a mean of 200,000 and a standard deviation of 50,000.
- The number of cows in the initial year is the number of breeding cows in the intial year divided by the fecundity in a typical year.
- The number of bulls in the initial year is two thirds the number of cows in the initial year.
- The number of calves in the initial year is the number of breeding cows in the initial year.
- The number of yearlings in the initial year is the number of calves in the initial year multiplied the calf survival in a typical year.
- The uncertainty in each data point is normally distributed with a standard deviation equal to the provided SE.

Model Templates

The base R code used in the analysis is summarized below.

Population (R-code)

```
. model {
 bSurvivalCow ~ dnorm(0, 2^-2)
 bSurvivalBull ~ dnorm(0, 2^-2)
 bFecundity ~ dnorm(0, 2^-2)
 bSurvivalCalfSummerAnnual ~ dnorm(0, 2^-2)
 bSurvivalCalfWinterAnnual ~ dnorm(0, 2^-2)

 sSurvivalCowAnnual ~ dnorm(0, 1^-2) T(0,)
 sSurvivalBullAnnual ~ dnorm(0, 1^-2) T(0,)
 sFecundityAnnual ~ dnorm(0, 1^-2) T(0,)
 sSurvivalCalfAnnual ~ dnorm(0, 1^-2) T(0,)
 for(i in 1:nAnnual){
  bSurvivalCowAnnual[i] ~ dnorm(0, sSurvivalCowAnnual^-2)
  bSurvivalBullAnnual[i] ~ dnorm(0, sSurvivalBullAnnual^-2)
  bFecundityAnnual[i] ~ dnorm(0, sFecundityAnnual^-2)
  bSurvivalCalfAnnual[i] ~ dnorm(0, sSurvivalCalfAnnual^-2)

  logit(eSurvivalCow[i]) <- bSurvivalCow + bSurvivalCowAnnual[i]
  logit(eSurvivalBull[i]) <- bSurvivalBull + bSurvivalBullAnnual[i]
  logit(eFecundity[i]) <- bFecundity + bFecundityAnnual[i]
  logit(eSurvivalCalfSummerAnnual[i]) <- bSurvivalCalfSummerAnnual +
bSurvivalCalfAnnual[i]
  logit(eSurvivalCalfWinterAnnual[i]) <- bSurvivalCalfWinterAnnual +
bSurvivalCalfAnnual[i]
 }
 bBreedingCows1 ~ dnorm(200000, 50000^-2) T(0,)
 logit(eFecundity1) <- bFecundity
 logit(eSurvivalCalfSummerAnnual1) <- bSurvivalCalfSummerAnnual
 logit(eSurvivalCalfWinterAnnual1) <- bSurvivalCalfWinterAnnual

 bCows[1] <- bBreedingCows1 / eFecundity1
 bBulls[1]<- bCows[1] * 2 / 3
 bCalves[1] <- bBreedingCows1
 bYearlings[1] <- bCalves[1] * eSurvivalCalfWinterAnnual1^(154/365) *
eSurvivalCalfWinterAnnual1^(211/365)
 bSpringCalfCow[1] <- bCalves[1] / (bCows[1] + bYearlings[1] / 2)
 bCowHarvestRate[1] <- CowHarvestRate[2]
 bBullHarvestRate[1] <- BullHarvestRate[2]

 for(i in 1:nAnnual) {
  eJuneToFallCor[i] <-  FallCalfCowDays[i] / 365

  eFallCows[i] <- bCows[i] * eSurvivalCow[i]^eJuneToFallCor[i]
  eFallBulls[i] <- bBulls[i] * eSurvivalBull[i]^eJuneToFallCor[i]
```

```
    eFallYearlings[i] <- bYearlings[i] * eSurvivalCow[i]^eJuneToFallCor[i]
    eFallCalves[i] <- bCalves[i] * eSurvivalCalfSummerAnnual[i]^eJuneToFallCor[i]

    bFallBullCow[i] <- (eFallBulls[i] + eFallYearlings[i]/2) / (eFallCows[i] +
eFallYearlings[i]/2)
    bFallCalfCow[i] <- eFallCalves[i] / (eFallCows[i] + eFallYearlings[i]/2)
  }

  for(i in 2:nAnnual) {
    eFallToJanCor[i] <- (218 - FallCalfCowDays[i-1])/365
    eJanToSpringCor[i] <- (SpringCalfCowDays[i] - 218) / 365
    eSpringToJuneCor[i] <- (365 - SpringCalfCowDays[i]) / 365

    eJanCows[i] <- eFallCows[i-1] * eSurvivalCow[i-1]^eFallToJanCor[i]
    eJanBulls[i] <- eFallBulls[i-1] * eSurvivalBull[i-1]^eFallToJanCor[i]
    eJanYearlings[i] <- eFallYearlings[i-1] * eSurvivalCow[i-1]^eFallToJanCor[i]

    bCowHarvestRate[i] <- CowHarvestRate[i]
    bBullHarvestRate[i] <- BullHarvestRate[i]

    eSpringCows[i] <- eJanCows[i] * (1 - bCowHarvestRate[i]) * eSurvivalCow[i-
1]^eJanToSpringCor[i]
    eSpringBulls[i] <- eJanBulls[i] * (1 - bBullHarvestRate[i]) * eSurvivalBull[i-
1]^eJanToSpringCor[i]
    eSpringYearlings[i] <- eJanYearlings[i] * eSurvivalCow[i-1]^eJanToSpringCor[i]

    eSpringCalves[i] <- bCalves[i-1] * eSurvivalCalfSummerAnnual[i-1]^(154/365) *
eSurvivalCalfWinterAnnual[i-1]^((SpringCalfCowDays[i] - 154) / 365)

    bSpringCalfCow[i] <- eSpringCalves[i] / (eSpringCows[i] + eSpringYearlings[i]/2)

    bCows[i] <- (eSpringCows[i] + eSpringYearlings[i] / 2) * eSurvivalCow[i-
1]^eSpringToJuneCor[i]
    bBulls[i] <- eSpringBulls[i] * eSurvivalBull[i-1]^eSpringToJuneCor[i] +
eSpringYearlings[i] / 2 * eSurvivalCow[i-1]^eSpringToJuneCor[i]
    bYearlings[i] <- bCalves[i-1] * eSurvivalCalfSummerAnnual[i-1]^(154/365) *
eSurvivalCalfWinterAnnual[i-1]^(211/365)
    bCalves[i] <- bCows[i-1] * eSurvivalCow[i-1] * (1 - bCowHarvestRate[i]) * eFecundity[i-1]
  }

  for(i in SurvivalAnnual) {
    CowSurvival[i] ~ dnorm(eSurvivalCow[i] * (1 - bCowHarvestRate[i+1]),
CowSurvivalSE[i]^-2)
  }

  for(i in CowsAnnual) {
```

```
  BreedingProportion[i] ~ dnorm(eFecundity[i-1], BreedingProportionSE[i]^-2)
  eBreedingCows[i] <- bCows[i] * eFecundity[i-1]
  BreedingCows[i] ~ dnorm(eBreedingCows[i], BreedingCowsSE[i]^-2)
 }

 for(i in FallBCAnnual) {
  FallBullCow[i] ~ dnorm(bFallBullCow[i], FallBullCowSE[i]^-2)
 }

 for(i in FallAnnual) {
  FallCalfCow[i] ~ dnorm(bFallCalfCow[i], FallCalfCowSE[i]^-2)
 }

 for(i in SpringAnnual) {
  SpringCalfCow[i] ~ dnorm(bSpringCalfCow[i], SpringCalfCowSE[i]^-2)
 }
..
```

Parameter estimates

The Bayesian model estimated principal parameters pertaining to the mean estimates of fecundity, bull survival, calf survival and cow survival. In addition, temporal variation in calf survival, bull survival, fecundity, and cow survival were estimated as random effects (Table 1).

Table 1: Bayesian IPM state space model coefficients. Parameters are given on the logit scale (which are then transformed to the probability scale using a logit transform). Parameter significance is determined by overlap of confidence limits with 0. The parameters are summarized in terms of the point *estimate*, standard deviation (*sd*), the *z-score*, *lower* and *upper* 95% CI/CLs and the *p-value* (Kery and Schaub 2011, p 37 and 42). The estimate is the median (50th percentile) of the MCMC samples, the z-score is mean/sd and the 95% CLs are the 2.5th and 97.5th percentiles. A p-value of 0.05 indicates that the lower or upper 95% CL is 0.

term	estimate	sd	zscore	lower	upper	pvalue
Main effects						
bFecundity	1.018	0.269	3.837	0.524	1.567	0.000
bSurvivalBull	0.785	0.173	4.685	0.531	1.242	0.000
bSurvivalCalfSummerAnnual	-0.388	0.323	-1.135	-0.937	0.332	0.258
bSurvivalCalfWinterAnnual	0.072	0.272	0.304	-0.450	0.621	0.759
bSurvivalCow	1.650	0.127	13.104	1.441	1.946	0.000
Random effects						
sFecundityAnnual	1.042	0.220	4.850	0.708	1.571	0.000
sSurvivalBullAnnual	0.421	0.327	1.447	0.035	1.250	0.000
sSurvivalCalfAnnual	1.081	0.218	5.053	0.752	1.609	0.000
sSurvivalCowAnnual	0.554	0.175	3.274	0.291	0.969	0.000

Model fit was judged using R-hat value which suggested adequate model convergence. In addition, the distribution of parameter estimates was inspected to assess model convergence (Table 2).

Table 2: Model summary. N is the number of parameters, nchains is the number of Markov Chains used, nthin is the number of Markov Chain samples that were thinned, ess is the effective sample size, R-hat is the R-hat convergence metric and convergence is the score based on effective sample size and number of parameters in the model.

n	K	nchains	niters	nthin	ess	R-hat	converged
34	10	3	1000	200	1473	1.002	TRUE

Unsplit R-hat values were used to assess if choice of prior distribution influenced the posterior distribution of parameter estimates (Table 3).

Table 3: Split R-hat values indicating sensitivity of posterior distributions to the choice of priors.

term	R-hat
bBreedingCows1	1.019
bFecundity	1.023
bSurvivalBull	1.009
bSurvivalCalfSummerAnnual	1.005
bSurvivalCalfWinterAnnual	1.002
bSurvivalCow	1.002
sFecundityAnnual	1.032
sSurvivalBullAnnual	1.027
sSurvivalCalfAnnual	1.006
sSurvivalCowAnnual	1.011
bBreedingCows1	1.019

The Bayesian model generated yearly estimates of demographic parameters as well as field measurements which were used in the fitting of the model. These estimates are detailed in Table 4. Most of the actual estimates are shown in Figures 9 to 14 of the main report.

Table 4: Parameter descriptions for estimates generated by the model. Parameter estimates are shown in Figures 31 to 35 in the main report.

Parameter	Description
Annual	The year as a factor
bCows1	The number of cows in the initial year
bFecundity	The proportion of cows breeding in a typical year
BreedingCows[i]	The data point for the number of breeding cows in the ith year
BreedingCowsSE[i]	The SE for BreedingCows[i]
BreedingProportion[i]	The data point for the proportion of cows breeding in the ith year
BreedingProportionSE[i]	The SE for BreedingProportionSE[i]
bSurvivalBull	The log-odds bull survival in a typical year
bSurvivalCalfAnnual[i]	The random effect of the ith Annual on bSurvivalCalfSummerAnnual and bSurvivalCalfWinterAnnual
bSurvivalCalfSummerAnnual	The log-odds summer calf survival if it extended for one year
bSurvivalCalfWinterAnnual	The log-odds winter calf survival if it extended for one year
bSurvivalCow	The log-odds cow (and yearling) survival in a typical year
bSurvivalCowAnnual[i]	The random effect of the ith Annual on bSurvivalCow
BullHarvestRate[i]	The proportion of bulls harvested in January of the ith year
CowHarvestRate[i]	The proportion of cows harvested in January of the ith year
CowSurvival[i]	The data point for cow survival from the i-1th year to the ith year
CowSurvivalSE[i]	The SE for CowSurvivalSE[i]
FallBullCow[i]	The data point for the bull cow ratio in the fall of the ith year
FallBullCowSE[i]	The SE for FallBullCow[i]
FallCalfCow[i]	The data point for the calf cow ratio in the fall of the ith year
FallCalfCowSE[i]	The SE for FallCalfCow[i]
SpringCalfCow[i]	The data point for the calf cow ratio in the spring of the ith year
SpringCalfCowSE[i]	The SE for SpringCalfCow[i]
sSurvivalCalfAnnual	The SD of bSurvivalCalfAnnual
sSurvivalCowAnnual	The SD of bSurvivalCowAnnual

Figure 1 displays sensitivity of parameter estimates and trends in parameter estimates to inclusion of the 2018 breeding female estimate. It can be seen that inclusion or exclusion of this estimate affects both estimates of cows, breeding cows, and bull + cows, but also estimates of cow survival. In most cases, estimates of survival are lower as well as estimates of fecundity/productivity prior to the 2018 survey. In both cases reduction of these parameter values results in a lower estimate of caribou on the 2018 calving ground.

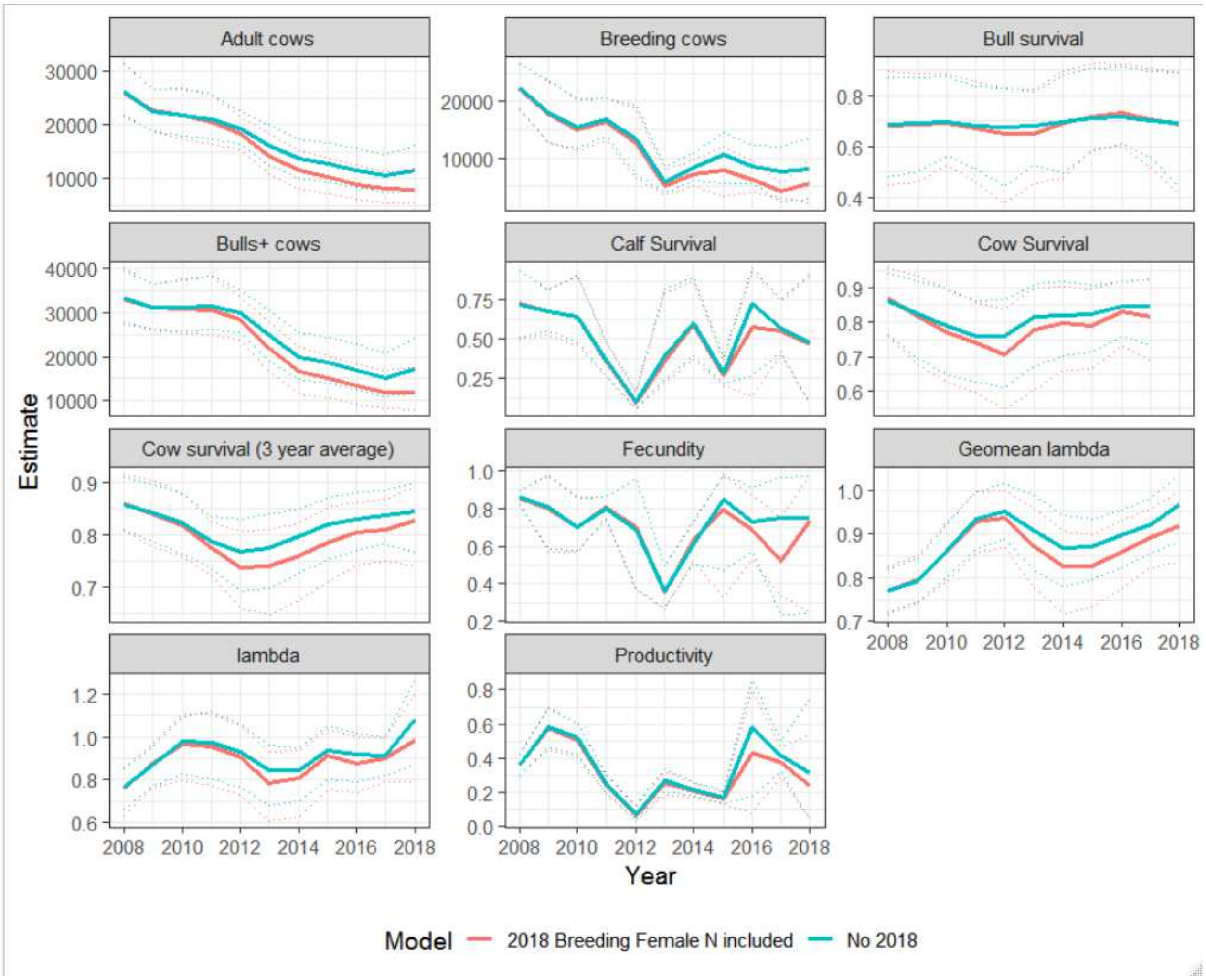


Figure 1: Estimates of principal demographic parameters from the IPM with the 2018 breeding female estimate included and excluded. Confidence limits are given as dashed lines around model predictions.

The harvest estimates used in the demographic model are given in Table 5.

Table 5: Harvest estimates and approximate harvest rates used in the demographic model. Rate is estimated harvest divided by estimate cow or bull abundance each year. Estimates based on Dogrib Harvest study, Boulanger et al. 2011, and approximate harvest levels estimated since 2010 (B. Croft, Unpublished).

Year	Harvest estimate		Harvest rate	
	cows	bulls	cows	bulls
1985	8380	7484	0.034	0.046
1986	8380	7484	0.036	0.050
1987	8380	7484	0.039	0.061
1988	8380	4606	0.043	0.042
1989	8380	3855	0.042	0.033
1990	8450	8970	0.045	0.086
1991	11626	10073	0.066	0.108
1992	9046	9685	0.051	0.103
1993	13107	7712	0.082	0.099
1994	8380	7484	0.053	0.092
1995	8380	7484	0.058	0.109
1996	8380	7484	0.058	0.103
1997	8380	7484	0.063	0.119
1998	8380	7484	0.068	0.132
1999	8380	7484	0.073	0.134
2000	8380	7484	0.081	0.176
2001	5000	2000	0.055	0.064
2002	5000	2000	0.064	0.071
2003	5000	2000	0.071	0.089
2004	5000	2000	0.086	0.102
2005	5000	2000	0.105	0.117
2006	5000	2000	0.130	0.142
2007	5000	2000	0.160	0.227
2008	5000	2000	0.193	0.289
2009	5000	2000	0.210	0.226
2010	5	70	0.000	0.008
2011	5	70	0.000	0.007
2012	5	70	0.000	0.007
2013	5	70	0.000	0.009
2014	5	70	0.000	0.014
2015	5	70	0.001	0.015
2016	5	70	0.001	0.017
2017	5	70	0.001	0.019
2018	5	70	0.001	0.019

LITERATURE CITED

Boulanger, J., A. Gunn, J. Adamczewski, and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. The Journal of Wildlife Management 75 (4): 883–96. https://doi.org/10.1002/jwmg.108.

Bradford, M. J., J. Korman, and P. S. Higgins. 2005. Using confidence intervals to estimate the response of salmon populations (Oncorhynchus Spp.) to experimental habitat alterations. Canadian Journal of Fisheries and Aquatic Sciences 62 (12): 2716–26. https://doi.org/10.1139/f05-179.

Brooks, S., A. Gelman, G. L. Jones, and X.-L. Meng, eds. 2011. Handbook for Markov Chain Monte Carlo. Boca Raton: Taylor & Francis.

Kery, M., and M. Schaub. 2011. Bayesian Population Analysis Using WinBUGS: A Hierarchical Perspective. Boston: Academic Press. www.vogelwarte.ch/bpa.html.

McElreath, R. 2016. Statistical Rethinking: A Bayesian Course with Examples in R and Stan. Chapman & Hall/CRC Texts in Statistical Science Series 122. Boca Raton: CRC Press/Taylor & Francis Group.

Newman, K.B., S.T. Buckland, B.J.T. Morgan, R. King, D.L. Borchers, D.J. Cole, P. Besbeas, O. Gimenez, and L. Thomas. 2014. Modeling Population Dynamics: Model Formulation, Fitting and Assessment Using State-Space Methods. http://dx.doi.org/10.1007/978-1-4939-0977-3.

Plummer, M. 2015. JAGS Version 4.0.1 User Manual. http://sourceforge.net/projects/mcmc-jags/files/Manuals/4.x/.

R Core Team. 2018. R: A Language and Environment for Statistical Computing. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Thorley, J. L., and G. F. Andrusak. 2017. The fishing and natural mortality of large, piscivorous bull trout and rainbow trout in Kootenay Lake, British Columbia (2008–2013). PeerJ 5 (January): e2874. https://doi.org/10.7717/peerj.2874.

Thorley, J.L. and Boulanger, J. 2019. Bathurst Caribou Herd Population Analysis 2019. A Poisson Consulting Analysis Report. Unpublished Contract Report.

Appendix 4: Trends in Bathurst Calving Ground Size and Densities 2009-2018

Introduction

This document provides additional information on calving ground size, distribution of caribou on calving grounds, and core calving ground densities on the Bathurst herd calving grounds 2009-2018, based on reconnaissance survey and photo survey data. The core area has also been referred to as the "annual concentrated calving area" by Russel et al 2002. Information on the Bluenose-East herd's calving ground size and densities and spatial distribution of caribou was requested during the WRRB April 2019 Bluenose-East Caribou Hearing. A summary on the Bluenose-East herd's patterns 2010-2018 was included as an appendix in the 2018 survey report (Boulanger et al. 2019). Similar analyses were also carried out for the Bathurst herd 2009-2018 based on calving ground surveys, and the results are included here.

This document provides a summary of data from previous surveys as opposed to full documentation of methods used to define core calving areas. For full descriptions of survey methods and results, readers should refer to calving photo survey results for the Bathurst herd in 2009 (Nishi et al. 2010), 2012 (Boulanger et al. 2014), 2015 (Boulanger et al. 2017) and 2018 (main text of this report).

Methods

Trends in segment densities from reconnaissance surveys flown during calving photo surveys were initially assessed to infer distribution and aggregation of higher densities of caribou. Segments that were contained within core calving strata were included in the analysis. Data were plotted spatially and by segment density class. Core calving area was defined by the presence of breeding caribou in contiguous segments.

Estimates of density based on photo survey data and core calving ground size (based on the area of survey strata) were used to estimate numbers of adult and breeding females. One potential issue with this approach is that the degree of aggregation of adult and breeding females varies among years, and therefore changes in the core area will be due to both changes in abundance, aggregation, and survey coverage. For example, in years of high aggregation the core area might be surveyed primarily by photo survey methods whereas photo and visual survey methods would be used when aggregation is lower. Therefore, defining core areas as those just photo surveyed may not represent the true density and distribution of breeding females. To explore this issue, we derived a weighted core calving ground index based on the summation of the product of stratum areas and proportions of breeding and adult females. For example, if a 100 km^2 stratum had 20% breeding females, then the core calving ground index was estimated as 20 km^2. Each survey stratum area was scaled using this approach and summed for the survey year to provide the aggregate core calving ground index value. Density estimates using this approach will be more robust to differences in calving ground surveys where layout and types of strata (i.e., photographic and visual) would vary. For example, this approach avoids the subjective inclusion or exclusion of survey strata areas for estimation of core areas and uses all the survey strata to estimate core area. However, the actual core calving ground index will not directly pertain to a defined geographic area.

Results

Plots of segment densities for the Bathurst herd from calving ground surveys 2009-2018 suggest different levels of aggregation for each survey year, with the highest levels in 2012 (Figure 1). The core area in 2018 was reduced to only low and medium density segments with no high density segments. The annual concentrated calving area for the Bathurst herd in 2018 was to the west of Bathurst Inlet. Segments near Bathurst Inlet, which contained intermittent pockets of females, are shown for reference purposes. This pattern of low densities on either side of Bathurst Inlet included some collared caribou cows, and was not observed in previous years. Estimation of the core area based on the survey strata detailed in the next section provides further inference on the core area in 2018.

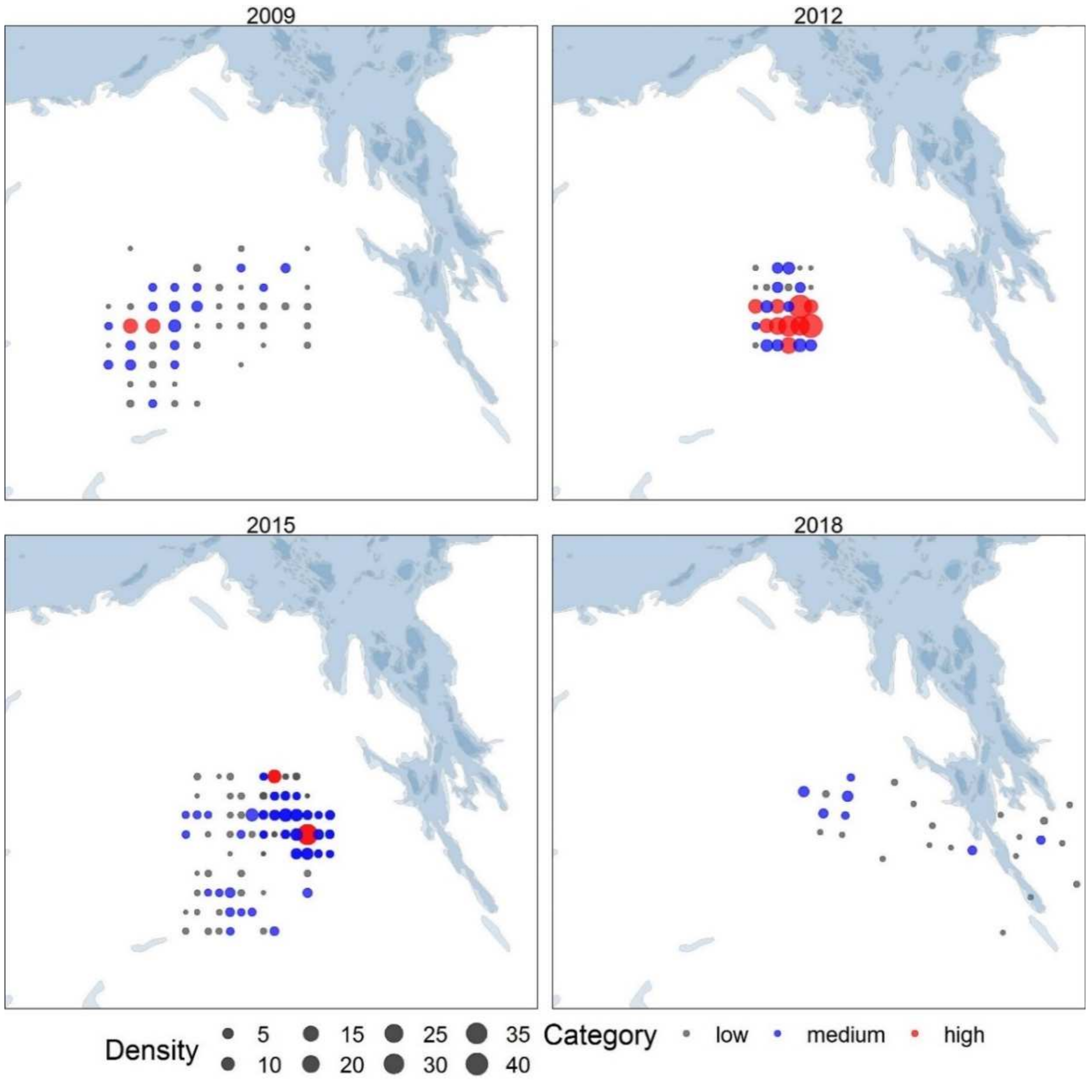


Figure 1: Maps of segment densities from reconnaissance surveys of the Bathurst caribou herd from calving ground surveys 2009-2018. Low density = <1 caribou/km^2, medium density = 1-9.9 caribou/km^2, and high density = at least 10 caribou/km^2.

Plots of segment densities also illustrate the higher level of aggregation in 2012 with fewer lower and medium density segments in comparison to high density segments (Figure 2).

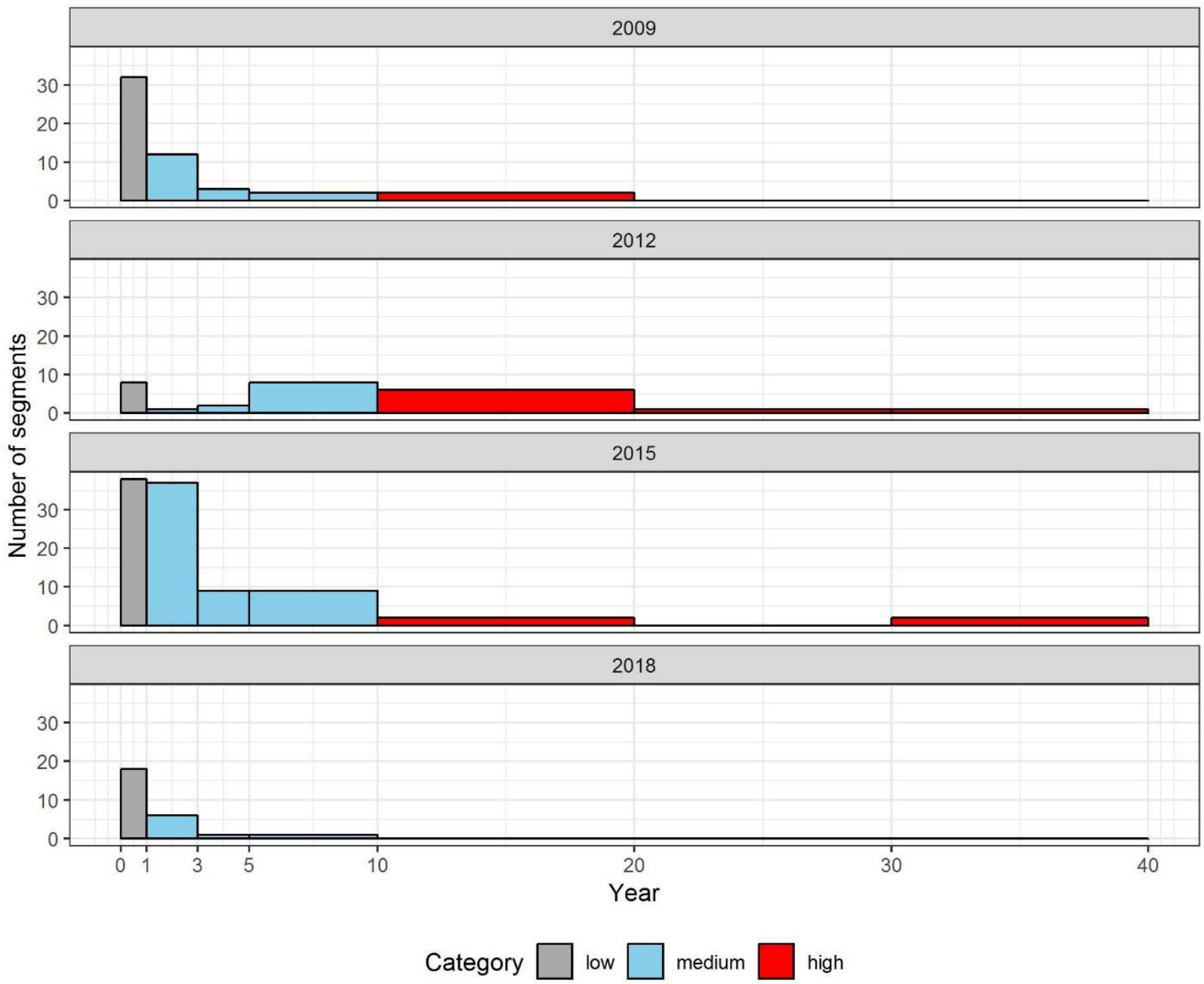


Figure 2: Segment densities in annual concentrated calving areas for the Bathurst caribou herd 2009-2018. Low density = <1 caribou/km^2, medium density = 1-9.9 caribou/km^2, and high density = at least 10 caribou/km^2.

Median segment densities were below 5 caribou per km^2 for all years except 2012 (Figure 3).

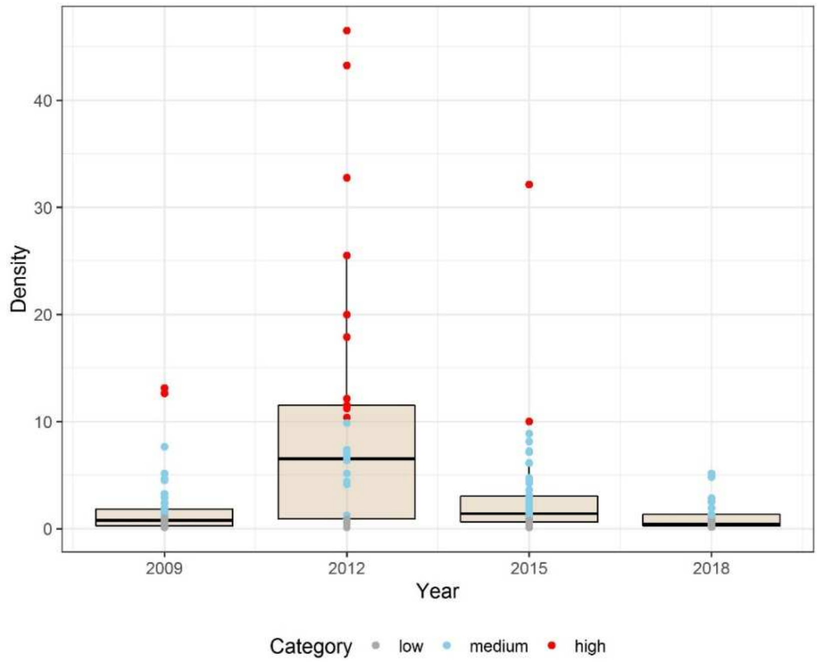


Figure 3: Boxplot of segment densities on calving ground surveys for the Bathurst herd 2009-2018.

A comparison of core areas further demonstrates the higher level of aggregation in 2012 with a smaller core area compared to other years (Figure 4).

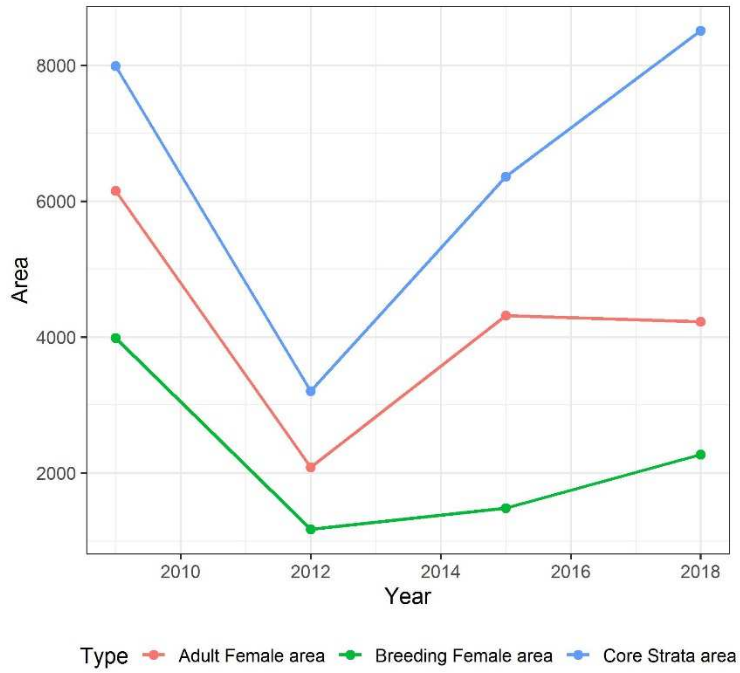


Figure 4: Area of core survey strata, area weighted by proportion of breeding females, and area weighted by proportion of adult females in survey strata by year for the Bathurst herd 2009-2018.

During this time, estimates of abundance of adult and breeding females stabilized from 2009-2012 followed by a decline from 2012-2018 (Figure 5).

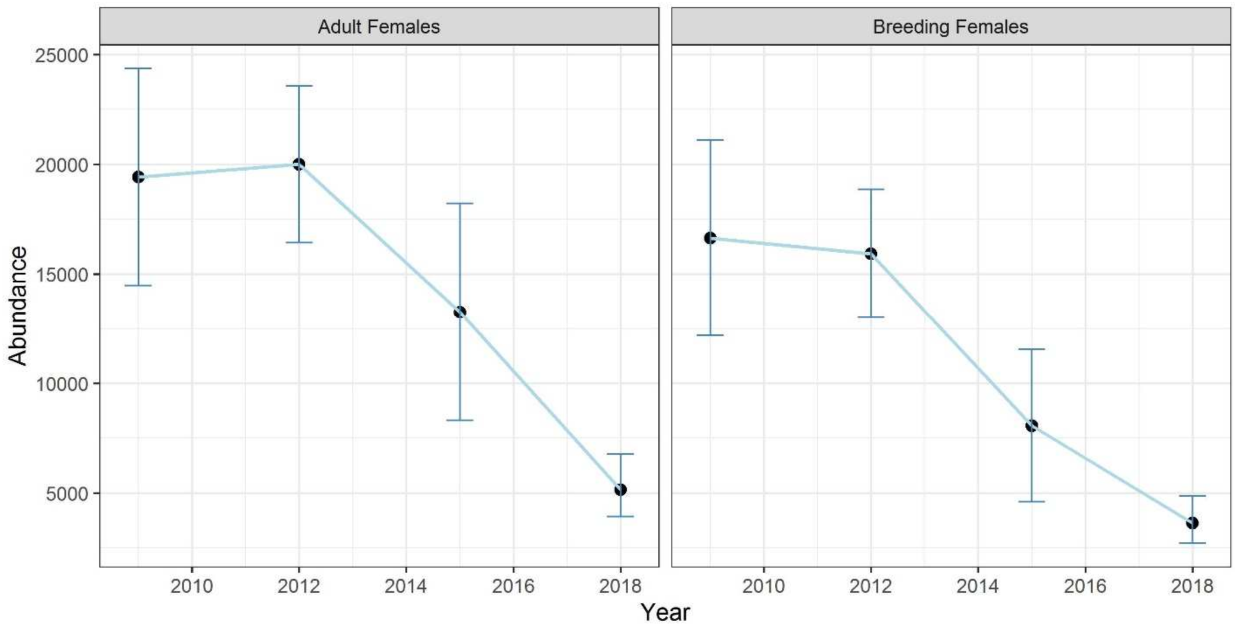


Figure 5: Estimates of abundance of adult and breeding females on core calving areas 2009-2018 for the Bathurst herd.

Density was estimated by dividing abundance (Figure 5) by core area (Figure 4). Plots of core densities suggest an increase from 2009-2012 followed by a decrease from 2012-2018 (Figure 5). The increase in density in 2012 was partially due to a decrease in core area of the calving ground rather than a substantive increase in overall abundance (Figure 6). Trends in density estimates using the core and weighted methods were reasonably similar.

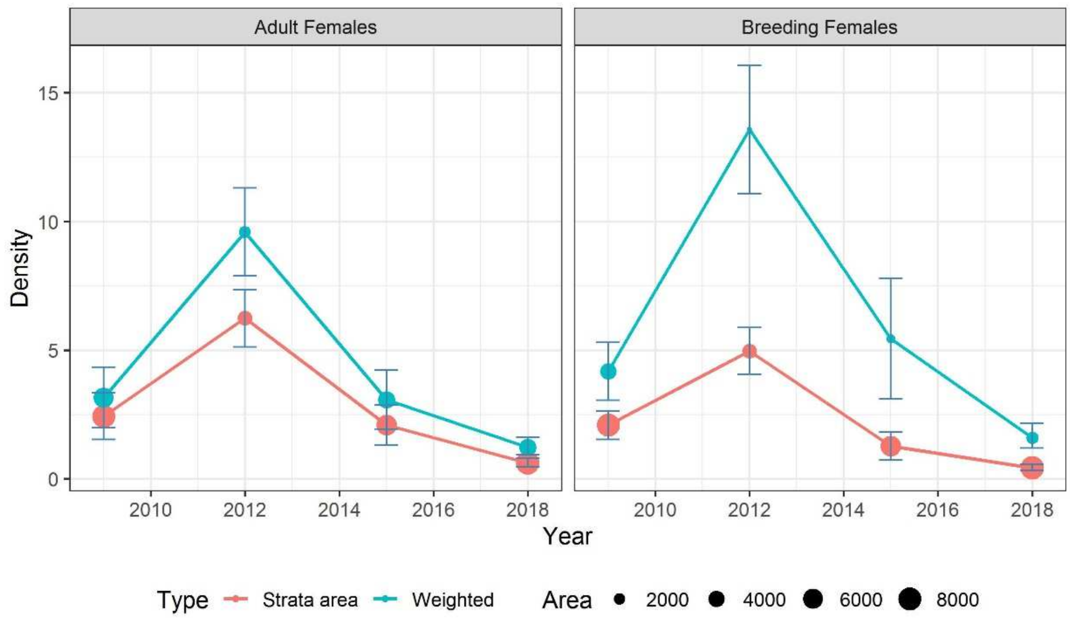


Figure 6: Densities (number/km^2) of adult females and breeding females in survey strata using total area (Strata area) and corresponding breeding female or adult female areas, for Bathurst calving ground 2009-2018. The size of symbols is proportional to the calving ground area used for density estimates.

Discussion

This report is based on Bathurst caribou calving photo surveys (2009-2018) and provides a summary of trends in caribou distribution, core calving ground area, and caribou densities in core calving ground areas. Defining the core calving area is challenging due to differences in levels of aggregation of caribou during each survey year. We describe a weighted method used to describe trends based on a calving ground core area index, which attempts to confront this issue by weighting the contribution of survey stratum to the overall estimate of core area by the proportion of adult and breeding females estimated in the given strata. The resulting core area index values are best used to infer trends rather than define an absolute area.

In general, aggregation of the Bathurst herd increased in 2012, as indicated by a reduced core calving ground area with increasing density, followed by a decline in density from 2012-2018 (Figure 6).

Alternative methods such as use of collared caribou locations could be used to further infer core areas. This type of analysis could be useful for the 2018 survey year when the core area was mainly defined in a single small area. This type of analysis is beyond the scope of this report but could be pursued in the future.

LITERATURE CITED – see main text

ᐃᓱᒪᓕᐅᕈᑕᐅᓂᕐᒧᑦ ᐱᔾᔪᑕᐅᓯᒪᔪᑦ ᑕᐃᒃᑯᓂᖓ ᑕᒪᐃᓐᓄᑦ ᐱᓕᕆᐊᖅᑎᑕᐅᖁᔭᐅᔪᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᕿᖓᐅᒻᒥ ᑐᒃᑐᓂᒃ
(ᐋᓚᑎᑐᑦ ᐅᖃᐅᓯᑐᖅᑏᒍᑦ ᑕᐃᔭᐅᔪᓂᒃ ᑳᑮᑏ ᐃᒃᐅᐋ-ᒥᒃ)
ᐅᐊᑮ ᓯ ᒥ ᐅᑦ ᓄᓇᒥ ᐅᑕᓕᖕᓃ ᑦ ᑲ ᑎᒪ ᔨ ᖕᒥ, ᐊᒃ ᑑᐱᕆ. 4, 2019

ᐊᐅᓚᑦ ᑎᔨ ᓄᑦ ᑐᕌ ᖕᖓ ᑦ ᓇᐃᓈᖅ ᑕᐅᓯ ᒪ ᓪ ᓗᑎᒃ

ᑖᒃ ᑯ ᐊ ᐅᖃᐅᓯ ᑐᖅᑲᖅ ᒥ ᒍ ᑦ ᐋ ᓚᐃ ᑦ ᑕᐃᒍ ᖅ ᑖᖕᖏ ᐅᐊᑮ ᓯ ᒥ ᐅᑦ ᓄᓇ ᖕᓂ ᐋ ᓚᖕᖏ ᓄᓇᒥ ᐅᑕᓕᖕᓃ ᒃ ᑯ ᑦ ᑲ ᑎᒪ ᔨ ᖕᒥ ᑲ ᒪ ᔨ ᐅᕗᑦ ᐆᒪ ᔪ ᓕᖓᓂᖅ ᒥ ᒃ ᐊᐅᓚᑦ ᑎᔨ ᐅᓂᖅ ᓄᓇ ᖑᒡ ᓂ ᑕᐃᔭ ᖕᓂ ᐅᐊᑮ ᓯ ᒥ ᐊᒻ ᒪ ᓗ ᑎᒍ ᒥ ᐊᖅ ᑎᐅᖃᑕᐅᓕ ᓗᑎᒃ ᐊᐅᓚᑕᐅᓂᖏ ᓂᒃ ᐊᒻ ᒪ ᓗ ᓇᐅᑦ ᑎᖅ ᑐᖅ ᑕᐅᕚ ᓕᐊᖏ ᓇᕐ ᓂᖏ ᓂᒃ ᕿᖑᐆᒻ ᒥ (ᐋ ᓚᐃ ᑦ ᓄᓇᐃ ᑦ ᑕᐃᔭ ᖏ ᓂ ᑳ ᑮ ᑏ ᐃᒃ ᐅᐊ -ᒥ ᒃ) ᑐᒃ ᑐᓂᒃ . ᑕᒫ ᓂ ᓄᕙᐱᕆ 2018-ᒥ, ᖃ ᕝᕙ ᒃ ᑯ ᑦ ᐊᕝᕙᑎᓕᕆᔨ ᒃ ᑯ ᖕᒥ ᓄᓇᒥ ᐅᑕᑐᖅᑲᓕᕆᔩ ᓪ ᓗ, ᓄᓇᑦ ᓯ ᐊᕐ ᒥ ᐅᓂᒃ ᑳ ᓕᐅᓚᐅᖅᑐᑦ, ᐃᓱᒪᒋᔭ ᖏ ᓂ, ᕿᖑᐆᒻ ᒥ ᑐᒃ ᑐᐃᑦ ᐊᒥᕐ ᓵ ᔭ ᓐ ᓅᑎᐊᖅ ᓯ ᒪ ᓂ ᖏ ᓂᒃ ᐱᓪ ᒪᑎᐅᔭ ᒥᒃ ᐊᒻ ᒪ ᓗ ᐊᐅᓚᑕᐅᓂ ᖏ ᓂᒃ ᖃᓄᐃᓕᐅᕈᑕᐅᒃ ᑲ ᓐ ᓂᑎᐊᖅᑲᕐ ᓂ ᖏ ᓂᒃ .

ᑕᒫ ᓂ ᔭ ᔪᐊᑎ 2019-ᒥ ᑕᐃᒃ ᑯ ᐊ ᒃ ᓵᑦ ᓵ ᒥ ᐅᑕᐃᑦ ᖃ ᕝᕙ ᐃᑦ ᐋ ᓚᖕᖏ ᐊᒻ ᒪ ᓗ ᓄᓇᑦ ᓯ ᐊᑉ ᖃ ᕝᕙ ᒃ ᑯ ᖕᒥ ᑐᓂᓯ ᓚᐅᖅᑐᑦ *ᑕᒪ ᐃ ᓐ ᓂᖅᑰᖅᑐᓂᒃ ᑐᒃ ᓯ ᕋᐅᑎ ᖏ ᓂᒃ ᐊᐅᓚᑦ ᑎᓂᕐ ᒧᑦ ᖃᓄᐃᓕᐅᕈᑕᐅᖁᔭ ᖏ ᓂᒃ ᕿᖑᐆᒻ ᒥ (ᓇᑉᐸᖅᑐᖅᑲᖕᖏ ᑐᕐ ᒥᐅᑦ) ᑐᒃ ᑐᖏ ᓂᒃ , ᐊᕐ ᕋᒍᓂᒃ 2019-2021-ᒧᑦ* ᑲ ᑎᒪ ᔨ ᖏ ᓄᑦ ᐅᐊᑮ ᓯ ᑯ ᑦ , ᐅᓂᒃ ᑳ ᖅ ᑐᓂᒃ ᐊᑐᓕᖅᑯᔭ ᖏ ᓂᒃ ᐊᐅᓚᑦ ᑎᓂᕐ ᒧᑦ ᖃᓄᐃᓕᐅᖅᑯᔭ ᖏ ᓂᒃ ᑭ ᖑᐆᒻ ᒥ ᑐᒃ ᑐᖏ ᓂᒃ ᐱᔾ ᔪ ᑎᖃᖅᑐᓂᒃ ᓄᓇᖏ ᓂ ᐅᐊ'ᑮ ᓯ ᒥ ᓲ ᖑᒍᓂᖏ ᓂ. ᐊᐅᓚᑦ ᑎᓂᕐ ᒧᑦ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴ ᐃᑦ ᐱᓕ ᐊᖅᑎᑕᐅᔪᒪ ᓂᖏᓐ ᒃ ᓵᑦ ᓵ ᒥ ᐅᑦ ᖃ ᕝᕙ ᖏ ᓄᑦ ᓄᓇᑦ ᓯ ᐊᑉ ᖃ ᕝᕙ ᒃ ᑯ ᖏᓄᑦ ᓗ ᑕᒪ ᐃ ᓐ ᓂᖅᑰᖅᑐᑦ ᑐᒃ ᓯ ᕋᐅᑎᑎᐊᕐᓇᓯ ᒪ ᔭ ᖕᒥ ᑲ ᑎᑕᐅᓚᐅᖅᐳᑦ ᑕᑦ ᑎᒪ ᓂᒃ ᐱᔾ ᔪ ᑎᖃᖅ ᓂᖏ ᓂᒃ ᐊᕙ ᒃ ᑐᖅ ᓯ ᒪ ᔪ ᓂᒃ ᒪ ᑯ ᓂᖕᖑᑐᒃ ᑐᓯ ᐅᕐ ᕚᐅᕝᕕ ᓂᖏ ᓂᒃ , ᐊᓯ ᖕᒥ ᑐᒃ ᑐᓯ ᐅᖅᐸᒃ ᑐᑦ ᐆᒪ ᔪᐃᑦ , ᓇᔪ ᖃ ᓇᕝᕕ ᑕᖕᒥ ᐊᒻ ᒪ ᓗ ᓄᓇᐃᑦ ᐊᑐᖅᐸᒃ ᑕᖕᒥ , ᐊᒻ ᒪ ᓗ ᐃᑎᓐ ᓂᐊᖅᑐᑎᓇᓂᕐ ᒥ ᒃ ᐊᒻ ᒪ ᓗ ᖃᐅᔨ ᓴ ᖃᑦ ᓂᕐ ᒥ ᒃ , ᓇᐅᑦ ᑎᖅ ᑐᐃᕝᕙ ᓂᕐ ᒥ ᒡ ᓗ. ᐱᓗᐊᖅ ᑐᒥ ᒃ , ᒃ ᑎᑦ ᓵ ᑉ ᖃ ᕝᕙ ᐃᑦ ᐊᒻ ᒪ ᓗ ᓄᓇᑦ ᓯ ᐊᑉ ᖃ ᕝᕙ ᒃ ᑯ ᑦ ᐊᕝᕙᑎᓕᕆᔨ ᖕᒥ ᓄᓇᒥ ᐅᑕᑐᖅᑲᓕᕆᔨ ᖏ ᓗ ᐱᓕ ᐊᖅ ᑎᑦ ᑎᔭᒪ ᕗᑦ ᑲ ᔭ ᓯ ᔭ ᒥ ᒃ ᑐᒃ ᑐᓂᒃ ᑕᒪ ᐃ ᓂᒃ ᑲ ᑎᓪ ᓗᒋ ᑦ ᑐᒃ ᑐᑕᐅᓯ ᒪ ᔭ ᓐ ᓇ ᕐ ᓂᖏ ᓂᒃ ᐋᖅᑭᒪ ᖁᔨ ᓪ ᓗᑎᒃ ᐱᑕᖅᖁᔨ ᖕᒥ ᑐᓂᒃ 0-ᒦ ᓐ ᓂᐊᖅ ᑐᓂᒃ *ᕿᖑᐆᒻ ᒥ* ᑐᒃ ᑐᖏ ᓂᒃ . ᖃᐅᔨ ᓴ ᖅ ᑕᐅᓭ ᓂᒃ ᐸᑕ ᑭ ᓯ ᐊᓂ ᐊᐅᓚᑦ ᑕᐅᓂᖏ ᓄᑦ ᐊᑐᓕᖅ ᑎᑦ ᑐᒪ ᔭ ᖕᒥ , ᑲ ᑎᒪ ᔩ ᑦ ᑐᑭ ᓕᐅᓚᐅᖅ ᑐᑦ ᐳᖅ ᑐᓂᓕᖕ ᒥ 2-ᒦ ᑦ ᑐᓂᒃ ᕿᒥ ᕈ ᐊᖅ ᑕᐅᖁᔨ ᓪ ᓗᑎᒃ ᓈᒻ ᒪᖕ ᓂᐊᖅ ᑐᓂᒃ , ᒪ ᓕᒃ ᑕᐅᓗᑎᒃ ᒪ ᓕᒐ ᓕᐊᕝᕕ ᓂᖕᖏ ᐊᐅᓚᑦ ᑎᕙᖕ ᓂᖏ ᒧᑦ ᐱᓕ ᐊᖅ ᑎᑕᐅᔪ ᒪ ᕗᒃ ᑐᓂᒃ . ᑕᐃᒪ ᐃᓂᖕᖓᓄᑦ , ᑲ ᑎᒪ ᔩ ᑦ ᐋᖅᑭᒪ ᑎᑦ ᑎᓕᓚᐅᖅᐳᑦ ᐱᐅᓯ ᑎᔭ ᐅᓂᐊᖅᑐᓂᒃ ᐊᒻ ᒪ ᓗ ᖃᑎᑕᐅᔭ ᒃ ᑯ ᑦ ᐃᓄᖕ ᓄᑦ ᐊᑎᓕᐅᖅ ᑕᐅᓯ ᒪ ᕝᕙ ᒃ ᓴ ᐅᔪ ᓂᒃ ᕝᕗᐊᑎ 4, 2019-ᖑᓚᐅᖅ ᑐᒥ .

ᑖᒃ ᑯ ᐊ ᐅᐊᑮ ᓯ ᒃ ᑯ ᑦ ᓄᓇᒥ ᐅᑕᓕᖕᓃ ᑦ ᑲ ᑎᒪ ᔨ ᖕᒥ , ᑐᑭ ᑖᓚᐅᖅ ᐳᑦ , ᑐᓐ ᑐᖕᖃᖅᖅᓱ ᑎᒃ ᒫ ᓇ ᐅᔭ ᖅ ᓴ ᕿᑎᑕᐅᓯ ᒪ ᓕᖅ ᑐᓂᒃ ᐊᒻ ᒪ ᓗ ᐃᓱᒪ ᓕᐅᕈᑎᑦ ᓚᐅᖅ ᑕᖏ ᓂᒃ 2016-ᒥ , ᐱᓪ ᒪ ᓕᐅᔭ ᓂᒃ ᓴ ᐳᓐ ᓂᐊᖅ ᑕᐅᓯ ᒪ ᔭ ᓕᐊᖅ ᑲ ᖏ ᓂᒃ ᐃᓱᒪ ᔫᑕᐅᓂᖏ ᓂᒃ ᓯ ᓕᒫ ᓐ ᓇᐅᔭ ᑦ *ᕿᖑᐆᒻ ᒥ* ᑐᒃ ᑐᓂᒃ ᐊᒻ ᒪ ᓗ ᐃᓚᖅᑲᓐ ᓂᓕᐊᖅ ᑲ ᖏ ᓂᒃ ᐊᐅᓚᑦ ᑎᓂᕐ ᒧᑦ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴ ᐃᑦ ᐊᒥ ᓯ ᕈ ᒃ ᑲ ᓐ ᓂᕈ ᓐ ᓇᕐ ᓂᐊᕐ ᒪ ᑕ ᑐᒃ ᑐᖕᖏ . ᐃᓱᒪ ᓕᕈ ᑕᐅᓂᖏ ᓂ ᑐᒃ ᑐᓯ ᐅᕐ ᕚᑦ ᑕᐃᓕᒪ ᑎᑕᐅᓂᖏ , ᐅᐊᑮ ᓯ ᒥ ᐅᑉ ᑲ ᑎᒪ ᔨ ᖕᒥ ᐃᓱᒪ ᒃ ᓴ ᖅ ᓯ ᐅᕈ ᑎᖅᑲᓚᐅᖅ ᐳᑦ ᐅᓗᑎᐊᓇᖅ ᑑᒦ ᓐ ᓂᖏ ᑐᒃ ᑐᐃᑦ ᒫ ᓇᓅ ᖑᓚᐅᖅ ᑐᖅ ᐊᒥᕐ ᓵ ᔭ ᓐ ᓅᓗᐊᓚᐅᕐ ᓂᖏ ᓂᒃ , ᓇᓗᓇᕐ ᓂᖏ ᓂᓪ ᓗ ᐱᔾ ᔪ ᑕᐅᓂᖏ ᓵ ᖅ ᐊᒥᕐ ᓵ ᔭ ᓐ ᓅᖅ ᓯ ᒪ ᖕ ᒪ ᖕᖏᑕ ᐊᒻ ᒪ ᓗ ᐱᓪ ᒪ ᓇᐅᓂᖕᖏ ᓇᐹᖅ ᑐᖅ ᑲ ᖕᖏ ᑐᕐ ᒥ ᐅᑦ ᑐᒃ ᑐᐃᑦ ᒃ ᑎᑦ ᓵ ᒥ ᐅᑦ ᐃᓄᖅᑯᑎᖏ ᓄᑦ ᐱᑕᖅᑲᐃ ᓇᑎᐊᖅ ᑲ ᖏ ᓄᑦ - ᑎᒥ ᖏ ᓄᑦ , ᐅᒃ ᐱᑎᔭ ᑐᖅᑲ ᖏ ᓄᑦ ᐊᒻ ᒪ ᓗ ᐃᑦ ᖅ ᑯ ᓯ ᑐᖅᑲ ᖏ ᓄᑦ .

ᐅᐊᑮ ᓯ ᒃ ᑯ ᑦ ᐋ ᓚᐃ ᑦ ᓄᓇᒥ ᐅᑕᓕᖕᓃ ᑦ ᑲ ᑎᒪ ᔨ ᖕᒥ ᑐᑭ ᓕᐅᓚᐅᖅ ᑐᑦ ᑕᒪ ᐃ ᓐ ᓂᒃ ᑲ ᑎᑦ ᓗᒋ ᑦ ᑐᒃ ᑐᓯ ᐅᕐ ᕚᐅᔭ ᓐ ᓇᕐ ᓂᖕᖏ ᐱᑕᖅᖏ ᑐᒥ ᓐ ᓂᐊᕐ ᓂᖅ 0-ᒥ ᑕᒪ ᐃ ᓐ ᓂᒃ ᐊᑐᖅ ᐸᒃ ᑐᓕᒫ ᑦ *ᕿᖑᐆᒻ ᒥ* ᑐᒃ ᑐᓂᒃ ᑕᒪ ᓅ ᐅᐊᑮ ᓯ ᐅᑉ ᓄᓇᖕᖏ ᐊᕐ ᕋᒍᒥ
2019/20-ᒥ ᐊᒻ ᒪ ᓗ 2020/21-ᒥ ᑐᒃ ᑐᓯ ᐅᕐ ᕚᐅᔭ ᓂ.
ᐊᐅᓚ ᓖᕐ ᕚᐅᕝᕕ ᓂᖕᖃᓄᓇᐃᑦ ᕿᖑᐆᒻ ᒥ ᑐᒃ ᑐᓄᑦ ᐊᒥ ᐊᒃ ᑯ ᓯ ᒪᕝ ᕚᐅᖃ ᓯ ᐊᕐ ᓂᖕᖏ ᐊᑐᖅ ᑕᐅᖏ ᓇᖅ ᐳᑦ ᐋᑐᑎᖅᑲᕐ ᓂᕐ ᒧᑦ ᐱᑕᖅᖏ ᑐᒦ ᑎᑦ ᑎᓂᖅ 0-ᒥ ᒃ ᑐᒃ ᑐᓯ ᐅᕐ ᕚᐅᔭ ᓐ ᓇᕐ ᓂᖏ ᓂᒃ , ᑕᐃᒃ ᑯ ᐊᓗ ᐅᐊᑮ ᓯ ᒥ ᐅᑉ ᓄᓇᒥ ᐅᑕᓕᖕᓃ ᖕᒥ ᐊᑐᓕᖅᑯᔫ ᓯ ᒪ ᓪ ᓗᑎᒃ ᐋᑐᑎᖅᑲᑦ ᑎᐊᕐ ᓂᖏ ᓂᒃ ᑕᒫ ᓂ ᐋ ᓚᐃ ᑦ ᓄᓇ ᖏ ᓂ ᓴ ᐳᓐ ᓂᐊᖅ ᑕᐅᓯ ᒪ ᖁᔭ ᖏ ᓂ ᑐᕌ ᖃ ᓄᔭ ᐅᔪ ᓂᒃ ᖃᐅᔨ ᓴ ᖅ ᑕᐅᖁᓪ ᓗᒋ ᑦ ᐃᓱᒪ ᒋᔭ ᐅᓯ ᓐ ᓈᕐ ᓗᑎᒃ ᑕᒪ ᐃ ᓐ ᓂᒃ ᑲ ᑎᖅᑲᖅ ᑕᕐ ᓂᖏ ᑐᒃ ᑐᐃᑦ ᐊᒻ ᒪ ᓗ ᐱᔫ ᖁᑕᐅᖏ ᑐᓂᒃ ᑐᒃ ᑐᕝᕙᐅᖅᑲᖅ ᑕᕐ ᓂᖏ ᓂᒃ .
ᓇᐅᑦ ᑎᖅ ᑐᖅ ᑕᐅᖃᑕᐃ ᓇᓄᐊᖅᑲᕐ ᓂᖏ ᐋ ᓚᐃ ᑦ ᓄᓇ ᖏ ᓐ ᓂᑦ ᑐᑦ ᑐᒃ ᑐᐃᑦ ᐊᑐᓄᐊᖅᑲᓪ ᒪ ᓄᖕ ᒪ ᑕ ᐅᔾ ᔨ ᖅ ᑐᑦ ᑎᐊᓄᐊᖅᑲᕐ ᓂᕐ ᒧᑦ ᐊᐅᓚᑦ ᑎᔨ ᐅᓂᖏ ᓂᒃ ᐃᓱᒪ ᓕᐅᖅ ᑎᐅᓚᐅᓗᑎᒃ , ᑲ ᑎᒪ ᔩ ᓪ ᓗ ᐊᑐᓕᖅᑯᔫ ᓪ ᓗᑎᒃ ᑕᐃᒃ ᑯ ᐊ ᒃ ᓵᑦ ᓵ ᒥ ᐅᑕᐃᑦ ᖃ ᕝᕙ ᐃᑦ ᐱᓕ ᐊᔨ ᑖᒃ ᑲ ᓐ ᓂᖅᑯᔭ ᐅᓚ ᓗᑎᒃ ᐊᓯ ᒃ ᑲ ᓐ ᓂᖏ ᓂᒃ ᓯ ᓕ ᓄᓇᓕᖕ ᓂ ᓇᐅᑦ ᑎᖅ ᑐᐃᔭ ᐅᖅᑲᖅ ᓂᐊᖅ ᑐᓂᒃ .

2018-ᒥ ᓄᕐ ᓇᕕᐅᕙᓐ ᓂᖕᒋᑦ ᓄᓇᐃᑦ ᐅᓂᒃ ᑳᓕᐊᖑᒐᒥᒃ ᑐᑭᓯ ᓇᖅᓯᑦ ᑎᐊᓚᐅᖅᑐᑦ ᑕᐃᒃ ᑯᐊ ᑐᒃ ᑐᐃᑦ ᓇᒧ ᖕᐅᖅᑕᑦ ᓂᖕᒋᑦ ᐱᒻ ᒪᓇᐊᓘᓂᖕᒋᑦ ᐱᔾ ᔪᑕᐅᖅᑕᑦ ᓂᖕᒋ ᓄᑦ ᐊᒥᓃᔪᓐ ᓃᑭᑕᐅᕙᓐ ᓂᑦ ᒧᑦ ᕿᖕᐅᒻ ᒥ ᑐᒃ ᑐᓄᑦ ᐋᓚᐃᑦ ᓄᓇᖕᒋ ᓂ. ᑕᒪᓐ ᓇ ᖃᐅᔨ ᒪᔭ ᐅᓂᖕᒐᓄᑖᖑᓪ ᓗᓂ ᐃᓚᒋ ᐊᑭᑕᐅᕗᖅ ᐱᒻ ᒪᓇᐅᓂᖅᓴᑦ ᑎᐊᒻ ᒪᓇᖕᒥᒃ ᓇᓗᓇᑭᑕᐅᓕᖅᑐᓂᒃ ᓯᕗᓂᒃ ᓴᖕᒐᓂᒃ ᑐᒃ ᑐᖕᒋ ᓄᑦ. ᐅᐊᑮ ᓯᒃ ᑯᑦ ᓄᓇᒥ ᐅᑕᓕᓇᔩᑦ ᑲᑎᒪᔨ ᖕᒋᑦ ᐊᑐᓕᕐᑯᔨ ᕗᖅ ᒃ ᓚᑦ ᔩᒥᐅᑦ ᐊᓪ ᓚᐃᑦ ᒐ ᕙᒪᒃ ᑯᖕᒋ ᓂᒃ ᐊᒻ ᒪᓗ ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪᒃ ᑯᖕᒋ ᓂᒃ ᑎᑎᕋᕐᑯᔨ ᓂᖅ ᑐᑭᓯᓇᑦ ᑎᐊᕐ ᓂᐊᖅᑐᓂᒃ ᐅᓂᒃ ᑳᑭᑎᓂᒃ ᖃᓄᐃᓕᖕᒐᕐᑯᔭ ᖕᒋ ᓂᒃ ᐱᔾ ᔪᑎᖃᖅᑐᓂᒃ ᓅᖃᑦ ᓂᖕᒋᑦ ᕿᖕᐅᒻ ᒥ ᑐᒃ ᑐᐃᑦ ᐋᓚᐃᑦ ᓄᓇᖕᒋ ᓄᑦ ᐊᒻ ᒪᓗ ᖃᓄᖅ ᐊᒃ ᑐᖅᑕᐅᓯᒪᓂᐊᕐ ᒪᖕᒪᓐ ᐋᕿᑭ ᐊᖅᑕᐅᔪᑎᒃ ᐊᐅᓚᑦ ᑎᓂᖃᔭ ᐅᔪᑦ ᑐᒃ ᑐᖕᒋ ᓂᒃ.

ᑐᑭᓯᒋ ᐊᖅᑕᐅᑦ ᑎᐊᒃ ᑲᓐ ᓂᕐᑯᓪ ᓄᒋᑦ ᖃᓄᐃᓕᐅᖅᑎᐅᖅᑕᐅᕙᓐ ᓂᖕᒋᑦ ᐆᒪᔪ ᐃᑦ ᑐᒃ ᑐᓂᒃ ᓂᕿᖃᔩᑦ ᐊᒥᓃᔪᓐ ᓃᑭᑕᐅᕙᓪ ᓕᐊᓂᖕᒋ ᓄᑦ ᕿᖕᐅᒻ ᒥ ᑐᒃ ᑐᓄᑦ ᐋᓚᐃᑦ ᓄᓇᖕᒋ ᓂ, ᐅᐊᑮᓯᒥ ᓄᓇᒥ ᐅᑕᓕᓇᔩᑦ ᑲᑎᒪᔨ ᖕᒋᑦ ᐊᑐᓕᕐᑯᔨ ᕗᑦ ᒃ ᓚᑦ ᔩᒥ ᐅᑕᐃᑦ ᒐ ᕙᒪᒃ ᑯᖕᒋ ᓂᒃ ᐊᒻ ᒪᓗ ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪᒃ ᑯᖕᒋ ᓂᒃ ᖃᐃᑦ ᑎᕐᑯᔭ ᐅᓪ ᓄᑎᒃ ᖃᐅᔨ ᕖᓪ ᓕᑭᑎᒃ ᓴᓂᒃ ᐱᔾ ᔪᑎᖃᖅᑐᓂᒃ ᑕᑯᔭ ᐅᖃᑦ ᓂᖕᒋᑦ ᑐᒃ ᑐᑐᖅᐸᒃ ᑐᑦ ᐆᒪᔪ ᐃᑦ ᐊᒻ ᒪᓗ ᒪᓕᒐᖃᑕᐅᓇᔭ ᖅᑐᓂᒃ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᓂᒃ ᑐᑭᓕᐅᕐ ᓂᕐ ᒧᑦ ᖃᔅ ᓯᓐ ᓂᒃ ᑕᒪ ᒃ ᑯᓂᖕᒐᐆᒪᔪ ᕐ ᓂᒃ ᑐᕐᑰᑎᖃᑕᕋᔭ ᕐ ᒪ ᖕᓚᑦ ᐊᕐ ᕋᒎᑕᒪ ᖅ. ᐊᒻ ᒪᑕᐅᖅ ᓯᓕ, ᐅᐊᑮᓯᒥᐅᑦ ᓄᓇᒥ ᐅᑕᓕᓇᔩᑦ ᑲᑎᒪᔨ ᖕᒋᑦ ᑐᓂᔭ ᐅᓯᒪᔭ ᓇᐊᖅᑲᓇᕗᑦ ᒪᓕᒐᖃᑕᐅᓇᔭ ᖅᑐᓂᒃ ᐱᔾ ᔪᑎᖃᖅᑐᓂᒃ ᐊᒪᑭ ᕐ ᓂᒃ ᑐᖕᕕᖅᑲᕐ ᓂᐊᖅᑐᓂᒃ ᒪᑯ ᓂᖕᒐ(i) ᐊᒪᑭ ᐃᑦ ᑕᑯᔭ ᐅᕙᓐ ᓂᖕᒋ ᓂ ᑖᒪ ᓂ ᐋᓚᐃᑦ ᓄᓇᖕᒋ ᓂ ᑕᐃᕙᒃ ᑕᖕᒋ ᓂ ᑰᑭ ᑎ-ᐃᒃ ᐋᒥ ᐅᖅᑲᐅᓯᑐᕐ ᒥᒍᑦ ᓄᓇᕐᑯᑎᖕᒋ ᓂ ᖃᐅᔨ ᓴᖅ ᑕᐅᓯ ᒪ ᓂᖕᒋ ᓂ ᑕᑯᔭ ᐅᖃᑕᖅ ᓯᒪᔪ ᓂ ᐊᒻ ᒪᓗ (ii) ᑕᑯᔭ ᐅᖃᓯ ᐅᔾ ᔭ ᐅᕙᓐ ᓂᖕᒋ ᓂᒃ ᕿᖕᐅᒻ ᒥ ᑐᒃ ᑐᐃᑦ ᐋᓚᐃᑦ ᓄᓇᖕᒋ ᓅᑦ ᑎᓪ ᓗᒋᑦ, ᐊᒪᑭ ᐃᑦ ᐊᓯ ᖕᓖᖕᒋ ᓂᒃ ᑐᒃ ᑐᓯ ᐅᕐ ᓂᖕᒋ ᓂ ᑲᑎᓕᖅᑕᖅᑐᓂ ᐊᔾ ᔨᒋ ᖕᒋᑦ ᑑᑏᑦ ᑐᒃ ᑐᐃᑦ ᑲᑎᑦ ᑕᕋᖕᖑᒃ.

ᑕᐃᒃ ᑯᐊ ᑕᐃᔭ ᐅᔭᑦ *ᐱᐅᓯᒋ ᐋᕿᑎᑦ ᓄᐊᑦ ᔅ ᓚᐃᕝ ᓄᓇᖕᒋ ᓂ ᐊᒪᑭᖅᓯᐅᑭᑎᑦ* ᐊᑐᖅᑕᐅᕙᒃ ᑐᑦ ᐊᒪᑭ ᐃᔭ ᑭᑕᐅᒋ ᐊᕐ ᓂᕐ ᒧᑦ ᕿᖕᐅᒻ ᒥ ᑐᒃ ᑐᐃᑦ ᐋᓚᐃᑦ ᓄᓇᖕᒋ ᓅᑦ ᑎᓪ ᓗᒋᑦ, ᐊᒻ ᒪᓗ ᑕᐅᕙᓅᓐ ᓂᖕᒋ ᓂ ᕐᑯᕐ ᓗᖅᑑᑉ ᑲᓇᖕ ᓇᖕᒐᓂᖕᒑᖅᐸᒃ ᑐᑦ ᑐᒃ ᑐᖕᒋᑦ ᓴᐱᒥ ᓄᓇᖕᒋ ᓂ ᑕᐃᔭ ᖕᒋ ᓂ. ᐅᔾ ᔨ ᖅᑐᑦ ᑎᐊᑭᒪ ᓂᕐ ᒧᑦ ᑕᒪ ᒃ ᑯᐊ ᐃᑲ ᔭ ᕐ ᓂᖅᕐ ᓂᖕᒋ ᓂᒃ ᐊᒥ ᐊᒃ ᑯᓯᒪᒋ ᐊᑭᒪ ᓂᕐ ᒧᑦ ᑭ ᖕᐅᒻ ᒥ ᑐᒃ ᑐᓂᒃ, ᑲᑎᒫᑦ ᐊᑐᓕᕐᑯᔨ ᕗᑦ ᓇᓃᓯ ᖑᓂᖕᒋᑦ ᐊᒻ ᒪᓗ ᐊᒥᓃᕙᓐ ᓂᖕᒋᑦ ᐊᒪᑭ ᖅᑕᐅᕙᓪ ᓕᐊᔭᑦ ᐅᓂᒃ ᑳᖅᑕᐅᕐᑯᓪ ᓄᒋᑦ ᑲᑎᒪᔨ ᓄᑦ ᐊᕐ ᕋᒎᑖᖅ, ᒪᓕᒐᖅᑭᑕᐅᓂᐊᖅᑐᑦ ᓴᕿᑎᑕᐅᔭ ᓇ ᓇᕐ ᓂᐊᕐ ᒪᑕ ᖃᓄᐃᓕᐅᕿᑕᐅᓂᕐ ᒧᑦ ᐋᑐᑎᖅᑭ ᓇ ᓇᕐ ᓂᖕᒋ ᓄᑦ, ᒪᓕᒡ ᓗᑎᒃ ᑕᒪ ᐃᓐ ᓂᒃ ᖃᐅᔨ ᓴᖅ ᑏᑦ ᐊᒻ ᒪᓗ ᐊᓪ ᓚᐃᑦ ᐱᐅᓯ ᑐᖅᑲᖕᒋ ᓂᒃ ᖃᐅᔨ ᒪᔭ ᐅᔭᑦ.

ᒃ ᓚᑦ ᔩᒥ ᐅᑦ ᒐ ᕙᒪ ᖕᒋᑦ ᐊᐅᓚᑦ ᑎᔾ ᐅᕙᒃ ᐳᑦ *ᓄᓇᓕ ᖕ ᓄᑦ-ᐊᐅᓚᑕᐅᔭᓂᒃ ᐊᒪᑭ ᖅᓯᐅᓂᕐ ᒧᑦ ᐊᔭᑭ ᓐ ᓂᖅᓴᐃᔾ ᔭᑎᓂᒃ* ᐊᑐᖅᑕᐅᕙᒃ ᑐᓂᒃ ᐊᒻ ᒪᓗ ᐅᐊᑮᓯᒥ ᐅᐸ ᓄᓇᒥ ᐅᑕᓕᓇᔩᑦ ᑲᑎᒪᔨ ᖕᒋᑦ ᐊᑐᓕᕐᑯᔨ ᓐ ᓗᑎᒃ ᑕᐃᒃ ᑯᐊ ᓇᓃᔅ ᔩ ᖕᒍᓂᖕᒋ ᓂᒃ ᐊᒻ ᒪᓗ ᐊᒪᑭ ᖅᑕᐅᖅᑕᑦ ᓂᖕᒋᑦ ᐊᒥ ᔩ ᓂᖕᒋᑦ ᐅᖅᑲᐅᓯ ᐅᖅᑲᑦ ᑕᕐᑯᓪ ᓄᒋᑦ ᑲᑎᒪᔨ ᖕᒋ ᓄᑦ ᐊᒻ ᒪᓗ ᖃᐅᔨᒋ ᐊᖅᑕᐅᓗᑎᒃ ᖃᓄᖅ ᐊᔭᑭ ᓈᖅᓴᐅᑎᒃ ᓴᐃᑦ ᐊᒪᑭ ᖅᓯᐅᑭ ᓇ ᓇᕐ ᓂᕐ ᒥᒃ ᐃᑲ ᔭ ᕐ ᓂᖅᕐ ᓂᐊᕐ ᒪᖕᓚᑦ ᐅᓂᒃ ᑳᓕᐅᕐ ᓗᑎᒃ ᓯᕗᓂᒃ ᓴᒥ ᐊᒪᑭ ᖅᓯᐅᖅᑕᕐ ᓂᖕᒋ ᓄᑦ ᐊᒻ ᒪᓗ ᐊᐅᓚᑦ ᑎᓂᖕᒋ ᓄᑦ. ᐊᒻ ᒪᑕᐅᖅ ᓯᓕ, ᑲᑎᒪᔨ ᑦ ᐊᑐᓕᕐᑯᔨ ᒋ ᕗᑦ ᒃ ᓚᑦ ᔩ ᐸ ᒐ ᕙᒪ ᖕᒋ ᓂᒃ ᐊᒻ ᒪᓗ ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪᒃ ᑯᖕᒋ ᓂᒃ ᑐᑭ ᓕᐅᕐᑯᔨ ᓂᖅ ᐃᖕᒥ ᓂᒃ *ᐱᐅᓯᒋ ᐊᑭᑎᓂᒃ ᓄᐊᑦ ᔅ ᓚᐃᕝ ᓄᓇᖕᒋ ᓂ ᐊᒪᑭᖅᓯᐅᑭᑎᑦ* ᐊᑐᖅᑕᐅᕙᓐ ᓂᖕᒋ ᓂᒃ ᐊᒻ ᒪᓗ ᑕᐃᒃ ᑯᓂᖕᒐ *ᓄᓇᓕ ᖕ ᓄᑦ-ᐊᐅᓚᑕᐅᔭᓂᒃ ᐊᒪᑭ ᖅᓯᐅᓂᕐ ᒧᑦ ᐊᔭᑭ ᓐ ᓂᖅᓴᐃᔾ ᔭᑎᓂᒃ* ᐊᑐᖅᑕᐅᕙᓐ ᓂᖕᒋᑦ ᑐᑭ ᑖᑭ ᑕᐅᔭ ᓐ ᓇᕐ ᓂᕐ ᒧᑦ ᐱᑕᖅᑭ ᓃᑭ ᑕᐅᔭ ᓐ ᓇᕐ ᓂᖕᒋ ᓂᒃ ᐊᒪᑭ ᐃᑦ ᐊᒥᔅ ᔩ ᓂᖕᒋ ᓂᒃ.

ᐅᐊᑭ ᔩᒥ ᐅᐸ ᓄᓇᒥ ᐅᑕᓕᓇᔩᑦ ᑲᑎᒪᔨ ᖕᒋᑦ ᒫ ᓐ ᓇᐅᔭ ᖅ ᐱᓕᓇᐊᖅᑲᓕᖅᑐᑦ ᐊᒃ ᓭᓕᓇᓂᕐ ᒥᒃ ᐆᒪᔭᓕᓇᓂᕐ ᒥᒃ ᐊᒻ ᒪᓗ ᐊᐅᓚᑕᐅᔭ ᓐ ᓇᕐ ᓂᖕᒋ ᓂᒃ ᐊᔭᕐ ᓇᖕᕆᓇᔭᕐ ᓂᖕᒋ ᓂᒃ ᖃᐅᔨ ᓴᕐ ᓂᕐ ᒥᒃ. ᐱᐅᓯᒋ ᐊᖅᑕᐅᕐᑯᓪ ᓄᒋᑦ ᐋᑐᑎᖅᑲᑦ ᑎᐊᑭ ᓐ ᓇᕐ ᓂᖕᒋᑦ, ᑲᑎᒪᔨ ᑦ ᐊᑐᓕᕐᑯᔨᒋ ᕗᑦ ᑕᐃᒃ ᑯᓂᖕᒐᖅᕝ ᕕᖕ ᓂᒃ ᐱᖅᓯ ᐅᔾ ᔭ ᐅᓯᒪ ᕐᑯᔨ ᓂᖅ ᖃᐅᔨ ᓴᖅ ᑕᐅᓂᐊᖅᑐᓂᒃ.

ᐅᐊᑮ ᓯᒃ ᑯᑦ ᓄᓇᒥ ᐅᑕᓕᓇᔨ ᖕᒋᑦ ᑲᑎᒫᑦ ᐃᓕᑕᖅᓯ ᓯᒪᔭᑦ ᐱᑕᖅᑰ ᖕᒍᓂᖕᒋᑦ ᓄᓇᖕᒋᑦ ᑕᐃᔭ ᐅᔭᓂᒃ ᓄᓇᖕᒋ ᓂ ᐅᖅᑲᐅᓯ ᑐᖅᑲᕐ ᒥᒍᑦ ᑯᒃ ᑭᑏᒥ ᐊᒻ ᒪᓗ ᓵ ᑑ ᐃᒃ ᑯᐋ ᒥ ᑐᒃ ᑐᓕᓇᔭᑦ ᓄᓇᕐᑯᑎᖕᒋᑦ ᐅᖕᒐᓃᑉ ᒪᑕ ᐅᐊᑮᓯᒥ ᐅᑕᐃᑦ ᓄᓇᖕᒋ ᓂᒃ ᐊᒻ ᒪᓗ ᓄᓇᑦ ᓯ ᐊᑉ ᓄᓇᕐᑯᑎᖕᒋ ᓂᒃ. ᑭᓯᐊᓂ, ᑕᐃᒪ ᐃᑲ ᓗᐊᖅᑎᓪ ᓗᒍ, ᐱᕙᓪ ᓕᐊᖕᒋᓗᐊᖅᑦ ᑕᕐ ᓯᒪᖕᒪᑕ ᑕᒪ ᐃᓐ ᓂᒃ ᐊᐅᓚᑕᐅᓂᖕᒋ ᓂᒃ ᐆᒪᔪ ᐃᑦ ᑐᒃ ᑐᓯ ᐅᖅᐸᒃ ᑐᑦ ᐊᒻ ᒪᓗ ᓄᓇᐃᑦ ᐊᐅᓚᑕᐅᕙᓐ ᓂᖕᒋᑦ ᓇᓂᑐᐃᓐ ᓇᖅ ᓄᓇᑦ ᓯ ᐊᑉ ᑭᒡ ᓕᖅᑦ ᔪ ᖕᓚ ᐃᓗᐊᓂ. ᑕᐃᒪ ᐃᓂᖕᒐᓄᑦ, ᑲᑎᒪᔨ ᑦ ᐊᑐᓕᕐᑯᔨ ᕗᑦ ᑕᐃᒃ ᑯᐊ ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪᒃ ᑯᖕᒋᑦ ᐊᒻ ᒪᓗ ᒃ ᓚᑦ ᔩᒥ ᐅᑦ ᒐ ᕙᒪᒃ ᑯᖕᒋᑦ ᓴᓇᕐᑯᔭ ᐅᓪ ᓄᑎᒃ ᑎᑎᕋᖅᑕᐅᕙᓪ ᓕᐊᔭ ᓂᒃ ᐊᖕᕿᑎᒃ ᓴᓂᒃ ᐱᕕᒃ ᓴᖅ ᓄᑎᒡ ᓗ ᑕᒪ ᕐ ᒥᒃ ᐊᐅᓚᑦ ᑎᓂᐊᕐ ᒪᑕ ᓄᓇᕐᑯᑎᖕᒋ ᓂᒃ ᑯᒥᓗ ᓵ ᑐ ᐃᒃ ᑯᐊ ᒥᓗ ᑕᐃᔭ ᖕᒋ ᓂ ᐱᓕᓇᖅᑭᖅᑲᕐ ᓗᑎᒃ ᐊᓯᒥᓂᒃ ᐊᐅᓚᑦ ᑎᔾ ᐅᖅᑕᐅᕙᒃ ᑐᓂᒃ.

ᒃ ᓛᑦ ᔩᒥ ᐅᑦ ᓄᓇᓖᑦ ᐊᒻ ᒪᓗ ᐃᓄᕐᑯᑎᖕᒋᑦ ᖃᐅᔨ ᔭ ᓇᐊᖅᑲᕐ ᒥ ᔭᑦ ᖃᓄᐃᓕᖕᒐᓂᖕᒋ ᓂᒃ ᑐᒃ ᑐᐃᑦ ᐊᒻ ᒪᓗ ᖃᐅᔨ ᑎᑕᐅᔭ ᓇᐊᖅᑲᕐ ᑐᑦ ᖃᓄᐃᓕᐅᕿᑕᐅᓂᖕᒋ ᓂᒃ ᐊᒥᔅ ᔩᔭ ᓐ ᓃᕐ ᑎᑕᐅ5ᑕᐃᓕᒪ ᓇᓯ ᖕ ᓂᖕᒋ ᓂ. ᐅᐊᑭ ᔩᒃ ᑯᑦ

ᓄᓇᒥ ᐅᑕᓕᕆᔩ ᑦ ᑲᑎᒪ ᔨ ᖏᑦ ᐊᑐᓕᖅᑯᔨ ᕗᑦ ᑲ ᔪ ᓯ ᑦ ᑎᐊᕈ ᓐ ᓇ ᕐ ᓂ ᖏᑦ ᐊ ᒻ ᒪ ᓗ ᐊ ᒃ ᓱ ᕉ ᑕᐅᓂ ᖏᑦ ᒃ ᑳ ᓪ ᓲ ᒥ ᐅ ᑦ
ᐊᑐᒐ ᒃ ᓴ ᓂ ᒃ ᓯ ᒪ ᔾ ᖏᑦ ᑐᓴ ᒐ ᒃ ᓴ ᓕᐊᕆᔾ ᐅᓗᑎ ᒃ ᓄᓇᓕ ᖕ ᓂ ᒃ ᑳ ᓪ ᓲ ᒥ ᐊ ᒻ ᒪ ᓗ ᐃᓕ ᓐ ᓂᐊ ᕐ ᕕ ᖏ ᓂ.

ᐊᒥ ᓲ ᔪ ᓐ ᓂ ᕐ ᓂ ᖏᑦ ᑐ ᒃ ᑐᐃ ᑦ ᐊ ᓪ ᓚᐃ ᑦ ᓄᓇ ᖕ ᓂ ᕿ ᖕᙵ ᓪ ᒥ ᑉ ᑐ ᑦ ᐊ ᒃ ᑐ ᖅ ᓯ ᓯ ᒪ ᕝ ᐸ ᑦ ᖃᓄᐃ ᖕ ᓂ ᖕ ᓂ ᒃ
ᒃ ᑳ ᓪ ᓲ ᒥ ᐅ ᑦ ᐃ ᓄ ᖅ ᑯ ᑎ ᖕ ᓂ ᒃ ᐊ ᓪ ᒪ ᓗ ᑲ ᑎ ᒫ ᔨ ᑦ ᓄᓇᒥ ᐅᑕᓕᕆᔩ ᒃ ᑯ ᑦ ᐊᑐᓕᖅᑯᔨ ᓪ ᓗ ᑎ ᒃ ᒃ ᑳ ᓪ ᓲ ᑉ
ᒐ ᕙ ᒪ ᒃ ᑯ ᖕ ᓂ ᒃ ᐊ ᓪ ᒪ ᓗ ᓄᓇ ᑦ ᓯ ᐊ ᑉ ᒐ ᕙ ᒪ ᒃ ᑯ ᖕ ᓂ ᒃ ᐅ ᖃ ᐅ ᓯ ᖃ ᖅ ᑯ ᔨ ᓂ ᖅ ᓯ ᕗ ᓪ ᓕ ᖅ ᐸ ᐅ ᑎ ᑕ ᐅ ᓂ ᐊ ᖅ ᑐ ᓂ ᒃ
ᐱ ᓕ ᕆ ᐊ ᒃ ᓴ ᖕ ᓂ ᒃ ᐊ ᓪ ᒪ ᓗ ᖃ ᓄ ᐃ ᓕ ᐅ ᕈ ᑎ ᒃ ᓴ ᖃ ᖅ ᓂ ᐊ ᖅ ᓂ ᖕ ᓂ ᒃ ᓂ ᕿ ᒃ ᓴ ᖃ ᕈ ᓐ ᓇ ᓇ ᐊ ᖃ ᖅ ᓂ ᖕ ᓄ ᑦ . ᑲ ᑎ ᒪ ᔩ ᑦ ᑕ ᐅ ᖅ
ᐊᑐᓕᖅᑯᔨ ᕆ ᕗ ᑦ ᒃ ᑳ ᓪ ᓲ ᑉ ᒐ ᕙ ᒪ ᒃ ᑯ ᖕ ᓂ ᒃ ᐊ ᓪ ᒪ ᓗ ᓄᓇ ᑦ ᓯ ᐊ ᑉ ᒐ ᕙ ᒪ ᒃ ᑯ ᖕ ᓂ ᒃ ᖃ ᐅ ᔨ ᒪ ᔾ ᔪ ᑎ ᒃ ᓴ ᖕ ᓂ ᒃ
ᑮ ᐳ ᑎ ᖃ ᑕ ᕈ ᓐ ᓇ ᖅ ᓂ ᖕ ᓂ ᒃ ᑐ ᒃ ᑐ ᓕ ᕆ ᓂ ᖅ ᒥ ᒃ ᐱ ᔾ ᔪ ᑎ ᖃ ᖅ ᑐ ᓂ ᒃ ᐊ ᒥ ᔅ ᓲ ᔪ ᓐ ᓅ ᕈ ᑕ ᐅ ᓂ ᖕ ᓄ ᑦ ᐱ ᔾ ᔪ ᑕ ᐅ ᓂ ᖕ ᖁ ᓄ ᓪ ᓗ
ᑲ ᔪ ᓯ ᔪ ᒥ ᒃ ᐊ ᒃ ᑐ ᖅ ᑕ ᐅ ᕙ ᓪ ᓕ ᐊ ᓂ ᖕ ᓂ ᒃ ᐊ ᒥ ᔅ ᓲ ᔪ ᓐ ᓅ ᖅ ᐸ ᓪ ᓕ ᐊ ᓂ ᖕ ᓄ ᑦ .

ᒪ ᓐ ᓇ ᐅ ᔪ ᖅ ᐱ ᑕ ᖃ ᕆ ᐊ ᖃ ᒪ ᕆ ᓕ ᖅ ᐸ ᑦ ᑐ ᒃ ᑐ ᓂ ᒃ ᐊ ᐅ ᓚ ᑦ ᑎ ᔾ ᔪ ᑎ ᒃ ᓴ ᐃ ᑦ ᑲ ᑎ ᒪ ᔩ ᓪ ᓗ ᐃ ᑲ ᔪ ᖅ ᓯ ᐃ ᓪ ᓗ ᑎ ᒃ
ᐊᒥ ᓯ ᕈ ᖅ ᓰ ᔪ ᒪ ᓂ ᖅ ᑐ ᒃ ᑐ ᓂ ᒃ ᒪ ᕐ ᕈ ᑕ ᓖ ᖕ ᓂ ᒃ ᐊ ᕐ ᕋ ᒎ ᖕ ᓂ ᒃ ᓈ ᕙ ᖕ ᓂ ᐊ ᖅ ᑐ ᓂ ᒃ , ᑭ ᓯ ᐊ ᓂ ᓕ ᒃ ᑕ ᐅ ᖅ ᓯ ᓕ
ᐅ ᔾ ᔨ ᖅ ᕈ ᓯ ᒃ ᓯ ᒪ ᓂ ᕐ ᒥ ᓂ ᒃ ᐱ ᓇ ᓱ ᒍ ᑕ ᐅ ᔪ ᑦ ᐊ ᑕ ᐅ ᑎ ᑰ ᕆ ᐊ ᖅ ᓂ ᐊ ᖅ ᑐ ᑦ ᓴ ᓂ ᓕ ᕆ ᔾ ᖏᓐ ᓴ ᑑ ᒥ ᐅ ᑦ ᓄ ᓇ ᖏ ᓂ
ᑐ ᒃ ᑐ ᓕ ᕆ ᔨ ᖏ ᓂ ᒃ ᐊ ᓪ ᒪ ᓗ ᑕ ᐃ ᒃ ᑯ ᓂ ᖓ ᑎ ᑉ ᔭ ᓕ ᖓ ᒥ /ᐊH ᐃ ᐊ ᖅ ᒥ ᓗ ᑐ ᒃ ᑐ ᓕ ᕆ ᓂ ᖏ ᓂ ᒃ . ᑲ ᑎ ᒪ ᔩ ᑦ ᑕ ᐅ ᖅ ᑖ ᒃ ᑯ ᐊ
ᐃ ᑲ ᔪ ᖅ ᓯ ᐃ ᒋ ᕗ ᑦ ᐊ ᑐ ᓕ ᖅ ᑎ ᑕ ᐅ ᓂ ᖏ ᓂ ᒃ ᐃ ᑉ ᓕ ᐊ ᖅ ᑲ ᓕ ᖅ ᑎ ᓪ ᓗ ᒋ ᑦ ᖃ ᐅ ᔨ ᓴ ᕈ ᑎ ᑦ ᓇ ᐅ ᑦ ᑎ ᖅ ᑐ ᐃ ᔾ ᔪ ᑏ ᑦ
ᐊ ᑐ ᕐ ᑲ ᑦ ᑕ ᕐ ᓗ ᑎ ᒃ ᖃ ᐅ ᔨ ᒪ ᔾ ᔪ ᑕ ᐅ ᔪ ᓐ ᓇ ᕐ ᓂ ᖏ ᓂ ᒃ ᐊ ᓇ ᖕ ᖏ ᓂ ᒃ ᑲ ᑎ ᖅ ᓯ ᖅ ᑕ ᐅ ᕙ ᒃ ᑐ ᓂ ᒃ .

ᑲ ᑎ ᒪ ᔩ ᑦ ᐊᑐᓕᖅᑯᔨ ᕗ ᑦ ᒃ ᑳ ᓪ ᓲ ᑭ ᒥ ᐅ ᑕ ᑦ ᖃ ᐅ ᔨ ᓴ ᖅ ᑎ ᖏ ᓂ ᓪ ᓗ ᓇ ᐅ ᑦ ᑎ ᖅ ᑐ ᐃ ᔨ ᖏ ᓂ ᓗ ᐱ ᓕ ᕆ ᐊ ᖑ ᓂ ᐊ ᖅ ᑐ ᓂ ᒃ
ᐊ ᑐ ᓕ ᖅ ᑎ ᑦ ᑎ ᕐ ᔪ ᓯ ᓪ ᓗ ᑎ ᒃ ᑕ ᒪ ᐃ ᓐ ᓂ ᒃ ᑐ ᒃ ᑐ ᓂ ᒃ ᐊ ᓪ ᒪ ᓗ ᑐ ᒃ ᑐ ᖅ ᕕ ᐅ ᕝ ᕙ ᒃ ᑐ ᓂ ᒃ ᓄ ᓇ ᓂ ᒃ
ᖃ ᐅ ᔨ ᓴ ᕐ ᕕ ᐅ ᕙ ᖕ ᓂ ᐊ ᖅ ᑐ ᓂ ᒃ ᓇ ᐅ ᑦ ᑎ ᖅ ᑐ ᖅ ᑕ ᐅ ᕙ ᓪ ᓕ ᐊ ᓗ ᑎ ᒃ ᐊ ᓪ ᒪ ᓗ ᐱ ᓪ ᓚ ᕆ ᐅ ᔪ ᓂ ᒃ ᐊ ᖑ ᓇ ᓯ ᒃ ᑕ ᐅ ᕝ ᕙ ᒃ ᑐ ᓂ ᒃ
ᐊ ᒥ ᓲ ᓂ ᖏ ᓂ ᒃ ᑐ ᒃ ᑐ ᑕ ᐅ ᕝ ᕙ ᒃ ᑐ ᑦ ᑎ ᑎ ᕋ ᖅ ᑕ ᐅ ᖅ ᑲ ᖅ ᑕ ᕐ ᓗ ᑎ ᒃ ᐊ ᑐ ᕐ ᓗ ᑎ ᒃ ᐃ ᓕ ᖅ ᑯ ᓯ ᑐ ᖅ ᑲ ᕐ ᒥ ᓂ ᒃ ᓈ ᓪ ᒪ ᕆ ᔭ ᐅ ᔪ ᓂ ᒃ
ᐱ ᐅ ᓯ ᖃ ᕐ ᓗ ᑎ ᒃ ᐃ ᓚ ᕆ ᐊ ᖅ ᑕ ᐅ ᕙ ᓪ ᓕ ᐊ ᓗ ᑎ ᒃ ᐋ ᕿ ᕆ ᐊ ᖅ ᑕ ᐅ ᓯ ᒪ ᓕ ᖅ ᑐ ᑦ ᐊ ᐅ ᓚ ᑦ ᑎ ᔾ ᔪ ᑎ ᒃ ᓴ ᐃ ᑦ . ᑲ ᑎ ᒪ ᔨ ᑦ
ᐊᑐᓕᖅᑯᔨ ᕗ ᑦ ᑕ ᐃ ᒃ ᑯ ᓂ ᖓ ᑐ ᒃ ᑐ ᓕ ᕆ ᓂ ᕐ ᒥ ᒃ ᐱ ᓕ ᕆ ᔨ ᐅ ᔪ ᑦ ᑲ ᑎ ᖅ ᓯ ᐃ ᖅ ᑯ ᓪ ᓗ ᒋ ᑦ ᓄᓇ ᒦ ᓐ ᓂ ᖏ ᓂ ᒃ ᓯ ᓚ ᐅ ᑉ
ᐊ ᓯ ᔾ ᔨ ᖅ ᐸ ᓪ ᓕ ᐊ ᓂ ᖓ ᓂ ᒃ ᖃ ᐅ ᔨ ᔭ ᐅ ᖅ ᑕ ᖅ ᓯ ᒪ ᔪ ᓂ ᒃ , ᐃ ᓚ ᔭ ᐅ ᕙ ᓪ ᓕ ᐊ ᓗ ᑎ ᒃ ᐋ ᕿ ᕆ ᐊ ᖅ ᑕ ᐅ ᓯ ᒪ ᓂ ᖏ ᓄ ᑦ
ᐊ ᐅ ᓚ ᑦ ᑎ ᓂ ᕐ ᒧ ᑦ ᑐ ᖕ ᖓ ᕆ ᔭ ᐅ ᓂ ᐊ ᖅ ᑐ ᓄ ᑦ .

ᑲ ᑎ ᒪ ᔨ ᑦ ᑕ ᐅ ᖅ ᐊᑐᓕᖅᑯᔨ ᕆ ᕗ ᑦ ᑕ ᐃ ᒃ ᑯ ᓂ ᖓ ᒃ ᑳ ᓪ ᓲ ᒥ ᐅ ᒐ ᕙ ᒪ ᐃ ᑦ ᐊ ᓪ ᒪ ᓗ ᓄ ᓇ ᑦ ᓯ ᐊ ᑉ ᒐ ᕙ ᒪ ᐃ ᑦ
ᐱ ᓕ ᕆ ᖃ ᑎ ᖃ ᖅ ᑯ ᓪ ᓗ ᒋ ᑦ ᐅ ᐊ ᑭ ᔫ ᒃ ᑯ ᑦ ᑲ ᑎ ᒪ ᔨ ᖏ ᓂ ᒃ ᓴ ᕿ ᑎ ᕆ ᓂ ᖅ ᒧ ᑦ ᑐ ᒃ ᑐ ᓄ ᑦ ᓇ ᓕ ᐊ ᖕ ᓄ ᑦ ᑐ ᕋ ᖕᖒ ᓂ ᒃ
ᐱ ᔾ ᔪ ᑎ ᖃ ᖅ ᑐ ᓂ ᒃ ᐋ ᕿ ᕆ ᐊ ᖅ ᑕ ᐅ ᓯ ᒪ ᔪ ᓂ ᒃ ᐊ ᐅ ᓚ ᑦ ᑎ ᓂ ᖅ ᒧ ᑦ ᑐ ᖕ ᖓ ᒃ ᓴ ᕆ ᔭ ᐅ ᓂ ᐊ ᖅ ᑐ ᓂ ᒃ ᑭ ᒡ ᓕ ᖃ ᖅ ᐃ ᐅ ᓂ ᖏ ᓂ ᒃ
ᓇ ᓗ ᓇ ᐃ ᒃ ᑯ ᑕ ᖃ ᐅ ᖅ ᓗ ᑎ ᒃ ᐊ ᐅ ᓚ ᑦ ᑎ ᓂ ᖅ ᒧ ᑦ ᖃ ᓄ ᐃ ᓕ ᐅ ᕈ ᑕ ᐅ ᔪ ᓐ ᓇ ᖅ ᓂ ᖏ ᓂ ᒃ ᐅ ᓂ ᒃ ᑳ ᖅ ᓯ ᒪ ᑦ ᑎ ᐊ ᖅ ᓗ ᑎ ᒃ .

October 4, 2019

Hon. Robert C. McLeod, Minister
Environment and Natural Resources
Government of the Northwest Territories
Box 1320
Yellowknife, NT X1A 2L9
Email: Robert_C_McLeod@gov.nt.ca

Via Email
Robert_C_McLeod@gov.nt.ca
georgemackenzie@tlicho.com

Grand Chief George Mackenzie
Tłı̨chǫ Government
Box 412
Behchokǫ̀, NT X1A 1Y0
Email: georgemackenzie@tlicho.com

Re: WRRB Reasons for Decision Final Report – Kǫ̀k'èetì ekwǫ̀ (Bathurst Caribou) Herd

Dear Minister McLeod & Grand Chief Mackenzie:

The Wek'èezhìı Renewable Resources Board (WRRB) is pleased to submit its Final Report, entitled *"Reasons for Decisions Related to a Joint Proposal for the Management of the Kǫ̀k'èetì ekwǫ̀ Bathurst Caribou) Herd"* to the Tłı̨chǫ Government (TG) and Department of Environment & Natural Resources (ENR), Government of Northwest Territories in response to the "*Joint Proposal on Management Actions for the Bathurst ʔekwǫ̀ (Barren-ground caribou) Herd 2019-2021*". The Reasons for Decision final report will be posted to the public registry: http://wrrb.ca/public-information/public-registry.

If you have any questions, please contact our office at (867) 873-5740 or jpellissey@wrrb.ca.

Sincerely,

Joseph Judas
Chair

Cc Dr. Joe Dragon, Deputy Minister, ENR-GNWT
Rita Mueller, Assistant Deputy Minister, Operations, ENR-GNWT
Bruno Croft, Superintendent, North Slave Region, ENR-GNWT
Laura Duncan, Tłı̨chǫ Executive Officer, TG
Tammy Steinwand-Deschambeault, Director, Culture and Lands Protection, TG
Michael Birlea, Manager, Culture and Lands Protection, TG

Reasons for Decisions Related to a Joint Proposal for the Management of the Kǫk'èetì Ekwǫ̀ (Bathurst Caribou) Herd

Wek'èezhìı Renewable Resources Board

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BCAC	Bathurst Caribou Advisory Committee
BGCTWG	Barren-ground Caribou Technical Working Group
CARC	Canadian Arctic Resources Committee
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
ENR	Environment & Natural Resources
GN	Government of Nunavut
GNWT	Government of the Northwest Territories
INAC	Indigenous and Northern Affairs Canada
LKDFN	Łutsel K’e Dene First Nation
MCBCCA	Mobile Core Bathurst Caribou Conservation Area
NWMB	Nunavut Wildlife Management Board
TAH	Total Allowable Harvest
TG	Tłı̨chǫ Government
TK	Tłı̨chǫ Knowledge; traditional knowledge
WRRB	Wek’èezhìı Renewable Resources Board

LIST OF TŁĮCHQ̨ TERMS

det'ǫcho	eagle
dìga	wolf
ʔekwǫ̀	barren-ground caribou
ʔįk'ǫǫ̀	spiritual power
Kǫk'èetì	Contwoyto Lake
Kǫk'èetì Ekwǫ̀	Bathurst caribou
Mǫwhì Gogha Dè Nįįtłèè	traditional area of the Tłįchǫ, described by Chief Monfwi during the signing of Treaty 11 in 1921
nǫ̀gha	wolverine
nǫʔokè	water crossings
sahcho	grizzly bear
Sahtì Ekwǫ̀	Bluenose-East caribou
tataa	corridors between bodies of water; land bridges
Wek'èezhìı	management area; within the boundaries of

1.0. Executive Summary

The Wek'èezhìı Renewable Resources Board (WRRB) is responsible for wildlife management in Wek'èezhìı and shares responsibility for managing and monitoring the *Kǫ̀k'èetì ekwǫ̀* (Bathurst caribou) herd. In November 2018, the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) reported that, in their view, the Kǫ̀k'èetì ekwǫ̀ herd had continued to decline significantly and that further management actions were required.

In January 2019, the Tłı̨chǫ Government (TG) and GNWT submitted the *Joint Proposal on Management Actions for the Bathurst Ɂekwǫ̀ (Barren-ground caribou) Herd 2019-2021* to the Board, outlining proposed management actions for the Kǫ̀k'èetì ekwǫ̀ herd in Wek'èezhìı. The management actions proposed by TG and GNWT in the Joint Proposal were grouped under the five categories: harvest, predators, habitat and land use, and education as well as research and monitoring. More specifically, TG and ENR proposed continuing a herd-wide total allowable harvest of zero for the Kǫ̀k'èetì ekwǫ̀ herd. Following an initial assessment of the management proposal, the Board determined that a Level 2 review was appropriate, as per its Rule for Management Proposals. Therefore, the Board established a proceeding and an online public registry on February 4, 2019.

The WRRB concluded, based on current evidence and its decision made in 2016, that a serious conservation concern continues to exist for the Kǫ̀k'èetì ekwǫ̀ herd and that additional management actions are vital for herd recovery. In making its decision about harvest limitations, the WRRB considered the risks to the herd from a recent high rate of decline, uncertainties about the underlying mechanisms for the decline and the importance of *Ɂekwǫ̀* (barren-ground caribou) for Tłı̨chǫ citizens to thrive – physically, spiritually, and culturally.

The WRRB determined that a TAH of zero shall be continued for all users of the Kǫ̀k'èetì ekwǫ̀ herd within Wek'èezhìı for the 2019/20 and 2020/21 harvest seasons.

As the Mobile Core Bathurst Caribou Conservation Area (MCBCCA) continues to be utilized to implement the zero TAH, the WRRB recommended that the effectiveness of the zone in achieving Kǫ̀k'èetì ekwǫ̀ conservation goals be quantitatively assessed while considering both overlap with adjacent herds and inadvertent harvesting. As monitoring of the Kǫ̀k'èetì ekwǫ̀ harvest is crucial for management decisions, the Board recommended that TG hire additional community monitors.

The 2018 calving ground survey report made it clear that emigration has become a significant factor contributing to the decline of the Kǫ̀k'èetì ekwǫ̀ herd. This information is new and adds a deeper level of uncertainty to the future of the herd. The WRRB recommended that TG and GNWT provide a plain language description of their positions regarding the implication of emigration on Kǫ̀k'èetì ekwǫ̀, and how it will influence adaptive management of the herd.

To improve our understanding of the role of predators on the decline of the Kǫ̀k'èetì ekwǫ̀ herd, the WRRB recommended that TG and GNWT provide the WRRB with information on the sighting rates of predator and the criteria to be used in determining the targeted number of predators to be removed annually. Additionally, the WRRB is to be provided with the criteria for *Dìga* (wolf) removal based on (i) dìga sightings during Kǫk'èetì ekwǫ̀ composition surveys and (ii) likely exposure of Kǫk'èetì ekwǫ̀ to dìga associated with neighbouring herds during the winter season.

The *Enhanced North Slave Dìga Harvest Incentive Program* is being used as a method of dìga removal on the winter range of Kǫ̀k'èetì and *Sahtì ekwǫ̀* (Bluenose-East caribou). To ensure that this program is contributing to conservation efforts of Kǫ̀k'èetì ekwǫ̀, the Board recommended that the location and number of dìga harvested are provided to the Board each year and that criteria are developed to measure the effectiveness of the program, based on scientific and traditional knowledge.

TG runs a *Community-based Harvest Training Program* and the WRRB recommended that the location and number of dìga harvested be provided to the Board as well as an assessment of how the training will contribute to future dìga harvesting and management. Additionally, the Board recommended that TG and GNWT coordinate the *Enhanced North Slave Dìga Harvest Incentive Program* and the *Community-based Dìga Harvest Training Program* to determine their role in removing the targeted number of dìga.

The WRRB is currently working on a *Sahcho* (grizzly bear) biological and management feasibility assessment. In order to improve efficiencies, the Board recommended that *Nǫ̀gha* (wolverine) be included in this assessment.

The WRRB acknowledged that the range of the Kǫ̀k'èetì and Sahtì ekwǫ̀ extends beyond Wek'èezhìı and the Northwest Territories. However, there has been a lack of progress on the joint management of predators and land management across territorial borders. As such, the Board recommended that GNWT and TG develop a draft agreement and timelines to jointly manage the Kǫ̀k'èetì and Sahtì ekwǫ̀ in cooperation with other co-managers.

Tłı̨chǫ community members as well the general public should be made aware of the status of the ʔekwǫ̀ and should be made aware about efforts being made to halt their decline. The WRRB recommended that the successes and challenges of TG's ekwǫ̀ Nàxoède K'è program be communicated to the Tłı̨chǫ communities and schools.

The decline of Kǫ̀k'èetì ekwǫ̀ affects the well-being of Tłı̨chǫ citizens and the Board recommended that TG and GNWT discuss priorities and solutions for food security. The Board also recommends that TG and GNWT exchange information about ʔekwǫ̀ regarding the reasons for the declines and the factors which continue to affect the declines.

Time is now of the essence for the management of Kǫ̀k'èetì ekwǫ̀ and the Board supported the increase of population surveys to every two years but notes that efforts should be made to have them occur concurrently with neighbouring Sahtì ekwǫ̀ and Beverly/Ahiak herds. The Board also supported the implementation of a pregnancy monitoring program utilizing fecal pellet collection.

The Board recommended the Tłı̨chǫ Research and Monitoring Program be implemented to ensure that both ʔekwǫ̀ and ʔekwǫ̀ habitat monitoring and realistic harvesting numbers are recorded in a culturally appropriate manner while feeding into adaptive management. The Board recommended that the Ekwǫ̀ Nàxoède K'è collect on-the-ground climate change observations to be incorporated into an adaptive management framework.

The Board recommended that TG and GNWT collaborate with the WRRB to develop a herd-specific adaptive management framework with thresholds linked to specific management actions.

2.0. Introduction

By 2018, the Kǫk'èetì ekwǫ̀ herd was at its lowest recorded size, with GNWT and TG stating that *"the current small and declining number of mature caribou in the Bathurst herd is a critical conservation status"*.[1] The herd has declined from approximately 472,000 in 1986 to about 8,200 in 2018, based on the latest calving ground survey in June 2018 (Figure 1). This is an unprecedented decline in herd size, approximately 98% over the last 32 years. While the small herd size is startling, the Board is more alarmed by the accelerated rate of decline of 29% per year since 2015 and what the future holds for the Kǫk'èetì ekwǫ̀ herd.

[1] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

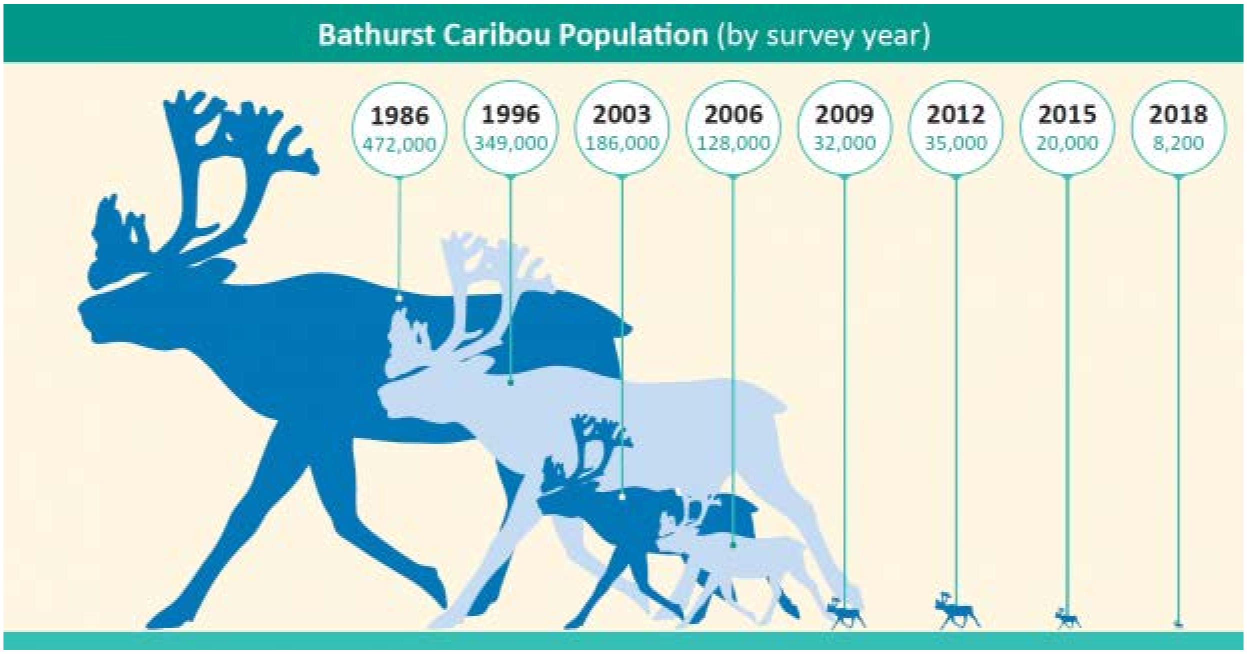


Figure 1. Bathurst Caribou Population (by survey year).[2]

Despite best efforts to halt it, the decline of the Kǫk'èetì ekwǫ̀ herd has continued. The herd rapidly declined from 2006-2009 and the WRRB made the difficult decision to severely restrict harvests in 2010. The decision seemed to be justified when the herd's numbers stabilized between 2009 and 2012.[3] Unfortunately, the decline again accelerated and, in 2016, the WRRB determined that the total allowable harvest (TAH) should be zero, which caused distress and hardship for harvesters. Despite halting harvest, the decline in the Kǫk'èetì ekwǫ̀ herd continued, which indicated that harvesting was not the only cause of low adult ʔekwǫ̀ survival. As such, the WRRB, in 2016, made recommendations to increase ʔekwǫ̀ survival and offset natural hardships for ʔekwǫ̀ by increasing dìga harvesting, conducting a feasibility assessment for dìga management, and supporting habitat conservation and monitoring.

In 2019, the Board received evidence that the causes of the decline are now more complicated as some collared cows moved to the neighboring Beverly/Ahiak herd's calving ground in 2018 and 2019, which has added emigration as a cause of the decline in Kǫk'èetì ekwǫ̀ herd size.

The reduced herd size and extent of the decline, as of June 2018, is reported in the 2019 Joint Proposal, entitled *"Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021"* (the "Joint Proposal") (Appendix A).[4]

[2] https://www.enr.gov.nt.ca/en/services/caribou-de-la-toundra/bathurst-herd.
[3] Ibid.
[4] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

TG and GNWT submitted the Joint Proposal on January 22, 2019. Since the Board was not required to consider a change in harvest restrictions, i.e. the TAH remained at zero, the WRRB undertook a Level 2 management proposal review, as per its Rule for Management Proposals.[5] The Board implemented review procedures, which included an open public comment period from February 4 to April 5, 2019.

The short-term goal of the 2019 Joint Proposal's proposed management actions is to halt the Kǫk'èetì ekwǫ̀ herd's decline and promote recovery over the period of 2019 to 2021. The long-term goal of the Joint Proposal is recovery of the herd to a level which meets community needs and where sustainable harvesting is once again possible within Mǫwhì Gogha Dè Nı̨ıtłèè.

The Joint Proposal is clear that the Kǫk'èetì ekwǫ̀ herd is in *"a critical conservation status that requires implementation of an integrated suite of recovery management actions"*.[6] Despite these goals, the Joint Proposal also states that the proposed specific management actions will not halt the decline.[7] This puts the herd in a fragile and perilous position.

This report describes the WRRB's assessment of the evidence on the record and is the basis for the Board's determinations and recommendations.

3.0. The Board and Its Authorities

3.1. WRRB Mandate & Authorities

The WRRB is responsible for the wildlife management functions set out in the Tłı̨chǫ Agreement in Wek'èezhìı [8] and shares responsibility for the management and monitoring of the Kǫk'èetì ekwǫ̀ herd. The WRRB is a co-management tribunal established by the Tłı̨chǫ Agreement to exercise advisory and decision-making responsibilities related to wildlife, forest, plant and protected areas management in Wek'èezhìı (Figure 2). The Board's legal authorities came into effect at the time the Tłı̨chǫ Agreement was ratified by Parliament.[9] Section 12.1.5 of the Agreement requires the Parties[10] to manage wildlife based on the principles of conservation, on an

[5] https://www.wrrb.ca/sites/default/files/REV%20FINAL%20Rule%20-%20Management%20Proposals%20-%2016oct18.pdf.
[6] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[7] Ibid.
[8] Section 12.1.2 of the Land Claims and Self-Government Agreement Among the Tłı̨chǫ and the Government of the Northwest Territories and the Government of Canada, Indian Affairs and Northern Development, Ottawa, 2003 (hereinafter the "Tłı̨chǫ Agreement").
[9] Tłı̨chǫ *Land Claims and Self-Government Act*, S.C. 2005, c.1. Royal assent February 15, 2005. See s.12.1.2 of the Tłı̨chǫ Agreement.
[10] This includes the Tłı̨chǫ Government, the Government of the Northwest Territories and the Government of Canada.

ecosystemic basis and in an adaptive fashion.[11] The WRRB's major authorities and responsibilities in relation to wildlife are further set out in Chapter 12 of the Tłı̨chǫ Agreement.[12]

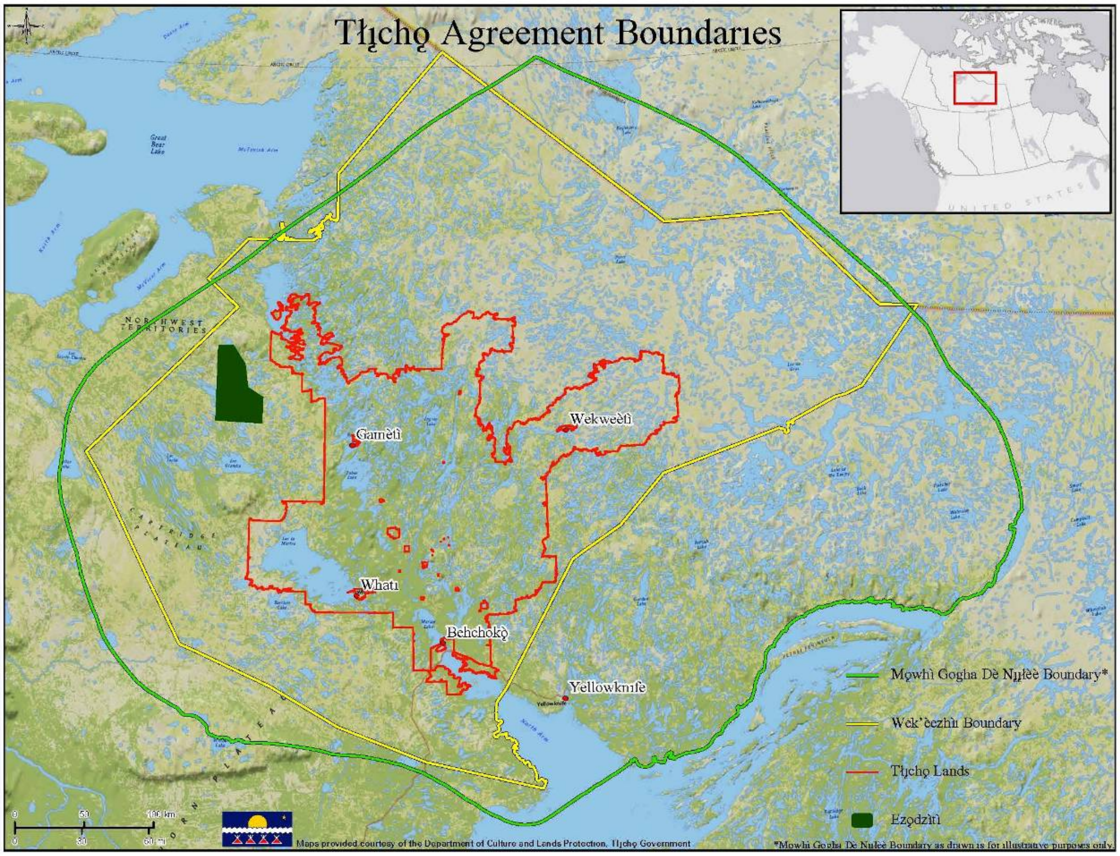


Figure 2. Wek'èezhìı Management Area.[13]

As required by Sections 12.5.1 and 12.5.4 of the Tłı̨chǫ Agreement, any Party[14] proposing a wildlife management action in Wek'èezhìı must submit a management proposal to the WRRB for review. This includes the establishment or adjustment of a TAH. Prior to making a recommendation, the WRRB must consult with any body that has authority over that wildlife species both inside and outside of Wek'èezhìı. Under Section 12.5.5 of the Agreement, the WRRB has sole responsibility for making a final determination with respect to a TAH for Wek'èezhìı.

[11] See Section 12.1.5 paragraphs (a) and (d) of the Tłı̨chǫ Agreement.
[12] See Section 12 of the Tłı̨chǫ Agreement.
[13] Department of Culture & Lands Protection, Tłı̨chǫ Government. 2014.
[14] As defined in the Tłı̨chǫ Agreement, "Parties" mean the Parties to the Agreement, namely the Tłı̨chǫ, as represented by the Tłı̨chǫ Government, the Government of the Northwest Territories and the Government of Canada.

The WRRB acts in the public interest. It is an institution of public government, which makes its decisions on the basis of consensus. Part 12.1 of the Tłı̨chǫ Agreement requires the coordination of the functions of governments (authorities whose responsibilities include wildlife management among other functions).[15] The WRRB works closely with Tłı̨chǫ communities, TG, and GNWT. The Board also collaborates with other territorial government departments, such as Lands and Industry, Tourism and Investment, and federal government departments, such as Environment and Climate Change Canada, Fisheries and Oceans Canada, and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). In addition, the WRRB works with other wildlife management authorities, Indigenous organizations and stakeholders.

Wildlife management is a central and vital component of the Tłı̨chǫ Agreement.[16] The rights of Tłı̨chǫ citizens to use wildlife for sustenance, cultural, and spiritual purposes are protected by the Tłı̨chǫ Agreement and the Constitution[17], subject to the management framework set out in Chapter 12.

The WRRB is bound by the Tłı̨chǫ Agreement if it is contemplating any limitation to Tłı̨chǫ citizens' harvesting, including any limitation to the harvesting of Kǫk'èetì ekwǫ̀. More specifically, Section 12.6.1 specifies that a TAH level shall be determined for conservation purposes only and only to the extent required for such purposes.[18] The Tłı̨chǫ Agreement defines conservation as follows:

> *"conservation" means*
>
> > *(a) the maintenance of the integrity of ecosystems by measures such as the protection and reclamation of wildlife habitat and, where necessary, restoration of wildlife habitat; and*
> >
> > *(b) the maintenance of vital, healthy wildlife populations capable of sustaining harvesting under the Agreement.*

In addition to the substantive legal protection for Tłı̨chǫ citizens' harvesting rights set out in the Tłı̨chǫ Agreement, the WRRB is also bound by the requirements of fairness. Section 12.3.10 gives the Board the authority to order a public hearing on a wildlife management proposal and makes it mandatory for the WRRB to hold a public hearing when it intends to consider establishing a TAH in respect of a species or a population such as the Kǫk'èetì ekwǫ̀ herd.

[15] See Section.12.1.4 of the Tłı̨chǫ Agreement.
[16] See Section.12.1.1 of the Tłı̨chǫ Agreement.
[17] *Constitution Act.* 1982. Section 35.
[18] See Section 12.6.1 of the Tłı̨chǫ Agreement.

3.2. Rule for Management Proposals

Under Section 12.3.6, the WRRB has the authority to make rules respecting the procedure for making applications to the Board. The WRRB has developed a Rule for Management Proposals[19] as a guide for making management proposal submissions, including actions taken in the issuance of licences, permits and other authorizations.

Section 12.5.1 of the Tłı̨chǫ Agreement is mandatory. Except in an emergency situation as set out in 12.5.14, it requires that a Party, before taking "*any action for management of wildlife in Wek'èezhìı submit its proposals to the WRRB for review under 12.5.4*". This section of the Agreement is intended to be broadly inclusive of wildlife management initiatives.

The WRRB, depending on the nature, content and context of a management proposal, will undertake one of three levels of review:

- Level 1 – will require Board or Board Staff (as directed by the Board) review but no public consultation;
- Level 2 – will require Board review and Board-led public consultation (no public hearing); or,
- Level 3 – will required Board review and Board-led public consultation with a public hearing.

Except where in the Board's view the proposal will require the establishment of a TAH as stated in Section 12.3.10 of the Tłı̨chǫ Agreement, all submissions are treated initially as a Level 1 review. Following assessment, the Board has the discretion to increase the level of review as it deems appropriate. For Level 2 management proposals, the Board may establish a proceeding and an online public registry. Notification of the proceeding and a request for comments will be made via its website, newspaper, social media and radio advertisements with a reasonable period granted to allow affected stakeholders and the public to provide comment.

Following closure of the public comment period, the WRRB reviews and provides recommendations. Level 2 management proposals may require up to 90 days for consultation, review and response. As per Section 12.5.8 of the Tłı̨chǫ Agreement, the Board *"shall give public notice of their recommendations"* by posting them on their website (www.wrrb.ca).

[19] https://www.wrrb.ca/sites/default/files/REV%20FINAL%20Rule%20-%20Management%20Proposals%20-%2016oct18.pdf.

WRRB determinations are final but recommendations made by the Board may be accepted, rejected or varied by the Party with the jurisdiction affected by the recommendation. However, once a recommendation is accepted, that Party doing so must implement it *"to the extent of its power under legislation"*.[20] This framework and these relationships are central to effective wildlife management in Wek'èezhìı.

Following submission of its recommendations to a Party, the Board expects a response within 42 days of receipt of its recommendations for a Level 1 or Level 2 management proposal. Section 12.5.11 of the Tłı̨chǫ Agreement states that *"each Party with power under its laws to implement a recommendation of the WRRB made under 12.5.5, 12.5.6, 12.5.7, 13.4.1 or 14.4.1 shall accept, reject or vary such recommendation"*. A Party must tell the Board whether its recommendation has been accepted. If a recommendation is varied, the Party must provide reasons for that decision, and, in addition, provide the change in wording so that the Board and all affected persons are clear about the final outcomes of the Board proceeding and necessary implementation actions. This ensures clarity with respect to the obligations under Section 12.5.12 of the Tłı̨chǫ Agreement, that *"each Party shall, to the extent of its power under legislation or Tłı̨chǫ laws, establish or otherwise implement a) a determination of the WRRB under 12.5.5 or 12.5.6; and b) any recommendation of the Board as accepted or varied by it".*

If a recommendation is rejected, the Party must provide specific reasons and an explanation of why the rejection has occurred.

4.0. Previous WRRB Ɂekwǫ̀ Determinations & Recommendations

The objective of Chapter 12, Wildlife Harvesting Management, of the *Tłı̨chǫ Agreement* is to recognize the importance of wildlife and its habitat to the Tłı̨chǫ First nation well-being, way of life and land-based economy.[21] The WRRB takes this objective seriously while making its decisions. The Board also acknowledges the tremendous importance that Kǫ̀k'èetì ekwǫ̀ play in the language, culture, and way of life of the Tłı̨chǫ people. The Board has kept this in mind over the last 14 years, since receiving the first management proposal for Kǫ̀k'èetì ekwǫ̀, by making determinations and recommendations using scientific and Tłı̨chǫ knowledge. Outlined below are the Board's determinations and recommendations from the 2007, 2010, and 2016 proceedings to demonstrate the effort the WRRB has put in to halt the decline of Kǫ̀k'èetì ekwǫ̀.

[20] See Sections 12.5.11 and 12.5.12 of the Tłı̨chǫ Agreement.
[21] See Section 12.1.1 of the Tłı̨chǫ Agreement.

4.1. 2007 Proceeding

In June 2006, GNWT conducted a calving ground photographic survey and estimated the Kǫ̀k'èetì ekwǫ̀ herd size was about 128,047 ɂekwǫ̀. The WRRB became fully operational in August 2006 and received its first management proposal, entitled *"Bathurst Caribou Herd Harvest Reductions"* from the GNWT on December 14, 2006 to reduce Kǫ̀k'èetì ekwǫ̀ herd harvest levels. The proposed management actions, based on the 2006 calving ground photographic survey results, were intended to limit the harvest to 4% of the 2006 estimated herd size for a total of 5120 Kǫ̀k'èetì ekwǫ̀. This included eliminating all commercial meat tags held by Tłı̨chǫ communities, reducing the number of tags for non-resident and non-resident alien hunters from 2 to 1, and reducing tags for all outfitters from 1559 to a total of 350.

Due to the significance of the management actions proposed, and the fact that the WRRB, as a new organization, had not yet heard from other Parties affected by the Department of Environment and Natural Resources (ENR), GNWT proposal, the Board decided to conduct a public hearing in March 2007 before making any decisions on the proposal. The WRRB held the public hearing on March 13-14, 2007 in Behchokǫ̀, NT. Once the evidentiary phase of the proceeding was completed, the Board decided to adjourn the proceeding in order to give ENR and the Tłı̨chǫ Government time to initiate a consultation process.

On April 17, 2007, the Minister of ENR advised the Tłı̨chǫ Government and the WRRB that the Big Game Hunting Regulations had been amended to reduce the number of tags available for outfitted hunts for ɂekwǫ̀ in Unit "R" to 750 for the 2007 season. The letter noted that this decision was made under the authority of Section 12.5.14 of the Tłı̨chǫ Agreement as ENR considered its action necessary due to an emergency situation regarding declining populations of the ɂekwǫ̀.

On May 30, 2007 and June 4, 2007 respectively, the Tłı̨chǫ Government and ENR submitted letters to the Board indicating that they were making substantial progress but required an extension to September 28, 2007 in order to develop a new joint ɂekwǫ̀ management proposal. The WRRB was concerned that any further adjournments could adversely affect the interests of other Parties affected by the proposal. ENR had already taken steps to implement portions of its proposal on the grounds that an emergency situation existed. Further extension of the proceeding to accommodate consultation which, in the Board's view should have taken place before the proposal was advanced, seemed inconsistent with the urgency asserted by ENR. For these reasons, the WRRB decided not to grant a further adjournment of its proceeding.

Based on the WRRB's review of the evidence presented during the proceedings, the Board recommended that ENR's proposal to undertake management actions to reduce the harvest of the Bathurst ʔekwǫ̀ herd not be implemented as submitted. The WRRB strongly encouraged ENR and the Tłı̨chǫ Government to continue their consultations towards the development of a Joint Proposal for the management of the Bathurst ʔekwǫ̀ herd. Additionally, the WRRB indicated that any future management actions that propose to limit any component of the harvest to a particular number, including zero, would be treated as a proposal for the establishment of a TAH.

Additional details of the 2007 proceeding can be found in Appendix B.

4.2. 2010 Proceeding

In June 2009, GNWT conducted a calving ground photographic survey and estimated the Kǫ̀k'èetì ekwǫ̀ herd size was about 31,900 ʔekwǫ̀. On November 5, 2009, TG and GNWT submitted a *Joint Proposal on Caribou Management Actions in Wek'èezhìı*, which proposed nine management actions and eleven monitoring actions, including harvest limitations, for the Kǫ̀k'èetì, Sahtì and Beverly/Ahiak ekwǫ̀ herds. While TG and GNWT agreed on the majority of actions set out in the proposal, there was no agreement reached on the proposed levels of Indigenous harvesting.

Upon review of the proposal, the WRRB held that any restriction of harvest or component of harvest to a specific number of animals would constitute a TAH. Thus, the Board ruled that it was required to hold a public hearing. Registered Parties were notified on November 30, 2009 of the Board's decision to limit the scope of the public hearing to Actions 1 through 5 of the Joint Proposal, which prescribed limitations on harvesting. All other proposed actions were addressed through written submissions to the Board. Originally scheduled for January 11-13, 2010, the public hearing on Action 1 to 5 took place March 22-26, 2010 in Behchokǫ̀, NT. Once the evidentiary phase of the proceeding was completed, TG requested the WRRB adjourn the hearing in order to give TG and GNWT time to work collaboratively to complete the joint management proposal.

On May 31, 2010, TG and GNWT submitted the *Revised Joint Proposal on Caribou Management Actions in Wek'èezhìı*. This revised proposal changed the original management and monitoring actions and incorporated an adaptive co-management framework and rules-based approach to harvesting levels. TG and GNWT were able to reach an agreement on Indigenous harvesting. Therefore, the WRRB reconvened its public hearing on August 5-6, 2010 in Behchokǫ̀, NT, where final presentations, questions and closing arguments were made.

On October 8, 2010, the WRRB submitted its final recommendations and reasons for decision report to TG and GNWT.[22] Many of the recommendations were related to the Kǫ̀k'èetì ekwǫ̀ herd and relevant management actions vital for herd recovery, including harvest restrictions. The Board also made harvest recommendations for the Sahtì ekwǫ̀ and Beverly/Ahiak ekwǫ̀ herds.

The Board recommended a harvest target of 300 (± 10%) Kǫ̀k'èetì ekwǫ̀ per year for harvest seasons 2010/11, 2011/12, and 2012/13 in Wek'èezhìı. Further, the Board recommended that the ratio of bulls harvested to cows should be 85:15. Although the evidence suggested that even if all harvest of the Kǫ̀k'èetì ekwǫ̀ herd stopped there was no guarantee that the herd would stabilize and begin to grow, the Board concluded that a limited harvest of 270-330 Kǫ̀k'èetì ekwǫ̀ with 60 or fewer cows was an appropriate management option to help Indigenous peoples maintain important cultural linkages with ʔekwǫ̀ while minimizing the impact of harvest on the herd. Additionally, the WRRB recommended that all commercial, outfitted and resident harvesting of the Sahtì ekwǫ̀ herd in Wek'èezhìı be set to zero.

The WRRB made additional ʔekwǫ̀ management and monitoring recommendations to TG and GNWT, specifically implementation of detailed scientific and Tłı̨chǫ knowledge (TK) monitoring actions and implementation of an adaptive co-management framework.

The WRRB also recommended to the Minister of CIRNAC (formerly Indian and Northern Affairs Canada) and GNWT to collaboratively develop best practices for mitigating effects on ʔekwǫ̀ during calving and post-calving, including the consideration of implementing mobile ʔekwǫ̀ protection measures, and for monitoring landscape changes, including fires, industrial exploration, and development, to assess potential impacts to ʔekwǫ̀ habitat.

The Board recommended that the harvest of dìga should be increased through incentives but that focused dìga control not be implemented. The Board understood if TG and GNWT were to plan for focused dìga control in the future, a management proposal would be required for WRRB consideration.

Of the 57 recommendations made in 2010 and accepted or varied by TG and GNWT, the Board has evidence that only 18 have been fully implemented. Specifically, the closure of commercial, outfitted and resident harvesting for the Kǫ̀k'èetì, Sahtì and Beverly/Ahiak ʔekwǫ̀ herds; the establishment and allocation of a harvest target for the Kǫ̀k'èetì ekwǫ̀ herd; the implementation of monitoring the density of cows on the calving grounds; the development and implementation of a scientific conservation education program; the establishment of the Barren-ground Caribou Technical Working Group

[22] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.

(BGCTWG); the ongoing discussions with the Government of Nunavut (GN) to identify opportunities for calving ground protection; the collaborative work to meet the obligations of Section 12.11 of the Tłı̨chǫ Agreement; the hiring of a TG Wildlife Coordinator to increase capacity to ensure full participation in monitoring and management of ɂekwǫ̀; the removal of GNWT's Emergency Interim Measures following the implementation of recommendations by January 1, 2011; the consultation with Tłı̨chǫ communities about Board recommendations prior to January 1, 2011; the development of a detailed implementation and consultation plan; and the development and implementation of an effective enforcement and compliance program.

Implementation of the remaining accepted recommendations appears to the WRRB to be incomplete, including the development of a government position regarding reinstatement of outfitting and resident harvesting in Wek'èezhìı; the negotiation of harvesting overlap agreements with the Sahtú and Nunavut; the implementation of the *Special Project, Using Tłı̨chǫ Knowledge to Monitor Barren Ground Caribou* of the overall Tłı̨chǫ Research and Monitoring Program; the implementation of TK and scientific ɂekwǫ̀ monitoring actions; the development of criteria to evaluate when management actions are to be revised; and the development of a land use plan for Wek'èezhìı.

Additional details of the 2010 proceeding can be found in Appendix C and a review of the 2010 WRRB Recommendations is found in Appendix D.

4.3. 2016 Proceeding

In June 2015, GNWT conducted a calving ground photographic survey and estimated the Kǫ̀k'èetì ekwǫ̀ herd had declined to 19,769 ɂekwǫ̀. In December 2015, TG and GNWT submitted the *Joint Proposal on Caribou Management Actions for the Bathurst Herd: 2016-2019* to the Board outlining proposed management actions for the Kǫ̀k'èetì ekwǫ̀ herd in Wek'èezhìı, including new restrictions on hunter harvest, predator management, and ongoing monitoring. More specifically, TG and GNWT proposed implementing a herd wide TAH of zero ɂekwǫ̀ and conducting a feasibility assessment of a full range of dìga management actions. The WRRB considered the proposed restriction of harvest as the establishment of a TAH and, therefore, was required to hold a public hearing. The public hearing took place February 23-24, in Yellowknife, NT.

In order to allow careful consideration of all the evidence on the record and to meet deadlines for legislation to implement a Board decision, the WRRB decided to prepare two separate reports to respond to the proposed management actions in the joint management proposal. The first report, Part A, dealt with the proposed harvest management actions that required regulation changes in order for new regulations to be in place for the start of the 2016/17 harvest season, as well as the proposed dìga feasibility assessment. The second report, Part B, dealt with additional predator management actions, biological and environmental monitoring, and cumulative effects.

On May 26, 2016, the WRRB submitted its final determinations and recommendations and Part A Reasons for Decision Report to TG and GNWT.[23] The WRRB determined that a TAH of zero ʔekwǫ̀ should be implemented for all users of the Kǫ̀k'èetì ekwǫ̀ herd within Wek'èezhìı for the 2016/17, 2017/18, 2018/19 harvest seasons.

The Board recommended that TG and GNWT agree on an approach for designating zones for aerial and ground-based surveillance throughout the fall and winter harvest seasons from 2016 to 2019. Additionally, the WRRB recommended weekly communication updates and timely implementation of hunter education programs for all harvesters of the Kǫ̀k'èetì ekwǫ̀ herd.

The WRRB recommended that the dìga feasibility assessment set out in the proposal be led by the Board with input and support from TG and GNWT. The Board continued to support the implementation of the Community-based Dìga Harvesting Project as a training program, subject to several conditions

On September 27, 2016, the WRRB submitted its final recommendations and Part B Reasons for Decision Report to TG and GNWT.[24] The WRRB recommended consultations with Tłı̨chǫ communities to determine a path forward for implementation of Tłı̨chǫ laws to continue the Tłı̨chǫ way of life and maintain their cultural and spiritual connection with ʔekwǫ̀.

In addition, the WRRB recommended several TK research and monitoring programs focusing on dìga, *Sahcho* (grizzly bear), stress and other impacts on ʔekwǫ̀ from collars and aircraft over-flights, and an assessment of quality and quantity of both summer and winter forage.

The Board recommended a biological assessment of sahcho as well as requesting that the BGCTWG prioritize biological monitoring indicators and develop thresholds under which management actions can be taken and evaluated. All scientific and TK monitoring data will be provided to BGCTWG annually to ensure ongoing adaptive management.

The WRRB recommended the implementation of Tłı̨chǫ Land Use Plan Directives as well as completing a Land Use Plan for the remainder of Wek'èezhìı. In addition, the completion of the Bathurst Caribou Range Plan and the long-term Bathurst Caribou

[23] PR (BATH 2019): 040 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A.
[24] PR (BATH 2019): 041 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.

Management Plan were requested with measures to be implemented in the interim to provide guidance to users and managers of the Kǫ̀k'èetì ekwǫ̀ herd range.

The Board also recommended the development of criteria to protect key ʔekwǫ̀ habitat, including *Nǫʔokè* (water crossings) and *Tataa* (corridors between bodies of water), using the Conservation Area approach in the NWT's *Wildlife Act*, offsets and value-at risks in a fire management plan. Additionally, the WRRB recommended the continued refinement of the Inventory of Landscape Change, the integration of Wildlife and Wildlife Habitat Protection Plans and Wildlife Effects Monitoring Programs objectives for monitoring the effects of development on ʔekwǫ̀ in Wek'èezhìı, and the development of monitoring thresholds for climate indicators

Of the one determination made by the Board and 25 recommendations accepted or varied by TG and GNWT, only the determination and seven recommendations have been fully implemented. Specifically, the establishment of a zero harvest for the Kǫ̀k'èetì ekwǫ̀ herd; the establishment and implementation of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA); the regular provision of updates on aerial and ground-based compliance surveillance of the Kǫ̀k'èetì ekwǫ̀ herd; the implementation of the GNWT's Hunter Education Program; the completion of a collaborative feasibility assessment of options for dìga management; the completion of the Bathurst Caribou Range Plan (BCRP); the update and refinement of the Inventory of Landscape Change; and, the completion and implementation of the Wildlife Management and Monitoring Plan guidelines.

The remaining accepted recommendations appear to the Board to be incomplete, including providing regular harvest updates; conducting TK research on sahcho predation on ʔekwǫ̀, and their relationship with ʔekwǫ̀, other wildlife and people; conducting a collaborative sahcho biological assessment; conducting TK research about stress and impacts on ʔekwǫ̀ and people related to collars and aircraft over-flights; prioritizing biological monitoring indicators in order of need for effective management and developing thresholds under which management actions can be taken and evaluated; developing a land use plan for Wek'èezhìı; investigating the potential use of offsets for ʔekwǫ̀ recovery; conducting a TK monitoring project with elders to document how climate conditions have affected preferred summer forage and impacted ʔekwǫ́ fitness; and developing monitoring thresholds for climate indicators.

Additional details of the 2016 proceeding can be found in Appendix E and a review of the 2010 WRRB Recommendations are in Appendix F.

5.0. Summary of 2019 Wildlife Management Proposal and Board Process

On January 22, 2019, the TG and GNWT submitted the *"Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021"* to the Board outlining proposed management actions for the Kǫk'èetì ekwǫ̀ herd in Wek'èezhìı.[25] The management actions proposed by TG and GNWT in the Joint Proposal were grouped under the five categories: harvest, predators, habitat and land use, and education as well as research and monitoring.

More specifically, TG and GNWT proposed the following:

- Harvest: maintaining a TAH of zero (0) for Kǫk'èetì ekwǫ̀; continuing use of the MCBCCA; continuing regular aerial and ground-based surveillance of the MCBCCA through the fall and winter seasons; maintaining frequent contact with Government of Nunavut regarding harvest of Kǫ̀k'èetì ekwǫ̀ in Nunavut;
- Predators: submitting a separate TG-GNWT joint management proposal on reduction of *dìga* numbers on the Sahtì and Kǫ̀k'èetì ekwǫ̀ herd ranges; increasing incentives for dìga harvesters in an area centered on the collar locations of wintering Kǫ̀k'èetì ekwǫ̀; continuing to develop a program to train dìga harvesters using culturally acceptable methods on the winter range; collaborating with GN about predator management;
- Habitat & Land Use: finalizing, endorsing and implementing the Bathurst Caribou Range Plan (BCRP) by 2019; supporting Indigenous governments and organizations to conduct additional work to identify key landscape features and areas of significance to ɂekwǫ̀ in order to better conserve and manage ɂekwǫ̀ habitats;
- Education: increasing education and public awareness to improve knowledge of ɂekwǫ̀, promoting respectful hunting practices to reduce wastage and wounding; expanding TG on-the-land programs focused on continued use and maintenance of traditional sites and trails; and,
- Research & Monitoring: increasing biological monitoring of the Kǫ̀k'èetì ekwǫ̀ herd, including conducting population surveys carried out at two-year intervals, increasing radio collars to 70, suspending June calving reconnaissance surveys in years between photo survey years, conducting annual composition surveys in June, October and March/April to assess productivity and mortality rates; continuing accurate harvest reporting and improving body condition assessment of harvested ɂekwǫ̀; supporting the expansion of the Tłı̨chǫ Ekwǫ̀ Nàxoède K'è (formerly the Boots on the Ground) program; supporting continued research into factors contributing to ɂekwǫ̀ declines.

---

[25] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

The Board initiated its 2019 Bathurst Caribou Herd Proceeding on January 30, 2019 and established an online public registry: http://www.wrrb.ca/public-information/public-registry. On February 4, 2019, public notice of the WRRB decision to open a proceeding for the Kǫk'èetì ekwǫ̀ herd was provided to potentially interested organizations in and out of Wek'èezhìı via email, WRRB website, social media and radio. The WRRB requested parties to provide written comments on the Joint Management Proposal by March 15, 2019.

The Board received a letter from the Minister of ENR on February 26, 2019, which requested parties on the distribution list to provide written comments on the Joint Management Proposal by April 5, 2019. As such, on March 4, 2019, the WRRB gave notice of its revised proceeding schedule, extending its public comment period to April 5, 2019. The Board received public comment from Canadian Arctic Resources Committee (CARC) on January 29, 2019, Alternatives North on February 27, 2019 and the Łutsel K'e Dene First Nation (LKDFN) on April 5, 2019.

On March 14, 2019, a letter was sent to the Nunavut Wildlife Management Board (NWMB) informing them of the WRRB's Kǫ̀k'èetì ekwǫ̀ proceeding. Sine the Kǫ̀k'èetì ekwǫ̀ herd is a migratory species that moves between the Northwest Territories and Nunavut, the WRRB is requested that the NWMB identify whether further consultation by the Board was required prior to a final decision on TG and GNWT's joint management proposal. Additionally, the NWMB was requested to update the WRRB on any processes related to the Kǫ̀k'èetì ekwǫ̀ herd that were underway in Nunavut. To date, no response has been received.

The proceeding was conducted in accordance with the WRRB's *Rules of Procedure, June 14, 2017*.[26] The Board requested that GNWT provide a compilation of any comments received through its consultations by April 10, 2019. The GNWT confirmed that no comments were received in response to their consultation letter on April 12, 2019. As such, the public record was closed on April 12, 2019.

Throughout the proceeding, GNWT assured the WRRB that submission of the 2018 Bathurst Caribou Calving Ground Survey Report was imminent. Unfortunately, as of June 7, 2019, the report was not available from the GNWT; therefore the WRRB adjourned the 2019 Bathurst Caribou Herd Proceeding until July 19, 2019 to allow GNWT the time necessary to complete and provide the 2018 Bathurst Caribou Calving Ground Survey Report. The report was provided to the WRRB on July 17, 2019.

[26] https://wrrb.ca/sites/default/files/WRRB%20Rules%20of%20Procedure%2014jun2017_1.pdf.

The Board reopened the record in this proceeding to post the 2018 Bathurst Calving Ground Survey Report as well as additional documents to the registry to assist with the completion of the final Reasons for Decision Report.

The public record was closed again on September 3, 2019 and the WRRB's deliberations followed.

6.0. Is there a Conservation Concern for the Kǫk'èetì Ekwǫ̀ Herd?

Based on the WRRB's review of Sections 12.6.1 and 12.6.2 of the Tłı̨chǫ Agreement, the first question which must be answered is whether there is a conservation concern with respect to the Kǫk'èetì ekwǫ̀ herd. If the WRRB is not convinced that there is a Kǫk'èetì ekwǫ̀ management problem, it does not have the authority to recommend harvest limitations on Tłı̨chǫ citizens.

During its 2016 Kǫk'èetì ekwǫ̀ proceeding, the Board repeatedly heard from governments, communities and members of the public of their concerns over the continued decrease of the Kǫk'èetì ekwǫ̀ herd, including recognition of the rapid rate of the decline. Vital rates associated with the herd, including the cow survival rate, calf recruitment, and pregnancy rate, all indicated that the herd would likely continue to decline. Despite the uncertainty, GNWT noted that to facilitate herd recovery and to once again provide harvesting opportunities for traditional users, that *"timely conservation-based management actions are needed"*.[27] Additionally, TG stated that *"in a time of crisis for caribou – closure of Aboriginal harvesting of caribou … are difficult but necessary actions"*.[28]

Despite all of the management actions taken over the past 12 years, the Kǫk'èetì ekwǫ̀ herd is still declining, and recovery of the herd remains uncertain. Additionally, in 2016, the Committee on the Status of Endangered Wildlife in Canada assessed ʔekwǫ̀ as Threatened. The status of ʔekwǫ̀ under federal Species at Risk legislation is currently under review. Within the NWT, ʔekwǫ̀ were assessed by the Species at Risk Committee as Threatened in 2017 and were later listed as Threatened under the NWT *Species at Risk Act* in 2018.[29] A draft ʔekwǫ̀ recovery strategy is currently undergoing public review.

The Board also notes that there is no current management or action plan for the Kǫk'èetì ekwǫ̀ herd. The Bathurst Caribou Advisory Committee (BCAC) was established in 2016 to advise on the management of the Kǫk'èetì ekwǫ̀ herd and its habitat,

[27] PR (BATH 2019): 040 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A.
[28] Ibid.
[29] https://www.nwtspeciesatrisk.ca/species/barren-ground-caribou.

including addressing and reconciling the various factors affecting the herd, including harvest, predation, environmental conditions, and land disturbance. In May 2019, the BCAC hired a technical writer to prepare a management plan as well as an action plan to implement the actions outlined in the management plan. At this time, a draft is not yet available.

The Kǫk'èetì ekwǫ̀ herd continues to decline at a rapid rate. Ɂekwǫ̀ have been both nationally and territorially assessed as threatened as well as listed as threatened in the Northwest Territories. Currently, there are no recovery documents available nor any management or action plans in place. Therefore, the WRRB continues to believe that there is a serious conservation concern for the Kǫk'èetì ekwǫ̀ herd.

7.0. WRRB's Recommendations

7.1. Introduction

The WRRB is highly concerned about the need for effective and timely actions and this was a substantial consideration in the development of the determinations and recommendations outlined in this report.

Consistent with the requirements of the Tłı̨chǫ Agreement, the WRRB is taking a precautionary approach[30] as well as learning from the experience of the 2016 TAH, which did not on its own achieve the objective of halting the decline. Reducing harvest and predation are the two management actions that most directly and immediately affect ɂekwǫ̀ survival rates.

While the WRRB was previously most concerned about harvest and predation reducing Kǫk'èetì ekwǫ̀ survival, the Board is now also concerned with the need for a precautionary approach to management given that the rapid decline has partly been caused by the emigration of cows abandoning their traditional Kǫk'èetì ekwǫ̀ calving ground. The Board also recognizes the importance of a healthy habitat, efficient and effective monitoring that can rapidly inform management decisions (adaptive management), and the support and understanding of an informed public. Therefore, in addition to the urgency of actions to halt the decline, the WRRB has recommendations on habitat, adaptive management, and education. In particular, the WRRB is concerned that the need to protect calving cows and newborn calves is more essential than ever.

[30] Section 12.1.5(c) of the Tłı̨chǫ Agreement.

7.2. Harvest & Harvest Monitoring

7.2.1. Introduction

A TAH is defined in the Tłı̨chǫ Agreement, *"in relation to a population or stock of wildlife, the total amount of that population or stock that may be harvested annually". S*ection 12.5.5(a)(i) of the Tłı̨chǫ Agreement sets out that the WRRB has sole responsibility for making a final determination with respect to a TAH for Wek'èezhìı.[31]

In 2016, the Board had determined that the seriousness of the Kǫk'èetì ekwǫ̀ herd's decline warranted a TAH of zero in Wek'èezhìı for the 2016/17, 2017/18, and 2018/19 harvest seasons despite the difficulties this was sure to cause for people. However, the zero TAH has not been accompanied by a halt in the decline and, in 2019, TG and GNWT proposed continuing the zero harvest of Kǫk'èetì ekwǫ̀. A difficulty in enforcing the harvest restriction is that, in some winters, ʔekwǫ̀ from neighboring herds may overlap with the Kǫk'èetì ekwǫ̀ herd. GNWT and TG proposed in 2016 and again in 2019 that a core mobile zone was the most effective way to differentiate between ʔekwǫ̀ herds when their winter distribution overlapped.

7.2.2. Proponent's Evidence

The Joint Proposal compared the 2015 and 2018 estimates of herd size based on calving ground aerial photographic surveys to report an accelerated decline in the Kǫk'èetì ekwǫ̀ herd size. The herd has declined by half from 19,769 in 2015 to 8,207 in 2018. Therefore, the rate of decline from 2015 to 2018 is approximately 29% a year.[32] Given the current herd size and rate of decline, TG and GNWT proposed to maintain the zero TAH and to rely on the MCBCCA.

TG and GNWT outlined in the Joint Proposal that currently, adaptive management is used in managing the MCBCCA. Established in 2011, the Barren-ground Caribou Technical Working Group (BGCTWG), which reviews annual biological monitoring information, is composed of representatives from TG, GNWT and the WRRB.[33] The BGCTWG is responsible for managing the MCBCCA, including developing and implementing the *"Rules for Definition of the Mobile Core Bathurst Caribou Conservation Area"* The Rule includes specific thresholds where changes to the MCBCCA are made, and the rule is updated annually. The current rule, revised in November 2018, recommends that 40 or more collars should be placed on the Kǫk'èetì

[31] Section 12.5.5(a)(i) of the Tłı̨chǫ Agreement.
[32] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[33] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.

ekwǫ̀ herd to define its distribution for purposes of the mobile zone and that TG and GNWT should jointly evaluate effectiveness of the Mobile Core Area in 2019.[34]

The Joint Proposal states that *"the current small and declining number of mature ʔekwǫ̀ in the Bathurst herd is a critical conservation status that requires implementation of an integrated suite of recovery management actions that continue and support the Total Allowable Harvest (TAH) of zero (0) established in 2016 (Determination #1-2016 in WRRB 2016a) along with enhanced monitoring."*[35]

The Joint Proposal lists that the key population processes in the Kǫk'èetì ekwǫ̀ herd that have likely contributed to its continued rapid decline are:

1) relatively low rates of survival (i.e. high rates of mortality) in adult female ʔekwǫ̀; and
2) low and variable rates of productivity that generally reflect a combination of low fecundity and poor calf survival rates (i.e. calf recruitment).[36]

The Joint Proposal also mentions as a third factor the emigration of cows from the Kǫk'èetì ekwǫ̀ calving ground.

TG and GNWT recommend that the TAH for the Kǫk'èetì ekwǫ̀ herd remain at zero in the Northwest Territories, and be reviewed within two years, following completion of the next Kǫk'èetì ekwǫ̀ herd calving ground survey and analyses of available demographic data (as per WRRB Determination #1-2016; WRRB 2016a).

TG and GNWT recommend the continuation of the MCBCCA as the means for managing and implementing the TAH of zero for the Kǫk'èetì ekwǫ̀ herd.

7.2.3. Other Parties' Evidence

Alternatives North stated that they couldn't find evidence that the TAH of the Kǫ̀k'èetì ekwǫ̀ herd is zero.[37] They noted that there is no assessment for the accuracy of reporting numbers in sex and composition of harvested Sahtì ekwǫ̀ from the overlapping range; as such, it is most likely that Kǫ̀k'èetì ekwǫ̀ are getting harvested as well.[38]

> *"Given the state of the Bathurst Herd, we ask the Board to ensure much more clarity and certainty that harvest of these animals is actually zero, or what the*

[34] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021. Appendix A.
[35] Ibid.
[36] Ibid.
[37] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[38] Ibid.

sex, age and size of the unintended harvest is. These numbers should be compiled and publicly reported."[39]

CARC believes that reliance upon the untested MCBCCA as a method to control harvest is ineffective. CARC identified the vulnerability to errors due to the proponent's identification of *"few Bathurst or Bluenose-East caribou were taken"*.[40]

LKDFN does not believe subsistence harvesting is the cause of the rapid decline, as the harvest restrictions were put in place almost 10 years ago and the decline of the Kǫk'èetì ekwǫ̀ herd is still increasing.[41] LKDFN stated that GNWT does not report the effectiveness of the zero TAH or the MCBCCA.[42] LKDFN requests that this information become available in order to ascertain the effectiveness. Based on information from LKDFN environmental monitor reports from early March 2019, Kǫ̀k'èetì ekwǫ̀ were being killed on the boundary of the MCBCCA and the ice road.[43] This creates issues as the GNWT can't check carcasses of already deceased animals and cannot stop people from using the ice road. LKDFN would like to see the TAH of zero continue to be enforced for the next two years and carried over across the border into Nunavut as well.[44]

7.2.4. Analysis and Recommendation

The evidence available to the Board is that the decline of the Kǫk'èetì ekwǫ̀ herd has accelerated since 2015 and that the underlying mechanisms have changed and become more complex. The evidence for the decreasing trend in herd size is from population estimates from aerial photographic and visual surveys over the Kǫk'èetì ekwǫ̀ herd's calving grounds in 2015 and 2018.[45] The Board finds that the survey methods and analyses for estimated herd size are clear and consistent with previous surveys.

The 2018 calving ground survey report concluded that adult cow survival was low, and that productivity was low and annually variable.[46] However, the 2019 Joint Proposal only used information up to 2015.[47] More recent information and analyses became

[39] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[40] PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.
[41] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] PR (BATH 2019): 020 – An Estimate of Breeding Females and Analyses of Demographics for the Bluenose-East Herd of Barren-ground caribou: 2015 Calving Ground Photographic Survey; and PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[46] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[47] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

available in July 2019 as part of the June 2018 calving ground survey report which showed that survival rates for adult cows have increased since 2015.[48] As illustrated in Figure 3 for 2015-2018, adult cow survival averages 85% a year which is close to the 88% required for a stable herd when productivity (pregnancy rate and calf survival) is 0.31 (the average for 2015-2017).[49] The WRRB notes that adult cow survival has improved since 2015 and the season of mortality has shifted from the summer to the winter (Figure 4).

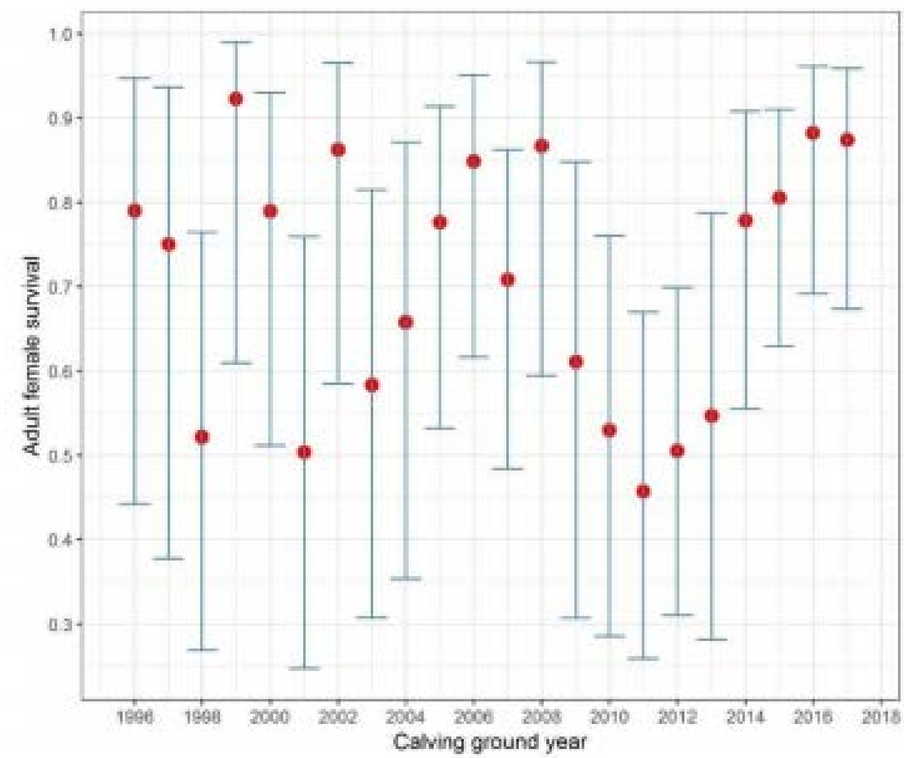


Figure 3. Annual Survival rate estimates 1996-2018 for Kǫk'èetì Ekwǫ̀ adult females based on collared female ʔekwǫ̀.[50]

[48] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[49] Ibid.
[50] Ibid.

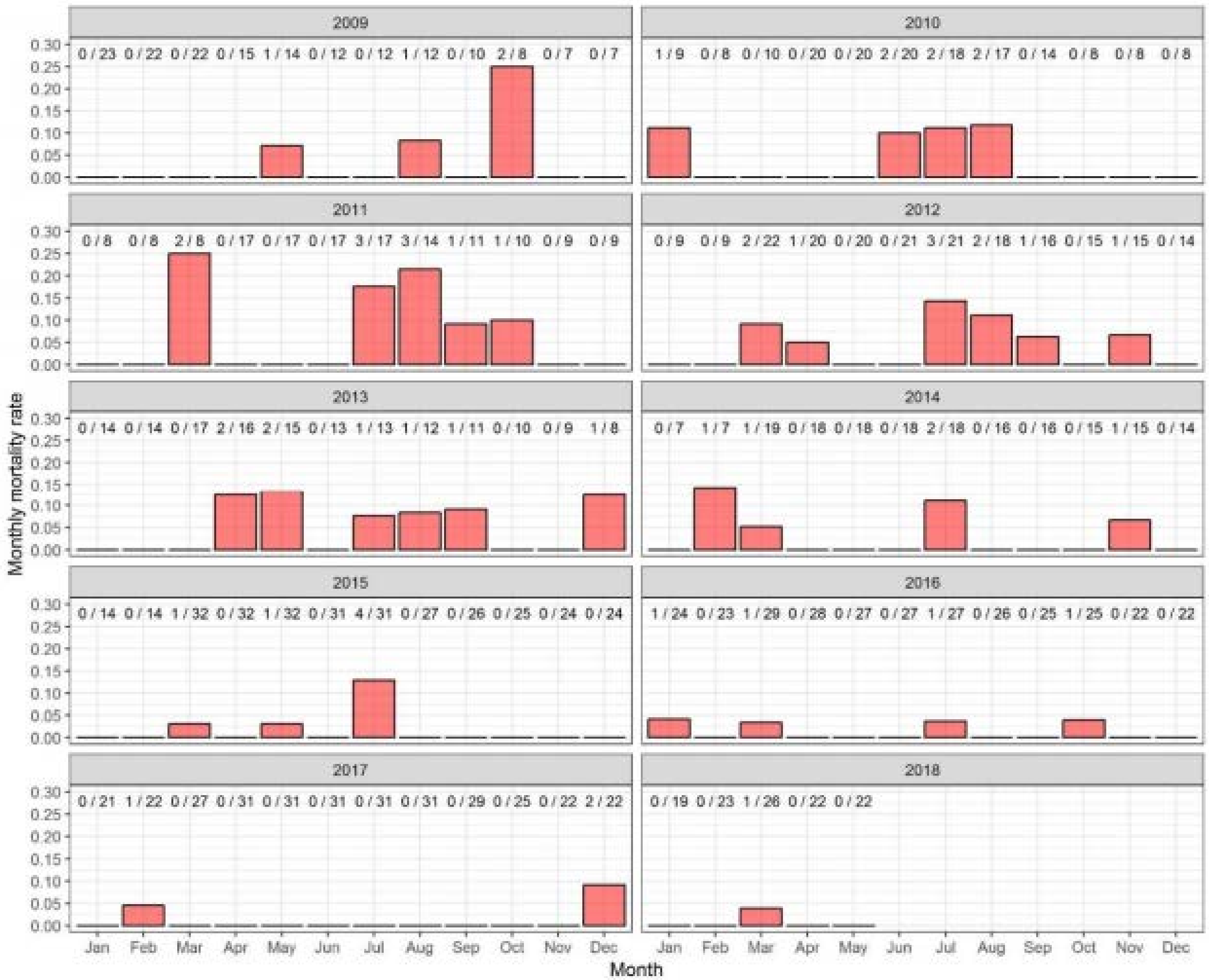


Figure 4. Summary of monthly collared cow mortality data for Kǫ̀k'èetì Ekwǫ̀ 2009-2018.[51]

In summary, while adult cow survival has increased since 2015, the Joint Proposal indicates that fecundity (percentage of breeding aged cows that calve) and calf survival are still less than that needed for recovery of the herd.[52] In addition, emigration has become a factor in the accelerated decline. Although the Joint Proposal acknowledged a role for emigration, analyses were not included but became available in July 2019.[53]

In June 2018, the Kǫk'èetì ekwǫ̀ calving ground, for the first recorded time since about 1990, had low densities on either side of Bathurst Inlet. 2018 was also the first year that

[51] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[52] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[53] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.

3 of the 11 collared cows, identified as Kǫk'èetì ekwǫ̀ cows based on their 2017 calving location, moved to the neighboring Beverly/Ahiak's calving ground.[54] Subsequently, one of these cows died in July and the other two cows stayed with the Beverly/Ahiak herd. In June 2019, three different cows (of 17 cows collared) with previous calving locations on the Kǫk'èetì ekwǫ̀ calving ground moved to and calved on the Beverly/Ahiak herd's calving ground.[55]

GNWT used both computer modelling and field data to report on how the aforementioned emigration may represent almost a third of the breeding cows in 2018 emigrating to the Beverly/Ahiak calving ground.[56] The Board concludes that this emigration is contributing to the rate of decline for the Kǫk'èetì ekwǫ̀ herd. The Board does question however, the harvest levels used in modelling, which are a constant rate for 2010 to 2018 of 5 cows and 70 bulls compared to 5000 cows and 2000 bulls for 2001 to 2009.[57]

The Board acknowledges the encouraging trend for 2015-2017 in increased survival of adult cows but notes that pregnancy and calf survival vary annually. Given the continued decline and very small size of the Kǫk'èetì ekwǫ̀ herd, and despite the uncertainty about under-lying causes and the implications of emigration, the Board has no evidence to revise its 2016 determination for the zero TAH.

Determination #1-2019 (Kǫk'èetì Ekwǫ̀): Total Allowable Harvest
The Board determines that a TAH of zero for all users of the Kǫk'èetì ekwǫ̀ herd for 2019/20 and 2020/21 harvest seasons. For further clarification, the absolute number of ekwǫ̀ that can be harvested from the Kǫk'èetì ekwǫ̀ herd in Wek'èezhìı is zero.

The TG and GNWT Joint Proposal did not include evidence on the effectiveness of monitoring the zero TAH. While the Joint Proposal did acknowledge that *"few Bathurst or Bluenose-East Caribou were taken (based on the locations of reported kills relative to distributions of collared ʔekwǫ̀)"*[58] but no details were provided or referenced. The Joint Proposal did not provide a summary or reference to reports about the effectiveness of community monitors, check stations, patrols or monitoring results for the MCBCCA. The Joint Proposal also did not summarize or refer to evidence about the frequency and extent of overlap in neighboring herd's wintering distribution.

[54] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[55] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[56] Ibid.
[57] Ibid.
[58] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021. Appendix A.

The Joint Proposal's lack of evidence for the effectiveness of the harvest monitoring and whether the MCBCCA reduces the risk of inadvertent harvesting creates difficulties for the WRRB. Of particular concern is that the Joint Proposal does not assess or reference assessments of the annual degree of overlap of neighboring herds during the winter, which may increase the risk of inadvertent harvest of Kǫk'èetì ekwǫ̀. The Board is aware that given the herd's current low numbers and high rate of decline, even a low number of ʔekwǫ̀ inadvertently harvested could increase risk to the Kǫk'èetì ekwǫ̀ herd. The Board also notes that LKDFN and CARC questioned the effectiveness of the MCBCCA.[59]

While the Board notes that TG and GNWT propose to evaluate the MCBCCA and to report to WRRB sometime in 2019, the Board needs to be confident that the evaluation will meet the Board's concerns. To be specific, the Board has two concerns:

I. The annual variation and any trends in the extent and definition of the overlap in the winter distribution of neighboring herds; and,
II. How the community-based harvest monitoring and check stations are integrated into describing the effectiveness of the MCBCCA.

Recommendation #1-2019 (Kǫk'èetì Ekwǫ̀): Effectiveness of Mobile Zone
To determine if the MCBCCA is functioning as intended, GNWT and TG will analyze the extent of overlap of neighboring herds during early to late winter in order to complete a quantitative assessment to evaluate the effectiveness of the MCBCCA and the risk of inadvertent harvesting of Kǫk'èetì Ekwǫ̀ and report to the WRRB with this assessment by February 1, 2020.

The uncertainty about the harvest levels and why they vary so much annually will not be solved simply by improved reporting and analyses. The reported variability also suggests that a better understanding of harvesting from the community perspective is essential. This can be achieved by an increase in community monitoring and more detailed reporting.

Harvest monitors not only provide critical information on harvest, but they are also a link between communities and responsible governments. Harvest monitors are on the front lines and can collect real-time information from harvesters on the health of the animals, and the herd. However, if ʔekwǫ̀ are abundant around the community, harvest monitors can be overworked, which can be a safety concern.

[59] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal; and PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.

Recommendation #2-2019 (Kǫk’èetì Ekwǫ̀): Community Monitors
To utilize the expertise of harvesters to monitor any inadvertent harvest of Kǫk’èetì ekwǫ̀, TG will hire up to four community monitors per community to collect and report on harvest data monthly throughout the 2019/20 and 2020/21 harvest seasons.

7.3. Predators and Emigration

7.3.1. Introduction

Ɂekwǫ̀ have always been subject to predation, but during a decline, the role of predators can become a contributing factor to the decline. While most of the attention is often focused on dìga as they follow the ɂekwǫ̀ year round, sahcho are also effective predators, especially on the calving grounds and during the summer. Nǫ̀gha and golden det’ǫcho are also predators for ɂekwǫ̀ but are rarely the focus of wildlife management. Predation of ɂekwǫ̀ has been a recurring theme in the Board’s proceedings since 2010 as elders, managers, and the public have sometimes held divergent views on managing predation.

In addition to the problems posed by predation, emigration of caribou to neighbouring herds is a new and compounding factor. The TG and GNWT Joint Proposal outlines that Kǫk’èetì ekwǫ̀ emigration to neighboring herd’s calving grounds started in 2018 after the herds had shared their winter range.[60] Just over a quarter of the collared cows emigrated in 2018, and then again in 2019, which suggests that emigration is a factor in the accelerated rate of decline and also, likely a consequence of the severity of the decline itself.[61] Typically, cows calve together on the traditional calving ground because there is protection from predators by being together; strength in numbers. For the Kǫk’èetì ekwǫ̀ herd, the number of cows on the calving ground is now so reduced that it is feasible to think that some cows are seeking this protection by moving to neighboring herd’s calving grounds. It is worth remembering that in 2010 and 2016 hearings, emigration was discussed at length.

In May 2010, TG and GNWT recommended a targeted increase in dìga removal from about 40 dìga to 80-100 a year using a phased approach. This included increased hunting and trapping effort, and a wolf removal program if harvesting did not meet the annual dìga harvest targets and the Kǫk’èetì ekwǫ̀ herd continued to decline.[62] The removal program was to be focused at den sites and on the winter range, and included developing survey and monitoring methodology as well as experimental design for

[60] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[61] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[62] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek’èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.

removal of dìga on the winter range and at den sites by fall 2010.[63] The WRRB recommended the training and incentives for the harvesting but not the targeted removals.

During the 2016 public hearings, the public expressed frustration over the failure to manage predation while harvest was so strictly restricted.[64] The Board supported community-based dìga harvesting as a training program.[65] By November 2017, as a collaborative effort, a technical feasibility assessment for dìga management options was completed and made available to the public through WRRB's web site.[66]

7.3.2. Proponent's Evidence

The Joint Proposal suggests that the accelerated decline of the Kǫk'èetì ekwǫ̀ herd, despite the zero TAH, likely reflects predation reducing calf and adult survival.[67] However, evidence of this in the 2019 Joint Proposal is limited. The trend for Kǫk'èetì ekwǫ̀ numbers is based on calving ground surveys and included the 2018 data. The data for adult and calf survival in the proposal were only up to 2015 and the Board had to wait until July 2019 to see the most recent data and analysis.

The 2019 Joint Proposal lists five proposed management actions for dìga:

(a) Joint dìga management proposal for Kǫk'èetì and Sahtì ekwǫ̀ ranges;
(b) Continued TG program to train dìga harvesters;
(c) Kǫk'èetì ekwǫ̀ dìga management feasibility assessment 2017;
(d) Increased GNWT incentives for dìga harvesters; and,
(e) Collaboration between NWT and NU managers about predator management.[68]

Three of these proposed actions, (b), (c) and (d) above, were carried over from 2010 and 2016. An additional proposed action is that TG and GNWT will provide a dìga management proposal in 2019 to recommend increasing the dìga harvest using more intensive dìga management techniques to a level that will influence ʔekwǫ̀ survival rates.[69] A second additional proposed action is that GNWT and TG are continuing on-

[63] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.
[64] PR (BATH 2019): 040 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A.
[65] Ibid.
[66] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd.
[67] Ibid.
[68] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[69] Ibid.

going discussions with Nunavut over predator management on the Kǫk'èetì ekwǫ̀ range.[70]

The Joint Proposal states that there have been a series of discussions between the GNWT and GN about the potential for collaboration centered on predator reduction on the Nunavut ranges of the Kǫk'èetì and Sahtì ekwǫ̀ herds. As the GNWT, TG, WRRB and other management organizations in the NWT have no management authority in Nunavut, potential predator management would need to consider the rights of Nunavut harvesters and Nunavut wildlife management processes.

7.3.3. Other Parties' Evidence

Alternatives North noted that one of the first considerations for intensive predator control is the assurance that TAH is at zero. The expansive range of the Kǫk'èetì ekwǫ̀ herd makes it very difficult to conduct predator controls. Alternatives North is concerned with predators multiplying if not all of the predators are harvested. They note that previous studies assessing the efficiency of predator control have been conducted on a small scale, while the area proposed to be managed to protect the Kǫk'èetì ekwǫ̀ is very large, which may cause it to be ineffective.[71]

LKDFN stated that based on their TK the dìga are not the cause of the Kǫk'èetì ekwǫ̀ herd's steep and steady decline and that dìga removal may at best slow the decline. LKDFN also requested GNWT report on the effectiveness of the dìga harvest incentive program since 2010.[72]

CARC did not raise concerns about the proposed predator control initiatives as presented in the Joint Proposal.

7.3.4. Analysis and Recommendations

The Joint Proposal stated that the cash incentives to increase dìga harvesting were ineffective.[73] However, no details were included. The role of the Tłı̨chǫ training program is not assessed. The Joint Proposal did not include evidence from dìga monitoring, and it was unclear if there was any such monitoring underway. The sighting rate of dìga and other predator observations during ʔekwǫ̀ surveys were not explained. The Joint Proposal also did not make use of the evidence in the dìga technical feasibility

[70] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[71] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[72] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.
[73] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

assessment, which identified a sharp decline in dìga abundance and productivity on the summer ranges.
The Joint Proposal did not provide any evidence beyond that provided in the 2016 hearings where the evidence clearly indicated a long-term trend of more sahcho than dìga sightings on the Kǫk'èetì ekwǫ̀ calving grounds from 2006-2015. In June 2018, the sighting of six sahcho to each dìga seen on the Kǫk'èetì ekwǫ̀ calving ground is consistent with the information presented during the 2016 hearings.[74]

The 2019 Joint Proposal did not suggest management actions for sahcho, but the 2018 calving ground survey report suggested predator studies may be undertaken.[75] In 2016, TG and Tłı̨chǫ elders referred to sahcho predation on the summer range and the Board recommended further documentation of TK and a collaborative sahcho biological assessment once the dìga technical assessment was completed.[76]

The evidence for emigration of Kǫk'èetì ekwǫ̀ collared cows and how it has added to the decline in herd size is mentioned in the Joint Proposal but was only analysed in the 2018 calving ground survey report. That report also notes that the emigration continued in June 2019.[77] The analyses are clear and thoughtful and include details of how the densities of the cows have sharply declined on the calving grounds. However, neither the Joint Proposal nor the calving ground survey report give thoughts on the implications of the emigration on management of the Kǫk'èetì or Beverly/Ahiak ekwǫ̀ herds other than that emigration may reduce the likelihood of recovery.

Increasingly, Kǫk'èetì ekwǫ̀ may be faced with a changing situation regarding predation; however, not all the required information is available for management actions by governments or the Board. First, there is a gap in understanding what the ʔekwǫ̀ decline has meant to the predators and their levels of ʔekwǫ̀ predation. It is possible that dìga predation has declined on the summer range, which is reflected by higher adult ʔekwǫ̀ survival. The reduced dìga numbers may leave sahcho predation on the calving ground and summer range proportionately more important as a factor in low calf survival.

Secondly, the 2018 calving ground survey report suggests that emigration is a significant part of the 2018 and 2019 decline.[78] This analysis is a new development in

[74] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey; and PR (BATH 2019): 041 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.
[75] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[76] PR (BATH 2019): 041 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.
[77] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[78] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.

the story of the Kǫk’èetì ekwǫ̀ and there are implications for management of the Kǫk’èetì ekwǫ̀ herd, as well as the Beverly/Ahiak herd, which has received the immigrant cows. While the 2018 calving ground survey report provides detailed evidence describing the extent of emigration in 2018 and 2019, GNWT and TG did not offer any suggestions in the Joint Proposal on how the effects of emigration could be integrated into an adaptive management process. Given the scale of emigration, the WRRB is concerned especially by the failure of the governments to offer leadership in how to address emigration.

Recommendation #3- 2019 (Kǫk’èetì Ekwǫ̀): Emigration
By December 1, 2019, in order to provide the WRRB clarity on the status of the Kǫk’èetì ekwǫ̀, GNWT and TG are to provide, in plain language, their positions regarding the implications of emigration of Kǫk’èetì ekwǫ̀ to other herds, and how this emigration will influence adaptive management.

In 2014, when GNWT terminated monitoring of dìga at their dens, the monitoring had been showing marked decreases in the number of dens occupied and in pup survival.[79] Between 2006 and 2012, a computer model suggested a 95% decline in dìga on the Kǫk’èetì ekwǫ̀ summer range.[80] The Kǫk’èetì ekwǫ̀ summer range had contracted, and the dìga struggled to find enough ʔekwǫ̀. Unfortunately, the 2015 and 2018 calving ground survey reports only listed predators seen on the calving ground. These observations were not provided, as a sighting rate, and thus trends cannot be assessed.[81] The 2019 Joint Proposal did not provide any evidence of dìga population numbers or trends in the dìga sighting rate for late winter during the ʔekwǫ̀ sex and age surveys.

> “*And so, as -- as to how -- if the wildlife -- if we're going to harvest the wolves, we -- we really need to kind of annually know exactly how many numbers that we need to harvest, how many wolves we need to harvest. And if we're harvesting wolves annually, is it -- will it show how well we know that we are helping the caribou?”*[82] (Elder Joseph Judas, 2016)

Besides not having information on trends in dìga numbers as the ʔekwǫ̀ have declined, the Board also faces uncertainty in trends of the ʔekwǫ̀ winter distribution. The Joint

[79] PR (BATH 2019): 041 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.
[80] Ibid.
[81] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey; and PR (BATH 2019): 020 – An Estimate of Breeding Females and Analyses of Demographics for the Bluenose-East Herd of Barren-ground Caribou: 2015 Calving Ground Photographic Survey.
[82] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd. Note: In 2016, Joseph Judas was a member of the Tłįchǫ Assembly and was not the Chair of the WRRB.

Proposal did not include or reference a report analyzing if there is a trend in overlap in the winter distribution of neighboring herds. If dìga accompany the herds to the overlap area, it is possible that dìga predation rates could increase. Additionally, it is difficult, when herds overlap, to predict how the increased dìga harvest will change adult ɂekwǫ̀ survival rates.

The trend for the decline based on the calving ground surveys is statistically robust and well- documented. The 2018 calving ground survey report included an updated analysis of adult survival which suggested that it had increased from 2015 to 2018 and had shifted from summer to winter timing of mortalities, although possible causes were not described.[83] Fall calf:cow ratios are not analysed in detail but appear relatively stable while late calf:cow ratios have higher annual variability. It is premature to relate the increase and change in timing of adult survival with a decline of dìga on the summer range, but it is a possibility.

The WRRB works within a broad ecological context and for that reason the Board is concerned about how the role of other predators may have changed as dìga populations have declined in response to the ɂekwǫ̀ decline. The role of scavengers such as nǫ̀gha will have changed, and nǫ̀gha may have become a more significant predator. Det'ǫcho are effective predators for newborn calves; as are sahcho. TK describes sahcho predation as extending outside of the calving grounds. Nǫ̀gha, sahcho and det'ǫcho are all relatively long-lived species and are opportunistic in their diet, which raises the possibility that their numbers could be slower to respond to the decline of the Kǫk'èetì ekwǫ̀ herd. The Board notes that there is a lack of information regarding nǫ̀gha, sahcho and det'ǫcho and, where information exists, it has not been compiled and shared. The Board is also conscious that as the herd has reached such low numbers, the herd trend may be more vulnerable to previously minor causes of ɂekwǫ̀ deaths.

After the Board had received the TG and GNWT Joint Proposal in January 2019, the Board was seriously concerned about the lack of progress on the role of predators relative to the ɂekwǫ̀ declines. Consequently, in February 2019, the Board reinforced the urgency and the extent of the decline of both the Kǫk'èetì and Sahtì ekwǫ̀ herds, by advancing its recommendations on predators to TG and GNWT. These recommendations and the response from TG and GNWT are included in Table 1 and Appendix G.

[83] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.

Table 1. WRRB Predator recommendation and TG/GNWT responses

	WRRB February 2019 predator recommendations	TG/GNWT Response	Variation (if applicable)
1	The WRRB supports continuing the ENR's dìga harvest incentive program and the TG's Community Based Dìga Harvesting Project as an education tool.	Accepted	
2	The WRRB recommends that dìga monitoring be undertaken so that population estimates, or indexes are generated. In addition, as much information as possible, including condition, diet, and reproductive status, should be collected from each harvested dìga.	Accepted	
3	The WRRB recommends that dìga management be undertaken in Wek'èezhìı. TG and ENR should review the *"Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd"* submitted in November 2017 to determine the most effective, humane and cost-efficient methods that would have the least impact and disturbance on the ekwǫ̀ herds themselves.	Accepted	
4	The WRRB recommends that dìga management should be closely monitored for effectiveness of halting or slowing the decline of the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds in order to provide future harvesting opportunities.	Accepted	
5	The WRRB recommends that the GNWT and TG work with the Government of Nunavut to enact predator management actions on the calving grounds of sahtì ekwǫ̀ and kokètì ekwǫ̀ in Nunavut.	Varied	Replace 'enact' with 'discuss'
6	The WRRB commits to striking a working group to begin work on a *sahcho* (grizzly bear) biological assessment by June 2019, specifically on the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds herd ranges. This working group will include at minimum the GNWT, TG and the Government of Nunavut. WRRB staff recommend that sahcho are monitored in order to determine if pressures are increasing on ekwǫ.	Varied	Accepted the Working Group Replace 'enact' with 'discuss
7	WRRB staff recommend that golden det'ǫcho (golden eagle) are monitored in order to determine if pressures of golden det'ǫcho are increasing on ekwǫ̀. WRRB staff recommends that TG and the GNWT work with the Government of Nunavut to support golden det'ǫcho monitoring.	Varied	Replace 'work with 'discuss'

Subsequent to the Board receiving TG and GNWT's responses to the Board's predator recommendations, the Board received further evidence in July 2019 when GNWT released its June 2018 calving ground survey report.[84] Given the way the evidence is presented, the Board remains concerned about the lack of reporting about the decline in dìga on the Kǫk'èetì ekwǫ̀ summer range, whether or how this decline will modify the level of dìga predation on the Kǫk'èetì ekwǫ̀ herd, and how it could affect the harvest of dìga. The importance of monitoring dìga was highlighted in the *"Wolf Tłı̨chǫ Knowledge and Perspective"* TK study where Tłı̨chǫ participants agreed it would be helpful to monitor dìga as *"packs of wolves usually follow caribou herds because they are part of the food chain for wolves so we need a good monitoring program for both animals*".[85] A first step toward integrating the different sets of information (rate of predator sightings, ʔekwǫ̀ winter distribution, and the two dìga harvest programs) is the basis for the following recommendations additional to the February 2019 recommendations.

Recommendation #4-2019 (Kǫk'èetì Ekwǫ̀): Predator Monitoring
To improve the understanding of the role of predators on the decline of the herd and increase adult and calf survival, GNWT and TG will provide the following to the WRRB: (1) sighting rates of dìga, sahcho, golden det'ǫcho, and nǫ̀gha during Kǫk'èetì ekwǫ̀ composition surveys by December 1 each year, beginning in 2019; and, (2) A set of criteria that will determine the numbers of predators to be targeted for annual removal, should the decision be made to do so, by December 1, 2020.

Recommendation #5-2019 (Kǫk'èetì Ekwǫ̀): Dìga Harvest
To ensure that harvest of dìga is contributing to the conservation of Kǫk'èetì ekwǫ̀: (1) TG and GNWT should provide to the WRRB the number of dìga to be targeted for removal during the harvest season from the Kǫk'èetì ekwǫ̀ winter range by December 1 each year, beginning in 2019; (2) TG and GNWT should determine the number of dìga to be targeted for removal based on (i) dìga sightings during Kǫk'èetì ekwǫ̀ composition surveys and (ii) likely exposure of Kǫk'èetì ekwǫ̀ to dìga associated with neighbouring herds during the winter season; and, (3) TG and GNWT will coordinate the *Enhanced North Slave Dìga Harvest Incentive Program* and the *Community-based Dìga Harvest Training Program* to determine their role in removing the targeted number of dìga.

[84] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[85] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd.

Recommendation #6-2019 (Kǫk'èetì Ekwǫ̀): ***Enhanced North Slave Dìga Harvest Incentive Program***
To help the Board understand the effectiveness of the GNWT's *Enhanced North Slave Dìga Harvest Incentive Program* on Kǫk'èetì ekwǫ̀, TG and GNWT will provide a comprehensive report on the program to the WRRB by May 31 each year. The contents of this report will be developed in collaboration with the Board and will include, but not be limited to, the following information: (1) provide the location and number of dìga harvested as a part of the Harvest Incentive Program; and, (2) provide clear criteria to measure the effectiveness of the Harvest Incentive Program based on both scientific and TK.

Recommendation #7-2019 (Kǫk'èetì Ekwǫ̀): ***Community-based Dìga Harvest Training Program***
To help the Board understand the effectiveness of the TG's *Community-based Dìga Harvest Training Program*, TG and GNWT will provide a comprehensive report on the program to the WRRB by May 31 each year. The contents of this report will be developed in collaboration with the Board and will include, but not be limited to, the following information: (1) provide the location and number of dìga harvested as a part of the Harvest Training Program; and, (2) provide an assessment of how the training will contribute to future dìga harvesting and management

While dìga pose significant threats to Kǫk'èetì ekwǫ̀ survival rates, nǫ̀gha, golden det'ǫcho, and sahcho are other predators which need to be assessed. TG and GNWT's Joint Proposal included no evidence on predator sighting rates on the calving grounds nor did the 2018 calving ground survey report. But the Joint Proposal did recommend increased support for predator monitoring as well as for on-the-land traditional monitoring programs like the Tłı̨chǫ Ekwǫ̀ Nàxoède K'è (formerly the Boots on the Ground) program.[86] GNWT's recommendation leads the WRRB to recommend monitoring predators on the calving grounds in collaboration with GN. In an effort to reduce disturbance to ʔekwǫ̀, this work should be done on the ground, and not via aircraft.

Nǫ̀gha can be found where their food is located. Some may consider nǫ̀gha to be a scavenger however, it is known that nǫ̀gha also actively hunt for their food. Nǫ̀gha share the barren-lands with ʔekwǫ̀ and, therefore, ʔekwǫ̀ can make up a significant portion of the nǫ̀gha diet through direct hunting or from carrion left by sahcho or dìga.

[86] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

As nǫ̀gha scavenge for ʔekwǫ̀, they tend to follow behind the ʔekwǫ̀ and dìga as they migrate through the barren-lands.[87]

Recommendation #8-2019 (Kǫk'èetì Ekwǫ̀): Nǫ̀gha (wolverines)
To determine the current abundance, trend and distribution of nǫ̀gha, GNWT and TG will compile existing TK and scientific information for nǫ̀gha in the NWT and Nunavut on the Kǫk'èetì and Sahtì ekwǫ̀ ranges by April 1, 2020. The data will be used by the Grizzly Bear Biological and Management Feasibility Working Group to expand the collaborative sahcho biological and management feasibility assessment to include nǫ̀gha.

The Board is disappointed by the lack of progress among TG, GNWT and GN in relation to management actions on predation and land management for the Kǫk'èetì ekwǫ̀ calving ground and summer ranges within Nunavut. These delays may be affecting the Kǫk'èetì ekwǫ̀ population. The Joint Proposal states that there has been *"a series of discussions involving GNWT and GN wildlife staff and more senior officials (ministers and deputy ministers) about the potential for collaboration centered on predator reduction on the NU ranges of the Bluenose-East and Bathurst herds"*.[88] While the Board is aware that NWT management authorities have no authority in Nunavut and any actions taken in Nunavut would need to be approved by the NWMB, GNWT and TG committed to pursuing these discussions further to develop and implement coordinated dìga removals across the Sahtì and Kǫk'èetì ekwǫ̀ herds.[89] The 2016 and 2019 Joint Proposals both stated that GNWT will remain in frequent contact with GN on these issues and participate where possible in the NWMB process on harvest issues.[90]

Recommendation #9-2019 (Kǫk'èetì Ekwǫ̀): Joint Management Agreement
The Board recommends GNWT and TG develop a draft agreement and timelines for joint management efforts to manage the Kǫk'èetì and Sahtì ekwǫ̀ and their ranges by February 29, 2020. This draft agreement should be developed in cooperation with the BCAC, the Advisory Committee for Cooperation on Wildlife Management, and discussed with the GN wildlife officials and NWMB as soon as possible.

[87] Species at Risk Committee. 2014. Species Status Report for Wolverine (Gulo gulo) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT. https://www.nwtspeciesatrisk.ca/sites/default/files/wolverine_status_report_and_assessment_final_dec_2014_v2.pdf.
[88] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[89] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[90] Ibid.

7.4. Habitat and Land Use

7.4.1. Introduction

The annual range of Kǫk'èetì ekwǫ̀ encompasses land in both the NT and Nunavut, which introduces jurisdictional complexity. Calving and post-calving ranges in Nunavut do not have protection. Key habitats in the NWT also remain unprotected despite the WRRB recommendations in 2010 and 2016. The WRRB has consistently stated that the Kǫ̀k'èetì ekwǫ̀ will require intact habitat for recovery and sustained use.

The WRRB recognizes that habitat is complex as it includes more than vegetation. Habitat also is the landscapes that allow ʔekwǫ̀ to make choices to reduce risks from predators, parasites and other threats including weather. The elders consider anything linked to ʔekwǫ̀ as their habitat. This includes things such as *ʔįk'ǫ̀ǫ̀* (spiritual power); human behaviour; predators, such as dìga and people; pests, such as mosquitoes and flies; landscapes, such as muskeg, eskers, and smooth bedrock leading to areas to cross water; weather conditions that create particular kinds of snow and ice conditions; water, wind, and temperature; and favoured vegetation.[91] When suitable habitat is limited, pregnancy rates and calf survival can be reduced, which reduces the potential for herd recovery.

7.4.2. Proponent's Evidence

The Joint Proposal mentions ʔekwǫ̀ range contraction but does not provide evidence on changes in seasonal distribution or how changes in distribution may reflect changes in habitat. The 2019 Joint Proposal did identify habitat loss and change as a factor in the herd's decline as they stated that *"other factors including predation, disturbance from mining activities and infrastructure, roads, and climate factors have likely been key to the herd's continued decline since harvest restrictions"*.[92] The joint proposal mentions the need to identify important areas and critical habitat as the steps potentially leading to interim or long term habitat protection.

The Joint Proposal's primary proposed management action is the endorsement and implementation of the Bathurst Caribou Range Plan (BCRP).[93] Implementation actions outlined in the BCRP are to develop and apply effective policies within an adaptive management framework in order to address cumulative effects of range disturbance on the Kǫk'èetì ekwǫ̀ range. TG and GNWT outline the four main objectives of the BCRP are to ensure the integrity of important habitats; ensure connectivity between seasonal

---

[91] PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłįchǫ Knowledge and Perspectives on ekwò˛ (Barrenland Caribou)
[92] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[93] Ibid.

ranges; ensure the amount of human-caused land disturbance is kept below certain levels; and, ensure the development, design and use of roads is managed with consideration of ʔekwǫ̀.[94]

7.4.3. Other Parties' Evidence

Alternatives North expressed their surprise to see the proponents recommend more work to identify key habitats for Kǫ̀k'èetì ekwǫ̀. With years of research already conducted, and resource development increasing, Alternatives North question the need for more work to assess the Kǫ̀k'èetì ekwǫ̀ range.[95] It is noted that the BCRP is mentioned in the Joint Proposal; however, there are no actions relating to habitat protections.

CARC also indicated its surprise to see the proponents calling for the identification of critical habitat as there is already critical habitat identified. CARC was happy to see the BCRP endorsed; however, they noted that there is no plan for how the BCRP will be approved and implemented.[96]

LKDFN supported aspects of the BCRP, such as protecting ʔekwǫ̀ habitat, the increased connectivity within the Kǫ̀k'èetì ekwǫ̀ range and mitigating resource exploration; however, LKDFN noted that it can not endorse the BCRP because the plan recommends additional disturbance as permissible despite the urgent conservation concerns with the Kǫ̀k'èetì ekwǫ̀.[97]

7.4.4. Analysis and Recommendations

The WRRB acknowledges that the BCRP is a comprehensive plan built on the knowledge of many people. However, the Board notes there are no dates for implementation of BCRP policies nor is there any framework or timelines to judge how or when this plan is expected to contribute to ʔekwǫ̀ recovery. In this, the Board agrees with Alternatives North and CARC. In order for the BCRP to be implemented, legal protections are required, and the Board is not aware of any advancement towards these requirements. The WRRB also notes that there should be an urgency to the implementation of the BCRP as two of five range assessment areas require enhanced management responses to address increased levels of disturbance.[98] In addition, the Board has previously recommended the need for calving and post-calving ground

[94] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[95] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[96] PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.
[97] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.
[98] https://www.enr.gov.nt.ca/sites/enr/files/resources/bathurst_caribou_range_plan_2019_-_plan_pour_laire_de_repartition_des_caribous_de_bathurst_2019.pdf.

protection, which depends on Nunavut land managers. The BCRP does acknowledge this but the Joint Proposal indicates clearly to the WRRB that the need for habitat protection is now urgent.[99] In addition, the abandoning of traditional calving grounds may be further evidence of the need for protection and limiting of disturbance.

TG and GNWT's Joint Proposal offered no evidence about the state of the Kǫ̀k'èetì ekwǫ̀ habitat, such as the cumulative winter range modified by fire or the total linear length of roads. As TG and GNWT have identified in the Joint Proposal that they are working on the implementation of the BCRP, the WRRB accepts this and does not, at this time, have any further recommendations on habitat and land use.

7.5. Education

7.5.1. Introduction

Communications with, and the education of, harvesters, Tłı̨chǫ citizens, and the public is crucial in the management of Kǫk'èetì ekwǫ̀. These initiatives aim to increase compliance, improve hunter practices, and reduce wounding and wastage.

7.5.2. Proponent's Evidence

The proposal did include a table listing proposed educational activities including annual and possible meetings, GNWT website updates, posters, and radio interviews.[100] The Joint Proposal emphasized the importance of supporting on-the-land activities, which focus on the continued use and maintenance of traditional sites. TG plans to expand on their current on-the-land programs.[101]

7.5.3. Other Parties' Evidence

LKDFN expressed their belief that public awareness and education, based on the best available traditional and scientific knowledge, are essential to improve the public's understanding of Kǫk'èetì ekwǫ̀, as well as the management tools that are being used to protect them. LKDFN recommend that the GNWT share the results of the bi-annual population survey and the composition surveys in a meaningful way at in-person meetings in all communities.[102]

Alternatives North and CARC did not raise concerns about the proposed communication and education initiatives as presented in the Joint Proposal.

[99] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[100] Ibid.
[101] Ibid.
[102] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.

7.5.4. Analysis and Recommendations

TG and GNWT's Joint Proposal offered no evidence about the frequency and effectiveness of education activities since the 2010 and 2016 proposals. Continuing efforts to increase awareness among Tłı̨chǫ communities and the public about the status of NWT ʔekwǫ̀ herds, the need for conservation actions and how harvesters can contribute to conservation, such as harvesting alternative species, is essential to promote recovery of the Kǫk'èetì ekwǫ̀ herd.

Recommendation #10-2019 (Kǫk'èetì Ekwǫ̀): Successes and Challenges of Ekwǫ̀ Nàxoède K'è
To increase community understanding of work being done for Kǫk'èetì ekwǫ̀, TG will report annually on the successes and challenges of Ekwǫ̀ Nàxoède K'è to Tłı̨chǫ communities and schools.

Recommendation #11-2019 (Kǫk'èetì Ekwǫ̀): Food Security
To ensure Tłı̨chǫ communities have access to nutritious, safe food that fits their lifestyle and provides a healthy diet throughout the year, and in light of a closed harvest on Kǫk'èetì ekwǫ̀, TG and GNWT will discuss priorities and solutions for food security issues, such as harvesting alternative country foods and/or implementing meat replacement programs, with each Tłı̨chǫ community by March 31, 2020.

Recommendation #12-2019 (Kǫk'èetì Ekwǫ̀): Public Consultation
To increase public understanding of the need for ʔekwǫ̀ management actions, starting in January 2020, TG and GNWT will: (1) exchange information about Kǫk'èetì and Sahtì ekwǫ̀ with Tłı̨chǫ communities, via focus groups and community meetings; and, (2) produce and distribute educational materials, via radio, television, social media and workshops, to the general public about the reasons for the Kǫk'èetì and Sahtì ekwǫ̀ population declines and the factors affecting the declines, including emigration.

7.6. Research and Monitoring

7.6.1. Introduction

Ongoing research and monitoring actions are required to make informed and timely management decisions for the Kǫk'èetì ekwǫ̀, including the proposed implementation of the Tłı̨chǫ Research and Monitoring Program. Adaptive management is the mechanism whereby monitoring results are used to inform management decisions as well as to determine the effectiveness of management actions. The WRRB already utilizes adaptive management principles in its operations and decision-making. However, an adaptive management framework with clear thresholds may lead to specific management actions that could lead to timelier implementation of management and monitoring actions. The WRRB is aware that as the Kǫk'èetì ekwǫ̀ herd continues to decline, the urgency of effective management increases.

7.6.2. Proponent's Evidence

TG and GNWT's Joint Proposal describes (a) biological monitoring; (b) an expansion of TG's Ekwǫ̀ Nàxoède K'è program; (c) support for research on the drivers of changes in ʔekwǫ̀ abundance; and, (d) an adaptive management framework under the Bathurst Caribou Range Plan.[103] More specifically, the proposed actions are:

> (a) The biological monitoring included a change to calving ground surveys taking place every two years rather than every three years; an increase in the number of collars to 70; an increase to annual monitoring of calf survival; harvest compliance monitoring; dropping the calving ground reconnaissance surveys and the addition of pregnancy monitoring.[104]
>
> (b) TG is proposing to expand the Ekwǫ̀ Nàxoède K'è program to span the entire ice-free period on the lakes.[105]
>
> (c) TG and GNWT recognize the need for research into the complexity of factors driving the declines of ʔekwǫ̀ herds using both TK and science as well as university partners.[106]
>
> (d) Implementation actions outlined in the BCRP should be initiated in 2019 to develop and apply effective policies and practices within an adaptive management framework and 5-year review interval, which will help address potential cumulative effects of range (habitat) disturbance and land use on Kǫk'èetì ekwǫ̀.[107]

7.6.3. Other Parties' Evidence

Alternatives North is concerned that with the increasing impacts related to climate change that the herd is facing, any harvest of the herd at all will increase their vulnerability significantly.[108]

[103] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[104] Ibid.
[105] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[106] Ibid.
[107] Ibid.
[108] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.

CARC noted that with a greater than 50% decline of Kǫ̀k'èetì ekwǫ̀ between the last two surveys and an overall decrease of 95% from peak levels, it indicates the *"desperately inadequate management over the past 10 years plus and the need for critical review".*[109]

LKDFN supports biological monitoring; however, they would like to see other Indigenous governments and organizations engaged in the harvest compliance monitoring. Additionally, LKDFN believes that Indigenous monitors should be trained in fecal sample collections. LKDFN supports the expansion of the Ekwǫ̀ Nàxoède K'è (Boots on the Ground) program and would like to see the GNWT support the LKDFN's Caribou Stewardship Plan. They support collaborative research partnerships; however, LKDFN notes that the time needed to conduct routine studies is too long for Kǫ̀k'èetì ekwǫ̀.[110]

7.6.4. Analysis and Recommendations

The WRRB's approach to making monitoring and research recommendations was developed in response to three requirements. First, delays in government implementation of management actions do not slow the decline in ʔekwǫ̀ numbers. This is the basis for the WRRB's recommendation to improve the implementation of adaptive management. Secondly, the WRRB is also concerned as to how TK and community experience is used in monitoring and adaptive management. Third, there is the requirement to balance the perspective of respecting and leaving the ʔekwǫ̀ alone against the need for monitoring information for management.

The Board is put in a difficult position trying to balance the apparent need for more monitoring of ʔekwǫ̀ and the elders who say we should leave the ʔekwǫ̀ alone. Evidence from Tłı̨chǫ elders during the 2007 TG workshop, suggest a willingness to restrict harvest, and leave the ʔekwò alone.[111] Leaving ʔekwǫ̀ alone, to the elders, includes all activities that stress or bother those remaining. As Elder Romie Wetrade summarizes:

> *"White people raise animals. So they are always thinking about what to do with them. Tłı̨chǫ do not raise animals. Caribou migrate all over the land. Because of white people we are now talking negatively about caribou. For me that is not right. Talking all the time about how we will fix it. How will they migrate back to us? What will happen to the young? We should leave them alone and let them be."*[112]

The Board also notes the difficulty of reconciling views over collaring ʔekwǫ̀. However, the Board acknowledges that increasing the number of collars on cows provides more

[109] PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.
[110] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou. Proposal.
[111] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[112] PR (BATH 2019): 029 - Monitoring the Relationship between People and Caribou.

reliable annual estimates of cow survival rates, as well as determining the effectiveness of the MCBCCA and overlap in winter distribution, assigning harvest to herds reliably, and providing evidence for emigration. The BGCTWG has stated that an effective MCBCCA requires, at minimum, 40 collars and biological monitoring will need a total of 70 collars on cows and bulls.

As a rationale for increasing the frequency of the calving ground estimates to every two years, the GNWT cites the rapid decline of the herd and possible dìga management implementation.[113] The Board understands that increasing the frequency of calving ground surveys is potentially a mixed blessing as statistical differences in population numbers may be more difficult to detect. However, the WRRB considers that this possible disadvantage of the increased survey frequency can be reduced by using rates of adult and calf survival to also interpret trends. Thus, the WRRB agreed with the management action proposed by GNWT and TG.

Recommendation #13-2019 (Kǫk'èetì Ekwǫ̀): Population Surveys
To ensure timely adaptive management, GNWT will conduct population surveys for Kǫk'èetì ekwǫ̀ every two years at the same time as Sahtì ekwǫ̀ and Beverly/Ahiak surveys. Therefore, the next population surveys will take place in June 2020.

While GNWT did refer to a change in tracking seasonal calf survival three times a year, they did not mention the need to increase sample size to reliably monitor pregnancy rates, which is the first step in monitoring calf survival.[114] Hence, the need for WRRB's agreement that pregnancy rates should be monitored through fecal pellet sampling. Dene harvesters are comfortable with the collection of fecal pellets to determine genetic material as well as monitoring pregnancy.[115] This is especially relevant when Dene experts' knowledge of ʔekwǫ̀ histories, movements and identities is respected. When knowledges are heard, respected and used, individuals are more likely to accept the results of others.[116] In the not so distant past, fecal pellets were examined in conjunction with examining vegetation in the months and stomachs of ʔekwǫ̀.[117] The WRRB also notes that pregnancy rates are a sensitive indicator to conditions including climate change on the summer ranges and thus can be related to observations from TG's Ekwǫ̀ Nàxoède K'è program.

[113] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[114] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[115] PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłı̨chǫ Knowledge and Perspectives on ekwò˛(Barrenland Caribou).
[116] PR (BATH 2019): 31 - Łeghágots'enetę (learning together): the importance of indigenous perspectives in the identification of biological variation
[117] PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłı̨chǫ Knowledge and Perspectives on ekwò˛(Barrenland Caribou).

Recommendation #14-2019 (Kǫk'èetì Ekwǫ̀): Pregnancy Monitoring
To better monitor the pregnancy rates of the Kǫk'èetì ekwǫ̀ herd, GNWT and TG should implement Kǫk'èetì ekwǫ̀ pregnancy monitoring through fecal pellet collection in the winter months, every year starting January 2020. Community members should have the opportunity to participate in the collection of fecal pellets on the Kǫk'èetì ekwǫ̀ winter range.

Indigenous people across Canada emphasize they monitor the land by living with it. In other words, using the natural resources it offers on a regular basis and, in doing so, watch everything on the land.[118] The elders' stories tell of change in the past. Harvesters must have ongoing, daily experiences and spiritual relations with all that is part of the ecosystem so they can watch for and see inconsistencies and change – whether rapid or slow.[119] This is maintained through walking and watching ʔekwǫ̀ habitat and harvesting in culturally appropriate ways.

Tłı̨chǫ participants in the *"Wolf Knowledge and Perspective"* TK study questioned the effectiveness of using GNWT's techniques, *"wolves are not going to wait to be monitored; they are very smart and fast"*.[120] In contrast to periodic scientific monitoring, monitoring based on Tłı̨chǫ experiential knowledge – observing, experiencing and sharing stories – is done on a regular and consistent basis by harvesters who know the land.[121]

By putting the Tłı̨chǫ Research and Monitoring Program in place, harvesters and elders will once again be in their intellectual and spiritual role to watch and experience the land so they can share what they observe and ensure people can respond quickly to occurrences that will impact their lives.

---

[118] PR (BATH 2019): 023 - "These Trees Have Stories to Tell" Linking Denésǫliné Knowledge and Dendroecology in the Monitoring of Barren-ground Caribou Movements in the Northwest Territories, Canada; PR (BATH 2019): 027 - Tłı̨chǫ Knowledge of Environmental Changes: Implications for Caribou Hunting; PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłı̨chǫ Knowledge and Perspectives on ekwò˛(Barrenland Caribou); PR (BATH 2019): 029 - Monitoring the Relationship between People and Caribou; PR (BATH 2019): 030 - Renewing our traditional laws through joint ekwǫ (caribou) management; 031 - Łeghágots'enetę (learning together): the importance of indigenous perspectives in the identification of biological variation; PR (BATH 2019): 033 - Boots on the Ground Caribou Monitoring Program 2017 Results; PR (BATH 2019): 034 - Boots on the Ground Caribou Monitoring Program - Monitoring Results 2016; PR (BATH 2019): 035 - "We Watch Everything" A Methodology for Boots on the Ground Caribou Monitoring; and PR (BATH 2019): 036 - Ekwò zò gha dzô nats'êdè "We Live Here For Caribou" Cumulative Impacts Study on the Bathurst Caribou.

[119] PR (BATH 2019): 029 - Monitoring the Relationship between People and Caribou; PR (BATH 2019): 030 - Renewing our traditional laws through joint ekwǫ (caribou) management; PR (BATH 2019): 032 - "We monitor by living here": Developing monitoring methods based in Indigenous knowledge; PR (BATH 2019): 033 - Boots on the Ground Caribou Monitoring Program 2017 Results; PR (BATH 2019): 034 - Boots on the Ground Caribou Monitoring Program - Monitoring Results 2016; and PR (BATH 2019): 035 - "We Watch Everything" A Methodology for Boots on the Ground Caribou Monitoring.

[120] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd.

[121] Ibid.

"We find our voices in the land where we have something to say, where we can contribute something."[122] (Dr. John B. Zoe, 2019)

Recommendation #15-2019 (Kǫk'èetì Ekwǫ̀): Tłı̨chǫ Research and Monitoring Program
To ensure that both ʔekwǫ̀ and ʔekwǫ̀ habitat monitoring, and realistic harvesting numbers are recorded in a culturally appropriate manner, and to contribute adaptive management, TG will implement the Tłı̨chǫ Research and Monitoring Program, starting in January 2020 (See Appendix H).

The WRRB is aware that the effects of climate change are already being felt and that the changes on the ʔekwǫ̀ ranges are measurable. The question now is what can be done about the effects of climate change on ʔekwǫ̀, and their ecological relationships, including people. The WRRB sees this as best answered by having more observers on the ground[123] and then ensuring that their observations are integrated into adaptive management for the herd. The WRRB believes that using more people on the ground (as indexed, for example by the number of observer days) is essential for adaptive management.

Tłı̨chǫ harvesters' and elders' holistic knowledge of the environment allows them to place the behaviour of humans into the ecosystem, which is why they can understand the reality of climate change.[124] Tłı̨chǫ harvesters and elders know that ʔekwǫ̀ will not migrate to places where there is no food. For example, dry conditions (high temperatures and low precipitation), wildfires, and lack of vegetation are indicators of climate change that harvesters can see on the land.

Recommendation #16-2019 (Kǫk'èetì Ekwǫ̀): Climate Change
To better understand the effects of climate change on ʔekwǫ̀, TG will systematically collect on-the-ground climate change observations including but not limited to (i) dry conditions, (ii) wildfires, and (iii) lack of vegetation, during the Ekwò Ņàxoède K'è program and the Tłı̨chǫ Research and Monitoring Program. Results of the monitoring programs should be designed to contribute an adaptive management framework and be reported to the WRRB and GNWT annually.

The Joint Proposal's Table 4 summarises the biological monitoring indicators, frequency, rationale, and options for management actions.[125] In the context of adaptive management, the WRRB finds that only four of the nine biological indicators in Table 4

[122] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[123] PR (BATH 2019): 033 - Boots on the Ground Caribou Monitoring Program 2017 Results.
[124] PR (BATH 2019): 027 - Tłı̨chǫ Knowledge of Environmental Changes: Implications for Caribou Hunting).
[125] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

have corresponding adaptive monitoring options and even those four are generalized rather than specific actions. The table is similar to that proposed for the Sahtì ekwǫ̀ in the 2019 Joint Proposal. When asked during the public hearing about the possibility of expanding and revising the table to make it more detailed and responsive for that herd, GNWT stated that they would need to discuss with their senior level management and pointed to the *Taking Care of Caribou Management Plan.*[126]

Given the 29% annual rate of decline for the Kǫk'èetì ekwǫ̀ herd, there is an urgent need to increase the speed in which managers react to changes in the herd and implement management actions. The WRRB is concerned about delays in implementation of management actions and the failure to implement the majority of the WRRB's recommendations. TG and GNWT acknowledged the need to speed up management responses. In the Joint Proposal, they propose increasing reviews of management actions from every three years to annually.[127] However, no mechanism is proposed. An adaptive management framework could minimize delay in the implementation of management action and proposals. An adaptive management framework must involve the Board for the reasons set out in Section 12.5.1 of the Tłı̨chǫ Agreement.[128] Such an approach provides for pre-identified management actions based on thresholds agreed to by management authorities, which then can be implemented in a timelier matter.

Adaptive management is now a standard part of management although in practice, it has sometimes struggled in the implementation phase.[129] The WRRB is of the view that such a framework can be developed in collaboration with governments. The Joint Proposal has already provided a rationale for specific monitoring thresholds and the management decisions that those thresholds trigger.[130]

The Joint Proposal refers to an *"integrated suite of recovery management actions"* but does not supply a mechanism for integration.[131] There is no evidence which describes how the individual management actions will be integrated, which is problematic as there will be trade-offs between them depending on monitoring results. The WRRB suggests that the integration of management actions should be achieved through an adaptive management framework. The framework should also identify how to integrate on-the-ground observations and climate change into management activities. The strength of an

[126] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[127] Ibid.
[128] See Section 12.5.1 of the Tłı̨chǫ Agreement.
[129] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[130] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[131] Ibid.

adaptive management framework is to build it collaboratively, which is the basis of the WRRB recommendation.

Recommendation #17-2019 (Kǫk'èetì Ekwǫ̀): Adaptive Management Framework
To ensure timelier implementation of management and monitoring actions, WRRB, TG and GNWT will collaborate to develop a herd-specific adaptive management framework with the thresholds linked to specific management actions by January 2020, with the WRRB taking a lead role for herds in Wek'èezhìı. The framework will take into consideration Tłı̨chǫ and scientific knowledge, existing management plans, and decisions and recommendations from Boards and governments.

7.7. Implementation of Recommendations from 2010, 2016 and 2019

The WRRB is troubled by the time it has taken governments to implement approved Board recommendations given that the Kǫk'èetì ekwǫ̀ herd has been declining by 19 to 29% every 3 years since 2012.

Based on the Board's previous proceedings, 60 recommendations were submitted in 2010 to TG and GNWT.[132] In 2016, the WRRB submitted 26 recommendations and one determination to the two governments.[133] The Board notes that, to date, only the determination and 25 of the 82 recommendations accepted or varied by TG and GNWT have been fully implemented (Appendix D and F). Consequently, the WRRB is of the view that perhaps a different approach will be more effective. The Board believes that a more intensive application of an adaptive management framework is needed to capitalize on the Board's and government's collective efforts. Given the urgency of decisive management action for the Kǫk'èetì ekwǫ̀ herd, it is the Board's opinion that an adaptive management framework would lead to more timely and effective management actions, which are essential to address the herd's decline.

Recommendation #18-2019 (Kǫk'èetì Ekwǫ̀): Implementation
To track the progress of implementation of the Board's recommendations, TG and GNWT will provide to the WRRB the following: (1) an implementation plan for the 2019 recommendations by January 31, 2020; (2) a summary report, within one year of the acceptance or variance of the Board's 2019 recommendations, on proposed management actions, including an evaluation of the success of implementation of management actions; and,

[132] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.
[133] PR (BATH 2019): 040 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A; and PR (BATH 2019): 041 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.

(3) an updated implementation plan for the 2010 and 2016 recommendations and an evaluation of all outstanding recommendations by January 31, 2020.

The Board notes that continued implementation of the TK recommendations is both mandatory and essential to ensure that the WRRB and other wildlife managers in Wek'èezhìı have appropriate information to make balanced decisions.

8.0. Conclusion

With the Kǫk'èetì ekwǫ̀ herd in a critical state, there is an urgent need to implement effective management actions to halt the decline as soon as possible. The Board's decisions in this report have been structured to have the least impact on ʔekwǫ̀ users and the greatest benefit to ʔekwǫ̀ that we can provide at this time.

> *"… a way of life, in relation to the caribou is described in the Tłı̨chǫ Agreement, which is 12.1.1, which encompasses our livelihood and we try to capture that in our agreement to ensure that we always have a connection to the caribou, the activity around the caribou and the ceremonial games that happen around the -- the caribou and the travel. Everything that we -- that we had was in relation to the caribou".*[134] (Dr. John B. Zoe, 2019)

Users, managers and governments must act now, in whatever way possible, to protect the herd and its habitat so that future recovery may be possible. The need is urgent. The Kǫk'èetì ekwǫ̀ herd has declined to the point where some cows, possibly to have the best chance to raise their calves, have emigrated to a neighboring herd's calving ground. These changes increase uncertainty for co-managers and governments. A collaborative and adaptive management is essential to ensure a future for Kǫk'èetì ekwǫ̀.

[134] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd

APPENDIX A 2019 Joint Proposal

Mr. Joseph Judas, Chair
Wek'èezhìi Renewable Resources Board
4504 49TH AVENUE
YELLOWKNIFE NT X1A 1A7

Dear Mr. Judas:

Joint Management Proposal for Bathurst Caribou

The Tłı̨chǫ Government and the Department of Environment and Natural Resources, Government of the Northwest Territories would like to submit to the Wek'èezhìı Renewable Resources Board (WRRB) a management proposal for the period of July 2019 to July 2021 for the Bathurst herd.

We look forward to hearing from the WRRB on our proposal on these caribou management and monitoring actions.

Sincerely,

Mr. Michael Birlea, Manager Lands Protection & Renewable Resources
Department of Culture and Lands Protection, Tłı̨chǫ Government
Behchokǫ̀, NT
MichaelBirlea@tlicho.com

Mr. Bruno Croft, Superintendent,
North Slave Region
Environment and Natural Resources
Yellowknife, NT
Bruno_croft@gov.nt.ca

Attachment

c. Honourable Robert R. McLeod
Premier

Mr. Gary Bohnet, Principal Secretary
Executive and Indigenous Affairs

Mr. Mike Aumond, Secretary to Cabinet/Deputy Minister
Executive and Indigenous Affairs

Ms. Shaleen Woodward, Deputy Secretary
Indigenous and Intergovernmental Affairs
Executive and Indigenous Affairs

Dr. Joe Dragon, Deputy Minister
Environment and Natural Resources

Ms. Rita Mueller, Assistant Deputy Minister, Operations
Environment and Natural Resources

Dr. Brett Elkin, Director, Wildlife
Environment and Natural Resources

Grand Chief George Mackenzie
Tłı̨chǫ Government

Chief Clifford Daniels
Community Government of Behchokǫ̀
Tłı̨chǫ Government

Chief David Wedawin
Community Government of Gamètì
Tłı̨chǫ Government

Chief Charlie Football
Community Government of Wekweètì
Tłı̨chǫ Government

Chief Alfonz Nitsiza
Community Government of Whatì
Tłı̨chǫ Government

Ms. Laura Duncan, Tłı̨chǫ Executive Officer
Tłı̨chǫ Government

Ms. Tammy Steinwand-Deschambeault, Director, Culture and Lands Protection
Tłı̨chǫ Government

Chief Maurice Moses
Pehdzéh Kį́ First Nation

Chief Edward Sangris and Band Council
Yellowknives Dene First Nation (Detah)

Chief Ernest Betsina and Band Council
Yellowknives Dene First Nation (N'Dilǫ)

Chief Darryl Marlowe and Band Council
Lutsel K'e Dene First Nation

Chief Louis Balsillie and Band Council
Deninu Kue First Nation

Ms. Ethel Liske, ADFN Negotiations Coordinator
Akaitcho Dene First Nations

Chief Frieda Martselos
Salt River First Nation #195

Grand Chief Gladys Norwegian
Dehcho First Nation

President William (Bill) Enge
North Slave Metis Alliance

President Garry Bailey
Northwest Territory Metis Nation

President Clem Paul
Mountain Island Metis

Ms. Jody Pellissey, Executive Director
Wek'èezhìi Renewable Resources Board

Mr. George Barnaby, Interim Chair
Sahtú Renewable Resources Board

Ms. Deborah Simmons, Executive Director
Sahtú Renewable Resources Board

Mr. Jozef Carnogursky, Chair
Gwich'in Renewable Resources Board

Ms. Amy Amos, Executive Director
Gwich'in Renewable Resources Board

Mr. Larry Carpenter, Chairperson
Wildlife Management Advisory Council-NWT

Ms. Jody Pellissey
Advisory Committee for Cooperation on Wildlife Management

Mr. Vernon Amos, Chairperson
Inuvialuit Game Council

Ms. Jodie Maring, Resource Coordinator
Wildlife Management Advisory Council (NWT)

Mr. Ron Robillard, Chief Negotiator & President
Athabasca Denesuline Né Né Land Corporation

Mr. Daniel Shewchuk, Chairperson
Nunavut Wildlife Management Board

Ms. Aluki Kotierk, President
Nunavut Tunngavik Inc.

Mr. Larry Adjun, Chair
Kugluktuk Hunters and Trappers Organization

Mr. Sam Kapolak, Chair
Burnside Hunters and Trappers Organization (Bathurst Inlet)

Mr. Peter Kapolak, Chair
Umingmaktok Hunters and Trappers Organization (Bay Chimo)

Mr. Attima Hadari, Chair
Kitikmeot Regional Wildlife Board

Mr. Stanley Anablak, President
Kitikmeot Inuit Association

Mr. Steve Pinksen, Deputy Minister
Department of Environment, Government of Nunavut

Mr. Drikus Gissing, Wildlife Director
Department of Environment, Government of Nunavut

Wek'èezhìi Renewable Resource Board
Management Proposal

1. Applicant Information
Project Title: Government of the Northwest Territories and Tłı̨chǫ Government Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021
Contact Persons: **Organization Names:** **Addresses:** **Phone/Fax Numbers:** **Email addresses:** Michael Birlea Lands Protection and Renewable Resources Manager Department of Culture and Lands Protection Tłı̨chǫ Government (TG) Behchoko, NT. X0E 0Y0 Phone: 867-392-6381 Ext: 1355 Fax: 867-392-6406 MichaelBirlea@Tłı̨chǫ.com Bruno Croft Regional Superintendent North Slave Region Department of Environment & Natural Resources (ENR) Government of the Northwest Territories 2nd Floor, ENR Main Building P.O. Box 2668 3803 Bretzlaff Drive Yellowknife, NT. X1A 2P9 Phone: 867-767-9238 Ext: 53234 Fax: 867-873-6260 Bruno_Croft@gov.nt.ca

2. Management Proposal Summary	
Start Date: July 1, 2019	**Projected End Date:** July 1, 2021
Length: 2 years	**Project Year:** 1 of 2
A June 2018 photographic calving ground survey of the Bathurst herd shows that the population has continued to decline by ~58% since the previous survey in 2015. The June 2018 Bathurst caribou survey estimates were 3,636 ± 1,253 (95% CI) breeding females and an overall herd estimate of 8,207 ± 3,008 (95% CI) caribou. Low rates of survival in adult female caribou, and low and variable rates of productivity (due to a combination of low fecundity and poor calf survival rates) are the main reasons for the continued decline. This joint management proposal for the Bathurst herd has been prepared as an update to the December 2015 proposal submitted to the Wek'èezhìi Renewable Resource Board (WRRB).	

The proposal describes 11 management recommendations according to the following five themes: 1) harvest management, 2) wolf (díga) management, 3) habitat and land use, 4) education, and 5) monitoring and research.

1) Harvest Recommendations for Bathurst Ekwǫ̀

- TG and ENR recommend that the Total Allowable Harvest (TAH) for the Bathurst herd remain at zero (0) in the Northwest Territories, and be reviewed within 2 years, following completion of the next Bathurst calving ground survey and analyses of available demographic data (as per WRRB Determination #1-2016; WRRB 2016a).

- TG and ENR recommend continuation of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA – also referred to as the 'Bathurst mobile conservation area') as the means for managing and implementing the TAH of zero for the Bathurst herd.

- TG and ENR recommend continuation of regular aerial and ground-based surveillance of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA) through the fall and winter harvest seasons.

2) Wolf (díga) Management

- ENR and TG are developing a joint proposal for diga management on the Bathurst and Bluenose-East (BNE) ekwǫ̀ ranges, which will be submitted as a separate joint management proposal to the WRRB in 2019.

3) Habitat and Land Use

- ENR and TG acknowledge the multi-year work completed by the Bathurst Caribou Range Plan (BCRP) Working Group and recommend that the BCRP (ENR 2018) be finalized, endorsed, and implemented by governments, the WRRB, industry, communities and other Range Plan partners. Recommended implementation actions in the BCRP should be initiated in 2019 to develop and apply effective policies and practices within an adaptive management framework and 5-year review interval, which will help address potential cumulative effects of range (habitat) disturbance and land use on Bathurst caribou.

- TG and ENR recommend that additional work be done by indigenous governments and organizations across the Bathurst range through TK research to continue identifying key landscape features and specific areas (eg: ekwǫ̀ no'oke – water crossings, tataa – land crossings, important unburned winter habitat, and important migration routes and habitats in seasonal ranges) that are important to caribou and may require conservation measures to manage potential disturbance and/or protect habitat areas.

4) Education

- Despite the recommendation for a TAH of zero for the Bathurst herd, TG and ENR suggest a coordinated suite of education/public awareness initiatives to improve general public knowledge of ekwǫ̀, and to promote respectful hunting practices that would reduce wounding and wastage in other areas where ekwǫ̀ are harvested.

- Tłı̨chǫ Government plans to continue and expand its delivery of programs focused on cultural practices on-the-land. These programs emphasize continued use and maintenance of traditional sites and trails. ENR will collaborate and support these programs through its the On-The-Land unit.

5) Monitoring and Research of Bathurst Ekwǫ̀

- Updated biological monitoring of the BNE and Bathurst herds, mostly led by ENR, is proposed for 2019-2021. A key focus of the increased monitoring is to provide annual information on productivity and survival of caribou calves and adult cows, as well as increased surveys to estimate herd size. This enhanced monitoring is in part proposed to help assess effectiveness of wolf management actions.

- TG and ENR recommend expansion of the Tłı̨chǫ "Boots on the Ground" traditional knowledge monitoring and guardianship program on the Bathurst range.

- TG and ENR recommend increased research into underlying drivers of change in Bathurst herd abundance through collaboration with academics and other researchers (including remote sensing specialists), using both scientific and traditional knowledge approaches.

Please list all permits required to conduct proposal.

NWT and Nunavut (NU) Wildlife Research Permits will be required annually to conduct monitoring recommended in this proposal.

The WRRB may hold a hearing to review management of Bathurst caribou, including a Total Allowable Harvest.

3. Background

3.1 BATHURST CARIBOU STATUS IN 2018

The June 2018 calving ground photographic survey resulted in an estimate of 3,636 ± 1,253 (95% CI) breeding females and an overall herd estimate of 8,207 ± 3,008 caribou in the Bathurst herd (Figure 1) (GNWT unpublished data). This result indicates that the herd has declined by ~58% since the last survey in June 2015, which estimated 8,075 ± 3,467 breeding females and an overall herd size of 19,769 ± 7,420 caribou in the Bathurst herd (Boulanger et al. 2017). A basic comparison of the two recent population estimates suggests that the Bathurst herd has declined at an annual rate of approximately 29% per year over the last three years.

A comparison of the June 2018 and 2015 estimates suggests that the Bathurst herd may have declined at a faster rate in the last three years than the annual rate of decline of approximately 19% observed between surveys in 2015 and 2012. As a basis for comparing these trends, if a caribou population were to continue declining at annual rates of 29% or 19%, it would be half of its size within ~2.5 years and ~3.7 years respectively.

Based on a recent assessment and status report (SARC 2017), the NWT Conference of Management Authorities listed barren-ground caribou as *Threatened* in the Northwest Territories in February 2018. As a previously large migratory barren-ground caribou herd that sustained an annual harvest of thousands of caribou (Case et al. 1996), the management implication for the Bathurst herd at its current size and trend is that it may not recover for decades to a size that could sustain a meaningful level of hunting. Indeed, it is almost ten years since the first harvest restrictions were placed on the Bathurst herd in winter 2010.

Based on a comparison of the 2009 and 2018 population estimates, the overall extent of decline for the Bathurst herd within the past 10 years is ~74%, which meets the population criterion of "endangered" (Table 2 in COSEWIC 2015). If the recent annual rate of decline observed between 2015 and 2018 (~29% per year) were forecast 10 years in to the future, the herd status would meet the population criterion of “critically endangered” (Table 2 in COSEWIC 2015). Thus, the current small and declining number of mature caribou in the Bathurst herd is a critical conservation status that requires implementation of an integrated suite of recovery management actions that continue and support the Total Allowable Harvest (TAH) of zero (0) established in 2016 (Determination #1-2016 in WRRB 2016a) along with enhanced monitoring. It is also worth noting that the current small size and trend of the Bathurst herd place it well below the low management threshold (i.e., red phase of low numbers) as defined for the Bluenose East and West herds by the Advisory Committee for Cooperation on Wildlife Management (ACCWM 2014).

Despite variability and small sample sizes in available datasets, the key population processes in the Bathurst herd that have likely contributed to its continued and rapid rate of decline are:
1) relatively low rates of survival (i.e. high rates of mortality) in adult female caribou; and
2) low and variable rates of productivity that generally reflect a combination of low fecundity and poor calf survival rates (i.e., calf recruitment).

A third potential contributing factor to the continued observed rate of decline is a recent increase in the proportion of satellite-collared Bathurst females that switched calving grounds in June 2018 to the coastal calving area along the Queen Maud Gulf.

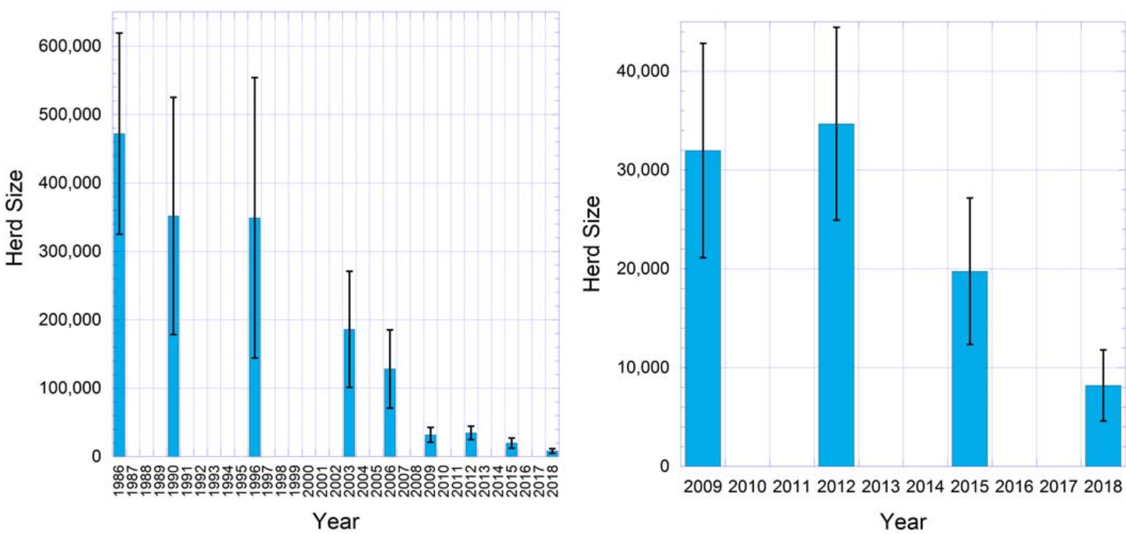


Figure 1. Trend of Bathurst caribou herd 1986-2018 (left) and 2009-2018 (right) based on calving ground photographic surveys.

(a) <u>Adult female survival, calf survival (recruitment), and fecundity</u>

A detailed demographic analysis by Boulanger et al. (2011), used an ordinary least squares (OLS) model to illustrate that adult female survival of Bathurst caribou declined from 0.86 in 1985 to 0.76 in 2006, followed by an accelerated decline down to 0.67 in 2009 for a net reduction of 19% (Figure 2 in Boulanger et al. 2011). More recent results using the same methodology, suggest that the adult female survival rate has increased to 0.78 (95% CI = 0.76-0.80) from 2009-2015 (Boulanger et al. 2017), which was concomitant with the implementation of harvest management of the herd (WRRB 2010, WRRB 2016a,b). However, this low adult female survival rate combined with low productivity of the herd (after 2011) have been primary drivers for the continued observed decline in the herd.

Although additional OLS model analyses are underway to include the June 2018 Bathurst survey results and other recent demographic data, the previous assessments suggested that the estimate of adult female survival in 2015 (Boulanger et al. 2017) was similar to that estimated from the 2012 calving ground survey (Boulanger et al. 2014). Based on the June 2018 survey results and the continued rapid decline of the herd, it is unlikely that adult female survival rates have improved; indeed, the more concerning case is that adult female survival may have declined.

Late winter composition surveys in late March or early April are used to estimate the proportion of calves that have survived their first year of life upon which their survival rate is assumed to be equal to that of adults. The age ratio data (i.e, calf:cow ratios) from these surveys are reported as the number of calves seen per 100 cows and are used to estimate recruitment of calves to yearlings; although it is also important to consider the possible effect of changing adult female survival rates on observed ratios. Compared to the mid-1980s and mid-1990s, late winter calf:cow ratios for the Bathurst herd dropped throughout the early 2000s (Figure 20a in SARC 2017), and rebounded from 2007 to 2011, and have returned to low levels since 2012 (Figure 2).

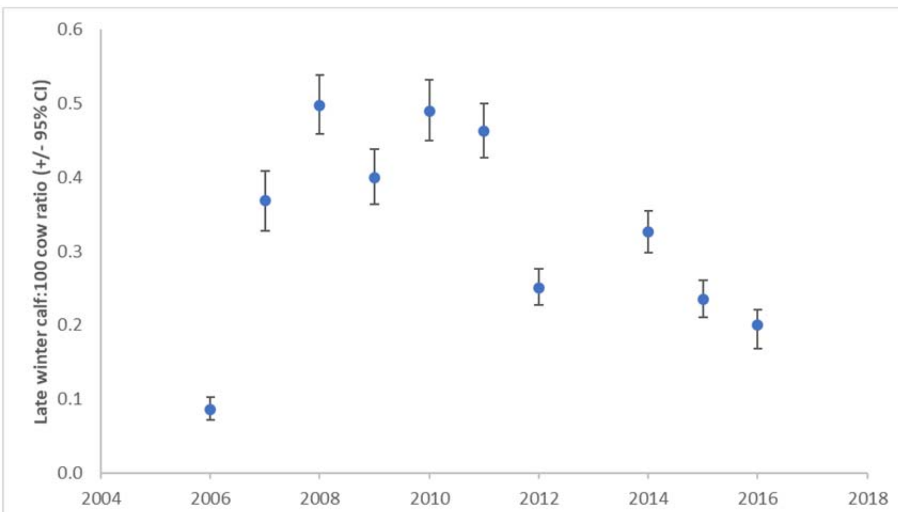


Figure 2. Bathurst caribou calf:cow ratios (+/- 95% CI) from late winter composition surveys (Mar-Apr). Data source: Cluff et al. (2016).

Combined with estimates of adult female survival (*S*), calf recruitment estimates (*R*) derived from late winter composition surveys may be used to estimate the finite rate of increase (λ) for the caribou population, where: $\lambda = S \,/\, (1 - R)$ (Hatter and Bergerud 1991, and see detailed methodology and assumptions in DeCesare et al. 2012). Thus, based on available information, the Bathurst herd will continue to decline without marked improvements in adult female survival and calf recruitment. Table 1 illustrates that given an estimated low adult female survival rate of 0.78, even during years with comparatively good calf recruitment (*i.e.*, 44 calves:100 cows observed in late winter), the population would decline at a rate of ~5% per year (λ = 0.952). Using the same assumption for adult female survival, the rate of decline is much steeper (~13% annual rate of decline or λ = 0.877) when recruitment rates are low (*i.e.*, 25 calves:100 cows observed in late winter), such as those observed recently from 2012-2016 (Figure 2). As a reference example, a population with an adult female survival rate of ~0.85 and late winter composition of ~35 calves:100 cows would be stable; and improvements in either parameter value would result in population increases.

Table 1. Deterministic population growth rates (λ and *r*) based on an average adult female survival rate (*S*) of 0.78, and comparatively high and low rates of calf recruitment (R_{RM}). High and low recruitment rates were

estimated from geometric means of calf:cow ratios (*X*) observed during late winter composition surveys for the Bathurst herd in 2007-2011, and 2012-2016, respectively (see Figure 2). Calculations were based on methods described by DeCesare et al. 2012 (and see Gunn et al. 2005).

	Average Calf:Cow Ratio (2007-2011)	Average Calf:Cow Ratio (2012-2016)
Calf:Cow Ratio (*X*)	0.440	0.249
Ad F Survival (*S*)	0.780	0.780
Adjusted Recruitment (R_{RM})	0.180	0.111
1-R_{RM}	0.820	0.889
finite rate of increase (λ)	0.952	0.877
exponential rate of increase *(r)*	-0.050	-0.131
(+) doubling or (-) halving time (years)	-14.0	-5.3

Fecundity is the proportion of breeding aged females that successfully give birth to a viable live calf. Pregnancy rates are a useful index of fecundity, although the rate of live births in breeding-aged females is generally lower because of *in utero* mortality of fetuses due to absorptions or abortions, and early mortality of neonates including stillbirths. Spring composition surveys on the calving grounds conducted during or shortly after the peak of calving may be used to estimate fecundity in barren-ground caribou and is based on the ratio of counts of productive females (i.e., cows with newborn calves, distended udders, and/or with hard antlers) to total adult females (Boulanger et al, 2011). Fecundity is a key demographic parameter because it reflects the reproductive potential for growth of a population, which for the Bathurst herd has been trending downward (Table 2). Combined with estimates of calf survival (i.e., recruitment), estimates of fecundity provide an understanding of the productivity of a caribou population. Figure 3 illustrates a declining pattern of productivity for Bathurst caribou due to declining trends of calf survival and fecundity from 2007 to 2014; this analysis is currently being updated to include recent data from 2015 to 2018.

Table 2. Estimates of fecundity from composition surveys conducted in conjunction with June calving ground photographic surveys

Calving Ground Survey Year	2009	2012	2015	2018
Fecundity (% of breeding females relative to total females)	84%	82%	61%	72%

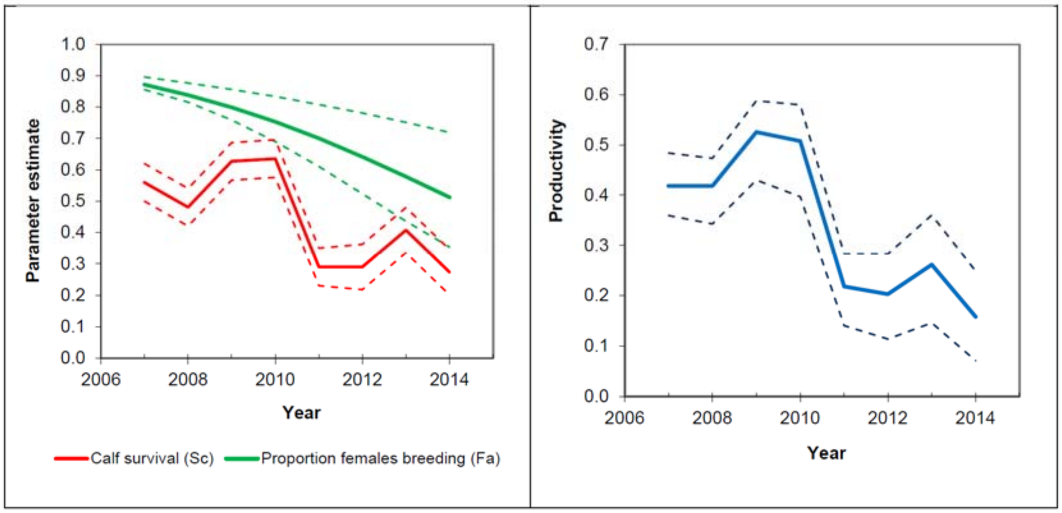


Figure 3. Trends in productivity of the Bathurst caribou herd, where productivity is the product of calf survival and fecundity. The trend lines for calf survival, fecundity and productivity are the most supported demographic parameters OLS model results in Boulanger et al. 2017 (Table 20, Model 1). Data source: Figure 30 in Boulanger et al. (2017).

(b) Calving ground fidelity

As summarized by Gunn and Miller (1986), there is convincing empirical evidence that female barren-ground caribou generally have strong fidelity to their calving grounds, and that fidelity to a calving ground is a reliable basis for defining and monitoring caribou herds. For migratory barren-ground caribou in the Northwest Territories and Nunavut, datasets from collared adult females tracked over multiple calving events illustrate that fidelity to calving grounds is consistent, with limited rates of switching occurring between neighboring herds.

An important assumption of demographic analyses on the Bathurst herd has been that net movement of Bathurst caribou to or from adjacent calving grounds (Bluenose-East and Beverly-Ahiak) is low to negligible, and that the main drivers of population change are rates of calf production and survival of caribou (Boulanger et al 2017). This assumption has been tested by documenting and evaluating the frequency by which collared caribou cows switch to or from neighbouring calving grounds. And up until June 2018, switching of parturient Bathurst female caribou to adjacent calving grounds has been very low and was unlikely to account for the declining trend observed through 2015 (Figure 4).

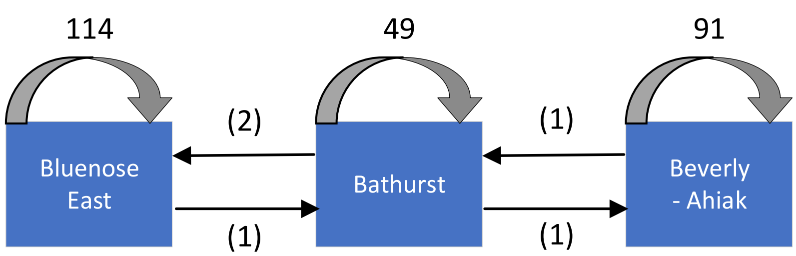


Figure 4 (Figure 30 in Boulanger et al. 2017). Rates of switching between calving grounds of collared caribou cows from Bathurst and neighbouring herds where at least two consecutive June locations were known, 2008-2015. Each pair of locations represents one data point. The numbers of cases where a cow returned to the same calving ground are shown above the curved grey arrows, and the cases where cows moved away from or on to the Bathurst calving ground are indicated by the straight black arrows with associated numbers in parentheses. Based on these data, ~94% (49/52) of paired calving locations for collared Bathurst cows exhibited fidelity to the Bathurst calving ground, while ~6% (3/52) showed switching behavior of Bathurst cows to adjacent calving areas.

During the calving period in June 2018, 3 of 11 known collared Bathurst cows (their locations in June 2017 or earlier were known) were located on the Queen Maud Gulf (QMG) coastal calving area of the Beverly-Ahiak herd. During winter 2017-2018, the collared Bathurst cows and bulls were heavily mixed with collared cows and bulls of the Beverly-Ahiak caribou that calve in the QMG. Additional analyses are being done to evaluate the demographic implication of the three collared Bathurst cows switching to the Queen Maud Gulf coastal calving area. However, the observed switching of the Bathurst cows was likely a consequence of the herd's small size and ongoing decline due to low adult female survival and calf productivity, rather than a previously undetected range shift being a cause of the decline. The large size disparity between the 2 herds may have contributed to the gregarious movement of the much smaller Bathurst herd with its larger eastern neighbor (8,200 Bathurst caribou as reported here vs about 100,000 Beverly/Ahiak caribou; M. Campbell, Government of NU, pers. comm. Oct. 2018).

As described by Gunn et al. (2012), gregariousness of female caribou during calving is a strategy for reducing predation risk and is a principal reason for high densities of breeding females on a calving ground. But as a population of migratory barren-ground caribou declines below a small threshold size, spatial fidelity to a calving area may start to break down resulting in a partial or complete shift in use of a calving area. Indeed, Adamczewski et al. (2015) suggested that a rapid numerical decline in abundance of the Beverly herd driven mainly by low cow survival and poor calf productivity led remaining Beverly cows, *circa* 2006, to switch to the coastal calving ground utilized by the larger, neighboring Ahiak herd. Due to the range shift of remaining few Beverly caribou, Adamczewski et al. (2015) posited that the Beverly herd no longer exists as a distinct herd.

Initial review of Bathurst calving ground surveys illustrates that densities of breeding females within photographic strata declined sharply in 2009 (3.5 breeding females/km^2) and have remained low with the 2018 survey having the lowest observed density (2.7 breeding females/km^2) (Figure 5). At this juncture, the key issues are 1) whether the initial observed rate of switching will continue and increase in subsequent calving periods especially if the Bathurst herd continues to decline; and 2) whether the switching observed for three Bathurst cows in June 2018 was an isolated occurrence and the rate of switching resumes at previously observed low levels and spatial fidelity to that Bathurst calving ground is maintained. The management implication of an increase in the rate of switching by Bathurst cows is that it may result in a breakdown of spatial fidelity and a shift in calving distribution, which in turn may accelerate the herd's numerical decline because an increasing proportion of Bathurst cows become integrated in to the calving and seasonal distribution of Beverly-Ahiak caribou. If this were to happen it would further reduce the likelihood of recovery for the Bathurst herd.

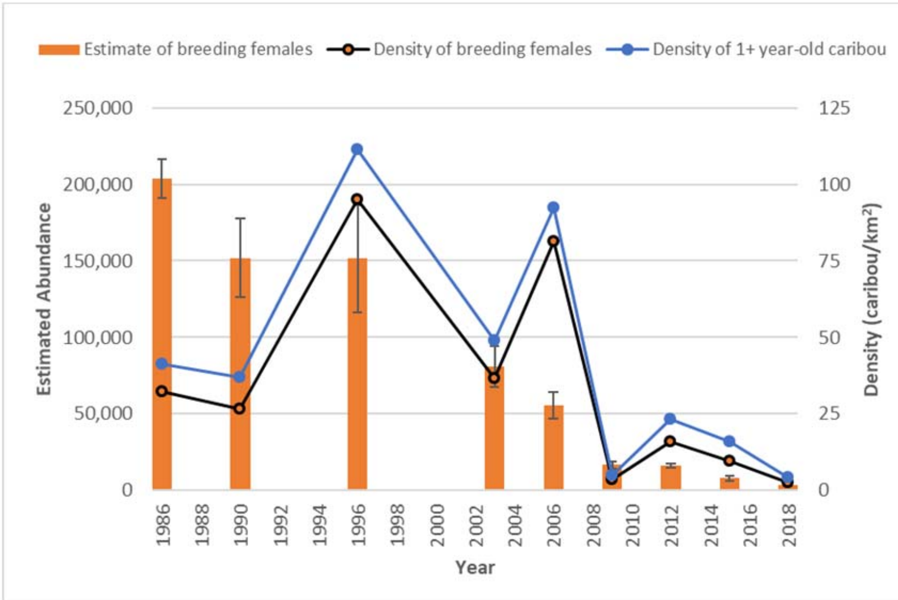


Figure 5. Estimates of breeding females (± SE) and associated average densities from 9 photographic calving ground surveys of the Bathurst caribou herd (1986-2018). Average caribou densities were derived from estimated abundance of caribou within the area (km^2) of photographic strata (mean 1.8; range 1-4 strata) that contained most of the breeding females for a survey (mean 95%; range 86%-100%).

3.2 OVERALL MANAGEMENT PROCESS

Chapter 12 of the Tłı̨chǫ Agreement requires that WRRB, TG, GNWT, and Canada develop an overall long-term management planning process for the Bathurst herd. This process is being developed with those parties that have jurisdiction over any part of the Bathurst range and with Aboriginal peoples who traditionally harvest the herd. Organizational meetings to define this long-term process began in 2012 and a Bathurst Caribou Advisory Committee (BCAC) was recently established in 2016. Further meetings in 2017 and 2018 resulted in agreement to update the 2004 management plan for the herd.

TG and ENR are committed to implementing the Tłı̨chǫ Agreement through continued collaboration with the WRRB and other partners in developing a comprehensive management process, which will include a Bathurst caribou management plan. Short term proposals such as this current one, include perspectives for management and monitoring of harvest and predators, as well as for management of development activities, caribou habitat, and other potential factors affecting the herd. This proposal is not intended to pre-empt any part of the comprehensive planning process for the Bathurst herd.

(a) Range planning and environmental assessment processes for the Bathurst herd

In recognition of the importance of habitat conservation and management, and in light of the scale of current and proposed development on the Bathurst herd's annual range, work to develop a range plan for the Bathurst herd was initiated by ENR in 2013. The purpose of the range plan is to provide guidance on how to monitor, assess and manage cumulative effects of human disturbance on the historic range of the Bathurst herd. This plan was developed through a multi-partner collaborative process and will eventually need to be included under the comprehensive management process required by the Tłı̨chǫ Agreement. A completed version of the Bathurst Caribou Range Plan is under review of the GNWT Cabinet (ENR 2018).

(b) Joint Management Proposals and WRRB recommendations 2007-2016

This proposal defers to the WRRB's Reasons for Decision (WRRB 2016a and 2016b) for a comprehensive overview of previous proceedings (2007, 2010, 2016) and board determinations and recommendations regarding the management of the Bathurst ekwǫ herd. These WRRB documents emphasize the need to manage the herd in a comprehensive, holistic manner and this proposal has been developed to address monitoring and management in a comprehensive manner.

(c) Scope of the current joint TG-ENR management proposal

This proposal continues and builds on management and monitoring recommendations that were developed in the 2015 joint TG-ENR joint management proposal and is meant to be consistent with the WRRB's previous determination on a total allowable harvest for the Bathurst ekwǫ herd (WRRB 2016a), and other management recommendations (WRRB 2016a and 2016b).

Results from the June 2018 Bathurst calving ground photographic survey show that the herd has continued to rapidly decline; those survey results and preliminary demographic analyses provide the basis for this updated joint management proposal from TG and ENR.

4. Description of Proposed Management Action

4.1 GOAL OF MANAGEMENT ACTIONS

The short-term goal of the proposed management actions is to halt the Bathurst herd's decline and promote recovery. In the 2015 proposal, the stated goal was to halt the Bathurst herd's decline within 3 years. Based on the 2018 survey results, the management goal has not been met as the herd has declined further. Nevertheless, this proposal maintains an ambitious timeframe for stabilization of the herd to highlight the need for implementing challenging but timely management actions, and to reflect a proposed increase in frequency of calving ground surveys (i.e., 2-year interval). The term of the proposal is 2 years, in part to reflect the 2-year interval on population surveys, but also to allow closer monitoring and assessment of whether management actions are effective.

Over the longer-term, the recovery goal is to enable sustainable caribou harvesting that addresses Indigenous community needs levels across this herd's range. Within Wek'èezhìi, the goal is to allow the exercise of Tłįchǫ rights to harvest caribou throughout Mǫwhì Gogha Dè Nįįtłèè.

Recommended actions in this section are summarized initially in bulleted form followed by a brief narrative describing rationale and perspective. The recommendations are structured according to five key themes: 1) harvest management, 2) wolf (díga) management, 3) habitat and land use, 4) education, and 5) monitoring and research.

4.2 HARVEST RECOMMENDATIONS FOR BATHURST EKWÒ

(a) <u>Recommended harvest for the Bathurst herd</u>

- TG and ENR recommend that the Total Allowable Harvest (TAH) for the Bathurst herd remain at zero (0) in the Northwest Territories, and be reviewed within 2 years, following completion of the next Bathurst calving ground survey and analyses of available demographic data (as per WRRB Determination #1-2016; WRRB 2016a).

(b) <u>Bathurst harvest management</u>

- TG and ENR recommend continuation of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA – also referred to as the 'Bathurst mobile conservation area') as the means for managing and implementing the TAH of zero for the Bathurst herd.

Through the Barren-ground Caribou Technical Working Group (BGCTWG), staff from TG, ENR, and the WRRB have updated the "Rules for Definition of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA) for winter 2017-2018" (revised Dec. 16, 2017; Appendix A). As part of the BGCTWG's adaptive management process, two specific recommendations have been developed with respect to harvest management:

1) 40 or more collars should be placed on the Bathurst herd to define its distribution during the harvest season with confidence; and
2) the implementation and effectiveness of the MCBCCA should be evaluated using available information and data since its inception.

The recommendation for increasing the number of collars on the Bathurst herd is developed further in this proposal under the section "Monitoring and Research." The recommendation for an evaluation of the MCBCCA is being undertaken by ENR and TG staff, with a summary report to be completed and provided to the WRRB in 2019.

(c) Monitoring of Bathurst mobile conservation area and compliance

- TG and ENR recommend continuation of regular aerial and ground-based surveillance of the Mobile Core Bathurst Caribou Conservation Area through the fall and winter harvest seasons.

The MCBCCA is monitored regularly (sometimes weekly) until the end of the winter hunting season by aerial reconnaissance flights to increase knowledge of the Bathurst herd's distribution and relative abundance, and to check for any activity (including hunting) on the winter roads to the mines. ENR wildlife officers also regularly conduct ground-based patrols to ensure compliance with the no-harvest regime. Aerial and ground-based surveillance by ENR would continue throughout the winter harvest season in 2019-2020 and in future years.

(d) Nunavut harvest of Bathurst caribou

In June 2016, a TAH of 30 bulls was established by the Nunavut Wildlife Management Board (NWMB) for Bathurst caribou in Nunavut. The June 2018 calving ground survey results indicate a further steep decline in the Bathurst herd, which have been provided to the Government of Nunavut (GN) and other wildlife management authorities in Nunavut.

GN has been working with the Kitikmeot Regional Wildlife Board, local Hunters and Trappers Organizations, communities and the NWMB on these caribou harvest issues; the process in NU includes a needs assessment and community consultation. ENR will remain in frequent contact with GN on these issues and participate where possible in the NWMB process.

4.3 WOLF (DÍGA) MANAGEMENT

(a) Joint Wolf Management Proposal for BNE and Bathurst Ranges

- ENR and TG are developing a joint proposal for diga management on the Bathurst and Bluenose-East (BNE) ekwǫ̀ ranges, which will be submitted as a separate joint management proposal to the WRRB in 2019. An overview of the rationale and strategies for díga management are highlighted in the section below.

The continued rapid decline in the Bathurst and BNE herds 2015-2018 occurred despite a very limited harvest of both herds between the NWT and NU. Low adult and calf survival rates in the herds suggest that predation is a key limiting factor. Since wolves are the primary predator of barren-ground caribou, several wolf management strategies are outlined below that are under consideration.

In addition to joint management proposals for the two caribou herds (including this document), a separate joint proposal for wolf management is currently under development that will include the ranges of both herds. Efforts to date to increase wolf harvest in the North Slave region, including GNWT incentives for wolf harvesters and the TG program to train wolf harvesters in culturally appropriate ways to hunt wolves, have not resulted in a meaningful increase in numbers of wolves taken. The new proposal will recommend ways to ensure that wolf harvest is increased to a level where caribou survival rates will be measurably increased. This will require more intensive wolf removal programs because small-scale wolf reductions are generally ineffective at increasing caribou survival rates.

(b) Continued TG program to train wolf harvesters

In January 2016, A pilot project proposal by TG and ENR described the approach that was initiated to train Tłı̨chǫ wolf hunters from the 4 communities in harvesting wolves using culturally appropriate methods. This program will be redesigned as a contributing component to the joint management proposal on wolves that is currently under development.

(c) Bathurst wolf management feasibility assessment 2017

A collaborative feasibility assessment of wolf management options for the Bathurst caribou range led by the WRRB, ENR and TG was completed in 2017 (Wolf Feasibility Assessment Technical Working Group 2017). The assessment considered 11 options including lethal and non-lethal methods, their potential effectiveness, costs and humaneness. This feasibility assessment will provide a basis for developing wolf management strategies for the Bathurst and Bluenose-East ranges.

(d) Increased GNWT incentives for wolf harvesters

In 2010, GNWT increased incentives for wolf harvesters to reduce predation and promote caribou recovery. The incentives were increased in 2015 and at that time, the incentives included $200 for an intact unskinned wolf, $450 for a wolf pelt skinned to traditional standards and up to $800 for a wolf pelt skinned to taxidermy standards. Overall, wolf harvest levels across the NWT and in the North Slave region showed no meaningful increase in wolf harvest because of these incentives. A substantial portion of the wolves that were taken were near community landfills, thus not from caribou winter ranges. Recognizing that the incentives to date have been ineffective, GNWT is proposing to increase them to $900 for an unskinned wolf, $1300 for a wolf pelt skinned to traditional standards and $1650 for a pelt skinned to taxidermy standards (Figure 6).

These higher incentives would apply in an area in the North Slave region centered on the collar locations of wintering BNE and Bathurst caribou. Wolf hunters would be required to check in and out of the wolf harvesting zone with increased incentives at winter road access points. This would ensure that wolves taken under the higher incentives are associated with the two caribou herds. The incentives are proposed in part to help increase interest in the TG program to train wolf harvesters from the Tłįchǫ training program described above.

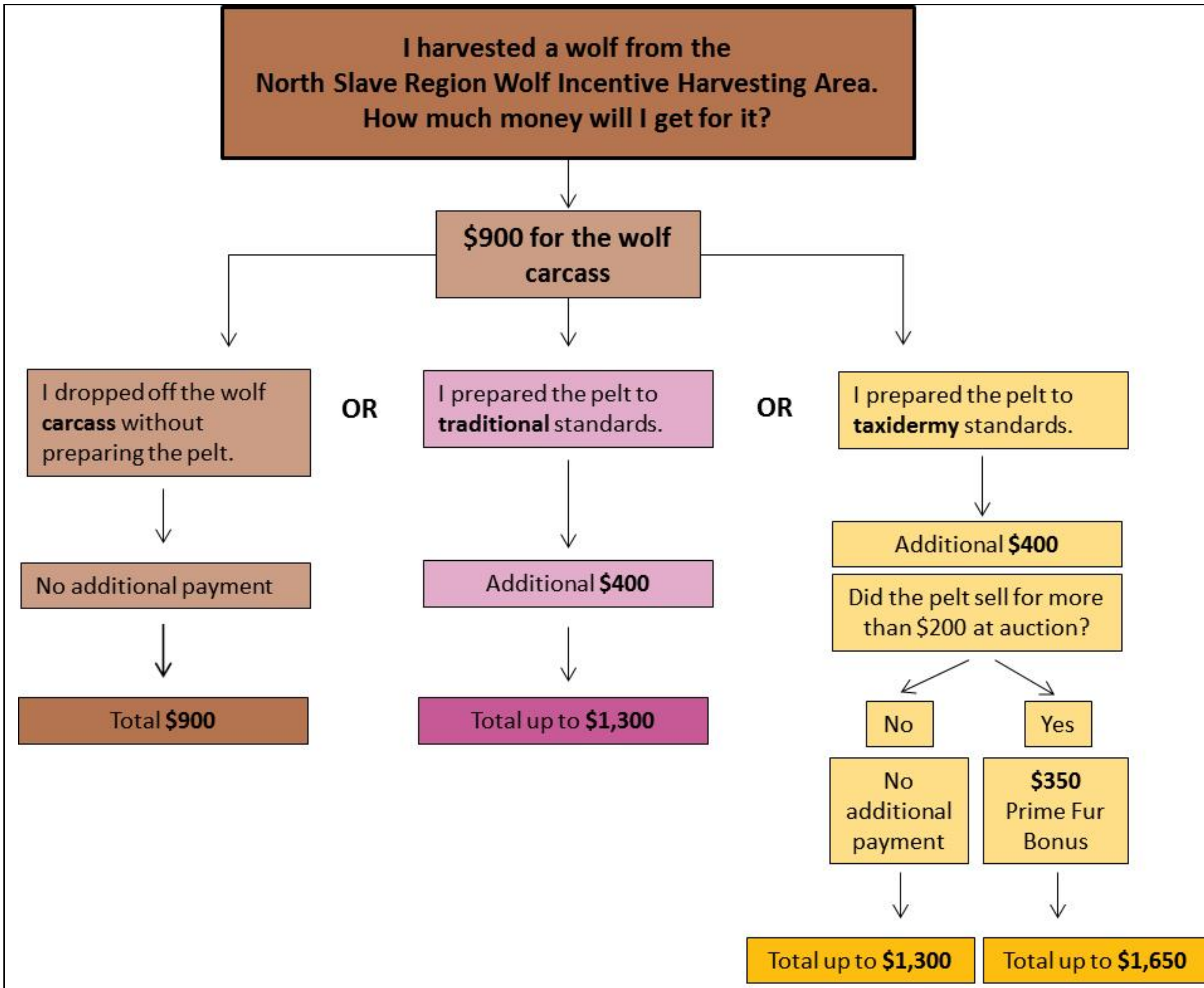


Figure 6. Proposed new incentives for wolf harvesters in North Slave region in areas with BNE and Bathurst caribou.

(e) <u>Collaboration between NWT and NU managers about predator management</u>

The calving grounds and a large portion of the summer ranges of the BNE and Bathurst caribou herds are in Nunavut. At these times of year (June-August), the herds are generally well separated and their ranges well-defined spatially. In contrast, winter ranges tend to be larger and more variable from year to year, but they are also more accessible to hunters and trappers. Range overlap of wintering caribou herds has often included extensive overlap between neighbouring herds; for example, the BNE, Bathurst and Beverly/Ahiak collared caribou were well mixed in December 2018. Wolf removals on calving and summer ranges would affect the targeted caribou herds directly. Wolf removals on the winter range is challenged by the overlap of caribou herds and mixing of the wolves associated with these herds; in this situation the overall number of wolves associated with the caribou herds will be larger and likely require more wolf removals to be effective.

There has been a series of discussions involving GNWT and GN wildlife staff and more senior officials (ministers and deputy ministers) about the potential for collaboration centered on predator reduction on the NU ranges of the BNE and Bathurst herds. As with harvest management or other possible management actions in NU, the GNWT, TG, WRRB and other management organizations in the NWT have no management authority in NU and potential predator management would need to consider NU processes and be approved by the NWMB.

However, coordinated harvest and wolf removal actions across jurisdictional boundaries are key to effectiveness and likelihood for caribou recovery. Harvesters associated with the Kugluktuk Hunters and Trappers Organization have expressed interest in contributing to recovery of the BNE and Bathurst herds by reducing wolf numbers. GNWT and TG will pursue these discussions further to develop and implement coordinated wolf removals across the BNE and Bathurst herd ranges.

4.4 HABITAT AND LAND USE

(a) <u>Endorse and Implement the Bathurst Caribou Range Plan</u>

- ENR and TG acknowledge the multi-year work completed by the Bathurst Caribou Range Plan (BCRP) Working Group and recommend that the BCRP (ENR 2018) be finalized, endorsed, and implemented by governments, the WRRB, industry, communities and other Range Plan partners. Recommended implementation actions in the BCRP should be initiated in 2019 to develop and apply effective policies and practices within an adaptive management framework and 5-year review interval, which will help address potential cumulative effects of range (habitat) disturbance and land use on Bathurst caribou.

To support recovery of the Bathurst herd a suite of management strategies is required. Harvest and predator management strategies are needed to improve survival of caribou. Concomitant range management strategies are needed to manage disturbance and maintain the land in a healthy condition so that habitat may continue to support survival and future growth (i.e., calf production) of the caribou herd over the long term.

In the context of range management, the BCRP reflects four main objectives which are to a) ensure the integrity of important habitats, b) ensure connectivity between seasonal ranges, c) ensure the amount of human-caused land disturbance is kept below certain levels, and d) ensure the development, design and use of roads is managed with consideration to caribou. The BCRP recommends a cumulative land disturbance framework that provides over-arching landscape-level management benchmarks along with management tools that are based on the importance of habitat areas and the levels of habitat disturbance. The seven management tools include the following:

1) community guardianship
2) habitat conservation
3) mobile caribou conservation measures
4) road planning / management
5) offsetting / compensatory mechanisms
6) wildfire and fuels management
7) online map staking

Endorsement and implementation of the BCRP would also help to formally acknowledge and start addressing some of the specific concerns raised by TG, ENR, and indigenous community elders and representatives. This proposal outlines the following actions (consistent with the BCRP) to support conservation of healthy habitat:

- promoting the protection of the Bathurst herd’s calving grounds in Nunavut;
- participating in development of the wildlife management plan for road access into Bathurst herd range, such as the Tibbitt-to-Contwoyto winter road (limiting speed limits, traffic and other mitigations for caribou);
- participating in environmental assessments and land use planning in NWT and NU that may affect this herd’s range; and
- identifying key unburned habitat on the winter range to be included in the Values at Risk hierarchy for fire management during the fire season.

(b) Identification and protection of key caribou habitats

- TG and ENR recommend that additional work be done by indigenous governments and organizations across the Bathurst range through TK research or guardianship programs to continue identifying key landscape features and specific areas (eg: ekwǫ̀ no'oke – water crossings, tataa – land crossings, important unburned winter habitat, and important migration routes and habitats in seasonal ranges) that are important to caribou and may require conservation measures to manage potential disturbance and/or protect habitat areas.

Currently, few areas of the Bathurst range are protected from industrial development. Traditional knowledge emphasizes the negative impacts from industrial development on caribou, and Tłı̨chǫ Government and GNWT suggest there is a need for establishing conservation or protected areas for Bathurst ekwǫ̀ in the Wek'èezhìi Management Area.

As a working example, the BCRP defined the centre of habitation for the Bathurst herd using empirical data from collared caribou and Traditional Knowledge. *The centre of habitation is a core use or refuge area that includes important habitats and migration paths, which a caribou population occupies and uses when it is at low numbers in its natural cycle. It is the core use area from which caribou extend their seasonal movements and gradually use more areas and travel greater distances as the population increases in abundance.*

In conjunction with the numerical decline, the Bathurst herd has contracted its range. Within recent years in Wek'èezhìi, Bathurst ekwǫ̀ tend to stay closer to its center of habitation on the barrenlands, between Contwoyto lake, Lac de Gras, Point lake, and into the treeline south of Wekweètì during winter months. With a focus on the core use area, additional work based on Tłı̨chǫ knowledge, Inuit Qaujimajatuqangit, and other indigenous TK sources should be done to identify and define important areas and *critical habitat*. A definition of *critical habitat* would potentially provide a basis for establishing interim or long-term protected areas under the Northwest Territories *Wildlife Act*.

4.5 EDUCATION

(a) Education and public awareness

- Despite the recommendation for a TAH of zero for the Bathurst herd, TG and ENR suggest a coordinated suite of education/public awareness initiatives to improve general public knowledge of ekwǫ̀, and to promote respectful hunting practices that would reduce wounding and wastage in other areas where ekwǫ̀ are harvested.

Tłı̨chǫ elders have emphasized the need for promoting respect for ekwǫ̀, and adopting traditional practices which includes using all parts of harvested ekwǫ̀ and minimizing wastage. TG and ENR recognize that continuing effort is needed to increase awareness among harvesters, communities and the public about the status of NWT caribou herds, the need for conservation actions to promote recovery and how people can contribute to conservation. This awareness and understanding is important because harvest effort for ekwǫ in the NWT will likely shift to the Beverly-Ahiak herd and respectful hunting practices will be needed. The following are education/public awareness initiatives to improve hunter practices and reduce wounding and wastage:

- Continue to work with the communities, in particular more closely with schools, on promoting Indigenous laws and respecting wildlife, including how to prevent wastage; and
- Invite elders to work with the youth to teach traditional hunting practices and proper meat preparation.

Posters, pamphlets, media and road signs will be used to better inform the public about respecting wildlife, traditional hunting practices, wastage, poaching and promoting bull harvest. Table 3 below summarizes the TG and ENR objectives for increased public engagement and hunter education.

ENR has promoted sound hunter harvest practices, preventing meat wastage, harvesting bulls instead of cows, and implementing related conservation education in NWT communities for a number of years. In response to community requests, ENR has developed a Hunter Education program that is meant to be tailored to the needs of individual communities and organizations.

An important area to emphasize will be ensuring that information on the status and management of regional caribou herds is provided in appropriate ways and on an on-going basis to harvesters, elders and other community members.

Table 3. Summary of approaches and objectives for increased public engagement and hunter education for caribou in Wek'èezhìi.

General Approach	Description & Objective	Lead (Support)
Community meetings	At least 1 meeting per year in each Tłı̨chǫ community to discuss and update wildlife management issues and actions	TG and ENR
Radio programs	When needed radio announcements, interviews and/or updates on wildlife management in Tłı̨chǫ language during winter hunting season (annual)	TG & ENR
Sight-in-your-rifle programs	Conduct community-based conservation education programs with an objective of 1 workshop / Tłı̨chǫ community / hunting season (annual)	ENR and TG; need to coordinate with community leaders
Boots on the Ground and other Traditional Knowledge monitoring and guardianship programs	Highlight the programs and their results with Tłı̨chǫ communities and the public (annual)	TG and ENR
Outreach through internet and social media	Regular updates (10 updates per season) on government websites and social media during fall and winter hunting seasons (Facebook & Tłı̨chǫ website)	TG, ENR (WRRB)
Poster campaign	Produce posters for distribution in each Tłı̨chǫ community: posters to be developed annually as needed	TG and ENR

(b) Cultural programs – Supporting on-the-land activities

- Tłı̨chǫ Government plans to continue and expand its delivery of programs focused on cultural practices on-the-land. These programs emphasize continued use and maintenance of traditional sites and trails including: hunting and trapping cabins, traditional canoe trails from the communities to cultural sites and harvesting locations on the barrenlands; winter skidoo trails to caribou hunting areas and other trails and cabin sites to be identified through program delivery.

Harvesting ekwǫ̀ is fundamental for the practice of Tłı̨chǫ culture on the land. Harvest restrictions were implemented for the Bathurst herd in 2010, and a total allowable harvest of zero has been in place for Bathurst ekwǫ̀ since 2015; and it is likely that the TAH of zero will continue in to the near future. Consequently, many young people and community members are growing up without the direct cultural experience of harvesting ekwǫ̀ and travelling and knowing dé (the land), as their parents and grandparents did. This has negative impacts on the continuity of Tłı̨chǫ culture, language and way of life and must be addressed.

The TG's long-term aim is to implement projects that transfer traditional knowledge of dé and ekwǫ̀ by bringing elders and youth together on the land. By maintaining traditional trails and rebuilding old harvesting cabins, youth and elders would work together and share knowledge of these important cultural and geographic locations along the Tłı̨chǫ trail system (see Andrews and Zoe 1997, Andrews et al. 1998). These sites are developed in relation to ekwǫ̀ harvesting, thus revisiting and maintaining these sites are important to maintain the people's knowledge base (Legat et al. 2001). On these trips, the elders teach the youth about the cultural and traditional knowledge of ekwǫ̀ and the land. This provides a vital learning opportunity for youth and community members to be immersed in Tłı̨chǫ language and culture (Steinwand 2007, Zoe 2007). Such projects are critically important for maintaining cultural identity and knowledge transfer especially under the current TAH of zero for the Bathurst herd. Maintenance of cultural identity, knowledge, and respectful practices will be key for Tłı̨chǫ when Bathurst ekwǫ̀ recover and hunting resumes. ENR's new On-The-Land unit will take a lead role for GNWT in supporting these initiatives.

4.6 MONITORING AND RESEARCH OF BATHURST EKWǪ̀

Three aspects of monitoring and research are described in this section: (a) biological monitoring, (b) expansion of the Tłı̨chǫ Boots on the Ground caribou monitoring, and (c) support for biological or TK research that helps explain drivers of change in caribou abundance.

(a) Biological monitoring

Table 4 lists updated biological monitoring of the BNE and Bathurst herds, mostly led by ENR, proposed for 2019-2023. A key focus of the increased monitoring is to provide annual information on productivity and survival of caribou calves and adult cows, as well as increased surveys to estimate herd size. The increased monitoring in part anticipates more intensive wolf management, for which assessment of effectiveness in improving caribou survival rates will be needed. The table includes a rationale for changes from previous monitoring as in the 2015 joint proposal for this herd. Changes are also described, and a brief rationale given for them below.

I. *Population surveys every 2 years*: In recent years, calving photo surveys for the BNE and Bathurst herds have been carried out every 3 years and the new population estimates have been benchmarks for revised management. The continued rapid decline of the two herds and expected increase in wolf management are the main rationale for proposing population surveys every 2 years for the two herds, i.e. in 2020 and 2022.

II. *Collar increase to 70/herd*: The total number of collars recommended is 70 (50 cows and 20 bulls). A technical rationale for increasing the number of collars on the Bathurst herd to 65 (50 cows and 15 bulls) was provided by Adamczewski and Boulanger (2016). Some applications, such as monitoring cow survival rates with good precision, would require 100 collared caribou, while other applications can be addressed reliably with 50 or fewer collars (i.e., the MCBCCA). At this time, increasing the number of collars on cows to 50 would provide more reliable annual estimates of cow survival rates, as well as increasing confidence in defining distribution of caribou throughout the year, assigning harvest to herd reliably, and monitoring of cow fidelity to calving grounds. Range use by bulls shows patterns that vary from those of cows, thus maintaining the 20 bull collars used in recent years will also be important. The collars may also assist in determining where and when predators should be removed as well as in monitoring whether predator management actions are influencing the herd.

III. *Annual composition surveys in June, October and March/April*: To date composition surveys have been carried out on a nearly annual basis for the Bathurst herd in late winter, as an index of calf survival to 9-10 months of age. Composition surveys on the calving grounds have been carried out every 3 years as part of the calving photo surveys and provide a measure of fecundity. Fall composition surveys have been carried out every 2-3 years to monitor the bull:cow ratio, which is needed to convert the estimate of cows from the June calving photo surveys to an overall herd estimate. Fall composition surveys also provide a calf:cow ratio that gives a measure of how many calves have survived the first 4-5 months. The recommended increase to annual June, October and late-winter composition surveys will provide annual information on initial birth rates of calves along with survival rates of calves to the fall and late-winter periods. Increased survival of adults and calves are the key changes that need to happen for this herd to stabilize and potentially increase. Increased survival will also be a key indicator of effectiveness of predator management.

IV. *Suspension of June calving reconnaissance surveys in years between photo surveys*: Reconnaissance surveys over the calving grounds have been used for the Bathurst and Bluenose-East herds in years between photographic population surveys as a way of tracking the numbers of cows on the calving grounds. In most years they have tracked trend from the more complete photo surveys well. However, the variance on these surveys has usually been high, which reduces confidence in the estimates. In some years the recon surveys have resulted in questionable results. In June 2017 a recon survey of the BNE calving grounds suggested that the decline had ended and the herd had increased from 2015; the June 2018 survey showed that the herd had in fact declined further by about half. In view of the high variance on these surveys and the questionable 2017 results, these surveys are being discontinued.

V. *Harvest compliance monitoring*: Accurate monitoring and compliance with a TAH of zero for Bathurst caribou is a high priority. TG and ENR will work together to ensure that all ekwǫ̀ harvest by Tłįchǫ harvesters occurs outside the MCBCCA and is reported based on authorization cards for Bluenose East and community monitors. ENR will continue overall monitoring of harvest via check-stations at Gordon Lake and McKay Lake, regular patrols by officers on the ground and periodic aerial monitoring. ENR will continue to monitor compliance within the

Bathurst mobile conservation area using the check-stations and patrols as in previous winters.

VI. *Caribou pregnancy monitoring:* Because of the TAH of zero for the Bathurst herd, there are no opportunities to directly monitor body condition and health of caribou from hunter-kills. However, sample collections of fecal pellets in winter that would be associated with late-winter composition surveys and capture of females during collaring, may provide a useful baseline dataset to estimate pregnancy rates in adult females from fecal hormone levels (Joly et al. 2015, Morden et al. 2011). Community-based sampling may be incorporated in to sample design and would require coordination and training of individuals. This approach may complement to June composition surveys that will measure calf-cow ratios at or near the peak of calving.

(b) Expansion of "Boots on the Ground" TK monitoring program:

- TG and ENR recommend expansion of the Tłı̨chǫ "Boots on the Ground" traditional knowledge monitoring and guardianship program on the Bathurst range.

The Boots on the Ground program was established to inform NWT decision makers on quality of Bathurst ekwǫ̀ summer range habitat, predation levels by wolves, bears and eagles, impacts from mining infrastructures and activities, and effects from climate change on caribou behaviour, herd demographics and migration. The program has operated successfully for the past three years since its inception (TRTI 2018). It is based on placing Tłı̨chǫ monitors (i.e., guardians) on the summer range of the Bathurst herd for six weeks through July and August. Currently, the monitoring program relies on two boats located at Contwoyto Lake and Fry Inlet. The boats enable access to a larger area around these two large water bodies. During recent summer field seasons, the Bathurst herd occurred in the Contwoyto Lake area, and monitors observed ekwǫ̀ by walking inland from lakes that had boats and were accessible by floatplane. However, when the ekwǫ̀ travel greater distances from these lakes, the monitors are unable to follow in a timely manner.

The Tłı̨chǫ Government proposes to expand the program to span the entire ice-free time period on the lakes, from approximately mid-July to end of September, but this will depend on availability of staff, elders and other resources. A third field team would be added to extend the monitoring period by an additional three weeks. With this extra field effort, Tłı̨chǫ monitors will be able observe Bathurst ekwǫ̀ from spring melt to freeze-up. TG is considering plans to also expand its monitoring effort across more locations within the herd's range. Additional boats would be placed on other larger lakes on the summer and fall Bathurst range. By placing boats on other larger lakes, field teams and equipment can be mobilized to these new locations and continue monitoring Bathurst ekwǫ̀. Furthermore, with boats at several lakes, multiple monitoring teams can operate at the same time when the ekwǫ̀ are spread over larger areas. The locations for additional placement of boats will be based on areas used by collared caribou and Tłı̨chǫ harvesters' knowledge. Depending on available resources, program expansion will be phased in through upcoming field seasons, along with capacity building through training of new monitors.

(c) Research on drivers of change in caribou abundance:

- TG and ENR recommend increased research into underlying drivers of change in Bathurst herd abundance through formal partnership and collaboration with academics and other researchers (including remote sensing specialists), using both scientific and traditional knowledge approaches.

Where possible, research opportunities should be undertaken as important educational and professional development opportunities for Tłı̨chǫ and other northern students. To the extent possible, research and monitoring should involve community members which should help project management and increase participants' knowledge and sense of involvement.

TG and ENR recognize that there are likely multiple factors that have contributed to the Bathurst herd's decline. While annual harvest levels of 3000-5000 cows and 1000-2000 bulls likely contributed to the Bathurst herd's decline up until 2010 (Boulanger et al, 2011), harvest was closed in 2010, limited to a harvest target of 300 from 2011-2014 and has essentially ceased in the NWT since winter 2014/2015. Therefore, other factors including predation, disturbance from mining activities and infrastructure, roads, and climate factors have likely been key to the herd's continued decline since harvest restrictions were implemented in winter 2009/2010.

Adverse environmental conditions may be important in some years to the herd's vital rates. For example, a drought year in 2014 potentially led to poor feeding conditions, poor cow condition and a low pregnancy rate in winter 2014-2015. A study by Chen et al. (2014) suggested that spring calf:cow ratios in the Bathurst herd were correlated with indices of summer range productivity one and a half years earlier; the mechanism proposed was that cows with poor summer feeding conditions were likely to be in poor condition during the fall breeding season, leading to low pregnancy rates and low June calf:cow ratios. An assessment by Boulanger and Adamczewski (2017) of relationships between environmental climate variables from a remote sensing database and demographic rates of the BNE and Bathurst herds demonstrated that climate variables such as the summer warble fly index, summer drought index, and winter climate indicators such as snow depth can help explain trends in cow survival, calf survival and pregnancy rate.

A further area of importance is monitoring and research focused on caribou health, which includes nutrition, condition and etiological (disease-causing) agents such as external and internal parasites, and bacterial and viral pathogens. There is also concern about the risk of transmission of etiological agents (including prions) that occur in southern animal populations to northern caribou herds. In summary, there is a need to better understand predation rates, impacts from mining activities and infrastructure and their significance to Bathurst caribou, along with the environmental and etiological factors affecting caribou health, condition and population trend, and the effects of climate change on these dynamic relationships.

Table 4. Biological monitoring of Bathurst herd (ENR and/or TG lead)

Indicator(s)	Rationale	Desired Trend	Adaptive Management Options	How Often	Notes
1. Estimate of breeding cows and extrapolated herd size from calving ground photo survey	Most reliable estimate for abundance of breeding cows and and total number of cows & can be extrapolated to herd size based on sex ratio.	Stable or increasing trend in numbers of breeding cows and herd size in 2023.	If trend in breeding cows increasing, continue as before; if trend stable-negative, re-consider management.	Every 2 years	Last survey 2018, next surveys in 2020 and 2022. Trend in breeding females is key indicator of herd trend.
2. Cow fecundity; composition survey on calving ground in spring (June)	Proportion of breeding females in June at peak of calving establishes initial fecundity or approximate pregnancy rate.	Proportion of breeding cows at least 80%.	Low ratio indicates poor fecundity and suggests poor nutrition in previous summer; survey data integrates fecundity & neonatal survival.	Annual	Essential component of calving ground photographic survey. Proposed increase to annual survey to monitor initial calf production and subsequent survival
3. Fall sex ratio and calf:cow ratio; composition survey (October)	Tracks bull:cow ratio and fall calf:cow ratio. Fall calf:cow ratio provides an index of calf survival from birth through initial 4.5 months.	Bull:cow ratio above 30:100; calf:cow ratio of more than 40:100.	If bull:cow ratio below target, consider reducing bull harvest. Low fall calf:cow ratios suggest poor calf survival.	Annual	Sex ratio needed for June calving ground extrapolation to herd size.
4. Calf:cow ratio in late winter (March-April); composition survey	Herd can only grow if enough calves are born and survive to one year, i.e., calf recruitment is greater than mortality.	At least 30-40 calves:100 cows on average.	Sustained ratios ≤ 30:100, herd likely declining; may re-assess management.	Annual	Calf productiion & survival vary widely year-to-year, affected by several variables, including weather.
5. Caribou pregnancy monitoring from late winter fecal sampling	Fecal pellet samples collected during late winter composition surveys (and caribou captures for collaring) may be used to estimate pregnancy rates. This would complement June composition surveys.	Pregnancy rates of at least 80%.	Low pregnancy rates indicate poor fecundity and low potential for calf production.	Annual	Preliminary sampling conducted to date. Sampling depends on minimal herd overlap on winter ranges, as reflected by collared cows
6. Cow survival rate estimated from OLS model and annual survival estimates from collared cows	OLS model-based cow survival estimate (2007-2014) was 78% (CI= 76-80%). Need survival rate of 85% (combined with ~35 calves:100 cows) for stable herd. Increased collar number to 50 cows should improve annual estimation.	At least 83-86% by 2022.	If cow survival continues <80%, herd likely to continue declining.	Annual	Population trend highly sensitive to cow survival rate; recovery will depend on increased cow survival.
7. Total harvest from this herd by all users groups (numbers & sex ratio)	To achieve a TAH of zero for Bathurst herd, accurate monitoring of all ekwǫ̀ harvest is essential and to determine whether management objectives are achieved, and actions are effective.	All harvest reported accurately and within agreed-on limits.	Re-assess recommended harvest annually; if herd continues to decline, re-assess harvest limit.	Annual	Multiple factors other than harvest may contribute to decline but harvest is one of the few factors humans control.
8. Maintain up to 70 satellite/GPS collars on herd (50 on cows, 20 on bulls)	Collar information is key to reliable surveys, evaluating fidelity to calving grounds, tracking seasonal movements, defining range/habitat use, monitoring survival and implementing harvest management in the Bathurst mobile conservation area (MCBCCA).	Additional collars added every March/April to maintain up to 70 collars on herd.		Annual additions to keep total of 70.	Information from collared caribou is essential to monitoring and management of all N. America caribou herds.
9. Wolf Harvest on Bathurst range	Several Indigenous governments and communities have expressed interest in increasing wolf harvest by hunters and trappers to increase caribou survival.	Increased harvest of wolves	If herd continues to decline, consider increased focus on wolf harvest to slow herd decline and increase likelihood of recovery.	Annual	Herd overlap in winter likely means mixing of wolves associated with those herds and may influence effectiveness of wolf removals.

5 Consultation
A letter with results of the Bluenose-East and Bathurst June 2018 surveys was sent from ENR by email to Indigenous governments, boards and other key stakeholders on Nov. 20, 2018, with an offer for organizations to speak to the minister or deputy minister of ENR in person or by phone. A letter was also sent to the minister of Environment with the Government of Nunavut on the same day with an offer of further discussion in person or by phone. Senior leadership from the Sahtu region (SSI and other organizations) met with the GNWT premier and other senior officials on Nov. 20 to discuss barren-ground caribou among other matters. A media briefing on the Bluenose-East and Bathurst survey results was also held at the NWT legislature on Nov. 20. ENR officials presented to the GNWT Standing Committee on Economic Development and the Environment (SCEDE) on the status and proposed management of the Bathurst and BNE herds on Jan. 16, 2019 to increase GNWT-wide understanding of the caribou herds' status and management. Staff from the Government of Nunavut (GN) and observers from Kugluktuk participated in the June 2018 surveys of the BNE and Bathurst herds. Staff from GN and Nunavut Tunngavik Incorporated (NTI) worked with ENR staff at a technical meeting Oct. 16 and 17, 2018 to review results of the GNWT-led surveys of the BNE and Bathurst herds and the GN-led survey of the Beverly herd in the Queen Maud Gulf in June 2018. This meeting was a continuation of collaboration between GN and GNWT staff on trans-border caribou issues. TG and ENR staff began to meet in late November 2018 and continuing into December 2018 and January 2019 to develop joint management proposals for the two caribou herds. Between these meetings, staff met with leaders and more senior staff of the two governments to discuss specific items to include in the management proposals. TG, ENR and WRRB staff met monthly in fall and winter 2018-2019 to talk about status and management of the Bluenose-East, Bathurst and Beverly/Ahiak caribou herds; these 3 groups comprise the Barren-Ground Caribou Technical Working Group. Meetings in the four Tłı̨chǫ communities are planned for January 2019. These will include the Tłı̨chǫ chiefs and senior officials from ENR to talk about the caribou herds and proposed management. Once the joint management proposals on Bathurst and Bluenose-East caribou have been submitted to WRRB in Jan. 2019, further consultation with affected Indigenous organizations will be done.

6 Communications Plan
TG and GNWT leadership will, together, hold an information session in each of the 4 Tłı̨chǫ communities. Emphasis will be placed on visual aids that are easily understood and on hearing from community members. Table 3 (listed earlier in this proposal) describes approaches and objectives for increased public engagement and hunter education for caribou in Wek'èezhìi.

7 Relevant Background Supporting Documentation
Adamczewski, J. Z., and J. Boulanger. 2016. Technical rationale to increase the number of satelite collars on the

Bathurst caribou herd. Manuscript Report No. 254, Government of the Northwest Territories, Yellowknife, NT.

Adamczewski, J. Z., J. Boulanger, B. Croft, B. T. Elkin, and H. D. Cluff. 2017. Overview: Monitoring of Bathurst and Bluenose-East Caribou Herds, September 2014. Manuscript Report No. 263, Department of Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Northwest Territories.

Adamczewski, J. Z., A. Gunn, K. G. Poole, A. Hall, J. Nishi, and J. Boulanger. 2015. What Happened to the Beverly Caribou Herd after 1994? Arctic 68:407-421.

Advisory Committee for the Cooperation on Wildlife Management (ACCWM). 2014. Taking Care of Caribou – The Cape Bathurst, Bluenose-West, and Bluenose-East Barren Ground Caribou Herds Management Plan (Final). C/O Wek'èezhìi Renewable Resources Board, 102A, 4504 – 49 Avenue, Yellowknife, NT, X1A 1A7.

Andrews, T. D., and J. B. Zoe. 1997. The Įdaà Trail: Archeology and the Dogrib cultural landscape, Northwest Territories, Canada. Pages 160-177 *in* G. P. Nicholas and T. D. Andrews, editors. At A Crossroads: Archeology and First Peoples in Canada. Department of Archeology, Simon Fraser University, Burnaby, BC.

Andrews, T. D., J. B. Zoe, and A. Herter. 1998. On Yamozhah's Trail: Dogrib sacrid sites and the anthropology of travel. Pages 305-320 *in* J. Oakes, R. Riewe, and K. Kinew, editors. In Sacred Lands: Aboriginal World Views, Claims, and Conflicts. Canadian Circumpolar Institute, University of Alberta, Edmonton, AB.

Boulanger, J., B. Croft, and J. Adamczewski. 2014. An estimate of breeding females and analyses of demographic indicators from the Bathurst herd 2012 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. File Report 142.

Boulanger, J., A. Gunn, B. Croft, and J. Adamczewski. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management 75:883-896.

Boulanger, J., and J. Adamczewski. 2017. Analysis of environmental, temporal, and spatial factors affecting demography of the Bathurst and Bluenose-East caribou herds. Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Northwest Territories, Canada. Manuscript Report (draft contract report).

Boulanger, J., B. Croft, J. Z. Adamczewski, H. D. Cluff, M. Campbell, D. S. Lee, and N. C. Larter. 2017. An estimate of breeding females and analyses of demographics for the Bathurst herd of barren-ground caribou: 2015 calving ground photographic survey. Manuscript Report No. 267, Department of Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, NT.

Case, R., L. Buckland, and M. Williams. 1996. The status and management of the Bathurst caribou herd, Northwest Territories, Canada. File Report No. 116. Department of Renewable Resources, Government of the Northwest Territories. Yellowknife, NT. 34 p.

Chen, W., L. White, J. Z. Adamczewski, B. Croft, K. Garner, J. S. Pellissey, K. Clark, I. Olthof, R. Latifovic, G. L. Finstad. 2014 Assessing the Impacts of Summer Range on Bathurst Caribou's Productivity and Abundance since 1985. *Natural Resources*, **5**, 130-145. http://dx.doi.org/10.4236/nr.2014.54014

Cluff, H. D., B. Croft, and J. Boulanger. 2016. Calf production and adult sex ratio in the Bathurst and Bluenose East herds of barren-ground caribou 2006-2016. Manuscript Report (in prep.).

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2015. COSEWIC assessment process, categories and guidelines. Committee on the Status of Endangered Wildlife in Canada, Ottawa, ON. 19 pp.

DeCesare, N. J., M. Hebblewhite, M. Bradley, K. G. Smith, D. Hervieux, and L. Neufeld. 2012. Estimating ungulate recruitment and growth rates using age ratios. Journal of Wildlife Management 76:144-153.

Environment and Natural Resources (ENR). 2018. Bathurst Caribou Range Plan (Dec 2018 Draft). Environment and Renewable Resources, Government of Northwest Territories, Yellowknife, NWT, Canada.

Gunn, A., and F. L. Miller. 1986. Traditional behaviour and fidelity to caribou calving grounds by barren-ground caribou. Rangifer Special Issue No. 1:151-158.

Gunn, A., J. Boulanger, and J. Williams. 2005. Calf survival and adult sex ratio in the Bathurst herd of barren-ground caribou 2001-2004. Manuscript Report No. 163, Government of the Northwest Territories, Yellowknife, NT.

Gunn, A., K. G. Poole, and J. S. Nishi. 2012. A conceptual model for migratory tundra caribou to explain and predict why shifts in spatial fidelity of breeding cows to their calving grounds are infrequent. Rangifer Special Issue No. 20:259-267.

Hatter, I. W., and W. A. Bergerud. 1991. Moose recruitment, adult mortality and rate of change. Alces 27:65-73.

Tłı̨chǫ Research and Training Institute (TRTI). 2018. Boots on the Ground Caribou Monitoring Program - 2017 Results. Tłı̨chǫ Research and Training Institute, Tłı̨chǫ Government, Behchokǫ, NT.

Joly, K., S. K. Wasser, and R. Booth. 2015. Non-invasive assessment of the interrelationships of diet, pregnancy rate, group composition, and physiological and nutritional stress of barren-ground caribou in late winter. PLOS One 10:e0127586.

Legat, A., G. Chocolate, B. Gon, S. A. Zoe, and M. Chocolate. 2001. Caribou migration and the state of their habitat. West Kitikmeot Slave Study, Yellowknife, NT. 90 pp. + 6 Appendices

Morden, C. J. C., R. B. Weladji, E. Ropstad, E. Dahl, Ø. Holand, G. Mastromonaco, and M. Nieminen. 2011. Fecal hormones as a non-invasive population monitoring method for reindeer. Journal of Wildlife Management 75:1426-1435.

Species at Risk Committee (SARC). 2017. Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT.

Steinwand, T. 2007. Chapter 6, Memories – Reflections of a magical journey. Pages 41-49 *in* J.B. Zoe, editor. Trails of Our Ancestors - Building a Nation. Tlicho Government, Behchoko, NT.

Wek'èezhìi Renewable Resources Board (WRRB). 2010. Report on a Public Hearing Held by the Wek'èezhìi Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokö, NT & Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst Caribou Herd. 8 October 2010. WRRB Unpublished Report, Yellowknife, NT. 20 pp.

Wek'èezhìi Renewable Resources Board (WRRB). 2016a. Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board, 23-24 February 2016, Yellowknife, NT., & Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwò (Barren-ground caribou) Herd - PART A. Wek'èezhìı Renewable Resources Board, Yellowknife, NT.

Wek'èezhìi Renewable Resources Board (WRRB). 2016b. Reasons for Decisons Related to a Joint Proposal for the Management of the Bathurst ekwǫ (Barren-ground caribou) Herd - PART B. Wek'èezhìı Renewable Resources Board, Yellowknife, NT.

Wolf Feasibility Assessment Technical Working Group. 2017. Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd. Wolf Feasibility Assessment Technical Working Group, Yellowknife, Northwest Territories. C/O Wek'èezhìi Renewable Resources Board, 102A, 4504 – 49 Avenue, Yellowknife, NT, X1A 1A7.

Zoe, J. B., editor. 2007. Trails of Our Ancestors - Building a Nation. Tlicho Government, Behchoko, NT.

8 Relevant Background Supporting Documentation

Appendix A. Rules for Definition of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA) for winter 2017-2018

- ENR, TG and WRRB, revised Nov. 16, 2018

1. **Background**:

The Mobile Core Bathurst Caribou Conservation Area (MCBCCA; hereafter referred to as the mobile zone) was first used in the winter of 2014-2015 to protect Bathurst caribou in the NWT from hunter harvest. The mobile zone was built as a minimum convex polygon (MCP; essentially a line drawn around the outside of all collars) with a buffer of 20-30km to account for other caribou in the herd associated with the collared animals.

A key assumption of defining the mobile zone is that the collared Bathurst caribou are truly representative of the distribution and movements of most animals in the herd. Based on this assumption being correct, the mobile zone offered two advantages over the two large fixed zones used 2010-2014: (1) the restricted area was much smaller than the two large zones, limiting harvest restriction in the region, and (2) the restricted area focused on where the herd was at any given time. In previous winters some Bathurst collars were west and east of the large fixed zones, thus potentially exposed to higher harvest pressure in those areas.

Prior to the 2016-2017 harvest season, delineation of the mobile zone included a 60km buffer (see Appendix A of this document). The rationale for this modification was to provide more certainty and clearer information to hunters about location of the mobile zone. The use of a larger mobile zone would allow for movement of caribou inside the zone between collar data acquisitions without creating the need for a new map every four days. Thus, if Bathurst collared caribou moved around within this expanded mobile zone, the boundaries could remain unchanged for extended periods, as compared to a new zone and boundaries that changed weekly.

However, in the winter of 2016-2017, the distribution of collared caribou from the Bathurst, Bluenose-East and Beverly and Ahiak herds showed an exceptional degree of overlap, which meant that the mobile zone for Bathurst caribou with a 60 km, 40 km or 30 km buffer also enclosed most of the neighbouring herds (based on collars) and would have severely limited Aboriginal hunting opportunities. As a result, the size of the buffer on the mobile zone was reduced to 20 km and then 10 km to give hunters reasonable opportunities to hunt the Beverly and Ahiak herds (where there is currently no harvest restriction in the NWT) and the Bluenose-East herd (which has a Total Allowable Harvest in place of 750 bulls in Wek'èezhìı). For a part of the winter, the single mobile zone was changed to two sub-zones, a main one in the west and a smaller one in the east. Overall, monitoring by officers and community monitors indicated that few Bathurst or Bluenose-East caribou were taken (based on the locations of reported kills relative to distributions of collared caribou) and that harvest was primarily Beverly and Ahiak caribou with a large proportion of bulls.

At a meeting of the Barren-Ground Caribou Technical Working Group Sept. 15, 2017, the unforeseen conditions and changes to the mobile zone in winter 2016-2017 were reviewed and a revised set of rules was developed. The group recognized that a balance might be needed between conservation (no harvest) of the Bathurst herd, which will likely be promoted by larger buffers, and limiting harvest restrictions on neighbouring herds, which may be enabled by smaller buffers if there is overlap. Plans need to be adaptive, depending on whether the

Bathurst herd is relatively well separated from neighbouring herds (Situation A) or well mixed with either one or both of the neighbouring herds (Situation B). These rules are an update on Appendix A from June 29, 2016 TG & ENR response to the WRRB's Bathurst Caribou Final Report, Part A. The wildlife regulation for the mobile zone is in Appendix B.

2. **Situation A: Bathurst herd is largely separate from neighbouring herds**

In some winters (e.g. 2015-2016; see Figure 1), the Bathurst collared caribou have been well separated from the Bluenose-East and Beverly and Ahiak caribou. Under these conditions (i.e. Situation A), hunter access to alternate herds is not restricted substantially by the mobile zone. Under these conditions, the following rules will be applied.

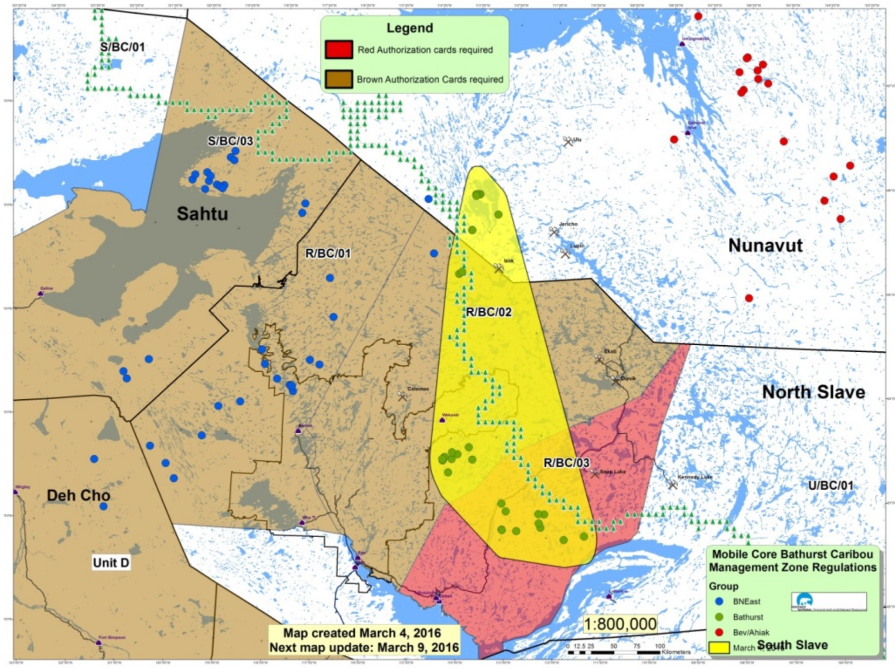


Figure 1. Mobile zone and collared caribou locations in March 2016. Bluenose-East collared locations are blue, Bathurst green and Beverly and Ahiak red. Map B. Croft, GNWT ENR.

- The mobile zone boundary will be defined from a minimum convex polygon (MCP) around all functioning collars on Bathurst caribou (cows and bulls) plus a 60 km buffer around the MCP.
- A recommended number of collars for the Bathurst herd to define its distribution with confidence is 40 or more, based on analyses by J. Boulanger and others (see Adamczewski and Boulanger 2016 for details and further references).
- With fewer collars, consideration should be given to a larger buffer on the mobile zone as there is a greater chance that a portion of the herd's distribution is not well defined.
- An approximately equal number of collars on the two neighbouring herds is also recommended to define their distribution with confidence.
- Collar locations will be updated weekly.
- The mobile zone will be defined based on all active Bathurst collars, including any in Nunavut (although the no harvest zone will only apply in NWT).
- In general, separation of the mobile zone into two or more sub-zones will be avoided and will be considered only when there is substantial overlap between herds. An example of

substantial overlap from winter 2016-2017 is in Fig. 2; similar situations will be considered on a case-by-case basis.

- Once established, the mobile zone boundaries will not change as long as all the collared Bathurst caribou remain within the mobile zone and no collars are less than 20 km from the boundary.
- If one or more collared Bathurst caribou move to within 20 km of the boundary of the zone or move out of the mobile zone, the mobile zone will be re-defined based on the same method described above (60 km buffer), and the new zone boundaries will be in effect as long as all collared Bathurst caribou remain within the new boundaries.
- With respect to areas where collared Bathurst caribou may overlap with collared Bluenose-East or Beverly and Ahiak caribou, the WRRB determination of a zero (0) Total Allowable harvest (TAH) on the Bathurst herd means that no caribou will be harvested within the mobile zone, regardless of herd affiliation.
- The mobile zone will be defined in the NWT prior to the fall harvest season and will continue until the end of the winter harvest season.
- TG and ENR will explore ways of modifying zone boundaries to use natural features such as rivers or lake edges as a way of making the zone more practical for hunters, provided that there is no significant reduction in protection for the Bathurst herd.
- TG and ENR will also explore ways of making information about the mobile zone location more easily accessible to hunters by making it available in formats for GPS devices and Google Earth, and by using signs on the winter road to show the direction of the zone boundary.

3. Situation B: Bathurst herd shows overlap with neighbouring herds

During winter 2016-2017, a 40km buffer on the Bathurst mobile zone would have nearly eliminated hunter access to Beverly and Ahiak caribou and severely restricted access to Bluenose-East caribou in Wek’èezhìı (see Figure 2). Under these conditions, reduction of the mobile zone buffer may be considered under the following rules.

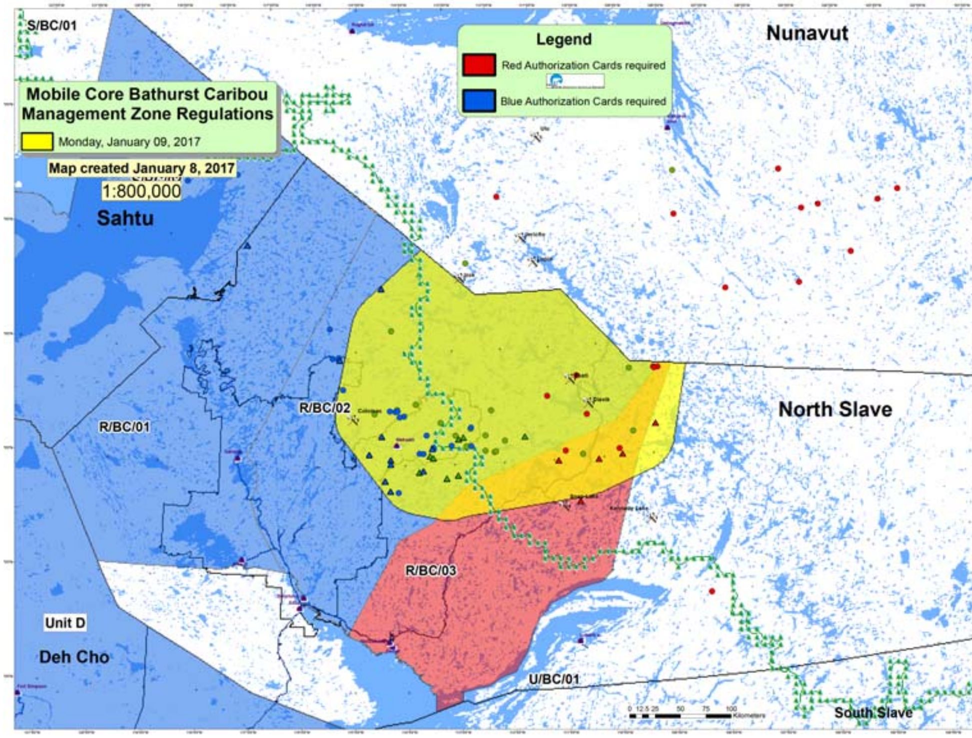


Figure 2. Mobile zone and collared caribou locations January 9, 2017 – 40 km buffer. Bluenose-East collared locations are blue, Bathurst green and Beverly and Ahiak red. Map B. Croft, GNWT ENR.

- The mobile zone boundary will initially be defined from a minimum convex polygon (MCP) around all functioning collars on Bathurst caribou (cows and bulls) plus a 60 km buffer around the MCP.
- Collar locations will be updated weekly.
- A recommended number of collars for the Bathurst herd to define its distribution with confidence is 40 or more, based on analyses by J. Boulanger and others (see Adamczewski and Boulanger 2016 for details and further references).
- With fewer collars, consideration should be given to a larger buffer on the mobile zone as there is a greater chance that a portion of the herd's distribution is not well defined.
- An approximately equal number of collars on the two neighbouring herds is also recommended to define their distribution with confidence.
- The mobile zone will be defined based on all active Bathurst collars, including any in Nunavut (although the no harvest zone will only apply in NWT).
- The minimum buffer under any conditions on the mobile zone will be 20 km[i].
- Hunter access to Beverly and Ahiak caribou or Bluenose-East caribou will be considered sufficient if at least 50% of active collars on either of these two herds in the NWT are outside the mobile zone.
- If more than 50% of the collared caribou from either the Bluenose-East or Beverly and Ahiak herds, found within the NWT, are within the mobile zone, then reduction of the mobile zone buffer can be considered.

[i] Based on experience of flying the Bathurst mobile zone in winters with little overlap (e.g. 2015-2016), the collars consistently are associated with the main wintering concentrations of the herd, and very few caribou are found more than about 20 km away from collars.

- Under these conditions, the mobile zone buffer may be reduced in 10km increments until less than 50% of the collars from the neighbouring herd are within the zone. A minimum of 20km on the buffer will be maintained at all times.
- Use the range and median distance traveled by the collared caribou over the preceding seven days to help determine the size of the buffer.
- In general, separation of the mobile zone into two or more sub-zones will be avoided.
- However, delineation of two or more sub-zones may be considered if there are two or more widely separated groups of collared caribou. The minimum distance between nearest-neighbour collars in proposed sub-zones will be 80km[ii].
- A sub-zone would need to have a minimum of 3 collared Bathurst caribou; this is the minimum needed to define a polygon.
- If one or more collared Bathurst caribou move to within 20 km of the boundary of the zone or move out of the mobile zone, the mobile zone will be re-defined.
- With respect to areas where collared Bathurst caribou may overlap with collared Bluenose-East or Beverly and Ahiak caribou, the WRRB determination of a zero (0) TAH on the Bathurst herd means that no caribou will be harvested within the mobile zone, regardless of herd affiliation.
- The mobile zone will be defined in the NWT prior to the fall harvest season and will continue until the end of the winter harvest season.
- TG and ENR will explore ways of modifying zone boundaries to use natural features such as rivers or lake edges as a way of making the zone more practical for hunters, provided that there is no significant reduction in protection for the Bathurst herd.
- TG and ENR will also explore ways of making information about the mobile zone location more easily accessible to hunters by making it available in formats for GPS devices and Google Earth, and by using signs on the winter road to show the direction of the zone boundary.

4. Review of Mobile Zone definition:

To assist in adaptive decision-making about the mobile zone, the Barren-Ground Caribou Technical Working Group will plan to meet in December and January to review collar data and mobile zone definition(s), and recommend to TG, ENR, and WRRB any changes to be made. By this time in the winter, collared caribou have usually ended most directional movement until April. The working group will periodically review information on harvest locations and amounts to check on herd assignments for harvest and check on the possibility of Bathurst caribou being harvested.

Reference:

Adamczewski, J. and J. Boulanger. 2016. Technical rationale to increase the number of satellite collars on the Bathurst caribou herd. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Manuscript Report no. 254.

[ii] With a 20km buffer, collared caribou 40km apart would have buffers that touch; the 80km separation would mean that the sub-zones with a 20 km buffer would be separated by 40km.

APPENDIX "A" from June 29, 2016 TG & ENR response to the WRRB's Bathurst Caribou Final Report, Part A

As a result of a number of discussions between TG and ENR, the approach to defining the Bathurst Mobile Core Conservation Zone (MCBCMZ) has been modified slightly from the initial two winters to reduce the number of times that the zone is re-defined, and make the zone more predictable and practical for hunters. The criteria for defining the zone for the 2016-2017 harvest season are expected to be as follows:

- The mobile zone boundary will be defined from a minimum convex polygon (MCP) around all functioning collars on Bathurst caribou (cows and bulls) plus a 60 km buffer around the MCP.
- Where collared Bathurst caribou show distinct, well-separated sub-groups, the mobile zone can be shaped as 2 or more parts of the mobile zone.
- Once established, the mobile zone boundaries will not change as long as all the collared Bathurst caribou remain within the mobile zone.
- If one or more collared Bathurst caribou move to within 5 km of the boundary of the zone or move out of the mobile zone, the mobile zone will be re-defined based on the same method described above, and the new zone boundaries will be in effect as long as all collared Bathurst caribou remain within the new boundaries.
- With respect to areas where collared Bathurst caribou may overlap with collared Bluenose-East or Beverly and Ahiak caribou, the WRRB determination of a zero (0) harvest on the Bathurst herd means that no caribou will be harvested within the mobile zone, regardless of herd affiliation. The possibility of dividing the mobile zone into two or more parts provides some flexibility with respect to identifying areas where collared caribou from neighbouring herds may be found and where some harvest is possible provided there are not Bathurst collars in the area.
- The mobile zone will be defined in the NWT beginning when collared Bathurst caribou move back into the NWT, potentially as early as mid-summer, and will continue until the end of the winter harvest season.
- TG and ENR will explore ways of modifying zone boundaries to use natural features such as rivers or lake edges as a way of making the zone more practical for hunters, provided that there is no significant reduction in protection for the Bathurst herd. Review of the mobile zone boundaries from winter 2015-2016 suggests that from about the end of November to the end of March, there was little directional movement of collared Bathurst caribou and a relatively fixed zone may be possible. Boundaries on the land that are readily recognized by hunters would be very helpful to both harvesters and enforcement officers.

TG and ENR will also explore ways of making information about the mobile zone location more easily accessible to hunters by making it available in formats for GPS devices and Google Earth, and by using signs on the winter road to show the direction of the zone boundary.

Appendix B: GNWT Wildlife Regulation for Bathurst Mobile Zone.

WILDLIFE ACT

MOBILE CORE BATHURST CARIBOU MANAGEMENT ZONE REGULATIONS
R-006-2016
In force January 23, 2016

AMENDED BY

This consolidation is not an official statement of the law. It is an office consolidation prepared by Legislation Division, Department of Justice, for convenience of reference only. The authoritative text of regulations can be ascertained from the *Revised Regulations of the Northwest Territories, 1990* and the monthly publication of Part II of the *Northwest Territories Gazette*.

This consolidation and other G.N.W.T. legislation can be accessed on-line at

https://www.justice.gov.nt.ca/en/browse/laws-and-legislation/

LOI SUR LA FAUNE

RÈGLEMENT SUR LA ZONE DE GESTION DU NOYAU DE POPULATION MOBILE DU CARIBOU DE BATHURST
R-006-2016
En vigueur le 23 janvier 2016

MODIFIÉ PAR

La présente codification administrative ne constitue pas le texte officiel de la loi; elle n'est établie qu'à titre documentaire par les Affaires législatives du ministère de la Justice. Seuls les règlements contenus dans les *Règlements révisés des Territoires du Nord-Ouest (1990)* et dans les parutions mensuelles de la Partie II de la *Gazette des Territoires du Nord-Ouest* ont force de loi.

La présente codification administrative et les autres lois et règlements du G.T.N.-O. sont disponibles en direct à l'adresse suivante :

https://www.justice.gov.nt.ca/en/browse/laws-and-legislation/

WILDLIFE ACT

MOBILE CORE BATHURST CARIBOU MANAGEMENT ZONE REGULATIONS

The Commissioner, on the recommendation of the Minister, under sections 88 and 173 of the *Wildlife Act* and every enabling power, makes the *Mobile Core Bathurst Caribou Management Zone Regulations*.

1. The Mobile Core Bathurst Caribou Management Zone is established as a wildlife management zone for barren-ground caribou, consisting of one or more areas delimited as follows:
   (a) from the date that these regulations come into force to January 25, 2016, in accordance with the area shaded in yellow in the map in the Schedule;
   (b) from January 26, 2016 and thereafter, in accordance with a map of the area or areas, which shall be
      (i) available for public inspection and lodged with the Superintendent at Yellowknife and each of the regional offices of the Department of Environment and Natural Resources, and
      (ii) posted in a conspicuous place in each community in or near which the area or areas are located.

2. (1) No person shall harvest barren-ground caribou in an area that is part of the Mobile Core Bathurst Caribou Management Zone.

(2) For greater certainty, these regulations prevail over the *Big Game Hunting Regulations* in respect of the authorization to harvest barren-ground caribou in those wildlife management zones or areas that overlap with any area that is part of the Mobile Core Bathurst Caribou Management Zone.

3. The *Mobile Core Bathurst Caribou Conservation Area Regulations*, established by regulation numbered R-006-2015, are repealed.

LOI SUR LA FAUNE

RÈGLEMENT SUR LA ZONE DE GESTION DU NOYAU DE POPULATION MOBILE DU CARIBOU DE BATHURST

Le commissaire, sur la recommandation du ministre, en vertu des articles 88 et 173 de la *Loi sur la faune* et de tout pouvoir habilitant, prend le *Règlement sur la zone de gestion du noyau de population mobile du caribou de Bathurst*.

1. La zone de gestion du noyau de population mobile du caribou de Bathurst est désignée à titre de zone de gestion de la faune du caribou des toundras et est composée d'une ou plusieurs des régions décrites comme suit :
   a) à compter de l'entrée en vigueur du présent règlement, soit le 25 janvier 2016, en conformité avec l'aire ombragée en jaune sur la carte à l'annexe;
   b) à compter du 26 janvier 2016 et, par la suite, en conformité avec la carte de la région ou des régions qui est, à la fois :
      (i) disponible à l'examen public et déposée auprès du surintendant à Yellowknife et de chaque bureau régional du ministère de l'Environnement et des Ressources naturelles,
      (ii) affichée dans un endroit bien en vue dans chaque collectivité dans, ou près de, laquelle la région ou les régions sont situées.

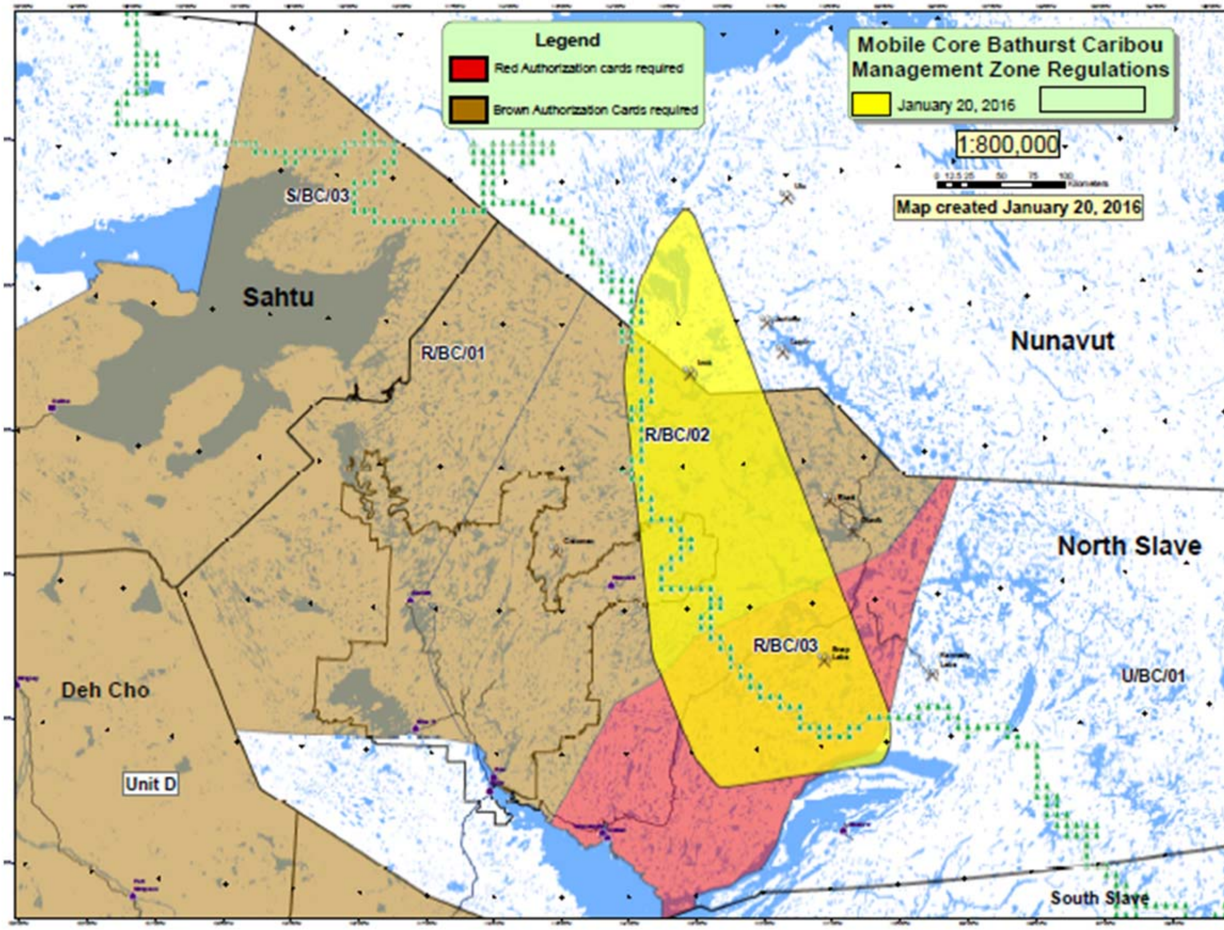
2. (1) Il est interdit à toute personne de récolter le caribou des toundras dans une région qui fait partie de la zone de gestion du noyau de population mobile du caribou de Bathurst.

(2) Il est entendu que le présent règlement l'emporte sur le *Règlement sur la chasse au gros gibier* qui traite de l'autorisation de récolter le caribou des toundras dans ces zones ou régions de gestion de la faune qui chevauchent toute région qui fait partie de la zone de gestion du noyau de population mobile du caribou de Bathurst.

3. Le *Règlement sur la région de conservation du noyau de population mobile du caribou de Bathurst*, pris par le règlement n° R-006-2015, est abrogé.

4. These regulations come into force January 23, 2016.

4. Le présent règlement entre en vigueur le 23 janvier 2016.



9 Time Period Requested
Identify the time period requested for the Board to review and make a determination or provide recommendations on your management proposal. July 2019 - July 2021; the next Bathurst calving ground photographic survey is scheduled for June 2020, which may lead to a new management proposal that year. Management actions should be reviewed annually or when key new information is available.

10 Other Relevant Information
If required, this space is provided for inclusion of any other relevant project information that was not captured in other sections. n/a

11 Contact Information
Contact the WRRB office today to discuss your management proposal, to answer your questions, to receive general guidance or to submit your completed management proposal. Jody Pellissey Executive Director Wek' èezhìi Renewable Resources Board 102A, 4504 – 49 Avenue Yellowknife, NT. X1A 1A7 Phone: (867) 873-5740 Fax: (867) 873-5743 Email: jpellissey@wrrb.ca

APPENDIX B Review of 2007 Proceeding & Decisions

B.1. Receipt of 2006 Joint Proposal

In December 2006, ENR submitted a management proposal recommending management actions to reduce harvest levels in a manner consistent with the Tłı̨chǫ Agreement and the Bathurst Caribou Management Plan for the WRRB's consideration. The proposed management actions were intended to limit the harvest to 4% of the 2006 herd size for a total of 5120 ʔekwǫ̀, including eliminate all commercial meat tags held by Tłı̨chǫ communities, reduce number of tags for non-resident hunters and non-resident alien hunters from 2 to 1, and reduce tags for all non-Hunters' & Trappers' Association (HTA) and HTA outfitters from 1559 to a total of 350.

Due to the significance of the management actions proposed, and the fact that the WRRB, as a new organization, had not yet heard from other Parties affected by the ENR proposal, the Board decided to conduct a public hearing before making any decisions on the proposal. The WRRB held the public hearing on March 13-14, 2007 in Behchokǫ̀, NT.

During the course of the hearing, ENR officials admitted that the Minister and Department had not consulted the Tłı̨chǫ Government about their proposal, as required in the Tłı̨chǫ Agreement, before it was submitted to the Board. Once the evidentiary phase of the proceeding was completed, the Board decided to adjourn the proceeding in order to give ENR and the Tłı̨chǫ Government time to initiate a consultation process. Specifically, ENR and the Tłı̨chǫ Government were directed to report to the WRRB on the outcome of their consultations by April 23, 2007.

On April 20, 2007 and April 23, 2007 respectively, the Tłı̨chǫ Government and ENR filed letters with the WRRB indicating that the consultation process had not been concluded, thereby requiring an additional 90 days to finish the consultations. The WRRB advised ENR and the Tłı̨chǫ Government, in early May 2007, that it had decided to extend the period of adjournment in the proceeding by 30 days to permit the Parties to conclude the consultations by June 1, 2007. The Board indicated that if the consultation efforts were not producing substantial progress, it would bring the proceeding to a close and prepare its Recommendations Report for submission to the Minister of ENR and the Tłı̨chǫ Government.

B.2. Emergency Measure

On April 17, 2007, the Minister of ENR advised the Tłı̨chǫ Government and the WRRB that the Big Game Hunting Regulations had been amended to reduce the number of tags available for outfitted hunts for ʔekwǫ̀ in Unit "R" to 750 for the 2007 season. The letter noted that this decision was made under the authority of Section 12.5.14 of the Tłı̨chǫ Agreement as ENR considered its action necessary due to an emergency situation regarding declining populations of the ʔekwǫ̀.

B.3. 2007 Board Decision

On May 30, 2007 and June 4, 2007 respectively, the Tłı̨chǫ Government and ENR submitted letters to the Board indicating that they were making substantial progress but required an extension to September 28, 2007 in order to develop a new joint ʔekwǫ̀ management proposal. The WRRB was concerned that any further adjournments could adversely affect the interests of other Parties affected by the proposal. ENR had already taken steps to implement portions of its proposal on the grounds that an emergency situation existed. Further extension of the proceeding to accommodate consultation which, in the Board's view should have taken place before the proposal was advanced, seemed inconsistent with the urgency asserted by ENR. For these reasons, the WRRB decided not to grant a further adjournment of its proceeding.

Based on the WRRB's review of the evidence presented during the proceedings, the Board recommended that ENR's proposal to undertake management actions to reduce the harvest of the Bathurst ʔekwǫ̀ herd not be implemented as submitted. The WRRB strongly encouraged ENR and the Tłı̨chǫ Government to continue their consultations towards the development of a Joint Proposal for the management of the Bathurst ʔekwǫ̀ herd. Additionally, the WRRB indicated that any future management actions that propose to limit any component of the harvest to a particular number, including zero, would be treated as a proposal for the establishment of a total allowable harvest.

B.4. Barren-ground Outfitter's Association Tag Request

In October 2007, the Barren-ground Caribou Outfitter's Association requested that the tag quota for ʔekwǫ̀ outfitters be restored to 1260 for the non-HTA outfitters and 396 for the HTA outfitters due to financial hardships experienced by the outfitters and supporting businesses. The Board did not recommend the tag increase to the GWNT as the WRRB is not mandated to address issues of economic viability. Further, the WRRB considered any requests for changes to tag quotas to be premature prior to the submission of a Joint Proposal regarding the management of ʔekwǫ̀ in Wek'èezhìı by ENR and Tłı̨chǫ Government.

APPENDIX C Review of 2010 Proceeding & Decisions

C.1. Receipt of 2009 Joint Proposal

On November 5, 2009, TG and GNWT submitted the *Joint Proposal on Caribou Management Actions in Wek'èezhìı*, which proposed nine management actions and eleven monitoring actions, including harvest limitations, for the Bathurst, Bluenose-East and Ahiak ʔekwǫ̀ herds. While there was agreement on the majority of actions proposed, there was no agreement reached on the proposed levels of Indigenous harvesting.

Upon review of the proposal, the WRRB held that any restriction of harvest or component of harvest to a specific number of animals would constitute a TAH. Thus, the Board ruled that it was required to hold a public hearing. Registered Parties were notified on November 30, 2009 of the Board's decision to limit the scope of the public hearing to Actions 1 through 5 of the Joint Proposal, which prescribed limitations on harvest. All other proposed actions were addressed through written submissions to the Board.

On January 1, 2010, GNWT implemented interim emergency measures, which included the closure of ʔekwǫ̀ commercial, outfitted,[135] and resident harvesting in the North Slave regions. In addition, all harvest was closed in a newly established no-hunting conservation zone (Figure B-1). This decision was made by the Minister of GNWT under the authority of Section 12.5.14 of the Tłı̨chǫ Agreement. The Board was informed of the Minister's decisions on December 17, 2009.

[135] Non-residents and non-resident aliens require an outfitter to hunt big game (but not small game). Outfitters provide licenced guides for the hunters they serve. A non-resident is a Canadian citizen or landed immigrant who lives outside the NWT or has not resided in the NWT for 12 months; a non-resident alien is an individual who is neither an NWT resident nor a non-resident. GNWT. 2015. Northwest Territories Summary of Hunting Regulations, July 1, 2015 to June 30, 2016.

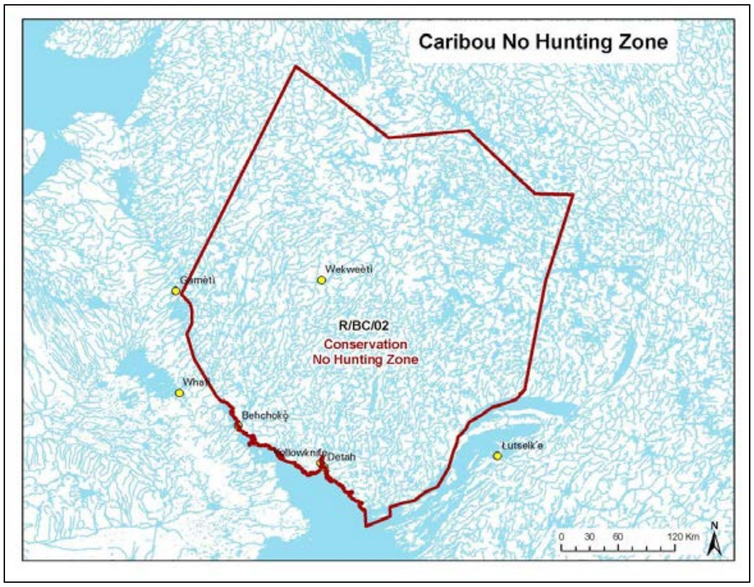


Figure C-1. No-Hunting Conservation Zone, R/BC/02, January 1, 2010 to December 8, 2010.[136]

Originally scheduled for January 11-13, 2010, the public hearing took place March 22-26, 2010 in Behchokǫ̀, NT. Once the evidentiary phase of the proceeding was completed, TG requested the WRRB adjourn the hearing in order to give TG and GNWT time to work collaboratively to complete the joint management proposal. The Board agreed to grant the application for adjournment with the condition that any revised proposal be filed by May 31, 2010 and that such a proposal address both harvest numbers and allocation of harvest for both the Bathurst and Bluenose-East ʔekwǫ̀ herds.

On May 31, 2010, TG and GNWT submitted the *Revised Joint Proposal on Caribou Management Actions in Wek'èezhìı*. This revised proposal changed the original management and monitoring actions and incorporated an adaptive co-management framework and rules-based approach to harvesting. TG and GNWT were able to reach an agreement on Indigenous harvesting. Following review of the information and comments from registered Parties, the WRRB accepted the revised proposal. Therefore, the WRRB reconvened its public hearing on August 5-6, 2010 in Behchokǫ̀, NT, where final presentations, questions and closing arguments were made.

C.2. 2010 Board Decision

On October 8, 2010, the WRRB submitted its final recommendations and Reasons for Decision Report to TG and GNWT. Many of the recommendations were related to the

[136] GNWT-GNWT 2010. http://www.GNWT.gov.nt.ca/_live/documents/content/No-Hunting_Conservation_Zone_Map.pdf

Bathurst ʔekwǫ̀ herd and relevant management actions vital for herd recovery, including harvest restrictions.

The Board recommended a harvest target of 2800 (± 10%) Bluenose-East ʔekwǫ̀ per year for harvest seasons 2010/11, 2011/12, and 2012/13 in Wek'èezhìı. Further, the Board recommended that the ratio of bulls harvested to cows should be 85:15. Although the evidence suggested that the Bluenose-East herd had not continued to decline, the Board concluded that a limited harvest of 2520-3080 ʔekwǫ̀ with 420 or fewer cows was a cautious management approach based on the current herd size and trend.

The Board recommended that all commercial, outfitted and resident harvesting of the Bluenose-East ʔekwǫ̀ herd in Wek'èezhìı be set to zero. The Board also made harvest recommendations for the Ahiak ʔekwǫ̀ herd.

The WRRB made additional ʔekwǫ̀ management and monitoring recommendations to TG and GNWT, specifically implementation of detailed scientific and Tłı̨chǫ knowledge monitoring actions and implementation of an adaptive co-management framework.

The WRRB also recommended to the Minister of CIRNAC (formerly Indian and Northern Affairs Canada (INAC)) and GNWT to collaboratively develop best practices for mitigating effects on ʔekwǫ̀ during calving and post-calving, including the consideration of implementing mobile ʔekwǫ̀ protection measures, and for monitoring landscape changes, including fires and industrial exploration and development, to assess potential impacts to ʔekwǫ̀ habitat.

The Board recommended that the harvest of dìga should be increased through incentives but that focused dìga control not be implemented. The Board understood if TG and GNWT were to plan for focused dìga control in the future, a management proposal would be required for WRRB consideration.

The Minister's emergency interim measures remained in effect until the WRRB's recommendations on ʔekwǫ̀ management in Wek'èezhìı were implemented on December 8, 2010. On January 13, 2011, TG and GNWT responded to the Board's recommendations, accepting 35, varying 22 and rejecting three of the 60 recommendations. TG and GNWT submitted an implementation plan to the WRRB on June 17, 2011, which the Board formally accepted on June 30, 2011.

APPENDIX D Review of 2010 WRRB Recommendations

Review of 2010 WRRB Recommendations				
No.	**WRRB Recommendation**	**TG/GNWT Response**	**Management Objective**	**Status**
1	TG and GNWT report annually on the overall success of the harvest target approach in meeting the objectives of effective collaborative management and the long-term recovery of the Bathurst caribou herd.	Accepted - GNWT and TG will provide a report on the overall success of the harvest target approach in June 2011.	Increase communication among the management authorities. Provide an opportunity to review the efficacy of management actions and make revisions if necessary.	Incomplete; no recommendations provided
2	All commercial harvesting of Bathurst caribou within Wek'èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bathurst caribou herd and set priority to Aboriginal harvest.	Completed
3	All outfitted harvesting of Bathurst caribou within Wek'èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bathurst caribou herd and set priority to Aboriginal harvest.	Completed
4	GNWT and TG, prior to the next survey of the Bathurst caribou herd, provide the Board and make public their positions with regard to the reinstatement of outfitting within Wek'èezhìı.	Varied - This will be addressed in the development of a long-term management plan for the Bathurst herd. The target date for the long-term management plan is the end of 2012.	Make criteria for reinstating Outfitted and Resident harvest public.	Incomplete; no criteria developed
5	All resident harvesting of Bathurst caribou within Wek'èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bathurst caribou herd and set priority to Aboriginal harvest.	Completed
6	GNWT and TG, prior to the next survey of the Bathurst caribou herd, provide the Board and make public their positions with regard to the reinstatement of resident harvesting within Wek'èezhìı. In developing this position, the Governments will review, assess, and implement, where conservation permits, a limited-entry draw system to facilitate the reinstatement of resident harvesting at the earliest opportunity.	Varied - This will be addressed in the development of a long-term management plan for the Bathurst herd. The target date for the long-term management plan is the end of 2012.	Make criteria for reinstating Outfitted and Resident harvest public.	Incomplete; no criteria developed

7	Establishment of a harvest target of 300 Bathurst caribou per year for 2010-2013.	Accepted - This was implemented on December 8, 2010 through a regulation change that established limited harvest zones inside and outside of Wek'èezhìı to reflect the current wintering area for the Bathurst caribou herd.	Set a level of harvest that can be sustained by the Bathurst herd.	Completed
8	Allocating the annual harvest target of Bathurst caribou between Tłı̨chǫ Citizens (225) and members of an Aboriginal people with rights to hunt in Mǫwhì Gogha Dè Nı̨ı̨tłèè (75)	Varied - As per prior agreement with TG to share a limited harvest of Bathurst caribou equally (150 animals for Tłı̨chǫ citizens and 150 caribou outside of Wek'èezhìı)	Establish a sharing of harvest between the Tłı̨chǫ and other Aboriginal hunters that is equitable.	Completed
9	The harvest of Bathurst caribou should target an 85:15 bull/cow ratio, i.e. the annual harvest of Bathurst caribou cows should be less than 45	Varied - GNWT and TG both agree that the harvest should focus on bulls but would prefer to use a target ratio of 80:20 males: females as agreed in revised Joint Proposal (cow harvest of 60). The modeling projections suggest that small changes in the harvest sex ratio would have negligible impacts on the Bathurst herd's likely trend.	Set a harvest sex ratio that can be sustained by the Bathurst herd.	Incomplete (excludes unknowns); target exceeded in all three years
10	TG and GNWT have information to suggest that the harvest of Bathurst caribou has <u>or will in the near future</u> exceed the harvest target of 300 by 10% or more, then regulations should be put in place to close all harvesting in areas occupied by the Bathurst herd.	Accepted - GNWT and TG will be closely monitoring harvest levels throughout the fall and winter hunting seasons and will keep communities and the WRRB informed.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Not required
11	TG and GNWT have information to suggest that the harvest of Bathurst caribou has <u>or will or in the near future</u> materially exceed 45 cows, then regulations should be put in place to close all harvesting in areas occupied by the Bathurst herd.	Varied (as per response #9) - GNWT and the TG will monitor the sex ratio of the harvest and work with hunters to target male caribou, wherever possible.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Incomplete; targets exceeded, and no regulations implemented

12	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual fall hunt, areas within which the harvest will be attributed to the Bathurst caribou herd.	Accepted - There will be ads in the local newspaper to inform the public about the new management zones within which Bathurst caribou harvest is limited. Detailed information on recent locations of radio-collared caribou will not be publicized.	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
13	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual winter hunt, areas within which the harvest will be attributed to the Bathurst caribou herd.	Accepted - There will be ads in local newspaper to inform the public about the new management zones where Bathurst caribou harvest is limited.	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
14	All commercial, outfitted and resident harvesting from the Bluenose-East caribou herd within Wek'èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bluenose-East caribou herd and set priority to Aboriginal harvest.	Completed
15	Establishment of a harvest target of 2800 Bluenose-East caribou per year for 2010-2013, with the annual harvest target and its allocation finalized in discussions between the existing wildlife co-management boards and Aboriginal governments in the Sahtú, Dehcho and Tłı̨chǫ.	Varied - Based on new 2010 estimate of the Bluenose-East herd's size, wildlife co-management boards are reviewing information and the proposed harvest targets recommended by the WRRB. GNWT and TG will be working together to promote harvest of bulls, monitor the harvest closely throughout the winter and keep the communities, as well as WRRB, SRRB and Nunavut informed.	Set a level of harvest that can be sustained by the Bluenose-East herd. Establish as sharing of harvest between the Tłı̨chǫ and other Aboriginal hunters that is equitable.	Incomplete
16	The harvest of Bluenose-East caribou should target an 85:15 bull/cow ratio, i.e. the annual harvest of Bluenose-East caribou cows should be less than 420 – Original recommendation varied to 80:20 bull/cow harvest (cow harvest of 560)	Varied (as per response #9 and #15) - GNWT and TG agree the harvest should focus on bulls but would prefer a target of 80:20 males: females as agreed to in the revised joint proposal.	Set a harvest sex ratio that can be sustained by the Bluenose-East herd.	Incomplete (excludes unknowns); target exceeded in 2 of 3 years

17	TG and GNWT have information to suggest that the harvest of Bluenose-East caribou has or will in the near future exceed the target by 10% or more, then regulations should be put in place to close all harvesting in areas occupied by the Bluenose-East herd.	Varied - Based on new 2010 estimate of the Bluenose-East herd, wildlife co-management boards and Aboriginal governments are reviewing information and the proposed target recommended by the WRRB and plan to develop a strategy which will be shared with affected wildlife co-management boards.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Incomplete; targets exceeded, and no regulations implemented
18	TG and GNWT have information to suggest that the harvest of Bluenose-East caribou has or will or in the near future materially exceed 420 cows, then regulations should be put in place to close all harvesting in areas occupied by the Bluenose-East herd.	Varied (as per response #15) - Based on new 2010 estimate of the Bluenose-East herd, wildlife co-management boards are reviewing information and proposed harvest targets recommended by WRRB.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Incomplete; targets exceeded, and no regulations implemented
19	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual fall hunt, areas within which the harvest will be attributed to the Bluenose-East caribou herd.	Accepted (as per response # 12)	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
20	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual winter hunt, areas within which the harvest will be attributed to the Bluenose-East caribou herd.	Accepted (as per response #13)	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time

21	TG and GNWT do not provide harvester assistance and/or incentives to access the Bluenose-East herd.	Rejected - GNWT and TG agree that conservation measures for the Bluenose-East herd are required. However, GNWT had previously agreed to provide support to construct a winter road to Hottah Lake so that people from Wekweètì could access the Bluenose-East herd as a measure to reduce pressure on Bathurst caribou herd, whose numbers are still very low.	Allow for alternative harvest opportunities while not placing undo pressure on adjacent herds.	Recommendation rejected - CHAP funding provide to assist harvesters for fall hunts to access Bluenose-East caribou.
22	TG consider negotiating caribou harvesting overlap agreements with Nunavut and the Sahtú region to make certain that existing relationships endure.	Varied - TG will consider.	Ensure informal traditional harvest sharing agreements among Aboriginal groups continue to be respected into the future.	Incomplete; no agreements negotiated
23	All commercial, outfitted and resident harvesting from the Ahiak caribou herd within Wek'èezhìı be set to zero in order to prevent incidental harvest of Bathurst caribou for 2010-2013.	Accepted	Reduce harvest of the Ahiak caribou herd and set priority to Aboriginal harvest. Reduce incidental harvest of Bathurst caribou herd.	Completed
24	TG and GNWT do not provide harvester assistance and/or incentives to access the Ahiak herd.	Rejected - GNWT and TG did not provide support for fall caribou harvests in 2010. However, for GNWT, it may be necessary to provide some assistance as part of accommodation for limiting harvest of the Bathurst herd. GNWT is working with harvesters to carefully monitor the harvest of the Ahiak herd.	Allow for alternative harvest opportunities while not placing undo pressure on adjacent herds.	Recommendation rejected - CHAP funding provide to assist harvesters for fall hunts to access Ahiak caribou.
25	TG consider negotiating caribou harvesting overlap agreements with Nunavut and the Akaitcho region to make certain that existing relationships endure.	Varied (as per recommendation # 22 for overlap agreements with Nunavut) - TG currently has a boundary agreement with Akaitcho.	Ensure informal traditional harvest sharing agreements among Aboriginal groups continue to be respected into the future.	Incomplete; no agreement negotiated with Nunavut; overlap agreement in place with Akaitcho.

26	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual fall hunt, areas within which the harvest will be attributed to the Ahiak caribou herd.	Accepted (as per response #12)	Ensure that the public know where the Ahiak caribou herd resides such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
27	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual winter hunt, areas within which the harvest will be attributed to the Ahiak caribou herd.	Accept (as per response #13)	Ensure that the public know where the Ahiak caribou herd resides such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
28	TG implement the Special Project, Using Tłı̨chǫ Knowledge to Monitor Barren Ground Caribou of the overall TK Research and Monitoring Program.	Varied - TG will be implementing the project based on its obligations and commitments pursuant to the provisions in the Tłı̨chǫ Agreement. Start date of the TK Research and Monitoring Program is anticipated in summer 2011.	Harvest monitoring to be controlled at community level and done in a manner that is consistent with Tłı̨chǫ cultures of sharing information and building knowledge.	Incomplete; not implemented

PREAMBLE: (#29-39) - The Tłı̨chǫ Government agrees with the recommendations 28-42 of the Recommendation Report related to the Revised Joint Proposal on Caribou Management Actions in Wek'èezhìı. We are committed to documenting and reporting on observations and trends observed by caribou harvesters and elders. Implementation of the Tłı̨chǫ Knowledge Research and Monitoring Program: Special Project, Using Tłı̨chǫ Knowledge (to Monitor Barren Ground Caribou' will take approximately eight months. The traditional monitoring system continues among the harvesters and elders. Nevertheless, the logistics of realizing a system that will rigorously and accurately document and report harvesters' observations and trends have yet to be initiated. The program requires trained Tłı̨chǫ researchers, offices, and equipment, all of which requires a realistic annual budget and extensive fundraising with those who will also benefit from Tłı̨chǫ knowledge research and monitoring.				
29	TG and GNWT implement the *spring calf survival* monitoring action as identified for TK and SK.	Scientific: Accepted - GNWT will provide the Board with a power analysis of how frequently spring composition surveys are required. GNWT has not recently used collars to assess cow mortality rate. GNWT would appreciate any suggestions from the Board on alternative methods to estimate cow mortality. Because the existing numbers of radio-collars on the Bathurst herd are insufficient to reliably monitor cow mortality rates, the Joint Proposal emphasized annual calving reconnaissance surveys to monitor the trend in the herd's numbers of breeding cows. High mortality rates in cows would translate to a declining trend in numbers of cows on the calving ground: low cow mortality rates would translate to increasing numbers of cows on the calving ground. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not implemented SK - Completed

30	TG and GNWT implement the *health and condition* monitoring action as identified for TK and SK.	Scientific: Accepted - GNWT expects that some Bathurst cows will be taken by hunters; therefore, sample kits will be available to all hunters to record basic information on health, condition and pregnancy rates of cows. Details of samples to be collected will be provided to TG community caribou monitors and GNWT staff. Typically, community hunts are an opportune time to take such samples. TK – See Preamble	Monitor the health and condition of Bathurst, Bluenose-East and Ahiak caribou in a way that does not increase the harvest of cows or take away from community harvest of cows.	TK - Incomplete; Special Project not implemented SK -Incomplete; no systematic approach
31	TG and GNWT implement the *birth rate* monitoring action as identified for TK and SK.	Scientific: Varied - Birth rate information will be collected in different ways for different herds. - For example, the size of the Ahiak and Bathurst caribou herds is estimated using the calving ground photo census surveys. Birth rate is estimated from a composition survey that is conducted on the calving ground right after the photo census. - This photo census technique is not usually used for the Bluenose-East herd (rather, herd size is estimated from a post-calving ground photo census survey). Instead, pregnancy rates are based on information collected from harvested Bluenose-East cows, and indirectly from composition surveys that assess the calf:cow ratio. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not completed SK - Completed

32	TG and GNWT implement the *adult sex ratio and fall calf survival* monitoring action as identified for TK and SK.	Scientific: Accepted - The result of the fall composition survey is one of the parameters used to determine a population estimate for the Bathurst and Ahiak herds. Fall adult sex ratio surveys for these herds are planned for 2011 and 2012 prior to photographic survey scheduled for 2011 (Ahiak/Beverly) and 2012 (Bathurst). The next Bluenose-East fall adult sex ratio survey is planned for 2011 to get more basic information on the number of bulls and cows for this herd. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not implemented SK - Incomplete; survey not conducted annually
33	TG and GNWT implement the *estimate of herd size* monitoring action as identified for TK and SK.	Scientific: Accepted - GNWT will work with all partners to undertake the: • Bathurst calving ground photo survey in June 2012. • Ahiak calving ground photo survey in 2011. • Bluenose-East post calving ground survey in 2012 or 2013. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not implemented SK - Completed

34	TG and GNWT implement the *wolf abundance (den occupancy)* monitoring action as identified by TK and SK.	Scientific: Varied - GNWT will continue with current wolf den surveys, which provide an index of wolf abundance. GNWT in consultation with the TG will provide a proposal with potential options and costings that are relevant to wolf monitoring, research, and management. The Parties will continue to explore new options with respect to monitoring and managing wolves. TK – See Preamble	Monitor wolf abundance as well as health and condition as it relates to productivity.	TK - Incomplete; Special Project not implemented SK - Completed
35	TG and GNWT implement the *wolf condition and reproduction* monitoring action as identified by TK and SK.	Scientific: Accepted - Through the Genuine Mackenzie Valley Fur Program the GNWT provides harvesters $200 for each intact wolf carcass and will provide a collection report to the WRRB and TG in June 2011 on the carcass collection. TK – See Preamble	Monitor wolf abundance as well as health and condition as it relates to productivity.	TK - Incomplete; Special Project not implemented SK - Completed, but no report
36	TG and GNWT implement the *wolf harvest* monitoring action as identified by TK and SK.	Scientific: Accepted - GNWT will provide a report to the WRRB and TG in June 2011 on wolf harvest data. TK – See Preamble	Monitor wolf harvest to assess if harvest incentives have led to changes in harvest.	TK - Incomplete; Special Project not implemented SK - Completed
37	TG and GNWT implement the *state of habitat* monitoring action as identified by TK and SK.	Scientific: Varied - GNWT will continue to provide an annual report to the WRRB and TG on fire activity. GNWT expects a number of research projects investigating the impact of fires on caribou habitat to be completed in 2012 and will provide an annual progress report to the WRRB and TG. GNWT will continue to explore new ways to monitor landscape change	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	TK - Incomplete; Special Project not implemented SK - Incomplete; no report provided

		driven by industrial exploration and development with our partners (e.g., INAC). TK – See Preamble		
38	TG and GNWT implement the *pregnancy rate* monitoring action as identified by TK and SK.	Scientific: Accepted - Note: GNWT will make available, sample kits to hunters so that any Bathurst or Bluenose-East cows that are harvested can be tested to determine pregnancy rates. The community hunts are opportune times to do this work. TK – See Preamble	Monitor the health and condition of Bathurst, Bluenose-East and Ahiak caribou in a way that does not increase the harvest of cows or take away from community harvest of cows.	TK - Incomplete; Special Project not implemented SK -Completed
39	GNWT implement the *density of cows on calving ground* monitoring action as identified.	Scientific: Varied - GNWT will undertake these surveys for the Bluenose-East, Bathurst and Ahiak herd in 2011 and 2012. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	Completed
40	TG implement the *caribou harvest* monitoring action as identified.	Varied - GNWT and TG will continue to work with harvesters to report harvests. Methods will be based on the last 2 years of harvest monitoring in the Tłįchǫ communities. A community-based program will be developed in the 2010/11 season.	Harvest monitoring to be controlled at community level and done in a manner that is consistent with Tłįchǫ cultures of sharing information and building knowledge.	Incomplete; information not consistently provided

41	TG and GNWT reporting on monitoring results to the WRRB and the general public a minimum of three times per year in April, September and December. April meeting changed to late-May.	Accepted -To make information available to the public, GNWT will also post reports provided to the WRRB on the GNWT website.	Share information in a timely manner with management authorities and the public.	Incomplete; information not consistently provided
42	TG develop and implement a TK conservation education program to support the relationship and respect Tłı̨chǫ have for caribou.	Accepted - TG has developed a Tłı̨chǫ Ekwo Working Group (TEWG) which held its orientation workshop on Dec 13-15. This group will assess and make recommendations for the TK conservation education program.	Ensure Tłı̨chǫ and other Aboriginal harvesters follow traditional practices with respect to appropriate harvest practices. Ensure that harvesters are not wasting or wounding animals that are not retrieved.	Incomplete; not implemented
43	GNWT develop and implement a scientific conservation education program to foster an increased appreciation of the resource.	Accepted - GNWT will undertake this work jointly with TG in Wek'èezhìı and with other Aboriginal groups outside of Wek'èezhìı. GNWT will prepare facts sheets that will be posted on the GNWT website. GNWT has developed an interactive Caribou Educational Program that can be used in schools for youth to learn about scientific management practices.	Ensure Tłı̨chǫ and other Aboriginal harvesters follow traditional practices with respect to appropriate harvest practices. Ensure that harvesters are not wasting or wounding animals that are not retrieved.	Completed
44	TG and GNWT implement a process of information flow, review and assessment.	Varied - The flow chart from the WRRB recommendation on page 44 suggests that the TK and scientific programs will be developed independently of one another. TG and GNWT would like to see a more integrated strategy between science and TK as discussed in the joint revised proposal.	Establish a process for sharing information in a timely manner among management authorities, to discuss the implementation of management actions and how well they are working. Increase communication among the management authorities. Provide an opportunity to review the efficacy of management actions	Completed: Barren-ground Caribou Technical Working Group created

			and make revisions if necessary.	
46	Criteria be developed by TG and GNWT for assessing success or failure that would indicate when management actions are to be revised, including reinstatement of harvest for residents, outfitters and commercial tags.	Accepted - As per recommendations #4 and #6, these criteria will be developed as part of a long-term management plan.	Establish a process for sharing information in a timely manner among management authorities, to discuss the implementation of management actions and how well they are working. Increase communication among the management authorities. Provide an opportunity to review the efficacy of management actions and make revisions if necessary.	Incomplete; criteria not developed
47	GNWT continue discussions with the Government of Nunavut for identifying opportunities for calving ground protection.	Accepted - Note: This issue is also being raised in Nunavut by the Beverly and Qamanirjuaq Caribou Management Board (BQCMB). INAC is the primary land manager in the NWT and Nunavut. Discussion will need to take place with INAC and Nunavut.	Make progress on opportunities for minimizing impacts of development on the Bathurst, Bluenose-East and Ahiak caribou herds.	Completed; ongoing
48	GNWT and INAC collaboratively develop best practices for mitigating effects on caribou during calving and post-calving, including the consideration of implementing mobile caribou protection measures.	Varied - This can be tied into the long-term management plan. Discussion will be needed to take place with INAC and Nunavut.	Ensure development on calving and post-calving ranges of the Bathurst, Bluenose-East and Ahiak herds does not unduly affect the sustainability of these herds.	Incomplete; not implemented
49	TG work towards development and implementation of a land use plan for Wek’èezhìı, including the consideration of thresholds for industrial land use.	Rejected - As per chapter 22.5 of the Tłįchǫ Agreement, it is the responsibility of Canada or GNWT to develop and implement a land use plan for Wek’èezhìı.	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	Recommendation rejected - GNWT responsibility; Tłįchǫ Land Use Plan completed

50	GNWT and INAC monitor landscape changes, including fires and industrial exploration and development, to assess potential impacts to caribou habitat.	Varied (as per response #37) - GNWT has carried out some cumulative effects modeling to assess effects to date of diamond mines on the Bathurst herd, and will continue to build on this modeling.	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	Incomplete; Bathurst Caribou Range Plan completed but not implemented
51	TG and GNWT assess the need for forest fire control in areas of important caribou habitat.	Accepted	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	Incomplete; no assessment completed
52	Harvest of wolves should be increased through the suggested incentives, except for assisting harvesters to access wolves on wintering grounds.	Accepted	Increase harvest of wolves to reduce predation pressure on Bathurst caribou herd.	Incomplete; incentives unsuccessful
53	Focused wolf control should not be implemented. If TG and GNWT believe that focused wolf control is required, a management proposal shall be provided to the WRRB for its consideration.	Accepted	Allow for assessment and review of wolf harvest incentives on an annual basis.	Incomplete; feasibility assessment completed but no management proposal submitted
54	TG and GNWT submit a joint management proposal for wood bison in Wek'èezhìı by the fall of 2011 to substantiate the establishment of zones and quotas made through the Interim Emergency Measure.	Varied - 10-year Wood Bison Management Plans for the Nahanni, Slave River Lowland, and Mackenzie herds are set to be completed by the winter of 2012. Development of these plans will review current interim harvest measures for Wood Bison in Wek'èezhìı. Draft plan will be provided to WRRB for approval. In December 2010, GNWT completed a regulation change to extend the season to September 1st.	Allow for harvest of wood bison to offset hardship of reduced Bathurst caribou harvest. Ensure bison harvest is sustainable in the long term through a management planning process.	Incomplete; not submitted

55	TG and GNWT work collaboratively to meet the obligations of Section 12.11 of the Tłı̨chǫ Agreement with support from WRRB staff as needed and a meeting be convened by January 2011.	Accepted	Develop guidance on managing caribou herds through abundance cycles by undertaking a collaborative management planning process.	Completed; ongoing
56	TG increase their capacity to ensure full participation in monitoring and management of caribou.	Accepted	Provide a forum for discussion of scientific and traditional ways of understanding caribou ecology. Allow for Tłı̨chǫ communities to be partners in management and decision-making.	Completed; Wildlife Coordinator hired
57	GNWT, TG and INAC implement its recommendations no later than January 1, 2011. GNWT's Emergency Interim Measures, put into effect on January 1, 2010, should remain in place until then.	Varied - Will be incorporated as part of the implementation plan.	Ensure timely implementation of management actions and that they are understood by Tłı̨chǫ and other Aboriginal harvesters.	Completed
58	TG and GNWT conduct consultations regarding the Recommendations Report prior to January 1, 2011.	Accepted	Ensure timely implementation of management actions and that they are understood by Tłı̨chǫ and other Aboriginal harvesters.	Completed
59	TG and GNWT develop a detailed implementation and consultation plan incorporating the WRRB's recommendations as soon as possible.	Accepted	Ensure timely implementation of management actions and that they are understood by Tłı̨chǫ and other Aboriginal harvesters.	Completed
60	GNWT develop and implement an effective and continuing enforcement and compliance program.	Accepted - The current protocol for GNWT enforcement and compliance program is effective. However, given the scope of the issues GNWT has enhanced its program to be a partnership with other affected Aboriginal organizations.	Ensure that harvest limits are respected, and that wastage and wounding loss is minimized.	Completed

APPENDIX E Review of 2016 Proceeding & Decisions

E.1 Receipt of 2015 Joint Proposal

On December 15, 2015, the TG and ENR submitted the *"Joint Proposal on Caribou Management Actions for the Bathurst Herd: 2016-2019"* to the WRRB outlining proposed management actions for the Bathurst ʔekwǫ̀ herd in Wek'èezhìı, including new restrictions on hunter harvest, predator management to reduce dìga populations on the winter range of the Bathurst ʔekwǫ̀ herd and ongoing monitoring. More specifically, TG and ENR proposed the closure of all harvesting of the Bathurst ʔekwǫ̀ herd and the development of mobile dìga-hunter camps. The WRRB considered the proposed restriction of harvest as the establishment of a TAH and, therefore, was required to hold a public hearing.

The Board initiated its 2016 Bathurst Caribou Herd Proceeding on January 18, 2016 and established an online public registry: http://www.wrrb.ca/public-information/public-registry. The public hearing took place February 23-24, 2016 in Yellowknife, NT. Final written arguments were submitted by registered intervenors on March 8, 2016, and by TG and ENR on March 11, 2016. The public record was closed on March 18, 2016 and the WRRB's deliberations followed.

E.2. 2016 Board Decision

The WRRB concluded, based on all available Aboriginal and scientific evidence, that a serious conservation concern exists for the Bathurst ʔekwǫ̀ herd and that additional management actions are vital for herd recovery. However, in order to allow careful consideration of all of the evidence on the record and to meet legislated timelines, the WRRB decided to prepare two separate reports to respond to the proposed management actions in the joint management proposal.

The first report, Part A, dealt with the proposed harvest management actions that required regulation changes in order for new regulations to be in place for the start of the 2016/17 harvest season, as well as the proposed dìga feasibility assessment. The second report, Part B, dealt with additional predator management actions, biological and environmental monitoring, and cumulative effects.

On May 27, 2016, the WRRB submitted its final determinations and recommendations and Part A Reasons for Decision Report to TG and GNWT. The WRRB determined that a total allowable harvest of zero shall be implemented for all users of the Bathurst ʔekwǫ̀ herd within Wek'èezhìı for the 2016/17, 2017/18, 2018/19 harvest seasons. As monitoring of the ʔekwǫ̀ wildlife management units and Bathurst ʔekwǫ̀ harvest are intricately linked to the implementation of a TAH, the Board recommended that TG and

ENR agree on an approach to designating zones for aerial and ground-based surveillance throughout the fall and winter harvests seasons from 2016 to 2019. Additionally, the WRRB recommended timely implementation of hunter education programs in all Tłı̨chǫ communities.

The Community-based Dìga Harvesting Project, proposed by TG and ENR as a pilot training program, was to train Tłı̨chǫ harvesters, in a culturally appropriate manner, to hunt and trap dìga on the Bathurst herd range. The Board continued to support the Project as a training program, with recommendations related to implementation and assessment.

The WRRB also recommended that the dìga feasibility assessment set out in the proposal be led by the Board with input and support from TG and ENR. The feasibility assessment would primarily be an examination of all options for dìga management, including costs, practicality and effectiveness.

On September 27, 2016, the WRRB submitted its final recommendations and Part B Reasons for Decision Report to TG and GNWT. The WRRB recommended consultations with Tłı̨chǫ communities to determine a path forward for implementation of Tłı̨chǫ laws to continue the Tłı̨chǫ way of life and maintain their cultural and spiritual connection with ʔekwǫ̀.

In addition, the WRRB recommended several Tłı̨chǫ Knowledge (TK) research and monitoring programs focusing on dìga, sahcho, stress and other impacts on ʔekwǫ̀ from collars and aircraft over-flights, and an assessment of quality and quantity of both summer and winter forage.

The Board recommended a biological assessment of sahcho as well as requesting that the Barren-ground Caribou Technical Working Group (BGCTWG) prioritize biological monitoring indicators and develop thresholds under which management actions can be taken and evaluated. All scientific and TK monitoring data will be provided to BGCTWG annually to ensure ongoing adaptive management.

The WRRB recommended the implementation of Tłı̨chǫ Land Use Plan Directives as well as completing a Land Use Plan for the remainder of Wek'èezhìı. In addition, the completion of the Bathurst Caribou Range Plan and the long-term Bathurst Caribou Management Plan are requested with measures to be implemented in the interim to provide guidance to users and managers of the Bathurst ʔekwǫ̀ herd range.

The Board recommended the development of criteria to protect key ʔekwǫ̀ habitat, including water crossings and *tataa* (corridors between bodies of water), using the Conservation Area approach in the NWT's *Wildlife Act*, offsets and value-at risks in a fire management plan. Additionally, the WRRB recommended the continued refinement of the Inventory of Landscape Change (ILC), the integration of Wildlife and Wildlife Habitat Protection Plans (WWHPP) and Wildlife Effects Monitoring Programs (WEMP) objectives for monitoring the effects of development on ʔekwǫ̀ in Wek’èezhìı, and the development of monitoring thresholds for climate indicators.

APPENDIX F Review of 2016 WRRB Determinations and Recommendations

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
Determination #1-2016	A total allowable harvest of zero for all users of the Bathurst ʔekwǫ̀ herd within Wek'èezhìı be implemented for the 2016/17, 2017/18, 2018/19 harvest seasons. For further clarification, the absolute number of caribou that can be harvested from the Bathurst herd is zero.	Accepted	♦ Completed
Recommendation #1-2016:	The Board recommends that TG and ENR come to an agreement on whether the MCBCMZ or Wildlife Management Units Subzones is the most effective way to differentiate between ʔekwǫ̀ herds, and then implement the approach with criteria for managing any overlaps between herds, for the 2016/17, 2017/18, and 2018/19 harvest seasons.	Accepted	♦ Completed
Recommendation #2-2016	The Board recommends that TG and ENR provide weekly updates to the WRRB and the general public on aerial and ground-based surveillance of the Bathurst ʔekwǫ̀ herd throughout the fall and winter harvest seasons for the 2016/17, 2017/18, and 2018/19.	Accepted	♦ Completed
Recommendation #3-2016	The Board recommends that TG and ENR increase public education efforts and implement ENR's recently developed Hunter Education program in all Tłı̨chǫ communities.	♦ Accepted	♦ Completed
Recommendation #4-2016	The WRRB continues to support the implementation of the Community-based Dìga Harvesting Project, as a training program only, subject to the following conditions: a) If the Project is to be expanded to other Tłı̨chǫ communities, a management proposal must be submitted to the WRRB for review and approval. b) If the Project is to be expanded in scope, prior to the submission of a management proposal to the	a) Accepted b) Accepted	♦ Incomplete

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	WRRB, an index of changing wolf abundance must be available and research on habitat quality and quantity on the Bathurst ʔekwǫ̀ herd range must be conducted; c) TG and ENR must inform the WRRB of the following prior to the start of the Project: i. How aerial and/or ground-based to disturbance to Bathurst ʔekwǫ̀ will be prevented or minimized? How will this potential disturbance be measured, assessed, and mitigated?; ii. How will unintentional or accidental harvest of Bathurst ʔekwǫ̀, by the Tłı̨chǫ dìga harvesters, be prevented? If a Bathurst ʔekwǫ̀ is harvested, how will TG and ENR report to the WRRB?; and, iii. How will the facilitation of wolf movements through the wolves' use of skidoo trails be prevented or minimized?; d) TG and ENR must communicate regularly about the Project with Tłı̨chǫ communities and the WRRB. Specifically, the Board requests an update prior to start up of the Project in December 2016 and a follow-up on the success of the Project in May 2017. As well, TG and ENR must report monthly on the Project, including numbers, age, sex and pregnancy rates of wolves harvested and location of wolf harvest, to the WRRB; e) The Project must be curtailed or stopped should negative impacts to the Bathurst ʔekwǫ̀ occur; and, f) TG and ENR must establish a threshold or criteria to evaluate	c) Accepted d) Accepted e) Accepted f) Accepted	

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	the success of the program, i.e. the effectiveness of training a core set of wolf harvesters, the acceptance of the Project by Tłı̨chǫ communities, continued program implementation and reaching the target number of dìga harvested.		
Recommendation #5-2016	The WRRB recommends TG and ENR support a collaborative feasibility assessment of options for dìga management, led by the Board.	♦ Varied	♦ Completed
Recommendation #1B-2016	The WRRB recommends that TG consult with Tłı̨chǫ communities, by March 2017, to ensure Tłı̨chǫ laws are implemented with respect to ʔekwǫ̀ harvesting practices to maintain the Tłı̨chǫ way of life and their relationship with ʔekwǫ̀.	♦ Varied – remove implementation piece	♦ Incomplete
Recommendation #2B-2016	WRRB recommends that TG conduct TK research to define, from the Tłı̨chǫ perspective, types of dìga, their behavior and their annual range, and their relationship with ʔekwǫ̀ and people by March 2017.	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one comprehensive study	♦ Incomplete
Recommendation #3B-2016	The WRRB recommends that TG conduct TK research on sahcho predation on ʔekwǫ̀, and their relationship with ʔekwǫ̀, other wildlife and people by June 2017.	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one comprehensive study	♦ Incomplete
Recommendation #4B-2016	The WRRB recommends that TG and ENR conduct a collaborative sahcho biological assessment, following the completion of the ongoing dìga feasibility assessment. The assessment should include summarizing available information on sahcho abundance, movement and diet for the Bathurst ʔekwǫ̀ herd's seasonal ranges as well as including TK collected in Recommendation #3B-2016.	♦ Varied – Will complete SARC report and engage with GN to discuss current information available in Nunavut	♦ Incomplete - Ongoing
Recommendation #5B-2016	The WRRB recommends that TG conduct TK research about stress and impacts on ʔekwǫ̀ and people related to collars and aircraft over-flights by	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one	♦ Incomplete

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	September 2017, which should be considered in determining number of collars deployed in 2018 and beyond.	comprehensive study	
Recommendation #6B-2016	The WRRB recommends that ENR determine whether reconnaissance surveys should be conducted during non-photo survey years with renewable resource boards, Aboriginal governments and other affected organizations in the NWT and Nunavut prior to conducting the next reconnaissance survey in June 2017.	♦ Varied- BGCTWG will review the value. BCAC should review survey methods once formed.	♦ Incomplete; no longer required as eliminated per 2019 proposed action
Recommendation #7B-2016	The WRRB recommends that TG and ENR provide a summary of scientific and TK monitoring data, including harvest and collar mortalities, as soon as available each year, to the BGCTWG.	♦ Accepted	♦ Incomplete – inconsistent reporting
Recommendation #8B-2016	The WRRB recommends that the BGCTWG prioritize biological monitoring indicators in order of need for effective management and develop thresholds under which management actions can be taken and evaluated. Implementation of this recommendation should be completed by no later than the end of March 2017.	♦ Varied – BGCTWG to review biological indicators to assess priorities for monitoring, particularly under budget constraints.	♦ Incomplete - to be addressed as part of the adaptive management framework.
Recommendation #9B-2016	The WRRB recommends that TG refine and implement Tłı̨chǫ Land Use Plan Directives, under Chapter 6 related to ʔekwǫ̀, land use and cumulative effects by March 2018.	♦ Accepted ♦ TG acknowledges suggestion and advises the Board that it intends to refine and implement the Tlicho LUP directives related to caribou. TG notes that land use planning in Wek'èezhìı is beyond the jurisdiction of the Board.	♦ Incomplete
Recommendation #10B-2016	The WRRB recommends that TG and ENR initiate, develop and implement	♦ Rejected	♦ n/a - rejected

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	a land use plan for Wek’èezhìı by March 2019.	♦ GNWT vary. Suggests that GNWT work collaboratively with TG, federal government, and other Aboriginal Government Organizations and planning partners to initiate, develop and implement a government-led approach to land use planning for public lands in Wek’èezhìı. GNWT notes that this suggestion goes beyond the authority of the Board (should be a suggestion, not a recommendation). ♦ TG agrees in substance with GNWT.	
Recommendation #11B-2016	The WRRB recommends ENR complete the Bathurst Caribou Range Plan, with an implementation strategy, by March 2018. In the interim, the Board recommends that ENR develop interim thresholds for developments and other human activities within the range of the Bathurst ʔekwǫ̀ herd by March 2017.	♦ Varied – draft thresholds will be provided by March 2017, and final draft by March 2018	♦ Completed
Recommendation #12B-2016	The WRRB recommends that TG and ENR complete and implement a long-term Bathurst Caribou Management Plan, with associate Action Plan, by March 2018.	♦ Varied – will include other parties with lead from the Bathurst Caribou Herd Cooperative Advisory Committee	♦ Incomplete - Ongoing
Recommendation #13B-2016	The WRRB recommends TG and ENR develop criteria under which the Conservation Area approach in the NWT’s *Wildlife Act* will be used to	♦ Varied –Bathurst caribou range planning process to determine when	♦ Incomplete; conservation areas noted as tool in

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	protect key ʔekwǫ̀ habitat by March 2018.	to protect key habitat by March 2018.	Bathurst Caribou Range Plan
Recommendation #14B-2016	The WRRB recommends that TG and ENR develop criteria to protect ʔekwǫ̀ water crossings and tataa from exploration and development activities in the NWT. The criteria should be developed by March 2018 and included in the Bathurst Caribou Range Plan and Tłı̨chǫ Land Use Plan.	♦ Accepted	♦ Incomplete; conservation areas noted as tool in Bathurst Caribou Range Plan
Recommendation #15B-2016	The WRRB recommends TG and ENR investigate and report to the WRRB and other stakeholders on the potential use of offsets for ʔekwǫ̀ recovery to compensate for losses caused by exploration and development activities by March 2018. A set of criteria should be developed to assess the effectiveness of each type of offset as it is investigated.	♦ Accepted	♦ Incomplete
Recommendation #16B-2016	The WRRB recommends that ENR continue to refine and update the Inventory of Landscape Change to ensure a comprehensive and standardized database of human and natural disturbance in the NWT.	♦ Accepted	♦ Completed
Recommendation #17B-2016	The WRRB recommends that TG and ENR integrate WEMP and WWHPP objectives and standardize approaches for monitoring the effects of development on ʔekwǫ̀ in Wek'èezhìı	♦ Accepted	♦ Completed
Recommendation #18B-2016	The WRRB recommends that TG and ENR complete and implement a fire management plan with criteria identifying under which the key ʔekwǫ́ habitat is defined as a value-at-risk by March 2018.	♦ Varied – involve community members in identifying important caribou habitat. Caribou habitat lower priority for habitat protection than property	♦ Incomplete
Recommendation #19B-2016	The WRRB recommends TG conduct a TK monitoring project with elders to	♦ Varied – combined 2B, 3B,	♦ Incomplete

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	document how climate conditions have affected preferred summer forage and impacted ʔekwǫ̀ fitness by September 2018.	5B, 19B, and 20B into one comprehensive study	
Recommendation #20B-2016	The WRRB recommends that TG conduct TK monitoring to assess the quality and quantity of winter forage by September 2018.	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one comprehensive study	♦ Incomplete
Recommendation #21B-2016	The WRRB recommends that the BGCTWG develop monitoring thresholds for climate indicators by March 2017.	♦ Varied – Need clarity on what is meant by climate indicators but agrees the research is necessary	♦ Incomplete – to be addressed as part of the adaptive management framework.

APPENDIX G WRRB Predator Management Recommendations and Government Response

Wek'èezhìı
Renewable Resources Board

February 6, 2019

Hon. Robert C. McLeod, Minister
Environment and Natural Resources
Government of the Northwest Territories
Box 1320
Yellowknife, NT X1A 2L9
Email: Robert_C_McLeod@gov.nt.ca

Via Email
Robert_C_McLeod@gov.nt.ca
georgemackenzie@tlicho.com

Grand Chief George Mackenzie
Tłı̨chǫ Government
Box 412
Behchokǫ̀, NT X1A 1Y0
Email: georgemackenzie@tlicho.com

Re: Section 12.5.6 of the Tłı̨chǫ Agreement – WRRB Predator Management Recommendations

Dear Minister McLeod & Grand Chief Mackenzie:

Background:
The *Kokètì Ekwǫ̀* (Bathurst caribou) and *Sahtì Ekwǫ̀* (Bluenose-East caribou) herds are both in a precipitous decline. The decline of the kokètì ekwǫ̀ herd was first documented in 1996 when the population was estimated at 349,000 animals, down from 420,000 in 1986. Management actions to date have failed to halt the decline and the herd's population was estimated at 8,200 animals in 2018. The decline of the sahtì ekwǫ̀ herd was first documented in 2013 when the herd's population was estimated at 68,000 animals, down from 121,000 in 2010. In 2018, the herd's population was estimated at 19,000 animals.

Range management, harvest restrictions and intensive study are being implemented or are already occurring in Wek'èezhìı for both herds. Previous joint management proposals for the kokètì ekwǫ̀ herd by the Department of Environment & Natural Resources (ENR), Government of the Northwest Territories (GNWT) and Tłı̨chǫ Government (TG) resulted in the Wek'èezhìı Renewable Resources Board (WRRB) holding public hearings in 2010 and again in 2016. A public hearing was also held to address management proposals for the sahtì ekwǫ̀ herd in 2016.

On January 14 and January 22, 2019 respectively, the WRRB received joint management proposals for the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds. These management proposals propose a number of actions. However, despite WRRB recommendations for the implementation of predator control dating as far back as 2010, neither of the current management proposals includes a plan for predator management in either the sahtì ekwǫ̀ or kokètì ekwǫ̀ ranges. Instead your governments have indicated their intention to address the control of predators, more specifically *Dìga* (wolves), in a separate joint management proposal later in the spring of 2019.

Yellowknife Office 102A, 4504 49th Avenue, Yellowknife, NT X1A 1A7 p. 867.873.5740 f. 867.873.5743
Wekweètì Office P.O. Box 67, Wekweètì, NT X0E 1W0 p. 867.713.2333 f. 867.713.2334 www.wrrb.ca

The Issue:
The situation for both of these herds is dire. Analysis of the joint management proposals by the Board and its advisors indicates an immediate need for action to reduce predation on the herds. During its 2016 public hearings and most recently in the TG-ENR *Ekwǫ̀* (barren-ground caribou*)* consultation tours, conducted on January 21-23, 2019, the WRRB has heard from the community members that dìga are continuing to put pressure on ekwǫ̀ populations. Community members would like to see action taken now. The Board agrees.

The Authority for WRRB Recommendations:
Section 12.5.6 of the Tłı̨chǫ Agreement states:

> *The Wek'èezhìı Renewable Resources Board may, without waiting for a proposal from a Party, make the following recommendations or determinations, after consulting with any Party or body with powers to manage any aspect of the subject matter of its recommendation or determination:*
> *(a) Recommend actions for management of harvesting in Wek'èezhìı, including*
> *(i) A total allowable harvest level for any population or stock of fish,*
> *(ii) Harvest quotas for wildlife or limits as to location, methods, or seasons of harvesting wildlife, or*
> *(iii) The preparation of a wildlife management plan; …*

The WRRB has chosen not to wait for ENR and TG to submit their predator management proposal to the Board later this spring. The 20% rate of annual decline of the kokètì ekwǫ̀ and sahtì ekwǫ̀ herds is in the Board's opinion so serious that waiting any longer to act will make recovery of the herds even more difficult. The Board is convinced that early action is essential.

In consideration of the updated 2018 sahtì ekwǫ̀ and kokètì ekwǫ̀ herd estimates and recent consultations with Tłı̨chǫ communities the WRRB makes the recommendations set out below to GNWT and the TG:

Recommendation #1-2019 (Predator): The WRRB supports continuing the ENR's dìga harvest incentive program and the TG's Community Based Dìga Harvesting Project as an education tool.

Recommendation #2-2019 (Predator): The WRRB recommends that dìga monitoring be undertaken so that population estimates, or indexes are generated. In addition, as much information as possible, including condition, diet, and reproductive status, should be collected from each harvested dìga.

Recommendation #3-2019 (Predator): The WRRB recommends that dìga management be undertaken in Wek'èezhìı. TG and ENR should review the *"Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd"* submitted in November 2017 to determine the most effective, humane and cost-efficient methods that would have the least impact and disturbance on the ekwǫ̀ herds themselves.

Recommendation #4-2019 (Predator): The WRRB recommends that dìga management should be closely monitored for effectiveness of halting or slowing the decline of the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds in order to provide future harvesting opportunities.

Recommendation #5-2019 (Predator): The WRRB recommends that the GNWT and TG work with the Government of Nunavut to enact predator management actions on the calving grounds of sahtì ekwǫ̀ and kokètì ekwǫ̀ in Nunavut.

Recommendation #6-2019 (Predator): The WRRB commits to striking a working group to begin work on a *sahcho* (grizzly bear) biological assessment by June 2019, specifically on the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds herd ranges. This working group will include at minimum the GNWT, TG and the Government of Nunavut. WRRB staff recommend that sahcho are monitored in order to determine if pressures are increasing on ekwǫ**.**

Recommendation #7-2019 (Predator): WRRB staff recommend that *golden det'ǫcho* (golden eagle) are monitored in order to determine if pressures of golden det'ǫcho are increasing on ekwǫ̀. WRRB staff recommends that TG and the GNWT work with the Government of Nunavut to support golden det'ǫcho monitoring.

In addition, as per Section 12.5.8 of the Tłı̨chǫ Agreement, the Board requests a response to these recommendations by March 6, 2019.

<u>Conclusion</u>:
The WRRB believes that predator management must begin by May 2019 in order to promote recovery of the herds. This action is essential to ensure the potential for a future harvest of sahtì ekwǫ̀ and kokètì ekwǫ̀.

The WRRB will, in accordance with the Tłı̨chǫ Agreement participate in any consultations on these proposals that the ENR or TG decides to undertake.

If there are any questions, please contact our office at (867) 873-5740 or jpellissey@wrrb.ca.

Sincerely,

Joseph Judas, Chair
Wek'èezhìı Renewable Resources Board

Cc Dr. Joe Dragon, Deputy Minister, ENR-GNWT
Rita Mueller, Assistant Deputy Minister, Operations, ENR-GNWT
Bruno Croft, Superintendent, North Slave Region, ENR-GNWT
Laura Duncan, Tłı̨chǫ Executive Officer, TG
Tammy Steinwand-Deschambeault, Director, Culture and Lands Protection, TG
Michael Birlea, Manager, Culture and Lands Protection, TG

Tłįchǫ Ndek'àowo

Tłįchǫ Government

Government of Northwest Territories Gouvernement des Territoires du Nord-Ouest

MAR 07 2019

Mr. Joseph Judas, Chair
Wek'èezhìi Renewable Resources Board
4504 49TH AVENUE
YELLOWKNIFE NT X1A 1A7

Dear Mr. Judas:

Re: Section 12.5.6 of the Tłįchǫ Agreement – WRRB Predator Management Recommendations

Thank you for your letter dated February 6, 2019 providing the Wek'èezhìı Renewable Resources Board's (WRRB) recommendations to the Tłįchǫ Government (TG) and the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories.

TG and ENR are providing the attached joint response to the WRRB's recommendations.

Sincerely,

Grand Chief George Mackenzie
Tłįchǫ Government
Behchokǫ̀, NT

Robert C. McLeod, Minister
Environment and Natural Resources
Yellowknife, NT

Attachment

c. Dr. Joe Dragon, Deputy Minister
Environment and Natural Resources

Ms. Rita Mueller, Assistant Deputy Minister, Operations
Environment and Natural Resources

Dr. Brett Elkin, Director, Wildlife
Environment and Natural Resources

Mr. Bruno Croft, Superintendent, North Slave Region
Environment and Natural Resources

Ms. Laura Duncan, Tłı̨chǫ Executive Officer
Tłı̨chǫ Government

Ms. Tammy Steinwand-Deschambeault, Director, Culture and Lands Protection
Tłı̨chǫ Government

Mr. Michael Birlea, Manager, Culture and Lands Protection
Tłı̨chǫ Government

Ms. Jody Pellissey, Executive Director
Wek'èezhìi Renewable Resources Board

WRRB Predator Management Recommendations

Recommendation #1-2019 (Predator): The WRRB supports continuing the ENR's dìga harvest incentive program and the TG's Community Based Dìga Harvesting Project as an education tool.

Response:

ENR and TG accept this recommendation.

ENR thanks the WRRB for their support of the Enhanced North Slave Wolf Harvest Incentive Program and notes that the program will continue until the prime fur season for wolves ends on May 31.

TG acknowledges and thanks the WRRB for its support of the Tłı̨chǫ Community-Based Dìga Harvesting Project, which is still under development. Tłı̨chǫ elders have been key proponents for developing and implementing a training program for Tłı̨chǫ hunters to become knowledgeable and effective harvesters of dìga. The training program engages Tłı̨chǫ elders directly so that Tłı̨chǫ knowledge and practices for hunting dìga are maintained and transmitted to the next generation of hunters. TG staff are working with selected Tłı̨chǫ hunters to provide them with additional training on harvesting and skinning methods through workshops that will be held in collaboration with ENR.

Recommendation #2-2019 (Predator): The WRRB recommends that dìga monitoring be undertaken so that population estimates, or indexes are generated. In addition, as much information as possible, including condition, diet, and reproductive status, should be collected from each harvested dìga.

Response:

ENR and TG accept this recommendation. ENR and TG agree that important aspects for assessing wolf management actions will be to a) monitor the relative abundance of dìga based on indices as removal actions are undertaken and b) evaluate health and condition of dìga including age, sex, diet, and reproductive status.

ENR and TG will develop and pilot a protocol for monitoring relative abundance of dìga in an adaptive manner to evaluate feasibility of sampling and robustness of results.

For each wolf carcass ENR receives, basic data on age, sex, diet, and reproductive status will be collected.

Recommendation #3-2019 (Predator): The WRRB recommends that dìga management be undertaken in Wek'èezhìı. TG and ENR should review the *"Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd"* submitted in November 2017 to determine the most effective, humane and cost-efficient methods that would have the least impact and disturbance on the ekwǫ̀ herds themselves.

Response:

ENR and TG accept this recommendation, and will use the feasibility assessment to develop the program.

ENR's Enhanced North Slave Wolf Incentive Program encourages harvesters to undertake ground-based shooting and/or snaring on the winter range of the Bluenose-East and Bathurst barren-ground caribou herds. The program is an extension of the previous program and was implemented to address requests from Indigenous hunters for further incentives to harvest wolves. This pilot project includes monitoring; ENR will track the number of dìga harvested and the observations of dìga reported by hunters as well as hunters' feedback on the logistics of harvesting dìga on the winter range. ENR will adaptively manage this program; if it is clear that this program is not resulting in a significant number of harvested dìga, enhancements will be made to the program and/or other options outlined in the feasibility assessment will be considered.

Recommendation #4-2019 (Predator): The WRRB recommends that dìga management should be closely monitored for effectiveness of halting or slowing the decline of the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds in order to provide future harvesting opportunities.

Response:

ENR and TG accept this recommendation. ENR and TG are working together to develop management actions to help recover caribou and developing a joint proposal on dìga management. Monitoring will be included as part of the implementation of any wolf management program. At the same time, ENR and TG have proposed to increase the monitoring of both the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds as outlined in the *Joint Proposal on Management Actions for the Bluenose-East ʔekwǫ̀ (Barren-ground caribou) Herd: 2019-2021* and the *Joint Proposal on Management Actions for the Bathurst ʔekwǫ̀ (Barren-ground caribou) Herd: 2019-2021.*

<u>Recommendation #5-2019 (Predator):</u> The WRRB recommends that the GNWT and TG work with the Government of Nunavut to enact predator management actions on the calving grounds of sahtì ekwǫ̀ and kokètì ekwǫ̀ in Nunavut.

<u>Response:</u>

As neither ENR nor TG have law-making jurisdiction in Nunavut we are unable to accept the recommendation as worded. ENR and TG would like to vary this recommendation, as the GNWT and TG can discuss potential predator management actions on the calving grounds of sahtì ekwǫ̀ and kokètì ekwǫ̀ with the Government of Nunavut.

<u>Recommendation #6-2019 (Predator):</u> The WRRB commits to striking a working group to begin work on a *sahcho* (grizzly bear) biological assessment by June 2019, specifically on the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds herd ranges. This working group will include at minimum the GNWT, TG and the Government of Nunavut. WRRB staff recommend that sahcho are monitored in order to determine if pressures are increasing on ekwǫ**.**

<u>Response:</u>

ENR and TG accept the first half of this recommendation. ENR and TG will participate in a collaborative process to work on a sahcho biological assessment led by WRRB staff. ENR can provide information on sahcho from the Northwest Territories. In April 2017, the Northwest Territories Species at Risk Committee released the "Species Status Report for Grizzly Bear (*Ursus arctos*) in the Northwest Territories", which includes both traditional knowledge and science. This status report provides a thorough biological assessment of sahcho within the NWT and should form a basis for the biological assessment.

As neither ENR nor TG have jurisdiction in Nunavut we are unable accept the second half of this recommendation as worded. Despite this, ENR can discuss potential sahcho monitoring in order to determine if pressures are increasing on ekwǫ with the Government of Nunavut. ENR and TG recognize that sahcho are an important predator on the calving and post-calving grounds of ekwǫ. As the majority of the calving grounds and post-calving ranges of the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds are in Nunavut, monitoring the pressures of sahcho on ekwǫ will occur in Nunavut and be the responsibility of the Government of Nunavut.

The TG Boots on the Ground program is one method of tracking sahcho on the Bathurst range and in the future on the Bluenose-East range. Sahcho have been observed during the TG Boots on the Ground program.

Recommendation #7-2019 (Predator): WRRB staff recommend that *golden det'ǫcho* (golden eagle) are monitored in order to determine if pressures of golden det'ǫcho are increasing on ekwǫ̀. WRRB staff recommends that TG and the GNWT work with the Government of Nunavut to support golden det'ǫcho monitoring.

Response:

As neither ENR nor TG have jurisdiction in Nunavut we are unable accept the recommendation as worded. ENR and TG would like to vary this recommendation, as TG and ENR can discuss potential options for monitoring both golden det'ǫcho and bald eagles with the Government of Nunavut.

ENR and TG recognize that eagles and in particular golden det'ǫcho have been identified as a significant predator of caribou calves in other barren-ground caribou herds.

The TG Boots on the Ground program is one method of tracking eagles on the Bathurst range and in the future on the Bluenose-East range. Bald eagles have been observed during the TG Boots on the Ground program.

APPENDIX H Tłı̨chǫ Research and Monitoring Program

Tłįchǫ Research and Monitoring Program

By
Allice Legat, Gagos Social Analysts, Inc.
Camilla Nitsiza, Whatì Community
Madelaine Chocolate, Gamètì Community
Rita Wetrade, Gamètì Community

2007

Table of Contents

Tłı̨chǫ Philosophy

Grand Chief Jimmy Bruneau directed the Tłı̨chǫ people to know both Western and Tłı̨chǫ knowledge so each Tłı̨chǫ citizen would be strong like two people. Bruneau's philosophy and direction was not new to the Tłı̨chǫ people, who have always been interested in the ways and knowledge of others. This philosophy has been noted in both their oral narratives and the journals of the trading post factors. Each tells of Tłı̨chǫ leaders learning the knowledge and negotiating techniques of trading post factors to ensure the best return for their people's furs. This philosophy is also evident - in oral narratives telling of activities leading up to discussions with the Federal Commissioner in 1921 when Möwhì signed Treaty 11. The stories explain that Tłı̨chǫ were aware of the European perspective based on information they acquired from the Slavey and Chipewyan further south. Upon learning from the experience of their southern neighbours they were better prepared to deal with the Treaty Party.

Tłı̨chǫ oral narratives stress the importance of understanding a problem, finding a solution and taking action. Their approach to learning, knowing and taking action is evident in most Tłı̨chǫ oral narratives, as well as the manner in which past research projects were approached. The Tłı̨chǫ have rarely allowed others to do research to address a problem they wish to know about themselves. They insist that they take an active part in research and monitoring. Specifically the Tłı̨chǫ:

- Explained to the managers of Rayrock Mine (1950s) that their observations were indicators of serious problems in the environment. They identified problems that they observed with plants and wildlife –such as beaver, marten and fish. These problems were particularly evident to those Tłı̨chǫ who either used the area frequently or worked at the mine.
- Insist research focus on their needs and priorities – take for example the priorities set by the Dogrib Renewable Resources Committee during the early 1990s: where caribou, habitat, water and heritage were of greatest concern.
- Insist on adequate funding to ensure Tłı̨chǫ researchers were employed as permanent, full time employees for the life of research projects – take for example the Traditional Justice and Traditional Medicine project in Whatì (1987-92); the Traditional Governance project in Gamètì (1993-1996); and the caribou and place names projects in all the Tłı̨chǫ communities (1996-2001).
- Use the participatory action research (PAR) method that includes researcher training; an elders – both male and female elders – committee/s; rigorous research methods carried out by Tłı̨chǫ researchers and overseen by the elders' committee; and verification of shared information. The PAR process ensures accurate understanding of the traditional knowledge that is

documented and ensures it leads to positive actions based on the recommendations.

Today, it is vital that the Tłı̨chǫ lead by undertaking their own harvesting and monitoring studies as the impacts of development on Tłı̨chǫ lands and the environment are becoming ever more evident. The Tłı̨chǫ Government and agencies have been given the authority to manage the land in the Tłı̨chǫ Agreement, but to do this effectively requires a system of research and monitoring that will feed into management decisions.

The Tłı̨chǫ Knowledge Research and Monitoring Program, which includes the collection of harvest information, outlined below is based on Tłı̨chǫ philosophy. First, the current issues for which this TK program was designed to solve are discussed, followed by a summary of the discussion with Tłı̨chǫ citizens that helped formulate the solutions. Thirdly, the program structure is described. There are five appendices that outline activities, outputs, and the evaluation questions so the TK Research and Monitoring Program can be improved through time. Appendices are as follows:

- Appendix I consists of the Program Design and Implementation Plan.
- Appendix II outlines the Evaluation Frameworks for both the on-going program activities and for the implementation activities.
- Appendix III is the Tłıcho Research and Monitoring Program Using Tłıcho Knowledge to Monitor Barren-ground Caribou.
- Appendix IV is a draft Tłıcho Knowledge Policy.

It should be noted that evaluation is done to ensure the best possible TK is being documented for future monitoring, education and understanding of the Tłı̨chǫ perspective.

Current Issue

The Tłı̨chǫ Agreement directs Boards, Agencies and the Tłı̨chǫ Government to i)use traditional knowledge, ii) promote cultural perspectives, and iii) select Board members that have knowledge of Tłı̨chǫ way of life. Yet the current systems – most of which are based on Western perspectives and the British legal system – make it difficult for Tłı̨chǫ knowledge (TK) to be used in a manner that is consistent within the Tłı̨chǫ cultural perspective and way of life.

The Agreement states that:

Section 12.1.6

> *In exercising their powers under this chapter, the Parties and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.*

Section 13.1.5

> *In exercising their powers in relation to forest management, the Government of the Northwest Territories, the Tłı̨chǫ Government and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.*

Section 14.1.4

> *In exercising their powers in relation to the management of plants, the Government of the Northwest Territories, the Tłı̨chǫ Government and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.*

Section 22.1.7

> *In exercising their powers, the Mackenzie Valley Environmental Impact Review Board and the Wek'èezhìi Land and Water Board shall consider traditional knowledge as well as other scientific information where such knowledge or information is made available to the Boards.*

Furthermore, Section 12.5.5 of the Tłı̨chǫ Land Claim and Self-government Agreement (the Agreement) states that the Wek'èezhìi Renewable Resources Board (WRRB) shall:

> *(a) Make a final determination, in accordance with 12.6 or 12.7, in relation to a proposal*
>
> *i. Regarding a total allowable harvest level for Wek'èezhìi, except for fish,*

ii. Regarding the allocation of portions of any total allowable harvest levels for Wek'èezhìi to groups of persons or for specified purposes, or

iii. Submitted under 12.11.1 for the management of the Bathurst caribou herd with respect to its application in Wek'èezhìi;

The Tłįchǫ Agreement authorizes the WRRB responsibility for total allowable harvest (TAH) for wildlife, forests and plants and authorizes the Minister of Fisheries and Oceans (DFO) responsibility for fish conservation and the establishment of TAH for fish stocks. Both WRRB and DFO have an obligation under terms of the Agreement to determine TAH through assessment studies and other research.

For WRRB and DFO to have information necessary for sustainable management it is imperative that the Tłįchǫ undertaken their own monitoring by documenting their observations and harvesting information to ensure they contribute to the process. If allocations are to be made among users of the resource it will be necessary to determine basic needs levels of the beneficiaries of the claim. Allocations of fisheries and wildlife resources will be difficult without this basic harvest information from the harvesters themselves.

For the Agreement to be honoured three activities need to occur:

1. Baseline information must be gathered from elders on known trends as harvest, wildlife and vegetation distribution.

2. Information gathered through Tłįchǫ traditional methods of monitoring needs to be documented on an on-going basis.

3. Realistic harvest studies need to be ongoing.

Although scientific information is readily available, most Tłįchǫ knowledge is in the minds of the elders and harvesters. For this reason, a program is needed so Tłįchǫ researchers can work with elders and harvesters to document their knowledge in a manner that does not lose the Tłįchǫ perspective. This is usually detailed knowledge of past conditions that they share with their descendants while sharing their current observations of wildlife and wildlife habitat. And, as is the traditional mode of sharing, numbers of species observed and harvested, are shared with others in the community along with other information such as behaviour of wildlife and the people harvesting. All information available is used to make management decisions.

One of the important features of Tłįchǫ knowledge is that it is acquired, enhanced and communicated on the land while people are engaged in land-based activities. It is also communicated after harvesters return to the community through oral narratives.

Modern harvest studies often ask harvesters to fill out survey forms in English, or to provide limited information that can be taken out of context. These studies may fail because they are not compatible with how Tłı̨chǫ knowledge, including information about harvest, is transmitted through oral narratives.

This project was designed to ensure that both monitoring and realistic harvesting numbers can be recorded in a culturally appropriate manner. This will help alleviate the problem that many respondents choose not to answer correctly harvest study questions posed by non-community members. (see Harvest Study Report, 2009).

Finding a Solution

In 1999-2000, the Tłı̨chǫ Regional Elders' Committee – under the direction of *K'àowo*[1] Jimmy Martin – requested Dogrib Treaty 11 staff who were working with the elders to bring male and female harvesters from each community to discuss a Tłı̨chǫ monitoring program. Funding for this meeting was secured from Cumulative Impacts and Monitoring Program, Environment Canada. The elders and harvesters directed staff to initiate monitoring around the diamond mines – with research/hunting camps located in strategic locations around the mines that would enable harvesters to observe the behaviour of caribou in relation to the mines. They also suggested a camp be located at Gots'ôkàtì and Deèzhàatì so caribou behaviour could be compared with non-mining areas.

In September 2008 the Wek'èezhìi Renewable Resources Board (WRRB) and the Tłı̨chǫ Government started work towards implementing a Tłı̨chǫ monitoring program. Also at that time members of the Wek'èezhìi Forum requested that work be done to develop TK policy.

The TK program design with associated policy guidelines were developed based on discussions held during the household visits made by the Project Team between April 2009 and December 31, 2009. All households in the three fly-in communities of Gamètì, Wekweetì and Whatì were contacted. Behchokö has a significant population therefore only those households with active harvesters and elders were contacted. During these visits Tłı̨chǫ researchers, along with Dr. Allice Legat, explained the importance of Tłı̨chǫ knowledge in the Tłı̨chǫ Agreement and the possibility of establishing a monitoring program as originally laid out by the elders and harvesters in 1999. Two Tłı̨chǫ researchers – Ms. Camilla Nitsiza and Ms. Madelaine Chocolate - did conducted the household visits, although Ms. Mary Adele Wetrade did assist Madelaine Chocolate in

[1] Translated as 'boss'. The role is significantly different than the Western concept for 'chair'.

Gamètì. Household visits took longer than anticipated because i) individuals wished to express their views after hearing the role of the WRRB as it is mandated in the Tłı̨chǫ Agreement; and ii) individuals were delighted to expound on the potential for harvesters and elders working together with Tłı̨chǫ researchers to monitor the land as first set out by the elders in 1999-2000. Their excitement at building on their traditional management practices was clear.

After completing household visits and analyzing Tłı̨chǫ responses, it became clear that it would be culturally appropriate to develop interview guidelines that allowed harvesters to share information in a manner similar to how they normally explain their harvest and observations to one another and to their elders. The Tłı̨chǫ researchers found harvesters would prefer to discuss their activities – both observations (monitoring) and harvesting – in either a home or office setting, but at their own convenience. Finally, they found that harvesters thought if Tłı̨chǫ were doing the documenting and report writing they could then be assured: i) individual harvest numbers would remain confidential; ii) their information would be documented realistically; and iii) their observations would remain in the context within which their observations were made.

Following the household visits, the next step was to hold community meetings, and establish Community Elders' and Harvesters' Committees to assist with the final design of the program and program guidelines.

After the first community meeting in Gamètì, the elders met to select a committee. The Gamètì Committee met four times with the TK staff, Rita Wetrade, and Allice Legat to discuss what had been heard at the household level and to hear more specific views. During the fourth meeting, the Committee recommended a Regional TK Elders/Harvesters Working Group (TK Regional Working Group) be established to complete the work. Gamètì Committee members thought that it would be better if Tłı̨chǫ from all four communities worked together from the start so they could address all issues together. Six (6) members on the TK Regional Working Group had been active on the TK Regional Elders Committee from 1996-2002 while the remaining ten (10) harvesters and elders were named by the Tłı̨chǫ WRRB members. The Working Group meetings were held between January and March 31, 2010: three in Gamètì,[2] one in Wek'weetì, and one in Behchokö.

[2] Under the direction of John B. Zoe, TEO, a TK Office has been established in Gametì. However office furniture and computers have yet to be purchased and staff has yet to be hired.

The following is a summary of how discussions at the household level and at community and TK Regional Working Group meetings have informed key components of the program design.

Species Important to Local Harvesters

Caribou and fish are always cited as the most important. Nevertheless, all Tłı̨chǫ elders and harvesters explain – as is consistent with members of hunting and gathering societies – that all species are important, including human. They also explained that if one is to understand trends and impacts within Wek'èezhìi, human behaviour should be monitored noting what is being harvested by both male and female harvesters and whether or not all is used or if resources are wasted. [3]

Everyone agreed that all harvested animals should be documented as it would demonstrate a more realistic flow of events and levels during the annual cycle, and a more accurate account of their observations and land use.

Tłı̨chǫ Citizens to be Interviewed

During conversations at the household level, it became apparent that many younger people felt they did not know enough about the environment to speak with the researchers, but did think that they could report what they had harvested and observed as long as older, more experienced elders and harvesters were present to help them to understand their observations. Specifically younger people thought that if elders and harvesters were present they would gain a better understanding of how their observations were similar or different than the past and how their own knowledge and behaviour impacts on their observations.

During past discussions – prior to this project - elders thought that all individuals should be encouraged to report their observations and harvest – even if observations are made while 'picnicking' or traveling with family members and harvesting is not the main goal.

Most of the elders and harvesters participating in the TK Regional Working Group thought leaders should tell harvesters to report their observations and harvest.

During discussions after the meetings, the Project Team thought that once the Community Elders' Committees are established the elders – specifically the *k'aawo* on those committees - would encourage individuals to visit the Tłı̨chǫ Knowledge Research and Monitoring office and report their observations and harvest.

---

[3] Although not discussed during the household visits or during the meetings, most elders and active harvesters suggest that human activities associated with industrial development and exploration should be monitored by stewards of the land.

Researchers documenting the information would be trained to note whether the individual is an experienced or inexperienced harvester, and whether or not they are a full-time or part-time harvester; and whether or not their main activity at the time of sighting resources was harvesting.

Sharing Information

Throughout all discussions it became clear that community members would be more open about sharing their harvesting information as well as their observations if they understood that their oral narratives and their observations - 'raw data' - would remain with and be safeguarded by the Tłı̨chǫ Government, and kept in the Tłı̨chǫ communities.

Several individuals expressed that they feel they are being "checked-up on" when non-Tłı̨chǫ ask questions and are worried that it can be used against them.

Schedule of Discussions with Households

Based on the manner in which Dene pass information, it was made abundantly clear during household visits and during the TK Regional Working Group meetings, that oral narratives are the process for sharing detailed information. (see also Basso, Cruikshank, Goulet, and Sharp on the importance of oral narratives among all Dene). For this reason the researchers/interviewers will be trained to use an 'gathering oral narratives guide' while documenting information shared by harvesters.

The TK Regional Working Group thought the office should be open at least five days a week so harvesters could report when convenient and on an ongoing basis so numbers and observations are recorded quickly.

Expectations of Harvesters and Elders

All Tłı̨chǫ citizens with whom the researchers spoke liked the idea that monitoring skills and harvesting information would be given back to the community every few months – by the Tłı̨chǫ researchers. They thought the communities could benefit from hearing this information and verifying the researchers' interpretations so misunderstandings could be clarified.

The TK Regional Working Group thinks that reporting back to the community at public meetings is extremely important. If the researchers share a summary of what they have heard with the community, then harvesters will be more likely to provide their observations and harvest numbers. They reasoned that the harvesters would know they were being heard and that their knowledge and information was being documented accurately. For example,

1. Their observations of the environment about health of animals and state of habitat, etc - are being heard;
2. Harvesters will feel secure that harvesting data is correct and their elders and leaders can use the information for management decisions.

Compensation for Harvesters

This has not been discussed with harvesters during the household visits or at the elders and harvesters meetings. During past discussions with elders, it was thought that harvesters should report on a volunteer basis, but should be compensated when attending the verification and sharing meetings when more information on their observations can be noted. Only those harvesters who participated on a volunteer basis would be compensated at the verification and working group meetings.

It is proposed that this is a decision for the Tłı̨chǫ leadership after being discussed at a Tłı̨chǫ Assembly, recognizing that availability of resources may be a constraint.

Reporting

Since using Tłı̨chǫ knowledge in environmental management is important to Tłı̨chǫ, it is recommended that after the verification meetings with elders and harvesters, report/s – annual or bi-annual - should be written for the Chief Executive Council that would then be released to the public – Boards, agencies, Industry, Federal and Territorial governments.

Duration of Harvest Study within Monitoring Program

During the household visits, the community meeting and the TK Regional Working Group meetings, the vast majority (young people did not speak to this topic) of Tłı̨chǫ citizens thought the harvest study within the monitoring program should be on-going.

Program Structure

The Tłįchǫ Knowledge Research and Monitoring Program is designed to capture knowledge in a manner that is compatible with the Tłįchǫ cultural perspective. It is also designed to acknowledge the continued importance of oral narratives as the medium with which to share information and the importance of Tłįchǫ land-based activities in learning and being able to apply and promote Tłįchǫ knowledge.

Program Goals

A Tłįchǫ Knowledge Research and Monitoring Program will support goals that assist the Tłįchǫ Government, and the boards and agencies under the Tłįchǫ Agreement, to fulfill their mandate within the co-management regimes. It will also provide direction to industry and non- Tłįchǫ researchers on expectations and costs. This program will support the following program outcomes:

1. Tłįchǫ knowledge and perspectives are utilized in management and decision-making.
2. The Tłįchǫ Government and its boards and agencies have the information they need to play a strong role in co-managing the environment, and to support programs such as education.
3. The Tłįchǫ Government has the information it needs to play a strong role in managing caribou and other wildlife, plants and forests; and has its own information and reports to support bargaining and negotiations.
4. Harvesting maintains its role as a respected and important economic and social endeavour.
5. Tłįchǫ knowledge, perspective and language are strengthened through oral narratives and land-based activities.
6. Integrated knowledge transfer is occurring across generations.
7. Tłįchǫ place names are documented accurately to express bio-geographical information, and to support the process of acquiring official place name status.

Social Impacts

If the program successfully achieving the above goals, it will help to support broader social impacts such as the following:

- Tłįchǫ citizens will fulfil their traditional stewardship responsibilities to care for the land.
- TK is transmitted in a manner that is compatible with Tłįchǫ culture and social structure.

- Tłı̨chǫ language is strong and used in daily conversations.
- Tłı̨chǫ citizens are emotionally and spiritually healthy.
- There is a structured process for Tłı̨chǫ youth to learn land-based skills and knowledge.
- Tłı̨chǫ place names become official.

Program Design and Implementation

The establishment of a fully developed, effective Tłı̨chǫ Knowledge Research and Monitoring Program is a necessary but ambitious undertaking. It will require substantial resources and careful planning. It will also require investment in training and in information technology. The program will take approximately two years to implement, and five years to become fully operational. It will take at least two years to develop TK policies, guidelines and directives that are consistent with the Tłı̨chǫ perspective and the Tłı̨chǫ Agreement, and provide direction and clarity for boards, agencies and TG departments that is both practical and respectful of Tłı̨chǫ knowledge. Guidelines and directives developed for boards, agencies and TG departments will reflect Tłı̨chǫ Government policy on access and use of Tłı̨chǫ knowledge.

There are several activities that need immediate attention if the program is going to provide information for caribou management, for the Environmental Assessment of the proposed highway route within Wek'èezhìi, and for Fortune Mineral's mining venture, with respect to impacts on land, wildlife and water.

To ensure harvesters' and elders' observations, knowledge and harvest are documented and used, the following activities will be undertaken within the next two years when initiated in November 2010:

1. Establish a comprehensive database to support the organization and storage of Tłı̨chǫ monitoring and harvest data in a manner that is consistent with oral narrative and protocol;
2. Digitize and enter existing information into the database;
3. Establish operating procedures for the program, including human resource policies and procedures, compensation policies, and development of research methods;
4. Establish training programs for researchers and data entry clerks;
5. Hire and train staff;
6. Undertake promotion and outreach to ensure that communities understand and support the program, and that harvesters participate;
7. Establish community Elders' Committees;

8. Develop a Tłı̨chǫ Knowledge Policy[4] for approval by the Tłı̨chǫ Government.

Appendix I contains a more detailed outline of the proposed structure of the program, including a comprehensive list of proposed activities required to implement the program and a comprehensive list of program activities over the longer term, together with anticipated outputs from those activities.

Appendix II contains a draft evaluation framework for implementation evaluations in Year 2, and a more fulsome outcome evaluation in Year 5. These evaluations will help to measure whether the program is on track to achieve the goals/outcomes outlined above.

The Tłı̨chǫ are faced with two urgent issues that require immediate attention: **i)** the need for caribou monitoring in the face of current concerns about the integrity and health of the Bathhurst caribou herd and harvest numbers; and ii) the Fortune Minerals and all-weather road proposal**s**. It is proposed that program implementation be fast-tracked with specific regard to these two issues. More detail on the activities required for the Special Project: Caribou Monitoring and Harvest Study can be found in Appendix III. Special Project Design for Environmental Assessments TK baseline research associated with Fortune Minerals and the proposed road will be completed in the near future.

In addition, the Tłı̨chǫ Government requires knowledge of several areas that are being proposed as protected areas.

[4] See Draft policy in Appendix IV.

Tłı̨chǫ Knowledge Research and Monitoring Program
Summary Table of Proposed Structure

SOCIAL IMPACTS

- Tłı̨chǫ citizens will fulfil their traditional stewardship responsibilities to care for the land.
- Tłı̨chǫ knowledge is transmitted in a manner that is compatible with Tłı̨chǫ culture and social structure.
- Tłı̨chǫ language is strong and used in daily conversations.
- Tłı̨chǫ citizens are emotionally and spiritually healthy.
- There is a structured process for Tłı̨chǫ to youth learn land-based skills and knowledge.
- Tłı̨chǫ place names become official

↑

GOALS

- Tâîchô knowledge and perspectives -are utilized in management and decision-making.
- The Tâîchô Government and its boards and agencies have the information they need to play a strong role in co-managing the environment, and to support programs such as education.
- The Tâîchô Government has the information it needs to play a strong role in managing caribou and other wildlife, plants and forests; and has its own information and reports to support bargaining and negotiations.
- Harvesting maintains its role as a respected and important economic and social endeavour.
- Tâîchô knowledge, perspective and language are strengthened through oral narratives and land-based activities.
- Integrated knowledge transfer is occurring across generations.
- Tâîchô place names are documented accurately to express bio-geographical information, and to support the process of acquiring official place name status.

↑

ACTIVITIES

- Establish a comprehensive database to support the organization and storage of Tłı̨chǫ monitoring and harvest data in a manner that is consistent with oral narrative and protocol.
- Digitize and enter existing information into the database.
- Establish operating procedures for the program, including human resource policies and procedures, compensation policies, and development of research methods.
- Hire and train staff – research, data entry, etc.
- Undertake promotion and outreach to ensure that communities understand and support the program, and that harvesters participate.
- Establish an Elders' Committees to guide the programme.
- Develop a Tłı̨chǫ Knowledge Policy[1] for approval by the Tłı̨chǫ Government.
- Evaluate the program to make sure it is achieving the goals.
- Implement culturally appropriate research and monitoring activities.

Appendix I
Program Design and Implementation

By Allice Legat
Gagos Social Analysts, Inc

Program Design and Implementation
Tłı̨chǫ Knowledge Research and Monitoring Program

Program Structure: Implementation Phase

	ACTIVITIES (What needs to be done)	*OUTPUTS (What we hope to achieve)*
Data Base	Design and develop database to compile and retain Tłı̨chǫ knowledge and to follow oral narrative protocol Copy tapes and photos in digital format. Enter photo information into photo data base	• Comprehensive and functioning database completed and operational • Tapes and photos can be used via computer and internet
Tłı̨chǫ Knowledge Policy	Comprehensive TK policy approved by TG	• WLWB and WRRB policies can complement TG • Industry knows TG's expectations • TK staff understand role of TK for future
Training	Identify staff training requirements and design training plans	• Staff will have the skills required to make the program a success • Training programs are designed for all aspects of program operations

	ACTIVITIES (What needs to be done)	*OUTPUTS (What we hope to achieve)*
TK Elders' Committee/s	Elders Committee are established and functioning as per the Terms of Reference	• Terms of reference are established and approved by TG • Elders Committee is operational • Elders are guiding the design and implementation of the program • Elders are working with community residents to know their traditional roles and responsibilities
Promotion and Outreach	Promote and explain the program to Tłı̨chǫ citizens	• Community residents are aware of the TKRM program • Tłı̨chǫ citizens support the program
	Describe steps taken to develop program in academic setting	• Tłı̨chǫ knowledge program gains credibility with a broader audience • Success in external fund-raising
Program Administration	Develop operating procedures for the program Develop comprehensive guidelines for program including issues such as harvester compensation, participation criteria Develop activity outline for pilot projects: Main office established Budget finalized Funding is secured for program start-up and fund-raising plans are developed	• Job descriptions are written and staff are hired • Required policies and procedures are in place • Compensation policy for participating harvesters is implemented • Concept of "harvester" is defined for the purposes of the program • Protocol for community meetings is established • Protocol for producing and distributing reports is established • caribou monitoring and harvest study • Baseline for Fortune minerals and proposed road • Office space secured • Archival section established • Core funding requirements for six years determined • Final budget approved by TG • Effective fund-raising approach results in external funding support (industry, GNWT, DFO, WLWB, WRRB)

	ACTIVITIES *(What needs to be done)*	*OUTPUTS* *(What we hope to achieve)*
Research and Monitoring Methodology	Implement culturally appropriate process for harvesters to share observations and harvest	• Harvesters are comfortable with the process • Tłı̨chǫ knowledge is transmitted in a culturally appropriate manner
	Describe program development process in academic paper and present at conference	• Papers written • Conference attended

Program Design and Implementation
Tłįchǫ Knowledge Research and Monitoring Program

Program Structure: Ongoing

	ACTIVITIES *(What needs to be done)*	*OUTPUTS* *(What we hope to achieve)*
Data Base	Maintain and update database regularly after each information exchange with harvesters and elders. Produce reports regularly and review at community meetings and with Elders' Committee Produce reports in response to requests	• Database is up to date and capable of creating reports upon demand • Baseline information is available for environmental assessments, and environmental management • The store of Tłįchǫ knowledge is expanded as new information is entered into the database
Tłįchǫ Knowledge Policy	The policy and associated directives provide appropriate guidance for TG elected representatives and staff, and external agencies	• The role of Tłįchǫ knowledge is understood • Industry is clear about TG expectations • Boards are clear about TG expectations • Federal and Territorial Governments are Clear on TG expectations
Collaborate with TG Departments	Sharing of information and expertise established through inter-department guidelines	• Process for intra-TG access to data base. • Information on TCSA tapes entered in data base. • Information on TK tapes storied in Land Department entered in data base. • Tłįchǫ language training schedule. • Land Department uses TK information and reports for management of land, wildlife and associated habitat.

	ACTIVITIES *(What needs to be done)*	*OUTPUTS* *(What we hope to achieve)*

<u>Training</u>	On-going training for program staff to ensure they are effective cultural interpreters	• Process for on-going training established.
		• Process for inter-department training to access and use data base to complete land, wildlife and other applications and permits.
		• Trained TK community researchers are available to work with harvester and elders.
		• Database administrator is trained to maintain the database.
		• Staff have the skill to:
		  ○ Efficiently document interviews.
		  ○ Use interview guidelines.
		  ○ Maintain archives and produce reports.
		  ○ 'Go after' concepts of Tłı̨chǫ and English terms.
		  ○ Write Tłı̨chǫ.
		  ○ Identify similarities and differences between Tłı̨chǫ and western management ideals.

<u>TK Elders' Committee/s</u>	Tłı̨chǫ elders provide on-going guidance to the program	• Elders' Committee is functioning effectively • Elders play a meaningful role in all phases of program • Elders work with Tłı̨chǫ citizens to know their traditional roles and responsibilities
<u>Promotion and Outreach</u>	Elders and leaders promote and explain the program to Tłı̨chǫ citizens Community meetings are held to promote program and review information. Establish network with WRRB and WLWB to ensure they have information needed for environmental management decision. Describe program in academic papers and settings.	• Community residents are aware of the program and its importance for Tłı̨chǫ knowledge • Tłı̨chǫ citizens support the program • A majority of harvesters participate in the program by providing information • Biannual reports are released publicly • Tłı̨chǫ knowledge program gains credibility with a broader audience • Success in external fund-raising

	ACTIVITIES *(What needs to be done)*	OUTPUTS *(What we hope to achieve)*
Culturally appropriate research, monitoring and harvest study	Implement culturally appropriate process for researchers to interview and receive information from elders and harvesters Establish protocols for providing monitoring and harvesting reports to appropriate agencies Conduct field camps with elders and Tłı̨chǫ researchers (including those in Land Department) to review data, expand database and build skills of researchers Collaborate with TCSA to link youth to the program	• Harvesters and elders are comfortable with the interview process • Tłı̨chǫ knowledge is transmitted in a culturally appropriate manner • Tłı̨chǫ place names are effectively documented • Three field camps are held annually, with 50 participants including youth • Field camps include participation across four generations • Information compiled by researchers is verified and expanded upon • Harvesters are fairly and appropriately compensated for their contribution. • Trends are made available to agencies on a timely basis
Research and Monitoring Methodology	Program operates efficiently and effectively Participatory Action Research method utilized • Interview guidelines utilized • Information organized • Team members understand final goals • On-going training accomplished Program is successful in achieving goals	• Useful information being collected and analyzed • Working within budget • Evaluation frameworks are established • Evaluation reports are completed • Program changes are made as required based on evaluation

Appendix II
Evaluation Frameworks

By

Allıce Legat
Gagos Social Analysts, Inc.

Evaluation Frameworks
Tłı̨chǫ Knowledge Research and Monitoring Program

Evaluation Framework: Five-Year Outcome Evaluation

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Goal #1: Tłı̨chǫ knowledge and perspectives are used in environmental management and decision-making	Is Tłı̨chǫ knowledge used by the Tłı̨chǫ Government, Boards, other governments to inform environmental management and decision-making? Is industry aware of Tłı̨chǫ Government expectations regarding use of Tłı̨chǫ knowledge? Is this reflected in development proposals? Are harvester observations being used to flag emerging trends and issues for regulatory agencies?	# of reports requested by all government agencies and Boards # of regulatory decisions that incorporate Tłı̨chǫ knowledge in written decisions # of times Tłı̨chǫ knowledge is reflected in government plans and policies # of reports requested by industry # of emerging issues flagged through harvester observations	Program files – TKRMP, TG, WRRB, WLWB Information requests will be entered into the database on an on-going basis Information from external agencies, e.g. federal and territorial departments, MVEIRB, MVLWB Database reports	Program management in consultation with other agencies Contractor or Program Management to conduct interviews with external agencies, file research as required

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Goals #2 and #3: **The Tłįchǫ Government and its boards and agencies have the information they need to play a strong role in co-managing the environment and to support programs such as education.** **The Tłįchǫ Government has the information it needs to play a strong role in managing caribou and other wildlife, plants and forests; and has its own information and reports to support bargaining and negotiations**.	Is the level of information available sufficient to meet the needs of government agencies for management decisions? Is the program documenting information on all aspects of harvesting, including harvest data, observations about trends, observations from women's as well as men's processing of products? Is the database working as an effective tool to access information? Have Tłįchǫ government agencies and boards used the information in reports? Are boards and agencies satisfied with the information that has been provided?	# of information requests received # of requests turned down because information not available # of reports produced in response to requests Compliance with established reporting protocols Reflection of information provided in regulatory and environmental decision-making Level of satisfaction with reports provided Incorporation of TKRMP information incorporated into curriculum development	Database Program files Review of regulatory and environmental decisions and reports Consultation with other TG agencies	Archivist and database manager Program management External contractor to conduct file review, consult clients

	Is information being used to inform curriculum development?			
Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Goal #4: **Harvesting maintains its role as a respected and important economic and social endeavour**	Is the proportion of Tłįchǫ citizens involved in harvesting activities increasing, decreasing or staying stable? What role does harvesting play in providing food to Tłįchǫ households? How many Tłįchǫ citizens are earning an income from harvesting activities? Are young people requesting time with harvesters so they can learn harvesting skills, including use of resources through production of crafts?	# of residents involved in harvesting and related activities # of harvesters participating in the TKRMP Amount of country food consumed by Tłįchǫ citizens Income from trapping Income from production of traditional crafts (including clothing)	Baseline information on participation in harvesting activities Participation and consumption rates from database Income information from census, GNWT	Baseline information - program management to compile as soon as possible Community researchers to enter results of harvester debriefs daily Program management to work with external contractor to compile

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Goal #5: Tłįchǫ knowledge, perspective and language are strengthened through oral narratives and land-based activities	Is TKRMP information being shared in a manner that is culturally appropriate? Is the program utilising the expertise of families with knowledge in specific geographical areas? Is the Elders' Committee effective in providing guidance to the program and participating in on-going evaluation? Is the program achieving recognition and credibility outside the Tłįchǫ area?	# of citizens participating in TKRMP review meetings, and trends # of participants who are comfortable with the process, and trends # of harvesters visiting the offices or requesting home visits, and participation trends Effectiveness of research methodology in acquiring enhanced Tłįchǫ knowledge Role of the Committee in influencing program operations and reports Number of presentations to external agencies or academic conferences External requests for information	Database Program files Interviews with program participants and clients (using appropriate methods) to determine effectiveness Focus groups and file research Elders' Committee evaluation	Community researchers through regular data inputs Program management External contractor

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Goal #6: Integrated knowledge management and transfer is occurring across four generations	Are field camps being held on a regular basis? How effective are the field camps in providing a forum for knowledge and values transfer? Is the knowledge of elders being transmitted successfully to younger generations? Is information from the TKRMP being used to educate youth and inform school curricula?	# and regularity of field camps Field camp participation rates and level of knowledge acquired by participants Satisfaction levels of field camp participants Ability of youth and elders to communicate about Tłı̨chǫ knowledge in the Tłı̨chǫ language Youth awareness of program and understanding of Tłı̨chǫ knowledge Incorporation of TKRMP information and methods into school programs	Program files Field camp pre- and post-tests Field camp evaluation results Explore partnership with TCSA to monitor TCSA program files and staff	Pre- and post-tests to be designed in Year 2 and administered by program staff at all field camps Field camp evaluation format to be designed in Year 1 and administered by program staff at all field camps Program management and external contractor

Goal #7: Information on Tłįchǫ place names is documented accurately to express bio-geographical knowledge, and to support the process of official place names	Is place name information being compiled and documented through research process? Are place names translated and spelled correctly to ensure accuracy of meaning? Is information being used to support the process of establishing Tłįchǫ names as official place names?	# of place names identified through research methods Review place names for accuracy and satisfaction # of official place names processed based on TKRMP information	Database Researchers and Elders' Committee to conduct regular review. Tłįchǫ Government toponymy files?	Community researchers to update database daily Program management to establish process in Year 2 External contractor to compile

Evaluation Frameworks
Tłįchǫ Knowledge Research and Monitoring Program

Evaluation Framework: Implementation Evaluation

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
<u>Database</u>	Is the database operational and adequate to meet program needs? Have past records been digitized and entered into the database? Have existing photos been digitized and entered into the data base? Are researchers using the database and regularly updating it? Does database follow oral narrative and protocol? Is information accessible on the internet?	# of tapes digitized # of photos digitized # of new entries made per month relative to harvesters' oral narrations and observations Volume of backlogged data entry being accomplished by staff	- Baseline assessment of existing data to be digitized - Data base - Program files - Researchers	Baseline information - program management as soon as possible Program director in consultation with researchers, at end of first and second years

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Tłįchǫ Knowledge Policy	Has the comprehensive TK policy approved by CEC? Has the TK policy been forwarded to Boards and Agencies, GNWT and Federal Departments? Have TG departments and agencies developed associated guidelines and protocols? Is industry aware of Tłįchǫ Government expectations?	Status of policy and guidelines Is policy publicly available on TG web page # of Boards, agencies, Government and business receiving policy TG and agency communications with industry	- TG, WLWB and WRRB records - Web page - TG and agency program files - Discussions with TG and agency program staff	Program management at end of first and second years

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Training	Have training plans been developed? Has schedule for training workshops been set? Have training programs been developed for : - Literacy in two languages - TK concepts and perspectives - Interview techniques - Report writing - Archival skills Is further training required?	# of training workshops designed and delivered # of staff who successfully complete training Degree of staff turnover(link to reason) #of staff with literacy in English and Tłįchǫ Staff use of interview techniques (guidelines) when listening to harvesters and elders #of documented material with correct numbering Staff acquisition of the necessary skills	- Training evaluation sheets - Personnel files - Program files - Program management observations	Training providers to ensure evaluations are completed of training sessions Program management, in consultation with trainers, harvesters and Elders' Committee; at end of first and second years

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Operation of Elders' Committee	Is the Committee operating as it was intended? Has the Elders Committee replaced the Working Group? Did Regional working Group develop Terms of Reference for elders' committee? Are the elders satisfied with the research results and interactions of program staff with the community?	Status of Terms of Reference Extent to which committee operations are consistent with TOR # of community meetings held Attendance at meetings Satisfaction of Committee members with process and support	- Program files (attendance and committee minutes) - Survey of Committee members	Program management, at end of first and second years

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Promotion and Outreach	Are elders and leaders encouraging participation? Are harvesters aware of the program? Are harvesters fairly and adequately compensated for their participation?	# of community residents who are aware of program # of introductory meetings held # of home visits Degree of expressed support for the program Degree of participation by harvesters Degree of satisfaction with compensation	Comparative information with household visits 2008-2010 Program files and data base	Baseline information - program management as soon as possible Community researchers to enter results of harvester debriefs daily Program management to compile annually
	Are program goals and achievements being shared with a broader audience?	Number of presentations to external agencies or academic conferences External requests for information	Program files	Program management to compile annually

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Research and Monitoring Methodology	Are harvesters comfortable with the process? Is Tłı̨chǫ knowledge transmitted in a culturally appropriate way? Has a methodology been established to ensure an effective role for elders in program evaluation?	# of harvesters sharing observations and harvest information through the program Harvester participation rates by category (i.e. women, youth, children) degree of harvester comfort with research methodology rate of participation in community meetings success of discussions at community meetings	- Data base - List of harvesters - Comments to researchers - Elders Committee evaluation	Community researchers to enter results of harvester debriefs daily Elders' Committee to provide input Program management, at end of first and second years

Evaluation Issue	*Evaluation Question*	*How Will we Measure It?*	*What information will be needed and where will we find it?*	*Who will collect this Information for Evaluations and When?*
Program administration	Do all staff have job descriptions? Are required policies and procedures in place? Has a space been secured for TK office? Are training and procedure manuals available for staff? Funding: Has core funding been established Has a funding raising plan been developed Does program have adequate funding	% of job descriptions completed % of policies, procedures, manuals and guidelines completed status of compensation guidelines and number of issues raised by harvesters or program administrators Funding: Status of budget development Availability of funding Success of external fund-raising efforts	Program files TG, WRRB and WLWB program files	Program management, at end of first and second years

Appendix III

Tłįchǫ Research and Monitoring Program

Using Tłįchǫ Knowledge to Monitor Barren-ground Caribou

Consultation, Verification and Program Design
Allice Legat
Camilla Nitsiza
Madeline Chocolate-Pasquayak

August 30, 2010

Table of Contents

Tłįchǫ Philosophy

Grand Chief Jimmy Bruneau directed the Tłįchǫ people to know both Western and Tłįchǫ knowledge so each Tłįchǫ citizen would be strong like two people. Bruneau's philosophy and direction was not new to the Tłįchǫ people, who have always been interested in the ways and knowledge of others. This philosophy has been noted in both their oral narratives and the journals of the trading post factors. Each tells of Tłįchǫ leaders learning the knowledge and negotiating techniques of trading post factors to ensure the best return for their people's furs. This philosophy is also evident - in oral narratives telling of activities leading up to discussions with the Federal Commissioner in 1921 when Möwhì signed Treaty 11. The stories explain that Tłįchǫ were aware of the European perspective based on information they acquired from the Slavey and Chipewyan further south. Upon learning from the experience of their southern neighbours they were better prepared to deal with the Treaty Party.

Tłįchǫ oral narratives stress the importance of understanding a problem, finding a solution and taking action. This approach to learning, knowing and taking action is evident in most Tłįchǫ oral narratives, as well as the manner in which past research projects were approached. The Tłįchǫ have rarely allowed others to do research to address a problem they wish to know about themselves. They insist that they take an active part in research and monitoring. Specifically the Tłįchǫ:

- Explained to the managers of Rayrock Mine (1950s) that their observations were indicators of serious problems in the environment. They identified problems that they observed with plants and wildlife –such as beaver, marten and fish. These problems were particularly evident to those Tłįchǫ who either used the area frequently or worked at the mine.
- Insist research focus on their needs and priorities – take for example the priorities set by the Dogrib Renewable Resources Committee during the early 1990s: where caribou, habitat, water and heritage were of greatest concern.
- Insist on adequate funding to ensure Tłįchǫ researchers were employed as permanent, full time employees for the life of research projects – take for example the Traditional Justice and Traditional Medicine project in Whatì (1987-92); the Traditional Governance project in Gametì (1993-1996); and the caribou and place names projects in all the Tłįchǫ communities (1996-2001).
- Use the participatory action research (PAR) method that includes researcher training; an elders – both male and female elders – committees; rigorous research methods carried out by Tłįchǫ researchers and overseen by the elders' committee; and verification of shared information. The PAR process ensures accurate understanding of the traditional knowledge that is documented and ensures it leads to positive actions based on the recommendations.

Today, it is vital that the Tłįchǫ lead by undertaking their own harvesting and monitoring studies as the impacts of development on Tłįchǫ lands and the environment are becoming ever more evident. The Tłįchǫ Government and co-management boards have been given the authority to manage the land in the Tłı̨chǫ Agreement, but to do this effectively requires a system of Tłı̨chǫ knowledge (TK) research and monitoring that will feed into management decisions.

The *Special Project: Using Tłı̨chǫ Knowledge to Monitor Barren Ground Caribou* described below is based on Tłı̨chǫ philosophy and is part of the Tłı̨chǫ Knowledge Research and Monitoring Program. The description of this project follows the following format: first, the current issues, for which the TK program was designed to solve, are discussed. Second, the program structure, on which the caribou monitoring and collection of harvest information is a part, is described.

It should be noted that evaluation is done to ensure the best possible TK is being documented for future monitoring, education and understanding of the Tłı̨chǫ perspective. The purpose is not to pass judgment but to provide tools to fine tune the program to ensure TK is documented and used.

Current Issue

The Tłı̨chǫ Agreement directs co-management boards, government agencies and the Tłı̨chǫ Government to i) use traditional knowledge, ii) promote cultural perspectives, and iii) select Board members that have knowledge of Tłı̨chǫ way of life. Yet the current systems – most of which are based on Western perspectives and the British legal system – make it difficult for Tłı̨chǫ knowledge (TK) to be used in a manner that is consistent within the Tłı̨chǫ cultural perspective and way of life.

The Wek'èezhìi Renewable Resources Board in collaboration with the Tłı̨chǫ Government decided to develop and implement a program that would be a positive step towards using Tłı̨chǫ knowledge in manner that considers Tłı̨chǫ perspectives.

The Agreement states that:

Section 12.1.6

> *In exercising their powers under this chapter, the Parties and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.*

Section 13.1.5

> *In exercising their powers in relation to forest management, the Government of the Northwest Territories, the Tłı̨chǫ Government and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.*

Section 14.1.4

> *In exercising their powers in relation to the management of plants, the Government of the Northwest Territories, the Tłı̨chǫ Government and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.*

Section 22.1.7

> *In exercising their powers, the Mackenzie Valley Environmental Impact Review Board and the Wek'èezhìi Land and Water Board shall consider traditional knowledge as well as other scientific information where such knowledge or information is made available to the Boards.*

Furthermore, Section 12.5.5 of the Tłı̨chǫ Land Claim and Self-government Agreement (the Agreement) states that the Wek'èezhìi Renewable Resources Board (WRRB) shall:

> *(a) Make a final determination, in accordance with 12.6 or 12.7, in relation to a proposal*
>
> *i. Regarding a total allowable harvest level for Wek'èezhìi, except for fish,*

ii. Regarding the allocation of portions of any total allowable harvest levels for Wek'èezhìi to groups of persons or for specified purposes, or

iii. Submitted under 12.11.1 for the management of the Bathurst caribou herd with respect to its application in Wek'èezhìi;

The Tłı̨chǫ Agreement authorizes the WRRB the responsibility for total allowable harvest (TAH) for wildlife, forests and plants and authorizes the Minister of Fisheries and Oceans (DFO) responsibility for fish conservation and the establishment of TAH for fish stocks. Both WRRB and DFO have an obligation under terms of the Agreement to determine TAH through assessment studies and other research.

For WRRB and DFO to have information necessary for sustainable management it is imperative that the Tłı̨chǫ undertaken their own monitoring by documenting their observations and harvesting information to ensure they contribute to the process. If allocations are to be made among users of the resource it will be necessary to determine basic needs levels of the beneficiaries of the claim. Allocations of fisheries and wildlife resources will be difficult without this basic harvest information from the harvesters themselves.

For the Agreement to be honoured three activities need to occur:

1. Baseline information must be gathered from elders on known trends as harvest, wildlife and vegetation distribution.

2. Information gathered through Tłı̨chǫ traditional methods of monitoring needs to be documented on an on-going basis.

3. Realistic harvest studies need to be ongoing.

4. All collected information must be stored in such a way as to respect the provider of the knowledge.

5. Reports to co-management boards will be sent several times per year to insure it will inform their management decisions.

Although scientific information is readily available, most TK is in the minds of the elders and harvesters. For this reason, a program is needed so Tłı̨chǫ researchers can work with elders and harvesters to document their knowledge in a manner that does not lose the Tłı̨chǫ perspective. This is usually detailed knowledge of past conditions that they share with their descendants while sharing their current observations of wildlife and wildlife habitat. And, as is the traditional mode of sharing, numbers of species observed and harvested, are shared with others in the community along with other information such as behaviour of wildlife and the people harvesting. All information available is used to make management decisions.

One of the important features of Tłı̨chǫ knowledge is that it is acquired, enhanced and communicated on the land while people are engaged in land-based activities. It is also communicated after harvesters return to the community through oral narratives.

Modern harvest studies often ask harvesters to fill out survey forms in English, or to provide limited information that can be taken out of context. These studies may fail because they are not compatible with how Tłı̨chǫ knowledge, including information about harvest, is transmitted through oral narratives.

This project was designed to ensure that both monitoring and realistic harvesting numbers can be recorded in a culturally appropriate manner. This will help alleviate the problem that many respondents choose not to answer correctly the harvest study questions posed by non-community members.

Program Structure

The Tłı̨chǫ Knowledge Research and Monitoring Program is designed to capture knowledge in a manner that is compatible with the Tłı̨chǫ cultural perspective. It is also designed to acknowledge the continued importance of oral narratives as the medium with which to share information and the importance of Tłı̨chǫ land based activities in learning and being able to apply and promote Tłı̨chǫ knowledge.

Program Goals

A Tłı̨chǫ Knowledge Research and Monitoring Program will support goals that assist the Tłı̨chǫ Government, and the boards and agencies under the Tłı̨chǫ Agreement, to fulfill their mandate within the co-management regimes. It will also provide direction to industry and non- Tłı̨chǫ researchers on expectations and costs. The caribou monitoring and harvest study portion of this program will support the following program outcomes:

1. Tłı̨chǫ knowledge and perspectives are utilized in management and decision-making.
2. The Tłı̨chǫ Government and co-management boards have the information they need to play a strong role in co-managing the environment, and to support programs such as education.
3. The Tłı̨chǫ Government has its own information and reports to provide boards and government and information it needs to play a strong role in managing caribou and other wildlife, plants and forests.
4. Harvesting maintains its role as a respected and important economic and social endeavour.
5. Tłı̨chǫ knowledge, perspective and language are strengthened through oral narratives and land-based activities.
6. Integrated knowledge transfer is occurring across generations.
7. Tłı̨chǫ place names are documented accurately to express bio-geographical information, some of which are associated with caribou harvesting.

Social Impacts

If the program successfully achieving the above goals, it will help to support broader social impacts such as the following:

- Tłı̨chǫ citizens will fulfil their traditional responsibilities to care for the land.
- TK is transmitted in a manner that is compatible with Tłı̨chǫ culture and social structure.
- Tłı̨chǫ language is strong and used in daily conversations.
- Tłı̨chǫ citizens are emotionally and spiritually healthy.
- There is a structured process for Tłı̨chǫ youth to learn land-based skills and knowledge.
- Tłı̨chǫ place names become official.

Program Design and Implementation

The establishment of a fully developed, effective Tłı̨chǫ Knowledge Research and Monitoring Program is a necessary but ambitious undertaking. It will require substantial resources, careful planning and a long term commitment to allow it to be successful. It will also require investment in training and in information technology.

Using Tłı̨chǫ Knowledge to Monitor Barren Ground Caribou and document caribou harvest is a constructive first step towards the development of the program.

There are several activities that need immediate attention if the program is going to provide on-going information for caribou monitoring and management.

To ensure harvesters' and elders' observations, knowledge and harvest are documented and used, the following activities will be undertaken immediately when initiated in November 2010:

1. Establish a comprehensive database to support the organization and storage of Tłı̨chǫ monitoring and harvest data in a manner that is consistent with oral narrative and protocol;
2. Digitize and enter existing information into the database;
3. Establish operating procedures for the program, including human resource policies and procedures, compensation policies, and development of research methods;
4. Establish training programs for researchers and data entry clerks;
5. Hire and train staff;
6. Undertake promotion and outreach to ensure that communities understand and support the program, and that harvesters participate;
7. Establish community TK Elders' Committees;
8. Finalize the Tłı̨chǫ Knowledge Policy initiated through the Wek'eezhii forum for approval by the Tłı̨chǫ Government.

Tłįchǫ Knowledge Research and Monitoring Program
Summary Table of Proposed Structure

SOCIAL IMPACTS

- Tłįchǫ citizens will fulfil their traditional stewardship responsibilities to care for the land.
- Tłįchǫ knowledge is transmitted in a manner that is compatible with Tłįchǫ culture and social structure.
- Tłįchǫ language is strong and used in daily conversations.
- Tłįchǫ citizens are emotionally and spiritually healthy.
- There is a structured process for Tłįchǫ to youth learn land-based skills and knowledge.
- Tłįchǫ place names become official

↑

GOALS

- Tłįchǫ knowledge and perspectives are utilized in management and decision-making.
- The boards and agencies mandated under the Tłįchǫ Agreement have the information they need to play a strong role in co-managing the environment and to support programs such as education.
- The Tłįchǫ Government has the information it needs to play a strong role in managing caribou and other wildlife, plants, forests and protected areas; and has its own information and reports to support bargaining and negotiations.
- Harvesting maintains its role as a respected and important economic and social endeavour.
- Tåîchô knowledge, perspective and language are strengthened through oral narratives and land-based activities.
- Integrated knowledge transfer is occurring across generations.
- Tåîchô place names are documented accurately to express bio-geographical information, and to support the process of acquiring official place name status.

↑

ACTIVITIES

- Establish a comprehensive database to support the organization and storage of Tłįchǫ monitoring and harvest data in a manner that is consistent with oral narrative and protocol.
- Digitize and enter existing information into the database.
- Establish operating procedures for the program, including human resource policies and procedures, compensation policies, and development of research methods.
- Hire and train staff – research, data entry, etc.
- Undertake promotion and outreach to ensure that communities understand and support the program, and that harvesters participate.
- Establish an Elders’ Committees to guide the programme.
- Develop a Tłįchǫ Knowledge Policy for approval by the Tłįchǫ Government.
- Evaluate the program to make sure it is achieving the goals.
- Implement culturally appropriate research and monitoring activities.

Caribou Monitoring and Harvest Study[1]

Section 12.5.5 of the Tłı̨chǫ Land Claim and Self-government Agreement (the Agreement) states that the Wek'èezhìi Renewable Resources Board (WRRB) shall:

(a) Make a final determination, in accordance with 12.6 or 12.7, in relation to a proposal

- *i. Regarding a total allowable harvest level for Wek'èezhìi, except for fish,*
- *ii. Regarding the allocation of portions of any total allowable harvest levels for Wek'èezhìi to groups of persons or for specified purposes, or*
- *iii. Submitted under 12.11.1 for the management of the Bathurst caribou herd with respect to its application in Wek'èezhìi;*

Tłı̨chǫ oral narratives tell of the annual cycles in which caribou and fish are key resources. For example, spring camp sites were and continue to be located along known caribou migration routes, good fishing locations and places known to have birch trees. Tłı̨chǫ waited for the caribou during spring migration back to the barrens but if caribou choose a different route, the people had fish while building canoes that were used to travel trails that led to the barrens making them ready to harvest caribou when they once again crossed paths. Even on the barren grounds Tłı̨chǫ camps continue to be located near good fishing locations that are known to be on caribou migration paths. Like traditional harvesting camps, current communities are located on or near fisheries and areas caribou are known to travel if they are in the area. Both resources continue to be important to the well-being of Tłı̨chǫ – psychologically as well as physically.

Tłı̨chǫ elders and harvesters who participated in the West Kitikmeot Slave Study (WKSS) research entitled, '*Caribou Migration and the State of their Habitat'*, (2001) and who originally participated in the design of the TK Monitoring Program in 1999-2000, think it is long past time to monitor barren ground caribou. The oldest Tłı̨chǫ elders know the WKSS researchers – Georgina Chocolate and Bobby Gon - focused on oral narratives from the past that provided baseline information.

They emphasize the importance of continuing to collect the most senior elders' knowledge (baseline) given the hiatus of 10 years (2001-2010). In addition they want the caribou monitoring program to:

1. Document current observations of the harvesters.
2. Research and data input and report writing to be done by adults that use both Tłı̨chǫ and English, and
3. Participation of young people through their school, during the summer and during other school or university breaks.

Elders, harvesters and other members of households – whether young or old – continue to want the Tłı̨chǫ people and their government to maintain their responsibility to watch and care for (monitor and manage) the land, water and resources they use, observe and enjoy. They want

[1] The Caribou Monitoring and Harvest Study Project is a special project within the TK Research and Monitoring Program.

Tłı̨chǫ citizens to use traditional values and rule associated with caribou to manage their resources.

The Tłı̨chǫ Agreement authorizes the WRRB's the responsibility for total allowable harvest (TAH) for wildlife, forests and plants. WRRB has an obligation under terms of the Agreement to determine TAH through assessment studies and other research for caribou. WRRB is recommending caribou harvesting targets rather than a TAH. The success of this approach is dependent on having the information necessary for sustainable management. It is, therefore, imperative that the Tłı̨chǫ undertaken their own monitoring by documenting their observations and harvesting information to ensure they contribute to the process. If the Chiefs use the TK Research and Monitoring Program to oversee the documentation of caribou harvesting among their citizens during this time of low caribou populations it will easier for the Land Protection Department, Tłı̨chǫ Government to maintain the target within a reasonable range and to allocate caribou resources to those in need, and for WRRB to receive reliable up to date information and to evaluate the success of the target approach. Furthermore, when caribou population numbers are higher, and allocations of this resource are more widespread, it will be necessary to determine basic needs levels of the beneficiaries of the claim.

For the Agreement to be honoured five activities need to occur:

1. Baseline information must be gathered from elders on known trends as harvest, wildlife and vegetation distribution. This information should be documented so it can be used to determine trends as well as indicators of change.
2. Information gathered through Tłı̨chǫ traditional methods of monitoring needs to be documented on an on-going basis.
3. Realistic harvest studies need to be ongoing.
4. All collected information must be stored in such a way as to respect the provider of the knowledge.
5. Reports must be provided to co-management boards to insure informed decisions can be made.

Most Tłı̨chǫ knowledge is in the minds of the elders and harvesters. For this reason, a program is needed so Tłı̨chǫ researchers can work with elders and harvesters to document their knowledge in a manner that does not lose the Tłı̨chǫ perspective. The process would include a detailed knowledge of past conditions that are compared to current observations of caribou behaviour, fitness and interactions with predators and pests as well as landscape and vegetation use. And, as is the traditional mode of sharing information, numbers of species observed and harvested, are incorporated into oral narratives that are told in the community. All information available is used to make management decisions and determine the number of caribou to be harvested in the near future.

One of the important features of Tłı̨chǫ knowledge is that it is acquired, enhanced and communicated on the land while people are engaged in land-based activities. It is also communicated after harvesters return to the community through oral narratives.

Modern harvest studies often ask harvesters to fill out survey forms in English, or to provide limited information that can be taken out of context. These studies may fail because they are not compatible with how Tłįchǫ knowledge, including information about harvest, is transmitted through oral narratives.

This project was designed to ensure that both monitoring and realistic harvesting numbers can be recorded in a culturally appropriate manner. This will help alleviate the problem that many respondents choose not to answer harvest study questions posed by non-community members.

Finding a Solution

In 1999-2000, the Tłįchǫ Regional Elders' Committee – under the direction of *K'àowo*[2] Jimmy Martin – requested Dogrib Treaty 11 staff who were working with the elders to bring male and female harvesters from each community to discuss a Tłįchǫ monitoring program. Funding for this meeting was secured from Cumulative Impacts and Monitoring Program, Environment Canada. The elders and harvesters directed staff to initiate monitoring around the diamond mines – with research/hunting camps located in strategic locations around the mines that would enable harvesters to observe the behaviour of caribou in relation to the mines. They also suggested a camp be located at Gots'ôkàtì and Deèzhàatì so caribou behaviour could be compared with non-mining areas.

In September 2008, the Wek'èezhìi Renewable Resources Board (WRRB) and the Tłįchǫ Government initiated work towards implementing a Tłįchǫ knowledge monitoring program that the Land Protection Department of the Tłįchǫ Government and co-management boards mandated under the Tłįchǫ Agreement could use in their decision making.

The TK program design with associated policy guidelines were developed based on discussions held during the household visits made by the Project Team between April 2009 and December 31, 2009. All households in the three fly-in communities of Gametì, Wekweetì and Whatì were contacted. Behchokö has a significant population therefore only those households with active harvesters and elders were contacted. During these visits Tłįchǫ researchers, under the direction of Allice Legat, explained the importance of Tłįchǫ knowledge in the Tłįchǫ Agreement and the possibility of establishing a monitoring program as originally laid out by the elders and harvesters in 1999. Two Tłįchǫ researchers – Camilla Nitsiza and Madelaine Chocolate - did conducted the household visits, although Mary Adele Wetrade did assist Madelaine Chocolate in Gametì. Household visits took longer than anticipated because i) individuals wished to express their views after hearing the role of the WRRB as it is mandated in the Tłįchǫ Agreement; and ii) individuals were delighted to expound on the potential for harvesters and elders working together with Tłįchǫ researchers to monitor the land as first set out by the elders in 1999-2000. Their excitement at building on their traditional management practices was clear.

After completing household visits and analyzing Tłįchǫ responses, it became clear that it would be culturally appropriate to develop interview guidelines that allowed harvesters to share information in a manner similar to how they normally explain their harvest and observations to

[2] Translated as 'boss'. The role is significantly different than the Western concept for 'chair'.

one another and to their elders. The Tłı̨chǫ researchers found harvesters would prefer to discuss their activities – both observations (monitoring) and harvesting – in either a home or office setting, but at their own convenience. Finally, they found that harvesters thought if Tłı̨chǫ were doing the documenting and report writing they could then be assured: i) individual harvest numbers would remain confidential; ii) their information would be documented realistically; and iii) their observations would remain in the context within which their observations were made.

Following the household visits a Regional TK Elders/Harvesters Working Group (TK Regional Working Group) was established to complete the work.[3] Gametì Committee members thought that it would be better if Tłı̨chǫ from all four communities worked together from the start so they could address all issues together. Six (6) members on the TK Regional Working Group had been active on the TK Regional Elders Committee from 1996-2002 while the remaining ten (10) harvesters and elders were named by the Tłı̨chǫ WRRB members or Chiefs in consultation with elders. The Working Group meetings were held between January and March 31, 2010: three in Gametì, [4] one in Wek'weetì, and one in Behchokö.

The following is a summary of how discussions at the household level and at the TK Regional Working Group meetings have informed key components of the TK caribou monitoring and harvest study approach.

Species Important to Local Harvesters

Caribou and fish are always cited as key species. Nevertheless, all Tłı̨chǫ elders and harvesters explain – as is consistent with members of hunting and gathering societies – that all species are important, including human. They also explained that if one is to understand trends and impacts within Wek'èezhìi, human behaviour should be monitored noting what is being harvested by both male and female harvesters and whether or not all is used. [5]

Tłı̨chǫ Harvesting information to be Documented

During conversations at the household level, it became apparent that many younger people felt they did not know enough about the environment to speak with their local researchers, but did think that they could report what they had harvested and observed as long as older, more experienced elders and harvesters were present to help them to understand their observations. Specifically younger people thought that if elders and harvesters were present they would gain a

[3] Members of the Regional Working Group are Romie Wetrade, Laiza Mantla, Louis Zoe and Mary Adele Wetrade (with Fred Mantla attending in place of Mary Adele Wetrade) from Gametì; Pierre Beaverhoe, Dora Nitsiza, Robert MacKenzie Sophia Williah, and Francis Simpson from Whatì; and Elizabeth Michel, Robert MacKenzie, Harry Mantla and Eddy Weyellan from Behchokǫ̀; and Jimmy Kodzin, Elizabeth Whane, Rosa P'ea, Elizabeth Arrowmaker. The Working Group members decided that since the working group was short term if someone missed a meeting – for any reason – they would not continue.

[4] Under the direction of John B. Zoe, TEO, a TK Office has been established in Gametì. However office furniture and computers have yet to be purchased and staff has yet to be hired.

[5] Although not discussed during the household visits or during the meetings, most elders and active harvesters suggest that human activities associated with industrial development and exploration should be monitored by stewards of the land.

better understanding of how their observations were similar or different than the past and how their own knowledge and behaviour impacts wildlife, particularly caribou.

Most of the elders and harvesters participating in the TK Regional Working Group thought leaders should tell harvesters to report their observations of caribou (and other wildlife) behaviour, fitness, number of young, etc as well as the number they harvested.

Discussion outside the formal structure of the TK Regional Working Group, the researchers discussed the importance of continuous 'watching caribou', and teaching the young about caribou behaviour and rules governing their behaviour around caribou; and, that caribou should be observed whether hunting is taking place or not.

Sharing Information

Throughout all discussions it became clear that community members would be more open about sharing their harvesting information as well as their observations if they understood that their oral narratives and their observations - 'raw data' - would remain with and be safeguarded by the Tłįchǫ Government, and kept in the Tłįchǫ communities.

Several individuals expressed that they feel they are being "checked-up on" when non- Tłįchǫ ask questions and are worried that it can be used against them.

Schedule of Interviews

Based on the manner in which Dene pass information, it was made abundantly clear during household visits and during the TK Regional Working Group meetings, that oral narratives are the process for sharing detailed information. (see also Basso, Cruikshank, Goulet, and Sharp on the importance of oral narratives among all Dene). For this reason the researchers will be trained to use an interview guide while documenting information shared by harvesters.

Researchers thought the oral narratives of the harvest and associated observations should be documented within two days of the harvester returning to the community.

Expectations of Harvesters and Elders

All Tłįchǫ citizens with whom the researchers spoke liked the idea that monitoring skills and harvesting information would be given back to the community every few months – by the Tłįchǫ researchers. They thought the communities could benefit from hearing this information and verifying the researchers' interpretations so misunderstandings could be clarified.

The TK Regional Working Group thinks that reporting back to the community at public meetings is extremely important. If the researchers share a summary of what they have heard with the community, then harvesters will be more likely to provide their observations and harvest numbers. They reasoned that the harvesters would know they were being heard and that their knowledge and information was being documented accurately. For example,

1. Their observations of the environment – health of caribou, state of the landscape and vegetation caribou use – are being heard and understood.
2. Harvesters will feel secure that harvesting data is correct, and their elders and leaders can use the information for management discussions with WRRB and the GNWT.

Compensation for Harvesters

This has not been discussed with harvesters during the household visits or at the elders and harvesters meetings. During past discussions with elders, it was thought that harvesters should report on a volunteer basis, but should be compensated when attending the verification and sharing meetings when more information on their observations can be noted. Only those harvesters who participated on a volunteer basis would be compensated at the verification and working group meetings.

It is proposed that this is a decision for the Tłı̨chǫ leadership after being discussed at a Tłı̨chǫ Assembly, recognizing that availability of resources may be a constraint.

Reporting

Since using Tłı̨chǫ knowledge in caribou management is important to Tłı̨chǫ, it is recommended that after the researchers hold verification meetings with elders and harvesters, reports be written for the WRRB as well as for the Chief Executive Council and the Territorial governments.

Reports will be sent to Boards, Governments and Land Protection Department at least three times per year.

Duration of Harvest Study within Monitoring Program

During the household visits and the TK Regional Working Group meetings, the vast majority (young people did not speak to this topic) of Tłı̨chǫ citizens thought the caribou harvest study within the TK monitoring program should be on-going. They also thought reporting on harvest should be on-going.

Activities Specific to Caribou Monitoring and Caribou Harvest Study

Basically the steps to traditional monitoring and documenting information on caribou are as follows:

- Harvesters have been taught since the time they were young to observe all that is around them and to consider their observations in relation to what they are harvesting, and in relation to all other aspects of their environment. It is <u>these observations</u> as well as information about their harvest that the researchers will document through digital recording and by entering key information into the data base.
- As researchers listen to harvesting accounts of the harvester, they will have an interview guide that they will use to mentally check off information, and as they enter key information into the data base. If necessary the researcher will ask the harvester for additional information, but only after they have shared their observations through a narration of their experience.
- Through hunting and through use of the caribou harvested both male and female harvesters will note the behaviour of caribou in various situations and note texture, smell and taste of meat and characteristics of hides, bones, etc. Researchers are responsible for acquiring and documenting all information of caribou.
- Researchers will mark the location of the harvester's observations and their harvest.
- Researchers will note number of caribou harvested, locations, age, sex, fitness, etc.
- Researchers will note information on wolf numbers associated with caribou as well as numbers harvested and fitness levels.
- Researchers will listen to the digital recording of the account and enter relevant information into the data base. They will also note additional questions for future reference, and, if necessary, they will visit the harvester for clarification.
- Researchers will search the data base for additional caribou information from that location, and begin developing a compilation of the information contained in the oral narratives.
- Harvesters will note and share through their oral narrative the condition of the environment, including landscape, vegetation, moist, snow depth, etc.
- If appropriate will compare their observations with reports available from the YK Dene, Kugluktuk and Lutselk'è who traditionally hunted in the region. Comparisons will be done by academic researcher in conjunction with community researchers.
- Since very few harvesters will be hunting caribou over the next several years the following activities are examples of information documented by researchers:

Autumn Migration

- Active male and female harvesters will travel to known water crossings
  - monitor caribou as they cross,
  - note number of calves, cows and bulls,
  - note direction of migration,
  - note number of wolves and other predators.
- Tłįchǫ citizens – elders, harvesters, researchers and youth – travel to Gotsak’atì to observe caribou
- Active male and female harvesters will travel to Æek’atì (Lac de Gras) area and observe caribou after leaving the Diavik and BHP claim blocks, around Æots’ik’è, Æek’atìtata

Wintering Areas

- Elders will select places to observe caribou behaviour in those areas, and to note additional aspects of fitness if harvesting caribou.
- Harvesters will also observe the state of the winter habitat

Spring Migration

- Active male and female harvesters will travel to places where caribou fences were located to observe the number of caribou (and gender and age) that travel through the area. In addition the harvesters will note fitness level. If caribou are taken, contents of their stomach and vegetation in mouths and in stools will be noted, as well as texture and smell of meat and state of hides, bones, and hair.
- Harvesters will do a visual appraisal for pregnancy and report pregnancy from the cow harvest.
- Harvesters will note number of wolves associated with the herds.
- Harvesters will note behaviour associated with pests.
- Active male and female harvesters should also travel to Gostak’atì, Dezaahtì to observe caribou at that stage of their migration.

Summer: Post Calving Area

- Elders will advise on where active male and female harvesters should travel to observe bull, cows and calf behaviour in their summer habitat assessing abundance at key locations.
- Harvesters also observe predators, insect levels, and other factors impacting caribou distribution, fitness and migration.

Project Structure: Activities and Products

	SPECIAL PROJECT ACTIVITIES *(What needs to be done)*	*PRODUCTS* *(What we hope to achieve)*
Data Base	Researchers enter harvest information into database the same day they hear and document it Maintain and update database regularly after each interview Produce reports regularly and review at community meetings and with Elders' Committee Produce reports in response to requests	• Database is up to date and capable of creating reports upon demand • Baseline information is available for environmental assessments, and environmental management • The collections of Tłı̨chǫ knowledge is expanded as new information is entered into the database • Realistic and current Tłı̨chǫ information on caribou and their habitat • Understand annual resource use -when low numbers of caribou • Ability to compare current caribou information with past: -is there a trend? -are caribou being impacted – if so what from what?
Training	On-going training for program staff to ensure they are effective researchers and cultural interpreters	• Trained TK community researchers are available to work with harvester and elders. • Database administrator is trained to maintain the database. • Staff have the skills to: ○ Efficiently document interviews. ○ Use interview guidelines. ○ Maintain archives. ○ Produce reports. ○ Identify similarities and differences between the Tłı̨chǫ and western management concepts and terms.

	SPECIAL PROJECT ACTIVITIES ***(What needs to be done)***	***PRODUCTS*** ***(What we hope to achieve)***
TK Elders' Committee/s	Tłı̨chǫ elders provide on-going guidance to the program	• Elders' Committee is functioning effectively • Elders play a meaningful role in all phases of program operations • Elders work with Tłı̨chǫ citizens to reinstate their traditional roles and responsibilities
Culturally Appropriate Research and Monitoring Methodology	**Interview and community meeting guidelines** -specific to caribou monitoring , caribou harvest and caribou habitat and loss of habitat due to fires and development	• Realistic and current Tłı̨chǫ information on caribou and their habitat. • Ensure trends are well documented, not hearsay
	Monitoring by harvesters • While harvesting • Specific to water crossings, caribou fence area, visit fire areas • If not harvesting caribou, then a form of compensation.	• Detailed current Tłı̨chǫ information on caribou and their habitat that can be discussed – in Tłı̨chǫ – between elders and harvesters with researchers documenting.
	Training specific to project • Caribou terminology • Laws and rules • Caribou management plan	• Ability to work efficiently
	Hold caribou meeting once every two months	• Realistic and current Tłı̨chǫ information on caribou and their habitat • Information available to write report on caribou observations

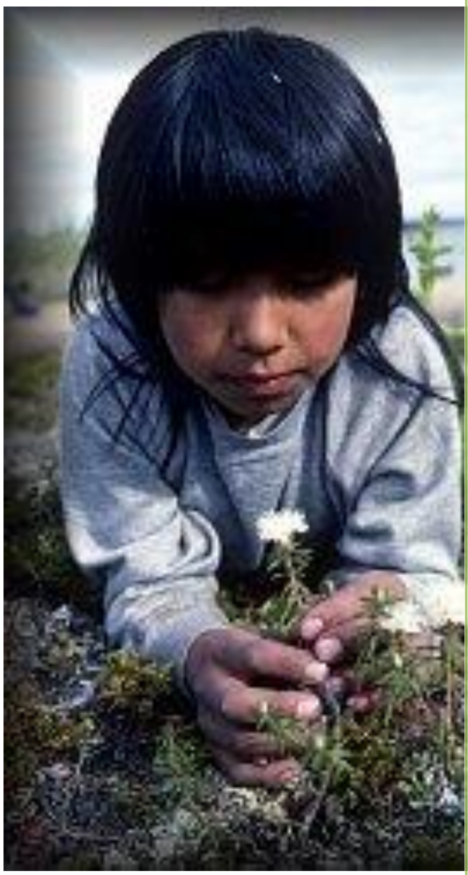
	SPECIAL PROJECT ACTIVITIES *(What needs to be done)*	*PRODUCTS* *(What we hope to achieve)*
Promotion and Outreach	Elders visit households and explain what can be used in lieu of caribou Chiefs sit with Tłı̨chǫ Knowledge Research and Monitoring Elders' Committees to go over restriction on and allocations of caribou harvest Project Directors explains monitoring process to chiefs and council with elders present Academic paper for journal and presented at appropriate conference	• Traditional use of resources due to ebb and flow of environment • Traditional sharing of information • More likely harvesters will visit and report harvest and observations • Elders Committee supports Chiefs' allocation on caribou harvest and their decision to monitor using elders and harvesters • Unique methodology and process is shared • Researchers experience discussions on what they are doing outside their communities

	SPECIAL PROJECT ACTIVITIES ***(What needs to be done)***	***PRODUCTS*** ***(What we hope to achieve)***
<u>Program Administration</u>	**Budget for this project** **Fundraising** **Protocol for sharing reports with WRRB etc,** **Guidelines for verifying information in reports** **Hire researchers**	• **Ability to carry out realistic fundraising** • **Sufficient money to monitor caribou and harvesting** • **Ensure research is rigorous** • • **Ensure results are not hearsay but based on Tłįchǫ knowledge and perspective** • **Special project will enhance long term goals of TK programme** • **Ensure use of information from Caribou migration and state of habitat project** • **Ensure data is collected and available to be used**

Appendix IV:

2011

Draft Tłı̨chǫ Knowledge Policy



Tłı̨chǫ Government

12/18/2011

Table of Contents

Tłı̨chǫ Government
Tłı̨chǫ Knowledge Policy

Preamble

To 'know something' implies knowing its origin as well as experiencing and observing. The body of Tłı̨chǫ knowledge has been acquired through thriving in a world of constant change. Tłı̨chǫ knowledge is constantly expanding, as the elders of each generation add their observations, experience, their wisdom and insights to what is already known. Tłı̨chǫ knowledge has been, and continues to be, preserved and shared with others through oral narratives.

The Tłı̨chǫ respect, honor and value living within Tłı̨chǫ neek'e – the place where Tłı̨chǫ belong –referred to in the Tłı̨chǫ Agreement as Mǫwhì Gogha Dè Nı̨ı̨tłèè in honor of Mǫwhì who valued Tłı̨chǫ knowledge and traveled Tłı̨chǫ nèèk'è observing all that was taking place and sharing with those who went on to negotiate the Tłı̨chǫ Land Claims and Self-Government Agreement.

Honoring brings with it a responsibility to learn and remember the knowledge that has been passed down while observing and experiencing all that is part of Mǫwhì Gogha Dè Nı̨ı̨tłèè so current and past oral narrative can be shared with other Tłı̨chǫ who will continue to care for the place where they belong.

Statement of Intent

Tłı̨chǫ Knowledge represents the collective intellect of the Tłı̨chǫ, and forms the foundation upon which all Tłı̨chǫ Government programs, services and activities are built. The knowledge and values of our ancestors should inform and influence all aspects of Tłı̨chǫ Government operations.

The Tłı̨chǫ Government will encourage and promote the continued acquisition, use and distribution of Tłı̨chǫ knowledge, and will work to ensure that Tłı̨chǫ knowledge is protected and safeguarded for future generations, in a manner that respects those who have shared their knowledge and to whom the knowledge belongs.

In accordance with the Tłı̨chǫ Agreement, the Tłı̨chǫ Government will encourage Government departments, boards and agencies, and the private sector to take steps to acquire and use Tłı̨chǫ knowledge in exercising their powers in relation to the *dè*, including management of human activities, land and water management, wildlife management, forest management, and management of plants; as well as during the environmental impact and review process.

Principles

Tłı̨chǫ Knowledge and values represent the cumulative and collective experience of the Tłı̨chǫ, and their acquisition and expression cannot be separated from the practice of traditional Tłı̨chǫ activities and practices associated with the *dè*.

Tłı̨chǫ communities and harvesters are responsible for the use and preservation of Tłı̨chǫ Knowledge, in a manner that preserves the context, spirit and intent of oral narratives.

Tłı̨chǫ Knowledge belongs to the people who share their oral narratives, and all Tłı̨chǫ Knowledge that is documented will be safeguarded within Tłı̨chǫ communities.

Tłı̨chǫ elders are the experts about Tłı̨chǫ knowledge and values and are best qualified to understand what needs to be acquired, documented, interpreted, and how best to apply this knowledge; they will play a lead role in any initiatives dealing with Tłı̨chǫ knowledge.

Tłı̨chǫ Knowledge and values are necessary for management processes dealing effectively with protected areas, land, water, habitat and wildlife.

Tłı̨chǫ Knowledge and values should be preserved for future generations, and as the foundation for the continued accumulation of knowledge.

Tłı̨chǫ place names are indicators of valuable information and should be documented and used as an aspect of Tłı̨chǫ Knowledge.

Documentation of Tłı̨chǫ Knowledge should not replace the telling of oral narrative and experiencing Tłı̨chǫ *nèèk'è – Mǫwhì Gogha Dè Nı̨ı̨tłèè* where knowledge is passed on in culturally appropriate manners.

Tłı̨chǫ Knowledge and values are best expressed in the Tłı̨chǫ language, and language enhancement and preservation is a critical component of Tłı̨chǫ Knowledge initiatives.

Holders of Tłı̨chǫ Knowledge have a critical role to play in monitoring the cumulative impacts and on-going health and integrity of the Tłı̨chǫ nèèk'è - *Mǫwhì Gogha Dè Nı̨ı̨tłèè*.

Definitions

Dè – Often translated as 'land' but includes the understanding that all of Creation has spirit.

External Institution – Institutions, agencies and boards both mandated and not mandated under the Tłı̨chǫ Agreement. This includes but is not restricted to Governments, industry, universities and other educational facilities.

Harvester – Any Tłı̨chǫ individual who participates in harvesting activities.

Harvesting activities – refers to all activities in which the Tłı̨chǫ have traditionally participated, including but not limited to: hunting; trapping; fishing; cutting and gathering wood or branches; collecting snow and ice; gathering plants and berries for medicine and food.

Informed consent - a statement of oral agreement that may be recorded in audio or video formats or in writing between a researcher and a Tłı̨chǫ knowledge holder that explains the nature of the research, and the manner in which the information the knowledge holder is giving, and how it can be used and accessed.

Tłı̨chǫ Agreement, The Agreement, or the Red Book - refers to the Tłı̨chǫ Land Claims and Self-Government Agreement among the Tłı̨chǫ First Nation, the Government of the Northwest Territories and the Government of Canada.

Mǫwhì Gogha Dè Nı̨ı̨tłèè is the traditional area of the Tłı̨chǫ described by Chief Mǫwhì during the signing of Treaty 11 in 1921.

Wek'èezhii is the management area of the Agreement.

Tłı̨chǫ Lands are lands owned by the Tłı̨chǫ Government under the Agreement.

Tłı̨chǫ knowledge holders – Individuals recognized by elders as possessing either or both specialized or general knowledge that has been passed on from previous generations who have the ability to integrate their own learning and share this knowledge with others.

Elder - An older person who is at least 75 years of age who follows the Tłı̨chǫ traditional system and is recognized by their peers as having expertise and are qualified to advise leaders and others.

Tłı̨chǫ knowledge - knowledge that elders and other community members hold from past intergenerational experience and is passed down to the Tłı̨chǫ through the generations. It continues to grow and is brought forward through experience, and given to descendants through oral narratives. Tłı̨chǫ knowledge is not just from the past, but includes knowledge based on present experiences as it intertwines with knowledge of the past.

Scope

This policy applies to all departments and agencies of the Tłı̨chǫ Government and their staff and representatives. The guidelines attached to this policy provides direction to industry, co-management boards, other governments and agencies conducting operations on Tłı̨chǫ lands, and within the Wek'èezhìi and Môwhì Gogha Dè Nîîtåèè areas where the Tłı̨chǫ Agreement provides legislated mandates.

Implementation

It is imperative to have a meaningful role for Tłı̨chǫ elders in the implementation of this policy. A regional committee will provide broad advice on policy and programming while the community committees will oversee any local projects and staff. There will be an TK elders committee in each community whether the community has TK staff or not. The following sets out in general their roles and responsibilities, detailed Terms of Reference are set out in Appendix I.

Regional Tłįchǫ Knowledge Elders' Committee

- Reviews research and monitoring requests and applications. May make recommendations for modifications or conditions to the Chiefs Executive Council.
- Establishes traditional knowledge research and program priorities, and makes recommendations to Chief Executive Council for approval.
- Responsible for overseeing a regional monitoring program and interpreting information collected to identify cumulative impacts and research needs.
- Provides oversight to Tłįchǫ knowledge research.
- Proposes and/or reviews proposed revisions to the Policy.
- Assists with solving problems associated with implementing this policy

Community Tłįchǫ Knowledge Elders Committee

- Oversees staff in community offices
- Informs community of Tłįchǫ Knowledge activities in their areas – by visiting homes and reporting to community meetings
- Updates Chiefs and Council on activities.
- Oversees research and monitoring conducted on traditional lands
- Assists with solving problems associated with implementing this policy

Authority and Accountability

Chief's Executive Council

- Reviews policy recommendations from the Regional Tłįchǫ Knowledge Elders' Committee
- Reviews and recommends to Assembly revisions to the Policy.
- Monitors implementation of the Policy.
- Approves priorities for research and monitoring.

Tłįchǫ Assembly

- Approves policy
- Approves amendments to policy
- Formally appoints committee members recommended by elders

Grand Chief

- Responsible for overall implementation of the policy.
- The Grand Chief will meet at minimum of twice per year with the Tłı̨chǫ Knowledge Regıonal Elders Commıttee to report on decisions of the Tłı̨chǫ Government in relation to Tłı̨chǫ Knowledge.

Tłı̨chǫ Knowledge Research & Monitoring

The Tåîchô Agreement directs Boards, Agencies and the Tåîchô Government to i)use traditional knowledge, ii) promote cultural perspectives, and iii) select Board members that have knowledge of Tåîchô way of life. Yet the current systems – most of which are based on Western perspectives and the British legal system – make it difficult for Tåîchô knowledge (TK) to be used in a manner that is consistent within the Tåîchô cultural perspective and way of life.

The Agreement states that:

Section 12.1.6

> In exercising their powers under this chapter, the Parties and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.

Section 13.1.5

> In exercising their powers in relation to forest management, the Government of the Northwest Territories, the Tåîchô Government and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.

Section 14.1.4

> In exercising their powers in relation to the management of plants, the Government of the Northwest Territories, the Tåîchô Government and the Wek'èezhìi Renewable Resources Board shall take steps to acquire and use traditional knowledge as well as other types of scientific information and expert opinion.

Section 22.1.7

> In exercising their powers, the Mackenzie Valley Environmental Impact Review Board and the Wek’èezhìi Land and Water Board shall consider traditional knowledge as well as other scientific information where such knowledge or information is made available to the Boards.

Furthermore, Section 12.5.5 of the Tåîchô Land Claim and Self-government Agreement (the Agreement) states that the Wek’èezhìi Renewable Resources Board (WRRB) shall:

> (a) Make a final determination, in accordance with 12.6 or 12.7, in relation to a proposal
>
> i. Regarding a total allowable harvest level for Wek’èezhìi, except for fish,
>
> ii. Regarding the allocation of portions of any total allowable harvest levels for Wek’èezhìi to groups of persons or for specified purposes, or
>
> iii. Submitted under 12.11.1 for the management of the Bathurst caribou herd with respect to its application in Wek’èezhìi;

The Tåîchô Agreement authorizes the WRRB responsibility for total allowable harvest (TAH) for wildlife, forests and plants and authorizes the Minister of Fisheries and Oceans (DFO) responsibility for fish conservation and the establishment of TAH for fish stocks. Both WRRB and DFO have an obligation under terms of the Agreement to determine TAH through assessment studies and other research.

For WRRB and DFO to have information necessary for sustainable management it is imperative that the Tåîchô undertake their own research and monitoring by documenting their observations and harvesting information to ensure they contribute to the process. If allocations are to be made among users of the resource it will be necessary to determine basic needs levels of the beneficiaries of the claim. Allocations of fisheries and wildlife resources will be difficult without this basic harvest information from the harvesters themselves.

For the Agreement to be honoured three activities need to occur:

1. Baseline Tłı̨chǫ information must be gathered from elders on known trends on harvest, wildlife and vegetation distribution.

2. Information gathered, through Tåîchô traditional methods of monitoring, needs to be documented on an on-going basis.

3. Culturally appropriate harvest studies need to be ongoing.

Although scientific information is readily available, most Tåîchô knowledge is in the minds of the elders and harvesters. For this reason, a program is needed so Tåîchô researchers can work with elders and harvesters to document their knowledge in a manner that does not lose the Tåîchô perspective. This is usually detailed knowledge of past conditions that they share with their descendants while sharing their current observations of wildlife and wildlife habitat. And, as is the traditional mode of sharing, numbers of species observed and harvested, are shared with others in the community along with other information such as behaviour of wildlife and the people harvesting. One of the important features of Tåîchô knowledge is that it is acquired, enhanced and communicated on the land while people are engaged in land-based activities. It is also communicated after harvesters return to the community through oral narratives.

Modern harvest studies often ask harvesters to fill out survey forms in English, or to provide limited information that can be taken out of context. These studies may fail because they are not compatible with how Tåîchô knowledge, including information about harvest, is transmitted through oral narratives.

A program must be designed to ensure that research will acquire realistic harvesting numbers can be recorded in a culturally appropriate manner. This will help alleviate the problem that many respondents choose not to answer correctly, harvest study questions posed by non-community members.

The Tłı̨chǫ Government will conduct all of its own research under the guidance of the Tłı̨chǫ Knowledge Regional Elders Committee and through the establishment of a Tłı̨chǫ Knowledge Department. All outside researchers interested in conducting research in the Tłı̨chǫ settlement area are encouraged to contact this department to explore collaboration opportunities. Further guidance is provided in the Appended Guidelines.

Tłı̨chǫ Knowledge Department

A department of Tłı̨chǫ Knowledge will be established to facilitate the implementation of this policy and program. The head offices will be located in Gamètì. A Regional Director of Tłı̨chǫ Knowledge will oversee the program and implementation of the policy. A Research Director will oversee all research and research staff. A Data Base Manager will develop and maintain a data base in both Tłı̨chǫ and English . Each community will have a staff team of a minimum of two members who will carry out research and data collection and input.

Researchers will work with the Land Protection Department to present research results in a format for ease of use to the Tłı̨chǫ Government and within the regulatory framework.

Researchers will verify monitoring information with those who provided information – elders and harvesters - at public community meeting prior to making the report public.

In addition to conducting traditional knowledge research, the staff will work with active harvesters and the TK Community Elders' Committees to monitor trends and occurrences on the land. They will employ traditional monitoring practices and good documentation practices that include individual reporting of observations followed by group discussion and analysis.

Ownership and Confidentiality

Tłı̨chǫ Knowledge belongs to Tłı̨chǫ collectively. Original documents should be turned over to the Tłı̨chǫ government for archival management in the TK head office in Gamètì. High quality copies and wıll also be stored ın storage systems wıth one ın the NWT Archıves untıl an archıves ıs buıld ın Gamètì.   Written permission must be obtained from informants and from local TK elders committee for the publication of Tłı̨chǫ *Knowledge.* In addition, researchers will record statements of purpose and permission in audio or video format at the beginning of each interview. See attached guidelines for more information.

Elders want their oral narratives to stay in their own language, and if others wish to listen to the stories of their experience then they should use those middle-aged persons who understand Tłı̨chǫ to tell them the story (after lıstenıng to the dıgıtal recordıng) – rather than translating the recording.

Provisions

- The Department of Tłı̨chǫ Knowledge will establish methodology and research procedures to guide the acquisition of Tłı̨chǫ oral narratives and knowledge.
- The Tłı̨chǫ Knowledge Department will take the lead and work with the Wek'eezhii Forum to establish procedures to guide the use of Tłı̨chǫ knowledge in each of their programs and services. Tłı̨chǫ researchers will work under the collective guidance of Tłı̨chǫ elders through the Regional and Community Committee in the design of research projects and writing reports.
- The Tłı̨chǫ Government will work in collaboration with the Wek'eezhii Land and Water Board and the Wek'èezhìi Renewable Resources Board to ensure that they have access to information about Tłı̨chǫ knowledge that is required to implement their mandates as specified in the Tłı̨chǫ Agreement.
- The Tłı̨chǫ Government will encourage the Wek'eezhii Land and Water Board and the Wek'eezhii Renewable Resources Board to work with the Department of Tłı̨chǫ Knowledge to establish procedures and guidelines for the use and incorporation of traditional knowledge in regulatory and management processes within their mandates.
- External institutions - including other governments, industry, and academia – who wish to conduct research on Tłı̨chǫ Knowledge will be encouraged to do so in accordance with the provisions of this policy and associated guidelines and protocols.
- The Tłı̨chǫ Government will develop regulations to guide the ownership and use of Tłı̨chǫ knowledge , including provisions for ensuring confidentiality when knowledge holders have requested it; recognition of Tłı̨chǫ knowledge holders when appropriate; the storage of Tłı̨chǫ *Knowledge* ; provisions for access; and publication and distribution. These regulations will complement existing research protocols established by the Government of the Northwest Territories, e.g.

requirements under the NWT *Scientists Act* to acquire research licenses and the attached Guidelines.

- Tłı̨chǫ Knowledge brought forward for consideration in the regulatory processes administered by the WLWB and WRRB must be compiled in accordance with the provisions of this policy and associated directives.

The following Appendices form part of this Policy:

Appendix I:	Terms of Reference - Elders' TK Community and Regional Committees
Appendix II:	Guidelines for Developers
Appendix III:	Sample Protocol Agreement
Appendix IV:	Guıdelınes for Researchers
Appendix V:	Guidelines for Authors and Illustrators

Appendix I
Tłı̨chǫ Knowledge Regional and Community Elders' Committees

Terms of Reference

Community Tłı̨chǫ Knowledge Elders Committee

- Each community will have an elders' committee overseeing their Tłı̨chǫ knowledge research and monitoring activities and providing advice to staff and researchers. These committees will be known as the Tłı̨chǫ Knowledge Communıty Elders' Committee.
- Informs community of Tłı̨chǫ Knowledge activities in their areas – by vısıtıng homes and reporting to community meetings
- Updates Chiefs and Councıl on activities.
- Oversees research and monitoring conducted on traditional lands
- Assists with solving problems associated with implementing this policy

The community of Wekweètì will have two members on their local committee, Gameti and Whati will have four elders, two female and two male elders representatives, and Behchokǫ̀ wıll have six members to reflect the size of each community. Where possible, one male and one female wıll be the oldest members of the communıty and two wıll be younger, who are chosen by the older elders. In Behchokǫ̀ two male and two females wıll be among the oldest elders , and two males and two females wıll be younger. Representative should be persons known to value Tłı̨chǫ knowledge and persons who know which individuals in their community has knowledge of specific places, events and wildlife, plants, forests and fish.

Tłı̨chǫ Knowledge Regıonal Elders Commıttee

- Reviews research and monitoring requests and applications. May make recommendations for modifications or conditions to the Chiefs Executive Council.
- Establishes traditional knowledge research and program priorities, and makes recommendations to Chief Executive Council for approval.
- Responsible for overseeing a regional monitoring program and interpreting information collected to identify cumulative impacts and research needs.
- Provides oversight to Tłı̨chǫ knowledge research.
- Proposes and/or reviews proposed revisions to the Policy.

- Assists with solving problems associated with implementing this policy

The Tłı̨chǫ Knowledge Regional Elders' Committee will consist of two of the oldest males and females from each community committee.

The elders' committees are participatory action committees who represent the collective interests of the elders and harvesters who continue to use the land and the resources from the land.

The elders on the committee will be chosen by the current committee elders based on skills and land-based knowledge.

Purpose of Committee

The primary purpose of the Elders Committees is to provide Tłı̨chǫ elders with the opportunity to offer the wealth of knowledge and wisdom they have accumulated for the benefit of the current and future generations in the management of the land they know and love.

Elders will be responsible to walk around and visit other members of the community to inform them of their activities and to identify individuals that should be interviewed on specific topics.

During community meetings and at the annual assembly the Committee Members will be responsible for demonstrating the value of their work by working with staff to make presentations relevant to the topics at hand.

Elders will ensure that time will be taken to do the research to their standards and will carry out activities that are aimed at solving problems and addressing challenges important to the communities and region.

To demonstrate the economic, social and cultural values of traditional land use.

Role of Members

a. Participate in local and regional Elders Committees as a way to help formulate, document and pass on traditional cultural knowledge for future generations.
b. Help make explicit and incorporate locally appropriate cultural values in all aspects of life in the community, while recognizing the diversity of opinion that may exist.
c. Make a point to utilize traditional ways of knowing, teaching, listening and learning in passing on cultural knowledge to others in the community.
d. Seek out information on ways to protect knowledge and retain copyright authority over all local knowledge that is being shared with others for documentation purposes.
e. Verify through translators of cultural information that has been written down to insure accuracy.
f. Follow appropriate traditional protocols as much as possible in the interpretation and utilization of cultural knowledge.

g. Assist willing members of the community to acquire the knowledge and skills needed to assume the role of Elder for future generations.
h. To develop a vision statement that will enable all to understand the future that they wish to foster. To develop a mission statement to guide the work of the Tłı̨chǫ Knowledge Department

Payment to Elders

Since elders on these committees will act more as advisors the older elders (including the k'àowo) will be paid a consulting fee of $350/day, whereas the younger elders who are continuing to learn from the older elders will be paid $250/day.

Meeting Attendance

If a members misses meetings the k'àowo will speak to the individual and determine the cause, if two meetings are missed they will be replaced by an individual chosen by elders in their community.

If a person has been drinking they will be asked to leave and will not be paid their per diem or their honorarium.

Decision Making

Following Tłı̨chǫ traditional governance practices only one topic will be discussed until a direction of action is reached. Eldest members will be invited to speak first and last on the topic under discussion.

Members will strive to reach consensus on all matters before them. Every effort will be made to hear and clearly understand any dissenting views.

Staff Support

Decisions of the committee will be recorded by staff. Researchers will support Committee members by insuring that reports are written that reflect traditional information gathered. These reports will support the elders desire to influence decisions that are respectful and caring of all Tłı̨chǫ citizens, the land and the resources.

Researches will carry out rigorous verification procedures with the Committee and information providers to ensure the integrity of the Tłı̨chǫ knowledge gathered and analysed.

Appendix II

Guidelines for Developers

The Tłı̨chǫ government encourages developers to work with us, and to work to understand ınformatıon that comes from our traditional knowledge.

The Tłı̨chǫ Agreement states WLWB shall consider traditional knowledge, the Agreement does not specify how this will occur. This policy clarifies the way in which Tłı̨chǫ knowledge will be considered within the Wek’èezhìi area.

Consıder thıs policy as early as possible in the project planning cycle to avoid problems and conflicts before projects enter the formal regulatory process. This will also provide the Tłı̨chǫ with the opportunity to make positive contributions and build constructive relationships.

We concur with the following statements set out in the Mackenzie Valley Environmental Impact Review Board Guidelines for incorporating Traditional Knowledge:

- Traditional knowledge shared specifically about the environment and the use and management of the environment is important for establishing baseline conditions, predicting possible impacts and determining appropriate mitigation and monitoring methods. This is particularly beneficial where there is no land use plan, where there are social or cultural concerns or when scientific data is inadequate.
- Early dialogue and relationships between the developer and traditional knowledge holders may result in a sharing of knowledge about environmental phenomena unavailable elsewhere. Such information may allow for necessary project design changes to take place even before the Environmental Impact Assessment (EIA process begins.
- Traditional knowledge can add to the understanding of the critical requirements of and potential threats to valued components.
- Traditional knowledge can assist a preliminary screener in deciding whether a proposed development might have a significant adverse impact or might be a cause for public concern and
- Traditional knowledge is critical in the early stages of the process to help identify issues as part of the EIA scoping and later on at community and formal hearings (if any) to assist the Review Board in determining the significance of potential impacts.

The Tłı̨chǫ Land Claim and Self-government Agreement (Tłı̨chǫ Agreement) clause 22.1.7 gives the Mackenzie Valley Environmental Impact Review Board and the Wek'eezhii Land and Water Board their mandate within Wek*'èezhìı:*

> In exercising their powers, the Mackenzie Valley Environmental Impact Review Board and the Wek*'èezhìı* Land and Water Board shall consider traditional knowledge as well as other scientific information where such knowledge or information is made available to the Boards.

Tłı̨chǫ traditional knowledge is useful when considering how future development will impact on the environment and the people. Furthermore it can provide a more relevant and meaningful baseline to insure that the environmental effects of any project can be understood in the future. If Tłı̨chǫ knowledge research is done in a rigorous and methodological manner during the initial stages of a development planning, then it is more likely a development project will have minimal impact on the environmental and communities, especıally ıf socıal ıssues and concerns are also consıdered.

General Principles

No two projects are the same; therefore, a one-size-fits-all approach to considering Tłı̨chǫ knowledge is not possible. Nevertheless a number of general principles have been identified with respect to the extent to which knowledge should be collected in relation to development proposals. These are presented below.

Where possible, the Tłı̨chǫ Knowledge Department (TKD) will conduct all traditional knowledge research and provide the proponent with a report. Expectations regarding the extent of the research and type of research varies with the type of development applications, interested parties will identify their needs and explore with TKD staff, the time and budget required to meet these needs.

Prior to research the Tłı̨chǫ government and the research team will be provided with clear and accurate information about the project proposal and the stage that it is at. If the proposal has already entered the EIA process, the Developer will be asked to share copies of such applications to ensure that the Tłı̨chǫ government can accurately assess the scope of Tłı̨chǫ Knowledge required and how it may be incorporated into the EIA process;

Following a review of the information provided by the Developer the Tłı̨chǫ government will outline a proposal for carrying out traditional knowledge research and ask the Developer to enter into a Protocol Agreement that would enable such research to proceed. A sample of such an agreement is set out in Appendix IV.

Appendix III

Sample Protocol Agreement

Between: (the Proponent, Developer, Federal and Terrıtorıal Government Agencıes) herein referred to as ___________________

and

The Tłı̨chǫ Government

(hereinafter the "Parties")

WHEREAS the Tłı̨chǫ Government are the caretakers of Tłı̨chǫ knowledge that has been and will be documented within Mǫwhì Gogha Dè Nı̨ı̨tłèè, Wek'èezhii and Tłı̨chǫ Lands; and

WHEREAS the Tłı̨chǫ Government wishes to protect Tłı̨chǫ knowledge from misuse; and

WHEREAS most of this knowledge is woven within the tapestry of the Tłı̨chǫ oral narratives; and

WHEREAS the Parties wish to respect the wishes of the Tłı̨chǫ elders, who have shared and will continue to share their knowledge through oral narratives and to ensure that all information taken from the oral narratives remains with Tłı̨chǫ; and

WHEREAS the Parties would like to ensure Tłı̨chǫ knowledge is used in manner consistent with section 12.1.6 of the Tłı̨chǫ Agreement:

NOW THEREFORE THE PARTIES AGREE AS FOLLOWS:

A. INTRODUCTION

The Tłı̨chǫ oral narratives and traditional knowledge is first, and foremost, for the Tłı̨chǫ citizens, therefore it should be:

a. Tłı̨chǫ citizens who carry out research on what Tłı̨chǫ knowledge about any given topic; and

b. Tłı̨chǫ elders and active harvesters who will assist with the design of Tłı̨chǫ knowledge projects, and in the research and in the writing of reports.

c. With respect for the Tłı̨chǫ Regional Elders' Committee request that their stories not be translated to ensure that:

1. Tłı̨chǫ citizens continue listening to and learning from the oral narratives that came from their ancestors in their own language;
2. Individuals – whether Tłı̨chǫ or non-Tłı̨chǫ – should work with a Tłı̨chǫ speaker, who has spent considerable time listening and experiencing with elders and harvesters the knowledge shared;
3. Their descendents, and those who work with them, understand the knowledge within the context of an occurrence (as it was told and brought to the present), and from the perspective of the Tłı̨chǫ;
4. Non - Tłı̨chǫ who work with Tłı̨chǫ speakers to understand the relevance of the oral narrative, and the knowledge it encompasses, within the context all other variables being discussed by the storytellers;
5. Tłı̨chǫ youth learn the oral narratives as well as to learn how to use these narratives to think with, and use that ability to write related reports.

B. COMMITMENTS OF THE PARTIES:

The Tłı̨chǫ Government Commits To:

1. Decide how, why and when Tłı̨chǫ the information is used.

2. Indicate what information is confidential and what is public.

3. Ensure that the requester of information has the information required to participate effectively in the Regulatory process.

(Proponent. Developer, Government Agency)____
Commits To:

Assist with the costs of research and of entering relevant information into the data base so the oral narratives and information can be managed, and used with Tłı̨chǫ Government GIS system as follows:

(enter budget info)

C. INTERPRETATION AND IMPLEMENTATION:

Entire Agreement

This Agreement constitutes the entire Agreement between Parties with respect to the subject matters set forth herein. There are no other collateral agreements or undertakings related to the subject matter hereof.

Further Acts

The Parties shall do all acts and execute and deliver all such documents as may from time to time be necessary in order to achieve the purpose and intent of this Agreement.

Applicable Laws

This Agreement shall be governed by and interpreted in accordance with Tłı̨chǫ laws, the laws of Canada, the Northwest Territories as applicable.

Notices

Any notices or communications required or permitted to be given pursuant to this Agreement shall be in writing and shall be delivered to, or sent by prepaid registered or certified mail, or confirmed facsimile, addressed as follows:

(a) in the case of a notice or communication to the **Proponent, Developer or Government Agency**:

____

Tel:

Fax:

(b) in the case of a notice or communication to the **Tłı̨chǫ Government**:

The Executive Officer

Tłı̨chǫ Government

____

Tel: (867) __________

Fax: (867) __________

or to such other address as either Party may notify the other in accordance with this section.

Assignment

The rights and privileges granted under this Agreement may not be assigned.

Amendment

This Agreement may be amended from time to time by consent of the Parties hereto by an instrument in writing.

Term

This Agreement shall come into effect on the date it is signed.

This Agreement shall be for an initial term of one year and may be renewed by mutual consent of the Parties.

Termination

This Agreement can be terminated upon 30 days notice in writing by either of the Parties.

Dispute Resolution

In the event that a dispute arises, the Parties will exercise all reasonable effort to resolve it amicably.

The Parties may resolve a dispute by mutual agreement at any time, and all such agreements shall be recorded in writing and signed by authorized representatives of the Parties.

Where there is a dispute that cannot be resolved amicably, either Party may give notice of termination of the Agreement.

IN WITNESS WHEREOF the Parties have caused this Agreement to be executed in their respective names by their duly authorized representatives.

Proponent or Developer	**Tłįchǫ Government**
per ____________________	**per _______________**

Dated: ______________, 20____

Appendix IV

Guidelines for Researchers

Researchers are ethically responsible for obtaining informed consent, accurately representing the Tłı̨chǫ *perspective and protecting the cultural integrity and rights of all participants in a research endeavor.*

Researchers may increase their cultural responsiveness through the following actions:

a. Enter into a Protocol Agreement with the Tłı̨chǫ Government
b. Effectively identify and utilize the expertise in participating communities to enhance the quality of information gathering as well as the information itself, and use caution in applying external frames of reference in its analysis and interpretation.
c. Explore ways in which to contribute to building local research capacity; all researchers whether the principle investigator or the local researchers should make a commitment to train those researchers with less skill.
d. Insure controlled access for sensitive cultural information that has not been explicitly authorized for general distribution, as determined by members of the local community.
e. Submit research plans as well as results for review by a Community or Regional Elders Committees and abide by its recommendations to the maximum extent possible.
f. Provide full disclosure of funding sources, sponsors, institutional affiliations and reviewers.
g. Include explicit recognition of all research contributors in the final report.

Appendix V

Guidelines for Authors and Illustrators

Authors and illustrators should take all steps necessary to insure that any representation of cultural content is accurate, contextually appropriate and explicitly acknowledged.

Authors and illustrators may increase their cultural responsiveness through the following actions:

a. Enter into a Protocol Agreement with the Tłı̨chǫ Government
b. Make it a practice to insure that all cultural content has been acquired under informed consent and has been reviewed for accuracy and appropriateness by knowledgeable local people representative of the culture in question.
c. Arrange for copyright authority and royalties to be retained or shared by the person or community from whom the cultural information originated, and follow local protocols for its approval and distribution.
d. Insure controlled access for sensitive cultural information that has not been explicitly authorized for general distribution.
e. Be explicit in describing how all cultural knowledge and material has been acquired, authenticated and utilized, and present any significant differing points of view that may exist.
f. Make explicit the audience(s) for which a cultural document is intended, as well as the point of view of the person(s) preparing the document.
g. Make every effort to utilize traditional names for people, places, and items where applicable, adhering to local conventions for spelling and pronunciation.
h. Identify all primary contributors and secondary sources for a particular document, and share the authorship whenever possible.
i. Acquire extensive first-hand experience in a new cultural context before writing about it.
j. Carefully explain the intent and use when obtaining permission to take photographs or videos, and make it clear in publication whether they have been staged as a re-enactment or represent actual events.
k. When documenting oral narratives, recognize and consider the power of the written word and the implications of putting oral tradition with all its non-verbal connotations down on paper, always striving to convey the original meaning and context as much as possible.

ᐊᔾ ᔨᒌ ᖏ ᓂᖏ ᓄᕐᕆᓈᑦ ᐊᒻᒪᓗ ᓄᕐᕆᐊᓂᒃᑎᓪᓗᒋᑦ ᐊᔾᔨᓕᐅᖅᑕᐅᓯᒪᔪᑦ ᖁᕐᓗᖅᑑᑉ ᓄᓇᖅᐱᙳᑕ ᑲᓇᖕᓇᖕᖓᓂ ᓇᐹᖅᑐᖃᖏᑦᑐᕐᒥᐅᑦ ᑑᑐᖏᓐᓂ ᑲᓇᑕᐅᑉ ᐅᐊᖕᓇᖕᖓᓂ ᐊᕐᕋᒍᒥ 2010

ᔮᓐ ᐊᑕᒻ ᔩᔅ ᑭ -Jan Adamczewski, ᔮᓐ ᐳᓛᓐ ᔩ -John Boulanger, Bᐅᕉ ᓅ ᑲᕝᑦ -Bruno Croft, ᑐᕇᓯ ᑎᕙᓴᓐ -Tracy Davison, Hᐃᐊᑐ ᓴ ᐃᔮᓐ -ᑯ ᕌᕗᑦ -Heather Sayine-Crawford, ᐊᒻ ᒪ ᓗ Bᐅᐃᔭᓐ ᑐᕌᔅ -Boyan Tracz. 2017-ᒥ. ᑲ ᓇᑕᒥ ᐅᑦ ᐆᒪ ᔪ ᓕᕆᔩ ᑦ ᐊᒻ ᒪ ᓗ ᐊᐅᓚᑦ ᑎᔩ ᖏ 6: 4-30.

ᓇᐃᓈᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐅᓂᒃ ᑳᓕᐊᑦ

ᒪ ᕐ ᑰ ᖕ ᓂᒃ ᐊᔾ ᔨ ᓕᐅᖅ ᑕᐅᖃᑦ ᑕᕐ ᓂᐅᔪ ᓂᒃ ᖃᐅᔨ ᓴ ᕈ ᓯ ᖃᕐ ᒪ ᑕ ᑲ ᓇᑕᐅᑉ ᐅᐊᖕ ᓇᖕᖓ ᓄᓇᑦ ᓯ ᐊᕐ ᒥ ᐊᒻ ᒪ ᓗ ᓄᓇᕗᒻ ᒥ ᐊᑐᖅ ᑕᐅᖁᒃ ᑐᓂᒃ ᓇᓚᐅᑖᕈ ᑕᐅᓂᕐ ᒧᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓲ ᓂᖕᒋ ᓂᒃ ᓇᐹᖅ ᑐᖃᖏ ᑐᓂ ᑐᒃ ᑐᓂᒃ . ᑕᐃᒃ ᑯᐊ ᓄᕐ ᕆᕙᖕᒋ ᓂ ᐊᔾ ᔨ ᓕᐅᖅ ᑕᐅᓯ ᒪ ᔪ ᑦ ᓇᓚᐅᑦ ᑕᕈ ᑕᐅᖁᒃ ᑐᑦ ᐊᒥ ᓲ ᓂᖕᒋ ᓂᒃ ᐊᕐ ᓇ ᓪ ᓗᐃᑦ ᓄᕐ ᕆᖁᒃ ᑐᑦ ᓄᕐ ᕆᕙᖕ ᓃᐸᒃ ᑐᑦ ᑕᓖ ᓂ ᔩ ᓐ ᒥ ᐊᐅᔭ ᒃ ᑯᑦ ᐊᒻ ᒪ ᓗ ᓇᓚᐅᑖᖅ ᑕᐅᔨ ᓐ ᓇᖅ ᓯ ᑎᒃ ᐊᒥ ᓲ ᓂᖕᒌ ᑐᒃ ᑐᐃᑦ ᓄᕐ ᕆᕙᖕ ᓃᖏ ᒥ ᔨ ᓂᒃ ᐊᑐᖅ ᓯ ᑎᒃ . ᓄᕐ ᕋᖅᑲᓂᐊᓂᒃ ᑎᓪ ᓗᒋ ᑦ ᐊᔾ ᔨ ᓕᐅᖅ ᑕᐅᓚᐅᖅ ᑐᑦ ᔨ ᓚᐃᒥ ᐊᒥ ᓲ ᓂᖅᓵ ᓘᓂᖕᒋ ᓂ ᑐᒃ ᑐᐃᑦ ᐊᔾ ᔨ ᓕᐅᖅ ᑕᐅᔨ ᓐ ᓇᕐ ᓂᖕᒋ ᓂ ᐊᕙᒃ ᑐᖅ ᓯ ᒪ ᔨ ᓂ ᐆᒃ ᑐᕋᐃᕙᐅᑎᑕᐅᔨ ᓂ ᐊᒻ ᒪ ᓗ ᓈᓴ ᖅ ᑕᐅᔨ ᓐ ᓇᕐ ᓂᖕᒋ ᓂ ᓴ ᕿᑎᑦ ᑎᔨ ᓐ ᓇᖅ >ᑦ . ᑕᒪ ᐃᓐ ᓂᒃ ᖃᐅᔨ ᓴ ᖃᑦ ᑕᖅ ᓯ ᒪ ᓕᖅ ᑐᒍ ᑦ ᖁᕐ ᓗᖅ ᑑᑉ ᓄᓇᖅ ᐱᙳᑕ ᑲ ᓇᖕ ᓇᖕᖓ ᓇᐹᖅ ᑐᖃᖏ ᑐᕐ ᒥ ᐅᑦ ᑐᑐᖕᒋ ᓂᒃ ᑕᓖ ᓂ 2010-ᒥ ᓄᓇᕗᒻ ᒥ ᐊᒻ ᒪ ᓗ ᓴ ᕿᑎᑦ ᑎᓯ ᒪᓪ ᓗᑕ ᓴ ᓂᓕᓈᒃ ᑐᓂᒃ ᑕᑯ ᒃ ᓴ ᐅᔨ ᓂᒃ ᐊᔾ ᔨᒌ ᖏ ᓂᖏ ᓂᒃ . ᓄᕐ ᕆᕙᖕ ᓅᓐ ᓂᖏ ᓂ ᐊᔾ ᔨ ᓕᐅᖅ ᑕᐅᓚᐅᖅ ᑐᑦ ᐱᒋ ᐊᓕᓵ ᕐ ᓂᖏ ᓂ ᔩ ᓐ ᒥ ᐊᒥ ᓲ ᓂᖏ ᓂᒃ ᓴ ᕿᑎᑦ ᑎᓚᐅᖅ ᑐᑦ ᐃᒪᓐ ᓇᐃᓕᖕᖓ ᓂᒃ ᓇᓚᐅᑖᖅ ᑕᐅᓯ ᒪ ᔨ ᓂᒃ ᓇᓴ ᐅᑎᓕᖕ ᓂ 51,757 ± ᐊᒥᔅ ᓲ ᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ ᐅᕝ ᕙᓘᓐ ᓅᑦ ᐊᒥᔅ ᓲ ᖕᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ 11,092 (95% >ᓴᓐ ᑎᖕᖏᑦ ᑐᑦ ᓇᓗᓇᕐ ᓂᓖᑦ) ᐱᑕᖃᕐ ᓂᖏ ᓄᓕᐊᕈᓐ ᓇᖅ ᑐᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᓄᕐ ᕆᕙᖕᖏᑦ ᑐᑦ ᓄᓇᒥ . ᓇᓚᐅᑖᓚᐅᖅ ᑐᒍ ᑦ ᑖᒥ ᓅᓐ ᓂᖏ ᓂᒃ ᓈᓴ ᐅᑎᓕᖕ ᓂ 114,472 ± ᐊᒥᔅ ᓲ ᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ ᐅᕝ ᕙᓘᓐ ᓅᑦ ᐊᒥᔅ ᓲ ᖕᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ 15,845 ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ 1 ᐊᑕᐅᓯᕐ ᒥᒃ ᐅᑭ ᐅᓖᑦ ᑐᒃ ᑐᖕᒌ ᐊᔾ ᔨ ᓕᐅᖅ ᑕᐅᓯ ᒪ ᓂᖏ ᓂᒃ ᐊᒻ ᒪ ᓗ ᑕᑯ ᔭ ᐅᓪ ᓗᑎᒃ ᓈᓴ ᖅ ᑕᐅᖃᑕᐅᓚᐅᖅ ᑐᑦ ᔩᓐ ᒥ ᖃᐅᔨ ᓴ ᖅ ᑕᐅᓕᕐ ᒪ ᑕ. ᓇᓚᐅᑖᖅ ᑕᐅᓯ ᒪ ᓂᖕᒌ ᓄᓕᐊᕈᓐ ᓇᖅ ᑐᑦ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᐃᒪᓐ ᓇᐃᓕᖕᖓᓯ ᒋ ᔭ ᐅᕗᑦ ᑕᒪ ᕐ ᒥᒃ ᑲ ᑎᓪ ᓗᒋ ᑦ ᑐᒃ ᑐᖕᒌ ᓇᓚᐅᑦ ᑖᖅ ᑕᐅᓯ ᒪ ᔪ ᑦ ᑖᒥ ᓅᓐ ᓂᖅ 105,326 ± ᐊᒥᔅ ᓲ ᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ ᐅᕝ ᕙᓘᓂᑦ ᐊᒥᔅ ᓲ ᖕᓂᖅ ᓴ ᐅᔨ ᓐ ᓇᖅ ᓯ ᑎᒃ 40,984 ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ ᒪᕐ ᑰ ᖕ ᓂ 2 ᐅᑭ ᐅᓖᑦ ᑐᒃ ᑐᐃᑦ ᐊᑐᖅ ᓯ ᑎ ᓇᓚᐅᑖᕈᑎᖕᒋ ᓂᒃ ᐊᕙᒃ ᑐᖅ ᓯ ᒪ ᓂᖕᒌ ᐊᕐ ᓇᓪ ᓗᐃᓪ ᓗ ᐊᖕᖑᓴ ᓪ ᓗᐃᓪ ᓗ ᐊᒻ ᒪ ᓗ ᐃᑉ ᓕᐊᓖᑦ ; ᐊᓯ ᖕᒌᖕᒋ ᓂᒃ ᓇᓚᐅᑖᖅ ᑕᐅᓯ ᒪ ᓕᖅ ᑐᑦ ᐊᒥ ᓲ ᓂᖕᒌ ᐃᒪᓐ ᓇ 120,880 ± ᐊᒥᔅ ᓲ ᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ ᐅᕝ ᕙᓘᓐ ᓅᑦ ᐊᒥᔅ ᓲ ᖕᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ 13,398 ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ ᒪᕐ ᑰ ᖕ ᓂ 2 ᐅᑭ ᐅᓖᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥᔅ ᓲ ᓂᖕᒌ ᑐᑭ ᓕᐅᖅ ᑕᐅᓚᐅᖅ ᑐᓂᒃ ᒪᓕᒃ ᓯ ᑎᒃ ᓇᓚᐅᑖᖅ ᑕᐅᓯ ᒪ ᓂᖏ ᓂ ᓄᕐ ᓇᓯ ᒪ ᔨ ᑦ ᐊᕐ ᓇᐃᓪ ᓗ ᐊᒻ ᒪ ᓗ ᐊᖕᖑᓴ ᓪ ᓗᐃᓪ ᓗ ᐊᕐ ᓇᓪ ᓗᐃᓗ ᐊᒥ ᓯ ᓂᖕᒌ . ᓈᓴ ᖅ ᑕᐅᓚᒥᒃ ᑐᒃ ᑐᐃᑦ ᐊᕙᒃ ᑐᖅ ᓯ ᒪ ᓂᖕᒌ ᔨ ᓚᐃᖑᑎᓪ ᓗᒍ ᓴ ᕿᓚᐅᖅ ᑐᑦ ᑕᒪ ᕐ ᒥᒃ ᑲ ᑎᓪ ᓗᒋ ᑦ ᐊᒥᔅ ᓲ ᓂᖃᕐ ᓂᖅ 92,481-ᓂᒃ ᑐᒃ ᑐᖕᒌ ᑕᒪ ᓅ ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ ᐊᑕᐅᓯᕐ ᒥᒃ 1 ᐅᑭ ᐅᓖᑦ ᑐᒃ ᑐᐃᑦ ᐊᕙᒃ ᑐᖅ ᓯ ᒪ ᔨ ᓂ 39-ᖕᖏᑦ ᑐᓂᒃ ᑲ ᑎᖕᒍᐅᖅ ᑐᓂ. ᓇᓚᐅᑦ ᑖᖅ ᑕᐅᓂᖕᒌ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓲ ᓂᖕᒌ ᐊᑐᖅ ᑕᐅᓪ ᓗᑎᒃ ᖃᐅᔨ ᓴ ᕈ ᓲ ᑦ ᑕᐃᔭ ᐅᔨ ᑦ ᓖᓐ ᑲᓐ -ᐱᑐᓴᓐ ᒥᒃ -Lincoln-Petersen ᑐᑭ ᓕᐅᕈ ᑕᐅᓚᐅᖅ ᑐᑦ ᑕᒪ ᓅᓐ ᓂᖏ ᓂᒃ 98,646 ± ᐊᒥᔅ ᓲ ᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ ᐅᕝ ᕙᓘᓂᑦ ᐊᒥᔅ ᓲ ᖕᓂᖅ ᓴ ᐅᔨ ᓐ ᓇᖅ ᓯ ᑎᒃ 13,965 ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ ᐊᑕᐅᓯᕐ ᒥᒃ 1 ᐅᑭ ᐅᓖᑦ ᑐᒃ ᑐᐃᑦ ᐊᒻ ᒪ ᓗ ᓇᓚᐅᑖᖅ ᑕᐅᓚᐅᖅ ᓯ ᑎᒃ ᐊᑐᖅ ᓯ ᑎᒃ ᖃᐅᔨ ᓴ ᕈ ᑎᓂᒃ ᓈᓴ ᐅᓯ ᓇᔾ ᔨ ᑎᓂᒃ ᑕᐃᔭ ᐅᔨ ᓂᒃ ᓇᕙᐊᔅ ᑦ -Rivest ᐊᒥ ᓲ ᓂᕋ ᐃᓚᐅᖅ ᑐᑦ ᐃᒪᓐ ᓇᑎᒋ 122,697 ± ᐊᒥᔅ ᓲ ᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ ᐅᕝ ᕙᓘᓐ ᓅᑦ ᐊᒥᔅ ᓲ ᖕᓂᖅ ᓴ ᐅᓂᖃᕈᓐ ᓇᖅ ᓯ ᑎᒃ 31,756-ᓂᒃ ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ ᐊᑕᐅᓯᕐ ᒥᒃ 1 ᐅᑭ ᐅᓖᑦ ᑐᒃ ᑐᐃᑦ . ᑕᐃᒃ ᑯᐊ ᓈᓴ ᐅᓯ ᓇᔾ ᔨ ᑏᑦ ᑕᐃᔭ ᐅᔨ ᑦ ᓇᕙᐊᔅ ᑦ ᒥᒃ -Rivest ᐊᑐᖅ ᓯ ᑎᒃ ᖃᓂᓛᖑᓇᓯ ᒋ ᔭ ᐅᕗᑦ ᑕᒪ ᐃᓐ ᓂᒃ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓲ ᓂᓇᔾ ᔮ ᖅ ᑕᖕᒋ ᓂᒃ ᓯ ᓕᔨ ᒥᒃ (ᑕᒪ ᕐ ᒥᒃ ≥ ᐅᖕᒋᓐᓅᑦ ᑐᓂᒃ ᓇᓕᖃᖕᒋ ᓂᑐᓂᓗᓐ ᓅᑦ ᐊᑕᐅᓯᕐ ᒥᒃ 1 ᐅᑭ ᐅᓕᑦ ᑐᒃ ᑐᖕᒋ ᓂᒃ). ᐊᔾ ᔨᒌ ᖏ ᓂᖏ ᓴ ᖕᒋ ᓂᖃᕐ ᓂᖏ ᐊᒻ ᒪ ᓗ ᐃᓯ ᖃᕐ ᓂᖏ ᓪ ᓗ ᒪᕐ ᑰ ᖕ ᓂᒃ ᑖᒃ ᑯ ᓇᖕᒐᖃᐅᔨ ᓴ ᖃᑕᐅᓚᐅᖅ ᑐᒍ ᑦ ᑐᑭ ᓕᐅᕈ ᑕᐅᔨ ᓐ ᓇᕐ ᓂᖕᒋ ᓄᑦ ᐊᑐᖅ ᑕᐅᔨ ᓐ ᓇᕐ ᓂᖅ ᐊᐅᓚᑦ ᑎᔨ ᓐ ᓇᕐ ᓂᕐ ᒧᑦ .

CANADIAN WILDLIFE BIOLOGY & MANAGEMENT

CWBM 2017: Volume 6, Number 1 *ISSN: 1929–3100*

Original Research

A Comparison of Calving and Post-calving Photo-surveys of the Bluenose-East Herd of Barren-ground Caribou in Northern Canada in 2010

Jan ADAMCZEWSKI[1], John BOULANGER[2], Bruno CROFT[3], Tracy DAVISON[4], Heather SAYINE-CRAWFORD[5], and Boyan TRACZ[6]

[1] Wildlife Division, Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Northwest Territories, X1A 2L9, Canada. Email: jan_adamczewski@gov.nt.ca

[2] Integrated Ecological Research, Nelson, British Columbia, Canada.

[3] North Slave Region, Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Northwest Territories, Canada.

[4] Inuvik Region, Environment and Natural Resources, Government of the Northwest Territories, Inuvik, Northwest Territories, Canada.

[5]Wildlife Division, Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Northwest Territories, Canada

[6] Sahtú Region, Environment and Natural Resources, Government of the Northwest Territories, Norman Wells, Northwest Territories, Canada. Present address: Wek'èezhìı Renewable Resources Board, 102A, 4504 – 49 Avenue, Yellowknife, Northwest Territories, Canada.

Abstract

Two photographic survey methods have long been used in Canada's Northwest Territories and Nunavut to estimate herd size in migratory barren-ground caribou herds (*Rangifer tarandus groenlandicus*). The calving photo-survey provides an estimate of the abundance of breeding females on the calving grounds in June and can be extrapolated to an estimate of herd size to account for caribou not on the calving grounds. The post-calving photo-survey is carried out in July when large dense groups of caribou formed in response to insects can be photographed and counted. We carried out both surveys for the Bluenose-East caribou herd in 2010 in Nunavut to provide a side-by-side comparison.

Correspondence: J. Adamczewski, GNWT ENR, Box 1320, Yellowknife, Northwest Territories, X1A 2L9, Canada; Email: jan_adamczewski@gov.nt.ca

The calving photo survey in early June produced an estimate of 51,757 ± 11,092 (95% Confidence Interval) breeding females on the calving grounds. We estimated 114,472 ± 15,845 ≥1-year-old caribou from the photographed and visually counted June survey strata. The estimate of breeding females was extrapolated to a herd size of 105,326 ± 40,984 ≥2-year-old caribou using estimates of sex ratio and pregnancy rate; an alternate extrapolation of 120,880 ± 13,398 ≥2-year-old caribou was derived from strata-based estimates of cows and an estimate of sex ratio. Counts of photographed caribou aggregations in July resulted in a total of 92,481 ≥1-year-old caribou in 39 groups. An estimate of herd size using a Lincoln-Petersen formula was 98,646 ± 13,965 ≥1-year-old caribou and an estimate using the Rivest estimator was 122,697 ± 31,756 ≥1-year-old caribou. The Rivest-derived estimate was likely closest to true herd size (all ≥1-year-old caribou). We compared strengths and limitations of the 2 survey methods, and their applicability for management.

Key Words: Barren-ground Caribou, Calving, Photo-survey, Population Estimate, Post-calving.

INTRODUCTION

Estimating population size in migratory caribou (*Rangifer tarandus*) herds that may number more than half a million (Bergerud *et al.* 2008) remains challenging in the 21st century. Two photographic surveys have been used since the 1980s in the Northwest Territories (NT) and Nunavut (NU) in northern Canada to estimate population size in migratory barren-ground caribou (*R. t. groenlandicus*) herds. Calving photo-surveys in June (Heard 1985) and post-calving photo-surveys in July (Valkenburg *et al.* 1985) take advantage of caribou aggregating spatially at a time when there is good separation between herds. Calving photo-surveys have been used more for eastern herds in NT and NU (Williams 1995; Nishi *et al.* 2007; Campbell *et al.* 2010). Post-calving photo-surveys have been used more for western herds in NT and NU (Patterson *et al.* 2004; Nagy and Johnson 2006), Alaska (Harper 2013), and Québec (V. Brodeur, 2016, Government of Québec, personal communication). A side-by-side comparison of the 2 methods had not been previously carried out in NT and NU, and was recommended by an independent review of the Government of Northwest Territories (GNWT) barren-ground caribou program (Fisher *et al.* 2009).

Calving photo-surveys, the first of the 2 methods, are carried out near the peak of calving in June and provide estimates of the abundance of breeding females on the calving grounds (Heard 1985; Nishi *et al.* 2007; Campbell *et al.* 2010). Movement rates of cows with newborn calves are limited, reducing the likelihood of movements inside or outside the survey area (Gunn *et al.* 2005). The survey area is defined by previous knowledge of a herd's calving grounds, recent locations of radio-collared cows, and extensive systematic reconnaissance flights that define the full distribution of breeding females. In the early years of calving photo surveys, surveys were completed without radio-collared caribou (e.g., Heard and Jackson 1990). However, calving may sometimes occur south of normally used calving grounds in years of late snowmelt (e.g., Porcupine herd in 2000 and 2001, Griffith *et al.* 2002), thus a sample of radio-collared cows in June is key confirmation that the bulk of the herd's cows are within the survey area.

Survey strata are defined on the calving grounds based on patterns of spatial aggregation and relative densities and composition of caribou observed during systematic reconnaissance flights. A photo plane flies transects of continuous photos over the higher-density strata with breeding cows at ground coverage of at least 30-40% (Heard 1985; Gunn *et al.* 2005; Nishi *et al.* 2007; Boulanger *et al.* 2014) and caribou are counted on the photos. Lower-density strata are re-flown by visual strip-transect methods. A ground and helicopter-based composition survey in all strata provides a precise estimate of the proportion of breeding females and of other sex and age classes in the survey area. The counts and composition percentages from each stratum are combined to derive an estimate of the number of breeding females on the calving ground (Gunn *et al.* 2005; Nishi *et al.* 2007; Boulanger *et al.* 2014).

Because most of the bulls and some of the yearlings and non-pregnant cows are not on the calving grounds in June, an extrapolation has been used to account for the missing caribou to derive an estimate of overall herd size (Heard 1985; Heard and Williams 1990). An estimate of sex ratio from fall composition surveys is used to account for the bulls, and an estimate of pregnancy rate is used to account for non-pregnant breeding-age cows (Heard 1985; Heard and Williams 1990; Nishi *et al.* 2007; Campbell *et al.* 2010). Since the 2010 Bluenose-East (BE) herd June survey described in this paper, a revised approach to accounting for breeding and non-breeding females on the calving ground survey area was first used by Campbell *et al.* (2016) for a 2014 calving photo survey of the Qamanirjuaq herd and more recently for a 2015 survey for the BE herd (Boulanger *et al.* 2016). This approach uses the estimated totals of breeding and non-breeding females on the June survey area directly, and a correction based on sex ratio is applied to account for bulls. We refer to the earlier extrapolation method as A, and the more recent one as B.

The large variance on early surveys of this type and the extrapolation calculations have led some biologists (Thomas 1998; Rivest *et al.* 1998) to question the value of the calving photo-survey as a method of counting caribou. Over the years, however, careful attention to allocation of survey effort has reduced the variance on estimates of breeding females (Nishi *et al.* 2007; Campbell *et al.* 2010; Boulanger *et al.* 2014). Biologists using this survey have emphasized that the method is repeatable and provides a reliable and relatively precise way of monitoring size and trend in the abundance of breeding cows, which are key demographic variables for the herd (Boulanger *et al.* 2011).

Post-calving photo-surveys are the second of the 2 survey methods and are usually carried out in early to mid-July when warm weather may lead caribou to aggregate in large groups of hundreds or thousands in response to biting flies. These groups can be photographed from small fixed-wing aircraft or helicopters and the caribou counted on the photos (Valkenburg *et al.* 1985; Patterson *et al.* 2004; Nagy and Johnson 2006; Alaska Fish and Game 2011). Groups of caribou without radio-collars are also photographed and counted. This survey includes male and female caribou in the herd that are at least 1 year old. In some surveys it is possible to count calves of the year (V. Brodeur, 2016, Government of Québec, personal communication). In the NT, the experience has been that some calves of the year are not always visible in tightly bunched groups of caribou, thus only ≥1-year-old caribou are counted (e.g., Nagy and Johnson 2006).

The post-calving survey depends on having adequate numbers of radio-collared caribou to find the groups (Valkenburg *et al.* 1985; Rivest *et al.* 1998; Rettie 2008), particularly because movement rates in July can be high due to biting flies and caribou may use large ranges during this season. The survey area is essentially defined by flying to the radio-collared caribou, with additional groups of caribou (without radio-collars) generally found incidentally near groups with radio-collars or en route flying to radio-collared caribou. Post-calving surveys appear capable of enumerating nearly the entire herd under the right field conditions with herd-wide aggregation and with adequate radio-collar numbers (e.g., post-calving surveys of the Western Arctic Herd in Alaska with 90-100 radio-collars; Alaska Fish and Game 2011; Harper 2013).

Post-calving surveys, like calving photo-surveys, have their limitations. Caribou may not aggregate tightly if the July weather has cool, wet or windy conditions when biting flies are less active. If the caribou are well dispersed, photography is not feasible and the survey fails. Post-calving surveys were attempted for the Porcupine herd annually from 2004 to 2010 and failed due to weather and insufficient caribou aggregation (Porcupine Caribou Management Board, www.taiga.net/pcmb/population.html). A further limitation of this survey is that estimation of caribou groups missed during the survey is difficult. If there are many small groups of caribou during post-calving (e.g., BE herd in 2000, Patterson *et al.* 2004), then a large number of radio-collars may be needed to find a high proportion of the groups (Rettie 2008). Under these conditions, there may also be multiple groups with no radio-collars, which may be less likely to be found than groups with radio-collars (Rivest *et al.* 1998).

Two methods have been used to estimate the proportion of the herd missed by the post-calving survey. One method has relied on the simple proportion of available radio-collared caribou in the herd found in photographed groups (e.g., Russell *et al.* 1996; Nagy and Johnson 2006). Some authors have suggested that only counts of groups with radio-collars should be used with the Lincoln-Petersen estimator (Russell *et al.* 1996, Patterson *et al.* 2004) whereas other studies have included caribou from groups without radio-collars (Nagy and Johnson 2006). In the current paper, we have included the groups without radio-collars in the Lincoln-Petersen calculations. The Lincoln-Petersen mark-recapture estimator was questioned by Rivest *et al.* (1998), as both population estimates and variance estimates are likely to be negatively biased. Rivest *et al.* (1998) proposed an alternate way of estimating missed caribou groups and an alternate way of estimating population size and variance from post-calving surveys. These methods are statistically more complex but have been increasingly adopted in Alaska (Harper 2013) and Québec (V. Brodeur, 2016, Government of Québec, personal communication), where the Rivest methods were developed.

After an attempted post-calving survey of the Bluenose-East (BE) herd in July 2009 failed due to poor weather and insufficient aggregation in portions of the herd, both calving and post-calving surveys of this herd were planned for 2010. Declines had been documented in this herd and neighbouring herds between 2000 and 2006 (Adamczewski *et al.* 2009). Attempting both surveys increased the likelihood of securing an up-to-date population estimate, and allowed for a side-by-side comparison of the 2 survey methods.

In the past, calving ground surveys were used for the Bluenose herd in the 1980s (e.g., 1983, Latour *et al.* 1986), followed by post-calving surveys for this herd in 1986, 198and 1992 (e.g., McLean and Russell 1992). Satellite radio-collaring studies initiated in the late 1990s then showed that the Bluenose herd was composed of 3 herds with individual calving grounds, one of them being the BE herd, and the other 2, the Bluenose-West and Cape Bathurst herds (Nagy *et al.* 2005). Dedicated post-calving surveys for the BE herd began in 2000 (Patterson *et al.* 2004).

A modified June calving photo-survey and a post-calving survey were carried out in 1993 on the George River herd in Québec/Labrador (Couturier *et al.* 1996) and produced similar population estimates. Our objectives in this paper are to compare results of the 2 BE 2010 surveys, to assess their strengths and limitations, and to assess their suitability for management. An earlier version of these results was documented in a government report (Adamczewski *et al.* 2014). In this paper we consider all ≥1-year-old caribou in June or July to be adults; however we note that our re-examination of the extrapolation calculations of Heard (1985) and Heard and Williams (1990) indicates that those calculations omit the yearlings and these estimates are effectively for ≥2-year-old caribou. We used both the earlier (A) and the more recent (B) extrapolation calculations for the BE June 2010 survey data.

Management context of calving and post-calving surveys in the NT

Although this paper is primarily focused on caribou survey methods, we provide some context on the management significance of the population estimates these surveys generate. Migratory barren-ground caribou herds have long been known to vary widely in abundance over time scales of decades (Zalatan *et al.* 2006; Bergerud *et al.* 2008; Beaulieu 2012) and have been of enormous significance to Aboriginal cultures in the Canadian north for thousands of years (Gordon 2008; Beaulieu 2012). Management plans for herds like the BE recognize these long-term fluctuations and tie management strategies for harvest, predators and land use to herd size, trend and other indicators. A plan called "Taking Care of Caribou" finalized in 2014 (ACCWM 2014) includes the BE herd and defines 4 colour phases for this herd as red (low herd size, ≤20,000), green (high herd size, ≥60,000), yellow (intermediate herd size, 20,000–60,000, and increasing) and orange (intermediate herd size, 20,000-60,000, and declining).

After the 2010 BE surveys described here, further calving photo surveys in 2013 and 2015 documented a rapid decline (Boulanger *et al.* 2014, 2016) with the extrapolated estimate of ≥2-year-old caribou in 2015 at 38,592 ± 4,733 (95% CI) and a near 50% loss of breeding females in just 2 years (Boulanger *et al.* 2016). These results, in combination with other indicators and Aboriginal Traditional Knowledge, have resulted in the herd being designated as in the orange declining phase, and led to a series of formal hearings in the NT and NU on management actions in 2016 for this herd, including severe reductions in harvest (e.g., WRRB 2016). Although many sources of knowledge are considered in management, the herd's size and trend, as defined by photo surveys every 2-3 years, are key sources of information.

Because of the importance of population estimates for barren-ground caribou management, the GNWT has since 2006 monitored 5 neighbouring herds (including the BE) every 3 years via photographic surveys to ensure that size and trend are adequately known. An assessment of preferable frequency of population surveys focused on trend and ability to detect change either by sequential *t*-tests or regression analysis, with an average Coefficient of Variation (CV) on breeding female estimates of 15%, and suggested that surveys every 3 years were appropriate for herds at low numbers (Boulanger 2011). Heard and Williams (1990) carried out an equivalent assessment and reached similar conclusions. Considerable effort has gone into increasing the precision of NT post-calving surveys through increased numbers of caribou radio-collars (e.g., Nagy and Johnson 2006; Rettie 2008) and optimal allocation of survey efforts has been used to increase precision of calving photo survey methods (e.g., Boulanger *et al.* 2014, 2016). The comparison described here for the BE herd was carried out to assess the comparability of the 2 survey methods with respect to estimates of adult caribou and adequacy of precision, using as a benchmark a CV of 20% or less (Pollock *et al.* 1990). True herd size in 2010 was not known and thus the accuracy of both surveys cannot be assessed directly. However, similar herd estimates from 2 very different survey methods in which a high proportion of the counted caribou is from high-resolution photos should provide some assurance that the methods are basically sound and can be used for management as described in the ACCWM (2014) plan for this herd.

MATERIAL AND METHODS

Calving photo-survey in June 2010

June reconnaissance survey and radio-collars

The study area was defined based on previous surveys of this herd's calving ground, local knowledge, and locations of 43 radio-collared cows and 4 radio-collared bulls in June 2010 (Figure 1). All radio-collars had either satellite (Argos)

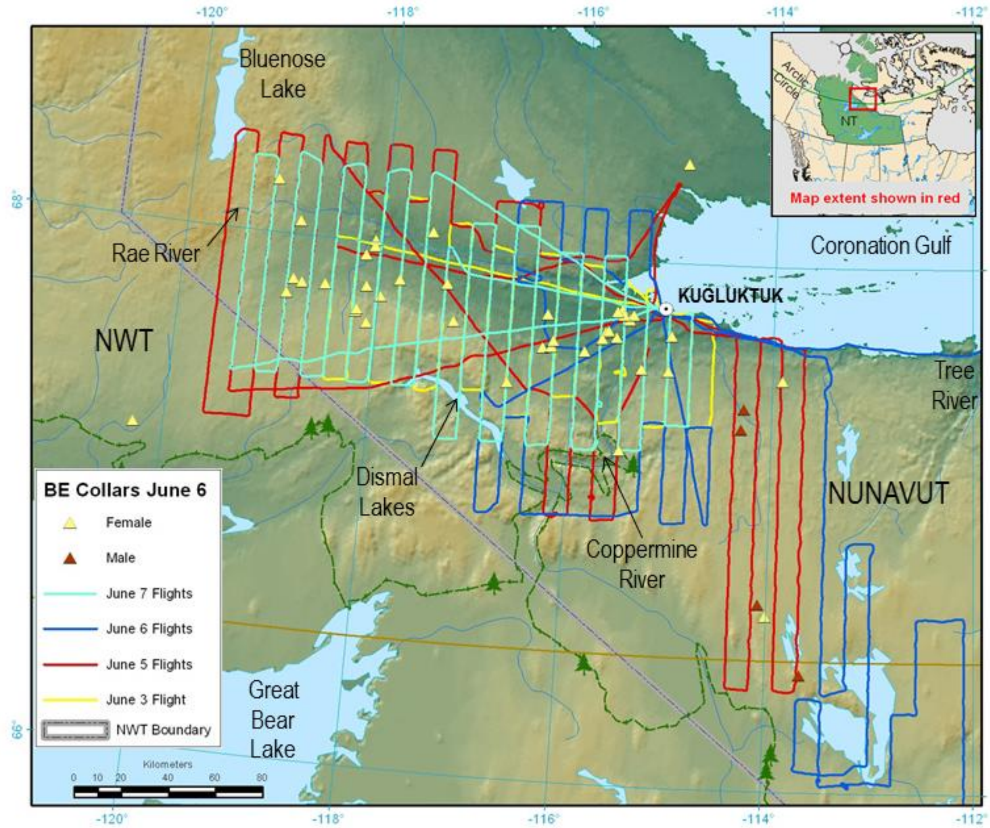


Figure 1. Reconnaissance flying over the Bluenose-East herd's calving ground and nearby areas at 10-km intervals on June 3, 5, 6, and 7, 2010. Radio-collar locations from 43 cows (yellow triangles) and 4 bulls (red triangles) for June 6 were also used to define the survey area.

transmitters and VHF (Very High Frequency) transmitters or GPS (Global Positioning System) satellite and VHF transmitters, with the satellite or GPS radio-collars programmed to provide at least 1 daily location at this time of year. Radio-collars were a number of models from Telonics, Inc. (Mesa, Arizona). These sources showed that the main cow-calf concentrations were consistently found in the Rae and Richardson valleys west of Kugluktuk, bounded in the west by Bluenose Lake (Figure 1).

Reconnaissance flying by 2 Cessna Caravan fixed-wing aircraft based in Kugluktuk was carried out on June 3, 5, 6, and 7 over the calving ground and nearby areas of the BE herd. The purpose of the initial flying was to map higher and lower densities of caribou, and to assess whether these areas had mostly breeding cows or non-breeding cows, yearlings and bulls. Flight lines were spaced at 10-km intervals in a north-south direction; survey elevation averaged 120 m above ground, and survey speeds averaged 150-160 km/hour, providing ground coverage of approximately 8%. Two observers and a recorder on each side of the aircraft recorded approximate abundance of caribou seen within a 400-m strip on either side of the plane. The presence of cows with calves, hard-antlered cows, bulls, yearlings, and non-breeding cows was recorded. Precise classification from fixed-wing aircraft was not practical, hence was estimated separately from a composition count later in the survey.

Observations from the reconnaissance flights were mapped in 10-km segments as densities of adult caribou: more than 10/km^2 was high; 1.0-9.9/km^2 was medium; and 0.1-0.9/km^2 was low. In some segments no caribou were seen. Composition of caribou in 10-km segments was mapped using the following classes:

(1) *Cows with calves* — if at least 1 newborn calf was seen or if hard-antlered cows were seen. Hard-antlered cows were considered breeding cows that had either calved recently or were about to calve, and had not yet dropped their antlers;

(2) *Non-antlered cows* — if antlerless cows were seen, but no calves or hard-antlered cows;

(3) *Non-breeding caribou* — if cows without hard antlers and yearlings were seen; non-breeding cows may have small new antlers in velvet in June;
(4) *Bulls* — if bulls were seen;
(5) *Mixed non-breeders* — if non-breeding cows, yearlings and bulls were seen.
In the periphery of the study area, few caribou were seen and composition was sometimes recorded as unknown.

In addition to the 47 (43 cows and 4 bulls) known BE radio-collared caribou during the June and July 2010 surveys, within the range of the BE herd, 1 radio-collared cow from the Bathurst herd (eastern neighbour of the BE herd) died in mid-June 2010 north of the main BE calving area. Two radio-collared caribou from the Bluenose-West herd (western neighbour of the BE herd) were within the summer range of the BE herd in 2010. One of these was briefly east of Bluenose Lake in June and early July and then returned to spend the rest of the summer well west of Bluenose Lake in Bluenose-West summer range. A second radio-collared cow that calved on the Bluenose-West calving ground in 2009 was within the BE summer range in June and July 2010, and in June 2011. Low rates of exchange of radio-collared cows between neighbouring herds in NT/NU and elsewhere have been known for many years (Adamczewski *et al.* 2009; Boulanger *et al.* 2011; Davison *et al.* 2014). These 3 radio-collared caribou were considered as falling within this normal low rate of exchange and were not considered further in estimating population size.

The reconnaissance flights in early June 2010 confirmed previous information about the distribution of cows, calves and bulls in this herd , as we found very few cows with young calves or hard-antlered cows east of the Coppermine River. Bulls, yearlings and non-breeding cows were observed consistently in this area. A few lines were flown further east to ensure spatial separation from Bathurst caribou.

June 2010 survey strata, photos, and strip transect counts

Reconnaissance flying was used to define 6 survey strata including 1 high-density stratum (Figure 2) and 1 medium-density stratum with mostly cow-calf caribou, 2 visual low-density strata with mostly cow-calf caribou (north and northwest), and 2 strata flown visually with low-medium densities and mostly bulls, yearlings and non-breeding cows (east and south). The south stratum was extended south by 10 km further than the initial reconnaissance flight lines due to the densities of caribou seen at the southern ends of the lines during the reconnaissance flights.

An optimal-allocation algorithm was used to determine the number of transect lines and coverage for each of the 6 strata, depending on stratum size and densities of caribou seen during the reconnaissance flights. Following recommendations by Gunn *et al.* (2005), a minimum of 10 transect lines were used for each stratum to reduce variance. Consistent with previous surveys of this type, the high and medium strata were re-flown on June 8 and 9 with a Commander aircraft (Geographic Air Survey Ltd., Edmonton) at an elevation of approximately 610 m taking continuous photo-transects to provide ground coverage of 31.3% and 16.8% in the high and medium strata (Figure 2). A total of 7,000 photos were taken. These 2 strata are referred to as photo strata in the remainder of the paper, and the other 4 strata are referred to as visual strata.

The other 4 strata were re-flown on June 8 and 9 with strip-transect methods with ground coverage varying from 14.2% to 28.2%. Survey lines were flown at an elevation of 120 m and an average survey speed of 150 km/hour, with 2 observers and a recorder on each side of the aircraft. Wing struts were marked to define a strip of 400 m on the ground at 120 m above ground on either side of the aircraft, using methods originally described by Norton-Griffiths (1978), and followed by previous calving photo-surveys (e.g., Gunn *et al.* 2005; Nishi *et al.* 2007).

Caribou at least 1 year old were counted on the aerial photos by an experienced consultant (P. Roy) who had counted caribou on this type of aerial photo for several previous calving photo-surveys of the Bathurst herd (Gunn *et al.* 2005; Nishi *et al.* 2007) and the Qamanirjuaq herd (Campbell *et al.* 2010). The caribou counted on photos could not be classified as cows, yearlings or bulls, only as ≥1-year-old caribou. Newborn calves were not counted as they could not always be seen if hidden by larger caribou or if bedded. In this paper, we use the term “adult” caribou for any ≥1-year-old caribou in June or July. In the 4 visual strata, adult caribou seen by any of the 4 observers were recorded.

June 2010 composition survey

A composition survey was carried out June 8-12 to sample multiple caribou groups in each of the survey strata (Figure 3). The classification was carried out primarily from the ground with a telescope and tripod to minimize disturbance to caribou, with a helicopter used to fly from 1 group of caribou to the next. Caribou were classified as described by Gunn *et al.* (2005) and Nishi *et al.* (2007) as newborn calves, cows, yearlings, and bulls. Cows were further classified into the following categories: (1) antlered cows with a distended udder; (2) antlerless cows with a distended udder; (3) antlered cows without a distended udder; and (4) antlerless cows without a distended udder. The first 2 categories of cows corresponded to breeding cows based on the distended udder, and the third, to breeding cows that likely had lost their calves. The fourth category consisted of non-breeding females characterized by the absence of a distended udder

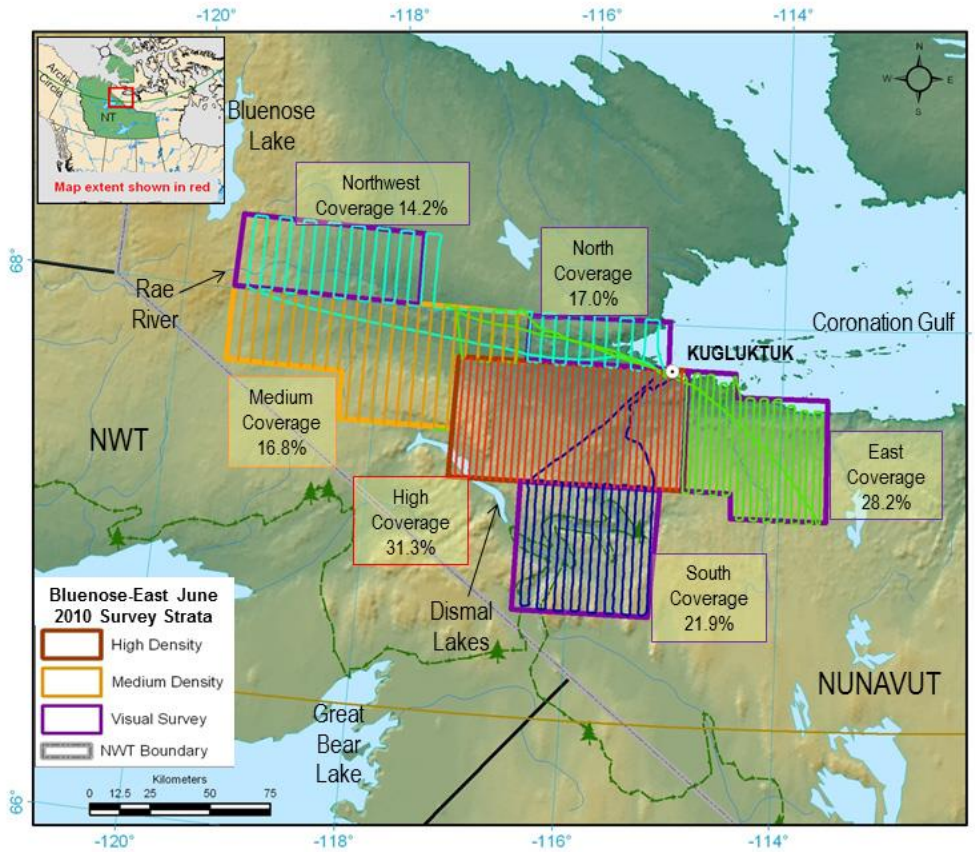


Figure 2. Survey strata, flight lines and coverage for the Bluenose-East June 2010 calving photo-survey. The high-density and medium-density strata were flown with the Commander photo-plane and the 4 strata outlined in purple were re-flown visually, with the area coverage as shown for each stratum.

and usually by the presence of new dark antler growth. Yearlings were distinguished based on their relatively small body size and short heads. Bulls were identified based on their reproductive organs, size and relatively large antlers in velvet.

Fall 2009 composition survey

To extrapolate from the estimated number of breeding females on the calving grounds to overall herd size, an estimate of herd sex ratio has been used from the fall rut in late October, as it is the one time of year when all sex and age classes are mixed (Heard 1985; Gunn *et al.* 2005; Nishi *et al.* 2007). A composition survey was carried out on October 19 and 20, 2009 on the BE range. The survey area was defined primarily by the locations of 31 radio-collared BE caribou. In addition, a fixed-wing reconnaissance survey was flown on October 16, 2009 to verify that substantial densities of caribou were associated with the concentrations of radio-collared caribou. Caribou were classified from the front seat of a helicopter as bulls, cows, and calves of the year. A total of 4,531 caribou in 79 groups were classified.

Post-calving photo-survey in July 2010

Field methods and photo counts

Reconnaissance flights over the BE summer range were carried out June 29 to July 4, to gain an overall sense of caribou distribution and composition of caribou groups (cows with calves, non-breeding cows, bulls and yearlings; Figure 4). The survey area was defined based on past July surveys of this herd and based on the locations of 47 radio-radio-collared caribou at the beginning of July. One survey crew was in a Helio-Courier equipped with Telonics RA-2AK dual antennae and an ATS receiver (Advanced Telemetry Systems Inc.) and the other survey crew was in a Cessna 185 equipped with Telonics RA-2AK dual antennae and a Telonics TR-5 Scanning-Receiver (Telonics, Inc.), with all flights based in Kugluktuk, Nunavut. After the initial reconnaissance flights, the 2 aircraft were used to check daily on radio-collared caribou and caribou associated with them, except during poor weather. Locations of all radio-collared caribou were received from a satellite link daily in the mornings and used to plan the day's flying. Exact locations of radio-collared caribou were found by homing in on their VHF signals.

Overall, caribou groups made up mostly of cows with young calves were found west of Kugluktuk in the Rae and Richardson valleys and these areas had the largest abundance of caribou. Mostly cow-calf groups were also found in lower densities north to the mainland coast (Figure 4). Bulls, yearlings, and non-breeding cows were primarily east of the Coppermine River and south-southeast of Kugluktuk, with a substantial area separating these groups from the cow-calf groups.

When caribou were seen to be forming groups of hundreds or thousands suitable for photography, every effort was made to account for all radio-collared caribou and caribou associated with them in the area, independently of group size. Caribou groups found without radio-collars were also photographed, and GPS locations of all groups were recorded. Multiple passes of either single photos of entire groups or multiple series of overlapping photos to cover larger aggregations were taken. Survey elevation was adjusted as needed. Photos were taken by 24 megapixel Nikon D3X cameras set for maximum resolution, through an open window of the Cessna 185 or through a "shooting window" on the left side of the Helio-Courier. VHF signals from the 47 radio-collars were monitored on all flights and the presence of individual radio-collared caribou was double-checked to properly identify them in the photographed groups.

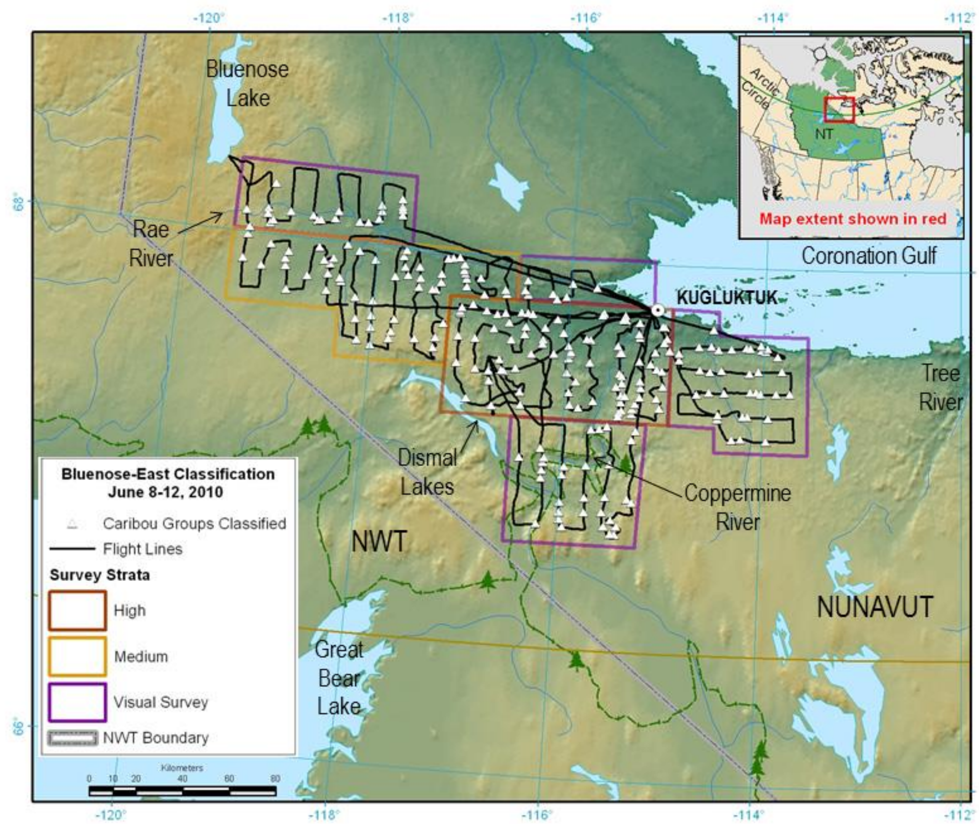


Figure 3: Locations (white triangles) and helicopter flight path (black lines) of caribou groups classified June 8 - 12, 2010 on or near the calving grounds of the Bluenose-East caribou herd.

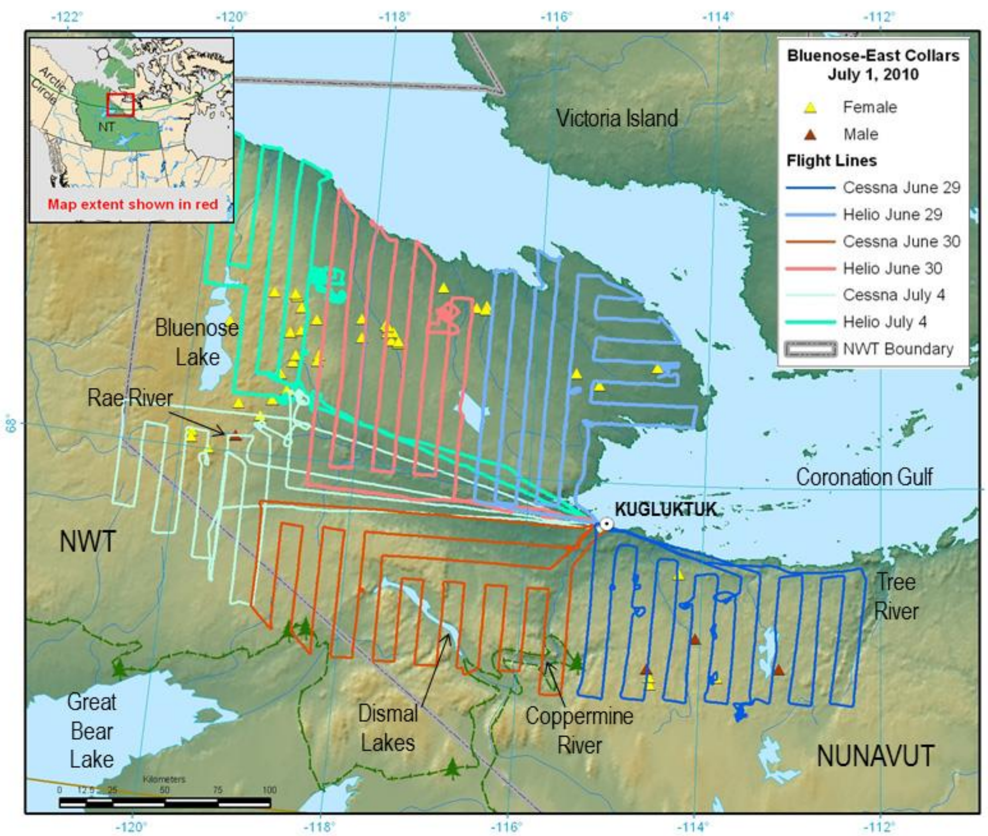


Figure 4: Initial reconnaissance flights at 10-km intervals at start of July 2010 Bluenose-East caribou post-calving survey June 29 – July 4, 2010. Radio-collar locations are from 43 cows and 4 bulls on July 1.

At the end of each day when photos were taken, the photos were downloaded and reviewed on laptop computers, and the best images were chosen for each group of caribou. Digital images were imported into the desktop mapping program Ozi Explorer (© D & L Software Ltd.) and converted to map files. Caribou on these images were then marked one after the other by placing a waypoint for each adult caribou. This method was developed by biologist J. Nagy and described in his survey reports (e.g., Nagy and Johnson 2006). All ≥1-year-old caribou were counted. Calves of the year were not counted as they could not be reliably identified under or behind larger caribou, particularly in more closely aggregated groups.

Caribou on each photo were counted at minimum by 2 of the authors independently (HS-C and JA). A third person independently counted a sub-set of the photos as a further check. On most photos, agreement among counters was close, with variation of totals well below 1 % (e.g., totals of 915 caribou vs. 918 caribou for a single photo). On a few photos of larger, tightly aggregated groups taken from higher elevations, the 2 authors who previously counted all the photos together counted the photos again to arrive at a final total.

Estimation of herd size and variance using Lincoln-Petersen estimator

White and Garrott (1990) augmented the Lincoln-Peterson Index to apply to radio-collared animals, a method that has been used in other post-calving surveys (Russell *et al.* 1996; Patterson *et al.* 2004; Nagy and Johnson 2006) to estimate population size. The formula is:

$$\mathbf{N = ((M+1)(C+1)/(R+1))-1}$$

Where:

N = estimate of population size during the census;

M = number of radio-collared caribou present in the herd (including all radio-collars known to be active during the survey);
C = number of caribou in all aggregations observed during the survey;
R = number of radio-collared caribou observed in these aggregations during the survey.
The 95% confidence interval for the estimate is calculated as:

$$\mathbf{N = 1.96\sqrt{(Var(N))}}$$

Where:
$$\mathbf{Var(N) = (M+1)(C+1)(M\text{-}R)(C\text{-}R)/((R+1)^2\ (R+2))}$$

These calculations were applied to the results of the July 2010 BE post-calving survey.

Estimation of herd size and variance using Rivest estimator

This section provides a basic summary of the Rivest approach; readers who want a more detailed statistical treatment are encouraged to read Rivest *et al.* (1998). All calculations were conducted using the R-package (R Development Core Team 2009) entitled "caribou" (Crépeau *et al.* 2012). The Rivest estimator considers the sampling of post-calving aggregations as a 2-phase sampling process. The first phase involves the initial radio-collaring of caribou and how the radio-collared caribou are distributed within the herd during the post-calving period. For this estimator, it is assumed that *n* radio-collared caribou are randomly distributed into *m* groups during the post-calving period. Given that radio-collared caribou are used to estimate detectability of groups, the Rivest estimator does not use data for groups of caribou that do not contain radio-collared caribou.

The second phase of sampling involves the actual aerial search for groups. For this phase, various models are proposed as to how the radio-collared caribou represent the groups, and how the radio-collared caribou and associated groups are detected. Each model is summarized below.

(1) *The homogeneity model* — this model assumes that caribou groups (with radio-collared caribou in the groups) are missed as a completely random event that is independent of the number of radio-collared caribou in the group or other factors. Each group will have the same probability of being detected by the aerial survey.

(2) *The independence model* — this model assumes that each radio-collared caribou in the group has the same independent probability of being detected and thus the overall probability of detecting a group increases as a function of the number of radio-collared caribou in the group. The assumption here is that the radio-collared caribou are independent so that a simple probability model can be applied to detection of the group.

(3) *The threshold model* — this model assumes that all groups with more than a threshold level of radio-collared caribou (symbolized by B) have a detection probability of 1. For example, it might be that, once more than 3 radio-collared caribou occur in a group, the group will always be detected whereas groups with 1 or 2 radio-collars are not always detected. For this model, all groups with 3 or more radio-collared caribou are assigned a detection probability of 1, and detection probability is estimated for groups with 1 or 2 radio-collars.

Each of these models can potentially describe detection probability variation in the data set. As part of the estimation procedure, a log-likelihood score is produced and the model with the highest log-likelihood is considered to best fit the data.

The estimate of herd size is then basically the summation of each group size divided by the probability of the observed group having at least 1 radio-collared animal included in it, and divided by the probability of the group being detected. The probability of having at least 1 radio-collared caribou is a function of the group size detection probabilities (which is associated with the underlying detection model described previously), the total group size of caribou counted relative to total herd size, and the overall number of radio-collars employed in sampling. It is through an iterative likelihood-based optimization procedure that each of these parameters is estimated to produce estimates of herd size.

An assumption of this method is that the radio-collared caribou are randomly distributed among the separate caribou groups that are photographed. This assumption can be tested by assessing the number of radio-collared caribou relative to group sizes that are counted. It is possible to test this assumption using a test for over-dispersion of the Poisson probability distribution. Over-dispersion applies to a case when non-independence of radio-collared caribou produces a distribution of radio-collared caribou relative to group sizes that is different from that if the caribou were randomly distributed. If over-dispersion occurs then both estimates of population size and variance from the Rivest estimator will be negatively biased (Rivest *et al.* 1998).

RESULTS

Calving photo-survey in June 2010

Reconnaissance survey June 3-7

Caribou observations recorded during the reconnaissance flights of June 3, 5, 6 and 7, 2010 were mapped as squares along the flight lines, with each square representing a 10-km segment, and darker red squares representing higher densities (Figure 5a). High (>10/km^2) and medium (1.0 - 9.9/km^2) adult caribou densities were generally west, southwest, south, and southeast of Kugluktuk, with lower densities in more peripheral areas. One high-density stratum, 1 medium-density stratum, and 4 low-density strata were defined based on the reconnaissance flights (Table 1).

The composition of caribou groups seen in 10-km segments was similarly mapped (Figure 5b). Cows with calves and hard-antlered cows were largely clustered in an elongated area in the Rae and Richardson valleys west of Kugluktuk. Further south and east in the survey area, non-breeding caribou predominated, with non-breeding cows and yearlings closer to the main cow-calf distribution and bulls in more peripheral areas south and southeast of Kugluktuk.

Caribou counted on photos and in visual strata

Overall, the high and medium density strata were photographed and contained 77.3% of the 28,478 adult caribou counted in the 6 survey strata, and a similar 76.1% of the adult caribou estimated for the entire survey area (Table 2). These 2 photographed strata also had the highest densities of adult caribou (10.5 and 8.2/km^2). The east and south visual strata had somewhat lower densities (3.7 and 3.9/km^2) and added proportionately to the overall total of caribou. The north and northwest visual strata had relatively low caribou densities (0.9 and 1.5/km^2).

Observations during the initial reconnaissance flights, along with composition recorded during June 8-12 indicated that the peak of calving likely occurred during June 6-9 with more than 50% of breeding cows observed after these dates having a calf at heel.

Caribou composition in June 2010 survey strata

The proportion of breeding females among adult caribou was below 50% in the high stratum, indicating a high number of non-breeding cows and yearlings (Table 3). The medium stratum, by contrast, had a much higher proportion of breeding females (77.0%) and relatively few yearlings. The calf:cow ratios for breeding females were high in the high and medium strata (86.0 and 81.2 calves:100 cows), but because of the large densities of non-breeding cows in the high stratum, the calf:cow ratio was much lower (49.6 calves:100 cows) when all cows were included, and somewhat lower (66.2:100) in the medium stratum. The proportions of breeding cows and estimates of adult caribou in each stratum were used to derive an estimate of 51,757 (± 11,092) breeding cows for the survey area.

Fall 2009 Bluenose-East composition survey and sex ratio

A total of 79 caribou groups and 4,531 caribou, including calves of the year, were classified in October 19 - 20, 2009 (Fig. 6, Table 4). This resulted in estimates of 46 calves:100 cows (± 3.5) and 42.9 bulls:100 cows (± 3.4). At the time of the survey, there were 31 active radio-collars in the BE herd, of which 30 were within or near the survey area. There were also 4 radio-collars from the neighbouring Bathurst herd to the north (Figure 6) but no caribou groups were classified among these radio-collared caribou.

Table 1. Transect sampling and size of strata for Bluenose-East June 2010 calving photo-survey.

	Stratum						
Variable	**High**	**Medium**	**East**	**North**	**North west**	**South**	**Totals**
Count method	Photo	Photo	Visual	Visual	Visual	Visual	n/a
Area of stratum (km^2)	4,840.0	4,453.9	2,996.4	1,118.3	2,259.6	3,006.9	18,675.1
Lines flown	33	23	21	10	16	16	n/a
Area sampled (km^2)	1,517.2	749.9	844.6	158.5	383.5	658.7	4,312.4
Coverage (%)	31.3	16.8	28.2	14.2	17.0	21.9	23.1

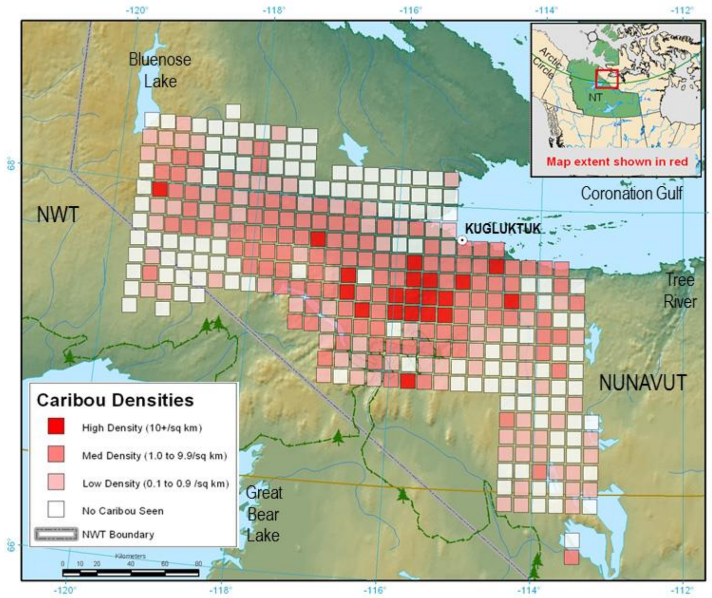


Figure 5a. Densities of adult caribou observed during June 2010 Bluenose-East caribou survey during reconnaissance flights, June 3, 5, 6 and 7. No caribou were seen in white squares and increasing densities are shown as lighter or darker pink squares, with the highest densities of >10 caribou /km^2 in red. Squares represent 10-km segments along flight lines.

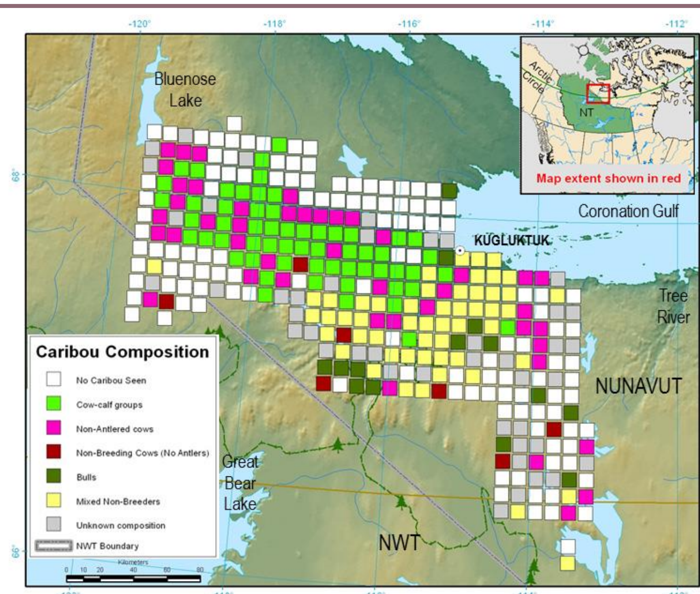


Figure 5b. Composition of Bluenose-East caribou groups during reconnaissance flights, June 3, 5, 6 and 7, 2010. The main cow-calf concentrations were light green squares, bull only areas were dark green and other types of caribou are as shown in the legend. Squares represent 10-km segments along flight lines.

Table 2. Adult caribou estimates by stratum from Bluenose-East June 2010 calving photo-survey. SE = Standard Error; CV = Coefficient of Variation.

	Stratum						
Variable	High	Medium	East	North	North west	South	Totals
Count method	Photo	Photo	Visual	Visual	Visual	Visual	n/a
Caribou counted	15,881	6,142	3,167	135	566	2,587	28,478
Density (caribou/km^2)	10.5	8.2	3.7	0.9	1.5	3.9	n/a
Estimated No. caribou 1+ year old in stratum	50,661.2	36,477.4	11,236.3	952.6	3,335.0	11,809.6	114,472
SE (N)	4,768.0	4,442.4	1,468.9	256.7	1,005.2	1,421.5	6,908.2
CV (N) as %	9.4	12.2	13.1	26.9	30.1	12.0	6.0

Table 3. June composition survey results and calculated stratum totals, ratios and variance from Bluenose-East June 2010 calving photo-survey. SE = Standard Error; CV = Coefficient of Variation.

	Stratum						
Variable	High	Medium	East	North	North west	South	Totals
Numbers classified							
No. groups classified	72	59	23	8	20	23	205
No. caribou classified	3,866	5,263	564	189	1,033	710	11,625
No. newborn calves	1,041	2,025	5	6	444	0	3,521
No. yearlings	497	157	99	40	12	132	937
No. bulls	230	23	219	10	3	353	838
No. cows	2,098	3,058	241	133	574	225	6,329
Calculated totals, ratios and variance							
No. caribou 1+ years old	2,825	3,238	559	183	589	710	8,104
No. breeding females	1,211	2,493	4	7	506	0	4,221
Proportion breeding females (%)	42.9	77.0	0.7	4.2	85.9	0	n/a
SE (% breeding females)	5.0	3.0	0.6	2.4	3.7	0	n/a
CV (% breeding females)	11.6	4.1	78.4	57.9	4.3	0	n/a
Estimated No. breeding females in stratum	21,784.3	26,993.3	80.4	39.5	2,859.7	0	51,757
SE (breeding females)	3,258.8	3,464.7	63.9	25.3	870.7	n/a	4,836
CV (% breeding females)	15.0	12.8	79.5	63.9	30.4	n/a	9.3
Calves: 100 cows, breeding cows	86.0	81.2	125	85.7	85.9	n/a	n/a
Calves: 100 cows, all cows	49.6	66.2	2.1	4.5	77.4	n/a	n/a

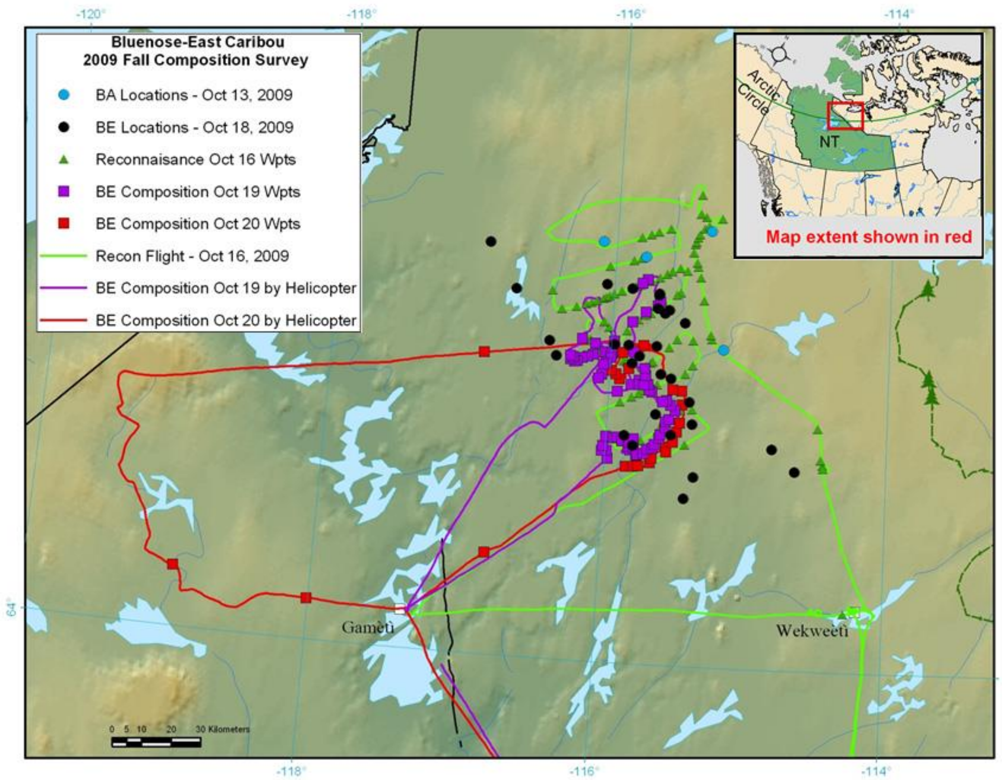


Figure 6. Composition survey flown October 19 and 20, 2009 in the range of the Bluenose-East caribou herd. Bluenose-East radio-collar locations are black dots and Bathurst radio-collar locations are blue dots. Composition of caribou groups near Bathurst radio-collars was not used for this survey.

Table 4. Composition survey results from October 19 and 20, 2009 for the Bluenose-East caribou herd. Ratios are shown ± 95% Confidence Interval.

No. groups classified	No. cows	No. calves	No. bulls	Total	Calves: 100 Cows	Bulls: 100 Cows
79	2,399	1,104	1,028	4,531	46.0 ± 3.5	42.9 ± 3.4

Estimated population size and proportions of cows, bulls and yearlings from June survey

The direct estimate of adult caribou from the June 2010 BE calving photo-survey included the total estimated number of ≥1-year-old caribou from the survey area of 114,472 ± 15,845 (95% Confidence Interval). The estimated number of breeding females, 51,757 ± 11,092, was divided by the proportion of cows in the herd (0.70, from bull:cow ratio of 42.9:100) from the fall 2009 composition survey and by 0.702 as the pregnancy rate for ≥1-year-old cows in the breeding season, resulting in an extrapolated estimate of 105,326 ± 40,984 ≥2-year-old caribou (Table 5, extrapolation A). The 0.702 pregnancy rate is based on an overall pregnancy rate of 285/406 from Dauphiné (1976, Table 14) for Qamanirjuaq ≥1-year-old cows in the breeding season in the 1960s. We note that Heard (1985) used a pregnancy rate of 0.72 based on the same source, which may have been a rounding error. We also used the more recent extrapolation method from Campbell *et al.* (2016), which included the estimated total of all ≥2-year-old cows in the survey area, divided by the same proportion of cows in the herd of 0.70 from the fall 2009 composition survey. This resulted in a second extrapolated estimate of 120,880 ± 13,398 ≥2-year-old caribou (Table 5, extrapolation B).

We used the totals of adult caribou from Table 2 for each stratum multiplied by the proportions of cows, bulls, and yearlings in Table 3 to estimate the total numbers of these 3 sex and age classes in the survey area in each stratum (Table 6). Cows made up 84,603 of the 114,472 adult caribou (73.9%) estimated for the survey area, and yearlings (13.2%) and bulls (12.9%) made up the remainder. If the yearlings are presumed to be divided equally among males and females (50:50 sex ratio), then the estimated totals overall of adult females and males were 92,174 (80.5%) and 22,298 (19.5%). This is equivalent to a ratio of 24.2 bulls:100 cows.

Post-calving survey in July 2010

Radio-collared caribou and photography of aggregated caribou

The movements of radio-collared caribou varied considerably in July. The main concentration of radio-collared cows in cow-calf groups was initially just east of Bluenose Lake (Figure 4) and later was concentrated further east and south (Figure 7). Caribou were concentrated in 3 sectors at the time photos were taken in July: bulls, yearlings and non-breeding cows were primarily in a southern sector east of the Coppermine River, most of the cow-calf groups and radio-collared cows were in a main sector west of Kugluktuk, and some smaller densities of cow-calf groups were in a northern sector. Aggregation of caribou suitable for photography generally did not last more than a day, and on some occasions changing weather meant that groups were tightly clustered for only a few hours. Caribou in the northern sector were the least likely to aggregate; caribou with and without radio-collars in this area tended to remain scattered except for the one day when photos were taken. Caribou in the southern sector were more likely to aggregate, which resulted in 2 separate sets of photos.

Caribou counted on photos from July survey

A total of 40 groups of caribou and 92,481 adult caribou were counted on photos from the July 2010 BE post-calving survey (Table 7). Two-thirds of these were in the main sector that had 30 radio-collars, with the remainder found about equally in the southern and northern sectors. The number of radio-collared caribou varied substantially among groups. There were 22 groups with radio-collars and 18 without radio-collars. Groups without radio-collared caribou were mainly between 1,000 and 2,000, with one group of 3,870 caribou. Groups with radio-collared caribou ranged from 1,000 to 11,652. Photos were taken on July 6, 9 and 12; over this time we monitored collared caribou locations daily and found no mixing between the main, northern and southern sectors.

In the northern sector, the largest group photographed had 3 radio-collars and 5,999 caribou, but there was also a group of nearly 3,870 with a single radio-collar. In the main sector, the larger groups generally had multiple radio-collars. In the southern sector on July 6, the largest group was 11,461 caribou with just 1 radio-collar, and another group of 4,080 also had only a single radio-collar. Figure 8 shows a small group of cows and calves from the July 2010 survey.

The 2 sets of photos of the southern sector resulted in 2 different counts. On July 6, 6 of 7 radio-collared caribou were found, 9 groups were photographed, and 16,917 adult caribou were counted on photos. On July 12, 7 of 7 radio-collared caribou were found, 4 groups were photographed, and 11,342 adult caribou were counted. We used the higher July 6 caribou count in the calculations of herd size. We assumed that the second set of photos was lower because the caribou had in the meantime formed different groups that resulted in a few thousand caribou without radio-collars that were not found on July 12.

Of the 47 radio-collared BE caribou in the survey area in July 2010, 44 were accounted for at the time of photos taken on July 6, 9 and 12. The other 3 were active GPS-satellite or satellite radio-collars. We assumed that these 3 radio-collared caribou and any caribou associated with them were in the survey area, given daily and changing GPS locations. However, although searched for when photos were taken in the area, they were not found at the time of taking photos due to erratic signals of VHF transmitters.

Table 5. Estimated number of breeding females and extrapolated population estimates (≥2-year-old caribou) for the Bluenose-East herd in June 2010. Extrapolation A used the estimate of breeding females divided by a sex ratio (42.9 bulls:100 cows, or proportion of females among adult population of 0.70) from an October 2009 Bluenose-East fall composition survey, and divided by 0.702 from an estimate of 70.2% pregnancy among ≥1-year-old cows in the breeding season in the herd (Dauphiné 1976). Extrapolation B used the total estimated number of cows on the June survey area divided by the proportion of females of 0.70. SE = Standard Error, CV = Coefficient of Variation, CI = 95% Confidence Interval.

Variable	Estimate	SE	CV as %	95% CI
No. breeding females	51,757	4,836	13.0	11,092
Proportion of females in entire herd	0.70	0.028	4.0	n/a
Proportion of females ≥ 2 year-old pregnant	0.702	0.072	10.0	n/a
Extrapolated estimate (A) of caribou at least 2-years-old	105,326	20,355	17.0	40,984
Extrapolated estimate (B) of caribou at least 2-years-old	120,880	5,841	4.8	13,398

Table 6. Estimated totals of cows, bulls and yearlings in each stratum, based on estimates of adult caribou in each stratum (from Table 2) and composition (from Table 3).

Variable	High	Medium	East	North	North west	South	Totals	% of Total
Estimated No. caribou 1+ year old in stratum	50,661.2	36,477.4	11,236.3	952.6	3,335.0	11,809.6	114,472	100
Estimated No. cows in stratum	37,623.7	34,449.6	4,844.3	692.3	3,250.1	3,742.5	84,603	73.9
Estimated No. yearlings in stratum	8,912.8	1,768.7	1,990.1	208.2	67.9	2,195.6	15,143	13.2
Estimated No. bulls in stratum	4,124.6	259.1	4402.1	52.1	17.0	5,871.5	14,726	12.9

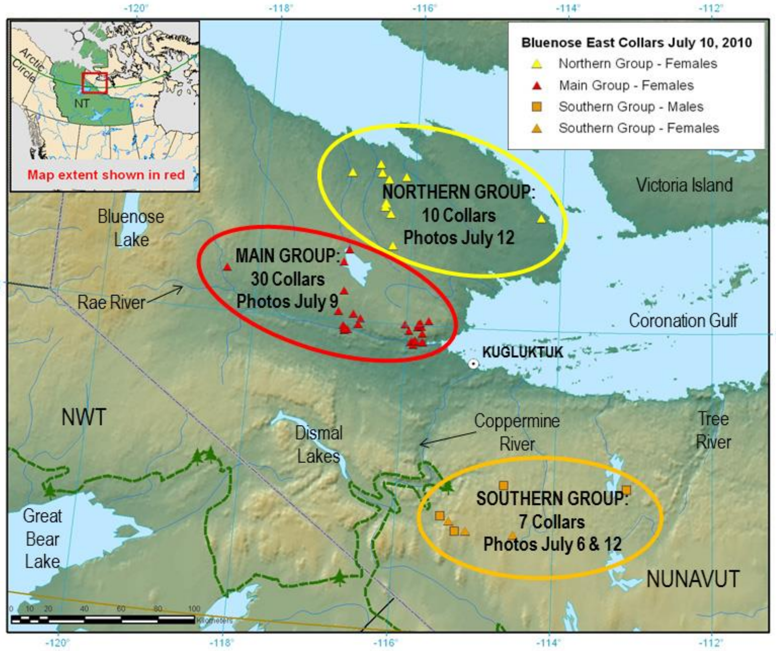


Figure 7. Locations of main, northern and southern sectors of caribou photographed during July 2010 post-calving survey of the Bluenose-East herd. Radio-collar locations are from July 10.

Figure 8. Small group of caribou cows and calves photographed during July 2010 post-calving survey of the Bluenose-East herd. Photo: B. Tracz, Environment and Natural Resources, Government of Northwest Territories.

Table 7. Groups of caribou, radio-collars, and caribou counted on photos from July 2010 Bluenose-East post-calving survey.

Southern Sector, photos July 6			**Main Sector, photos July 9**			**Northern Sector, photos July 12**		
Group No.	Radio-collars	Caribou	Group No.	Radio-collars	Caribou	Group No.	Radio-collars	Caribou
1	1	11,461	1	8	11,652	1	3	5,999
2	1	4,080	2	3	8,327	2	2	1,106
3	1	804	3	2	7,585	3	1	760
4	1	385	4	5	7,528	4	1	115
5	1	5	5	1	7,365	5	1	14
6	1	3	6	4	4,989	6	1	3
7	0	175	7	2	4,942	7	1	1
8	0	2	8	2	1,943	8	0	3,870
9	0	2	9	1	1,014	9	0	914
Totals	6 of 7	16,917	10	0	2,263	10	0	268
(used in estimate)			11	0	1,980	11	0	226
			12	0	1,523	12	0	175
Southern Sector, photos July 12			13	0	670	13	0	6
Group No.	Radio-collars	Caribou	14	0	242	14	0	2
1	2	5,711	15	0	79	Totals	10 of 10	13,459
2	2	4,629	16	0	2			
3	2	1,002	17	0	1			
4	1	1	Totals	28 of 30	62,105			
Totals	7 of 7	11,342						
(not used in estimate)								
			Overall Total	**44 of 47**	**92,481**			

Estimated herd size and variance with Lincoln-Petersen and Rivest estimators

An estimate of 98,646 ± 13,965 (95% CI) ≥1-year-old caribou in the BE herd in 2010 was derived using the Lincoln-Petersen estimator. For the Rivest estimator, only data for groups that had at least 1 radio-collared caribou were used. In general, numbers of radio-collared caribou increased with group size (Figure 9), although 3 groups greater than 4,000 had just one radio-collar.

A suite of detection models was applied to the post-calving data set. As an initial step, a test for randomness of the distribution of radio-collars in each caribou group was conducted using the independence, homogeneity, and threshold models (Table 8). In all cases, the null hypothesis of randomness was not rejected, suggesting that this assumption was reasonable for the BE 2010 data set.

The independence, homogeneity, and threshold models with thresholds of radio-collared caribou ranging from 2 to 5 were run and compared using log-likelihood scores. A threshold model that assumed that groups of caribou that had 5 or more radio-collars (B=5) had a detection probability of 1 had the highest likelihood score (2.415; Table 9). This model indicated that groups with a radio-collar sample size of < 5 had a detection probability of 0.91. A homogeneity model had a very similar likelihood (2.412) and in this case each group had a probability of 0.94 of being detected. A threshold model with B=2 radio-collars also had a very similar likelihood (2.409). The estimates and confidence intervals from these 3 models were very similar (122,697 ± 31,756; 120,495 ± 30,720; and 121,702 ± 31,231) with acceptable levels of precision (CV<14% for all estimates). The independence model had a lower likelihood but the estimate was only marginally higher at 127,101 ± 35,389. The probability of detection in this case corresponds to the individual radio-collared caribou and therefore the probability of detecting a group depended on the number of radio-collared caribou in the group. For this model the probability of detecting a group with one radio-collar was 0.83 and the probabilities of detecting a group having 3 or more radio-collars were very close to 1 (0.99).

DISCUSSION

Population estimates for the Bluenose-East herd from June 2010 calving photo-survey

The BE June 2010 calving photo-survey resulted in 3 estimates of herd size. An estimate of 114,472 ± 15,845 ≥1-year-old caribou resulted from counts of the 6 survey strata,

Table 8. Tests for randomness of radio-collared caribou relative to group sizes from Bluenose-East July 2010 post-calving survey.

Model	Z value	P value
Independence	1.11	0.133
Homogeneity	0.97	0.165
Threshold B=2	1.13	0.128
Threshold B=3	1.07	0.142

including the photographed strata that accounted for about 76% of all caribou counted. The first extrapolated estimate (A) of 105,326 ± 40,984 caribou was an estimate of ≥2-year-old caribou, based on further review detailed below, and was lower primarily because of the omission of yearlings in the extrapolation. The second extrapolated estimate (B) of 120,880 ± 13,398 was also an estimate of ≥2-year-old caribou. We suspect that all 3 of these estimates slightly under-estimated true herd size (all ≥1-year-old caribou).

The calving photo-survey was designed to provide a precise estimate of the abundance of breeding females on a herd's calving grounds (Heard 1985; Gunn *et al.* 2005; Boulanger *et al.* 2014). These surveys were initially carried out in the 1980s without radio-collared caribou (e.g., Beverly herd, Heard and Jackson 1990; Williams 1995), relying on the predictable return of pregnant cows to previous calving grounds. For the objective of assessing herd status, it could be argued that assessment of breeding female abundance is as valuable as an estimate of overall herd size. The use of a detailed composition survey in June allows for an in-depth assessment of herd demography (e.g., the proportion of breeding females on the calving ground and spatial or temporal variation in composition). The breeding female sector of the herd will generally be relatively stable over time and less influenced by annual variation in productivity; the annual increment of yearlings can vary widely from year to year (e.g., Boulanger *et al.* 2011). For the BE June 2010 survey, the first for this herd, the 43 radio-collared cows and 4 radio-collared bulls and extensive reconnaissance flying allowed us to map and survey the breeding cows on the calving grounds as planned, with good precision (CV of 9.3%).

The extrapolated estimate (A) of 105,326 ± 40,984 caribou should be considered a conservative herd estimate as it effectively is an estimate of ≥2-year-old adults. Yearlings are not included in the extrapolation because the pregnancy rate for yearlings (which would be 5-months-old during the previous fall breeding season) is effectively zero, as caribou calves almost never breed in their first year and rarely as yearlings (Dauphiné 1976; Thomas and Kiliaan 1998). Mean pregnancy rate for extrapolated estimates of herd size has been estimated by the ratio of caribou that are pregnant divided by caribou that are capable of being pregnant (0.702, Dauphiné 1976), and yearlings are almost never pregnant. If the proportion of yearlings present in the population were known, then the extrapolated herd estimate could be adjusted to include yearlings.

Heard (1985) and Heard and Williams (1990) recognized that an estimate of herd size extrapolated from the estimate of breeding cows using sex ratio and pregnancy rate was a "rough estimate" of overall herd size. Our results confirm their assertion. Some biologists showed little confidence in this method as an overall estimator of herd size (Rivest *et al.* 1998; Thomas 1998) because of the assumptions associated with the extrapolation of the breeding female estimate to total herd size, and the sometimes large variance of these estimates. The use of a fall sex ratio and an estimate of pregnancy rate in the extrapolation can lead to imprecise herd estimates and inflates variances around the extrapolated estimates when compared to the estimate of breeding females. As a percentage of the estimate, the 95% CI on the extrapolated estimate (A) of ≥2-year-old caribou was 38.9%, compared to 21.4% on the estimate of breeding females, 17.8% on the estimate of 1-year-old or older caribou on the June survey area, and 25.9% on the best Rivest estimate from the post-calving survey.

The estimation of sex ratio from 1 or more recent fall composition counts is preferable in the extrapolation to using a fixed sex ratio of 66 bulls:100 cows as initially used by Heard and Williams (1990, 1991); the sex ratio clearly can vary and was much lower in the BE herd in 2009 (42.9:100) than in the increasing herds surveyed by Heard and Williams in the 1980s. A further BE herd fall composition survey in October 2013 resulted in a similar bull:cow ratio of 42.6 bulls:100 cows based on a sample of 117 groups and 5,369 caribou (Boulanger *et al.* 2014), suggesting the 2009-2013

Table 9. Estimates of Bluenose-East adult caribou herd size in July 2010, based on detection models from Rivest estimation, ranked by log-likelihood. The Lincoln-Petersen estimate is given for comparison.

Detection Model	Log-likelihood	Detection probability	SE (Detection probability)	Estimated herd size $\hat{T}$	Standard Error SE ($\hat{T}$)	95% Confidence Interval (±)	Coefficient of Variation
Threshold (B=5)	2.415	0.91	0.069	122,697	16,202	31,756	13.2
Homogeneity	2.412	0.94	0.066	120,495	15,673	30,720	13.0
Threshold (B=6)	2.409	0.92	0.067	121,702	15,934	31,231	13.1
Threshold (B=2)	2.364	0.81	0.098	127,841	18,361	35,988	14.4
Independence	2.363	0.83[A]	0.087	127,101	18,055	35,389	14.2
Threshold (B=4)	2.361	0.90	0.072	123,872	16,349	32,045	13.2
Threshold (B=3)	2.313	0.88	0.079	124,934	17,060	33,438	13.7
Lincoln-Petersen				98,646	7,125	13,965	3.7

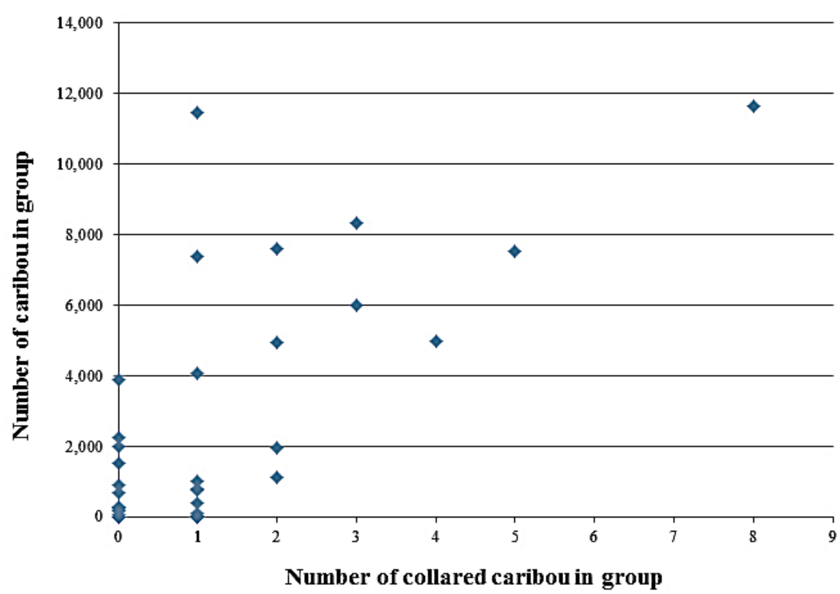


Figure 9. Number of caribou counted in individual groups as a function of the number of radio-collared caribou in each group, for Bluenose-East July 2010 post-calving survey.

herd's sex ratio was relatively constant over that period and that this ratio could be used reliably in the extrapolation.

The use of a fixed pregnancy rate in the extrapolation introduces potential error as pregnancy rates vary depending on cow condition (Gerhart *et al.* 1997; Russell *et al.* 1998). Pregnancy rates in hunter-killed Beverly caribou averaged 75.7% in ≥1-year-old females (605 of 800) from 1981 to 1987, a rate that can be compared directly to Dauphiné's (1976) 70% (285 of 406) for ≥1-year-old cows. Annual pregnancy rates in ≥4-year-old cows during this period in Beverly caribou ranged from 78 to 98% (Thomas and Kiliaan 1998). Pregnancy rate in ≥2-year-old cows in the George River herd varied over a similar range from 90-91% during the herd's increase to 78-80% near peak herd size and 69-77 % during its early decline (Bergerud *et al.* 2008). These estimates provide an index to the degree to which use of a constant pregnancy rate of 70% for ≥1-year-old cows based on Dauphiné (1976) might bias the extrapolation. A potential improvement in the extrapolation to account for non-breeding females would be the use of an estimate of pregnancy rate in the surveyed herd's females in the winter before the June survey, either from hunter-killed caribou (e.g., Thomas and Kiliaan 1998) or from fecal samples assayed for progesterone (e.g., Joly *et al.* 2015).

The revised (B) extrapolation approach to accounting for breeding and non-breeding females on the calving ground survey area was first used by Campbell *et al.* (2016); it may be a preferable approach to extrapolation than the earlier method (A) that uses ratios for both pregnancy rate and sex ratio. This approach uses the estimated totals of breeding and non-breeding females on the June survey area directly, and there is no calculation based on pregnancy rate. A correction based on sex ratio is still applied, and this extrapolation still omits the yearlings. This approach assumes that all ≥2-year-old cows (that are potential breeders) are within the June survey area; this assumption is more likely to be valid if there is an adequate number of radio-collared cows available and found within the survey area in June. Therefore, the reliability of this estimate will depend on whether survey strata included all breeding as well as non-breeding cows. In June 2010, 41 of 43 BE radio-collared cows were within the survey area, with the remaining 2 radio-collared cows found in peripheral areas with very low caribou densities.

The estimate of 114,472 ± 15,845 adults on the June survey area is based on sample counts of the full survey area, and 76% of the estimated numbers of adults were from the 2 photographed strata. We believe that we defined and surveyed a high proportion of the non-breeding cows, bulls and yearlings in the herd, most of them in the south and east strata that had very few cows with calves. The survey area included 45 of 47 radio-collared caribou in the herd, with the other 2 radio-collared caribou in areas with very low densities of caribou. However, the reconnaissance and composition survey results suggest that our survey area did not take in all the bulls, yearlings or non-breeding cows, particularly at the southern edge of the survey area. The bull:cow ratio calculated from June counts of strata and the composition survey was 24.2 bulls:100 cows, well below the 42.9 bull:100 cows estimated in October 2009 for this herd. The strata-based estimate of 114,472 ≥1-year-old caribou should be viewed with caution as an unknown proportion of the bulls, particularly, was missed.

Our June 2010 survey outcome suggests that a modified June photo-survey for barren-ground caribou that includes all herd sectors may be feasible, provided that there are adequate numbers of radio-collared cows and bulls, and if both the calving grounds and areas with non-breeding caribou can be comprehensively defined and surveyed. This could, however, be logistically challenging as the "trailing edge" of bulls, yearlings and non-breeding cows in early June may cover a large area with low caribou densities that extends south of the tree-line.

Population estimates for the Bluenose-East herd from July 2010 post-calving photo-survey

As with the June survey, the July 2010 BE caribou survey resulted in 2 population estimates: 122,697 ± 31,756 ≥1-year-old caribou from the best model of the Rivest estimator and 98,646 ± 13,965 ≥1-year-old caribou from the Lincoln-Petersen estimator. All the estimates from the Rivest models (Table 9) were similar (120,495-127,841) and had similar confidence intervals.

The estimate of 122,697 ± 31,756 from the Rivest estimator is the preferred population estimate of the 2 from the July 2010 BE post-calving survey, as the Lincoln-Petersen estimate most likely under-estimates herd size and produces an unrealistically low estimate of variance (Rivest *et al.* 1998). A fundamental assumption of the Lincoln-Petersen estimator is that all radio-collared caribou have equal probability of detection, and that each radio-collared caribou will be a random representation of all caribou, so that the recapture rate of the radio-collared caribou will reflect the true proportion of the population sampled. This assumption is problematic given that the number of radio-collared caribou is very small compared to herd size, and often larger groups have more radio-collars than smaller groups. The survey is built around flying to the radio-collared caribou, thus groups with no radio-collars are less likely to be found. On the BE 2010 survey, all radio-collars were searched for when photos were being taken, but the 3 radio-collars that were not found at the time of photography had erratic signals that did not allow us to home in on them. We had daily GPS or Argos locations for these 3 radio-collars, which indicated that they were active and moving, thus were part of the sample of radio-collars available. We found that VHF transmitters, particularly on older radio-collars, may sometimes be erratic. Thus some groups, particularly those with no radio-collars or a single radio-collar, may have lower detection rates than others. Analysis of detection probabilities for the current post-calving survey suggested that groups with several radio-collars were more likely to be detected than groups with a single radio-collar. Some ad-hoc methods have been proposed to account for bias issues with the Lincoln-Petersen estimator (Russell *et al.* 1996), however, these are subjective and often result in the loss of data from smaller group sizes (Rivest *et al.* 1998).

The homogeneity, independence and 5 threshold Rivest models produced similar estimates between 120,495 and 127,841, similar log-likelihood scores and similar 95% CIs; thus, there is little clear rationale to select one model over the others. In practice, it is very likely that a group with 2 or more radio-collars with functioning GPS/Argos and VHF transmitters would be found during a post-calving survey with good conditions and herd-wide aggregation. In attempted post-calving surveys of this herd in 2009 and 2012, conditions did arise where a portion of the herd, with associated radio-collars, did not aggregate sufficiently for photos and prevented a viable herd estimate. The results we obtained for caribou in the southern sector where the bulls, yearlings and non-breeding cows were also concentrated in July suggest that the number of radio-collars was somewhat low in this area, and that some caribou may have been missed. When photos were taken on July 6 in this area, 16,917 caribou in 9 groups were photographed and 6 of 7 radio-collars were found. Six days later, all 7 radio-collared caribou in this area were found but the total number of caribou counted (11,342) in 4 groups was more than 5,000 caribou lower. The groups found on the 2 days were quite different in size and radio-collar distribution, thus it is possible that several thousand caribou on July 12 had no radio-collars and were not found. As we noted for the June survey, there were just 4 radio-collared bulls (all in the southern sector, along with 3 radio-collared cows) during the July survey of this herd, compared to 43 radio-collared cows. A larger number of radio-collared bulls in closer proportion to the herd's bull:cow ratio would improve confidence in the population estimate from possible future post-calving surveys of this herd.

Post-calving survey methods with adequate cow and bull radio-collar numbers can result in estimates of overall herd size that include all the age classes (≥1-year-old) of the caribou population. The Rivest estimator can produce robust population estimates provided radio-collar sample sizes are adequate (Alaska Department of Fish and Game 2011; Harper 2013). Analysis of post-calving surveys of the Western Arctic Herd with 90-100 radio-collared caribou indicated that the Rivest estimates were generally very similar to the totals counted on photos, suggesting that the herd had effectively been censused or counted almost entirely (Alaska Department of Fish and Game 2011; Harper 2013). The biggest challenge of the post-calving survey method remains the possibility of caribou not aggregating sufficiently for photos due to poor weather conditions. As has happened with other herds, issues with portions of the herd not aggregating resulted in unsuccessful post-calving surveys of the BE herd in 2001, 2009, and 2012, and created challenges in BE surveys flown in 2000, 2005, and 2006.

MANAGEMENT CONSIDERATIONS

The preferred population estimate for the BE caribou herd in 2010 from July of 122,697 ± 31,756 adults had overlapping confidence intervals with the June strata-based survey estimate of 114,472 ± 15,845 adults, and differed by 6.7% of the post-calving estimate. The alternate extrapolated estimate (B) of 120,880 ± 13,398 ≥2-year-old caribou basedon strata-based estimates of all cows divided by the sex ratio was very similar to the Rivest July estimate. Because we suspect that the June strata-based estimate of 114,472 ≥1-year-old caribou slightly under-estimated the bulls, yearlings and non-breeding cows in the herd, we suggest that the July estimate of 122,697 adult caribou is likely closest to the true population size (≥1-year-old caribou) for the BE herd in 2010. This estimate had a CV of 13.2%, an acceptable variance below Pollock *et al.*'s (1990) 20% benchmark, and the other Rivest models all generated very similar herd estimates. The biggest problem in using the post-calving survey for this herd has been the lack of herd-wide aggregation that has occurred in several attempted surveys of this herd; attempted surveys in 2001 (Patterson *et al.* 2004), and in 2009 and 2012 in the present authors' experience resulted in failed surveys and no population estimate.

The estimate of breeding females from the June survey had a CV of 9.3% and the estimate of ≥1-year-old caribou in the June survey area had a CV of 6.0%, both of which should be acceptable for management purposes. Heard and Williams (1990) and Boulanger *et al.* (2011) emphasized the importance of size and trend in the breeding female sector of the herd to its dynamics. The extrapolated estimates of ≥2-year-old caribou remain rough estimates of herd size, as described by Heard (1985). The more recent approach to the extrapolation (B) developed by Campbell *et al.* (2016) uses only one ratio calculation and results in a lower variance than the earlier extrapolation (A) which uses 2 ratios. The BE 2010 estimate from this method of 120,880 was within 1.5% of the post-calving estimate of 122,697 and this approach may be preferable for June surveys where there are adequate radio-collar numbers to define the full distribution of all cows.

The June and July 1993 surveys of the George River herd by Couturier *et al.* (1996) differed somewhat from the methods and calculations we used, but the June and July 1993 George River population estimates showed good agreement. Statistically, this is a sample size of just 2 comparisons, and true herd size was not known in either case. However, the correspondence of the 2 pairs of estimates suggests that both survey methods are fundamentally sound, if carried out with adequate radio-collar numbers, field techniques that emphasize high precision, and appropriate analyses. Management recommendations about harvest or other factors (e.g., WRRB 2016) are generally based on a range in herd sizes and take other factors like trend and key demographic indicators into account (PCMB 2010; ACCWM 2014). In the case of the BE herd in 2010, the management plan (ACCWM 2014) would have identified the herd as in the green "high numbers" phase based on all the estimates generated from the June and July 2010 surveys.

ACKNOWLEDGEMENTS

Aerial surveys like the June and July 2010 BE calving and post-calving photo-surveys require months of planning, logistic support, careful field work, and analysis. We would like to thank Adam Bourque and Monika Koetzle for capably piloting the Cessna Caravans during the June survey, Perry Linton and Brett Van Hearden for capably piloting the Helio-Courier and Cessna 185 during the July survey, and Jesse Pierce for flying the helicopter during the June composition survey. Mathieu Dumond, Jorgen Bolt and Allan Niptanatiak provided excellent logistic support in Kugluktuk. A special thank you to Phil Spencer in Norman Wells for daily supplying the caribou radio-collar locations during the surveys and for the maps he created for this report.

Our thanks also to Jennifer Bailey for capable support with data entry and mapping during the June survey. Paul Roy once again meticulously counted photos from the June survey, as he has for these surveys for many years. Noel Doctor, George Mandeville, Kelvin Kotchilea, Joe Blondin, Nicole McCutchen, Kerri Garner, and Karin Clark were able observers during the June survey. Andrea Hrynkiw kindly assisted with the July field work and counting of caribou on July photos. Judy Williams provided her usual expert support with logistics and survey planning.

Funding was primarily provided by the GNWT, with assistance from the Nunavut government. These surveys represent a collaboration among Inuvik, North Slave and Sahtú ENR regional staff and ENR headquarters staff. Alasdair Veitch in Norman Wells provided cheerful support during the surveys and organized a community observer tour at the end of the survey in July. We would also like to thank senior management staff in ENR, including Susan Fleck, Nicole McCutchen, Ernie Campbell, and Gary Bohnet for ensuring that we were able to carry out these surveys with the resources and support that these expensive, time-consuming surveys depend on.

LITERATURE CITED

Advisory Committee for Cooperation on Wildlife Management (ACCWM). 2014. Taking Care of Caribou – The Cape Bathurst, Bluenose-West, and Bluenose-East Barren Ground Caribou Herds Management Plan (Final). C/O Wek'èezhìi Renewable Resources Board, 102A, 4504 – 49 Avenue, Yellowknife, Northwest Territories, Canada.

Adamczewski, J., J. Boulanger, B. Croft, H. D. Cluff, B. Elkin, J. Nishi, A. Kelly, A. D'Hont, and C. Nicolson. 2009. Decline in the Bathurst caribou herd 2006–2009: a technical evaluation of field data and modeling. Department of Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Canada. http://www.wrrb.ca/node/208. Accessed 1 October 2012.

Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford, and B. Tracz. 2014. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in the Northwest Territories, Canada in 2010. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Manuscript Report no. 244.

Alaska Department of Fish and Game (ADFG). 2011. Caribou management report of survey-inventory activities

1 July 2008 – 30 June 2010. P. Harper, editor. Juneau, Alaska, USA.

Beaulieu, D. 2012. Dene traditional knowledge about caribou cycles in the Northwest Territories. Rangifer Special Issue 20: 59–67.

Bergerud, A. T., S. N. Luttich, and L. Camps. 2008. The return of caribou to Ungava. Queen's University Press, Montreal, Québec, Canada.

Boulanger, J. 2011. Optimal survey design, survey intervals, and analysis strategies for caribou calving ground surveys, reconnaissance surveys, and composition surveys. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Unpublished Contract Report.

Boulanger, J., A. Gunn, J. Adamczewski, and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management 75: 883–896.

Boulanger, J., B. Croft, and J. Adamczewski. 2014. An estimate of breeding females and analyses of demographics for the Bluenose-East herd of barren ground caribou: 2013 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, File Report no.143.

Boulanger, J., B. Croft, J. Adamczewski, D. Lee, N. Larter, and L.-M. Leclerc. 2016. An estimate of breeding females and analyses of demographics for the Bluenose-East herd of barren-ground caribou: 2015 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Manuscript Report no. 260.

Campbell, M., J. Nishi, and J. Boulanger. 2010. A calving ground photo survey of the Qamanirjuaq migratory barren-ground caribou (*Rangifer tarandus groenlandicus*) population, June 2008. Department of Environment, Nunavut Wildlife Service, Government of Nunavut, Arviat, Nunavut, Canada, Technical Report Series 2010 - No. 1-10.

Campbell, M., J. Boulanger, and D. S. Lee. 2016. Estimating abundance of the Qamanirjuaq mainland migratory barren-ground caribou subpopulation - June 2014. Department of Environment, Nunavut Wildlife Service, Government of Nunavut, Arviat, Nunavut, Canada, Technical Report Series (in preparation).

Couturier, S., R. Courtois, H. Crépeau, L.-P. Rivest, and S. Luttich. 1996. Calving photocensus of the Rivière George Caribou Herd and comparison with an independent census. Rangifer Special Issue no. 9: 283–296.

Crépeau, H., L. P. Rivest, S. Couturier, and S. Baillargeon. 2012. Package "caribou" (R): Estimation of caribou abundance based on large scale aggregations monitored by radio telemetry, Version 1.1. Université Laval, Québec City, Québec, Canada.

Dauphiné, T. C. Jr. 1976. Biology of the Kaminuriak population of barren-ground caribou. Part 4: Growth, reproduction and energy reserves. Canadian Wildlife Service, Environment Canada, Ottawa, Ontario, Canada, Canadian Wildlife Service Report Series no. 38.

Davison, T. M., H. Sawada, P. Spencer, M. Branigan, and R. Popko. 2014. Calving ground fidelity of the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West and Bluenose-East barren-ground caribou herds. Environment and Natural Resources, Government of the Northwest Territories, Inuvik, NT, Canada. Poster presentation at the Fifteenth North American Caribou Workshop, 12 – 16 May 2014, Whitehorse, Yukon, Canada.

Fisher, J. T., L. D. Roy, and M. Hiltz. 2009. Barren-ground caribou management in the Northwest Territories: an independent peer review. Alberta Research Council, Sustainable Ecosystems Unit, Vegreville, Alberta. Available from Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada.

Gerhart, K. L., D. E. Russell, D. Van DeWetering, R. G. White, and R. D. Cameron. 1997. Pregnancy of adult caribou (*Rangifer tarandus*): evidence for lactational infertility. Journal of Zoology, London 242: 17–30.

Gordon, B. C. 2005. 8000 years of caribou and human seasonal migration in the Canadian Barrenlands. Rangifer Special Issue 16:155–162.

Griffith, B., D. C. Douglas, N. E. Walsh, D. D. Young, T. R. McCabe, D. E. Russell, R. G. White, R. D. Cameron, and K. R. Whitten. 2002. Section 3: the Porcupine Caribou Herd. US Geological Survey, Biological Science Report, USGS/BRD 2002-0001.

Gunn, A., J. Nishi, J. Boulanger, and J. Williams. 2005. An estimate of breeding females in the Bathurst herd of barren-ground caribou, June 2003. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Manuscript Report no. 164.

Harper, P., editor. 2013. Caribou management report of survey-inventory activities 1 July 2010–30 June 2012. Alaska Department of Fish and Game, Juneau, Alaska, USA. Species Management Report ADF&G/DWC/SMR-2013-3, Juneau, Alaska, USA.

Heard, D. C. 1985. Caribou census methods used in the Northwest Territories. Proceedings of the second North

American caribou workshop, Val Morin, Quebec, October 1984. McGill Subarctic Research Paper 40: 229–238.

Heard, D. C., and F. J. Jackson. 1990. Beverly calving ground survey, June 2-14, 1988. Department of Renewable Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, File Report no. 86.

Heard, D. C., and M. Williams. 1990. Caribou project summary and review, February 1990, Part 1. Unpublished Report. Department of Renewable Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada.

Heard, D. C., and M. Williams. 1991. Caribou project summary and review, February 1990, Part 2, Population Dynamics. Department of Renewable Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Unpublished Report.

Joly, K., S. K. Wasser, and R. Booth. 2015. Non-invasive assessment of the interrelationships of diet, pregnancy rate, group composition, and physiological and nutritional stress of barren-ground caribou in late winter. PLoS ONE 10(6): e0127586.

Latour, P., M. Williams, and D. Heard. 1986. A calving ground and population estimate for the Bluenose caribou herd in 1983. Department of Renewable Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, File Report no. 61.

McLean, B. D., and J. D. Russell. 1992. Photocensus of the Bluenose caribou herd. Department of Renewable Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, File Report no. 108.

Nagy, J. A., and D. Johnson. 2006. Estimates of the number of barren-ground caribou in the Cape Bathurst and Bluenose-West herds and reindeer/caribou on the upper Tuktoyaktuk Peninsula derived using post-calving photography, July 2006. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Manuscript Report no. 171.

Nagy, J.A., W. H. Wright, T. M. Slack, and A. M. Veitch. 2005. Seasonal ranges of the Cape Bathurst, Bluenose-West, and Bluenose-East barren-ground caribou herds. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Manuscript Report no. 167.

Nishi, J.S., Croft, B., J. Williams, J. Boulanger, and D. Johnson. 2007. An estimate of breeding females in the Bathurst herd of barren-ground caribou, June 2006. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, File Report no. 137.

Norton-Griffiths, M. 1978. Counting Animals: Serengeti Ecological Monitoring Program Handbook No. 1. African Wildlife Leadership Foundation, Nairobi, Kenya.

Patterson, B. R., B. T. Olsen, and D. O. Joly. 2004. Population estimate for the Bluenose-East caribou herd using post-calving photography. Arctic 57: 47–58.

Pollock, K. H., J. D. Nichols, C. Brownie, and J. E. Hines. 1990. Statistical inference for capture-recapture experiments. Wildlife Monographs 107: 1–97.

Porcupine Caribou Management Board (PCMB). 2010. Harvest management plan for the Porcupine Caribou Herd in Canada. http://www.pcmb.ca/PDF/general/Plan/Harvest%20Management%20Plan%202010.pdf

R_Development_Core_Team. 2009. R: A language and environment for statistical computing. In R Foundation for Statistical Computing, Vienna, Austria.

Rettie, J. 2008. Determining optimal satellite collar sample sizes for monitoring barren-ground caribou populations. Environment and Natural Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, Canada, Unpublished Contract Report.

Rivest, L. P., S. Couturier, and H. Crepeau. 1998. Statistical methods for estimating caribou abundance using postcalving aggregations detected by radio telemetry. Biometrics 54: 865–876.

Russell, J., S. Couturier, L. G. Sopuck, and K. Ovaska. 1996. Post-calving photocensus of the Rivière George caribou herd in July 1993. Rangifer 9: 319–330.

Russell, D. E., K. L. Gerhart, R. G. White, and D. Van De Wetering. 1998. Detection of early pregnancy in caribou: evidence for embryonic mortality. Journal of Wildlife Management 62: 1066–1075.

Thomas, D.C. 1998. Needed: less counting of caribou and more ecology. Rangifer Special Issue 10:15–23.

Thomas, D. C., and H. P. L. Kiliaan. 1998. Fire-caribou relationships: (II) Fecundity and physical condition of the Beverly herd. Canadian Wildlife Service, Prairie and Northern Region, Edmonton, Alberta, Canada., Technical Report Series no. 310.

Valkenburg, P., D. A. Anderson, J. L. Davis, and D. J. Reed. 1985. Evaluation of an aerial photocensus technique for caribou based on radio telemetry. Proceedings of the second North American caribou workshop, Val Morin, Québec, October 1984, McGill Subarctic Research Paper 40: 287–299.

White, G. C., and R. A. Garrott. 1990. Analysis of wildlife Radio tracking data. Academic Press, London, United Kingdom.

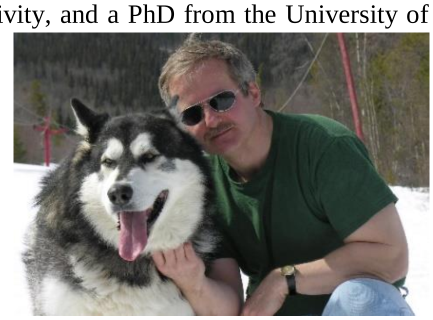
Williams, T. M. 1995. Beverly calving ground surveys June 5-16, 1993 and June 2-13, 1994. Department of Renewable Resources, Government of Northwest Territories, Yellowknife, Northwest Territories, File Report no. 114.

Wekèezhìı Renewable Resources Board (WRRB). 2016. Final Report, Part A, Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 6-8 April 2016, Behchokǫ̀, NT & Reasons for Decisions Related to a Joint Proposal for the Management of the Bluenose-East ʔekwǫ̀ (Barren-ground caribou) Herd. Wek'èezhìi Renewable Resources Board, 102A, 4504 – 49 Avenue, Yellowknife, Northwest Territories, Canada.

Zalatan, R., A. Gunn, and G. H. R. Henry. 2006. Long-term abundance patterns of barren-ground caribou using trampling scars on roots of *Picea mariana* in the Northwest Territories, Canada. Arctic, Antarctic and Alpine Research 38: 624–630.

ABOUT THE AUTHORS

Jan Adamczewski has a BSc in Wildlife Biology from the University of Guelph, an MSc from the University of Alberta in Wildlife Productivity, and a PhD from the University of Saskatchewan in Biology. He has worked as a biologist for the Government of Newfoundland, as a biologist for the Sahtú Renewable Resources Board in Norman Wells, NT, as a regional biologist for the Yukon Government in Watson Lake, and as an ungulate biologist with the Government of the Northwest Territories in Yellowknife. Most of his time since 2007 with the GNWT has been focused on barren-ground caribou, but his first love among all wildlife remains muskoxen, which have the cutest babies on the planet.

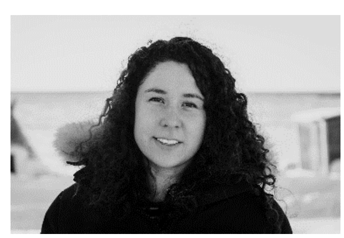


John Boulanger is an independent wildlife researcher with Integrated Ecological Research based out of Nelson, British Columbia. He has been working on the development of barren ground caribou population estimation and modeling methods in Northwest Territories and Nunavut since 2000. He also specializes in the development of estimation and modeling methodologies for carnivores and other wildlife species using DNA mark-recapture methods. John has a B.Sc. (Wildlife Biology) from Colorado State University and a Master's degree (Zoology) from University of British Columbia. He is a registered professional biologist in British Columbia.

Bruno Croft began a BSc at the Université du Québec à Rimouski, then finished it at Acadia University. Bruno completed an MSc at the University of Saskatchewan in Wildlife Management. Bruno began working for the Government of the Northwest Territories, Environment and Natural Resources (ENR) as a wildlife technician in 1986, and has been a biologist and wildlife manager since 2006 with main responsibilities for barren-ground caribou monitoring and management in the North Slave region. Bruno figures he has probably spent more time in the air and in the field than anyone else for ENR since 1986.

Tracy Davison is a regional biologist for the Inuvik region of the Northwest Territories. The region stretches from the arctic islands to the Boreal forest and includes 2 land claim regions; the Inuvialuit Settlement Region and the Gwich'in Settlement Area. Tracy implements monitoring and studies in the region to ensure that the co-management boards have the best information possible to make management decisions. The primary species Tracy monitors are barren-ground caribou, Peary caribou, muskox, moose and Dall's Sheep.

Heather Sayine-Crawford holds a BSc in Biology from the University of Alberta and is working towards an MSc in fish and wildlife management from Montana State University. She was a wildlife biologist/manager with the Government of Northwest Territories in Norman Wells, NT for 7 years and worked on a variety of wildlife research and management projects in the Sahtú region of the Northwest Territories with most of her time focused on barren-ground caribou and Dall's sheep. In April 2017, she



moved to Yellowknife to begin a position as Manager of Wildlife Research and Management in the Wildlife Division.

Boyan Tracz holds a BSc(H) in Ecology from the University of Manitoba, and both a MSc in Ecology and a Master of Business Administration from the University of Alberta. Over the past few years, Boyan has focused his activities in the Northwest Territories, having been the Cumulative Effects Biologist in the Sahtú Region, and a Program Manager for the Cumulative Impact Monitoring Program. Boyan is currently working for the Wek'èezhìı Renewable Resources Board as their Wildlife Management Biologist.

Received 6 June 2016 – Accepted 7 December 2016

Government of Northwest Territories Gouvernement des Territoires du Nord-Ouest

A General Approach to Harvest Modeling for Barren-ground Caribou Herds in the NWT and Recommendations on Harvest Based on Herd Risk Status

John Boulanger
Integrated Ecological Research,
Nelson, BC

Jan Adamczewski
Environment and Natural Resources,
Government of Northwest Territories

2016

Manuscript Report No. 262

ABSTRACT

Previous modeling of barren-ground caribou demographics and harvest for the Bathurst and Bluenose-East herds was carried out under a limited range of demographic scenarios to evaluate the likely consequences of varying levels and sex ratio of harvest. The modeling in this report was carried out to assess risk associated with harvest in a wider range of conditions, to generate more general results that could be applicable to multiple herds varying in size and trend. A deterministic model was used with a caribou herd of 100,000 with low, moderate and high calf productivity and low, moderate and high levels of adult survival. Harvest levels modeled ranged from 0-8,000, and sex ratio of the harvest varied from 0-100% cows. Time-steps of three and six years were used to match the frequency of recent Government of the Northwest Territories population surveys of most caribou herds. With low adult survival, herd trend is likely to be negative and a substantial harvest would increase the risk of greater decline. Herds with high survival and high calf productivity can tolerate substantial harvest levels. Power to detect declines within three years was limited to larger scale (>31%) declines in herd size. Bull-cow ratios were sensitive to male and female harvest levels with increases in bull-cow ratios when female harvest was higher. Case studies of the Bathurst and Bluenose-East herds using the most recent demographic information suggest that harvest should be very conservative, given herd size, trend and relatively low cow survival in these herds. Recommended harvest should be re-assessed frequently because a herd's productivity and survival rates can change quickly. Results of the harvest modeling were used to develop approaches to recommending harvest level and sex ratio based on herd risk status, including a simple rule of thumb approach.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

In the wake of declines in all barren-ground caribou herds monitored by the Government of the Northwest Territories (GNWT) in the early 2000s, harvest management was recommended by co-management boards and implemented for the Cape Bathurst, Bluenose-West and Bathurst herds (Adamczewski et al. 2009, Boulanger et al. 2011). Population modeling was carried out in 2009-2010 to assess acceptable hunter harvest (number and sex ratio) for the Bathurst herd compatible with providing the herd a strong opportunity to recover (see Boulanger and Adamczewski 2015 and Boulanger et al. 2011).

Long-term management planning for these herds, the Bluenose-East herd (e.g. ACCWM 2014), and for the Beverly and Qamanirijuaq herds is either completed or underway. Management recommendations for harvest for multiple herds at various population sizes and trends will be needed. The purpose of this paper is to demonstrate a modeling process that can be used to estimate the risk of harvest for a population based upon its relative size and trend. The modeling is intended to provide guidelines that could be used by co-management boards or governments to complement harvest management strategies developed through co-management processes. The modeling does not address harvest allocation. We also recognize that harvest recommendations and herd-based plans will reflect other criteria, knowledge and views, in addition to biological considerations.

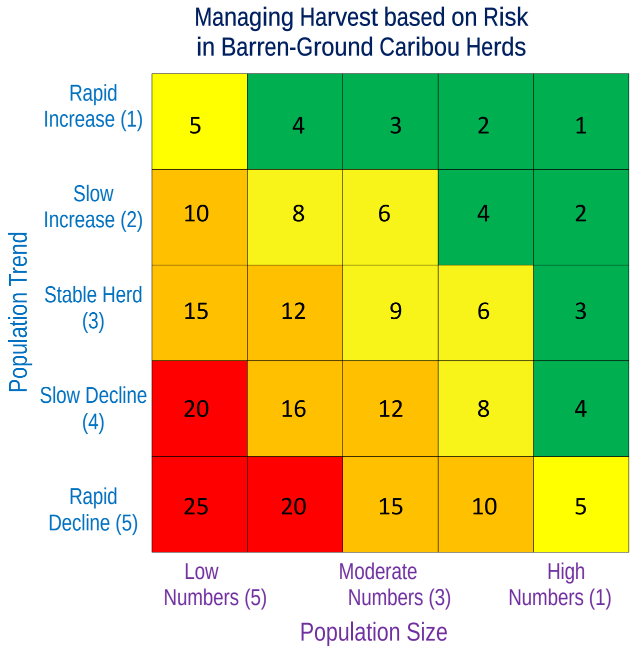


Figure 1. Relative levels of risk as a function of population trend and size.

It is important to remember that other factors that influence caribou, such as weather in all seasons, predation, and cumulative effects of development, will continue to affect each herd. In addition, barren-ground caribou herds have long been known to fluctuate widely in numbers over time (Zalatan et al. 2006, Bergerud et al. 2008). Caribou harvest management will need to be flexible and adaptive to shifting conditions for each herd.

METHODS

The underlying model used for simulations was similar to the demographic model used for the Bathurst and Bluenose-East herds (Boulanger and Adamczewski 2015, Boulanger et al. 2011, Boulanger 2016 In Prep.). Because this was a deterministic model, no variation was simulated in model parameters.

This model attempts to define the relative risk to a herd of various harvest strategies as evaluated at three and six years. This approach is meant to emulate the management process where harvest levels are initially set based upon herd size with usually less knowledge about population trend. Therefore, managers often are faced with only knowing one of the axes in Figure 1 when setting harvest levels. However, if surveys are conducted at three year intervals then it should be possible to re-evaluate trend and population size. Therefore, simulations are tailored to ask what risk category a herd would be at three years after a harvest regime is imposed.

Selection of Input Parameters

Parameters were selected to span the most commonly observed values in caribou herds. Model parameters were based upon ranges of adult survival (Figure 2) and levels of productivity (as indicated by calf-cow ratios) (Figure 3) observed for various caribou herds. Adult female survival is directly related to herd trend (Figure 2) so adult survival rates also dictated overall herd trend with smaller scale changes dictated by productivity levels.

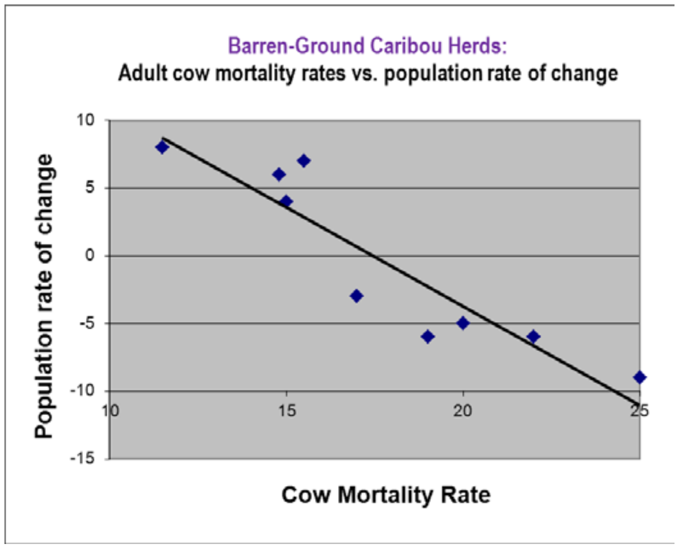


Figure 2. Empirical relationship between caribou adult cow survival rates and population rate of change (courtesy of Don Russell, coordinator, CARMA Network, personal communication).

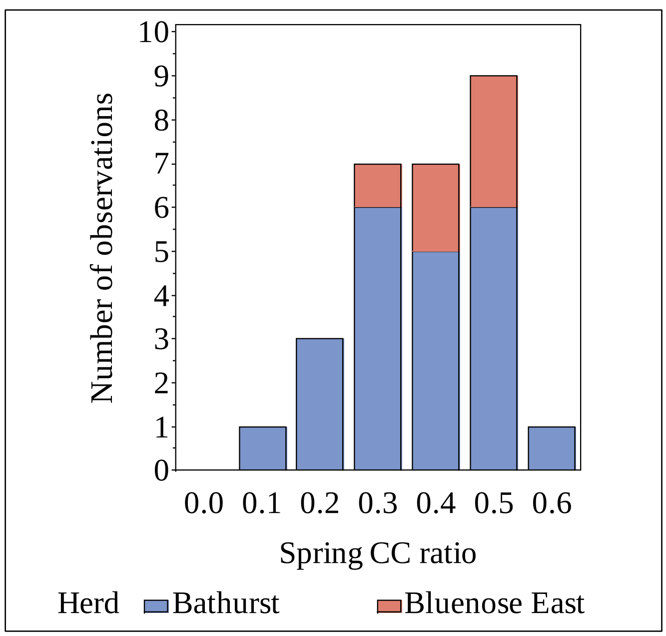


Figure 3. Ranges of spring (March-April) calf-cow ratios for the Bathurst herd (1985-2012) and Bluenose-East (2007-12) caribou herds.

Productivity was modeled as the product of calf survival and fecundity (the relative proportion of adult females that produce a calf each year). Productivity in this context would be the proportion of calves that survive their first year of life relative to the number of adult females that gave birth to calves on the calving ground in the previous year. The actual measure that is available for productivity is calf-cow ratios recorded in late winter at about ten months of age and therefore an initial step of modeling was to calibrate productivity values so that they spanned the observed range of calf cow ratios. This was done by adjusting calf survival values (which vary more than fecundity) to produce calf-cow ratios that ranged from 0.2-0.5 (Figure 3). We note that calf-cow ratios were relatively unaffected by adult female survival values (Figure 4), with a slight tendency for higher values if adult female survival was lower.

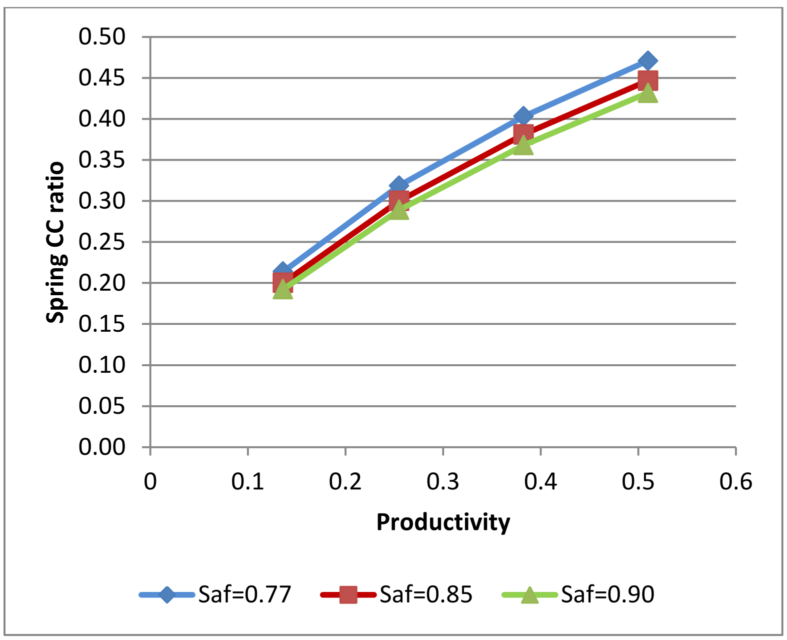


Figure 4. Productivity values with corresponding calf-cow ratios. Various values of adult survival (Saf) are given. Other parameters are listed in Table 1.

Other parameter values were based upon relationships from the OLS model analysis of the Bathurst herd (Boulanger et al. 2011) (Table 1). Namely, yearling survival was set equal to adult female survival and bull survival was assumed to be 80% of the value of adult female survival. The initial bull-cow ratio was set at 0.43 which was the average value of estimated bull-cow ratios for the Bathurst herd from 2004-12 (range=0.36-0.56) and the estimated value for the Bluenose-East herd in 2010. As discussed later, these assumptions should be re-considered for herds that have actual demographic parameter estimates since they assume demography that is similar to the Bathurst herd (a declining herd) and the Bluenose-East herd (the bull-cow ratio).

One point that is important to note is that productivity is partially influenced by adult female survival given that higher survival of adult females means that more calves will be produced in a given year. For example, for simulations the initial number of adult females (out of the herd size of 100,000) was 69,930. The actual number that produced calves was determined by the product of adult survival and fecundity. Thus higher adult survival values resulted in higher numbers of breeding females (Table 1).

Table 1. Initial parameterization of simulations. Productivity was the product of calf survival and fecundity. Initial breeding females was the product of initial cows (69,930 *adult survival* fecundity). Asymptotic λ values for females and calf cow ratios are also given.

Survival Scenario	Productivity	Survival				Fecundity	Initial	Female Trend	CC* ratios	
		Cow	Bull	Calf	Yearling		Breed F N*	λ	Spring	Fall
Low	0.14	0.77	0.62	0.16	0.77	0.85	45,769	0.83	0.21	0.40
	0.26	0.77	0.62	0.30	0.77	0.85	45,769	0.87	0.32	0.46
	0.38	0.77	0.62	0.45	0.77	0.85	45,769	0.90	0.40	0.50
	0.51	0.77	0.62	0.60	0.77	0.85	45,769	0.94	0.47	0.52
Moderate	0.14	0.85	0.68	0.16	0.85	0.85	50,524	0.91	0.20	0.38
	0.26	0.85	0.68	0.30	0.85	0.85	50,524	0.95	0.30	0.45
	0.38	0.85	0.68	0.45	0.85	0.85	50,524	0.99	0.38	0.49
	0.51	0.85	0.68	0.60	0.85	0.85	50,524	1.02	0.45	0.51
High	0.14	0.90	0.73	0.16	0.90	0.85	53,496	0.96	0.19	0.38
	0.26	0.90	0.73	0.30	0.90	0.85	53,496	1.00	0.29	0.44
	0.38	0.90	0.73	0.45	0.90	0.85	53,496	1.04	0.37	0.48
	0.51	0.90	0.73	0.60	0.90	0.85	53,496	1.08	0.43	0.51

*Breed F N = Breeding Female Number; CC = Calf: Cow

The combinations of productivity and adult survival resulted in asymptotic λ values for the female segment of the population ranging from 0.83-1.08 which corresponded to an annual 17% decrease up to an 8% increase respectively (Figure 5). At low cow survival rates (0.77), the expected population trend was negative at all levels of productivity.

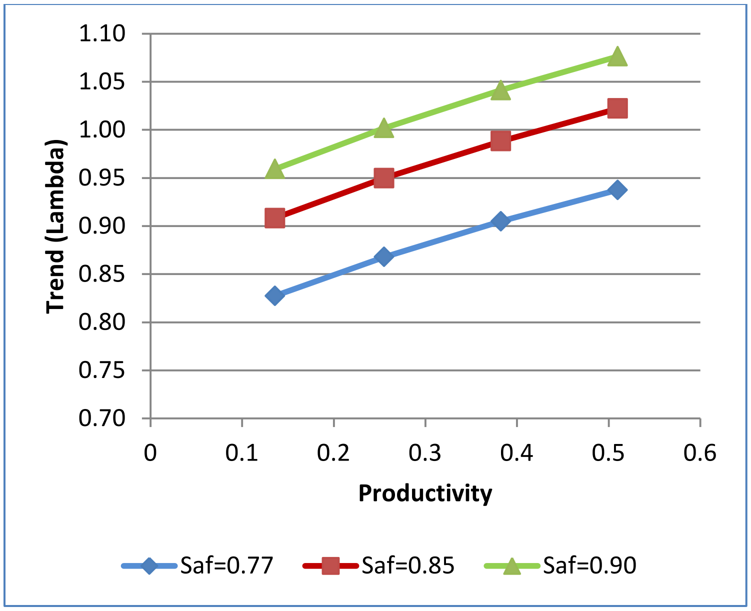


Figure 5. Trend in female population size as a function of productivity and adult female survival.

Selection of Risk Thresholds

The next step in the modeling process was to assign simulation outcomes to risk categories for the herd as evaluated in three and six years. To do this, the relative risk zones in Figure 1 were assigned categories based on herd size and annual rate of population change. As with Figure 1, higher rates of decline were considered acceptable for larger herd sizes but as herd size decreased the risk of serious decline were considered less acceptable.

Table 2. Thresholds of risk as a function of trend and population size.

Population Size (thousands)

Lambda	**% change**	**<30**	**30-60**	**60-90**	**90-120**	**>120**
>1.1	>10%	5	4	3	2	1
1.02-1.09	2-9%	10	8	6	4	2
0.98-1.02	-2 to +2%	15	12	9	6	3
0.9-0.98	-10 to -2	20	16	12	8	4
<0.9	<-10%	25	20	15	10	5

In the context of Table 2, risk levels associated with green and yellow were considered acceptable, risk zones of orange were considered to be of concern, and risk zones of red and black as not acceptable (warranting strong consideration of harvest restriction).

Case Studies for Bluenose-East and Bathurst Herds

The simulations conducted assumed a starting herd size of 100,000 caribou as a benchmark. We also ran a set of simulations that were tailored to the Bluenose-East and Bathurst herds to further illustrate the application of the generic harvest model across two different combinations of herd size and trend.

RESULTS

The relative risk of various harvest strategies was evaluated graphically with harvest levels as the x-axis and percent cows as the y-axis at three years (Figure 6) and at six years (Figure 7). Figures 6 and 7 present a wide range of outcomes specific to combinations of cow survival rate, calf productivity, harvest levels and harvest sex ratio. These graphs can also be viewed in a simpler manner: graphs with substantial amounts of green and yellow represent situations with relatively little risk of significant decline, while graphs with substantial red or black represent situations with a high risk of serious decline.

Included were results with zero harvest which corresponded to the farthest left cells on each plot. The relative amount of harvest pressure increased with increasing x-axis values but also with increasing y-axis values since the harvest would include more females. When evaluated at three years, it can be seen that the highest risk categories corresponded to the low survival and low productivity (0.14-0.25); herds with these conditions would be declining with zero harvest. In most other scenarios risk was moderate to low. However, this result was potentially misleading since a decreasing population would only have three years to decrease therefore the longer-term risks of various harvest strategies may not be as evident. If the same simulations are evaluated at six years then risk levels become higher for all of the low survival scenarios, for the medium survival scenarios if productivity <0.25, and for the high survival scenarios if productivity ≤0.14) (Figure 7). This result highlights the need for frequent re-evaluation of harvest strategies at three year intervals especially if the initial harvest strategy places a herd into a higher risk category.

In general, the lowest risk situations were herds with high adult survival and high calf productivity; these herds could tolerate substantial harvest levels, including cow harvest. These conditions were last seen in the Northwest Territories caribou herds in the early 1980s. In herds with low adult survival, a declining trend was expected with no harvest, thus any significant harvest would increase the risk of rapid decline.

One question that would be related to adaptive management is whether the effects of different harvest strategies could be detected within three years. Power analyses (Figure 8) were also evaluated graphically to explore this question. In Figure 8, red or green cells indicate that a negative or positive change would be detected in breeding female estimates. It can be seen that decreases would be detectable for the low survival scenario regardless of harvest when productivity was low (<0.25) and at higher harvest levels when productivity was higher. Declines would only be detectable at higher harvest levels in the medium and high survival scenarios when productivity was low.

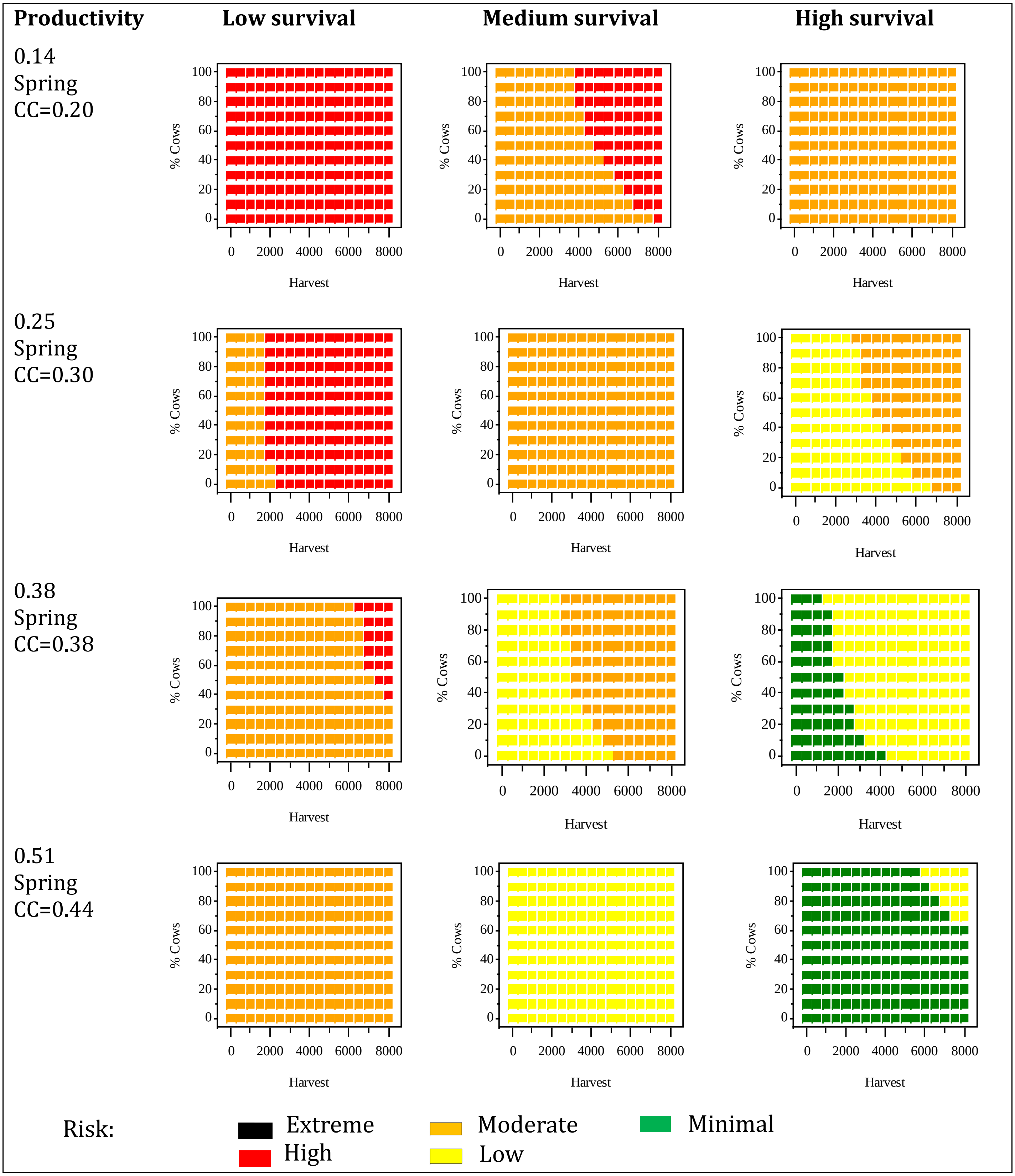


Figure 6. Relative risk of various harvest strategies when evaluated at three years. Risk categories are defined in Table 2.

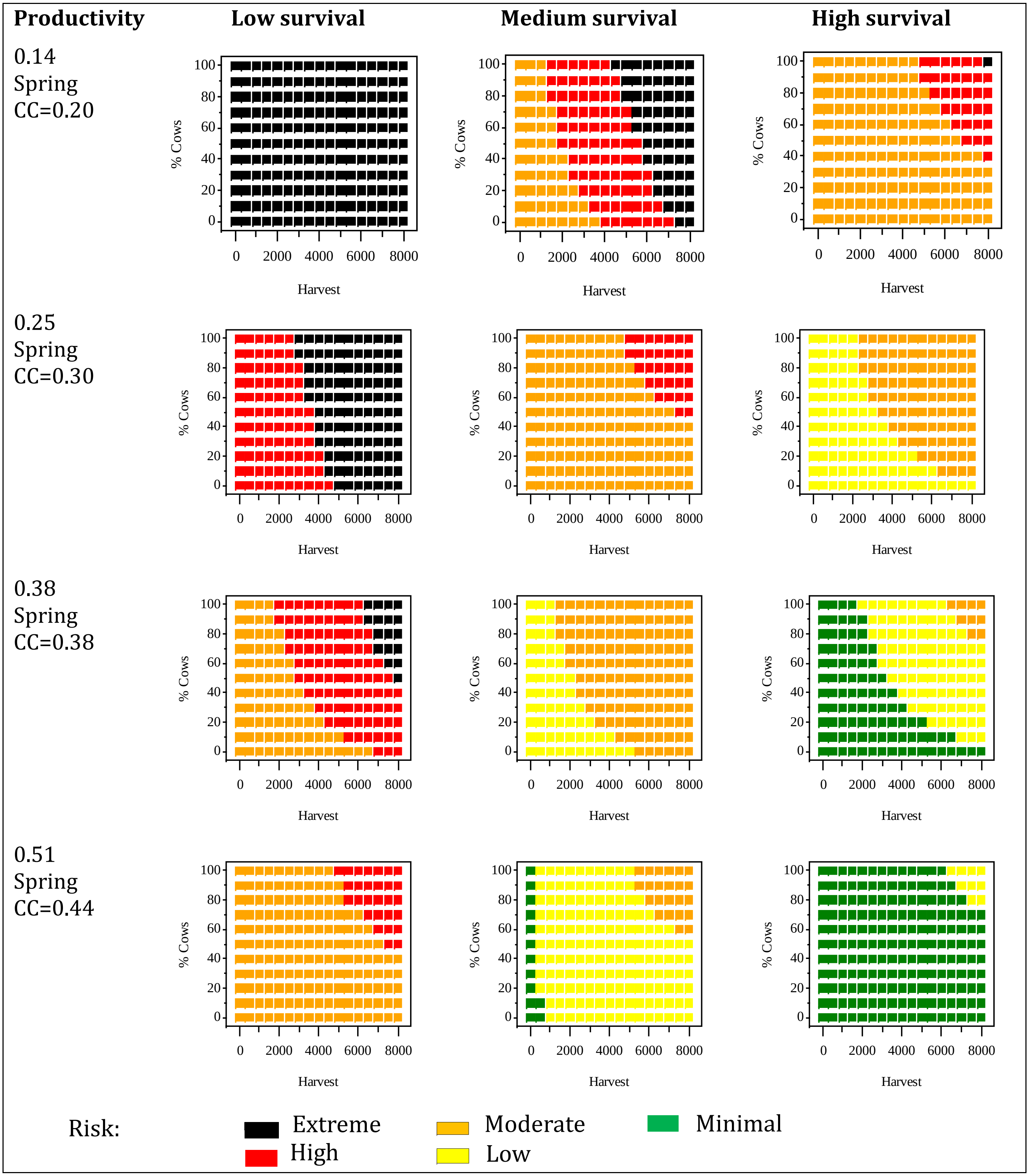


Figure 7. Relative risk of various harvest strategies when evaluated at six years. Risk categories are defined in Table 2.

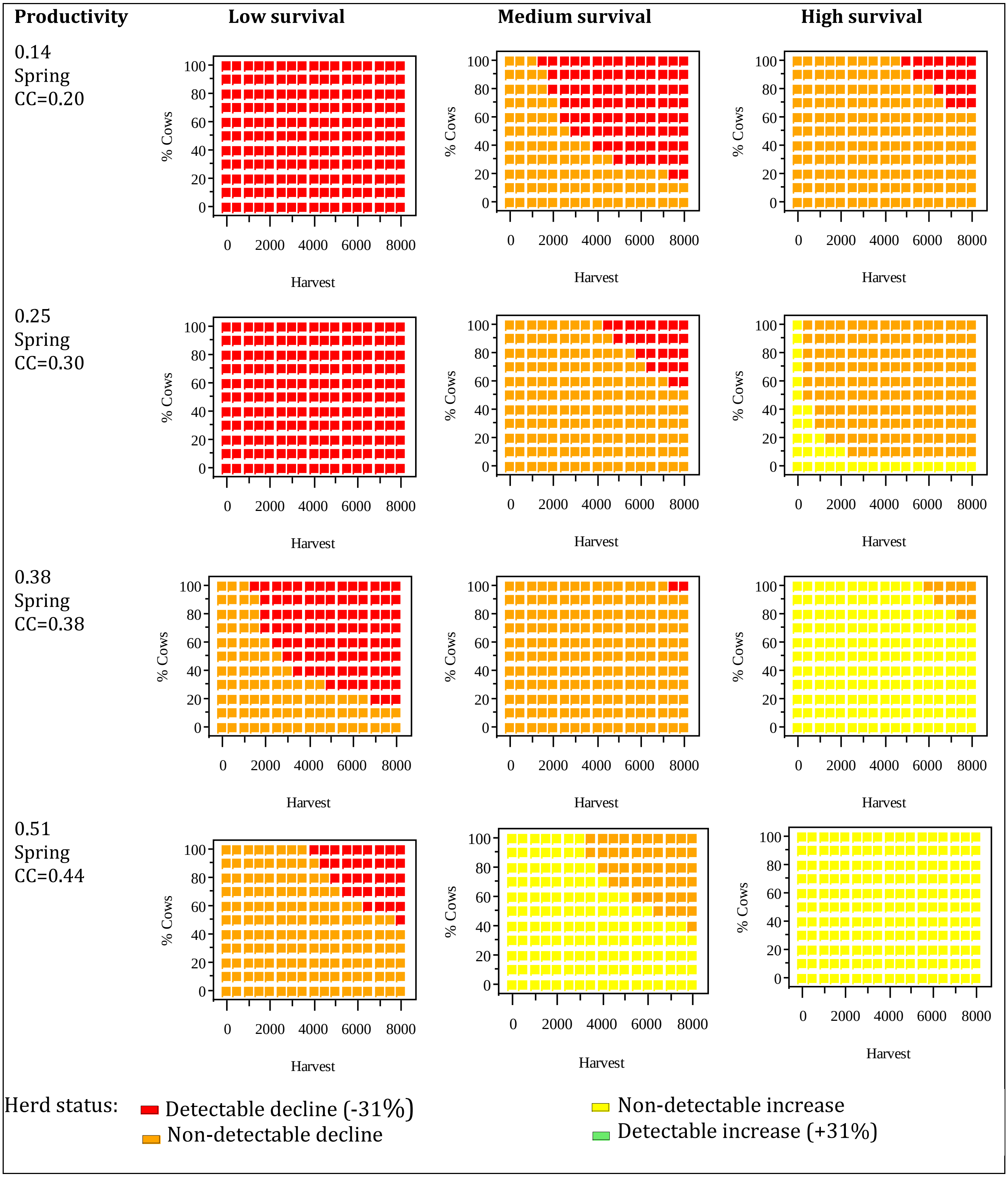


Figure 8. Power to detect change at three years based on various harvest levels. Red denotes that a negative trend was detected (at least 31% decline) whereas orange would be a non-detectable decline, yellow a non-detectable increase and green a detectable increase of at least 31%.

One important indicator of herd status is the bull-cow ratio which can signal a depletion of bulls when harvest is strongly bull-oriented. In general bull-cow ratios should remain high enough to ensure that breeding success is not reduced. However, naïve interpretation of bull-cow ratios can be misleading given that a ratio can also increase if the cow population size is decreasing relative to bulls (due to cow harvest or other factors). Figure 9 displays simulation results in terms of bull-cow ratios with higher risk indicated by red and black cells. Moderate and lower risks are indicated by orange and yellow whereas minimal risk (an increase in bull-cow ratio) is indicated by green. A grey cell indicates an increase in bull-cow ratio compared to the initial value that was partially due to a decrease in cow population size. In this case, an increasing bull-cow ratio would be misleading. From this it can be seen that higher bull harvest caused extreme risk (black cells) in scenarios where productivity is <=0.38. Grey areas (decreasing cows relative to males) could occur at higher harvest levels when the majority of the harvest is cows. In general, if productivity is above 0.38 then moderate harvest of bulls results in acceptable risk in terms of bull-cow ratios.

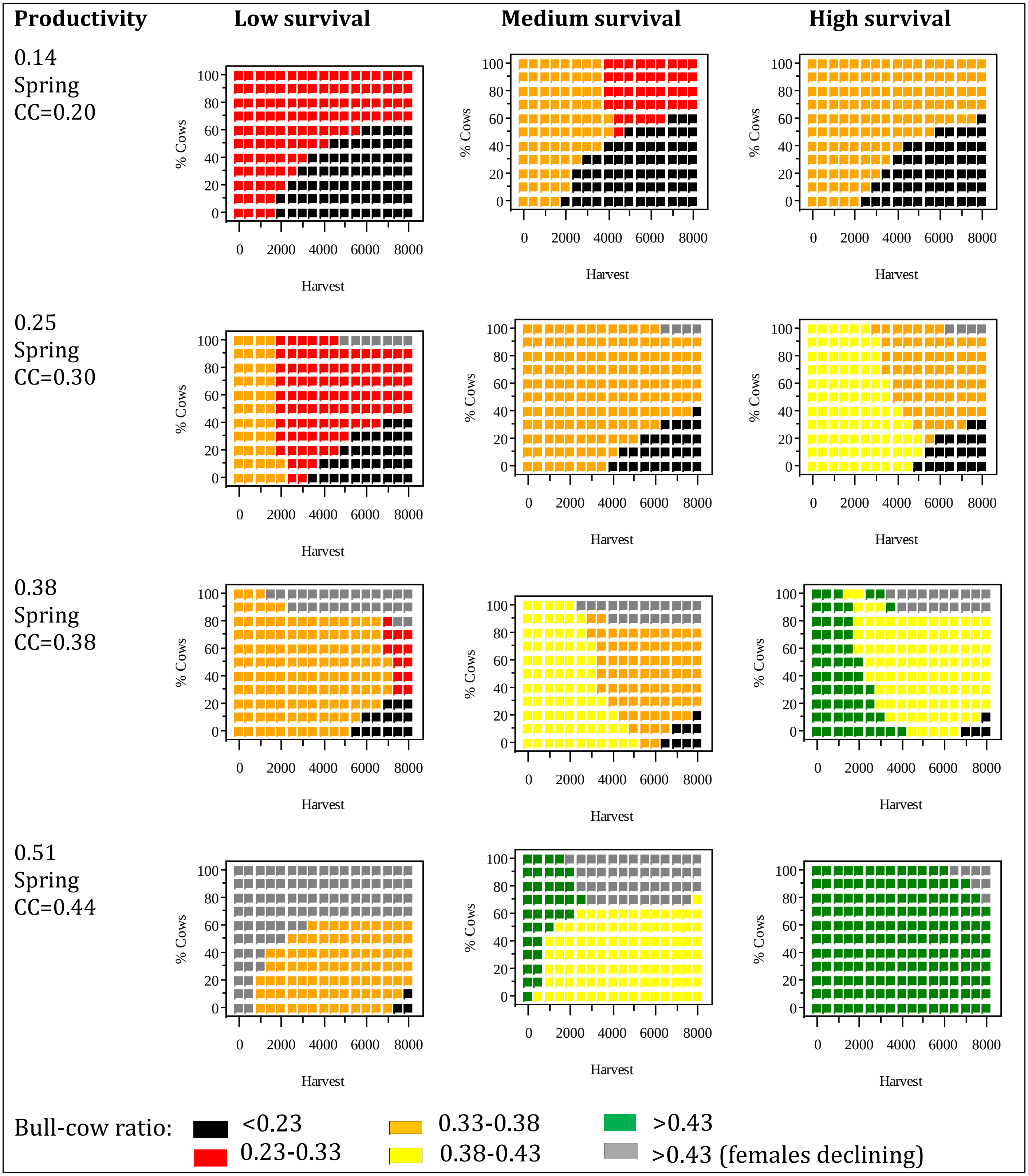


Figure 9. Bull-cow ratios after three years. Grey areas indicate higher bull-cow ratios that are partially due to declining cows and therefore should be interpreted cautiously. A value of 0.43 means a bull:cow ratio of 43 bulls: 100 cows.

The results of these simulations can be used to gauge relative levels of risk associated with harvest levels assuming an initial population size of 100,000 adult caribou. A relevant question is how risk varies with population size and proportion of the population harvested. We plotted the proportion of the adult herd harvested as a function of herd size after three years of simulations (Figure 10). From this it can be seen that overall risk is related to herd size with larger proportions of harvest acceptable when herd size is larger. However, it can be also seen that factors such as overall trend, and the proportion of females harvested will also influence risk. In fact, in the case of the simulations, herd size and trend are correlated at year three since only simulations with negative trends would cause a reduced total herd size. Harvest rates greater than 5% are only likely to be acceptable when a herd is large and has high survival and productivity. A good knowledge of a herd's demographics is essential in defining acceptable harvest recommendations.

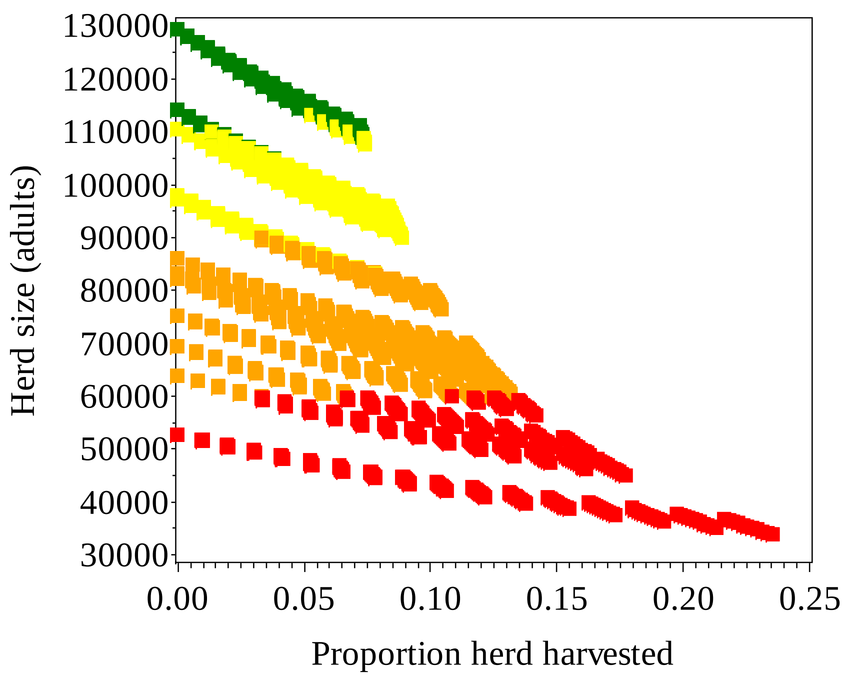


Figure 10. Proportion of herd harvested versus herd size at year three of simulations. Colors correspond to risk categories (Table 2).

Case Study: Applying Harvest Modeling to the Bluenose-East and Bathurst Herds

Recent modeling for the Bathurst herd and Bluenose-East herd has suggested that adult female survival rates are lower than assumed in previous harvest modeling papers

(Boulanger and Adamczewski 2015, Boulanger 2016 In prep.). We therefore applied the results of recent studies for these herds to the harvest model to assess relative risk of herd at assumed harvest levels. We used estimates of demographic parameters from recent analyses conducted as part of the Bathurst 2012 survey (Boulanger et al. 2014a) and Bluenose East 2013 survey (Boulanger et al. 2014b). A summary of demographic estimates is given in Table 3.

Table 3. Indicators for Bathurst and Bluenose-East herds from analyses conducted from the 2012 Bathurst and 2013 Bluenose-East calving ground surveys (Boulanger et al. 2014a, Boulanger et al. 2014b).

Indicator	Herd	
	Bathurst (2009-12)	**Bluenose-East (2010-13)**
Adult female survival	0.78	0.75 (harvest of 2,600 assumed)
Adult male survival	0.71	0.62 (harvest of 1,400 assumed)
Productivity	0.38	0.26
Herd size	2012: 34,690 (CI=24,934-44,445)	2013: 68,295 (CI=40,655-62,849)
Population trend	0.99 (CI=0.86-1.08)	0.87 (CI=0.85-0.91)
Last Bull-cow ratio	2012: 0.57 (CI=0.51-0.64)	2013: 0.426 (CI=0.39-0.46)
Annual harvest	<1,000	2,800-4,000
Proportion females harvested	0-40%	65%
Approximate proportion N harvested	1%*	4-6%

*Reported harvest for Bathurst has been <300/year but there is uncertainty as to true harvest due to overlap with Bluenose-East on winter range. A harvest of 300 is assumed here. Reported Bluenose-East harvest since 2010 has averaged 2,800/year but may be under-reported. A harvest of 2,800-4,000 is assumed here.

The population size and trend for the Bathurst herd puts it in the orange "moderate risk" category (box 12 in Table 2) mainly because the overall trend appears to be stable. The Bluenose-East herd also is placed into the orange (box 12) mainly because of the steep rate of decline even though the population size is still substantially larger than in the Bathurst herd. In both herds it is likely that substantial harvest will increase risk of serious decline.

The low levels of survival for the Bathurst and Bluenose-East put them into the lower survival scenario simulations (Table 1) with productivity at 0.38 for the Bathurst and productivity close to 0.26 for the Bluenose-East. We re-ran the harvest model with starting population sizes, bull survival rates and bull-cow ratios that were based on the 2012 (Bathurst) and 2013 (Bluenose-East) calving ground survey and evaluated the results based upon the low survival (0.77)-productivity=0.38 scenario for the Bathurst and low-survival-productivity=0.26 scenario for the Bluenose-East. The boxes predicting herd status for each herd at three years, power to detect change in three years, and bull-cow ratios are shown in Figure 11.

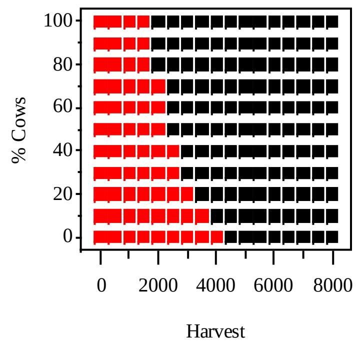
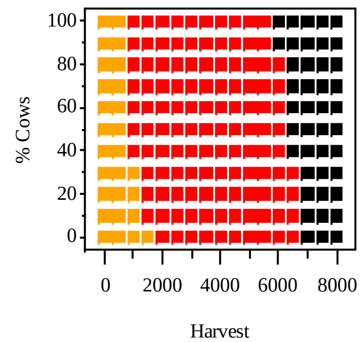
For both herds the majority of simulation outcomes result in a red risk category across most scenarios. If there is no harvest or harvest is low (<1,000) then the Bluenose-East remains in the orange category. This suggests that if lower survival levels continue the herd status will go into the red from the orange zone given likely harvest levels (Table 2). This is because of the low estimated survival values for both herds. For the Bathurst, levels of harvest of 2,000 or more result in the highest risk category (black) further demonstrating that this herd cannot tolerate significant harvest given its relatively low size. For Bluenose East, high harvest levels (>7,000) could also put the herd in the black zone given the relatively low level of productivity. In both cases power to detect decline in three years is high. For the Bluenose-East, bull-cow ratios will be reduced especially if bull harvest is high. If cow harvest is high (100%) and harvest is greater than 4,000 then bull-cow ratios could increase due to reduction in cow population size compared to bull population size (grey squares).

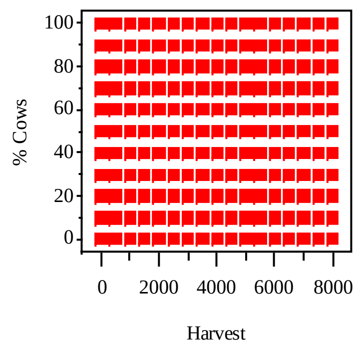
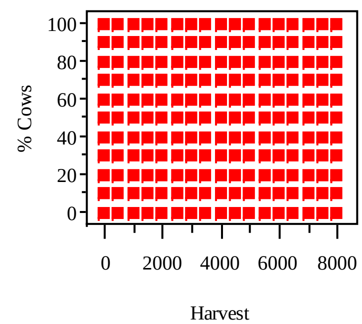
Interpretation of bull-cow ratios is more challenging given that bull-cow ratios were high (0.57) in 2012 for the Bathurst herd which placed it in the green zone in Figure 9. In this case, reduction of bull-cow ratios would not cause a significant risk to the herd since this level suggests there are a high proportion of bulls in the herd relative to cows. However, simulation results suggest that given the estimated ratios of bull and cow survival rates it is possible that the bull-cow ratio could increase (grey squares) under current levels of productivity (0.38) which would be partially due to female mortality. This is explained further in the Bathurst 2012 survey report (Boulanger et al. 2014b). Note that this effect becomes more pronounced if there is any female harvest mortality. Therefore, we suggest that any changes in bull-cow ratio for this herd be interpreted cautiously and in unison with other indicators.

<table>
<tr><th>Indicator</th><th>Bathurst
Low survival (0.77)
Productivity=0.38</th><th>Bluenose-East
Low survival (0.77)
Productivity=0.26</th></tr>
<tr><td><u>Herd status in three years</u> (Figure 7).
Using initial N as starting point.

Orange indicates moderate risk (Table 2)

Red indicates a high risk

Black indicates extreme risk.</td><td></td><td></td></tr>
<tr><td><u>Power to detect change at three years</u> (Figure 8)

Red indicates that decline would be detectable.</td><td></td><td></td></tr>
<tr><td><u>Bull-cow ratios after three years</u> (Figure 9)

Grey indicates cows declining.

Green indicates high (>0.43) b/c ratio

Red: bc=0.23-0.33

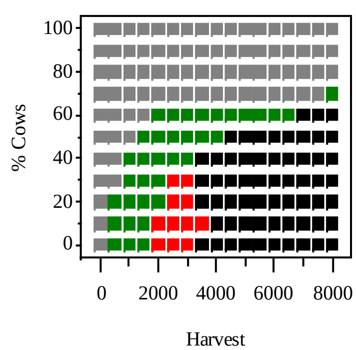
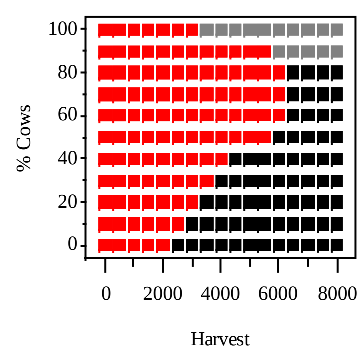
Black: bc<0.23</td><td></td><td></td></tr>
</table>

Figure 11. Herd indicators from harvest simulations as applied to the Bathurst and Bluenose-East herds with starting herd sizes and bull-cow ratios as listed in Table 3. Evaluations would occur at three years after population surveys *assuming constant survival and productivity rates.* Survival and productivity scenarios are detailed in Table 2.

DISCUSSION

The results of these simulations illustrate how survival and productivity need to be considered when evaluating the risk of various harvest strategies. Demographic analyses of the Bathurst and Bluenose-East herds indicate lower natural survival rates suggesting that herds are declining even without harvest pressure (Boulanger et al. 2014a, b). Therefore, assessment of additional risk of decline due to harvest pressure is required given that a constant harvest on a declining population can accelerate population declines (Boulanger et al. 2011).

Adult survival rates determine the relative robustness of the herd to harvest and other perturbations whereas productivity ensures replacement of caribou. Monitoring of survival, productivity, and population size are therefore essential elements in sound population management. Even if collar sample sizes are low, it is still possible to estimate relative survival rates using the OLS model as has been done with the Bathurst and Bluenose-East herds. If survival estimates are not available, then consideration of relative trend and levels of productivity may give an indication of survival. The following sequence of steps could be used to initially assess likely survival values.

1. What is the trend of the herd?
2. What was the level of productivity in the previous years?
3. Given levels of productivity—is trend due to survival or productivity?
   a. If it is productivity then trend will most likely be less steep
   b. If it is survival then trend will be steeper
4. Divide harvest/female N—what proportion is being harvested?

These simulations are a simplification of herd dynamics in that they assume that demographic parameters are constant across individuals and time (White 2000). In reality, all demographic parameters vary and therefore the most appropriate way to view the future trajectory of a population as influenced by harvest is as a range of outcomes or probabilities of different target harvest levels (Boulanger and Adamczewski 2015, Boulanger et al. 2011, Boulanger 2013 In Prep.). The best use of the simulation results in this paper is to define general areas of higher risk. For example, simulations show that if productivity is low then only low to moderate harvest is acceptable to ensure that longer-term risk to the herd is minimized.

The simulations in this report assume that initial bull-cow ratios were similar to the Bathurst and Bluenose-East herds in recent years. The eventual bull-cow ratios at three and six year intervals were then influenced by bull and cow survival and relative levels of recruitment into the bull and cow segments of the herd, which would be related to productivity level. If initial bull-cow ratios were higher then it would be expected that a higher level of bull harvest might be possible. We note certain cases where increasing bull-cow ratios may be due to a decreasing cow population size and therefore naïve interpretation of ratios may be misleading. We suspect that a declining female segment of the population may be one reason for the increase of bull-cow ratios with the Bathurst herd (Boulanger et al. 2014a).

The initial herd size of 100,000 was based upon an average level of herd size to allow generalization of model results. However, when possible, a more exact analysis specific to a herd under particular conditions that considers variation in demography may be needed to assess risk of harvest. Harvest levels should always be considered in relation to overall herd size given that a harvest level of 5,000 will impact a herd of 25,000 very differently than a herd of 100,000 or a herd of 350,000 (Bathurst herd in 1990s). If bull-cow ratios and related demographic parameters are available, then simulations that are more tailored to individual herds should be pursued, as detailed in the Bathurst and Bluenose-East case studies. Deterministic simulations such as those documented in this paper could be useful to assess risk of harvest levels. Unlike stochastic simulations, deterministic simulations can be run very quickly and the methods presented in this manuscript should provide an intuitive way to interpret results. Stochastic simulations would provide the best assessment of risk with focused harvest strategies given that variation in demographic parameters would be considered. Consideration of stochastic variation would be most meaningful when herd size is smaller (<50,000 caribou) in which case temporal and demographic variation may have a larger impact on herd status compared to larger herd sizes.

The case studies of the Bluenose-East and Bathurst highlight one of the most important messages of this exercise which is that caribou demographics are likely to be temporally dynamic and therefore assessment of risk due to harvest or due to estimated survival rates should be undertaken frequently.

LITERATURE CITED

Advisory Committee for Cooperation on Wildlife Management (ACCWM). 2014. Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East barren-ground caribou herds management plan. Yellowknife, NWT. c/o Wek'èezhìi Renewable Resources Board.

Adamczewski, J., Boulanger, J., Croft, B., Cluff, D., Elkin, B., Nishi, J., Kelly, A., D'Hont, A., and Nicolson, C. 2009. Decline in the Bathurst caribou herd 2006–2009: a technical evaluation of field data and modeling. Environment and Natural Resources, Government of Northwest Territories. (www.wrrb.ca/sites/default/files/public_registry/Technical%20Report%20of%20Bathurst%20herd%2017%20Dec%2009.pdf).

Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The return of caribou to Ungava. McGill-Queen's University Press, Canada.

Boulanger, J. 2016 In Prep. Exploration of harvest strategies for the Bluenose East caribou herd using post-calving based estimates of herd size in 2010. Environment and Natural Resources, Government of the Northwest Territories.

Boulanger, J., and J. Adamczewski. 2015. Simulations of Harvest and Recovery for the Bathurst Caribou Herd, with Annual Variation. Environment and Natural Resources, Government of Northwest Territories. File Report No. 145. 53pp.

Boulanger, J., B. Croft, and J. Adamczewski. 2014a. An estimate of breeding females and analyses of demographic indicators from the Bathurst herd 2012 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. File Report No. 142. 91pp.

Boulanger, J., B. Croft, and J. Adamczewski. 2014b. An estimate of breeding females and analyses of demographics for the Bluenose-East herd of barren ground caribou: 2013 calving ground photographic survey. Environment and Natural Resources, Government of Northwest Territories. File Report No. 143. 90pp.

Boulanger, J., A. Gunn, J. Adamczewski, and B. Croft. 2011. A data-driven demographic model to explore the decline of the Bathurst caribou herd. Journal of Wildlife Management 75:883-896.

White, G.C. 2000. Population viability analysis: Data requirements and essential analyses. Pages 289-331 *in* L. Boitani, andT. K. Fuller, editors. Research techniques in animal ecology: Controversies and consequences. Columbia University Press, New York, New York, USA.

Zalatan, R., A. Gunn, and G.H.R. Hare. 2006. Long-term abundance patterns of barren-ground caribou using trampling scars on roots of Picea mariana in the Northwest Territories, Canada. Arctic, Antarctic and Alpine Research 38:624-630.

APPENDIX A: HARVEST RECOMMENDATIONS FOR BARREN-GROUND CARIBOU BASED ON HERD RISK STATUS: A RULE OF THUMB APPROACH

Background

The Advisory Committee for the Cooperation on Wildlife Management (ACCWM)'s management plan for the Cape Bathurst, Bluenose-West and Bluenose-East caribou herds (ACCWM 2014) identifies an approach to hunter harvest management that assumes each herd will cycle between high and low numbers. Four colored zones are defined for each herd as (a) low (red), (b) decreasing (orange), (c) increasing (yellow), or high (green). Thresholds for transitions between these zones are defined based on the range of estimated herd sizes for the three herds, and harvest recommendations are proposed based on which zone the herd is in.

This approach is intuitive and pragmatic. However, there are two potential issues with this approach: (1) herds do not always cycle predictably, and (2) at best, reliable population estimates for the three herds only extend back to the late 1980s. Consequently, the basis for defining historic high and low levels and the associated thresholds between zones may sometimes be limited[1]. The Department of Environment and Natural Resources (ENR) has developed additional "rules of thumb" approach to help in defining harvest recommendations based on a herd's risk status, particularly its size and trend. This approach should be complementary to the type of recommendations on harvest in the ACCWM plan (2014) or other management plans. Harvest recommendations are meant to be revisited as new information on a given herd's risk status becomes available. The rule of thumb approach described here was based in large part of the general harvest modeling described in the main body of this report.

[1] The Fortymile herd in Alaska/Yukon numbered an estimated 568,000 in 1920, then declined rapidly and between 1940 and 1990 (50 years) remained between about 6,000 and 50,000 (Valkenburg et al. 1994). Bergerud et al. (2008) re-constructed approximate numbers of the George River (GR) herd in Labrador/Quebec from various sources and concluded that the herd reached high numbers around 1800, 1890, and 1990. Between 1890 and 1950, the GR herd was thought to have had two smaller peaks in numbers in about 1910 and 1925, with successively lower low numbers around 1900, 1920 and then 1940-1950. What constitutes a "high" and "low" herd size is less easily defined under these conditions.

Harvest Management Context in the Northwest Territories

In the Northwest Territories (NWT), management of barren-ground caribou harvest is a shared responsibility between governments, co-management boards and communities. Recommendations and decisions about caribou harvest should in part reflect biological realities; that is, what the herd can tolerate. Management plans may also define varying priorities or goals for a herd; for example, recommended harvest for a herd might be different if the priority is maximizing hunting opportunities than if the priority is herd growth. The purpose of the approach described here is to help define a range of acceptable harvest options for a caribou herd based on its risk status. These options should be revisited in an adaptive manner when new information on the herd's risk status becomes available. Recommendations and decisions on harvest management will ultimately reflect a range of considerations, in particular the requirements of land claims and treaties, and management priorities defined through co-management.

Harvest Modeling for Caribou

Population modeling was conducted to assess the likely effects of harvest varying in scale (% of herd) and sex ratio for herds varying in population size and trend. This work, along with earlier harvest/population modeling, was described in the main body of this report.

Significance of Harvest to Barren-ground Caribou Herds

How harvest affects a caribou herd depends on a number of factors. Key ones are:

a) the herd's trend (increasing, stable, declining);
b) the rate (%) of the harvest in relation to herd size; and
c) the sex ratio of the harvest (proportion of cows in the harvest).

Herd trend: Increasing herds usually have high calf productivity and high adult survival rates; consequently, they are best able to withstand substantial hunter harvest. Modeling suggests that herds with high cow survival, sustained high calf productivity, and rapid rates of increase can tolerate annual harvest rates of up to 5-8% and continue to grow or be stable. These demographic conditions have not been observed in NWT's herds since the early 1980s. Conversely, herds with a declining natural trend usually have low calf productivity and low adult survival; consequently, mortality rates already exceed the rate at which yearling caribou are added to the herd. Under these conditions, harvest rates as low as 1-2% may increase the rate of decline.

For example, modeling of the Bluenose-East herd in 2012 suggested that if the herd's increasing trend and good calf recruitment as observed in 2010 continued, a harvest of 3,000 (2.5% of the 2010 herd size estimate of 122,000) was likely compatible with a stable herd. However, a decline in herd size was likely with a harvest of 5,000-6,000 (4-5% of estimated herd size in 2010).

Harvest as % of herd size: A harvest of 5,000 cows from a large and stable herd of 350,000 caribou is expected to have relatively little impact on the herd, since only a small fraction of the herd is harvested (just over 1%). However, a harvest of 5,000 cows from a herd of 30,000 would be 16.7% of the herd. A caribou herd could never produce enough young to sustain this level of harvest.

Harvest management plans or actions taken for a number of herds across Canada (e.g. Porcupine, George River, Cape Bathurst, Bluenose-West, Bluenose-East, and Bathurst) include possible harvest closure at very low numbers for conservation to allow the herd its greatest opportunity to recover.

Harvest of cows and bulls: Harvest of cows affects herds more strongly than harvest of bulls. Removing a breeding cow takes out the cow, the calf she is carrying, and all future calves she may produce. Although over-harvesting bulls is also not desirable, a healthy bull can breed many cows, while each cow typically only carries one fetus. The effect of harvesting a high proportion of cows is strongest in declining herds and the least in increasing herds with high calf productivity. Emphasis on bull harvest over cow harvest should be greatest in declining herds and/or herds at low numbers, and least in herds increasing and/or at high numbers.

Sustainable and acceptable harvest: Sustainable harvest from wildlife populations can be defined as harvest that does not cause a population to decline. By this definition, no harvest is sustainable from a caribou herd that has a declining natural trend. A limited harvest may be still be considered acceptable for declining caribou herds, with the understanding that substantial harvest (particularly that of cows) from a declining herd increases the risk of more rapid and extensive decline.

Rule of thumb approach to harvest based on herd risk status

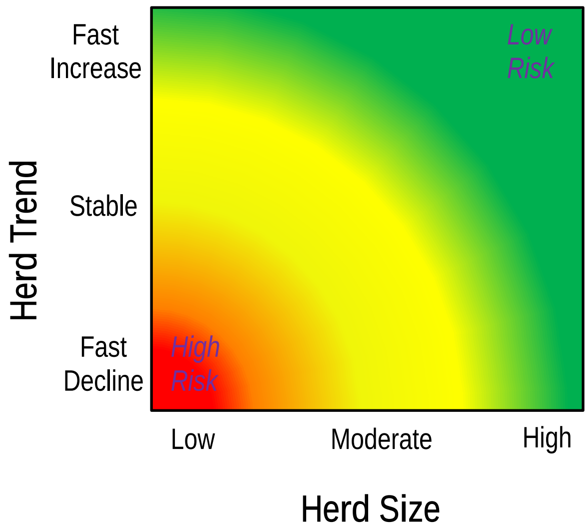


Figure 1. Assessment of risk status based on herd size and trend.

Herd risk status based on size and trend: Figure 1 shows how risk status of a caribou herd could be defined based on its size and trend (red - high risk; yellow - medium risk; green - low risk). A herd at relatively high numbers and increasing rapidly is at low risk of significant decline (green), while a herd already at low numbers and declining rapidly is at high risk of further significant decline (red). Recommendations on harvest would begin with a risk assessment of the herd.

Other measures of herd risk status: As described in the draft ACCWM caribou management plan, monitoring of caribou includes other indicators such as late-winter calf:cow ratios, fall bull:cow ratios, health and condition assessment, harvest, and information about predator numbers, herd accessibility, environmental indicators, and disturbance on the landscape. Information from people on the land is often the first indicator of change on the caribou range. These indicators could serve as additional ways of assessing the herd's risk status after herd size and trend are considered. Sustained low calf:cow ratios, caribou in consistently poor condition, high wolf numbers and increased levels of disturbance might be used to assess a herd as being at greater risk.

Basing harvest level and sex ratio on herd risk status: Figure 2 (below) shows how the rate (% of herd) and sex ratio of harvest could be adjusted to the herd's risk status. Acceptable harvest as a percentage of the herd should be limited in high-risk herds (1% or less of the herd) and increase to 2, 3 and 4% of the herd in lower-risk herds. In herds at very low risk and high numbers, harvest of 5% or greater would be acceptable. Emphasis on harvest of bulls-only or a high percentage of bulls in the harvest would be greatest in high-risk herds, while either-sex harvest would be acceptable in low-risk herds. A higher overall harvest rate could be considered in medium-high risk herds if it is predominantly a bull harvest; for example, this approach was used in harvest recommended for the Bluenose-West herd in 2007 (harvest rate of 4% and a bull biased harvest (80% bulls)).

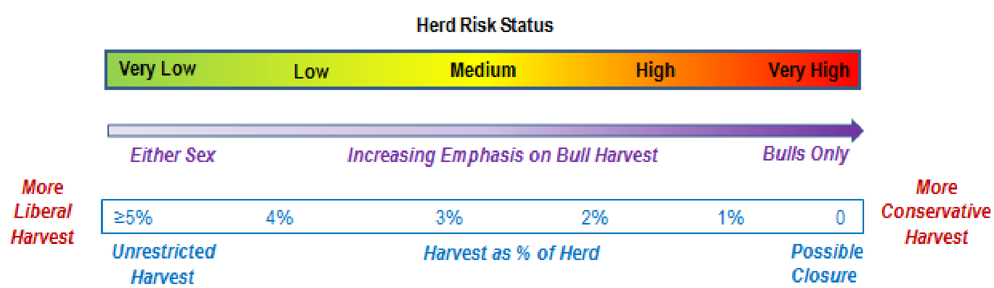


Figure 2. Suggested approach to recommending rate and sex ratio of harvest depending on a herd's risk status.

This approach could be used to define a range of options for harvest rate (% of herd) and harvest sex ratios appropriate to a herd of a particular size and trend, with consideration of other indicators. Additional indicators suggesting high risk might be low calf recruitment, poor condition assessed by hunters, accessibility of the herd's range to hunters, and substantial disturbance on key parts of the herd's range. In addition, consideration should be given to objectives for the herd: an emphasis on herd growth would be consistent with a lower harvest rate and a higher emphasis on bull harvest. An adaptive approach would include regular reviews of up-to-date information on herd status and reported harvest, and adjusting recommended harvest as needed. This approach would rely on on-going reliable reporting of harvest (numbers and sex ratio) by all hunters, whether the herds are large or small, and increasing, stable or declining.

Examples of rule of thumb approach applied to harvest recommendations

In 2009, the Cape Bathurst herd was at very low numbers compared to earlier estimates (less than 2,000), with a stable trend and improving recruitment. All harvest had been closed for this herd in 2007. The herd's range is small and easily accessed by hunters. This herd's status could be assessed as High Risk given its very low numbers or Very High Risk based on its very low numbers and continued high accessibility. Continued harvest closure would help maximize the herd's opportunity to recover. If harvest was considered, it would likely be at a low rate (1% or less of the herd) with a high emphasis on a bull-only or predominantly bull harvest.

In 2010, the Bluenose-East herd was estimated at about 122,000 with an increasing trend and good recruitment (Adamczewski et al. 2014). Based on the herd's trend and relatively large size, it would likely be assessed as being at Low-Medium risk. If the management goal was to give priority to a stable trend and a strong chance of continued herd growth, a conservative approach to harvest would be 2-3% of herd size with strong promotion of bull harvest. A more liberal approach to harvest would be 4% of the herd with a sex ratio including a substantial percentage of cows. This approach would give priority to maximizing harvest opportunities but would carry a higher risk of population decline.

Since 2010, the Bluenose-East herd was declined substantially to about 68,000 in 2013 and at a more rapid rate, to about 38,600 caribou in 2015 (see Boulanger et al. 2016 In Prep.).

Its large loss of numbers and rapid rate of decline would place it in a high risk category where any further harvest would need to be carefully considered and should include a high bull or all bull component.

Table 1 (below) includes a summary of the rule of thumb approach that includes possible approaches to resident and commercial harvest of caribou. The underlying elements of the summary are borrowed from management plans or proposed harvest management for the Porcupine, George River, Bathurst, Beverly, Qamanirijuaq, Bluenose-West, Bluenose-East and Cape Bathurst herds, and harvest modeling carried out by ENR for the Bathurst and Bluenose-East herds.

Table 1. Rule of thumb approach to recommending rate and sex ratio of harvest for barren-ground caribou based on risk status, with possible approaches to Aboriginal, resident and commercial harvest.

Herd Risk Status	Suggested Acceptable Harvest (% of herd)	Recommended Aboriginal Harvest	Recommended Resident Harvest (assuming unrestricted Aboriginal harvest)	Recommended Commercial/Outfitter Harvest (assuming unrestricted Aboriginal harvest)
Very Low	**5 % or higher**	Unrestricted, either sex	≥2 bull tags/hunter	Limited commercial tags
Low	**3-5 %**	Unrestricted, promote bull harvest	2 bull tags/hunter	Limited commercial tags
Medium	**2-3 %**	Unrestricted, promote bull harvest	1 bull tag/hunter; possible limit on tags	Either no commercial tags or small numbers of tags
High	**<2 %**	Promote conservation voluntary bulls only	1 bull tag/hunter; possible limit on tags	No commercial tags
	<1 %	Consider mandatory bulls only	No resident tags	No commercial tags
Very High	**0.01 %**	Consider closure; harvest for social/ceremonial reasons	No resident tags	No commercial tags

LITERATURE CITED

Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford, and B. Tracz. 2014. A comparison of calving and post-calving photo surveys for the Bluenose-East herd of barren-ground caribou in the Northwest Territories, Canada in 2010. Environment and Natural Resources, Government of the Northwest Territories. Manuscript Report No. 244. 57pp.

Advisory Committee for Cooperation on Wildlife Management (ACCWM). 2014. Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East barren-ground caribou herds management plan. Yellowknife, NT. c/o Wek'èezhìi Renewable Resources Board.

Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The return of caribou to Ungava. McGill-Queen's University Press, Canada.

Boulanger, J., B. Croft, J. Adamczewski, D. Cluff, D. Lee, N. Larter, and L.M. Leclerc. 2016 In Prep. An estimate of breeding females and analyses of demographics for the Bluenose-East herd of barren-ground caribou: 2015 calving ground photographic survey, draft February 19, 2016. Environment and Natural Resources, Government of the Northwest Territories.

Valkenburg, P., D.G. Kelleyhouse, J.L. Davis, and J.M. Ver Hoef. 1994. Case history of the Fortymile Caribou Herd, 1920-1990. Rangifer 14: 11-22.

ᑕᒪ ᐃᓐᓂᒃ ᖃᓄᐃᓕᖓᓂᖏᑦ ᑐᒃᑐᓯᐅᕝᕕᐅᔪᓐᓇᕐᓂᖏᓐᓄᑦ ᐋᕿᐅᒪᔪᓐᓇᕐᓂᖅ ᓇᐹᖅᑐᖃᖏᑦᑐᕐᒥᐅᑕᓂᒃ ᑐᒃᑐᓂᒃ ᓄᓇᑦᓯᐊᕐᒥᓗ ᐊᒻᒪᓗ ᐊᑐᓕᕐᑯᔭᓕᐊᑦ ᑐᒃᑐᓯᐅᕝᕕᐅᔪᓐᓇᕐᓂᖏᓐᓂ ᒪᓕᒃᑕᐅᓪᓗᑎᒃ ᑐᒃᑐᐃᑦ ᐅᓗᕆᐊᓇᖅᑐᒥᑐᓐᓇᕐᓂᖏᓐᓂ ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ

ᔮᓐ Bᐅᓛᓐᔾᕐ-John Boulanger ᐊᒻᒪᓗ ᔮᓐ ᐋᑕᒻᓯᐊᔅᑭ-Jan Adamczewski, 2016. ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪ ᐃᑦ ᐊᕙᑎᓕᕆᔨᒃ ᑯᑦ ᓄᓇᒥ ᐅᑕᑐᖃᓕᕆᔩᑦ ᓗ, ᑎᑎᖃᖁᑎᖕ ᓂᐅᓂᒃ ᑳᓕᐊᖕ ᓂᖔᖅᑐᑦ 262.

ᓇᐃᓈᖅᑕᐅᓯᒪᔪᑦ ᐅᓂᒃ ᑳᓕᐊᑦ
ᓯᕗᓂᐊᒎᑦ ᐊᑐᖅᑕᐅᕙᓚᐅᖅᑐᑦ ᓇᐹᖅᑐᖃᖕᖢ ᑐᕐ ᒥ ᑐᒃ ᑐᓂᒃ ᓄᓇᒥ ᖃᐅᔨ ᓴ ᖃᑕᕐ ᓂᖕ ᓂᒃ ᐊᒻ ᒪ ᓗ ᑐᒃ ᑐᓯ ᐅᕐ ᕕᐅᕙᓚᐅᕐ ᓂᖕᖢ ᕿᖕᖠᐅᒻ ᒥ ᓗ ᐊᒻ ᒪ ᓗ ᕐᑯᕐ ᓗᖅ ᑑᑉ ᑲ ᓇᖕ ᓇᖕᓂ ᑐᒃ ᑐᓂᒃ ᐊᐅᓚᑕᐅᕙᓚᐅᖅᑐᑦ ᐃᓚᐃᓇᖕ ᓂᒃ ᓄᓇᒦᓐ ᓂᖕ ᓂᒃ ᖃᓄᐃᓕᖕᓂᖕ ᓂᒃ ᖃᐅᔨ ᓴ ᕿᓯ ᖃᖅ ᓱ ᑎᒃ ᐊᔾ ᔨ ᒌ ᖕᖢ ᑑᑎᐅᕙᓚᐅᖅᑐᓂᒃ ᐊᒻ ᒪ ᓗ ᐊᑐᖅ ᓱ ᑎᒃ ᐊᕐ ᓇᓪ ᓗᐃᓪ ᓗ ᐊᖕᒍᔅ ᓴᓪ ᓗᐃᓪ ᓗ ᐊᒥ ᓲ ᓂᖕ ᓂᒃ ᒪ ᓕᖃᑕᓚᐅᖅᑐᓂᒃ . ᑖᒃ ᕙᓂ ᐊᑐᖅ ᑕᐅᓂᖕᖢ ᐅᓂᒃ ᑳ ᓕᐊᓂᒃ ᑲ ᔪ ᓯ ᑎᑕᐅᓚᐅᖅ ᐳᑦ ᖃᐅᔨ ᔪ ᒪ ᓪ ᓗᕆ ᑦ ᐅᓗᕆᐊᓇᕐ ᓂᖃᕿ ᓐ ᓇᕐ ᓂᖕᖢ ᑐᒃ ᑐᓯ ᐅᕐ ᕕᐅᖃᑦᑕᕐ ᓂᖕ ᓂᒃ ᐊᖕᕆᓂᖅ ᓴ ᐅᔪ ᑎᒎᑦ ᑕᑯᒋ ᐊᖅ ᑕᐅᔪ ᒪ ᓪ ᓗᑎᒃ , ᑕᒪ ᐃᓐ ᓂᒃ ᓴ ᕿᑎᓇᔪ ᓐ ᓇᕐ ᓂᖅ ᓴ ᐅᓗᑎᒃ ᐊᑐᕿ ᓐ ᓇᖅ ᑖᖕ ᓂᒃ ᐊᒥ ᓯ ᓂᒃ ᑐᒃ ᑐᖃᕐ ᕕᐅᕝ ᑐᓂᒃ ᐊᔾ ᔨ ᒌ ᖕᖢ ᑐᓂᒃ ᐊᖕᕆᓕᖕ ᓂᒃ ᐊᒻ ᒪ ᓗ ᐊᔾ ᔨ ᒌ ᖕᑐᓂᒃ ᖃᓄᐃᓕᕚᓪ ᓕᐊᓂᖕ ᓂᒃ . ᑐᑭ ᓕᐅᕿ ᑎᖃᖃᑦ ᑕᓚᐅᖅᑐᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓲ ᓂᖃᖅ ᑎᑕᐅᓂᖕ ᓂᒃ ᐱᕆ ᐊᕐ ᕕᖃᖅᑐᓂᒃ ᑕᒫ ᓂ ᓈᓴ ᐅᑎᓕᖕ ᒥᒃ 100,000-ᖏᓃᑎᑕᐅᔪ ᓂᒃ , ᐊᒻ ᒪ ᓗ ᐋᕿᐅᒪ ᔪ ᓐ ᓇᖅ ᑐᓂᒃ ᐊᑦ ᑎᒃ ᑑᓂᖕ ᓂᒃ , ᐊᑯ ᓂᖕᖠᓃᑦ ᑐᓂᒃ ᐊᒻ ᒪ ᓗ ᑯᑦ ᑎᒃ ᑐᒥ ᓂᖕ ᓂᒃ ᓄᕐ ᑎᕙᓪ ᓕᐊᓂᖕ ᓂ ᐊᒻ ᒪ ᓗ ᐊᑦ ᑎᒃ ᑑᒦ ᑐᓐ ᓇᕐ ᓂᖕᖢ , ᐊᑯ ᓂᖕᖠᓃᑦ ᑐᓐ ᓇᕐ ᓂᖕ ᓂᒃ ᐊᒻ ᒪ ᓗ ᑯᑦ ᑎᒃ ᑑᒦ ᑐᓐ ᓇᕐ ᓂᖕ ᓂᒃ ᐱᕿ ᐊᓂᒃ ᓯ ᒪ ᔪ ᑦ ᑐᒃ ᑐᐃᑦ ᐆᒪ ᐃᓐ ᓇᕿ ᓐ ᓇᕐ ᓂᖕᖢ . ᑑᒃ ᑐᓯ ᐅᕐ ᕕᐅᓇᔭ ᕿ ᑎᒃ ᑕᒫ ᖕᖦ ᓈᓴ ᐅᑎᓕᖕ ᓂᒃ 0--ᒥ ᒃ 8,000-ᓄᑦ , ᐊᒻ ᒪ ᓗ ᐊᕐ ᓇᐃᓪ ᓗ ᐊᖕᒍᔅ ᓪ ᓗᐃᓪ ᓗ ᐊᒥ ᓲ ᓂᖕ ᓂᒃ ᑐᒃ ᑐᑕᐅᕙᖕ ᓂᖕ ᓂᒃ ᐊᔾ ᔨ ᒋ ᖕ ᓂᖅ ᑎᑕᐅᕙᓚᐅᖅᑐᓂᒃ ᓈᓴ ᐅᑎᓕᖕ ᓂᒃ 0-ᒥ ᒃ 100% ᐳᓴ ᑎᓕᖕ ᓄᑦ ᐊᕐ ᓇᓪ ᓗᕐ ᓂᒃ ᓄᕐ ᕋᖅᑐᑦ . ᓯᕗᕙᓇᐊᕐ ᓗᕆ ᑦ ᐱᖑᐊ ᓂᒃ 3 ᐱᖑᐋ ᔪᖅ ᑐᓄᑦ 6-ᓄᑦ ᐊᕐ ᕋᒍ ᓄᑦ ᐊᑐᖅ ᑕᐅᓚᐅᖅᑐᑦ ᓈᒻ ᒪᓈᓇᐊᕿ ᑕᐅᓂᕐ ᒨᑦ ᐊᒥ ᓷᑎᕆ ᕙᖕ ᓂᖕ ᓄᑦ ᒫ ᓐ ᓇᔮ ᖅ ᓄᓇᑦ ᓯ ᐊᑉ ᒐ ᕙᒪ ᒃ ᑯᖕ ᓄᑦ ᐊᒥ ᓷ ᓂᖕᖢ ᖃᐅᔨ ᓴ ᖅᑕᐅᓯ ᒪ ᔪ ᑦ ᑕᒪ ᐃᓐ ᓂᒃ ᑲ ᓴ ᒃ ᑐᒃ ᑐᖅ ᕚ ᑦ . ᐊᑦ ᑎᒃ ᑑᒦ ᓐ ᓂᖕ ᓂ ᐆᒪ ᐃᓐ ᓇᕿ ᓐ ᓇᕐ ᓂᖕᖢ ᐱᕿ ᐊᓂᒃ ᓯ ᒪ ᔪ ᑦ ᑐᒃ ᑐᐃᑦ , ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓯ ᕿ ᖅ ᐸᓪ ᓕᐊᓇᔭ ᖏ ᑦ ᑐᒃ ᓴ ᐅᔪ ᑦ ᐊᒻ ᒪ ᓗ ᐊᒥ ᓯ ᓂᒃ ᑐᒃ ᑐᑕᐅᔪ ᓐ ᓇᕿ ᑎᒃ ᐊᒥ ᕝ ᓷ ᔪ ᓐ ᓅᕿ ᑕᐅᒋ ᐊᒃ ᑲ ᓐ ᓂᕿ ᓐ ᓇᓇ ᓪ ᓗᑎᒃ . ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓷ ᓂᖕᖢ ᐆᒪ ᐃᓐ ᓇᕿ ᓐ ᓇᖅ ᑐᑦ ᐊᒻ ᒪ ᓗ ᐊᒥ ᔅ ᓷ ᓂᒃ ᓄᕐ ᑎᕙᓪ ᓕᐊᕙᒃ ᑐᑦ ᐊᒥ ᓷ ᓂᖅ ᓴ ᒃ ᑐᒃ ᑐᕝ ᕕᐅᖅᑕᕿ ᓐ ᓇᕋᔭ ᖅ ᐳᑦ . ᐊᔭ ᖏᓂᖃᕐ ᓂᖕᖢ ᖃᐅᔭ ᐅᔭ ᓐ ᓇᕐ ᓂᖅ ᐊᒥ ᔅ ᓷ ᓐ ᓂᖅ ᐸᓪ ᓕᐊᓂᖕ ᓂᒃ ᐃᓗᐊᓂ ᐱᖑᐊ ᑕᒫ ᑦ ᐊᕐ ᕋᒍ ᐃᑦ ᐃᓱ ᖃᕐ ᕕᐅᓚᐅᖅᑐᑦ , ᐊᖑᔩ ᑎᐅᓂᖅ ᓴ ᐃᓐ ᓇᐅᓂᖕ ᓄᑦ ᐅᖓᑖᓃᑦ ᑐᓂᒃ >31% ᐳᓴ ᑎᓂᒃ) ᐊᒥ ᔅ ᓷ ᔪ ᓐ ᓃᖅ ᓯ ᒪ ᔪ ᓂᒃ . ᐸᖕ ᓃᓐ ᓗ ᐊᕐ ᓇᓐ ᓗᐃᓪ ᓗ ᓄᕐ ᕋᖅᑐᑦ ᐊᒃ ᑐᖅ ᑕᐅᓴ ᕋᐃᑦ ᑑᕗᑦ ᐊᖕᒍᔅ ᓪ ᓗᐃᓪ ᓗ ᐊᕐ ᓇᓪ ᓗᐃᓪ ᓗ ᑐᒃ ᑐᑕᐅᔪ ᓐ ᓇᕐ ᓂᖕ ᓂᒃ ᐊᒥ ᓷ ᓂᖅ ᓴ ᐅᔭ ᕌᖑᒃ ᐊᕐ ᓇᐃᓪ ᓗ ᑐᒃ ᑐᑕᐅᕙᖕ ᓂᖕ ᓂ. ᖃᐅᔨ ᓴ ᓚᐅᖅ ᑐᓂ ᕿᖕᖠᐅᒻ ᒥ ᓗ ᕐᑯᕐ ᓗᖅ ᑑᑉ ᑲ ᓇᖕ ᓇᖕᓂ ᑐᒃ ᑐᐃᑦ ᐊᑐᖅ ᑕᐅᓪ ᓗᑎᒃ ᓄᓇᒥ ᓇᓃᔅ ᔩᖕᓂᖕᖢ ᒫ ᓐ ᓇᓴ ᖑᓚᐅᖅ ᑐᖅ ᐃᓱ ᒪ ᓇᖅ ᑐᑦ ᐊᒥ ᔩ ᓗᐊᓇᐊᖅᖕᖠᖕ ᓂᒃ ᑐᒃ ᑐᕝ ᕕᐅᔪ ᓐ ᓇᕐ ᓂᖕᖢ , ᐃᓱ ᒪ ᕆ ᓪ ᓗᕆ ᑦ ᑕᒪ ᕐ ᒥ ᒃ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᔅ ᓷ ᓂᖕᖢ , ᖃᓄᐃᓕᕚᓪ ᓕᐊᓂᖕ ᓗ ᐊᒻ ᒪ ᓗ ᐊᒥ ᓷ ᓗᐊᖅ ᐸᖕᖠᖕᖢ ᐊᕐ ᓇᓪ ᓗᐃᑦ ᐆᒪ ᐃᓐ ᓇᕿ ᓐ ᓇᓷ ᖑᓂᖕᖢ ᑕᒪ ᒃ ᑯᓇᓂ ᑐᒃ ᑐᓂᒃ . ᐊᑐᓕᕐᑯᔨ ᕗᒍᑦ ᑑᒃ ᑐᓯ ᐅᕝ ᕕᐅᔪ ᓐ ᓇᕐ ᓂᖕᖢ ᖃᐅᔨ ᓴ ᖅᑕᐅᑲ ᓐ ᓂᖃᑕᐃᓐ ᓇᓇᐊᖃᕐ ᓂᖕ ᓂᒃ ᐱᔾ ᔪ ᑕᐅᓪ ᓗᑎᒃ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓯ ᕿ ᖅ ᐸᓪ ᓕᐊᔪ ᓐ ᓇᕐ ᓂᖕᖢ ᐊᒻ ᒪ ᓗ ᐆᒪ ᐃᓐ ᓇᕿ ᓐ ᓇᓷ ᖑᓂᖕᖢ ᓯ ᒃ ᑲ ᓕᔪ ᒥ ᒃ ᐊᓯ ᔾ ᔨ ᖃᑕᕐ ᓂᖕ ᓄᑦ . ᓴ ᕿᑎᑕᐅᓯ ᒪ ᔪ ᑦ ᑐᒃ ᑐᓯ ᐅᕐ ᕕᐅᖃᑦᑕᕐ ᓂᖕ ᓂᒃ ᐊᑐᖅ ᑕᐅᓚᐅᖅᑐᑦ ᖃᓄᐃᓕᐅᕿ ᑕᐅᔪ ᓐ ᓇᕐ ᓂᕐ ᒨᑦ ᐊᑐᓕᕐᑯᔭ ᐅᓂᐊᖅ ᑐᓂᒃ ᑐᑭ ᓕᐅᕐ ᓂᕐ ᒨᑦ ᑐᒃ ᑐᓯ ᐅᕝ ᕕᐅᔪ ᓐ ᓇᕐ ᓂᖕ ᓄᑦ ᐊᒻ ᒪ ᓗ ᖃᓄᐃᓕᖑᔾ ᓇᓕᐊᖅ ᕐ ᓂᖕ ᓄᒃ ᑐᒃ ᑐᑕᐅᔪ ᓐ ᓇᕐ ᓂᖕᖢ ᐊᕐ ᓇᐃᓪ ᓗ ᓐ ᓃᑦ ᐊᖕᒍᔅ ᓪ ᓗᐃᓪ ᓗ ᓐ ᓃᑦ ᒪ ᓕᒃ ᑐᓂᒃ ᐅᓗᕆᐊᓇᕐ ᓂᕐ ᒦᓐ ᓂᖕᖢ ᑐᒃ ᑐᐃᑦ , ᐊᒻ ᒪ ᓗ ᐅᔾ ᔨ ᖅ ᑐᑦ ᑎᐊᕐᑯᔨ ᓂᕐ ᒥ ᒃ ᐱᐅᓯ ᖃᕐᑯᔨ ᑐᐃᓐ ᓇᕐ ᓂᕐ ᒥ ᒃ .

ᐊᒥᕐ ᓱᕈᖅᓯ ᐊᕆᔭ ᐅᓂᖏ ᓄᑦ

ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴ ᐃᑦ ᓇᐹᖅ ᑐᖃᖕᑐᕐ ᒥ ᐅᑦ

ᑐᒃ ᑐᖏ ᓂᒃ [ᑎᑎᕋᖅ ᑕᐅᕙᓕᐊᔪ ᑦ] (ᔪᓚᐃ 2019)

ᓄᓇᑦ ᓯ ᐊᕐ ᒥ

ᐆᒪ ᔪᐃᑦ ᐊᒥᕐ ᓲᖏᑐᐊᓕᕐ ᓂᖏ ᓄᑦ (ᓄᓇᑦᓯᐊᕐ ᒥ) ᒪᓕᒐᐃᑦ

ᐊᐅᓚᑕᐅᓂᖏ ᓄᑦ ᐸᕐ ᓇᐅᑏᑦ ᐊᒥ ᓱᕈᖅᓲ ᓂᕐ ᒧᓪ ᓗ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴ ᐃᑦ
ᑭᖑᓕᖓᒃ ᑐᑦ 2019

ᐊᐅᓚᑦᑎᔩᓄᑦ ᑐᕌᖓᑦ ᐅᓂᒃᑳᓕᐊᑦ ᓇᐃᓈᖅᑕᐅᓯᒪᔪᑦ

ᐃᓅᓯᖓᓄᑦ, ᐃᓕᖅᑯᓯᑐᖃᖓᓄᑦ, ᐃᓅᑉ ᔪᑎᒃ ᓴᐅᓂᖏᒧᓪᓗ ᐊᑑᑎᖃᕐᓂᖏ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃᑐᐃᑦ ᓄᓇᓕᖓᓄᑦ ᓄᓇᑦᓯᐊᕐᒥ ᐊᒃᓱᐊᓗᒃ ᓴᖏᔫᑦ; ᐊᑕᖓᒪᑕ ᑐᒃᑐᐃᑦ ᐃᓅᓯᖓᓄᑦ ᑕᐅᓴᒐᓴᖕᒋ ᓅᓕᖅᑐᓂᒃ ᐊᕐᕿᒍᓂ ᐊᓂᒍᖅᑐᓂ. ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃᑐᐃᑦ ᐱᑕᖃᕐᓂᖏᑦ ᓄᓇᑦᓯᐊᕐᒥ ᐊᖑᓇᓱᒃᑕᐅᖃᑦᑕᐃᓐᓇᕐᒪᑕ ᓄᓇᓕᑐᖃᕐᓄᑦ ᓄᓇᖃᖅᑐᑐᖃᐅᖏᑦᑐᓄᓪᓗ ᐃᓄᖁᑎᖏᓄᑦ ᑕᒪᐃᓐᓂᒃ ᐊᕕᒃᑐᖅᓯᒪᓂᖏᓂ ᓄᓇᑦᓯᐊᑉ, ᐊᒻᒪᓗ ᓴᓂᓕᕆᔾᖏᓄᑦ ᓄᓇᖃᑎᒋᖏᓄᑦ ᐅᖏᑉ ᑐᓂ ᐊᑭᓂᐊᓂᕐᒥᐅᑕᐅᔭᓂ ᓄᓇᓃᑦ ᐃᓄᖁᑎᖏᓄᑦ (ᓄᓇᕗᒥ, ᓴᔅᑳᑦᓯᐋᓐ, ᒫᓂᑑᐸ ᐊᒻᒪᓗ ᐋᓪᐴᑕᒥ).

ᖁᓕᖕᒋᓗᐊᖅᑑᑦ 9-ᖑᔪᑦ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃᑐᖃᕐᕼᐅᓂᖏ[1] ᓄᓇᒥ ᐅᑕᐅᔪᑦ ᑕᒪᐃᓐᓂᒃ ᑖᓐᓂᖅᑲᑕᐃᓐ ᓇᓲᖑᓂᖏᓂᒃ ᐅᕝᕙᓗᓐ ᓃᑦ ᐃᓚᐃᓐ ᓇᓇᕙᒃ ᑕᖏᓂ ᑖᓐ ᓃᓯᖑᓂᖏᓂᒃ ᓄᓇᑦᓯᐊᕐᒥ. ᑕᐃᒪᖓᓂᒃ, ᑐᒃᑐᖃᖅᐸᖕᓂᖏᑦ ᐊᓯᑉᔨ ᖃᑦᑕᖅᐳᑦ ᐊᒥᕐᓰᕙᖕᓂᖏᓂ ᐊᒥᕐᓰᓂᓇᕙᒃᑕᓂᖏᓗ ᖃᐅᔨᒪᔭᐅᓪᓗᑎᒃ ᓂᑭ ᑖᖃᑦᓂᖏᓂᒃ ᑲᐃᕝᑐᒥᒃ ᓰᖅᓗ ᐊᒥᕐᓯᑯᖅᐸᖕᓂᖏᓂ ᐊᒥᕐᓰᔭᓐᓅᖅᐸᖕᓂᖏᓂᓗ. ᒫᓐᓇᓵᖑᓕᖅᑐᖅ ᐊᒥᕐᓰᔭᓐᓂᖅᓯᒪᓂᖏ ᐊᒃᓯᐊᓗᒃ ᐱᓪᒪᕆᐅᓕᖅᑐᑦ ᑖᓃᓕᖅᓯᑎᒃ 98 ᐳᓴᓐᑎᖕᖏᓂᒃ ᐊᒥᕐᓯᓂᖅᐹᕆᔭ ᐅᕙᓚᐅᖅᑐᓂᒃ. ᑖᓂ ᐊᕐᕿᒍᒥ 2018-ᒥ, ᑐᒃᑐᖏ ᐊᕝᕙᖅᒥ ᐊᒻᒪᓗ ᖁᕐᓗᖅᑑᐸ-ᑲᓇᖕᓇᖕᓂ ᖃᓄᐃᓗᐊᖅᑑᔭᖃᑦᑕᓚᐅᖏ ᑑᓚᓗᐊᑦ ᑭᓯᐊᓂ ᐊᒥᓰᔭᓐᓅᖅᓯᒪᔪᑦ ᓴᓂᐊᓂᒃ ᑕᐃᒪᖕᒫᖅ ᐊᒥᕐᓰᔭᓐᓅᕐᓂᓇᕙᓚᐅᖅᑕᖏᓂᒃ ᐱᓂᖅᐹᖑᓕᖅᑐᒥᒃ. ᑐᒃᑐᔭᖅᑑᐸ ᓄᕗᐊᓂ, ᖁᕐᓗᖅᑑᐸ-ᑲᓇᖕᓇᖕᓂ ᐊᒻᒪᓗ ᕿᓐᖖᐅᒻᒥ ᑐᒃᑐᐃᑦ ᐊᒥᕐᓰᔭᓐᓂᖅᓯᒪᕐᔪᐊᕐᒪᑕ ᐱᒻᒪᕆᐊᓗᖕᒥᒃ. ᑎᑉᔭᓕᖕᒥ ᑐᒃᑐᐃᑦ ᓯᒃᑲᐃᓂᖅᓴᒥᒃ ᐊᒥᕐᓰᓂᖅᐸᓕᓕᐊᓗᑎᒃ ᑕᐃᒃᑯᐊᓗ ᖃᒪᓂ'ᑦ ᑐᐸ ᑐᒃᑐᖏ ᖃᓄᐃᖏᓯᑎᒃ ᐅᕝᕙᓗᓐ ᓃᑦ ᓯᒃᑲᐃᑦᑐᒥᒃ ᐊᒥᕐᓯᔭᓐᓅᕐᐸᓕᓕᐊᓗᑎᒃ. ᑕᒪᒃᑯᐊ ᑐᒃᑐᐃᑦ ᐊᒥᕐᓗᐊᖃᑦ ᑕᖏ ᑐᑐᖃᐅᕕᒥᒃ ᓵᖕᒐᓕᖅᑐᑦ ᐊᑐᖅᑕᐅᓚᐅᖅᓯᒪᖏ ᑐᓂᒃ ᐊᒃᓯᐅᖅᓇᖅᑐᓂᒃ ᐊᒥᕐᓯᓂᒃ ᐅᓗᓇᐊᓇᖅᑐᓂᒃ ᐊᒻᒪᓗ ᐱᕙᓕᐊᔪᓂᒃ ᐊᒃᑐᖅᑕᐅᕙᓕᐊᖕᖁᖅᓂᖏᓂᒃ.

ᑖᒃᑯᐊ ᐊᒥᓯᐅᖅᓰᓂᖅᒧᑦ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴᐃᑦ ᓇᐹᖅᑐᖃᖏᑦ ᑐᒥ ᑐᒃᑐᓂᒃ ᓄᓇᑦᓯᐊᕐᒥ ᓴᓇᔭ ᐅᓯᒪᔫᑦ ᑲᑎᒪᔾᖏᓄᑦ ᐊᐅᓚᑦᑎᔩ ᐅᔭᓇᖅᓂᖅᒥᒃ ᐱᔭᓇᐅᑎᖅᖅᑐᓂ, ᐋᖅᑭᐅᒪᓪᓗᑎᒃ ᐊᖑᒪᔭ ᓇᐊᖅᑲᖅ ᓂᖅ ᖃᓄᐃᓕᐅᕈᑕᐅᔭ ᓇᐊᖅᑲᓕᖅᑐᓂᒃ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃᑐᖏ ᐊᒥᓯᐅᖅᓯᐊᓇᔭ ᐅᓂᖏᓄᑦ ᐊᑐᕐᓗᑎᒃ ᐆᒪᔪᐃᑦ ᐊᒥᕐᓲᖑᐊᕐᓂᖏᓂᒃ (ᓄᓇᑦᓯᐊᕐᒥ) ᒪᓕᒐᕐᓂᒃ. ᐊᒥᓯᐅᖅᓯᐊᓇᔭ ᐅᓂᖏᓄᑦ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴᐃᑦ ᐊᑑᑎᖃᓗᐊᕐ ᓂᐊᖅᑐᑦ ᑲᑐᑉ ᔾ ᖃᑎᒌᖕ ᓂᐊᖅᑐᓂᒃ ᐊᐅᓚᑦᑎᔩ ᐅᖃᑕᐅᔪᓂᒃ ᑲᑎᒪᔾᒐᓴᖏᓂᒃ, ᓄᓇᓕᑐᖃᐃᑦ ᒐᕙᒪᒃ ᑯᖏᓂᒃ ᐊᒻᒪᓗ ᑎᒥᖁᑎᖏᓂᒃ, ᑲᓇᑕᐅᑉ ᐅᑭ ᐅᖅᑕᖅᑐᖅᐸᓯᖕᒐ ᐊᕕᒃᑐᖅᓯᒪᓂᖏ ᓂ/ᑲᓇᑕᐅᑉ ᓂᒋᐊᓂ ᐊᕕᒃᑐᖅᓯᒪᓂᖏ ᓂ/ᑲᓇᑕᐅᓪᓗ ᒐᕙᒪᖏᓂᒃ, ᑐᒃᑐᓂ ᐊᐅᓚᑦᑎᔩ ᐅᓂᖏᒧᑦ ᑲᑎᒪᔾᖏᓂᒃ ᐊᒻᒪᓗ ᓄᓇᓕᖕᓂᒃ.

ᑕᒪᒃ ᑯᐊ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴᐃᑦ ᑐᑭᓕᐅᕈᑕᐅᔪᑦ ᑕᒪᐃᓐᓂᒃ ᑐᕌᒐᓕᐅᔾᔭ ᐅᓂᖏᓂᒃ, ᐱᔾᔪᑎᖅᑕᐅᓯᐊᑦ ᓂᐊᖅᑐᓂᒃ, ᐊᒻᒪᓗ ᖃᓄᐃᓕᑎᑕᐅᔪᒪᔪᓂᒃ ᓇᓗᓇᐃᔾ ᐃᓂᖏᓄᑦ ᓴᐳᓐ ᓂᐊᖅᑕᐅᓯᒪᔾᔭᓇᐊᖅᑲᖅ ᓂᖏᓂᒃ ᐊᒻᒪᓗ ᐊᒥᓯᐅᒃ ᑲᓐ ᓂᐅᓐ ᓇᖅᑰᓗᒋᑦ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᐃᑦ ᓄᓇᑦᓯᐊᕐᒥ. ᐊᑯᓂᐅᓂᐊᖅᑐᒧᑦ ᑕᐅᑐᒐᓴᐅᔪᑦ ᑖᒃ ᑯᓇᓂ ᖃᓄᐃᓕᐅᕈᑎᒃ ᓴᓂᒃ ᐱᔾ ᔪᑎᖅᖅᐳᑦ ᓴᐳᓐ ᓂᐊᖅᑕᐅᖁᔾ ᓂᖅ ᓇᓛᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑕᐃᑦ ᑐᒃ ᑐᖏᓂᒃ ᐊᒻᒪᓗ ᐅᔾ ᔾ ᖅᑐᑦ ᑎᐊᕈᒪᓂᖏ ᒧᑦ ᓇᓛᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃᑐᐃᑦ

---

[1] ᖃᐅᔾᓴᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᐅᔾᔭᐅᔪᑦ ᑎᒃ ᑯᐊᖅᓯ ᓗᑕᐅᔫᑦ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᖏᓂᒃ ᑕᐃᒃ ᑯᓄᖕᒐ ᐃᓕᑕᕆᔭᐅᔪᓇᕐ ᓂᖏᓂᒃ ᐊᒻᒪᓗ ᐃᖕᒥᒎᖕᒐᖏᓂᒃ ᓄᕐ ᕆᕕᒋᕙᒃ ᑕᖏ. ᓄᓇᓕᑐᖃᐃᑦ ᖃᐅᔾᒪᔾ ᑕᕆᔭᖏ ᓄᓇᓕᑐᖃᐃᓪᓗ ᓄᓇᖏ ᐊᐟ ᔾ ᒋᖏ ᑑᑎᐅᔪᓂᒃ ᑐᑭ ᖅᑎᑦ ᑎᓖᖑᔪᑦ ᑐᒃ ᑐᐃᖃᕐ ᕼᐅᓂᖅᐃᓂᖅ ᒥᓂᒃ: ᐃᓚᖏ ᐊᐟ ᔾ ᒌ ᖃᑦ ᑕᖏ ᓂᖏ ᓂᒃ ᑐᒃ ᑐᐃᑦ ᐊᒥᓯᓂᒃ ᖃᓗᐃᓕᐅᕈᓯ ᖃᖅ ᓂᖏ ᓂᒃ (ᓇᒧᖕᐅᕙᖕ ᓂᖏ ᓂᒃ, ᓇᐅᑰ ᖃᑦ ᓂᖏ ᓂᒃ ᓄᓇᐃᑦ ᐊᖏᓂᖏ ᓂᒃ, ᑕᖅᓴᖃᖅ ᓂᖏ ᓂᒃ/ᑎᒥ ᖕᒐ ᐊᖏᓂᖏ ᓂᒃ/ᑎᒥ ᖕᒐ ᖃᓄᐃᓕᖕᒐᓂᖏ ᓂᒃ ᐊᒻᒪᓗ ᓂᕿᑦ ᑎᐱᖃᖏ ᓂᖏ ᓂᒃ), ᐊᔾ ᖏᓗ ᐃᓕᑕᖅᓯᓯᒪᔾ ᖑᓗᑎᒃ ᓇᐹᖅᑐᖃᖏᑦ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᖏᓂᒃ ᐃᓚᒋᔭ ᐅᕙᖕ ᓂᖏ ᓂᒃ ᐊᔾ ᖏ ᓄᑦ ᐃᖕᒥᒎ ᖕᒐᕙᒃ ᑐᓄᑦ ᓗᓐ ᓃᑦ, ᑲᑎᖕᖑᖅᐸᒃ ᑐᓄᑦ ᓗᓐ ᓃᑦ.

ᐱᑕᖃᐃᓐ ᓇᓇᐊᖃᕐᓂᖕᒥ ᐱᒻᒪᕆᐅᓂᖕᒋᓄᑦ ᐃᓕᖅᑯᓯᑐᖃᕆᔭᐅᔪᓄᓐᓄ ᐊᕙᑎᓄᑦ, ᐊᕙᑎᒥ ᐅᑕᓄᓐᓄ ᐆᒪᔪᖁᑎᒋᔭᐅᓂᖕᒋᓄᑦ. ᑕᐅᑐᖓᓇᔭᐅᔪᑦ ᖃᓄᐃᓕᐅᕈᒪᓂᕐᒧᑦ ᐃᓚᖃᕆᕗᑦ ᐅᔾᔨᖅᑐᑦ ᑎᐊᓇᐊᖃᕐᓂᖅ ᓇᐹᖅᑐᖃᕐᑐᖅᒥᐅᑦ ᑐᒃᑐᐃᑦ ᓇᒧᑐᐃᓐ ᓈᕈᓐ ᓇᓇᐊᖃᕐᓂᖕᒥ ᓄᓇᒥ, ᓇᔪᒐᓇᕙᒃᑕᐅᖅᓇᔭᖕᒥᓂ ᑕᐃᒫᒃ ᐱᐅᓯᑐᖃᕐᒥᓂᒃ ᐊᑐᓐᓇᕐᓂᐊᕐᒪᑕ ᐊᒻᒪᓗ ᓄᑦᑐᓐᓇᖃᑦᑕᐃᓐᓇᕐᓗᑎᒃ ᓅᕚᒥᖃᑦᑕᖅᑕᐅᖅᓇᔭᒥᓄᑦ. ᑕᒪᐃᓐᓂᒃ ᑐᕋᒐᖃᖅᐳᑦ ᒪᑯᓂᖓ ᐊᒥᓱᕈᖅᓯᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕈᑎᖃᕐᓂᖕᓂ:

1. ᐋᖅᑭᐅᒪᑎᑦᑎᓂᖅ ᐅᕝᕙᓗᓐᓃᑦ ᐊᔪᕈᓐᓂᖅᑎᑦᑎᓂᖅ ᐃᖕᒥᓂᒃ ᖃᓄᐃᖕᒥᑐᓐᓇᖅᓂᖕᓂᓂᒃ, ᖄᖕᑭᐅᑎᔪᓐᓇᖃᑦᑕᖅᓂᐊᖅᑐᓂᒃ ᐊᒥᒃᓲᓂᖕᓂᓂᒃ ᑕᐃᒃᑯᐊ ᓇᐹᖅᑐᖃᕐᑐᖅᒥᐅᑦ ᑐᒃᑐᐃᑦ, ᑕᐃᒫᒃ ᓴᓗᐃᓴᐅᓂᐊᕐᓂᒪᑕ ᑐᒃᑐᖃᖅ ᐱᐅᕙᓐᓂᖕᒥ.
2. ᐃᑲᔪᖅᓯᐃᓂᖅ ᐊᓪᕕᐊᖁᑕᖅᑐᖅᑐᓂᒃ ᓇᒧᖕᐅᕕᖅᑭᓐᓇᕐᓂᖕᓂᓂᒃ ᐊᒻᒪᓗ ᐅᖕᒍᕝᑐᒧᑦ ᓅᑉᐸᓕᐊᖅᑕᑭᓐᓇᕐᓂᖕᓂᓂᒃ ᓇᐹᖅᑐᖃᕐᑐᖅᒥᐅᑦ ᑐᒃᑐᖅᒥ ᓇᔪᒐᓇᕙᒃᑕᐅᖅᓈᓐᓇᖅᑕᖕᕈᓂᒃ ᓄᓇᓂᒃ.
3. ᐊᑐᓕᖅᑎᑦᑎᕙᓕᓕᐊᓂᖅ ᐃᓅᖃᑎᒌᒃᑐᓂ, ᐃᓕᖅᑯᓯᑐᖃᕐᓂ ᐊᒻᒪᓗ ᐃᓅᔾᔪᑎᒃ ᓴᓇᕙᒃᑕᕐᓂ ᖃᓄᐃᓕᖕᕙᖃᓐᓇᕐᓂᖕᓂᓂᒃ ᑕᐃᒪ ᐃᑕᓇᐊᖃᖅᑐᓂ ᐊᒥᓱᕈᖅᐸᓕᓕᐊᔪᓐᓇᕐᓂᐊᕐᒪᑕ ᑐᒃᑐᐃᑦ.

ᖃᓄᐃᓕᐅᕈᑎᑦ ᓴᐃᑦ ᐃᓕᑕᖅᓯᓯᒪᔫᑦ ᓇᓕᐊᖕᓄᑦ ᑐᕋᖕᖑᑐᕐᓂᖕᓂᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᑦ ᓴᐃᑦ ᐱᒻᒪᕆᐅᓂᐊᕐᒪᑕ ᑐᑭᓕᐅᕈᑕᐅᓂᕐᒧᑦ ᓇᐅᑦᑎᖅᑐᖅᑕᐅᕙᓕᓕᐊᔭᓇᐊᖃᕐᓂᖕᓂᓄᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑕᐅᑦᑎᐊᓇᐊᖃᕐᓂᖕᓂᓄᑦ ᒪᓕᒐᖃᕈᑕᐅᓂᖕᒋ. ᐃᓕᑕᓇᔪᐅᒥᕗᑦ ᑕᐃᒃᑯᐊ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᐅᕈᑕᐅᓂᐊᖅᑐᑦ ᓄᓇᑦᓯᐊᕐᒥ ᑐᒃᑐᓕᕆᓂᕐᒧᑦ ᓇᐹᖅᑐᖃᕐᑐᖅᒥᐅᑕᐅᔪᓂᒃ ᐊᐅᓚᑕᐅᓴᕆᐊᖃᕐᓂᖕᓂᓂᒃ ᑲᑐᑦᔨᖅᑎᒡᒍᑎᒃ ᐊᐅᓚᑦᑎᔾᔪᑎᒃ ᐅᖃᑕᐅᔪᓐᓇᕐᓂᖕᒥ ᑲᑎᒪᔩᑦ, ᓄᓇᓕᖕᑐᖃᐃᑦ ᓚᕝᒪᒃᑯᖕᒥ ᐊᒻᒪᓗ ᑎᒥᖁᑎᖕᒥ, ᑲᓇᑕᐅᑉ ᐅᑭᐅᖅᑕᖅᑐᑉᓯᕗᓪᓕ ᐊᕕᒃᑐᖅᓯᒪᓂᖕᒋᓂ/ᑲᓇᑕᐅᑉ ᓂᒋᐊᓂ ᐊᕕᒃᑐᖅᓯᒪᓂᖕᒋᓂ/ᑲᓇᑕᐅᓐᓄ ᓚᕝᒪᒃᖏᖅᓂᒃ, ᑐᒃᑐᓂᒃ ᐊᐅᓚᑦᑎᔾᔪᑎᖅᓄᑦ ᑲᑎᒪᔩᖕᓂᒃ ᐊᒻᒪᓗ ᓄᓇᓕᖕᓂᒃ ᐃᓂᖃᖅᑐᓂᒃ ᑐᒃᑐᖅᕕᐅᕙᒃᑐᓂ ᖃᓂᒋᔭᖕᓂᓗᓐᓃᑦ ᓖᓐᓇᐅᔭᖅᑕᐃᑦᓯᒪᓂᓗ ᑐᒃᑐᖅᕕᐅᔭᑐᖃᐅᕙᖕᓂᖕᓂᓂᒃ, ᑕᒪᒃᑯᐊ ᓇᐹᖅᑐᖃᕐᑐᖅᒥᐅᑕᐅᔪᓂᒃ ᑐᒃᑐᐃᑦ ᐱᒻᒪᕆᐅᓂᖃᐃᓐᓇᖅᑎᓕᐅᖅ ᐃᓄᖃᑎᒌᒃᑐᓄᑦ, ᐃᓕᖅᑯᓯᑐᖃᕐᒧᑦ, ᐅᒃᐱᑎᓴᑐᖃᕐᒧᑦ ᐊᒻᒪᓗ ᐃᓅᔾᔪᑎᒃᓴᕈᑕᐅᕙᖕᓂᖕᓂᒧᑦ.

ᑖᒃᑯᐊ ᖃᓄᐃᓕᐅᕈᑎᑦ ᓴᐃᑦ ᐊᑐᕐᓂᐊᖅᐳᑦ ᒪᑯᓂᖓ ᐱᓴᓇᖅᑕᐅᓯᐊᖅᐅᔪᓂᒃ ᐊᒻᒪᓗ ᖃᓄᐃᓕᖕᐅᓯᐊᖅᐅᓂᖕᓂᓂᒃ:

ᐱᓴᓇᖅᑕᐅᓯᒪᔭᒃᓴᖅ 1: ᐃᓚᒋᓪᓗᑎᒃ ᑲᑐᑦᔨᖅᑎᖕᓂᐊᖅᑐᑦ ᓴᓇᓴᐅᓂᖕᓂ ᐊᑐᓕᖅᑎᑕᐅᓂᖕᓂᓗ ᐊᐅᓚᑦᑎᑦᔪᑎᒃᓴᐃᑦ, ᓇᐅᑦᑎᖅᑐᐃᕙᓕᓕᐊᑦᔪᑎᒃᓴᐃᑦ, ᒥᐊᓂᕆᔾᔪᑎᒃᓴᐃᑦ, ᓴᐳᓐᓂᐊᕈᑎᒃᓴᓄᓐᓄ ᐸᕐᓇᐅᑎᑦ ᓇᐹᖅᑐᖃᕐᑐᖅᒥᐅᑕᐅᔪᓄᑦ ᑐᒃᑐᓄᑦ ᓄᓇᑦᓯᐊᕐᒥ.

ᖃᓄᐃᓕᐅᕐᓗᑎᒃ 1.1: ᐊᑐᓕᖅᑎᑦᑎᓗᑎᑦ ᓇᓕᐊᖕᓄᓐᓄ ᓗᑐᖅ ᑐᒃᑐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᓂᒃ ᑐᒃᑐᖕᓂᓂᒃ ᐊᕙᖅᒥ, ᖁᓗᖅᑑᑉ -ᐱᖕᖑᕐ ᓇᖕᖏᓂ, ᖁᕐᓗᖅᑐᑉ -ᑲ ᓇᖕ ᓇᖕᖏᓂ, ᑎᐸᔭᓕᖕᒥ ᐊᒻᒪᓗ ᖃᒪᓂᑦᑐᐊᑉ ᑐᒃᑐᖕᓂᒃ, ᐊᒥᓱᕈᖅᓯᐊᓇᔭᐅᓂᖕᓂᓄᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖕᓂᓗ ᑐᒃᑐᖅᕕᐅᕙᒃᑐᑐᖃᐃᑦ ᓄᓇᖕᒥ.

ᖃᓄᐃᓕᐅᕐᓗᑎᒃ 1.2: ᐱᓴᓇᖅᑕᐅᓗᑎᒃ ᐊᑐᓕᖅᑎᑕᐅᓗᑎᒃ ᓗ ᓇᓕᐊᖕᓄᑦ ᑐᕋᖕᖑᑐᖅᑐᑦ ᑐᒃᑐᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᑦ ᓴᐃᑦ ᑐᒃᑐᓴᖅᑑᑉ ᓄᕙᐊᓂ ᐊᒻᒪᓗ ᕿᓐᖑᐊᑉ ᑐᒃᑐᖕᓂᓂᒃ ᐊᒥᓱᕈᖅᓯᐊᓇᔭᐅᓂᖕᓂᓄᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖕᓂᓗ ᑐᒃᑐᖅᕕᐅᕙᒃᑐᑐᖃᐃᑦ ᓄᓇᖕᒥ.

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 1.3: ᑲᔪᓯᔪᒥᒃ ᐱᓕᕆᖃᑎᖃᐃᓐ ᓇᑦ ᓗᑎᒃ ᓄᓇᕗᒻ ᒥᐅᓂᒃ ᐃᓚᒋ ᓂᐊᖅᑕᖏᓐ ᓂᒃ ᐋᓗᑎᖃᑦ ᑎᐊᑦ ᓂᐊᖅᑐᓂᒃ ᓴᐳᓐ ᓂᐊᖅᑕᐅᓂᖏᓐ ᓄᑦ ᐊHᐃᐊᑉ ᑐᒃ ᑐᖏᓐ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 1.4: ᕿᒥ ᑦ ᖁᐊᖅᑕᐅᓂᖏᓐ ᓄᑖᖁ ᕆᐊᖅᑕᐅᓂᖏᓐ ᓗ ᓇᓪ ᓕᐊᖕ ᓄᑦ ᑐᕌᖑᓛ ᓗᑐᖅᑐᑦ ᑐᒃ ᑐᓂᒃ ᐊᐅᓚᑦ ᑎᓂᑦ ᒧᑦ ᐸᑦ ᓇᐅᑏᑦ ᐱᑕᖃᕆᐊᖃᑦ ᓂᖏᓐ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 1.5: ᐃᑲᔪ ᖅᓱ ᐃᓗᑎᒃ ᓄᓇᓕᖕ ᒥᐅᑕᓄᑦ -ᓴ ᓇᔮ ᐅᓯ ᒪ ᔪ ᓂᒃ ᓇᐹᖅᑐᖃᖏᓐ ᑐᑦ ᒥ ᐅᑦ ᑐᒃ ᑐᖏᓐ ᓂᒃ ᓇᐅᑦ ᑎᖅᑐᐃᓂᑦ ᒧᑦ , ᒥ ᐊᓂᕆᔾ ᐅᓂᑦ ᒧᑦ ᐊᒻ ᒪ ᓗ ᓴ ᐳᓐ ᓂᐊᖅᑕᐅᓂᖏᓐ ᓄᑦ ᐸᑦ ᓇᐅᑎᓕᐊᕆᔮ ᐅᔪ ᓂᒃ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 1.6: ᐱᓕᕆᐊᖑᐃᓐ ᓇᑦ ᓗᑎᒃ ᓈᒪ ᔪ ᓂᒃ ᐊᑐᒐ ᒃ ᓴ ᖃᕆᐊᖃᑦ ᓂᖏᓐ ᑆ ᓇᐅᔮ ᓂᒃ ᐊᒻ ᒪ ᓗ ᑲᔪᓯᔪᒥᒃ ᐃᑲᔪ ᖅᓱ ᖅᑕᐅᖏᓐ ᓇᑦ ᓗᑎᒃ ᒐ ᕙᒪ ᒃ ᑯ ᓐ ᓄᑦ ᐊᓯ ᖏᓄᓪ ᓗ ᐃᓚᒋ ᕙᖕ ᓂᐊᖅᑕᖏᓐ ᓄᑦ (ᑕᐃᒃ ᑯ ᓇᖕᖑ ᓗ ᓄᓇᒥ ᐱᕙᓪ ᓕᐊᔪ ᓕᕆᔾ ᐅᕝᕙᒃ ᑐᓄᑦ , ᐊᐅᓚᑦ ᑎᔾ ᐅᖃᑕᐅᕙᒃ ᑐᓂᒃ ᐊᒻ ᒪ ᓗ ᒪ ᓕᒐ ᓪ ᓗᑐᑦ ᓂᒃ ᑲ ᑎᒪ ᔾ ᐅᕙᒃ ᑐᓂᒃ , ᐊᒻ ᒪ ᓗ ᒐ ᕙᒪ ᐅᖏᓐ ᑐᓂᒃ ᑎᒥ ᖁᑎᒋ ᔭ ᐅᔪ ᓂᒃ) ᐊᑐᓕᖅ ᑎᑕᐅᓂᖏᓐ ᓄᑦ ᑕᒪ ᒃ ᑯᐊ ᐊᒥ ᓱ ᖁ ᖅ ᔫ ᓂᑦ ᒧᑦ ᖃᓄᐃᖁ ᑎᒃ ᓴ ᓂᒃ ᐊᐅᓚᑦ ᑎᕐ ᔪ ᑎᒃ ᓴ ᓂᒡ ᓗ, ᓇᐅᑦ ᑎᖅᑐᐃᓂᑦ ᒧᑦ , ᒥ ᐊᓂᕆᔾ ᐅᖃᑕᐅᓂᑦ ᒧᑦ , ᐊᒻ ᒪ ᓗ ᓴ ᐳᓐ ᓂᐊᖅ ᑎᐅᖃᑕᐅᓂᑦ ᒧᑦ ᐸᑦ ᓇᐅᑎᖕᖏ ᓂᒃ ᐅᖃᐅᓯ ᐅᓯ ᒪ ᔪ ᑦ ᐊᑐᖅ ᑕᐅᓗᑎᒃ ᖃᓄᐃᓕᐅᖁ ᑕᐅᓂᐊᖅ ᑐᑦ ᓈᔅ ᓴ ᐅᑎᓖᑦ 1.1-ᒥ ᒃ 1.5- ᒧᑦ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 1.7: ᐊᖏ ᓕᒋ ᐊᖅ ᑕᐅᓗᑎᒃ ᐊᔪ ᖏ ᓂᖃᕿ ᓐ ᓇᑦ ᓂᖏᓐ ᓄᓇᓕᑐᖃᐃᑦ ᐃᓚᒋ ᔮ ᐅᖃᑕᕿ ᓐ ᓇᑦ ᓂᖅ , ᐃᓚᐅᖃᑦ ᓗᑎᒃ ᓇᓕᒧ ᒋ ᔮ ᐅᔪ ᒥ ᒃ ᐊᒻ ᒪ ᓗ ᐋᑎᖃᑦ ᑎᐊᑦ ᓂᐊᖅᑐᓂᒃ ᐳᓐ ᓂᐊᖅ ᑎᐅᓂᑦ ᒥ ᒃ ᓇᐹᖅᑐᖃᖏᓐ ᑐᑦ ᒥ ᐅᑦ ᑐᒃ ᑐᖏ ᓂᒃ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 1.8: ᐱᓕᕆᖃᑎᒋ ᓗᒋ ᑦ ᐱᕙᓪ ᓕᐊᓂᖏ ᓂ ᐊᑐᓕᖅ ᑎᑕᐅᓂᖏ ᓂᓗ ᑲ ᓇᑕᓕᒫ ᒥ ᓇᐹᖅᑐᖃᖏ ᓂᑦ ᒥ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᓱ ᖁ ᖅ ᓯ ᐊᕆᔮ ᐅᓂᖏ ᓄᑦ ᖃᓄᐃᓕᐅᖁ ᑎᒃ ᓴ ᐃᑦ , ᐃᓚᖃᑦ ᓗᑎᒃ ᐃᓕᑕᕆᔮ ᐅᓂᖏ ᓂᒃ ᓴ ᐳᓐ ᓂᐊᖅᑕᐅᓂᖏ ᓗ ᐱᑕᖃᕆᐊᖃᒻ ᒪ ᕆᒃ ᑐᑦ ᓄᓇᐃᑦ ᓇᔪ ᒐ ᕆᔮ ᐅᕝᕙᒃ ᑐᑐᖃᐃᑦ ᑐᒃ ᑐᓄᑦ , ᑐᑭ ᓕᐅᖅ ᑕᐅᓗᑎᒡ ᓗ ᑐᒃ ᑐᐃᑦ ᐊᒥ ᔅ ᓰ ᓂᖏᓐ ᐊᒻ ᒪ ᓗ ᓇᓃᑐᓐ ᓇᑦ ᓂᖏᓐ ᐱᓕᕆᐊᖑᓂᐊᖅ ᑐᑦ .

ᐱᔭ ᕇᖅ ᑕᐅᔪ ᒃ ᓴ ᖅ 2: ᓇᐅᑦ ᑎᖅ ᑐᖅ ᑕᐅᕙᓪ ᓕᐊᖕ ᓇᑦ ᓂᖏᓐ ᓇᐹᖅᑐᖃᖏᓐ ᑐᑦ ᒥ ᐅᑦ ᑐᒃ ᑐᐃᑦ , ᓇᔪ ᖅ ᐸᒃ ᑕᖕ ᓗ ᓄᓇᐃᑦ ᐊᒻ ᒪ ᓗ ᐱᒻ ᒪ ᕆᐅᓂᖏᓐ ᐱᔅ ᔪ ᑕᐅᔪ ᑦ ᐊᒻ ᒪ ᓗ ᐅᓗᕆᐊᓇᖅ ᑕᐅᔪ ᑦ ᐊᒃ ᑐᐃᔪ ᓐ ᓇᑦ ᓂᖅ ᖃᓄᐃᓂᖓᓂᖕ ᓄᑦ ᐊᒻ ᒪ ᓗ ᖃᓄᐃᑦᑯ ᐅᖕᖏᖏᓐ ᑐᒃ ᑐᐃᑦ ᓄᓇᑦ ᓯ ᐊᑦ ᒥ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 2.1: ᓇᐅᑦ ᑎᖅ ᑐᖅ ᑕᐅᕙᓪ ᓕᐊᖕ ᓇᑦ ᓗᑎᒃ ᐊᒥ ᔅ ᓰ ᓂᖏᓐ , ᖃᓄᐃᓕᕙᓪ ᓕᐊᓂᖏᓐ , ᖃᓄᐃᖕ ᓂᖕ ᓗ ᑕᒪ ᐃᓐ ᓂ ᓄᓇᑦ ᓯ ᐊᑦ ᒥ ᓇᐹᖅᑐᖃᖏᓐ ᑐᑦ ᒥ ᐅᑦ ᑐᒃ ᑐᖃᑦ ᕼᐅᓂᖏᓐ .

ᖃᓄᐃᓕᐅᑦ ᓗᑎᒃ 2.2: ᓇᐅᑦ ᑎᖅ ᑐᖅ ᑕᐅᕙᓪ ᓕᐊᖕ ᓇᑦ ᓗᑎᒃ ᑐᒃ ᑐᓯ ᐅᖅ ᐸᒃ ᑐᑦ ᐆᒪ ᔪ ᐃᑦ ᐊᒃ ᑐᖅ ᓯ ᓯ ᒪ ᔪ ᓐ ᓇᖅ ᑐᑦ ᓇᐹᖅᑐᖃᖏᓐ ᑐᑦ ᒥ ᐅᑕᓂᒃ ᑐᒃ ᑐᓂᒃ , ᖃᐅᔾ ᓴ ᖅ ᑕᐅᖃᑦ ᓗᑎᒃ ᐊᑕᖃᑎᑏ ᔩ ᖑᓂᖏᓐ ᐆᒪ ᔪ ᐃᑦ

ᑐᒃ ᑐᓯ ᐅᖅᐸᓐ ᓂᖏ ᓂᕿᒃ ᓴᒥᓄᑦ-ᑐᒃ ᑐᐃᓪᓗ ᐊᒻᒪᓗ ᖃᓄᑎᒋ
ᑐᒃ ᑐᕕᐅᕙᓐ ᓂᖏ ᑕᒪᒃ ᑯᓄᖓ

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 2.3: ᓇᐅᑦ ᑎᖅᑐᖅᑕᐅᓗᑎᒃ ᐊᒃ ᑐᖅᑕᐅᓯᒪᔭᓐᓇᕐ ᓂᖏ ᐊᓯᖏᓄᑦ ᐱᔅᔭᑕᐅᔭᓐᓇᖅᑐᓄᑦ ᓇᐹᖅᑐᖃᖏ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᖏᓂᒃ ᐊᒻᒪᓗ ᓇᔭᖅᐸᒃ ᑕᖏᓂᒃ ᓄᓇᓂᒃ, ᑕᒪᒃ ᓂᖓ ᓰᕐ ᓗ ᐆᒃ ᑑᑎᒋᓗᒋᑦ, ᖃᓂᒪ ᓕᕈᑕᐅᔭᓐᓇᕐ ᓂᖏ ᑐᒃ ᑐᓄᑦ, ᑯᒪ ᖃᓕᕈᓐᓇᕐᖏ, ᖁᐱᕐ ᕈᕆᓴ ᐃᑦ, ᐊᓇᖕ ᒌᓪ ᓗᓐ ᓅᑦ, ᕿᒃ ᑐᓇᐊᓪ ᓗᓐ ᓅᑦ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᔅᔨᖅᐸᓪᓕᐊᓂᖓ

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 2.4: ᓇᐅᑦ ᑎᖅᑐᖅᑕᐅᓗᑎᒃ ᐊᓯᔅᔨᖅᐸᓪᓕᐊᓂᖏ ᓇᔭᒐᓇᙵᒃ ᑕᖏ ᓂ ᓄᓇᖏ ᑕ ᐱᐅᔫ ᓂᖏ, ᐱᑕᖃᑦ ᑎᐊᕐ ᓂᖏ ᐊᒻᒪᓗ ᐊᑐᐃᓐᓇᐅᔭᓐᓇᕐ ᓂᖏ ᑐᒃ ᑐᓄᑦ ᐱᐅᓯ ᑐᖃᕐ ᒥᔪᑦ ᐊᒻᒪᓗ ᐃᓄᖕᓄᑦ ᐱᔅᔭᑕᐅᔭ ᓂᒃ ᐊᓯᔅᔨᖅᑕᐅᕙᓪᓕᐊᓂᖏᓂᒃ ᓄᓇᐃᑦ ᓇᔭᒐᓇᙵᒃ ᑕᖏ.

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 2.5: ᓇᐅᑦ ᑎᖅᑐᖅᑕᐅᓗᑎᒃ ᖃᓄᐃᓕᖑᓂᖏ ᐊᑕᖃᑎᒌᖕ ᓂᖏ ᐃᓄᐃᓪᓗ ᐊᓪᓚᐃᓪᓗ ᑐᒃ ᑐᐃᓪᓗ ᓇᓗᓇᐃᒃ ᑯᑕᓇᔅ ᐅᔭᓐᓇᕐ ᓂᕐᒧᑦ ᑐᒃ ᑐᐃᑦ ᖃᓄᐃᓂᖏᓄᑦ.

ᐱᔾᓅᖅᑕᐅᔭᒃᓴᖅ 3: ᖃᐅᔨᒪᔭᐅᖏ ᓂᖏ ᖃᐅᔨᔭᐅᕙᓪᓕᐊᓗᑎᒃ, ᐊᑐᕐᓗᑎᒃ ᐃᓄᐃᑦ/ᐊᓪᓚᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏ ᓂᒃ, ᓄᓇᓕᑦ ᖃᐅᔨᒪᔭᖏ ᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᓴᖅᑎᑦ ᖃᐅᔨᒪᔭᖏ ᓂᒃ, ᐱᐅᓯᒋᐊᕈᑕᐅᔭᓐᓇᕐ ᓂᖏ ᓂᒃ ᑲᒪᔨᐅᑦ ᑎᐊᓇᐊᖃᕐ ᓂᖏ ᓄᑦ ᐊᒻᒪᓗ ᐃᒃ ᐱᒋᔭᐅᑦ ᑎᐊᓇᐊᖃᕐ ᓂᖏ ᓄᑦ ᓇᐹᖅᑐᖃᖏ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᐃᑦ ᓴᐳᓐᓂᐊᖅᑕᐅᓇᓯᖕ ᓂᖏ.

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 3.1: ᓄᑖᕈᓇᐊᖅᑕᐅᖃᑦᑕᕐᓘᑎᒃ ᐅᕝᕙᓗᓐᓅᑦ ᓴᓇᔭᐅᑦ ᑎᐊᒃ ᑕᑲ ᓂᖃᑕᕐᓘᑎᒃ ᐊᒥᔅᓰ ᓂᖏ ᓂᒃ ᐃᔅᔭᐊᖅᓯᓯᒪᔅᔭᑏᑦ ᐊᑐᖅᑕᐅᙱᓐ ᓂᖏ ᓄᑦ ᒦᓐᓇᐅᔭᖅ ᖃᐅᔨᔭᐅᕙᓪᓕᐊᔭᑦ.

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 3.2: ᐊᑐᓕᖅᑎᑦ ᑎᙵᓕᐊᖁᔨ ᓂᖅᒧᑦ ᑲᑎᖅᓯ ᐃᕕᐅᔭᓐᓇᕐ ᓂᖏ ᓂᒃ ᐊᒻᒪᓗ ᑐᓂᓯ ᖃᑦ ᑕᐅᑎᔭᓐᓇᕐ ᓂᖏ ᓂ ᖃᐅᔨᒪᔅ ᔭᑎᒃ ᓴᓇᔭᐅᓂᐊᖅᑐᓂᒃ ᑐᒃ ᑐᐃᑦ ᐊᕙᑎᒥ ᐱᑕᖃᑦ ᓂᖏ ᓂᒃ, ᖃᓄᐃᓕᖑᓂᖏ ᓂᒃ ᐊᒻᒪᓗ ᑐᓂᓯ ᖃᑕᐅᑎᔭᓐ ᓴᕐ ᓂᖏ ᓂᒃ ᑐᒃ ᑐᓄᑦ ᐅᓗᓇᐊᓇᕈᑕᐅᙱᑦ ᑐᓂᒃ.

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 3.3: ᐊᑐᓕᖅᑎᑦ ᑎᙵᓕᐊᖁᔨ ᓂᖅᒧᑦ ᑲᑎᖅᓯ ᐃᕝᕕᐅᔭᓐᓇᕐ ᓂᖏ ᓂᒃ ᐊᒻᒪᓗ ᑐᓂᓯ ᖃᑕᐅᑎᔭᓐᓇᕐ ᓂᖏ ᓂ ᖃᐅᔨᒪᔅ ᔭᑎᒃ ᓴᐅᔭᓐᓇᓯ ᖅᑐᓂᒃ ᐱᔅ ᔭᑎᖃᖅᑐᓂᒃ ᐱᑕᖃᔮ ᖑᓂᖏ ᓂ ᖃᓄᐃᓕᖑᓂᖏ ᓂᒃ ᓇᐹᖅᑐᖃᖏ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᐃᑦ, ᑐᒃ ᑐᓂᒃ ᐆᒪᔭᐃᑦ ᓂᒃ ᓴᖅᓯᐅᖅᐸᓐ ᓂᖏ ᓂᒃ ᐊᒻᒪᓗ ᑕᒪ ᐃᓐ ᓂᒃ ᐊᕙᑐᖏ ᓂᒃ ᖃᓄᐃᓕᖑᓂᖏ ᓂᒃ.

ᖃᓄᐃᓕᐅᕐᓘᑎᒃ 3.4: ᖃᐅᔨᓴᖃᑦ ᓘᑎᒃ ᐱᕙᓪᓕᐊᖏ ᓇᖅᑐᓂᒃ ᐊᒃ ᑐᖅᑕᐅᕙᓪᓕᐊᓂᖏ ᓂᒃ ᐱᐅᓯ ᑐᖃᕐ ᒥᔪᓄᑦ ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᐱᓕᕆᕙᓐ ᓂᖏ ᓄᑦ ᓄᓇᒥᒃ ᐊᓯ ᔩ ᓂᕐ ᒥᒃ ᓇᐹᖅᑐᖃᖏ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᖏ ᓂᒃ ᐊᒻᒪᓗ ᓇᔭᒐᓇᙵᒃ ᑕᖏ ᓂᒃ.

ᐱᔾᓅᖅᑕᐅᔭᒃᓴᖅ 4: ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖏ ᖃᓄᐃᓕᔭᐅᓂᖅ ᓗᒃ ᑕᐃᓕᒪᓂᖏ ᓗ ᓇᐹᖅᑐᖃᖏ ᑐᕐᒥᐅᑦ ᑐᒃ ᑐᐃᑦ ᐊᒥᓰ ᓂᖏ ᐊᒻᒪᓗ ᓇᔭᖅᐸᒃ ᑕᖏ ᓄᓇᐃᑦ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.1: ᐱᓕᕆᖃᑎᒋᓗᒋᑦ ᓄᓇᒥ ᐱᕙᓪᓕᐊᔪᓕᕆᔨᐅᔭᒃᑐᑦ, ᒐᕙᒪᐃᓪᓗ, ᐊᐅᓚᑦᑎᓯᐅᖃᑕᐅᔪᓪᓗ ᑲᑎᒪᔨᖏᑦ ᐊᒻᒪᓗ ᒪᓕᒐᓪᓗᑐᖅᓂᒃ ᒪᓕᒐᓕᕆᓃᑦ ᓴᓇᔭᐅᓂᖕᖏᓂ ᐊᑐᕐᑎᑕᐅᓂᖕᖏᓂᓗ ᐱᐅᓂᖅᐹᖑᓂᐊᖅᑐᓂᒃ ᐱᐅᓯᕆᔭᐅᓂᐊᖅᑐᑦ ᐊᒃᑐᑕᐅᓗᐊᓃᒃ ᑯᑎᒃ ᓴᐅᓂᐊᖅᑐᓄᑦ ᐃᓄᐃᑦ ᓄᓇᒥ ᐊᑐᖃᑦᑕᖅᓂᖏᓄᑦ ᑕᒫᓂ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑦ ᑐᒃᑐᖃᖅᑯᐅᓂᖏᓂ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.2: ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᐅᕙᓪᓗᑎᒃ ᑲᒪᒋᔭᐅᔪᓐᓇᖅᓂᖏᓂᒃ ᑐᒃᑐᓯᐅᖅᐸᒃᑐᑦ ᓂᖁᒃᓴᖃᓲᑦ ᐆᒪᔪᐃᑦ ᐊᐅᓚᑦᑕᐅᓂᖏᓄᑦ ᐊᑐᖅᑕᐅᖕᒎᕈᓇᖅᑐᓂᒃ ᑕᐃᒫᒃ ᐃᑲᔪᖅᓂᖃᕈᓐᓇᖅᓂᐊᖅᑐᓂᒃ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑦ ᑐᒃᑐᐃᑦ ᐊᒥᓱᑲᓐᓂᕈᓐᓇᖅᓂᖏᓄᑦ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.3: ᐊᑐᕐᑎᑦᑎᓗᑎᒃ ᑕᒻᒪᖅᑕᖅᓯᒪᖏᑦᑐᓂᒃ ᑕᒪᒃᑭᖅᑐᓂᒃ ᐅᓂᒃᑳᓕᐅᕈᑎᓂᒃ ᐱᔾᔪᑎᖃᖅᑐᓂᒃ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑦ ᑐᒃᑐᐃᑦ ᑐᒃᑐᓯᐅᖅᕿᐅᕙᖕᖏᓂᒃ ᓇᓂᑐᐃᓐᓇᖅ ᓄᓇᑦᓯᐊᖅᒥ ᑕᐃᒃᑯᓂᖕᖓ ᐃᓚᖃᖅᓗᑎᒃ ᓇᓚᐅᑖᕈᑕᐅᔪᓂᒃ ᑐᖅᑯᑕᐅᓂᖏᓂᒃ ᐱᔭᐅᖃᑦᑕᖅᓯᒪᖏᑦᑐᓂᒃ ᐊᒻᒪᓗ ᐋᓐᓂᖅᑕᐅᑐᐃᓐᓇᖅᓯᒪᔪᓂᒃ ᐃᑭᓪᓚᕈᖅᑕᐅᓯᒪᔪᓂᒃ ᐱᑕᖅᑕᐅᓯᒪᖏᑦᑐᓂᒃ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.4: ᐊᑐᕐᑎᑦᑎᓂᖅ ᐃᒃᐱᒍᑦᑎᐊᖃᑦᑕᖅᓂᖅᒥᒃ ᑐᒃᑐᐸᖕᓂᖅ, ᑕᐃᒃᑯᓂᖕᒐ ᐊᑐᖃᑦᑕᖅᑯᓯᓂᖅ ᐃᒃᐱᒍᓱᑦᑎᐊᖅᑐᓂᒃ ᐱᐅᓯᑐᖃᖅᒥᒍᑦ ᒪᓕᒐᑐᖃᖅᖏᓂᒃ ᐊᒻᒪᓗ ᐊᖕᖏᑕᐅᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᒪᓕᒃᑕᐅᕙᖕᖏᓂᒃ ᑐᒃᑐᓯᐅᖅᑲᑦᑕᖅᓂᖏᓂ ᐊᐅᓚᑦᑎᑦᑎᐊᖃᑦᑕᕆᐊᖃᖅᓂᖏᓂᒃ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.5: ᓴᖅᑭᑎᑦᑎᓗᑎᒃ ᓄᓇᖃᖅᑲᐅᓂᖏᓂ ᖃᓄᐃᓕᐅᕈᑎᒃᓴᓂᒃ ᐊᐅᓚᑕᐅᓂᖏᓄᑦ ᑲᔪᓯᕗᓕᐊᖏᓇᖅᑐᒥᒃ ᐊᒃᑐᖅᑕᐅᕙᖕᓂᖕᖏᑦ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑦ ᑐᒃᑐᐃᑦ ᐊᒻᒪᓗ ᓇᔪᖅᐸᒃᑕᖕᖏᑦ ᓄᓇᖕᖏᑦ ᐱᐅᓯᑐᖃᖅᒧᑦ ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᓄᓇᒦᖃᑦᑕᖅᓂᖏᓂᒃ ᐊᓯᔾᔩᕗᓕᐊᖃᑦᑕᖅᓂᖏᓄᑦ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.6: ᐱᕋᔭᒍᑕᐅᑦ ᑕᐃᓕᒪᓂᖕᖏᑦ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑕᓄᑦ ᓄᓇᖁᑎᖏᔭᐅᓂᖕᖏᑦ ᑐᒃᑐᓄᑦ ᐃᓚᐅᖃᑕᖅᓗᑎᒃ ᐱᓪᒪᕆᐅᔪᓂᒃ ᐊᕙᑎᒥᒃ ᐊᒃᑐᖅᑕᐅᔪᓐᓇᖅᑐᓂᒃ ᐅᖃᐅᓯᐅᔪᓂᒃ ᐊᒻᒪᓗ ᓄᓇᐃᑦ ᐊᑐᖅᑕᐅᔪᓐᓇᖅᓂᖏᓂᒃ ᐸᖅᓇᐅᑎᓕᕆᓂᕐᒥᒃ ᓄᓇᑦᓯᐊᖅᒥ, ᐊᓯᖏᓂᓗ ᐱᓕᕆᕕᐅᔪᒪᔪᑦ ᐊᒃᑐᐃᓂᖅᑲᖅᓂᐊᕈᑎᒃ ᓄᓇᑦᓯᐊᖅᒥᒃ ᑐᒃᑐᖅᑲᖅᕕᐅᓂᖏᓂᒃ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.7: ᐃᓕᑕᕆᔭᐅᓂᖕᖏᑦ ᐊᒻᒪᓗ ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖕᖏᑦ ᐱᑕᖃᕆᐊᖃᓪᒪᕆᒃᑐᑦ ᐱᓪᒪᕆᐅᔪᓪᓗ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑦ ᑐᒃᑐᖏᓄᑦ ᓄᓇᐃᑦ ᓲᕐᓗ ᓄᕐᕆᕕᒋᕗᒃᑕᖕᖏᑦ, ᓄᕐᕆᓯᒪᓕᖅᑎᓪᓗᒋᑦ ᓇᔪᖅᐸᒃᑕᖕᖏᑦ ᐊᒻᒪᓗ ᐱᓪᒪᕆᐅᓂᖕᖏᑦ ᑕᒪᒃᑯᐊ ᐃᒪᒃᑯᑦ ᐃᑳᕆᐊᖅᑐᖅᕕᒋᕙᑕᖕᖏᑦ.

ᖃᓄᐃᓕᐅᖅᓗᑎᒃ 4.8: ᐅᔾᔨᖅᑐᑦᑎᐊᖅᑲᑦᑕᖅᓂᖅ ᑕᐃᒃᑯᐊ ᓇᐹᖅᑐᖃᖕᖏᑐᖅᒥᐅᑦ ᑐᒃᑐᐃᑦ ᐱᓪᒪᕆᐊᓗᖕᓂᒥᒃ ᐊᓐᓂᖅᓇᖅᓂᖏᓂᒃ ᐃᓚᒋᔭᐅᔪᓪᒪᕆᐅᓗᑎᒃ ᐊᕙᑎᓕᕆᓂᕐᒥᒃ ᐊᒃᑐᖅᑕᐅᓯᒪᔪᓐᓇᖅᓂᖏᓂᒃ ᐃᓱᒪᓕᐅᕈᑕᐅᔭᕆᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᓴᐳᓐᓂᐊᖅᑕᐅᔭᕆᐊᖃᖅᓂᖏᓄᑦ ᐸᖅᓇᐅᑕᐅᔪᓂ

ᓄᓇᑦᓯᐊᕐᒥ ᐊᓯᖏᓂᒡᓗ ᐊᐅᓚᑦᑎᕕᐅᔪᓂ ᐱᒋᐊᖅᑎᑕᐅᔪᒪᓂᖏᓂ ᐃᓱᒪᓕᐅᕈᑕᐅᔭ ᓇᐊᖃᖅᑐᓂᒃ ᐊᒃᑐᐃᓂᖃᕐᕈᓐᓇᖅᑐᓂᒃ ᓄᓇᑦᓯᐊᕐᒥᒃ ᑐᒃᑐᖏᓂᒃ.

ᐱᔭᕇᖅᑕᐅᔭᒃᓴᖅ 5: ᐃᓕᓐᓂᐊᖅᑎᑦᑎᖃᑕᕐᓗᑎᒃ ᐊᒻᒪᓗ ᐃᒃᐱᒋᔭᐅᑦᑎᐊᖃᑦᑕᕐᕿᔪᓗᑎᒃ ᓇᕚᖅᑐᖃᖏᓐᑐᕐᒥᐅᑦ ᑐᒃᑐᖏᓂᒃ, ᓇᔪᒐᕆᕙᒃᑕᖏᓂᒃ ᐊᒻᒪᓗ ᓴᐳᓐᓂᐊᖅᑕᐅᓇᓱᖕᓂᖏᓄᑦ ᐱᓕᕆᐊᕐᔪᓂᒃ.

ᖃᓄᐃᓕᐅᕐᓗᑎᒃ 5.1: ᐱᕙᓪᓕᐊᑎᑦᑎᓗᒃ ᐊᑐᓕᖅᑎᑦᑎᕙᓪᓕᐊᓗᑎᒡᓗ ᐊᖑᓇᓱᑦᑎᐅᓂᕐᒥᒃ ᐃᓕᓐᓂᐊᕈᑎᓂᒃ ᖃᐅᔾᔭᐅᔪᓂᒃ ᑐᓂᓯᖃᑕᐅᔪᓐᓇᕐᓂᐊᕐᒪᑕ ᐱᔅᔪᑎᖃᖅᑐᓂᒃ ᓇᕚᖅᑐᖃᖏᓐᑐᕐᒥᐅᑦ ᑐᒃᑐᖏᓂ ᐊᒻᒪᓗ ᐊᑐᖃᑦᑕᕐᕿᔪᓂᕐᒥᒃ ᐱᐅᔪᓂᒃ ᐊᖑᓇᓱᑦᑎᐊᕈᓯᐅᕙᖕᓂᐊᖅᑐᓂᒃ.

ᖃᓄᐃᓕᐅᕐᓗᑎᒃ 5.2: ᐃᑲᔪᖅᓯᐃᓗᑎᒃ ᐊᑐᖓᒃᓴᓂᒃ ᐱᔅᔪᑎᖃᖅᑐᓂᒃ ᓇᕚᖅᑐᖃᖏᓐᑐᕐᒥᐅᑦ ᑐᒃᑐᓂᒃ, ᑲᑎᑐᓐᓇᐅᑕᐅᕙᖕᓂᐊᖅᑐᓂᒃ ᐃᓐᓇᑐᖃᕐᓄᓪᓗ ᒪᒃᑯᒃᑐᓄᓪᓗ ᐃᓕᓐᓂᐊᕐᕕᖕᓂ ᐊᒻᒪᓗ ᓄᓇᒧᖕᖑᐅᖃᑕᕐᓗᑎᒃ.

ᖃᓄᐃᓕᐅᕐᓗᑎᒃ 5.3: ᐊᑐᓕᖅᑎᑦᑎᕙᓪᓕᐊᓗᑎᒃ ᐃᓕᓐᓂᐊᕈᑎᒃᓴᓂᒃ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᓂᒃ ᐊᔅᓭᓲᖏᓐᑑᑎᐅᔪᓂᑦ ᐃᓕᑦᑎᖃᑕᐅᔪᓐᓇᕐᒥᔪᓄᑦ ᑐᑭᓯᐅᒪᔭᐅᑦᑎᐊᒃᑲᓐᓂᕈᓐᓇᕐᓂᐊᕐᒪᑕ ᓴᐳᓐᓂᐊᖅᑕᐅᓂᖏᓄᑦ ᐱᓕᕆᐊᖑᓕᖅᑐᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑕᐅᔪᓐᓇᕐᓂᖏᓄᑦ ᐅᓗᕆᐊᓇᕈᑕᐅᕙᒃᑐᑦ ᓇᕚᖅᑐᖃᖏᓐᑐᕐᒥᐅᑦ ᑐᒃᑐᖏᓄᑦ.

RECOVERY STRATEGY FOR BARREN-GROUND CARIBOU [DRAFT]

In the Northwest Territories

SPECIES AT RISK (NWT) ACT

Management Plan and Recovery Strategy Series 2019

For copies of the recovery strategy or for additional information on Northwest Territories (NWT) species at risk, please visit the NWT Species at Risk website (www.nwtspeciesatrisk.ca).

Recommended citation: Conference of Management Authorities. 2019. Recovery Strategy for Barren-ground Caribou (*Rangifer tarandus groenlandicus*) in the Northwest Territories [**Proposed Draft**]. Conference of Management Authorities, Yellowknife, NT.

This document is a draft and should not be cited without permission from the CMA or relevant Management Authorities.

ISBN to come

Cover illustration: Barren-ground caribou, Rob Gau, Environment and Natural Resources (ENR).

What is the *Species at Risk (NWT) Act*?
The *Species at Risk (NWT) Act* (the Act) provides a process to identify, protect, and recover species at risk in the NWT. The Act applies to any wild animal, plant, or other species for which the Government of the Northwest Territories has management authority. It applies everywhere in the NWT, on both public and private lands, including private lands owned under a land claims agreement, in accordance with the land claims agreements.

What is the Conference of Management Authorities?
The Conference of Management Authorities (the Conference) was established under the Act and is made up of the wildlife co-management boards and governments in the NWT that share responsibility for the conservation and recovery of species at risk in the NWT (referred to as 'Management Authorities'). The purpose of the Conference is to build consensus among Management Authorities on the conservation of species at risk and to provide direction, coordination, and leadership with respect to the assessment, listing, conservation, and recovery of species at risk while respecting the roles and responsibilities of Management Authorities under land claim and self-government agreements. The Conference develops consensus agreements on listing species at risk, conservation measures, management strategies, and recovery plans. Only Management Authorities that have jurisdiction for a species are involved in making the decisions.

What is a Threatened species?
Under the Act, a Threatened species is a species that is likely to become Endangered in the NWT if nothing is done to reverse the factors leading to its extirpation or extinction.

What is a recovery strategy?
Under the Act, a recovery strategy is a document that recommends objectives for the conservation and recovery of a Threatened species. It also recommends approaches to achieve those objectives. It includes a description of threats and positive influences on the species and its habitat. Under the Act, a recovery strategy must be done for Threatened species within two years after the species is added to the NWT List of Species at Risk.

PREFACE

This *Recovery Strategy for Barren-ground Caribou in the Northwest Territories* (recovery strategy) is the result of a collaborative effort among diverse groups representing many different perspectives across the range of barren-ground caribou in the NWT. It is important to acknowledge that the species at risk approach, and more broadly, perspectives on “managing” caribou, are part of a scientific framework that may not necessarily represent how some Indigenous individuals and organizations would characterize their relationships with caribou. In particular, there is a strong belief in some northern Indigenous communities that talking about caribou too much or in a negative way can make them go away. The draft Łutsel K’e Dene First Nation’s caribou stewardship plan entitled, Yúnethé Xá Ɂetthën Hádı[1], notes the following:

> **Etthën hurétth’ą** (the caribou are listening to us) – We shouldn’t talk too much about Ɂetthën; they are listening to us; we must speak good words for them; and we must help protect them. The Ɂetthën have their own natural laws and, as such, we have to respect the ways of the Ɂetthën and all life forms.

Generally, using terms like “threatened”, “at risk”, or “dramatic declines” can be seen to be negative. Discussions about “managing” caribou can also be seen as inappropriate; it is at times preferable to clarify that while caribou can look after themselves, it is peoples’ activities that need to be managed. This topic is addressed in Délı̨nę́’s *Belare Wíle Gots’ę́ Ɂekwę́ - Caribou for All Time*[2] plan:

> **Goɂǫ́ beghǫ gots’edé nı̨dé dzá ǫ̨t’e** (when people talk about caribou too much, it’s not good) – The talk disturbs ɂekwę́ and they don’t like it. This is true for all animals. When ɂekwę́ move away, this is a sign that they want to be left alone. Ɂekwę́ make their own decisions – we’re not the boss of them. We need to give them a rest for as long as it takes for them to recover. Dene ɂehtséokə say that when they decide to return, ɂekwę́ nı̨ɂah, they make a thundering sound.

Differing perspectives such as these can be difficult to reconcile in species at risk discussions and documentation, yet there is also alignment between scientific and Indigenous knowledge regarding caribou not being as available currently as they were in the past. For the immediate purposes of helping to protect caribou and create conditions in which they can recover, those involved in the development of this recovery strategy chose to work within the scientific framework, sharing a language and terminology that helps us understand each other and facilitate important discussion.

This recovery strategy constitutes advice to:

- other jurisdictions with management and guardianship responsibilities for the herds and their habitats;
- all potential partners or organizations whose activities may impact the herds or their habitats, including industry, communities, and individuals; and

- organizations that play a role in influencing the extent to which the herds are impacted, including community organizations, co-management boards, environmental assessment and regulatory bodies, and environmental non-government organizations.

This recovery strategy will outline overall goals, objectives, and approaches for barren-ground caribou conservation and recovery across the NWT. This recovery strategy applies to all barren-ground caribou herds that occur either entirely or partially in the NWT, with the exception of the Porcupine herd, which is considered geographically distinct and not at risk at this time.

Management tools and actions specific to the needs of individual barren-ground caribou herds are outlined in herd-specific management plans (either existing or under development). The recovery strategy will therefore provide overarching guidance on management and stewardship of barren-ground caribou in the NWT over the long term, while ensuring that herd-specific requirements are met through more detailed herd-specific management plans. This approach recognizes the huge amount of work that governments, co-management authorities, communities, and stakeholders have already put in, and are still putting in, to developing herd-specific management plans.

Background information on barren-ground caribou and threats is summarized from *Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2011-2015* (ENR 2011[3]) (CMS) and the Species at Risk Committee's (SARC) 2017 *Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories*[4] (status report). To avoid repetitive citations, it can be assumed that the information was taken from the CMS and/or the status report, unless another reference is given.

This recovery strategy does not commit any party to actions or resource expenditures; implementation of this strategy is subject to the appropriations, priorities, and budgetary constraints of the participating Management Authorities.

Success in the recovery of this species depends on the commitment and cooperation of the many groups who will be involved in implementing the approaches set out in this strategy and cannot be achieved by the Management Authorities or any other group alone. All NWT residents and others who use NWT lands and waters are encouraged to join in supporting and implementing this strategy for the benefit of barren-ground caribou, communities that have traditionally relied on these herds, and NWT society as a whole.

ACCEPTANCE STATEMENT

To be completed as a final step once the recovery strategy is finalized.

The Wildlife Management Advisory Council (NWT), Gwich'in Renewable Resources Board, Sahtú Renewable Resources Board, Wek'èezhìı Renewable Resources Board, Tłįchǫ Government, and the Government of the Northwest Territories accepted this recovery strategy on DATE through a Conference of Management Authorities consensus agreement under the *Species at Risk (NWT) Act*.

ACKNOWLEDGEMENTS

Two five-year management strategies were developed for barren-ground caribou in the NWT by Environment and Natural Resources (ENR) and its partners: *Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2006-2010* (ENR 2006[5]) and *2011-2015* (ENR 2011[3]). These caribou management strategies recognized the collaborative nature of management for barren-ground caribou in the NWT along with the importance of herd-specific management strategies. In May 2018, the Conference of Management Authorities met and agreed to adapt and update the 2011-2015 caribou management strategy as the recovery strategy for barren-ground caribou in the NWT, in accordance with the *Species at Risk (NWT) Act*.

Preparation of this strategy was funded by ENR. We would like to thank ENR, and particularly Jan Adamczewski (Wildlife Biologist, Ungulates), for their work on the earlier caribou management strategies, along with the partners and reviewers who provided extensive input on earlier drafts of this recovery strategy.

Background information in this document is also summarized from the 2017 *Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories*[4]. We would like to thank the NWT Species at Risk Committee for their work on this detailed and extensive assessment of the status of barren-ground caribou in the NWT.

We would also like to thank the Species at Risk Secretariat for adapting the caribou management strategy to address the requirements of a recovery strategy, as required by the *Species at Risk (NWT) Act*. The principal preparers of the adapted strategy were Michele Grabke (Species at Risk Implementation Specialist) and Claire Singer (Species at Risk Implementation Supervisor).

Finally, we thank the many individuals who reviewed and provided input on earlier drafts; this work significantly improved the recovery strategy. We thank the following organizations for providing helpful comments:

- Wildlife Management Advisory Council (NWT)
- Gwich'in Renewable Resources Board
- Sahtú Renewable Resources Board
- Wek'èezhìı Renewable Resources Board
- Tłı̨chǫ Government
- Government of the Northwest Territories
- Government of Canada
- Beverly and Qamanirjuaq Caribou Management Board
- Athabasca Denesųłiné Né Né Land Corp.

EXECUTIVE SUMMARY

The social, cultural, and economic value of barren-ground caribou to the people of the Northwest Territories (NWT) is immense; the relationship between people and caribou dates back thousands of years. Barren-ground caribou that occur in the NWT have been harvested by Indigenous and non-Indigenous people from nearly all regions of the NWT, as well as by Indigenous people from adjacent jurisdictions (Nunavut, Saskatchewan, Manitoba, and Alberta).

There are nine barren-ground caribou herds[a] that reside partially or entirely in the NWT. Historically, herds have undergone large fluctuations in population size and their abundance has been known to cycle. Recent decreases have been dramatic and estimates indicate historically low numbers. For example, the Bathurst herd has declined as much as 98 percent from peak numbers. As of 2018, the Cape Bathurst and Bluenose-West herds appeared roughly stable but at lower numbers than observed in historic surveys. The Tuktoyaktuk Peninsula, Bluenose-East, and Bathurst herds were declining at a substantial rate. The Beverly herd was declining slowly, and the Qamanirjuaq herd was either stable or declining slowly. These herds are at historically low numbers and are facing unprecedented pressure from a range of threats and cumulative effects.

This *Recovery Strategy for Barren-ground Caribou in the Northwest Territories* was prepared by the Conference of Management Authorities and is designed to meet the requirement for a barren-ground caribou recovery strategy under the *Species at Risk (NWT) Act*. The recovery strategy emphasizes collaboration among co-management boards, Indigenous governments and organizations (IGOs), territorial/provincial/federal governments, caribou management boards, and communities.

This strategy defines overall goals, objectives, and approaches to guide conservation and recovery of barren-ground caribou in the NWT. The long-term vision of this strategy is to conserve barren-ground caribou and to ensure that barren-ground caribou remain a cultural and ecological keystone species. The vision includes ensuring that barren-ground caribou are able to move freely on the land within their historic ranges to ensure natural habitat use and migration. The overall goals of the recovery strategy are:

1. Maintain or restore self-sustaining, resilient populations of each barren-ground caribou herd, such that no herd is lost.
2. Support unobstructed movement and migration of barren-ground caribou across historic ranges.
3. Promote the social, cultural, and environmental conditions necessary for recovery.

[a] Scientific knowledge designates barren-ground caribou into herds based on identifiable and distinct calving grounds. Traditional knowledge holders and Indigenous communities vary in the interpretation of herds; some distinguish among different herds using a variety of techniques (direction of travel, range, colour/size/body condition and the taste of the meat), while others do not identify barren-ground caribou as belonging to distinct units or groups at all.

The strategy recognizes herd-specific management plans as having a key role in defining detailed monitoring and management requirements. It also recognizes that management actions in the NWT for barren-ground caribou are carried out in a collaborative process with co-management boards, IGOs, territorial/provincial/federal governments, and communities located on or near the current and historical ranges of herds and for which barren-ground caribou have and continue to play a key role socially, culturally, spiritually, and economically.

The strategy recommends the following objectives and approaches:

Objective 1: Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.

Approach 1.1: Implement herd-specific management plans for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq herds to promote recovery and conserve habitat.

Approach 1.2: Complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst herds to promote recovery and conserve habitat.

Approach 1.3: Continue working with partners in Nunavut on effective conservation of the Ahiak herd.

Approach 1.4: Review and update herd-specific management plans as required.

Approach 1.5: Support community-based barren-ground caribou monitoring, guardianship, and conservation plans.

Approach 1.6: Continue working to secure adequate resources and ongoing support from governments and other partners (including industry, co-management and regulatory boards, and non-government organizations) for the implementation of this recovery strategy and the management, monitoring, guardianship, and conservation plans noted in approaches 1.1 to 1.5.

Approach 1.7: Increase capacity among Indigenous partners to participate equally and meaningfully in the conservation of barren-ground caribou.

Approach 1.8: Cooperate in the development and implementation of the national barren-ground caribou recovery strategy, including identification and protection of critical habitat, and defining population and distribution objectives.

Objective 2: Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.

Approach 2.1: Monitor size, trend, and health of all NWT barren-ground caribou herds.

Approach 2.2: Monitor predator populations that may affect barren-ground caribou, assess predator-prey relationships and predation rates.

Approach 2.3: Monitor the impacts of other key factors affecting barren-ground caribou and their habitat, including, for example, disease, parasites, insects, and climate change.

Approach 2.4: Monitor changes in habitat quality, quantity, and availability for caribou resulting from natural and human-caused landscape changes.

Approach 2.5: Monitor the status of the relationship between people and caribou as an indicator of caribou well-being.

Objective 3: Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.

Approach 3.1: Update or develop population models using current information.

Approach 3.2: Promote the collection and exchange of information on caribou ecology, status, and threats.

Approach 3.3: Promote the collection and exchange of information on the relationships among barren-ground caribou, predators, competitors, and their wider environment.

Approach 3.4: Assess cumulative impacts of natural and human-caused landscape change on barren-ground caribou and their habitat.

Objective 4: Conserve and protect barren-ground caribou populations and their habitat.

Approach 4.1: Work with industry, governments, and co-management and regulatory boards to develop and implement best practices to minimize impacts of human land use on barren-ground caribou.

Approach 4.2: Consider responsible predator management options that may benefit barren-ground caribou recovery.

Approach 4.3: Develop accurate and complete reporting of barren-ground caribou harvest across the NWT along with estimates of unrecovered kills and wounding losses.

Approach 4.4: Promote respectful harvest of caribou, including respect for traditional laws and protocols, and compliance with harvest management measures.

Approach 4.5: Develop range-level approaches for management of cumulative impacts on barren-ground caribou and their habitat from natural and human-caused landscape change.

Approach 4.6: Conserve integrity of barren-ground caribou habitat through participation in key environmental assessment and land use planning processes in the NWT and other jurisdictions where projects may affect NWT herds.

Approach 4.7: Identify and protect essential and important barren-ground caribou habitats such as calving grounds, post-calving ranges, and important water crossings.

Approach 4.8: Ensure that barren-ground caribou habitat is a key value that is integrated into environmental assessment decisions and conservation planning initiatives in the NWT and other jurisdictions where proposed decisions/initiatives may affect NWT herds.

Objective 5: Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.

Approach 5.1: Develop and implement hunter education programs to share information on barren-ground caribou and promote hunter excellence.

Approach 5.2: Support programs centred around barren-ground caribou that bring elders and youth together in schools and on the land.

Approach 5.3: Promote educational programs for diverse audiences to increase understanding of conservation initiatives and management of threats to barren-ground caribou.

TABLE OF CONTENTS

RECOVERY STRATEGY

1. INTRODUCTION

1.1. Background

Barren-ground caribou (*Rangifer tarandus groenlandicus*) are an ecological and cultural keystone species[b], and are a critical part of northern ecosystems. Barren-ground caribou have been a central part of Indigenous cultures for many generations and all languages across the range of barren-ground caribou have words for the iconic species: tuktu/tuktut (Inuvialuktun), tuktuvialuit/tuktuit (Inuinnaqtun and Siglitun), tuttuvialuk (Ummarmiutun), vadzaıh (Teetł'it and Gwichya Gwich'in), ʔekwǫ̀ or hozıʔekwǫ̀ (Tłı̨chǫ), ʔekwę́, ʔepę́, ʔedə (Sahtú Dene – Dél̨ıne, Tulít'a, and Fort Good Hope/Colville Lake), nódı (South Slavey - Kátł'odeeche dialect), ʔetthɛ̃́n (Chipewyan – Denínu Kų́é and Łutsel K'e), etthén (Dënesųłıné), atihk (Cree), and caribou de la toundra (French).

Barren-ground caribou are often classified in terms of 'herds'. Scientific knowledge defines herds based on identifiable and distinct calving grounds (Figure 1), although some mixing and movement does occur. Traditional knowledge holders and Indigenous communities vary in their interpretation of barren-ground caribou herds. Some distinguish among different herds using a variety of techniques (e.g. direction of travel, range, colour/size/body condition, and the taste of the meat). Other interpretations stress fluidity and interconnectedness and do not identify barren-ground caribou as belonging to distinct units or groups. Indigenous stewards of the land, management authorities, and governments have been working within the scientific designations of herds to facilitate collaboration on managing threats for barren-ground caribou and to guide recovery.

Across the global range of barren-ground caribou, 14-15 barren-ground caribou herds are recognized, extending from northeastern Alaska to western Hudson Bay and Baffin Island.[6] The NWT is considered home, either entirely or partially, to nine of these herds, or approximately 45% of the global population of barren-ground caribou (Porcupine[c], Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds).

[b] An ecological keystone species is a species that plays an important role in an ecosystem, such that if it was lost, the ecosystem would change significantly. A cultural keystone species is a species of exceptional significance to a culture/people.
[c] The Porcupine herd is not included within the scope of this recovery strategy, see *Preface*.

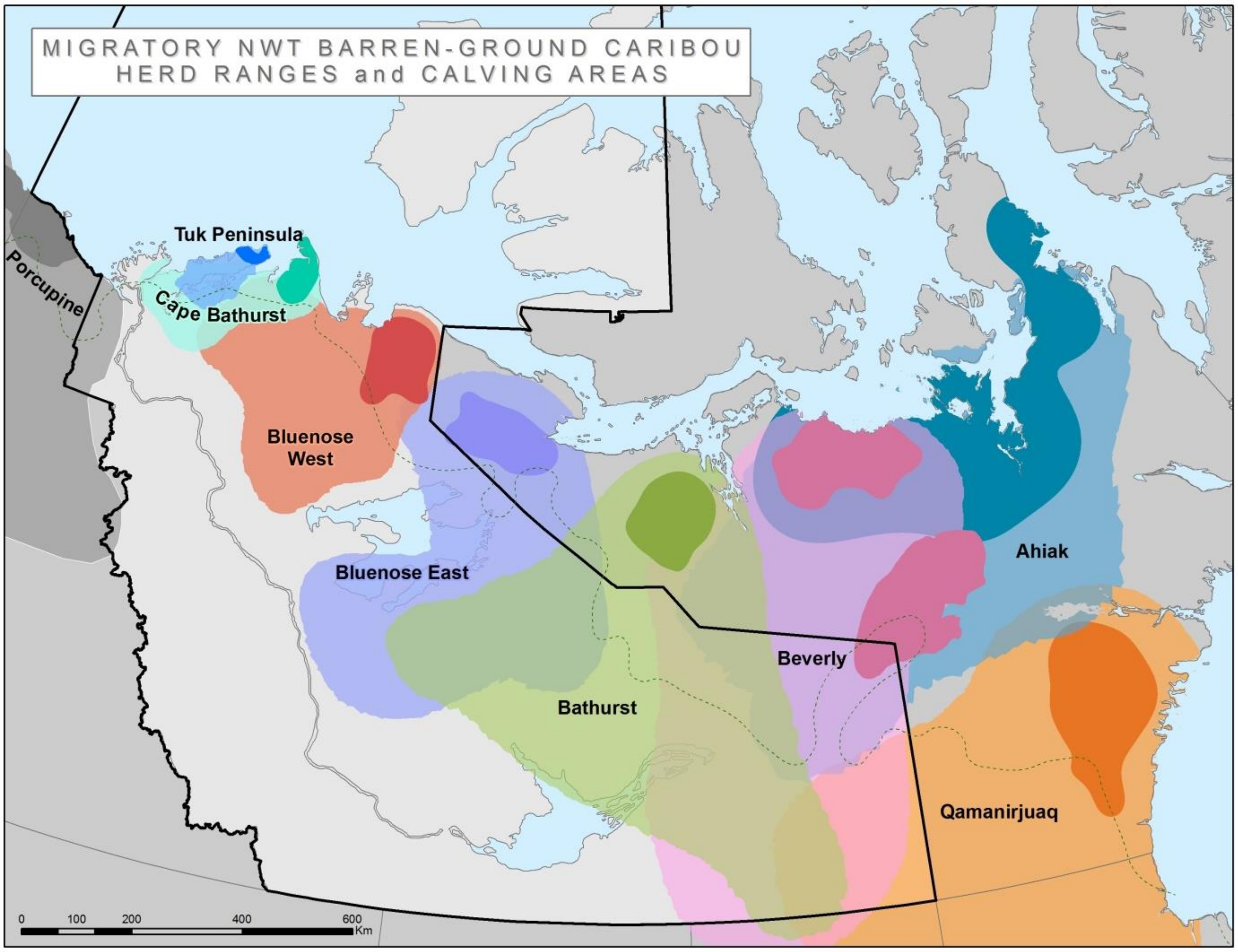


Figure 1: Barren-ground caribou annual ranges (pale colours) and calving grounds (dark colours) for herds that occur in the NWT based on collar data.[d,e] Polygons were derived using collar data from the Government of the Northwest Territories (GNWT), Government of Nunavut, Yukon Environment, and United States Fish and Wildlife Service. The composite shapefile was developed by GNWT-ENR, Yellowknife.[f]

Barren-ground caribou herds have historically undergone large fluctuations in population size and their abundance has been known to cycle. However, recent decreases have been dramatic and estimates indicate historically low numbers (Table 3, section 4.2.2). The reasons for these recent declines are complex and due to multiple

---

[d] Qamanirjuaq range based on radio-collar data from 1993-2008; Qamanirjuaq calving ground based on compilation of all data from government surveys (1963-2008) and telemetry (1993-2012). Tuktoyaktuk Peninsula range based on collar data from 2006-2012. Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, and Ahiak ranges based on collar data from 1996-2008. Beverly range based on collar data from 1995-2008; Beverly calving ground based on compilation of all data from government surveys (1957-2011) and telemetry (1996-2012). The inland Beverly calving ground (southern of the two dark pink polygons) has not been used by the herd since 2010.

[e] The range of the Porcupine herd is included (greyscale) for completeness, however, as noted in the *Preface*, this geographically distinct population is not included in the recovery strategy.

[f] Annual range use varies for each herd, and actual annual ranges since 2000 have been smaller, corresponding with smaller herd sizes. This figure does not necessarily reflect the historic extent of barren-ground caribou ranges.

interacting factors. These declines have raised concerns about caribou conservation, well-being, herd viability, and have highlighted the importance of long-term monitoring and management.

In light of the observed declines, barren-ground caribou were assessed as Threatened by both the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Species at Risk Committee (SARC) in December 2016 and April 2017, respectively[g]. Habitat changes due to climate, predation, industrial development, and forest fires were identified as threats to barren-ground caribou, according to both science and traditional knowledge. SARC noted that "the cumulative effects from multiple interacting threats are considered unprecedented[4]." For details of these assessments, please see APPENDIX A – SPECIES STATUS and ASSESSMENTS. Currently, a decision on listing under the federal *Species at Risk Act* is pending the completion of Aboriginal consultation and public engagement. In the NWT, barren-ground caribou were added to the NWT List of Species at Risk as Threatened in July 2018.

1.1.1. About the Recovery Strategy

Recovery strategies are required for Threatened species within two years of their designation under the *Species at Risk (NWT) Act*. This recovery strategy will provide overall guidance on recovery and stewardship of barren-ground caribou in the NWT over the long term. Existing and under development herd-specific and community management plans will provide more detailed, herd-specific guidance. This approach recognizes the work that barren-ground caribou management partners have put into developing existing management plans.

Guiding principles were followed in preparing this recovery strategy. They are provided in APPENDIX C – GUIDING PRINCIPLES.

Table 1 lists the herds included in this recovery strategy along with corresponding herd-specific and community management plans (if applicable). These plans support cross-regional action planning by providing specific guidance on what management for barren-ground caribou looks like from a community perspective. They also offer a community vision, community perspectives on the key problems to be addressed, and actions that communities can help to lead, with support from their co-management partners.

[g] Note that the scope of COSEWIC's assessment was of the Designatable Unit of barren-ground caribou, including the Porcupine herd, some islands (e.g. Baffin Island), and some northeast mainland populations in Nunavut. As noted in *Preface*, SARC's assessment included all barren-ground caribou herds that occur partially or entirely within the NWT, with the exception of the Porcupine herd, which is considered geographically distinct and not at risk at this time.

Table 1: Existing or under development herd-specific and community management plans for barren-ground caribou in the NWT.

Herd	Management Plan	Lead Organization	Review Period
Tuktoyaktuk Peninsula	To be developed	Wildlife Management Advisory Council (NWT)	To be determined
Cape Bathurst	Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan (November 2014)[7]	Advisory Committee for Cooperation on Wildlife Management (ACCWM)	5-year review (2019); 10-year intervals thereafter
Bluenose-West			
Bluenose-East	Belarewíle Gots'ę́ ʔekwę́ (Délı̨ne caribou conservation plan)[2]	Délı̨ne Belarewíle Gots'ę́ ʔekwę́ Planning Participants	To be determined
Bathurst	Draft Bathurst Caribou Range Plan (under development)[8]	Bathurst Caribou Range Plan Working Group	5-year review
	Yúnethé Xá ʔetthën Hádı - Caribou Stewardship Plan	Łutsel K'e Dene First Nation	To be determined
	Bathurst Caribou Management Plan (under development)	Bathurst Caribou Advisory Committee	To be determined
Beverly	Beverly and Qamanirjuaq Caribou Management Plan 2013-2022 (March 2014)[9]	Beverly and Qamanirjuaq Caribou Management Board (BQCMB)	Ongoing for objectives and actions; overall review in 2021-2022
Qamanirjuaq	Yúnethé Xá ʔetthën Hádı - Caribou Stewardship Plan	Łutsel K'e Dene First Nation	To be determined
Ahiak	Not applicable	Management of the Ahiak herd is under the jurisdiction of the Government of Nunavut.	To be determined
	Yúnethé Xá ʔetthën Hádı - Caribou Stewardship Plan (Łutsel K'e Dene First Nation)	Łutsel K'e Dene First Nation	To be determined

1.1.2. Collaboration and Management for Barren-ground Caribou

The recovery strategy recognizes the collaborative and interjurisdictional nature of barren-ground caribou conservation in the north and the shared responsibility to care for caribou by Indigenous governments and organizations (IGOs), federal/territorial/provincial governments, co-management boards, and caribou management boards (APPENDIX B – PLANNING PARTNERS).

Under the *Species at Risk (NWT) Act*, the responsibility for developing the recovery strategy rests primarily with the Conference of Management Authorities (CMA). The CMA is the group of renewable resources boards and governments in the NWT that share management responsibility for the conservation and recovery of species at risk. In addition, other IGOs and management boards have been invited to participate in CMA meetings and to provide input into the development of the recovery strategy. Table 2 lists Management Authorities and other IGOs who were invited to participate in the development of this recovery strategy.

Table 2: Members and participants/observers of the Conference of Management Authorities.

Management Authorities for barren-ground caribou in the NWT	Wildlife Management Advisory Council (NWT) Gwich'in Renewable Resources Board Sahtú Renewable Resources Board Wek'èezhìı Renewable Resources Board Tłı̨chǫ Government Government of the Northwest Territories Government of Canada
Invited participants or observers	Acho Dene Koe First Nation Akaitcho Territory Government Athabasca Denesųłiné Beverly and Qamanirjuaq Caribou Management Board Dehcho First Nations Kátł'odeeche First Nation North Slave Métis Alliance Northwest Territory Métis Nation Salt River First Nation

2. HISTORICAL AND SOCIAL PERSPECTIVES

The people of the NWT are intrinsically linked to and share a sacred relationship with barren-ground caribou. Barren-ground caribou are a cultural keystone species and for many Indigenous peoples and communities, no other animal has such a large influence socially, culturally, spiritually, or economically on their way of life and indigeneity, in the past and for present and future generations. The relationship between Indigenous peoples and caribou is intertwined both historically and currently. Caribou provide essential resources such as food, clothing, tools, shelter, and connections to the land, animals, community, and ancestors. Since time immemorial, Indigenous peoples have maintained a relationship of reciprocity with barren-ground caribou, forming their cultural identities, spiritual practices, seasonal rounds, trails and travel-ways, and habitation sites around the relatively dependable health and well-being of barren-ground caribou. This experience is of vital importance to the effective management of barren-ground caribou.

Even with the documented changes in harvesting in recent years, the importance of barren-ground caribou to Indigenous peoples and communities cannot be overstated. Indeed, many Indigenous peoples feel a tremendous responsibility to care for caribou and feel immense loss when caribou well-being is threatened.

3. HOW DO WE KNOW ABOUT BARREN-GROUND CARIBOU?

Barren-ground caribou range widely throughout circumpolar North America, including throughout the majority of the NWT. The extensive network of caribou trails carved into the landscape of the NWT reflects the traditional range of barren-ground caribou. Traditional knowledge explains the importance of these caribou life-ways and how the survival of “caribou people” depended on their expertise of knowing caribou trails, crossings, and ways of being at any given time.

Traditional understandings of respectful relationships, including things like laws and harvesting protocols, are fundamental to the continued survival of people and caribou as well as their relationship with the land. In this context, traditional knowledge provides detailed, direct, seasonal observations about caribou and their habitat. Additionally, traditional knowledge spans very long timeframes, and is often a strong source of up-to-date information on trends, behaviour, herd movements, predators, health, and body condition.

Periodic scientific estimates of herd size provide key quantitative benchmarks for management, and comparison of two or more consecutive surveys shows whether a herd is increasing, stable, or declining. Currently, most NWT herds are surveyed every 3 years; this frequency reflects low herd numbers and increased concern over herd status. This affirms what traditional knowledge holders have already observed.

Population size is estimated using visual and photographic calving ground surveys in June for the eastern barren-ground caribou herds in the NWT (Bathurst, Bluenose-East, Beverly, Ahiak, and Qamanirjuaq). The Government of the Northwest Territories

(GNWT) uses estimates of breeding females in the herd and pregnancy rates to extrapolate to overall herd size for the Bluenose-East and Bathurst herds. A similar method is used for the Beverly and Qamanirjuaq herds by the Government of Nunavut to extrapolate total herd size based on an estimate of all adult females in the herd. For western herds (Bluenose-West, Cape Bathurst, and Tuktoyaktuk Peninsula), photographic post-calving surveys in July are used to provide an estimate of adult caribou in the herd, based on photos of large aggregations that form in response to biting flies. Both methods are considered to be accurate and the results are comparable.

Additional information may also be collected by biologists, harvesters, and elders (e.g. body condition, survival rates, sex ratio, pregnancy rates, the proportion of cows calving in June, condition of habitat or changes to habitat, fat thickness, colour of marrow, colour of organs, signs of disease or parasites in harvested caribou, and predator abundance) to assess factors that may affect trend and condition of caribou or caribou habitat. Population models can be useful for integrating various kinds of information and providing insight into past and likely future trends. All this information helps wildlife managers and Indigenous guardians identify possible reasons for caribou declines and increases, understand the potential impacts of key factors, and decide on monitoring and management actions.

4. SPECIES INFORMATION

Common name in English:	Barren-ground caribou
Name(s) in other languages:	Tuktu/tuktut (Inuvialuktun) Tuktuvialuit/Tuktuit (Inuinnaqtun and Siglitun) Tuttuvialuk (Ummarmiutun) Vadzaıh (Teetł'it and Gwichya Gwich'in) ʔekwǫ̀ or hozıʔekwǫ̀ (Tłı̨chǫ) ʔekwę́, ʔepę́, ʔedə (Sahtú Dene – Délı̨ne Tulı́t'a and Fort Good Hope/Colville Lake) Nódı (South Slavey - Kátł'odeeche dialect) ʔetthë́n (Chipewyan – Denı́nu Kųę́ and Łutsel K'e) Etthén (Denesųłiné) Atihk (Cree) Caribou de la toundra (French)
Scientific name:	*Rangifer tarandus groenlandicus*

4.1. Species Description, Biology, and Habitat Needs

Barren-ground caribou are a medium-sized member of the deer family and are slightly smaller than the closely related boreal woodland caribou (*Rangifer tarandus caribou*). Barren-ground caribou have the largest antlers relative to their size of any species of deer. Caribou and reindeer are the only deer species in which females grow antlers, but breeding males may have larger antlers for display and contest during the rut (breeding season).

There can be wide variation in colouring within and between herds. Both males and females have light-coloured hair around their tails and on their stomachs, and their coats become progressively darker towards the spine. Mature males have a striking white neck and mane, a brown back, and a distinct band along the flank separating the brown back from the white belly. Females and juveniles show a more muted version of the males' colours. Females have smaller antlers, shorter necks, and smaller bodies, and are typically lighter in colour than the males. Variation in the flavour of the caribou meat also exists among different herds in the NWT.

Barren-ground caribou males usually reach maturity between the ages of 2 and 4 years but may not reach full size and weight until they are 4-6 years old. Males may not begin breeding at that age though, as large dominant males do most of the breeding. Female caribou usually first breed at 2-3 years of age and will typically have one calf per year (in very rare cases, twins), although breeding pauses may occur when females are in poor condition. Rut (breeding) - and consequently calving - are highly synchronized, with most calves born within a few days of each other. Calves are typically born eight to nine months after the fall rut, in late May or the first two weeks of June, after the spring migration northwards to the barrens. The reproductive lifespan of caribou is likely about 12 years, with some females living as long as 12-17 years, and males for a few years less.

An array of predators and scavengers depend on barren-ground caribou. Wolves are considered the primary predators of barren-ground caribou, though grizzly bears, wolverines, and possibly lynx and eagles also prey on or scavenge barren-ground caribou. The role and impact of predation on caribou probably differs among herds, and has a stronger influence during declines and when herds are at low numbers. Grizzly bears may have a greater impact on newborn caribou on calving grounds than wolves in some herds, but wolves are effective year-round predators of all sex and age classes of caribou. Parasites may also have an important impact on caribou. High numbers of insects in July can cause stress for caribou, resulting in decreased body condition and, in extreme cases, death from heat exhaustion as caribou attempt to find refuge.

Typically, barren-ground caribou prefer colder temperatures, which they are very well adapted to: in winter, cold weather prevents icing conditions and inaccessibility of forage, while in summer it reduces insect activity, resulting in less stress for the caribou and better body condition overall.

Barren-ground caribou calve on the tundra near the Arctic coast in the NWT and Nunavut and winter below the treeline of the NWT and in the northern regions of Manitoba, Saskatchewan, and (historically) Alberta. Barren-ground caribou require the use of large annual ranges to support their seasonal migrations, to be able to use alternate ranges (e.g. when some winter habitat burns), and to support large populations. Their twice-annual migration between calving grounds and wintering grounds is, in part, a response to seasonal changes in the suitability of their habitat (food becomes unavailable, movement becomes difficult, etc.) as well as a means of reducing predation risk, especially for cows during calving.[10,11]

All ranges used during the year are important to barren-ground caribou, but calving and post-calving ranges have been consistently identified as necessary to the survival of barren-ground caribou, and hence essential to recovery of herds at low numbers. Calving and post-calving ranges have been identified from scientific knowledge and traditional knowledge as highly sensitive habitat that should not be disturbed.[8,12,13,14] Displacement from preferred calving ranges has been linked, through simulation modeling, to negative effects on calf survival and population trend.[15,16]

Other important parts of the range include: [8,12,13]

- Key water crossings and land bridges: Some water crossings have a history of use by caribou and hunters dating back thousands of years.[17,18] These areas are well known to Indigenous peoples who have long set up camps at these key locations. Land bridges are considered key travel and migration corridors.[8]
- Centre of habitation or core range: The centres of habitation or core ranges are used even at times of low herd numbers. This concept was first defined by Skoog[19] for Alaskan caribou, but the idea was recognized much earlier by Indigenous elders.[18,20] The Bathurst herd's restricted annual range at low numbers, effectively its core range or centre of habitation, was recognized in the Bathurst Caribou Range Plan[8] and given a high priority as an important area through times of scarcity and abundance.
- Large, strategically located patches of unburned winter range: The importance of lichen-rich, unburned, older forests has been recognized by multiple Indigenous communities in the north and identified in the Bathurst Caribou Range Plan.

4.2. Population and Distribution

4.2.1. Changes in Distribution

Written descriptions from traditional knowledge and spatial data from scientific knowledge indicate that the historic range[h] of barren-ground caribou has contracted substantially (several hundred kilometers) since the 1970s-1980s with a large movement north and east (Figure 2). Historically, the winter range of barren-ground caribou in the NWT extended further to the south, including northern Alberta, Saskatchewan, and Manitoba. Migration routes and calving grounds have also shifted slightly or changed over time.

[h] Historic ranges are areas that barren-ground caribou were known to use in the past. The historic maximum range is the outermost area that barren-ground caribou once occupied but are not currently using, for one or multiple reasons.

Figure 2: Historic maximum barren-ground caribou range, compiled based on spatial data and written descriptions of range, derived from traditional and community knowledge.

Distribution changes are often linked to changes in population numbers, in that fewer caribou will occupy a smaller area. However, measuring changes in distribution over time is complicated due to gaps in historical trend information, variation in annual range use, changes or shifts in winter distribution among years, and overlapping winter distribution among neighbouring herds. Also, as some herds contract, other herds may move into and occupy adjacent ranges.

In addition to changes in population numbers, distribution changes may be the result of forest fires, food availability, and hunting pressure. Localized contractions in range resulting from human development in the form of roads, mines, mineral exploration camps, towns, oil and gas, hydro projects, and utility corridors have also been documented.

Traditional knowledge holders often mention the disappearance of barren-ground caribou populations. In some instances, it is said that caribou go underground or underwater, and when they become lonely for people they will return. Caribou may also disappear as a result of disrespectful treatment by humans. This is the lesson at the heart of the frequently told story of the man hitting a caribou with a stick, and the caribou's subsequent shunning of that region for an extended period of time.

Although the distribution of barren-ground caribou has changed over time, it is important that the habitat throughout the historic distribution of the herds is maintained. Even if barren-ground caribou do not currently use the full extent of their historic distribution, they may need to use those areas again in the future.

4.2.2. Changes in Population

It is generally understood that barren-ground caribou undergo large, natural fluctuations in population numbers. These fluctuations are likely driven by interactions among factors such as climate, food availability, predation, and parasites. Periods between high and low numbers can be decades in duration, although the timing and extent of peaks and troughs are not reliably predictable. Traditional and community knowledge suggests that the difference between high and low population numbers within these cycles can be quite large. Although the natural range of variation in barren-ground caribou population cycles has not been quantified beyond scientific surveys over the past 50 years, traditional and community knowledge holders have stated that the population highs are not as high as they used to be and, if recent declines are the result of permanent changes to the landscape, the ability of herds to return to historic highs may be impeded.

In terms of more recent trends in barren-ground caribou populations, traditional and community knowledge does not typically speak to numerical abundance; rather, traditional knowledge holders observe general trends in their region or around their community. Where changes in abundance have been noted, it was often understood to be changes in migration patterns, rather than changes in absolute numbers. From these accounts, there is some indication that the Tuktoyaktuk Peninsula herd may be increasing. The Bathurst and Bluenose-East herds are likely decreasing and there is some evidence of recent declines in the Beverly and Qamanirjuaq herds. Trends for the Cape Bathurst and Bluenose-West herds are not clear based on available resources and there is no available trend information for the Ahiak herd. In the area of the Athabasca Denesųłiné (northern Saskatchewan), knowledge holders suggest a recent decline in caribou in their region.

Scientific surveys and population estimates indicate that barren-ground caribou numbers were generally low from the 1950s to the 1970s, after which numbers began to increase. By the mid-1980s to mid-1990s, populations were peaking in abundance. Declines were underway during the late 1990s and 2000s. Numbers stabilized for some herds between 2009 and 2012, but the declines of the 1990s-2000s (70-90%) continued through 2012-2018. As of 2018, two herds appeared roughly stable at low numbers (Cape Bathurst, Bluenose-West), three were declining at a substantial rate (Tuktoyaktuk Peninsula, Bluenose-East, and Bathurst), and the Beverly and Qamanirjuaq herds were declining slowly (Table 3). Trends in the Ahiak herd cannot be determined. Declines in several herds have been extensive (Cape Bathurst, Bluenose-

West, and Bluenose-East), with the largest decline having been seen in the Bathurst herd (98% decline from peak population in 1986).

Table 3. Barren-ground caribou herd population estimates and trends in the NWT[i]. ± indicates 95% confidence interval on estimate, except where standard error (SE) is noted. Population estimates are based on scientific surveys completed since the 1980s.

Barren-ground caribou herd	Population estimates			Recent trend	Short-term approach to address recent trend
	High (year)	Low (year)	Most recent		
Tuktoyaktuk Peninsula	**3,320** ± 623 (2006)[21]	**1,499** ± 614 (2018)	**1,499** ± 614 (2018)	Continued decline since 2006	More information required
Cape Bathurst	**16,813** ± 18,119 (1987)[22]	**2,039** ± 319 (2006)[23]	**4,521** ± 876 (2018)	Roughly stable 2006-2015; increasing 2015-2018	Maintain current trend
Bluenose-West	**140,083** ± 31,828 (1987)[24,25]	**21,011** ± 4,602 (2018)	**21,011** ± 4,602 (2018)	Roughly stable since 2006	Increase trend
Bluenose-East	**120,880** ± 13,398 (2010)[26]	**19,294** ± 3,230 (2018)	**19,294** ± 3,230 (2018)	Continued decline since 2010	Stop the decline
Bathurst	**472,000** ± 147,017 (1986)	**8,210** ± 3,604 (2018)	**8,210** ± 3,604 (2018)	Continued decline since 1986	Stop the decline
Beverly[j,k]	**276,000** ± 106,600 SE (1994)[27]	**103,372** ± 5,109 SE (2018)[28]	**103,372** ± 5,109 SE (2018)	Slow decline since 2011-2018[29]; decline since 1994	Stop the decline
Ahiak[l]	Not available	Not available	**71,340** ± 3,882 SE (2011)[29]	Unknown	More information required
Qamanirjuaq[m]	**496,000** ± 105,400 SE (1994)[30]	**264,718** ± 21,913 SE (2014)[31]	**288,244** ± 22,439 SE (2017)[32]	Roughly stable 2014-2017; slow decline from 2008-2017; decline since 1994	Stop the decline

[i] High and low estimates (if known) are based on surveys since the 1980s. Population estimates for 2017 and 2018 are based on unpublished data from the GNWT and Government of Nunavut.
[j] The Beverly herd was defined by calving ground surveys up to 1994 based on an inland calving ground south of Garry Lake. The Beverly herd was redefined in 2011 as calving in Queen Maud Gulf and may not be equivalent to the Beverly herd as defined to 1994.
[k] The 1994 Beverly estimate used a different method to extrapolate total herd size (based on breeding females) than the method used for 2011 and 2018 surveys (based on all females).
[l] The Ahiak herd as defined in 2011 does not correspond to earlier Ahiak surveys in the 1990s and 2000s.
[m] The 1994 Qamanirjuaq estimate used a different method to extrapolate total herd size (based on breeding females) than the method used for 2008, 2014, and 2017 surveys (based on all females).

5. LIMITING FACTORS, THREATS, AND POSITIVE INFLUENCES

5.1. Natural Limiting Factors

Barren-ground caribou are a resilient and adaptable species and occupy diverse habitats. In general, they are adapted to a range of environments, temperatures, and forage, and they have the long, slender legs and endurance to walk hundreds of kilometers. However, barren-ground caribou prefer and are well-adapted to colder temperatures. They may be vulnerable to extreme heat and there has been some speculation in traditional knowledge sources that barren-ground caribou may begin to range further north in an effort to avoid stresses related to this kind of heat. Cold weather also helps prevent icing conditions and inaccessibility of forage. Traditional knowledge studies indicate that barren-ground caribou do not tolerate noise or human disturbance well, resulting in changes in behaviour and stress. Minimizing noise disturbance is important for barren-ground caribou.

Barren-ground caribou are generalist foragers, particularly in the snow-free period, however, their preferred winter forage is lichen. Lichens are high in digestible carbohydrates, but low in protein and minerals. Caribou are able to offset low protein content by recycling nitrogen and by also selecting for vascular plants higher in protein. As well, a mixed diet of lichen and vascular plants stimulates digestion of the lichen. Therefore, while not an obligate relationship, the availability of lichen on the winter range likely limits caribou distribution. In situations where lichen is substantially disturbed or removed (e.g. from forest fires), regrowth of lichen is very slow.

5.2. Threats

Indigenous peoples have co-existed for a long time with barren-ground caribou and with the certainty that although their numbers may go up and down, caribou eventually come back. However, changing conditions across barren-ground caribou ranges reduce that certainty and make predicting caribou movements, behaviour, and migrations more challenging.

Barren-ground caribou are affected by multiple threats and each herd is exposed to these threats to varying degrees. Threats that can be managed to some extent include predation, harvest, land use activities, forest fires, and environmental contaminants and pollution. Other threats are more difficult to manage, such as parasites/disease and climate change. Combined climate change impacts are perhaps the greatest single threat.

The combined influence of these threats is acting in addition to large natural population fluctuations. The cumulative effects from multiple interacting threats are considered unprecedented. As the importance of these threats differs among herds, it is important to monitor and manage the threats that each herd is exposed to separately.

The below subsections describe each threat in more detail. They are presented in no particular order.

5.2.1. Management Complexity

The extensive range and transboundary nature of barren-ground caribou herds leads to interjurisdictional complexity. In the NWT, caribou conservation involves the participation of many IGOs, territorial/provincial/federal governments and agencies, co-management boards, various stakeholder organizations, and communities. Differences in political, cultural, economic, land management, and wildlife management interests create a net effect where management on caribou seasonal ranges can be fragmented, disjointed, and partial.

However, progress has been made to facilitate the challenges encountered by transboundary partners working towards the conservation of barren-ground caribou. As discussed earlier (subsection 1.1.1), herd-specific management plans and community conservation plans support cross-regional action planning by providing specific guidance on what management for barren-ground caribou looks like from a community perspective. Co-management organizations have also been established to bring together representatives from public governments, IGOs, and cultures that share conservation responsibilities. The Beverly and Qamanirjuaq Caribou Management Board was established in 1982, in part, to help provide a consistent approach to the conservation of the Beverly and Qamanirjuaq herds and to promote communication among diverse participants. The Advisory Committee for Cooperation on Wildlife Management (ACCWM) was created to share information and coordinate wildlife management between inter-jurisdictional wildlife management boards, with a particular focus on the management of trans-boundary caribou herds.

In addition to interjurisdictional complexity, obtaining some information, such as herd size/composition and harvest levels, affects the ability of governments and co-management boards to respond rapidly to declines. When declines are initially reported, there is an understandable desire to first confirm and then an obligation to consult on the declines before taking actions. The Bathurst herd's decline was first identified in 2003, but limited actions were undertaken until 2010, by which time the decline had accelerated and population size was further reduced. Further, interweaving traditional knowledge with scientific knowledge in a timely, meaningful, appropriate, and respectful way presents more challenges.

Although some herds have management plans and guardianship programs in place, a key challenge is the lack of long-term management plans for all herds, especially in the context of cumulative effects.

5.2.2. Land Use Activities

Land use activities have the potential to increase access for harvesters and predators, create energetically costly disturbances, and/or create barriers to movement. Disturbances (low flying aircraft, people on foot, and vehicles) can increase caribou energetic costs, particularly if caribou are feeding, resting, or migrating. Roads and development sites may be avoided or act as barriers to movement (altering migration routes). Concerns about cumulative effects and development footprints are an ongoing concern. There still remains considerable uncertainty about when, how, and if there is a threshold for cumulative effects at which clear and predictable effects on herd size and trend can be expected. Many traditional knowledge holders see these combined activities as being disrespectful to caribou and link them to changes in caribou populations.

The NWT remains relatively undisturbed compared to most Canadian jurisdictions. Land use in some barren-ground caribou ranges is relatively low (e.g. Bluenose-West and Bluenose-East). Other ranges have experienced more substantial land use activities. Industrial development activities (exploration, mining, and oil and gas) have varied over time, in a boom and bust cycle dependent upon the global economy. Following peaks in the 1990s and mid- to late 2000s (prior to the 2008 market crash), exploration and development activity has, for the most part, been declining in the NWT. However, the NWT has large undeveloped oil and gas reserves that could represent a significant portion of Canada's marketable petroleum resources. There has been some recent increase in prospecting and mineral claims as a result of interest in diamond, gold, base metal, rare earth element, and uranium exploration. Mineral exploration and mining have increased in areas such as the Kitikmeot and Kivalliq regions of Nunavut.

The range of the Bathurst herd, which has experienced the greatest population decline, has also experienced the greatest amount of pressure from human activity. Exploration within the Bathurst range increased rapidly through the early to mid-2000s to peak at 95 exploration camps in 2006. Winter roads, all-season roads, and highways totalling over 2,100 km in length occur within the Bathurst herd's range. Within the next two decades, development is forecasted to increase on the tundra in the range of the Bathurst herd.

Despite decades of concerns, calving grounds remain mostly unprotected by legal mechanisms, with the exception of the Bluenose-West herd's calving ground, which is largely protected by Tuktut Nogait National Park, and the Beverly and Ahiak herd's calving grounds, which are provided partial protection by the Queen Maud Gulf Migratory Bird Sanctuary.

Developments on calving grounds are a significant potential threat as almost all the females of a herd are in one relatively small area during calving. Intact calving grounds are generally accepted as being essential for the continued survival of the herds. Well-known trails and water crossings are also used repeatedly by migrating barren-ground caribou. Water crossings are extremely important and play a large role in dictating the direction caribou travel across the landscape. Water crossings are particularly sensitive to human disturbances such as the construction of camps, cabins, mines, roads, or other infrastructure in their vicinity, and if crossings become blocked or are subject to major disturbances, migration routes may shift to less familiar and less desirable areas.

5.2.3. Forest Fires

Forested winter range offers caribou more shelter during winter months, and potentially better lichen forage than can be found on the tundra. Community members have stated that caribou that winter in the forest are larger than caribou that spend all their time on the tundra.[33]

Fire renews forest stands and is a normal occurrence in the boreal forest ecosystem. However, forest fires can affect the availability of forage, especially slow-growing lichen. In the NWT, regeneration of lichen-supporting forest stands can take 70-230 years. Caribou have adapted to fire over thousands of years by shifting from recently burned areas to unburned older forests. Traditional knowledge holders explain that caribou tend to avoid recently burned areas and may not return to a burned site for upwards of 100 years, when the habitat may be suitable again. Recent studies on the Bathurst winter range indicate that caribou do use recently burned areas more than expected, possibly to access nutritious regenerating vegetation. Caribou are also known to use unburned or little-burned areas within burns.

Forest fires disturb an average of 600,000 hectares (ha) of NWT forest annually. A warming climate may mean an increase in the intensity, duration, and frequency of big fire years like 2014 (approximately 3.4 million ha were disturbed), and potentially a shift to a younger forest overall, with less of the prime, older, lichen-rich forests that caribou prefer.

Some community observers from the NWT and Saskatchewan have identified loss of barren-ground caribou winter range to fire as a serious concern for caribou and have asked for protection for key unburned winter range areas in important migratory corridors. Some of these areas have been mapped and will be considered in fire management practices, including values at risk fire planning. In big fire years like 2014, with exceptionally dry and warm conditions, some fires will burn regardless of fire-fighting activities and NWT communities and infrastructure will remain the priority for fire suppression. Suppressing all fires is unrealistic and in the past, in the south, has resulted in building fuel for fires that may then be more intense.

5.2.4. Climate and Range Conditions

A rapidly changing climate means that the pace of change in environmental variables (temperature, precipitation, etc.) is accelerating, as are changes in vegetation and habitat on the tundra and in the boreal forest. It is difficult to know what impact climate-related changes will have, however, changes to the ecology of barren-ground caribou due to climate change will be complex, consisting of positive and negative effects.

Documented changes to the range of barren-ground caribou include longer growing seasons, increases in shrub cover, changes in the timing of spring green-up, and decreases in lichen. Precipitation has also changed, with increases in wet snow or freezing rain in the Arctic tundra that have been linked to mortality of caribou. Some NWT barren-ground caribou ranges have experienced increased drought in the summer. Elders have observed more freeze-thaw cycles that trap tundra vegetation under ice, meaning that barren-ground caribou must work harder to get at their food. Deep or wind-packed snow and ice crusts make it hard or even impossible to access forage and may also influence the ability of caribou to move across the landscape. Melting or thawing permafrost has also been noted, as well as increases in the number of insects. Changes in the presence and abundance of other ungulates and predators have been observed and further changes are anticipated, however, predicting future trends is difficult.

Climate change signals are particularly strong in the Arctic and the Mackenzie River valley. In the Mackenzie District (western and southwestern NWT), the increase is so pronounced that it drives national averages: between 1948 and 2011, winter temperatures increased by 4.5°C.[34] During hot, dry summers, plant growth may be of poor quality for caribou and abundant insects may interfere with caribou feeding, resulting in poor physical condition in cows and lower pregnancy rates. Traditional knowledge holders have extensive experience observing this behaviour and explain how caribou can run around in a frenzy and then collapse in exhaustion - the link between increased temperatures, insects, and caribou exhaustion is well understood. Hot, dry summers will also likely mean more large fire years and altered winter foraging conditions for caribou in the boreal forest. These factors are likely to be of increasing importance to NWT barren-ground caribou herds in the future and will need to be monitored and understood better. A changing climate may also mean an influx of diseases and parasites previously uncommon in the NWT, as well as more favourable conditions for disease outbreaks, parasitism, and invasive species. Further, traditional knowledge holders talk about how caribou can change their range when competitors such as moose and deer expand their ranges.

As climate change is a global phenomenon, climate change needs to be addressed at a global scale. However, while total emissions in the NWT are low on a national scale, the NWT economy depends heavily on fossil fuels to meet its energy needs. This dependence on fossil fuels results in significant greenhouse gas emissions per capita in the NWT.[35] Taking shared action on this threat is therefore important.

5.2.5. Parasites and Disease

Parasites such as warble flies have been shown to significantly influence barren-ground caribou behaviour, body condition, pregnancy rates, and ultimately productivity and survival. Barren-ground caribou also harbour a diverse array of gastro-intestinal nematodes and tapeworms, muscle and lung worms, as well as blood parasites, but their interrelationships are not well described or understood. Some parasites (i.e. bot flies) are commonly found in harvested caribou, but are not considered overly harmful.

Although it is very unusual for caribou to be killed by insects outright, excessive harassment by mosquitoes can impact caribou through stress-related effects that may further impact behaviour, body condition, and productivity.

Warbles bite caribou and lay their eggs under the skin. The eggs then hatch into larvae, which bore holes into the hide. The stress caused by these insects can result in less time spent resting and foraging. The level of infestation is partly determined by weather. Adult flies are active only when the temperatures and wind speed are suitable. Warble fly activity on the summer range of the Bathurst herd has shown a significant increase as summers have become warmer, especially after the early 1980s. In this manner, climate change may therefore increase the incidence of parasites and disease.

Territory expansion by other species, including wood bison and white-tailed deer, may increase the potential for disease transmission to barren-ground caribou. Chronic wasting disease (CWD) is transmitted between species and is considered a potential threat to barren-ground caribou. CWD has not been recorded in the NWT, however, if it reaches the range of barren-ground caribou herds it is expected to have devastating effects.[36] CWD is transmitted and spread through both direct (animal to animal) and indirect environmental (animal-to-premises-to-animal) transmission. CWD is a progressive and fatal disease of the nervous system and it is known to naturally infect white-tailed deer, mule deer, moose, red deer, elk, and reindeer.[37] Other interspecific diseases that caribou may be susceptible to include anthrax, Johne's disease (*Mycobacterium avium paratuberculosis* (MAP)), brucellosis, and foot rot.

Harvesters and community members have reported numerous instances of poor body condition, including changes in the flavour, colour, and smell of the meat (e.g. yellow/white pus on the meat, cysts or white spots in the meat, blister-like spots) and abnormalities in the meat and internal organs (lungs stuck to rib cages, swollen joints, sandpaper skin, sores and puss, watery joints, bad livers). Information from hunters and observers on the land provides key insights into caribou health.

Monitoring of harvested caribou provides general assessments of health and disease in NWT herds. In addition, assessing potential threat risks would be beneficial to barren-ground caribou health monitoring.

5.2.6. Predation

Barren-ground caribou are an integral part of the ecosystem and a number of predators rely on caribou as a prey species, including wolves, grizzly bears, wolverines, lynx, and possibly golden eagles. Predation is a limiting factor in barren-ground caribou ecology as it can affect adult and calf survival rates, thus ultimately affecting abundance.

The role of predation on barren-ground caribou abundance differs among herds. Predation rates are influenced by barren-ground caribou life stage, seasonal distribution, and environmental conditions. Predation likely has a greater impact on barren-ground caribou populations during declines and the phase of low numbers (i.e. mortality has a greater effect on lower populations). In addition, when predation pressure is combined, or interacts, with other factors (climate change, parasites, disease, loss of habitat, harvest) it may threaten the ability of barren-ground caribou populations to recover.

Wolves are considered the primary predator of barren-ground caribou throughout the year. Wolves and caribou are linked in that wolf abundance and productivity are in part limited by the caribou population. However, there is uncertainty as to how and when wolf abundance responds to changes in caribou abundance because there is limited information on wolf abundance available in the NWT. Traditional knowledge holders from several communities have indicated that in some areas the number of wolves is increasing in the NWT. Increases in wolf populations may occur in response to increases in alternate prey abundance (e.g. moose, muskoxen) or in response to decreases in the number of people hunting wolves. In other areas of the NWT, wolf populations may be declining. Scientific studies on wolf-caribou dynamics were completed on the summer range of the Bathurst caribou herd from 1996 to 2012. This work suggested that wolf numbers and productivity declined as caribou numbers declined. Despite the decline, it is likely that wolves continue to have an impact on caribou populations.

Grizzly bear predation on barren-ground caribou has been described by traditional knowledge holders as occurring during the calving period when the calves are young and vulnerable. Some surveys suggest that there are more grizzly bears than wolves on the calving grounds. There are also reports of increasing numbers of grizzly bears in some areas of the NWT (Mackenzie Mountains, mainland of the Inuvialuit Settlement Region, and the Arctic Archipelago),[4] including within the ranges of the Bluenose-East, Bluenose-West, Cape Bathurst, and Tuktoyaktuk Peninsula herds.

As barren-ground caribou population numbers have fallen to historic lows, there have been increasing calls for action to reduce predator populations that may be limiting the ability of herds to recover. Predator control or removal has been highly controversial in Canada and views about predator removal vary in the NWT. In 2016/2017, the Wolf Feasibility Assessment Technical Working Group was established and compiled information on wolf management options in the Bathurst herd's range and associated costs, likely effectiveness, risks, and uncertainties.[38] There has also been interest in predator management on the ranges of other herds.

Whether predator populations are increasing or decreasing, there is a desire to better understand the impact predation has on barren-ground caribou. There is little recent information available about predation rates of wolves or grizzly bears on barren-ground caribou in the NWT. Information on predation has been collected primarily through sightings during aerial surveys and through the number of predators harvested. Management decisions and actions would benefit from a holistic approach that incorporates information on predator abundance and predation rates.

5.2.7. Disrespectful Harvesting Practices

Since time immemorial, Indigenous peoples have harvested barren-ground caribou for subsistence, sustenance, clothing, tools, materials, and more. The relationship between people and caribou was fostered though respectful practices such as honouring caribou that "give" themselves so that people can survive. Many traditional knowledge holders talk about harvesting caribou as defining what it means to be a northern Indigenous person such that cultural identity is threatened without maintaining this cultural practice. No other animal has had such a profound influence on northern Indigenous peoples socially, culturally, or economically in most NWT communities. However, harvest has a direct impact on barren-ground caribou numbers and is an important factor to consider in management for this keystone species.

Harvest alone is not considered a threat to the ability of barren-ground caribou populations to recover, particularly when herds have stable to increasing populations and harvest rates are low. However, when populations are declining or when herd numbers are low, harvest can negatively influence the ability of a herd to recover, particularly where roads enable easy access for hunters. Further, when traditional harvesting protocols are not taught or practiced, caribou well-being is threatened.

Changes to hunting practices, such as technological enhancements (powerful snow-machines, air-supported hunts, knowledge of caribou locations from satellite collars) or increasing access (development and use of winter and all-season roads) have the potential to adversely affect population recovery. These disrespectful harvest practices are considered a threat.

Measuring the impact of this threat requires successful harvest monitoring to detect trends, including information on how many animals are being taken and whether those animals are cows, calves, or bulls. Continuous, reliable, long-term information on harvesting will help Management Authorities better understand how harvest influences herds. Developing effective means of communicating and sharing information is also critical for informing management decisions. In the NWT, harvest information is collected by government and IGOs, but there are regional differences in the approach and scale of harvest monitoring in different areas. Community guardianship/monitoring initiatives have a role in collecting this important information.

Concerns related to non-traditional harvest practices should also be considered. These include reckless shooting, inappropriate or heavy use of motorized vehicles (pickup trucks versus snowmobiles), wasting meat and leaving carcasses on the ground, not sharing meat, and not using the entire carcass. Other concerns include the sale of barren-ground caribou meat and traditional harvest shifting from declining herds to adjacent herds (e.g. shifting harvest from Bathurst to Bluenose-East, Beverly, Ahiak, and Qamanirjuaq herds). The impact of these threats is unknown, but they are recognized as likely affecting caribou populations.

Ensuring that barren-ground caribou remain a cultural and ecological keystone species will require a concerted effort towards respectful harvest, harvest education, promotion of traditional laws and values, harvest management measures, and harvest reporting that is both accurate and complete.

5.2.8. Environmental Contaminants and Pollution

Contaminants can affect caribou health and condition and the effect of pollution, including tailings ponds, hazardous waste, and airborne particulates from mines, is identified as an important concern for traditional knowledge holders. However, monitoring for more than 20 years suggests that contaminant levels in herds across the NWT, Nunavut, and Yukon are generally low and stable. Caribou are monitored for the presence and concentration of contaminants, such as heavy metals like cadmium and mercury, and various chemicals used as pesticides and herbicides. Variation in concentrations of heavy metals among herds is apparent and possibly related to the proportion of lichen in the diet.

5.2.9. Cumulative Effects

Cumulative effects[n] have become an increasing concern for NWT communities, particularly for herds at low numbers where any impediments to recovery are problematic.[7] Most barren-ground caribou herd populations are now at low points and they are facing an unprecedented level of cumulative effects from multiple interacting threats. These include development and industrial activity (including mines, mills, roads, and powerlines), disrespectful treatment by humans not following traditional laws and harvesting protocols, use of advanced hunting equipment, increased access for harvesters and predators, and climate change. Each major development project that is subject to environmental assessment includes a cumulative effects assessment, but a range-wide approach is needed to properly assess and manage the threat from multiple interacting factors.

5.3. Factors That May Have a Positive Influence

The immense importance that barren-ground caribou have had to NWT Indigenous cultures, in some cases for thousands of years, means that safeguarding caribou habitat and giving herds at low numbers a chance to recover are high priorities for Indigenous peoples. In some cases, Indigenous governments and organizations have taken a lead role in developing plans that define their own limits to harvesting and set out other actions such as guardianship programs to promote herd recovery and healing the relationship between people and caribou.

A number of management instruments are already in place for herds in the NWT. A management plan called *Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan* was developed by a group of co-management boards called the Advisory Committee for Cooperation on Wildlife Management (ACCWM) and finalized in late 2014. Action plans for all three herds were completed in 2018 and these are updated annually. In 2014, the Beverly and Qamanirjuaq Caribou Management Board (BQCMB) finalized an updated *Beverly and Qamanirjuaq Caribou Management Plan: 2013-2022*, the fourth management plan produced by the BQCMB and supported by the GNWT since 1982. These herd-specific plans are comprehensive and include actions that may be taken to address harvest, predators, land use, habitat protection, threats to caribou, and the need to respect caribou.

A *Bathurst Caribou Range Plan* has been drafted and is scheduled to be finalized in 2019 following approval by the Tłı̨chǫ Government and GNWT. The range plan is focused on developing an approach to range-wide management of development that considers key habitats like calving grounds, water crossings, and core ranges used by the Bathurst herd at low numbers.

---

[n] Cumulative effects refer to changes to the environment that are caused by an action in combination with other past, present, and potential future human actions. Cumulative effects are usually greater than the sum of individual effects.

In addition to these plans, most NWT herds have been subject to measures implemented by governments and co-management boards between 2006 and 2016. Hearings held by co-management boards have been a key part of reviewing information and determining actions to be taken for each herd. Harvest has been restricted on most NWT herds' ranges since 2007-2010 and was closed on the Cape Bathurst range in 2007 and the Bathurst range in 2015. Various forms of subsistence and resident harvest restrictions or protections are in place for the Tuktoyaktuk Peninsula (seasonal protection – Inuvialuit harvest restricted between April 1 to June 15 to permit the migration of the Cape Bathurst herd), Bluenose-West (Indigenous harvest limited by quota), Bluenose-East (voluntary restriction of Indigenous harvest), Beverly (NWT resident harvest is limited to one male per year), and Ahiak (NWT resident harvest is limited to one male per year). Currently, there is no commercial harvesting of any barren-ground caribou herd in the NWT[o]. These restrictions, along with collaborative co-management planning and application of traditional laws and protocols, have contributed to stabilizing trends in the Cape Bathurst and Bluenose-West herds since 2006.

Habitat protection for barren-ground caribou in the NWT is currently offered through existing protected areas, while proposals for protected areas may offer additional future protection (Thaidene Nene, Ezdzìtì, Thelon Wildlife Sanctuary, Edaįįla, Saoyú-ʔehdacho National Historic Site, Tuktut Nogait National Park, Yambahti). Range planning processes and regional land use planning processes (Gwich'in, Sahtú, Tłįchǫ, and Nunavut land use plans, and the six community conservation plans in place in the Inuvialuit Settlement Region) may also offer some protection. The GNWT and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) have developed a draft Terms of Reference for a land use planning committee for the public lands in Wek'èezhìı, and are working towards the start-up phase to plan for the public lands in Wek'èezhìı. In the southeastern NWT, the GNWT and CIRNAC are working in partnership with the Akaitcho Treaty 8 Tribal Corporation, the Athabasca Denesųłiné, and the Northwest Territory Métis Nation on the Terms of Reference to design a land use planning process based on future land claim settlements being negotiated in this area. The GNWT is engaging with IGOs with traditional territories in this area to understand their interests in future planning. The Dehcho Land Use Planning Committee, made up of representatives from the Dehcho First Nations, Canada, and the GNWT is leading the development of an Interim Dehcho Land Use Plan pursuant to the Dehcho Interim Measures Agreement.

The direct and indirect effects of climate change are important factors influencing barren-ground caribou recovery and health. The GNWT has developed a territorial climate change mitigation and adaptation framework to guide mitigation and adaptation activities within the NWT.

[o] Note that there is commercial harvest of the Bathurst and Qamanirjuaq herds in Nunavut for Nunavut outfitters (Bathurst) and the Rankin Inlet meat plant (Qamanirjuaq).

5.4. Knowledge Gaps

1. **Climate change impacts:** Climate change may act as a continuing threat to barren-ground caribou through a complex mechanism involving shifts in timing of green-up, changes in summer forage quality, rain-on-snow and icing events on the winter range, longer fire seasons, melting permafrost and erosion, changes to freeze-up and thaw timing, and increasing shrub cover. Parasites and diseases are a potential and complex threat under a warmer climate. Shifts in ranges of deer, moose, and other species will also affect caribou ranges. A better understanding of the impacts of climate change on barren-ground caribou habitat is needed.
2. **Predator-prey dynamics:** Predation plays a stronger role when barren-ground caribou are at low numbers, but the impact of predators is unclear. Predation can affect survival of adult and calf caribou and therefore abundance, and there are reports of increasing predator populations in some areas. Information on predator abundance and distribution, as well as on the effectiveness of predator management actions, would benefit management decisions. Information on the impact of predators on caribou numbers and herd dynamics, the impact of different predators, which age/sex class(es) of caribou are most affected, and how predation impacts recovery is also required.
3. **Impacts of human-caused disturbance:** Industrial development is considered to be a significant factor affecting barren-ground caribou, however, a clear link has not been established. Activities and infrastructure associated with exploration and development may disturb caribou and affect their behaviour (e.g. migration patterns, gregarious calving behaviour), reduce the quantity, quality, and availability of habitat and forage, and facilitate access to caribou for hunters and predators. This can contribute to reduced caribou reproduction and survival rates and population declines. Further, many community members talk about disturbance as being disrespectful and harmful to overall caribou well-being. Additional information is needed.
4. **Natural disturbance regimes:** Forest fires represent the most visible factor driving habitat fragmentation and change, impacting forage availability and movement. This threat is particularly important in the winter range. Climate change may lead to even hotter and drier summers in the NWT, possibly increasing the frequency, size, and intensity of fires. Recognizing uncertainties, it is important in the interim to pursue an experimental approach, with companion research to determine effectiveness over time. Research into the implications of climate change on wildfire frequency, intensity, and extent is also required.[8]
5. **Population/demography:** Barren-ground caribou populations undergo large fluctuations over periods of several decades. Caribou can respond to changes in climate and the ecosystem, as well as to human-caused disturbance, through changes in abundance, productivity, and distribution. However, the extent to which caribou can adapt to rapid and often complex changes and fluctuations is poorly understood (for example frequency and rate of herd switching).

6. **Cumulative effects:** The impact of multiple interacting threats to barren-ground caribou and their habitat is considered unprecedented and the implications to barren-ground caribou are unknown. More information is required to understand the scope and scale of cumulative effects from natural and human-caused stressors.
7. **Harvest information:** Harvest plays a stronger role when barren-ground caribou are declining or at low numbers. Management actions such as hunting restrictions have contributed to stabilizing trends in some herds, however, the relationship between harvest and population trends is complex and difficult to measure. Improved harvest information, including information about wastage, would help guide management actions. The practice of traditional laws around harvesting is critical to caring for caribou.
8. **Health (including nutrition, disease, parasites, toxicology, and contaminants):** It is not known if the decline in reproductive rate is due to body condition, energy use/availability, or overall nutrition from the diet. A better understanding of general health (pregnancy rates, mortality rates, etc.), condition, diseases, parasites, and insect harassment would help guide management decisions.
9. **Identification of important/preferred habitat:** It is generally recognized that some areas of the seasonal and annual ranges are more important to barren-ground caribou.[8] Additional research on habitat use, forage availability, and habitat importance and sensitivity would help to identify key areas and habitats for barren-ground caribou. An improved understanding may help provide better spatial and temporal resolution for identifying sensitive habitats and times for barren-ground caribou that can be incorporated into mitigation measures and habitat protection.

6. CONSERVATION AND RECOVERY

6.1. Conservation and Recovery Goals and Objectives

The long-term vision of this strategy is to conserve barren-ground caribou and to ensure that barren-ground caribou remain a cultural and ecological keystone species. The vision includes ensuring that barren-ground caribou are able to move freely on the land within their historic ranges to ensure natural habitat use and migration. The overall goals of the recovery strategy are to:

1. Maintain or restore self-sustaining, resilient populations of each barren-ground caribou herd, such that no herd is lost.
2. Support unobstructed movement and migration of barren-ground caribou across historic ranges.
3. Promote the social, cultural, and environmental conditions necessary for recovery.

As noted in subsection 4.2.2, the natural range of variation for population numbers is difficult to quantify. Barren-ground caribou herds have undergone large fluctuations in population size in the past, but it is not known how high or how low their numbers were. Population estimates are only available for the recent past (within the last 50 years, or one population cycle). These documented low and high numbers are presented in Table 3, along with the recent trend for each herd.

Short-term milestones towards reaching the recovery strategy goals are listed below (also see Table 3 in subsection 4.2.2, *Changes in Population*).

- Tuktoyaktuk Peninsula herd – more information is required to determine short-term milestones
- Cape Bathurst herd – maintain current trend
- Bluenose-West herd – increase trend
- Bluenose-East herd – stop the decline
- Bathurst herd – stop the decline
- Beverly herd – stop the decline
- Ahiak herd – more information is required to determine short-term milestones
- Qamanirjuaq herd – stop the decline

In order to accomplish the recovery strategy goals, five objectives have been established (Table 4), combined with recommended approaches to achieve these objectives. Progress toward achieving these objectives will be evaluated every five years.

Table 4. Conservation and recovery objectives.

No.	Conservation and Recovery Objectives
1	Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.
2	Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.
3	Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.
4	Conserve and protect barren-ground caribou populations and their habitat.
5	Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.

6.2. Approaches to Achieve Objectives

This recovery strategy recommends the following approaches to achieve the conservation and recovery objectives:

Objective 1: Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.

In the NWT, caribou management involves interactions among many IGOs, territorial/provincial/federal governments and agencies, co-management boards, various stakeholder organizations, industrial interests, and communities. Successfully managing threats to barren-ground caribou in the NWT requires collaborative decision-making with these partners.

Management plans have been completed and implementation is underway for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq herds. Implementation of these plans needs to be continued and resourced adequately. Work remains to be done to complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst herds. As most NWT herds range into neighbouring jurisdictions, transboundary agreements and collaboration are necessary for consistent and effective management. The Ahiak herd is not currently subject to a co-management agreement or management plan, and monitoring and management is primarily the responsibility of the Government of Nunavut and other Nunavut organizations. However, management of this herd is done collaboratively between the Government of Nunavut and GNWT. Further to these management plans, Indigenous monitoring programs based on traditional knowledge of elders, harvesters, and community members have been developed to collect field knowledge of barren-ground caribou and their habitat. Indigenous-led caribou conservation and guardianship programs can be a key component in caring for caribou. Indigenous guardians can play an important role in monitoring caribou health and conditions on the land, respectful harvesting, and promoting conservation.

Meaningful participation in management for wildlife in the NWT, and particularly management for caribou, will be enhanced if IGOs have sufficient resources to participate meaningfully and the commitment that their contributions and understandings will be considered fully and equally.

Approach 1.1: Implement herd-specific management plans for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq caribou herds to promote recovery and conserve habitat.

Approach 1.2: Complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst caribou herds to promote recovery and conserve habitat.

Approach 1.3: Continue working with partners in Nunavut on effective conservation of the Ahiak herd.

Approach 1.4: Review and update herd-specific management plans as required.

Approach 1.5: Support community-based barren-ground caribou monitoring, guardianship, and conservation plans.

Approach 1.6: Continue working to secure adequate resources and ongoing support from governments and other partners (including industry, co-management and regulatory boards, and non-government organizations) for the implementation of this recovery strategy and the management, monitoring, guardianship, and conservation plans noted in approaches 1.1 to 1.5.

Approach 1.7: Increase capacity among Indigenous partners to participate equally and meaningfully in the conservation of barren-ground caribou.

Approach 1.8: Cooperate in the development and implementation of the national barren-ground caribou recovery strategy including identification and protection of critical habitat, and defining population and distribution objectives.

Objective 2: Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.

Difficult harvest management decisions were required when declines in barren-ground caribou became apparent. Since then, herd numbers have been monitored more closely compared to when population numbers were high. This kind of monitoring is expensive but it provides key information on herd status and range use. Monitoring of indicators like late-winter calf-cow ratios, cow survival and pregnancy rates, health and condition of harvested caribou, disturbance on the land, industrial development impacts, range and vegetation condition, trends in environmental variables, harvest levels, and predator abundance has also intensified. Monitoring of this kind is often done using scientific methods, but information from elders and harvesters on the land can also contribute important information, knowledge, and context. Guardianship programs, as well as Indigenous-led monitoring and health programs, increase both interest in and opportunities to collect baseline information.

Approach 2.1: Monitor size, trend, and health of all NWT barren-ground caribou herds.

Approach 2.2: Monitor predator populations that may affect barren-ground caribou, assess predator-prey relationships and predation rates, and consider responsible predator management options that may benefit barren-ground caribou recovery.

Approach 2.3: Monitor the impacts of other key factors affecting barren-ground caribou and their habitat, including, for example, disease, parasites, insects, and climate change.

Approach 2.4: Monitor changes in habitat quality, quantity, and availability for caribou resulting from natural and human-caused landscape changes.

Approach 2.5: Monitor the status of the relationship between people and caribou as an indicator of caribou well-being.

Objective 3: Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.

Although monitoring of herd size and trend is essential for management, the reasons underlying declines are not fully understood, and projecting herd trend into the future remains difficult. This recovery strategy recognizes the importance of supporting research that may help improve our understanding of factors underlying declines of NWT herds. As Management Authorities have limited capacity for in-depth research, resources should be directed towards increased partnerships with communities, academic researchers, including graduate students, and towards cost-sharing of research projects.

Population models have been used to integrate demographic information to improve understanding of declines, and to assess the likely impacts of various levels of harvest and harvest sex ratio on caribou herds. The Cumulative Impact Monitoring Program and cumulative effects models have helped improve our understanding of how development affects caribou and how future development scenarios may affect caribou.

Large-scale declines in migratory caribou are not limited to the NWT, and there are traditional knowledge holders, researchers, biologists, and managers across North America, Europe, and Russia with shared interests and useful knowledge. Continuing exchange of knowledge and information will begin to heal the relationship between people and caribou and benefit conservation of caribou, habitat, and ecosystems in the NWT and elsewhere. It will be important to share results of herd monitoring and research with co-management partners quickly so that management is based on the best knowledge available.

Approach 3.1: Update or develop population models using current information.

Approach 3.2: Promote the collection and exchange of information on caribou ecology, status, and threats.

Approach 3.3: Promote the collection and exchange of information on the relationships among barren-ground caribou, predators, competitors, harvest, and their wider environment.

Approach 3.4: Assess cumulative impacts of natural and human-caused landscape change on barren-ground caribou and their habitat.

Objective 4: Conserve and protect barren-ground caribou populations and their habitat.

The impact mines, roads, and other exploration and development activities have on barren-ground caribou and their habitat is a concern to many people, particularly on the range of the Bathurst herd. In this context, it is important to develop range-level approaches for managing cumulative impacts and to minimize the effects of development as part of promoting the conditions necessary for recovery.

There have also been increasing calls for action to reduce predator populations that might limit the ability of herds to recover. Predator removal has often been controversial in Canada and views on predator control measures are diverse in the NWT.

Forest fires disturb an average of 600,000 ha of NWT forest annually. A warming climate may mean an increase in the intensity, duration, and frequency of forest fires. The loss of barren-ground caribou habitat to fire is of serious concern to many people. Additional ecological changes associated with climate change will be complex and it is difficult predict whether the sum of these changes will be positive or negative for barren-ground caribou. Harvest restrictions have been implemented for conservation reasons in the NWT ranges of barren-ground caribou herds: Cape Bathurst (since 2007), Bluenose-West (since 2007), Bluenose-East (since 2016), and Bathurst (since 2014-15). Implementation of harvest closures or restrictions will need adequate monitoring to ensure compliance. Accurate, consistent, and complete harvest reporting will be necessary to ensure effective caribou management in the NWT. Ensuring respectful harvest of caribou, including respect for traditional laws and harvesting protocols, will also be necessary.

Most barren-ground caribou herds are now at low points in their abundance and they are facing cumulative effects from multiple interacting threats that are considered unprecedented.

Approach 4.1: Work with industry, governments, and co-management and regulatory boards to develop and implement best practices to minimize impacts of human land use on barren-ground caribou.

Approach 4.2: Consider responsible predator management options that may benefit barren-ground caribou recovery.

Approach 4.3: Develop accurate and complete reporting of barren-ground caribou harvest across the NWT along with estimates of unrecovered kills and wounding losses.

Approach 4.4: Promote respectful harvest of caribou, including respect for traditional laws and protocols, and compliance with harvest management measures.

Approach 4.5: Develop range-level approaches for management of cumulative impacts on barren-ground caribou and their habitat from natural and human-caused landscape change.

Approach 4.6: Conserve integrity of barren-ground caribou habitat through participation in key environmental assessment and land use planning processes in the NWT and other jurisdictions where projects may affect NWT herds.

Approach 4.7: Identify and protect essential and important barren-ground caribou habitats such as calving grounds, post-calving ranges, and important water crossings.

Approach 4.8: Ensure that barren-ground caribou habitat is a key value that is integrated into environmental assessment decisions and conservation planning initiatives in the NWT and other jurisdictions where proposed decisions/initiatives may affect NWT herds.

Objective 5: Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.

Indigenous elders have taught that becoming knowledgeable about the land and the caribou is the way that respect is shown to caribou. Widespread caribou declines and harvest restrictions have meant a loss of opportunities to learn traditional respect and culture through caribou harvesting, but the need to respect caribou and their habitat has never been greater. Public education programs carried out in collaboration with Indigenous organizations, especially with youth in schools and on the land, can promote respect for caribou and ensure that all NWT residents understand the status of caribou herds, traditional protocols around caring for caribou, and the measures necessary for herd recovery.

Approach 5.1: Develop and implement hunter education programs to share information on barren-ground caribou and promote hunter excellence.

Approach 5.2: Support programs centred around barren-ground caribou that bring elders and youth together in schools and on the land.

Approach 5.3: Promote educational programs for diverse audiences to increase understanding of conservation initiatives and management of threats to barren-ground caribou.

6.3. Measuring Progress

At least every five years, a report will be produced focusing on the activities carried out by all parties and the progress made towards meeting the objectives of this recovery strategy. The first such report will be due in 2026. The recovery strategy may also be updated at that time.

Overall progress and success can be measured using various factors, for example: adherence to traditional laws and protocols, renewed relationship between caribou and people, population trends (stable or increasing), species distribution (species continues to be found in its historical range and range recession has not occurred, or has been reversed), and species status (species has not become at risk or further at risk when assessed/re-assessed). These are long-term indicators of success.

Recovery will be considered successful if barren-ground caribou are conserved and their place as a cultural and ecological keystone species is maintained. They should be able to move freely on the land within their historic ranges, facilitating natural habitat use and migration. Healing the relationship between people and caribou will be critical to barren-ground caribou conservation.

Table 4. Recommended approaches for conservation and recovery of barren-ground caribou in the NWT.

Objective	Management approaches	Threats and/or knowledge gaps addressed	Relative Priority[p]/ Time frame[q]
Objective #1: Partners collaborate on the development and implementation of management, monitoring, guardianship, and conservation plans for barren-ground caribou in the NWT.	**Approach 1.1:** Implement herd-specific management plans for the Cape Bathurst, Bluenose-West, Bluenose-East, Beverly, and Qamanirjuaq caribou herds to promote recovery and conserve habitat.	All	Critical/Short-term
	Approach 1.2: Complete and implement herd-specific management plans for the Tuktoyaktuk Peninsula and Bathurst caribou herds to promote recovery and conserve habitat.	All	Critical/Short-term
	Approach 1.3: Continue working with partners in Nunavut on effective conservation of the Ahiak herd.	All	Beneficial/Ongoing
	Approach 1.4: Review and update herd-specific management plans as required.	All	Necessary/Ongoing
	Approach 1.5: Support community-based barren-ground caribou monitoring, guardianship, and conservation plans.	All	Necessary/Ongoing
	Approach 1.6: Continue working to secure adequate resources and ongoing support from governments and other partners (including industry, co-management and regulatory boards, and non-government organizations) for the implementation of this recovery strategy and the management, monitoring, guardianship, and conservation plans noted in approaches 1.1 to 1.5.	Management complexity	Necessary/Ongoing
	Approach 1.7: Increase capacity among Indigenous partners to participate equally and meaningfully in the conservation of barren-	All	Necessary/Ongoing

[p] Relative priority can be *critical*, *necessary* or *beneficial*. Critical approaches are the highest priority for the conservation of caribou and should be implemented sooner rather than later. Necessary approaches are important to implement for the conservation of caribou but with less urgency than critical. Beneficial approaches help to achieve management goals but are less important to the conservation of the species compared to critical or necessary.

[q] Relative timeframe can be short-term, long-term, or ongoing. Short-term approaches should be completed within five years (2026) and long-term approaches require more than five years to complete. Ongoing approaches are long-term actions carried out repeatedly on a systematic basis.

	ground caribou.		
	Approach 1.8: Cooperate in the development and implementation of the national barren-ground caribou recovery strategy, including identification and protection of critical habitat, and defining population and distribution objectives.	All	Critical/Short-term
Objective #2: Monitor barren-ground caribou, their habitat, and key factors and threats that may be affecting the status and health of herds in the NWT.	**Approach 2.1:** Monitor size, trend, and health of all NWT barren-ground caribou herds.	All	Critical/Ongoing
	Approach 2.2: Monitor predator populations that may affect barren-ground caribou, assess predator-prey relationships and predation rates.	All	Necessary/Ongoing
	Approach 2.3: Monitor the impacts of other key factors affecting barren-ground caribou and their habitat, including, for example, disease, parasites, insects, and climate change.	All	Necessary/Short-term
	Approach 2.4: Monitor changes in habitat quality, quantity, and availability for caribou resulting from natural and human-caused landscape changes.	All	Necessary/Ongoing
	Approach 2.5: Monitor the status of the relationship between people and caribou as an indicator of caribou well-being.	All	Necessary/Ongoing
Objective #3: Fill knowledge gaps, using traditional, community, and scientific knowledge, to enhance responsible and respectful barren-ground caribou conservation.	**Approach 3.1:** Update or develop population models using current information.	All	Beneficial/Short-term
	Approach 3.2: Promote the collection and exchange of information on caribou ecology, status, and threats.	All	Necessary/Ongoing
	Approach 3.3: Promote the collection and exchange of information on the relationships among barren-ground caribou, predators, competitors, and their wider environment.	All	Necessary/Ongoing
	Approach 3.4: Assess cumulative impacts of natural and human-caused landscape change on barren-ground caribou and their habitat.	Cumulative effects	Necessary/Ongoing
Objective #4: Conserve and protect barren-ground caribou populations and their habitat.	**Approach 4.1:** Work with industry, governments, and co-management and regulatory boards to develop and implement best practices to minimize impacts of human land use on barren-ground caribou.	Land use activities	Necessary/Ongoing
	Approach 4.2: Consider responsible predator management options that may benefit barren-ground caribou recovery.	Predation	Necessary/Ongoing
	Approach 4.3: Develop accurate and complete reporting of barren-ground caribou harvest across the NWT along with estimates of unrecovered kills and wounding losses.	Disrespectful harvesting practices	Critical/Ongoing

	Approach 4.4: Promote respectful harvest of caribou, including respect for traditional laws and protocols, and compliance with harvest management measures.	Disrespectful harvesting practices	Critical/Short-term
	Approach 4.5: Develop range-level approaches for management of cumulative impacts on barren-ground caribou and their habitat from natural and human-caused landscape change.	Land use activities	Necessary/Ongoing
	Approach 4.6: Conserve integrity of barren-ground caribou habitat through participation in key environmental assessment and land use planning processes in the NWT and other jurisdictions where projects may affect NWT herds.	Land use activities	Critical/Ongoing
	Approach 4.7: Identify and protect essential and important barren-ground caribou habitats such as calving grounds, post-calving ranges, and important water crossings.	Land use activities	Critical/Short-term
	Approach 4.8: Ensure that barren-ground caribou habitat is a key value that is integrated into environmental assessment decisions and conservation planning initiatives in the NWT and other jurisdictions where proposed decisions/initiatives may affect NWT herds.	Land use activities	Necessary/Ongoing
Objective #5: Provide education and promote respect for barren-ground caribou, their habitat, and conservation initiatives.	**Approach 5.1:** Develop and implement hunter education programs to share information on barren-ground caribou and promote hunter excellence.	All	Necessary/Ongoing
	Approach 5.2: Support programs centred around barren-ground caribou that bring elders and youth together in schools and on the land.	All	Necessary/Ongoing
	Approach 5.3: Promote educational programs for diverse audiences to increase understanding of conservation initiatives and management of threats to barren-ground caribou.	All	Necessary/Ongoing

6.4. Socioeconomic, Cultural, and Environmental Effects of Management

Barren-ground caribou are of exceptional cultural and ecological significance. The Indigenous people of the NWT are inextricably bound to barren-ground caribou. For Indigenous peoples and many NWT communities, no other animal has such a large influence socially, culturally, spiritually or economically on their way of life, in the past and for current and future generations. The importance of barren-ground caribou to Indigenous peoples and communities cannot be overstated. Caribou provide subsistence and sustenance, including essential resources such as food, clothing, tools, and shelter to survive in the harsh northern environment. Caribou also provide connections to the land, animals, community, and ancestors. Survival would be difficult for many Indigenous people and community members without caribou. Indigenous people honour, respect, and identify with caribou and caribou are fundamental to survival.

> *"One of the first things I was taught as a child is to respect and honour ekwǫ̀, because without this herd many of my ancestors would have perished and would be gone. Ekwǫ̀ give us life, so in return we have to do our best to guard and protect them."*[39]

The economic value of barren-ground caribou is also immense; the Beverly and Qamanirjuaq Caribou Management Board estimated that the annual economic value of the harvest alone from the Beverly and Qamanirjuaq herds for 2005-2006 was about \$20 million.[9]

Accepting when a caribou offers itself through harvest and use of caribou are seen as signs of respect in many Indigenous cultures. Traditional laws and harvesting protocols emphasize taking only what you need, using everything you take, and not wasting anything. These protocols help keep populations strong.

Declines in caribou population numbers have initiated restrictions of harvest of some herds. Voluntary and/or land owner-mandated harvest restrictions are considered sacrifices and they have the potential to displace a nutritious food resource, to threaten cultural identity, harm the relationship between people and caribou, and to negatively impact the way of life for Indigenous people. Without caribou, aspects of Indigenous culture are at risk of being lost and connections to the land are also in peril.

In addition, whether voluntary or not, harvest restrictions can cause frustration among harvesters. There are concerns that harvest and hunters are being unfairly targeted for management action and that population numbers are not increasing despite restrictions. These adverse impacts need to be carefully considered and addressed in reference to land claim agreements and Aboriginal and treaty rights.

Similar to harvest, predation has the potential to limit barren-ground caribou population growth. Actions to manage predator populations have been proposed as a potential approach to assisting the recovery of barren-ground caribou. However, predator control is a complex and controversial topic. Responsible predator management will need to consider the impacts on predator population dynamics and on other species (i.e. moose).

7. NEXT STEPS

Management partners will use this recovery strategy to help in assigning priorities and allocating resources to conserve and recover barren-ground caribou in the NWT, as well for engaging other parties (e.g. communities, industry, co-management boards, regulators, caribou management boards, non-government organizations).

This recovery strategy will be followed by a consensus agreement by the Conference of Management Authorities that will lay out the actions the participating Management Authorities intend to undertake to implement it. At least every five years, there will be a report on the actions undertaken to implement the recovery strategy and the progress made towards meeting its objectives. The first such report will be due in 2026.

Success in the conservation and recovery of barren-ground caribou depends on the commitment and cooperation of various groups involved in directing this plan and cannot be achieved by any one agency alone. All NWT residents and others who use NWT lands and waters, including the NWT public, management partners, municipalities, industry, and other organizations are encouraged to join in supporting and implementing this strategy for the benefit of barren-ground caribou, communities that have traditionally relied on these herds, and NWT society as a whole.

8. REFERENCES

1. Łutsel K'e Dene First Nation. 2019. Yúnethé Xá ʔetthën Hádı - Caribou Stewardship Plan (draft). Wildlife, Lands and Environment Department, Łutsel K'e Dene First Nation, Łutsel K'e, NT.
2. Délı̨ne ʔehdzo Got'ı̨ne (Renewable Resources Council). 2016. Belarewíle Gots'ę́ ʔekwę́ Délı̨nę Caribou Conservation Plan. First edition – January 8, 2016 edition. Website: http://www.srrb.nt.ca/index.php?option=com_docman&view=download&alias=1287-2016-009-deline-caribou-plan-approved-16-01-08-edition&category_slug=proposal-for-decision-and-supporting-documentation&Itemid=697.
3. Environment and Natural Resources. 2011. Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2011-2015. Environment and Natural Resources, Inuvik, NT. 56 pp. Website: https://www.enr.gov.nt.ca/sites/enr/files/strategies/2011-2015_barren-ground_caribou_management_strategy.pdf
4. Species at Risk Committee. 2017. Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) (Rangifer tarandus groenlandicus) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT. Website: https://www.nwtspeciesatrisk.ca/sites/default/files/bgc_and_pch_status_report_and_assessment_final_apr1117_0.pdf
5. Environment and Natural Resources. 2006. Caribou Forever - Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2006-2010. Environment and Natural Resources, Inuvik, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/strategies/caribou_forever_our_heritage_our_responsibility.pdf.
6. Committee on the Status of Endangered Wildlife in Canada. 2016. COSEWIC Assessment and Status Report on the Caribou *Rangifer tarandus*, Barren-ground Population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiii + 123 pp. Website: http://www.registrelep-sararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1.
7. Advisory Committee for Cooperation on Wildlife Management. 2014. Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East Barren-ground Caribou Herds Management Plan. Advisory Committee for Cooperation on Wildlife Management, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/rev_bluenose_caribou_herds_draft_management_plan_v10_final_signed_-_nov_4_2014_0.pdf.
8. Environment and Natural Resources. 2018. Draft Bathurst Caribou Range Plan. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/resources/draft_bathurst_caribou_range_plan.pdf.
9. Beverly and Qamanirjuaq Caribou Management Board. 2014. Beverly and Qamanirjuaq Caribou Management Plan 2013-2022. Beverly and Qamanirjuaq Caribou Management Board, Stonewall, MB. Website: https://arctic-caribou.com/resources/#_management-plan.
10. Heard, D.C., T.M. Williams, and D.A. Melton. 1996. The relationship between food intake and predation risk in migratory caribou and implications to caribou and wolf population dynamics. Rangifer Special Issue 2: 37-44.
11. Russell, D.E. and P. McNeil. 2005. Summer Ecology of the Porcupine Caribou Herd. Porcupine Caribou Management Board, 1st Edition December 2002, 2nd Edition March 2005. Website: http://pcmb.ca/.
12. International Porcupine Caribou Board. 1993. Sensitive Habitats of the Porcupine Caribou Herd. Website: https://pcmb.ca/PDF/researchers/Habitat/Sensitive%20Habitats%20of%20the%20Porcupine%20Caribou%20Herd%20booklet.pdf.
13. Beverly and Qamanirjuaq Caribou Board. 2005. Protecting Calving Grounds, Post-calving Areas and Other Important Habitats for Beverly and Qamanirjuaq Caribou: A Position Paper by the Beverly and Qamanirjuaq Caribou Management Board, September 2004. Website: http://arctic-caribou.com/pdf/Position_Paper.pdf.

14. Gwich'in Tribal Council. 2019. Gwich'in Tribal Council (GTC) comments on Coastal Plain Oil and Gas Leasing Program Draft Environmental Impact Statement (Leasing EIS). Submitted to United States Department of the Interior, Bureau of Land Management (BLM), March 13, 2019.
15. Griffith, B., D.C. Douglas, N.E. Walsh, D.D. Young, T.R. McCabe, D.E. Russell, R.G. White, R.D. Cameron, and K.R. Whitten. 2002. The Porcupine Caribou Herd. Pp. 8-37 in D.C. Douglas, P.E. Reynolds, and E.B. Rhode (eds.). Arctic Refuge Coastal Plain Terrestrial Wildlife Research Summaries. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD BSR-2002-0001.
16. Russell, D. and A. Gunn. 2019. Vulnerability Analysis of Potential Impact of 1002 Development in the Porcupine Caribou Herd. Draft Report to Environment Yukon, Environment and Climate Change Canada, and NWT Environment and Natural Resources.
17. Gordon, B.H.C. 2005. 8000 years of caribou and human seasonal migration in the Canadian barrenlands. Rangifer Special Issue 16:155 – 162.
18. Bergerud, A.T., S.N. Luttich, and L. Camps. 2008. The Return of Caribou to Ungava. McGill-Queen's University Press, Montreal, QC and Kingston, ON.
19. Skoog, R.O. 1968. Ecology of the Caribou (*Rangifer tarandus granti*) in Alaska. PhD thesis, University of California, Berkeley, California, USA.
20. Beaulieu, D. 2012. Dene traditional knowledge about caribou cycles in the Northwest Territories. Rangifer Special Issue 20: 59-67.
21. Nagy, J.A., and D. Johnson. 2006. Estimates of the Number of Barren-ground Caribou in the Cape Bathurst and Bluenose-West Herds and Reindeer/Caribou on the Upper Tuktoyaktuk Peninsula Derived Using Post Calving Photography, July 2006. Manuscript Report No. 171. Environment and Natural Resources, Yellowknife, NT.
22. Nagy, J.A. 2009. Population Estimates for the Cape Bathurst and Bluenose-West Barren-ground Caribou Herds Using Post-calving Photography. Manuscript Report (in prep.). Environment and Natural Resources, Yellowknife, NT.
23. Boulanger, J., J. Adamczewski, and T. Davison. 2018. Estimates of caribou herd size using post-calving surveys in the Northwest Territories and Nunavut: A meta-analysis. Raniger, 38, (1) 2018.
24. Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford, and B. Tracz. 2014. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in the Northwest Territories, Canada in 2010. Manuscript Report No. 244. Environment and Natural Resources, Yellowknife, NT.
25. Adamczewski, J., J. Boulanger, B. Croft, T. Davison, H. Sayine-Crawford, and B. Tracz. 2017. A comparison of calving and post-calving photo-surveys for the Bluenose-East herd of barren-ground caribou in northern Canada in 2010. Canadian Wildlife Biology and Management 6:4-30.
26. Gunn, A., J. Dragon, and J. Nishi. 1997 Bathurst Calving Ground Survey 1996. File Report No. 119. Resources, Wildlife and Economic Development, Yellowknife, NT.
27. Williams, T. M. 1995. Beverly calving ground surveys June 5-16, 1993 and June 2-13, 1994. File Report No. 114. Department of Renewable Resources, Yellowknife, NT.
28. Campbell, M., pers. comm. 2019. Correspondence to Leslie Wakelyn, BQCMB. Kivalliq Regional Wildlife Biologist, Department of Environment, Government of Nunavut, Arviat, NU.
29. Campbell, M., J. Boulanger, D.S. Lee, M. Dumond, and J. McPherson. 2012. Calving Ground Abundance Estimates of the Beverly and Ahiak Subpopulations of Barren-ground Caribou (*Rangifer tarandus groenlandicus*) – June 2011. Technical Summary. Department of Environment, Government of Nunavut, Iqaluit, NU.
30. Williams, T. M., unpubl. report. 1994. Qamanirjuaq Caribou Calving Ground Survey. Department of Renewable Resources, Yellowknife, NT.
31. Campbell, M., J. Boulanger, D.S. Lee. 2015. Estimating Abundance of the Qamanirjuaq Mainland Migratory Barren-ground Caribou Subpopulation – June 2014. Interim report, Technical Report Series No. 01-2016. Department of Environment, Government of Nunavut, Iqaluit, NU.
32. Boulanger, J., M. Campbell, D.S. Lee. 2018. Estimating Abundance and Trend of the Qamanirjuaq Mainland Migratory Barren-ground Caribou Subpopulation – June 2017. Technical Summary – No: 01-2018. Department of Environment, Government of Nunavut, Iqaluit, NU.
33. Trottier, T., pers. comm. 2019. Correspondence to Leslie Wakelyn (BQCMB). Area Wildlife Ecologist, Saskatchewan Ministry of Environment, La Ronge, SK.

34. Environment and Natural Resources. 2016. NWT State of the Environment Report. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/en/nwt-state-environment-report.
35. Government of the Northwest Territories. 2018. 2030 NWT Climate Change Strategic Framework. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/resources/128-climate_change_strategic_framework_web.pdf.
36. Fenton, H., pers. comm. 2019. Email correspondence to M. Grabke. April 2019. Wildlife Veterinarian, Wildlife Division, Environment and Natural Resources, Yellowknife, NT.
37. Environment and Natural Resources. 2019. Frequently Asked Questions on Chronic Wasting Disease (CWD), Wildlife Diseases: Chronic Wasting Disease. 2019. Environment and Natural Resources, Yellowknife, NT. Website: https://www.enr.gov.nt.ca/sites/enr/files/resources/faq_chronic_wasting_disease_march_2019_en.pdf.
38. Wolf Feasibility Assessment Technical Working Group, unpubl. report. 2017. Wolf Technical Feasibility Assessment – Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd. Environment and Natural Resources, North Slave Métis Alliance, Tłı̨chǫ Government, Wek'èezhìı Renewable Resources Board, Yellowknife, NT. Website: https://www.wrrb.ca/sites/default/files/FINAL%20Wolf%20Feasibility%20Assessment%20-%2010nov17.pdf.
39. Sangris 2012 *in* Species at Risk Committee. 2017. Species Status Report for Porcupine Caribou and Barren-ground Caribou (Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds) (*Rangifer tarandus groenlandicus*) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT. Website: https://www.nwtspeciesatrisk.ca/sites/default/files/bgc_and_pch_status_report_and_assessment_final_apr1117_0.pdf.

APPENDIX A – SPECIES STATUS AND ASSESSMENTS

Jurisdiction	**Status Rank**[r] (Coarse filter – to prioritize)	**Status Assessment**[s] (Fine filter – to provide advice)	**Legal Listing**[t] (To protect under species at risk legislation)
NWT	S3 – At Risk (2016)	Threatened (2017)	Threatened (2018)
Canada	N4 – Apparently Secure (2016)	Threatened (2016)[u]	Under Consideration
Global	G5T4 – Apparently secure (2016)	N/A	N/A

[r] National and global ranks are from the NatureServe conservation status assessments that determine the extinction risk of species and elimination risk of ecosystems at global scales, as well as their extirpation risk at national scales. Website: http://explorer.natureserve.org/. For NatureServe definitions of rankings, see: http://www.natureserve.org/conservation-tools/conservation-status-assessment. The NWT status ranks and ranking definitions are from the Working Group on General Status of NWT Species (2016).

[s] Status assessments are independent biological assessments. A status assessment in the NWT is determined by the NWT Species at Risk Committee (SARC): http://www.nwtspeciesatrisk.ca/SARC. Status in Canada is assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC): http://www.cosewic.gc.ca/ and the species status assessment can be found at: www.sararegistry.gc.ca. Global status is assessed by the IUCN Species Survival Commission (SSC) and is found on the IUCN Red List of Threatened Species: http://www.iucnredlist.org/. Status and year in table reflects the most recent assessment.

[t] Legal listing is the legal status of the species on the NWT List of Species at Risk under the territorial *Species at Risk (NWT) Act*: www.nwtspeciesatrisk.ca and on Schedule 1 of the federal *Species at Risk Act*: www.sararegistry.gc.ca. There is no global legal listing.

[u] Note that the scope of the status assessment for Canada is somewhat different than that used for the NWT. See *Preface* for more details.

<u>Species Assessments:</u>

Assessment of Barren-ground Caribou in the NWT by the Species at Risk Committee (SARC 2017[4]).

The Northwest Territories Species at Risk Committee met in Fort Smith, Northwest Territories on April 5, 2017 and assessed the biological status of barren-ground caribou in the Northwest Territories (including the Tuktoyaktuk Peninsula, Cape Bathurst, Bluenose-West, Bluenose-East, Bathurst, Beverly, Ahiak, and Qamanirjuaq herds).The assessment was based on the approved status report. The assessment process and objective biological criteria used by the Species at Risk Committee are available at: www.nwtspeciesatrisk.ca.

<u>Assessment:</u> Threatened in the Northwest Territories

Likely to become endangered in the Northwest Territories if nothing is done to reverse the factors leading to its extirpation or extinction.

<u>Reasons for the assessment:</u> Barren-ground caribou fit criterion (a) for Threatened.

(a) There is evidence that the population is declining in such a way that it could disappear from the Northwest Territories in our children's lifetime.

<u>Main factors:</u>

- This means that there is a 10% chance that barren-ground caribou could disappear from the Northwest Territories within 75 years.
- Although about 530,000 barren-ground caribou still reside either entirely or partially within the NWT, overall, the numbers have declined by more than 85% for all herds where we have trend information, except the Qamanirjuaq herd, during the past three caribou generations (about 25 years).
- Overall trend demonstrates a continued population decline even though two herds (Cape Bathurst and Bluenose-West) appear to have recently stabilized at very low numbers.
- The main threats are:
    - Climate change may act as a continuing threat to barren-ground caribou through a complex mechanism involving shifts in timing of green-up, changes in summer forage quality, rain-on-snow and icing events on the winter range, longer fire seasons, melting permafrost and erosion, changes to freeze-up and thaw timing, and increasing shrub cover. Parasites and diseases are a potential and complex threat under a warmer climate.
    - Predation can affect survival and reproduction and therefore abundance, and there are reports of increasing predator populations in some areas.
    - Industrial development is considered to be one of the most significant factors affecting barren-ground caribou. It can disturb caribou and affect

their behaviour, the quality of habitat and forage, and ultimately, the survivability of the species. It can also facilitate access for both humans and predators.

    - Forest fires represent the most visible factor driving habitat fragmentation and change, impacting forage availability and movement. This threat is particularly important in the winter range. Climate change may lead to even hotter and drier summers in the NWT, possibly increasing the frequency and intensity of fires.

Additional factors:

- Barren-ground caribou populations undergo large fluctuations over several decades. The causes of these fluctuations in abundance are complex and likely driven by climate interacting with forage availability, predation, and parasites. Harvest and predation play a stronger role when barren-ground caribou are at low numbers.
- The threats mentioned above are acting in addition to these large fluctuations. The cumulative effects from multiple interacting threats are considered unprecedented.

Positive influences on barren-ground caribou and their habitat:

- Collaborative co-management has led to management planning for caribou and resulted in measures to reduce harvest in response to low numbers. Range planning has been initiated for the Bathurst herd.
- Application of traditional laws and harvesting protocols (e.g. respectful harvest, sharing, avoiding wastage, etc.) have, and will continue to have, a positive influence on caribou health, population numbers, and habitat.
- There are community-based conservation measures and community support for management actions.
- Calving grounds of the Bluenose-West and Beverly herds are provided partial protection from development by inclusion in protected areas and sanctuaries. Habitat protection is also offered through land use planning instruments.

Recommendations:

- Complete and implement herd management and action plans.
- Complete or initiate range planning where needed.
- Improve harvest reporting.
- Work with interjurisdictional partners to achieve effective protection of all calving grounds and other key habitat components (e.g. water crossings).
- Consideration should be given to increasing research into causes of barren-ground caribou population decline and habitat changes to better inform effective management actions.
- Climate change is an underlying driver of many of the threats facing barren-ground caribou and their habitat. Action to reduce greenhouse gas emissions is

required for the long term conservation of barren-ground caribou. Actions should be taken to ensure that the impact of climate change on caribou is highlighted through the appropriate regional, national, and international fora and that effects of climate change on caribou are monitored and mitigation actions taken where possible.

Assessment of Caribou - Barren-ground Population in Canada by COSEWIC (COSEWIC 2016[6])

Assessment Summary - November 2016

Common name
Caribou - Barren-ground population[v]

Scientific name
Rangifer tarandus

Status
Threatened

Reason for designation
Members of this population give birth on the open arctic tundra, and most subpopulations (herds) winter in vast subarctic forests. Well-known for its large aggregations, lengthy migrations, and significant cultural and social value to northern Aboriginal peoples and other Canadians, its 14-15 subpopulations range from northeastern Alaska to western Hudson Bay and Baffin Island. Numbering more than 2 million individuals in the early 1990s, the current population is estimated at about 800,000. Most subpopulations have declined dramatically, but two are increasing, including the Porcupine caribou herd. For 70% of the population with sufficient data to quantify trends, the decline is estimated at 56% over the past three generations (since 1989), with several of the largest herds having declined by >80% from peak numbers. Available survey data for an additional 25% of the total population also indicate declines. Evidence from both local Aboriginal people and scientific studies suggests that most herds have undergone natural fluctuations in numbers in the past; however, available demographic data indicate no sign of rapid recovery at this time and cumulative threats are without historical precedent. Status meets criteria for Endangered because of a reduction in numbers of ≥50%, but Threatened is recommended because, overall, this population does not appear to be facing imminent extinction at this time. Despite worrisome declines across most of the range, the current numerical abundance of the Porcupine caribou herd and the initiation of numerous management actions by governments, wildlife management boards, and communities support Threatened as a more appropriate conservation status. The status of these subpopulations will have to be carefully monitored and may warrant re-assessment

[v] Note that the scope of COSEWIC's assessment was somewhat different than the scope of the NWT assessment. See *Preface* for more information.

within five years.

Occurrence
Yukon, Northwest Territories, Nunavut, Alberta, Saskatchewan, Manitoba

Status history
Designated Threatened in November 2016

APPENDIX B – PLANNING PARTNERS

The Wildlife Management Advisory Council (NWT) advises governments on wildlife policy, management, regulation, and administration of wildlife, habitat, and harvesting in the NWT portion of the Inuvialuit Settlement Region (*Inuvialuit Final Agreement*, section 14). The Wildlife Management Advisory Council (NWT) works collaboratively with the Inuvialuit Game Council, hunters and trappers committees, and government in research, monitoring, and management of wildlife and habitat. The Wildlife Management Advisory Council (NWT) consults regularly with the Inuvialuit Game Council and hunters and trappers committees, and these groups assist the Council in carrying out its functions, upon request.

The Gwich'in Renewable Resources Board is the main instrument of wildlife management in the Gwich'in Settlement Area. Its powers include approving plans for the management and protection of particular wildlife populations (including endangered species), particular wildlife habitats, and forests (*Gwich'in Comprehensive Land Claim Agreement*, sections 12 and 13). The Gwich'in Renewable Resources Board works collaboratively with renewable resources councils and government in research, monitoring, and management of wildlife and habitat. The Gwich'in Renewable Resources Board consults regularly with the renewable resources councils, and its management authority may be delegated to renewable resources councils.

The Sahtú Renewable Resources Board is the main instrument of wildlife management in the Sahtú Settlement Area. Its powers include approving plans for the management and protection of particular wildlife populations (including endangered species), particular wildlife habitats, and forests (*Sahtú Dene and Metis Comprehensive Land Claim Agreement*, sections 13 and 14). The Sahtú Renewable Resources Board works collaboratively with renewable resources councils and government in research, monitoring, and management of wildlife and habitat. The Sahtú Renewable Resources Board consults regularly with the renewable resources councils, and management authority may be delegated to renewable resources councils.

The Wek'èezhìı Renewable Resources Board is the wildlife co-management authority responsible for managing wildlife, wildlife habitat, forests, plants, and protected areas in Wek'èezhìı as set out in the *Tłı̨chǫ Agreement* (*Tłı̨chǫ Agreement*, sections 12, 13, 14 & 16). Responsibilities include making determinations or recommendations on management proposals for activities that may affect wildlife and wildlife habitat. The Wek'èezhìı Renewable Resources Board works collaboratively with the Tłı̨chǫ communities and Tłı̨chǫ, territorial, and federal governments in research, monitoring, and management of wildlife and habitat.

The Tłı̨chǫ Government has powers to enact laws in relation to the use, management, administration and protection of lands and renewable resources, on Tłı̨chǫ lands. This includes laws relating to the management and exercise of harvesting rights for wildlife, plants and trees (*Tłı̨chǫ Agreement*, section 7). The Tłı̨chǫ Government has prepared the *Tłı̨chǫ Land Use Plan* to assist in managing approximately 39,000 km^2 of Tłı̨chǫ lands.

The Plan provides a guide for future development by outlining how Tłı̨chǫ land will be protected and how activities and development on Tłı̨chǫ lands should occur.

The Government of Canada has ultimate responsibility for the management of migratory birds (as described in the *Migratory Birds Convention Act*, 1994), fish, marine mammals, and other aquatic species (as described in the *Fisheries Act*). It also has responsibilities for the implementation of the federal *Species at Risk Act*, including enforcement of the general prohibitions and critical habitat prohibitions where listed species occur on federal lands that belong to her Majesty, in Right of Canada, or under the direct authority of the Minister of the Environment (national wildlife areas and migratory bird sanctuaries) and the Minister responsible for the Parks Canada Agency (national parks, national park reserves, and national historic sites).

The Government of the Northwest Territories (GNWT), represented by the Minister of Environment and Natural Resources (ENR), has ultimate responsibility for the conservation and management of wildlife, wildlife habitat, and forest resources in the NWT, subject to land claims and self-government agreements. It is the Minister of ENR's ultimate responsibility to prepare and complete management plans and recovery strategies under the *Species at Risk (NWT) Act*. Other GNWT departments also have responsibilities, including for land management, resources, communities, public infrastructure, and economic development. ENR engages with other GNWT departments on species at risk issues through the Inter-departmental Species at Risk Committee, inter-departmental committees of Directors and Deputy Ministers, and Executive Council.

Table B1: Shared management for NWT barren-ground caribou herds.

Herd	**Co-management organizations**	**Main management board/instrument**
Tuktoyaktuk Peninsula	Government of the Northwest Territories Hunters and trappers committees Inuvialuit Game Council Wildlife Management Advisory Council (NWT)	No main board or instrument
Cape Bathurst	Government of the Northwest Territories Gwich'in Renewable Resources Board Hunters and trappers committees Inuvialuit Game Council Wildlife Management Advisory Council (NWT)	Advisory Committee for Cooperation on Wildlife Management
Bluenose-West	Government of Canada Government of the Northwest Territories Gwich'in Renewable Resources Board Hunters and trappers committees Inuvialuit Game Council Sahtú renewable resource councils Sahtú Renewable Resources Board Tuktut Nogait National Park Management Board Wildlife Management Advisory Council (NWT)	Advisory Committee for Cooperation on Wildlife Management
Bluenose-East	Délinę Renewable Resources Council Government of Canada Government of Nunavut Government of the Northwest Territories	Advisory Committee for Cooperation on Wildlife Management

	Hunters and trappers committees Inuvialuit Game Council Kitikmeot Regional Wildlife Board Kugluktuk Hunters and Trappers Organization Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Sahtú renewable resource councils Sahtú Renewable Resources Board Tłįchǫ Government Wek'èezhìı Renewable Resources Board Wildlife Management Advisory Council (NWT)	
Bathurst	Athabasca Denesųłiné Né Né Land Corporation Deninu Kųę́ First Nation Government of Canada Government of Nunavut Government of the Northwest Territories Hunters and trappers organizations Kitikmeot Inuit Association Kitikmeot Regional Wildlife Board Łutsel K'e Dene First Nation North Slave Métis Alliance Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Salt River First Nation Tłįchǫ Government Wek'èezhìı Renewable Resources Board Yellowknives Dene First Nation	Bathurst Caribou Advisory Committee Bathurst Caribou Range Planning Working Group
Beverly	Athabasca Denesųłiné Government of Canada Government of Nunavut Government of Saskatchewan Government of the Northwest Territories Hunters and trappers organizations Kitikmeot Regional Wildlife Board Kivalliq Wildlife Board Łutsel K'e Dene First Nation Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Tłįchǫ Government Wek'èezhìı Renewable Resources Board	Beverly and Qamanirjuaq Caribou Management Board
Ahiak	Athabasca Denesųłiné Government of Canada Government of Nunavut Government of Saskatchewan Government of the Northwest Territories Hunters and trappers organizations Kitikmeot Regional Wildlife Board Kivalliq Wildlife Board Łutsel K'e Dene First Nation Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board	No main board or instrument

	Tłı̨chǫ Government Wek'èezhìı Renewable Resources Board	
Qamanirjuaq	Athabasca Denesųłiné Ghotelnene K'odtineh Dene Government of Canada Government of Manitoba Government of Nunavut Government of Saskatchewan Government of the Northwest Territories Hunters and trappers organizations Kivalliq Wildlife Board Łutsel K'e Dene First Nation Northlands Denesuline First Nation Northwest Territory Métis Nation Nunavut Tunngavik Inc. Nunavut Wildlife Management Board Sayisi Dene First Nation	Beverly and Qamanirjuaq Caribou Management Board

APPENDIX C – GUIDING PRINCIPLES

The following principles guided the development of this recovery strategy:

- Recognize that the biological diversity of the NWT is a legacy to be preserved, and that all NWT residents and others who use NWT lands and waters have a shared responsibility for the protection and conservation of species at risk:
    - Recognize the shared responsibility of the Management Authorities, seek collaborative partnerships, and expect that all responsible parties will contribute.
    - Respect Treaty and Aboriginal rights as well as land claim and self-government agreements.
    - Involve interested parties in developing the plan/strategy, including engagement at the community level throughout the process.
    - Promote engagement by all parties in playing a meaningful role in implementing this strategy and supporting long-term recovery of NWT barren-ground caribou.
- Recognize that conservation measures may have social, economic, or ecological implications.
- Use adaptive management, which is: a systematic approach for continually improving management policies or practices by deliberately learning from the outcomes of management actions.
- Be guided by and implement the Precautionary Principle, which states that a lack of scientific certainty will not be used as a reason to delay measures to alleviate a threat to a species at risk.
- Make full use of the best available information, including traditional, community, and scientific knowledge:
    - Recognize and respect differences and similarities in approaches to the collection and analysis of different types of knowledge.
    - Recognize and address information gaps.
- Have a clear goal and clear, measurable objectives:
    - Include only management approaches that are realistic and biologically feasible.
    - Recognize that conservation and recovery can take a long time; therefore long-term approaches are needed.
- Management actions will be taken at the herd level to maintain population numbers, distribution, and range use of each barren-ground caribou herd, such that no herd is lost and sufficient high quality habitat is maintained to allow for herd recovery into historic range.

- Each caribou herd has value to one or more NWT Indigenous governments and organizations and to others outside the NWT as well, and should be maintained in a healthy state on the landscape.
- Collaboration among governments, co-management boards, caribou management boards, communities, and, where needed, with neighbouring jurisdictions, is essential to ensuring successful and effective management for caribou in the NWT.
- Public education will be necessary to promote respect for caribou and awareness of traditional Indigenous practices so that all NWT residents and others who use NWT lands and waters know how and are encouraged to contribute to the recovery of caribou.

Follow the links below to view the *How we count caribou, calving ground photo survey* video submitted by the Government of Northwest territories.

English

https://buff.ly/2wsN9Ad

Inuinnaqtun

https://buff.ly/2SYREdr

Inuktitut

https://buff.ly/2T0ffuf

ᕙᕝᕗᐊᓇ 14, 2020

ᑖᓐᓂᐅᓪ ᓯᐅᕐᓴᒃ, ᐃᒃᓯᕙᐅᑕᖅ
ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
ᑎᑎᖅᑲᑦᑯᕕᖓ 1379
ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ X0A 0H0
ᖃᕆᓴᐅᔾᑯᑦ: receptionist@nwmb.com

ᖃᕆᓴᐅᔾᑯᑦ
receptionist@nwmb.com

ᐱᓪᓗᒍ: ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓄᑦᑎᒍᑦ ᐃᓄᓐᓂᑦ ᑲᑎᒪᑎᑦᑎᓂᖅ ᐃᓱᒪᒋᔭᕐᑲᓂᕐᒧᑦ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ
ᑐᓴᕐᑲᐅᑎᖓ ᐊᑦᑎᓪᓕᒋᐊᕐᓗᒍ ᑲᑎᑦᑐᒥᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᑦ ᕿᖓᒡᐅᑦ ᑐᑦᑐᖏᓐᓄᑦ ᐱᒋᐊᕐᓗᓂ 30 ᑎᑭᓪᓗᒍ 0

ᑐᕌᖅᑐᖅ ᒥᔅᑕ ᓯᐅᕐᓴᒃ:

ᐅᑯᐊ ᑎᑎᕋᖅᓯᒪᔪᑦ ᑐᓂᔭᐅᔪᑦ, ᐃᑲᔪᖅᑐᐃᔪᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ ᐊᒻᒪ ᑐᓂᔭᐅᔪᑦ ᑭᒡᒐᖅᑐᖅᑐᒥᑦ Wek’èezhìı (ᕗᐃᑭᔁ) ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB), ᐃᓱᒪᒋᔭᐅᓂᐊᖅᑐᑦ ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ (NWMB) ᐃᓄᓐᓂᑦ ᑲᑎᒪᑎᑦᑎᓂᕐᒧᑦ *Kǫ̀k’èetì ekwǫ̀ (ᑰᑮᑎ ᐃᐊᒃᕗ)* (ᕿᖓᒡᐅᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃᑦ, ᐊᑐᖅᑕᐅᕕᔅᓴᖓ ᒫᑦᓯ 5-6, 2020 ᐃᖃᓗᑦᑑᑦᑎᐊᒥ, ᓄᓇᕗᑦ. ᑲᑎᒪᔩᑦ ᖁᔭᓐᓇᒦᕈᒪᔪᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓂᑦ ᑐᓂᓯᓂᖏᓐᓄᑦ ᕗᐃᑭᔁ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ “ᑎᒥᐅᔪᖅ” ᖃᓄᐃᓂᖓᓂᖓᓂ ᐃᓄᓐᓄᑦ ᑲᑎᒪᑎᑦᑎᓪᓗᒥᑦ, ᐱᔪᓐᓇᑎᑦᑎᔪᖅ ᑲᑎᒫᑦ ᑐᓂᓯᓗᑎ, ᑭᐅᓗᑎ ᐊᒻᒪ ᑕᑯᓐᓇᕐᓗᑎ ᐃᓚᓕᒫᖓᓂ ᑲᑎᒪᑎᑦᑎᓂᐅᔪᒥᑦ.

ᕗᐃᑭᔁ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑐᕌᒐᖃᖅᑐᑦ ᐆᒪᔪᓄᑦ, ᐱᕈᖅᑐᓄᑦ ᐊᒻᒪ ᓇᐹᖅᑐᓄᑦ ᓄᐃᑮᒥ ᐊᒻᒪ ᒪᓕᖃᑦᑕᖅᑐᑦ ᒪᓕᒐᖏᓐᓂ ᐊᒻᒪ ᐊᑐᖅᑕᐅᕙᑦᑐᓂᑦ ᐱᐅᖅᓯᐊᓂᕐᒧᑦ ᐱᓕᕆᐊᖃᖅᑕᖏᓐᓂᑦ. ᑲᑎᒫᑦ ᑐᓂᓯᖃᑦᑕᖅᑐᑦ ᐱᓕᕆᐊᕆᒋᐊᓕᖏᓐᓂᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᒻᒪ ᖃᐅᔨᓴᓂᕐᒧᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᑐᑦᑐᖏᑦ. ᑲᑎᒫᑦ ᑎᑎᕋᖅᓯᒪᔾᔪᖏᑦ ᑐᓂᔭᐅᔪᑦ, ᐃᑲᔪᖅᑐᐃᔪᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ ᐊᒻᒪ ᖃᕆᓴᐅᔾᑯᑦ ᑕᑯᔅᓴᐅᑎᑕᐅᔪᑦ, ᐊᑎᖅᑲᖅᑐᖅ *“ᕗᐃᑭᔁ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᒻᒪ 2019 ᕿᖓᒡᐅᑦ ᑐᑦᑐᖏᑦ ᐱᔭᓪᓕᐊᓂᖏᑦ”*, ᐱᑕᖃᖅᑎᑦᑎᔪᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᑐᑭᓯᒋᐊᕈᑎᔅᓴᓐᓂᕐᓂᑦ ᐱᔾᔪᑎᖃᖅᑐᓂ ᐱᖃᑕᐅᓂᖏᓐᓄ ᕗᐃᑭᔁ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᑐᑦᑐᐃᑦ ᓄᓇᕐᓯᐊᒥ (NWT), ᐱᓗᐊᖅᑐᒥᑦ ᓄᐃᑮ, ᐊᒻᒪ ᓄᓇᕗᑦ.

<u>ᑰᑮᑎ ᐃᐊᒃᕗ (ᕿᖓᒡᐅᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃᑦ ᐊᐅᓚᑕᐅᓂᖏᑦ ᓄᓇᕐᓯᐊᒥᑦ</u>
ᓴᖅᑭᖅᑎᑕᐅᔪᒪᓂᓂᑦ 2006–ᒥᑦ, ᕗᐃᑭᔁ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐱᓕᕆᑎᑕᐅᓯᒪᔪᑦ ᐊᐅᓚᑦᑎᓂᕐᒥᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᑐᑦᑐᐃᑦ. ᑲᑎᒫᑦ ᐱᓕᕆᓯᒪᔪᑦ ᑎᓴᒪᓂᑦ ᐸᕐᓕᐊᓂᐅᔪᓂᑦ ᐱᓕᕆᐊᖃᖅᑐᓂ ᑐᑦᑐᑕᐅᕙᑦᑐᑦ ᑭᓪᓕᖏᓐᓄᑦ 2007, 2010, 2016, ᐊᒻᒪ 2019 ᑐᑦᑐᓄᑦ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᖏᓐᓇᖅᑐᑦ ᐊᕐᕌᒍᓂᓂᑦ 2003. ᐅᓂᒃᑳᑦ 2010 ᐊᒻᒪ 2016 ᐸᕐᓕᐊᓂᐅᔪᑦ ᐊᒻᒪ ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᑭᐅᔾᔪᑎᖏᑦ ᐊᑐᐃᓐᓇᐅᔪᑦ ᕗᐃᑭᔁ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᖃᕆᓴᐅᔾᑯᑦ ᑐᓯᕋᕐᕕᖓᓂ.

.../ᒪᑉᐱᖓ 2

2019 ᐸᕐᓕᐊᓂᖓ

Yellowknife Office 102A, 4504 49th Avenue, Yellowknife, NT X1A 1A7 p. 867.873.5740 f. 867.873.5743
Wekweètì Office P.O. Box 67, Wekweètì, NT X0E 1W0 p. 867.713.2333 f. 867.713.2334
www.wrrb.ca

ᔮᓐᓄᐊᕆ 2019, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᑐᓂᓯᓚᐅᖅᑐᑦ *ᑲᑐᑎᑦᑐᑎ ᑐᓴᕋᐅᑦ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᖃᓄᐃᓕᓯᒋᐊᓂᕐᒧᑦ ᕿᖓᐅᖠ ᐃᐊᒃᕗ (ᓇᐹᖅᑐᖅᑳᖏᑦᑐᓂᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃᑦ 2019-2021* ᑲᑎᒪᔨᓄᑦ, ᓇᓗᓇᐃᔭᐃᔪᑦ ᑐᓯᕋᖅᑕᐅᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᓂᕐᒧᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᑦᑐᐃᑦ ᕗᐃᑭᔾᒥ. ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᕈᑏᑦ ᑐᓯᕊᖑᔪᑦ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᑲᑐᑎᑦᑐᑎ ᑐᓴᕋᐅᒻᒥᑦ ᑲᑎᖅᓱᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᑦᑕᒪᐅᑦᑐᑎ ᖃᓄᐃᓕᖓᓂᖏᑦ: ᐊᖑᓇᓱᑦᑕᐅᔪᑦ, ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ, ᓇᔪᖅᑕᖏᑦ ᐊᒻᒪ ᓄᓇ ᐊᑐᖅᑕᐅᓂᖓ, ᐊᒻᒪ ᐃᓕᓐᓂᐊᕐᓂᖅ ᐊᒻᒪᓗᑦᑕᐅᖅ ᖃᐅᔨᓴᕐᓂᖅ ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᖅ. ᐱᓗᐊᖅᑐᒥᑦ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᐱᓕᕆᕖᐊᖓ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᓄᓇᒦᐅᑕᓕᕆᔨᒃᑯᑦ ᑐᓴᕋᓚᐅᖅᑐᑦ ᑲᔪᓯᑎᑦᑎᓗᑎ ᑐᑦᑐᓕᒫᓄᑦ ᑲᑎᑦᑐᒋᑦ ᑐᑦᑐᑦᑕᐅᔪᓐᓇᖅᑐᑦ ᐱᑕᖃᖏᑦᑐᓂ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᑦᑐᖏᓐᓄᑦ. ᑭᖑᓂᐊᒍᑦ ᖃᐅᔨᓴᕆᐊᓐᖓᓚᐅᖅᑎᑦᑐᒋᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᓴᕋᐅᒻᒥᑦ, ᑲᑎᒫᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑐᑦ ᖁᕝᕙᓯᓐᓂᖓ 2 ᕿᒥᕐᕈᓂᕐᒥᑦ ᓈᒻᒪᓚᐅᖅᑐᖅ, ᒪᓕᑦᑐᒋᑦ ᒪᓕᒐᖏᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᓯᖃᐅᑎᓂᑦ. ᑕᒪᐃᓐᓂᖓᓄᑦ, ᑲᑎᒫᑦ ᐋᖅᑭᓱᓚᐅᖅᑐᑦ ᐱᕙᑦᓕᐊᓂᖏᓐᓄᑦ ᐊᒻᒪ ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓄᓐᓄᑦ ᐊᑎᓕᐅᕐᕕᒃ ᕕᕝᕗᐊᕆ 4, 2019.

ᒪᓕᑦᑐᒍ ᐃᓚᖓ 12.5.5(a)(i) Tłįchǫ (ᑎᓖᓯ) ᐊᖏᕈᑎᒥᑦ, ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑕᐅᓯᐅᑦᑐᓂ ᑲᒪᒋᔭᕐᑲᖅᑐᑦ ᓴᓇᓗᑎ ᑭᖑᓪᓕᖅᐹᒥᑦ ᑲᔪᖏᓯᓯᒪᓂᕐᒧᑦ ᐱᔾᔪᑎᖃᖅᑐᓂᑦ ᑲᑎᑦᑐᒋᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᑦ ᐊᒥᓲᓂᖏᓐᓄᑦ ᐅᑯᓘᓐᓃᑦ ᑲᑎᓐᖓᔪᓂᑦ ᐆᒪᔪᓂᑦ ᕗᐃᑭᔾᒥᑦ. ᐃᓱᒪᓕᐅᖅᑎᑦᑐᒋᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᓂᑦ ᑭᑦᓕᖏᓐᓂ, ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᒋᔭᕐᑲᓚᐅᖅᑐᑦ ᐊᑦᑕᓇᕈᑎᐅᔪᓐᓇᖅᑐᑦ ᑐᑦᑐᓄᑦ ᐊᒥᓱᓂᑦ ᖃᑦᑎᓐᓇᕈᓇᐊᕐᓂᖏᓐᓄᑦ, ᓇᓗᓇᕈᑕᐅᔪᑦ ᖃᓄᖅ ᐊᐅᓚᓂᖏᓐᓄᑦ ᖃᑦᑎᓐᓇᕈᓇᐊᕐᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐱᒻᒪᓇᐅᓂᖓᓄᑦ ᐃᐊᒃᕗ (ᓇᐹᖅᑐᖅᑳᖏᑦᑐᒥᑦ ᑐᑦᑐᐃᑦ) ᑎᓖᓯᒥᐅᑕᓄᑦ ᐱᑕᖃᑦᑎᐊᕐᓗᑎ – ᐱᑕᖃᕐᓂᖏᓐᓄᑦ, ᑕᕐᓂᒃᑯᑦ, ᐊᒻᒪ ᐱᖅᑯᓯᒃᑯᑦ. ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑐᑦ ᑲᑎᑦᑐᒋᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᑦ ᐱᑕᖃᖏᑦᑐᓂ ᑲᔪᓯᑎᑕᐅᔭᕆᐊᓕᒃ ᐊᑐᖃᑦᑕᖅᑐᓕᒫᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᑦᑐᖏᓐᓂ ᐃᓗᐊᓂ ᕗᐃᑭᔾ 2019/2020 ᐊᒻᒪ 2020/2021 ᑐᑦᑐᖓᓯᐊᕐᓇᐅᔪᓂᑦ. ᐃᓚᒋᐊᕐᓗᒍ, ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕐᑯᔨᓚᐅᖅᑐᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᕈᑎᒃᑲᓂᕐᓂᑦ ᐊᑦᑐᐊᓂᓖᑦ ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ, ᓇᔪᖅᑕᖏᑦ ᐊᒻᒪ ᓄᓇ ᐊᑐᖅᑕᐅᓂᖓ, ᐊᒻᒪ ᐃᓕᓐᓂᐊᕐᓂᖅ ᐊᒻᒪᓗᑦᑕᐅᖅ ᖃᐅᔨᓴᕐᓂᖅ ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᖅ.
ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔾᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᒋᓂᐊᖅᑕᖏᓐᓂᑦ, ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑐᓂᓯᔪᑦ ᐅᑯᓂᖓ ᐃᑲᔪᓯᖅᑐᓂᑦ ᑎᑎᕋᖅᓯᒪᔪᓂᑦ:

- ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ 2019 ᑰᑭᑎ ᐃᐊᒃᕗ ᐱᔾᔪᑎᖏᑦ ᐃᓱᒪᓕᐅᓂᕐᒧᑦ ᐅᓂᒃᑳᑦ, ᐊᑎᖃᖅᑐᖅ *“ᐱᔾᔪᑎᖏᑦ ᐃᓱᒪᓕᐅᓂᕐᒧᑦ ᐊᑦᑐᐊᓂᓖᑦ ᑲᑐᑎᑦᑐᑎ ᑐᓴᕋᐅᑦ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ (ᕿᖓᐅᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃᑦ”*
- ᓇᓗᓇᐃᔭᖅᓯᒪᔪᑦ ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ 2019 ᑰᑭᑎ ᐃᐊᒃᕗ ᐱᔾᔪᑎᖏᑦ ᐃᓱᒪᓕᐅᓂᕐᒧᑦ ᐅᓂᒃᑳᑦ
- ᑭᐅᔪᑏᑦ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᐊᒻᒪ ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ 2019 ᑰᑭᑎ ᐃᐊᒃᕗ ᐱᔾᔪᑎᖏᑦ ᐃᓱᒪᓕᐅᓂᕐᒧᑦ ᐅᓂᒃᑳᑦ
- ᐊᑐᓕᖅᑎᑕᐅᓂᖓ ᖃᐅᔾᒪᔭᐅᓂᖏᓐᓄᑦ ᑎᑎᕋᕐᕕᒃ ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ 2019 ᑰᑭᑎ ᐃᐊᒃᕗ ᐱᔪᒪᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐊᑐᓕᕐᑯᔭᐅᔪᑦ

<u>ᐊᑯᓂᐅᔪᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐃᓂᕐᒧᑦ ᐊᒻᒪ ᐅᖓᓯᓐᓂᖏᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ</u>
2013–ᓂᑦ, ᑲᑎᒫᑦ ᐃᓚᐅᕐᑕᑕᐅᓯᒪᔪᑦ ᐊᑯᓂᐅᔪᒧᑦ ᐸᕐᓇᐃᓂᕐᒧᑦ ᐱᕙᓪᓕᐊᓂᖏᓐᓂᑦ ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪ ᒐᕙᒪᒃᑯᖏᓐᓂ ᓄᓇᕗᐊᖅ, ᐊᒻᒪᓗᑦᑕᐅᖅ ᑲᑐᔾᔨᖅᑲᑎᒌᖑᔪᑦ ᓄᓇᕗᒻᒥ, ᓴᖅᑭᑎᑦᑎᓗᑎ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᒻᒪ ᐅᖓᓯᓐᓂᖏᓐᓄᑦ ᐸᕐᓇᐅᒻᒥᑦ ᑐᑦᑐᓄᑦ. ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᖁᕕᐊᓱᒡᓚᐅᖅᑐᑦ ᐃᑲᔪᕐᓗᒍ ᑭᖑᓪᓕᖅᐸᖓ ᕿᖓᐅᑦ ᑐᑦᑐᖏᓐᓄᑦ ᐅᖓᓯᓐᓂᖓ ᐸᕐᓇᐅᑦ 2019-ᒥᑦ ᐊᒻᒪ ᑕᓴᑯᔪᒪᓂᕐᑲᖅᑐᑦ ᐊᑐᓕᖅᑎᑕᐅᓂᖓᓄᑦ. ᕿᖓᐅᑦ ᑐᑦᑐᖏᓐᓄᑦ ᐅᕐᑲᐅᔾᔨᕆᐊᖅᑏᑦ ᑲᑎᔨᕋᑖᖏᑦ ᐃᖅᑲᓇᐃᔮᕐᑲᐃᓐᓇᖅᑐᑦ ᓴᖅᑭᑦᑎᓂᕐᒥᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᒻᒥᑦ. ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑕᑯᔪᒪᔪᑦ ᐱᔭᕇᖅᑕᐅᓂᖓᓄᑦ ᐊᒻᒪ ᐊᑐᓕᖅᑎᑕᐅᓂᖓᓄᑦ 2020.

<u>ᓄᖅᑲᕐᓂᖓ</u>
ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᑦᑐᐃᑦ ᐱᔪᒥᓇᖏᑦᑐᒥᑦ ᖃᓄᐃᓕᖓᓂᖃᓕᖅᑐᑎᑦ, ᑲᑎᒫᑦ ᐅᐱᒋᓯᑦᑐᑦ ᐃᓄᓕᒫᑦ

…/ᒪᐸᒐᖅ 3

ᐆᒪᔪᖃᑦᑕᖅᑐᑦ ᑐᑦᑐᓂᑦ ᐃᑲᔪᕐᓂᖃᕆᐊᓖᑦ ᑐᑦᑐᐃᑦ ᐅᑎᕐᓂᖏᓐᓄᑦ. ᐊᑐᖃᑦᑕᖅᑐᑦ ᐊᒻᒪ ᐊᐅᓚᑦᑎᔾᔨᑦ ᒫᓇ ᖃᓄᐃᓕᓯᒋᐊᕆᐊᖃᓕᖅᑐᑦ, ᖃᓄᑐᐃᓐᓇᑦᑎᐊᖅ, ᓴᐳᒻᒥᓗᒋᑦ ᑐᑦᑐᖏᑦ ᓯᕗᓂᔅᓴᒥ ᐅᑎᕆᓐᓇᓂᐊᕐᒪᑕ. ᑐᑦᑐᑕᐅᖃᑦᑕᖅᑐᓂᖅ ᑰᑭᑎ

ᐃᐊᒃᕗ ᑐᑦᑐᖏᑦ ᒪᑐᔾᐅᓚᐅᖅᑐᖅ ᓄᓇᖠᐊᒥ, ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑲᔪᖏᖅᓴᐃᔪᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᔾᔨᐸᓗᐊᓂ ᐊᑐᕐᓗᑎ ᓴᐳᒻᒥᔾᐅᓂᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᓄᓇᕗᒻᒥ.

ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑲᔪᓯᑎᑦᑎᔪᒪᔪᑦ ᐱᓕᕆᕐᑲᑎᒌᑦᑎᐊᖅᑐᒥᑦ ᐱᓕᕆᕐᑲᑎᒌᓐᓂᕐᒥᑦ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐱᔾᔪᑎᕐᑲᖅᑐᑦ ᓇᐸᙳᖅᑐᕐᑲᖏᑦᑐᒥ ᑐᑦᑐᓂᑦ. ᐊᐱᖅᑯᑎᖃᕐᑲᕈᕕᑦ, ᕐᑲᐅᔨᒋᐊᕐᕕᒋᒍᒃ ᐊᓪᓚᕕᒃ ᐅᕙᓂ (867) 873-5740 ᐅᖕᕙᓘᓐᓃᑦ jpellissey@wrrb.ca.

ᑎᑎᕋᖅᑐᖅ,

ᔩᓴᑉ ᔩᑕᔅ
ᐃᒃᓯᕙᐅᑕᖅ

ᐊᔾᔨᖏᓂᒃ ᐱᑎᑕᐅᔪᑦ

ᐅᕗᖓᓗ ᔭᐃᓴᓐ ᐊᕐᑭᐊᕈᖅ, ᑐᑭᒧᐊᖅᑎᑦᑎᔨ
ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ

ᒪᓕᒐᓕᐅᕐᑎᖅᔪᐊᖅ ᓴᐃᓐ ᑖᓴᓐ, ᒥᓂᔅᑕ
ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᐊᒻᒪ ᓄᓇᒦᖔᖅᑐᓂᑦ, ᓄᓇᖠᐊᑉ ᒐᕙᒪᖓᑦ

ᐃᐅᕆᓐ ᑭᐊᓕ, ᐃᓇᖏᖅᓯᓯᒪᑲᐃᓐᓇᕐᑐᖅ ᒥᓂᔅᑕᐅᑉ ᑐᖓᓕᖓᑕ ᐃᑲᔪᖅᑎᖓᓄᑦ
ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᐊᒻᒪ ᓄᓇᒦᖔᖅᑐᓂᑦ, ᓄᓇᖠᐊᑉ ᒐᕙᒪᖓᑦ

ᑭᐅᕆᓐ ᑲᓛᒃ, ᐃᓇᖏᖅᓯᓯᒪᑲᐃᓐᓇᕐᑐᖅ ᑐᑭᒧᐊᖅᑎᑦᑎᔨᐅᑲᐃᓐᓇᖅᑐᖅ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ
ᐊᕙᑎᓕᕆᓂᕐᒧᑦ ᐊᒻᒪ ᓄᓇᒦᖔᖅᑐᓂᑦ, ᓄᓇᖠᐊᑉ ᒐᕙᒪᖓᑦ

ᐊᖏᔪᖅᑳᖅ ᔨᐊᔾ ᒪᑭᐊᓐᓯ
ᑎᓖᓯ, ᒐᕙᒪᖓᑦ

ᓗᐊᕋ ᑕᓐᑲᓐ, ᑎᓖᓯ, ᑐᑭᒧᐊᖅᑎᑦᑎᔨ
ᑎᓖᓯ, ᒐᕙᒪᖓᑦ

ᑕᒥ ᓯᑕᐃᓐᕚᓐ-ᑎᐊᔅᓵᓪᔂᕐᑦ, ᑐᑭᒧᐊᖅᑎᑦᑎᔨ
ᐱᓕᕆᕝᕕᖓ ᐱᖅᑯᓯᓂᑦ ᐊᒻᒪ ᓄᓇᐃᑦ ᓴᐳᒻᒥᔾᐅᓂᖏᓐᓄᑦ, ᑎᓖᓯ, ᒐᕙᒪᖓᑦ

Wek’èezhìı
Renewable Resources Board
Wildlife • Plants • Forests • Protected Areas

Wek’èezhìı (ᕗᐃᑭᔩ) ᓄᓇᒥᐅᑕᓕᕆᓃᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᐊᒻᒪ 2019 ᖅᑭᖕᒐᐅᑦ ᑐᑦᑐᖏᑦ ᐱᕙᓪᓕᐊᓂᖏᑦ

ᒥᔅᑕ ᔫᓯᕝ ᔫᑕᔅ, ᐃᒃᓯᕙᐅᑕᖅ ᐊᒻᒪ ᔫᐅᑎ ᐱᖕᓂᔅᓯ, ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᔨᖅᔪᐊᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᖅᑭᖕᒐᐅᑦ ᑐᑦᑐᖏᓐᓂ ᐃᓄᓐᓂᑦ
ᑲᑎᒪᑎᑦᑎᓂᖅ, ᐃᖃᓗᒃᑑᑦᑎᐊᖅ
ᒫᑦᓯ 5-6, 2020

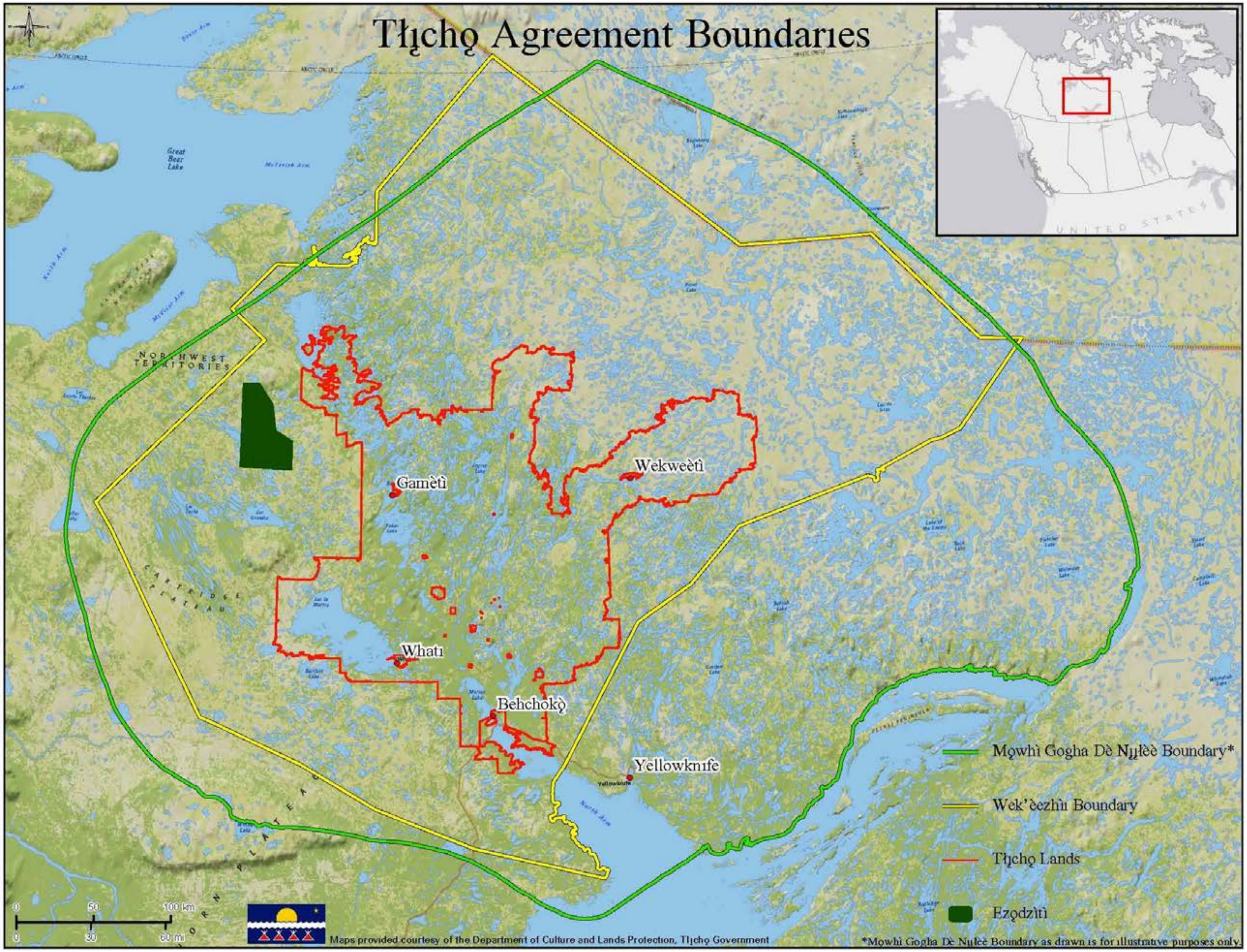
Wek'èezhìı Renewable Resources Board

Wildlife • Plants • Forests • Protected Areas

ᑯᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ

- ᑯᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᐊᐅᓚᕐᑎᖅᑲᑎᒌᖅᑲᑕᐅᔪᖅ ᑲᑎᒪᔨᐅᓪᓗᑎ ᓴᖅᑭᖅᑎᑕᐅᔪᑦ ᐅᑯᓄᖓ ᑎᓵᓯ ᐊᖏᕈᑦ

- ᑲᑎᒪᔩᑦ ᐱᓕᕆᖅᑲᑦᑕᖅᑐᑦ ᐃᓄᓐᓄᑦ ᐱᓴᐅᔪᒪᔪᓂᑦ; ᐃᓱᒪᒋᓴᖅᑲᖅᑐᑦ ᐱᓴᐅᔪᒪᔪᓂᑦ ᐊᑐᖅᑲᑦᑕᖅᑐᓕᒫᓂᑦ ᐃᓱᒪᓕᐅᕐᓂᐅᔪᓂᑦ



Tłįchǫ Agreement Boundaries
Gamètì
Wekweètì
Whatì
Behchokǫ̀
Yellowknife
Great Bear Lake
NORTHWEST TERRITORIES
Mǫwhì Gogha Dè Nįįtłèè Boundary*
Wek'èezhìı Boundary
Tłįchǫ Lands
Ezǫdzìtì
Maps provided courtesy of the Department of Culture and Lands Protection, Tłįchǫ Government
*Mǫwhì Gogha Dè Nįįtłèè Boundary as drawn is for illustrative purposes only.

ᐃᖅᑲᓇᐃᔭᖃᑎᒌᓐᓂᖅ ᑲᒪᔨᑦᑎᐊᖅᑐᒥᑦ ᐆᒪᔪᐃᑦ ᓇᐹᖅᑐᓖᑦ, ᐱᕈᖅᑐᐃᑦ ᐊᒻᒪ ᓴᐳᒻᒥᔭᐅᔪᑦ ᕗᐃᑭᓘᒥ ᒫᓐᓇᐅᔪᒧᑦ ᐊᒻᒪ ᓯᕗᓂᔅᓴᒧᑦ ᑭᖑᕚᑦᑎᓐᓄᑦ

ʔełexè ʔeghàlaìdè dıı tį̀ch'aàdı̀ı, dèk'eè ʔasìı dehshe, ʔeyıgots'ǫ dııdzęę̀ ts'ǫ ʔı̨daà ghà Wek'èezhı̀ı k'èè goghà wek'èhodı̀

Wek'èezhìi Renewable Resources Board

Wildlife • Plants • Forests • Protected Areas

ᐃᓱᒪᒋᓴᐅᔪᑦ

- ᐊᑦᑐᐊᓂᖃᖃᑎᒌᓐᓂᐅᔪᑦ ᐆᒪᔪᐃᑦ, ᓄᓇᐃᑦ ᐊᒻᒪ ᐃᓄᐃᑦ
- ᐱᐅᖅᓱᐊᓂᕐᒧᑦ ᐊᒻᒪ ᖃᐅᔨᒪᓇᓱᑦᑎᐊᓂᕐᒧᑦ ᐊᑐᐊᒐᐃᑦ
- ᐊᑐᕐᓂᖅ ᐱᕐᑯᓵᓂᑦ ᑐᑭᓯᒋᐊᕈᑎᓂᑦ ᐊᑐᐃᓐᓇᐅᔪᓂᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᓗᒋᑦ
  - Tłįchǫ (ᑎᓛᓱ) ᖃᐅᔨᒪᔭᖕᒋᑦ
  - ᖃᐅᔨᓴᖅᑏᑦ ᖃᐅᔨᒪᔭᖕᒋᑦ
  - ᖃᐅᔨᒪᑎᑕᕐᒧᑦ ᐃᓱᒪᒋᔭᐅᔪᖅ

"ᓴᖕᒋᔪᑦ ᒪᕿᑎᑐᑦ ᐃᓅᓐᓂᒃ"

S. ᐴᕐᒫᓐᑦ,
ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖕᒋᑦ

Wek'èezhìi Renewable Resources Board

Wildlife • Plants • Forests • Protected Areas

2019 ᕿᖕᒐᐅᑦ ᑐᑐᖕᒋᑦ ᐱᕙᓪᓕᐊᓂᖕᒋᑦ

- *ᑲᑐᑎᔭᐅᓪᓗᓂ ᑐᔅᓯᕋᐅᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᓂᕐᒧᑦ ᕿᖕᒐᐅᑦ ᐃᐅᒃᑯ (ᓇᐹᖅᑐᖅᑲᖕᒋᑦᑐᒥᑦ ᑐᑐᐃᖅ) ᑐᑐᖕᒋᑦ 2019-2021*

- ᑐᔅᓲᕐᒍᔪᑦ ᖃᓄᐃᓕᓯᒋᐊᕈᑎᐅᔪᑦ: ᐊᖑᓇᓱᖕᓂᖅ, ᑐᑐᓂ ᓂᕿᖃᖅᑕᖅᑐᑦ, ᓇᔪᖃᖅᑕᖅᑕᖕᒋᑦ ᐊᒻᒪ ᓄᓇᐃᑦ ᐊᑐᖅᑕᐅᓂᖕᒋᑦ, ᐊᒻᒪ ᖃᐅᔨᓴᕐᓂᖅ ᐊᒻᒪ ᖃᐅᔨᓴᖃᖅᑕᕐᓂᖅ

B. ᑐᕋᐃᓯ,
ᒍᐃᑮ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖕᒋᑦ

J. ᓇᐃᒋ,
ᐃᐊᒃᑯ ᓈᒃᓯᑎ ᑲᐃ ᐊᕙᑦᑐᖅᓯᒪᔪᖅ

ᐊᖕᒍᓇᓱᑦᑕᐅᔪᑦ

- ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑐᑦ ᑖᒃᑯᐊ ᑲᑎᑦᑐᒋᑦ ᐆᒪᔪᖅᑕᐅᔪᓐᓇᖅᑐᑦ ᑲᔪᓯᑎᑕᐅᓗᓂ ᐊᑐᖃᑦᑕᖅᑐᓕᒫᓄᑦ ᕿᖓᐅᑦ ᑐᑦᑐᖏᓐᓂ ᐃᓗᐊᓂ ᕗᐃᑭᔩ ᐊᖀᒍᒧ 2019-2021
- ᖃᓄᐃᓕᓂᐅᔪᑦ ᐅᑎᖅᑕᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᑐᑦᑐᐃᑦ

ᑐᕐᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ

- ᓇᓗᓇᐃᖅᑕᐅᓂᖓ ᑕᑯᔭᐅᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᖁᕝᕙᓯᓐᓂᖏᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑐᕐᑐᓂ ᓂᕆᖃᑦᑕᖅᑐᑦ ᐊᒻᒪ ᐋᖅᑭᔅᓯᒪᓂᖏᑦ ᐊᑐᖅᑕᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᒍᑎᐅᓪᓗᑎ ᐊᕐᕌᒍᑕᒫᑦ ᑐᕌᖅᑕᐅᔪᒧᑦ ᐲᖅᑕᐅᓂᖏᓐᓄᑦ
- ᐱᔭᕇᖅᑕᐅᓂᖓ ᖃᐅᔨᓴᖅᑕᐅᓂᖓ ᐊᒻᒪ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᓈᒻᒪᓐᓂᖓᓄᑦ ᖃᐅᔨᓴᐃᓂᖅ ᐊᒃᓱᐃᑦ ᐊᒻᒪ ᖃᕝᕕᒃ



ᐃᓕᓐᓂᐊᕐᓂᓕᕆᓂᖅ

- ᐅᖅᑲᐅᓯᖅᑲᖅᑐᑦ ᓯᕗᓪᓕᐅᔾᔪᐅᔪᓇᐊᓕᓐᓂᑦ ᐊᒻᒪ ᐋᖅᑭᒍᑎᓄᑦ ᓂᕿᓄᑦ ᐊᑦᑕᓇᐃᖅᓯᒪᓂᕐᒧᑦ
- ᑐᓂᓯᖅᑲᑦᑕᐅᑎᓂᖅ ᑐᑭᓯᒋᐊᕈᑎᓂᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᓂᑦ ᐊᒻᒪ ᐱᔾᔪᑎᖃᖅᑎᑦᑎᔪᑦ ᑐᑦᑐᐃᑦ ᖃᑦᑎᓐᓇᕈᕐᓂᖏᓐᓄᑦ

ᖃᐅᔨᓴᕐᓂᖅ ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᖅ

- ᐱᕙᓪᓕᐊᑎᑕᐅᓂᖓ ᑐᑦᑐᓄᑦ–ᓇᓗᓇᐃᖅᓯᒪᔪᓄᑦ ᐊᑐᓕᖅᑕᐅᔪᓐᓇᖅᑐᖅ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᓴᓇᓯᒪᓂᖓ ᐊᒥᓱᓂᑦ ᑲᑎᙵᓂᖃᖅᑐᓂ ᓇᓗᓇᐃᕐᓯᒪᔪᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᕆᐊᕈᑏᑦ

- ᓄᐊᑕᐅᓂᖏᑦ ᓯᓚᐅᑉ ᐊᓯᔾᔨᕐᓂᖓᓄᑦ ᖃᐅᔨᔭᐅᔪᑦ Ekwǫ̀ Nàxoède K'è (ᐃᐊᒃᑯ ᓇᐋᔾᐅᐃᑎ ᑲ'ᐄ [ᑲᓛᓅᒃ ᓄᓇᒥ]) ᐱᓕᕆᐊᖃᖅᑎᓪᓗᒋᑦ

ᐊᑐᖃᑦᑕᖅᑐᑦ ᐊᒻᒪ ᐊᐅᓚᑦᑎᔩᑦ ᒫᓐᓇ ᖃᓄᐃᓕᓯᒋᐊᓇᐊᖃᓕᖅᑐᑦ, ᖃᓄᑐᐃᓐᓇᑦᑎᐊᖅ, ᓴᐳᒻᒥᔪᒋᑦ ᑐᑦᑐᖕᒋᑦ ᓯᕗᓂᔅᓴᒥ ᐅᑎᕈᓐᓇᓂᐊᕐᒪᑕ

ᖁᓯᖕᓇᒦᒃ

ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᑐᑭᓯᒋᐊᕐᕕᐅᓂᖏᓐᓄᑦ ᑐᑭᓯᒋᐊᕈᑎᖏᑦ:
102A, 4504-49th Ave, Yellowknife
jpellissey@wrrb.ca, 867-873-5740

ᓇᓗᓇᐃᔭᖅᓯᒪᔪᑦ Wek'èezhìı (ᓄᐃᑭᔩ) ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑭᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐅᓂᒃᑳᑦ, ᐊᑎᖃᖅᑐᖅ "ᐱᔾᔪᑎᖏᑦ ᐃᓱᒪᓕᐅᓂᕐᒧᑦ ᐊᑦᑐᐊᓂᓖᑦ ᑲᑎᑐᑎᔪᓂᑦ ᑐᓯᕋᐅᒻᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ Kǫk'èetì Ekwǫ̀ (ᑰᑮᑎ ᐃᐊᒃᓄ) (ᕿᖓᐅᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃ"

ᓄᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᑲᒪᒋᔭᖃᖅᑐᑦ ᐆᒪᔪᓂᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᓄᐃᑮᓯ ᐊᒻᒪ ᑲᑐᑎᓪᓗᑎ ᑲᒪᒋᔭᖃᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᓂᕐᒧᑦ *ᑰᑮᑎ ᐃᐊᒃᓄ* (ᕿᖓᐅᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃ. ᓅᕙᐱᓇᒥ 2018, ᐱᓕᕆᕝᕙᐊᖓ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᓇᒃᑲᓐᓂᕈᓐᓇᖅᑐᓕᕆᔨᖏᑦ (ENR), ᓄᓇᖓᓯᐊᖅ ᒐᕙᒪᖓᑦ (GNWT) ᑐᓴᖅᑎᑦᑎᓚᐅᖅᑐᑦ, ᑕᑯᓪᓇᖅᑕᖏᑎᒍᑦ, ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᖏᑦ ᓱᑲᑦᑐᒥᑦ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᖏᓐᓇᖅᑐᑦ.

ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᖏᑦ ᒫᓐᓇ ᐊᑦᑎᓛᓕᓯᒪᔭᖏᓐᓃᑦᑐᑦ ᑎᑎᕋᖅᑕᐅᖃᑦᑕᖅᓯᒪᔪᓂᑦ ᐊᒥᓲᓂᖏᓐᓄᑦ, ᓄᓇᖓᓯᐊᑉ ᒐᕙᒪᖓᑦ ᐊᒻᒪ Tłįchǫ (ᑎᓖᓱ) ᒐᕙᒪᖓᑦ (TG) ᐅᖃᖅᓯᒪᔪᑦ "*ᒫᓐᓇᐅᔪᒥᑦ ᖃᑦᑏᓐᓇᐅᓂᖏᑦ ᐊᒻᒪ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᓂᖏᑦ ᐃᓐᓇᖏᑦ ᑐᑦᑐᐃᑦ ᕿᖑᐅᑦ ᑐᑦᑐᖏᑦ ᐱᒻᒪᕆᐅᔪᖅ ᐱᐅᖅᓱᐊᓂᕐᒧᑦ ᖃᓄᐃᓕᖓᓂᖓ*". ᑐᑦᑐᐃᑦ ᖃᑦᑏᓐᓇᕈᕆᐊᖅᓯᒪᔪᑦ ᖃᓂᒋᔭᐸᓗᖏᓐᓂ 472,000 ᐊᕐᕌᒍᖓᓂ 1986 ᑎᑭᑦᑐᒍ ᖃᓂᒋᔭᖓᓄᑦ 8,200 2018–ᒥᑦ, ᑐᓐᖓᕙᒋᓪᓗᒋᑦ ᓄᕋᓕᐅᕝᕙᖏᓐᓂ ᖃᐅᔨᓴᕐᓂᐅᔪᒥᑦ ᔫᓂ 2018. ᑕᒪᓐᓇ ᓂᕆᐅᓇᖏᑦᑐᖅ ᐊᑦᑎᓪᓕᒋᐊᕐᓂᖏᑦ ᑐᑦᑐᐃᑦ ᐊᒥᓲᓂᖏᑦ, ᖃᓂᒋᔭᐸᓗᐊᓂ 98% 32 ᐊᕐᕋᒎᓕᖅᑐᓂᑦ. ᖃᑦᑏᓐᓇᐅᓂᖏᑦ ᑐᑦᑐᐃᑦ ᖁᐊᖅᕖᕐᓇᕋᓗᐊᖅᑎᓪᓗᒍ. ᑲᑎᒪᔩᑦ ᖃᐅᔨᓂᖅᓴᐅᔪᑦ ᓱᑲᑦᑐᒥᑦ ᖁᕝᕙᓯᓐᓂᖓ ᖃᑦᑏᓐᓇᕈᕆᐊᕐᓂᖏᓐᓄᑦ 29% ᐊᑕᐅᓯᕐᒥᑦ ᐊᕐᕌᒍᒥᑦ 2015–ᒥᓂᑦ ᐊᖅᒪ ᓯᕗᓂᐢᓴᒥ ᖃᓄᐃᓕᖓᓂᐊᕐᓂᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᖏᑦ.

ᔫᓐᓄᐊᕆᒥ 2019, ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᖓᓯᐊᑉ ᒐᕙᒪᖓᑦ ᑐᓂᓯᓚᐅᖅᑐᑦ *ᑲᑐᑎᓪᓗᑎ ᑐᓯᕋᐅᑦ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᖃᓄᐃᓕᓯᒋᐊᓂᕐᒧᑦ ᕿᖓᐅᒃ ᐃᐊᒃᓄ (ᓇᐸᖅᑐᖃᖏᑦᑐᓂᑦ ᑐᑦᑐᖏᑦ) ᑐᑦᑐᐃᑦ 2019-2021* ᑲᑎᒪᔨᓄᑦ, ᓇᓗᓇᐃᔭᐃᔪᑦ ᑐᓯᕋᖅᑕᐅᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᓂᕐᒧᑦ ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᐃᑦ ᓄᐃᑭᔩᒥ. ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᕈᑏᑦ ᑐᓯᕌᖑᔪᑦ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᖓᓯᐊᑉ ᒐᕙᒪᖓᑦ ᑲᑐᑎᓪᓗᑎ ᑐᓯᕋᐅᒻᒥᑦ ᑲᑎᖅᓱᖅᑕᐅᓚᐅᖅᑐᑦ ᑖᓪᓕᒪᐅᓪᓗᑎ ᖃᓄᐃᓕᖓᓂᖏᑦ: ᐊᖑᓇᓱᑦᑕᐅᔪᑦ, ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ, ᓇᔪᖅᑕᖏᑦ ᐊᒻᒪ ᓄᓇ ᐊᑐᖅᑕᐅᓂᖓ, ᐊᒻᒪ ᐃᓕᓐᓂᐊᕐᓂᖅ ᐊᒻᒪᓗᑦᑕᐅᖅ ᖃᐅᔨᓴᕐᓂᖅ ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᕐᓂᖅ. ᐱᓗᐊᖅᑐᒥᑦ, ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᐱᓕᕆᕝᕙᐊᖓ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐊᒻᒪ ᓄᓇᒦᐅᑕᓕᕆᔨᒃᑯᑦ ᑐᓯᕋᓚᐅᖅᑐᑦ ᑲᔪᓯᑎᑦᑎᓗᑎ ᑐᑦᑐᓕᒫᓄᑦ ᑲᑎᑦᑐᒥᑦ ᑐᑦᑐᑦᑕᐅᔪᓐᓇᖅᑐᑦ ᐱᑕᖃᖏᓪᓗᓂ ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᖏᓐᓄᑦ. ᑭᖑᓂᐊᒍᑦ ᖃᐅᔨᓴᕆᐊᓐᖓᓚᐅᖅᑎᓪᓗᒋᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᓯᕋᐅᒥᑦ, ᑲᑎᒪᔩᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑐᑦ ᖁᕝᕙᓯᓐᓂᖓ 2 ᕿᒥᕈᓂᕐᒥᑦ ᓈᒻᒪᓚᐅᖅᑐᖅ, ᒪᓕᑦᑐᒋᑦ ᒪᓕᒐᖏᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᓯᖃᐅᑎᓂᑦ. ᑕᒪᐃᓐᓂᖓᓄᑦ, ᑲᑎᒪᔩᑦ ᐋᖅᑭᔅᓯᓚᐅᖅᑐᑦ ᐱᕙᓪᓕᐊᓂᖏᓐᓄᑦ ᐊᒻᒪ ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓄᓐᓄᑦ ᐊᑎᓕᐅᕐᕕᒃ ᕕᕗᐊᕆ 4, 2019.

ᓄᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑦ, ᑐᓐᖓᕙᒋᓪᓗᒋᑦ ᒫᓐᓇᐅᔪᒥᑦ ᖃᐅᔨᔭᔅᓴᐅᔪᑦ ᐊᒻᒪ ᐃᓱᒪᓕᐅᖅᑕᐅᓯᒪᔪᖅ 2016, ᐱᒻᒪᕆᐅᔪᒥᑦ ᐱᐅᖅᓱᐊᓂᕐᒧᑦ ᐃᓱᒫᓘᑎᑦᑲᐃᓐᓇᖅᑐᖅ ᐅᑯᓄᖓ ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᖏᓐᓄᑦ ᐊᒻᒪ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᒃᑲᓂᕐᓂᐅᔪᑦ ᐱᒻᒪᕿᐅᔪᑦ ᑐᑦᑐᐃᑦ ᐅᑎᖅᑎᑕᐅᓂᖏᓐᓄᑦ. ᐃᓱᒪᓕᐅᖅᑎᓪᓗᒋᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᓂᑦ ᑭᓪᓕᖏᓐᓂ, ᓄᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᒋᔭᖃᓚᐅᖅᑐᑦ ᐊᑦᑕᓇᕈᑎᐅᔪᓐᓇᖅᑐᑦ ᑐᑦᑐᓄᑦ ᐊᒥᓱᓂᑦ ᖃᑦᑏᓐᓇᕈᕆᐊᕐᓂᖏᓐᓄᑦ, ᓇᓗᓇᕈᑕᐅᔪᑦ ᖃᓄᖅ ᐊᐅᓚᓂᖏᓐᓄᑦ ᖃᑦᑏᓐᓇᕈᕆᐊᕐᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐱᒻᒪᕆᐅᓂᖓᓄᑦ *ᐃᐊᒃᓄ* (ᓇᐸᖅᑐᖃᖏᑦᑐᒥᑦ ᑐᑦᑐᐃᑦ) ᑎᓖᓱᒥᐅᑕᓄᑦ ᐱᑕᖃᑦᑎᐊᕐᓗᑎ – ᐱᑕᖃᕐᓂᖏᓐᓄᑦ, ᑕᕐᓂᒃᑯᑦ, ᐊᒻᒪ ᐱᖅᑯᓯᒃᑯᑦ.

ᓄᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᓇᓗᓇᐃᖅᓯᓚᐅᖅᑐᑦ ᑲᑎᑦᑐᒥᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᑦ ᐱᑕᖃᖏᓪᓗᓂ ᑲᔪᓯᑎᑕᐅᔭᕆᐊᓕᒃ ᐊᑐᖃᑦᑕᖅᑐᓕᒫᓄᑦ ᑰᑮᑎ ᐃᐊᒃᓄ ᑐᑦᑐᖏᓐᓂ ᐃᓗᐊᓂ ᓄᐃᑭᔩ 2019/2020 ᐊᒻᒪ 2020/2021 ᑐᑦᑐᒐᓱᐊᕐᓇᐅᔪᓂᑦ.

ᐃᖏᕋᔪᑦ ᕿᖓᐅᑦ ᑐᑦᑐᖏᓐᓂ ᓴᐳᒻᒥᔭᐅᕝᕕᒃ (MCBCCA) ᑲᔪᓯᑎᑕᐅᔪᖅ ᐊᑐᖅᑕᐅᓪᓗᓂ ᐊᑐᓕᖅᑎᑕᐅᓗᓂ ᐱᑕᖃᖏᓪᓗᑎ ᑲᑎᑦᑐᒥᑦ ᑐᑦᑐᑕᐅᔪᓐᓇᖅᑐᑦ, ᓄᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔨᓚᐅᖅᑐᑦ

ᐊᑐᕐᓂᖃᑦᑎᐊᕐᓂᖓ ᑭᓪᓕᖓ ᑎᑭᑦᑎᓗᓂ ᑯᑮᑎ ᐃᐊᒃᕗ ᐱᐅᖅᓱᐊᓂᕐᒧᑦ ᑐᕌᖓᒋᑦ ᐊᒥᓰᓂᖏᑎᒍᑦ ᖃᐅᔨᓴᖅᑕᐅᓗᓂ ᐃᑐᒪᒋᔭᖃᖅᓯᓈᕐᓗᑎ ᐅᖓᑕᐅᔾᔨᖃᑦᑕᐅᑎᔪᓂᑦ ᐊᑦᑐᐊᓂᓕᓐᓄᑦ ᑐᑦᑎᑐᓄᑦ ᐊᒻᒪ ᑐᑦᑐᑕᐅᒋᐊᖏᑦᑐᑦ ᑐᑦᑐᑕᐅᔪᑦ.
ᖃᐅᔨᓴᖃᑦᑕᕐᓂᐅᔪᖅ ᑰᑮᑎ ᐃᐊᒃᕗ ᑐᑦᑐᑕᐅᙱᑦᑐᓂᑦ ᐱᒻᒪᓇᐅᔪᖅ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐃᓱᒪᓕᐅᕐᓂᐅᔪᓄᑦ, ᑲᑎᒪᔩᑦ ᐊᑐᓕᕐᑯᔾᓚᐅᖅᑐᑦ ᑖᒃᑯᐊ ᑎᑞᓱ ᓚᙱᒪᖓᓚᑦ (TG) ᐃᖅᑲᓇᐃᔭᖅᑎᑎᒃᑲᓂᕐᓗᑎ ᓄᓇᓕᒻᒥ ᐅᐊᑦᑎᔾᔭᓂᑦ.

2018 ᓄᕐᕋᓕᐅᕐᕕᖏᓐᓂ ᖃᐅᔨᓴᕐᓂᐅᔪᖅ ᓇᓄᓇᐃᖅᓱᑦᑎᐊᓚᐅᖅᑐᖅ ᓅᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᓗᐊᓕᖅᑐᖅ ᐊᑦᑎᓪᓕᒋᐊᕐᓂᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᑐᑦᑐᖏᑦ. ᑖᒃᑯᐊ ᑐᑭᓯᒋᐊᑭᑏᑦ ᓄᑖᙳᔪᑦ ᐊᒻᒪ ᐃᓚᓯᓪᓗᑎ ᖁᕝᕙᓯᓐᓂᖅᓴᒥᑦ ᓇᓄᓇᕈᑕᐅᔪᓂᑦ ᓯᕗᓂᔅᓴᖏᓐᓄᑦ ᑐᑦᑐᐃᑦ. ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕐᑯᔾᓚᐅᖅᑐᑦ ᑖᒃᑯᐊ ᑎᑞᓱ ᓚᙱᒪᖓᓚᑦ (TG) ᐊᒻᒪ ᓄᓇᕖᐊᑉ ᓚᙱᒪᖓᓚᑦ ᐱᑕᖃᖅᑎᑦᑎᓗᑎ ᐅᖃᓖᒐᓚᖏᑦᑐᓂᑦ ᓇᓄᓇᐃᔭᖅᓯᒪᓂᖏᓐᓄᑦ ᖃᓄᐃᓕᖓᓂᓇᓕᖅᑕᖏᓐᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᑦ ᖃᓄᐃᓕᑎᑦᑎᓂᐅᔪᑦ ᓅᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ, ᐊᒻᒪ ᖃᓄᖅ ᐊᑐᓕᖅᑎᑦᑎᔪᓇᓂᐊᕐᓂᖓᓄᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᑦᑐᓂᑦ.

ᑐᑭᓯᐅᒪᑦᑎᐊᓂᖅᓴᓇᓗᒋᑦ ᖃᓄᐃᓘᖃᑦᑕᕐᓂᖏᑦ ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ ᐊᑦᑎᓪᓕᒋᐊᕐᓂᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᑐᑦᑐᐃᑦ, ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕐᑯᔾᓚᐅᖅᑐᑦ ᑖᒃᑯᐊ ᑎᑞᓱ ᓚᙱᒪᖓᓚᑦ (TG) ᐊᒻᒪ ᓄᓇᕖᐊᑉ ᓚᙱᒪᖓᓚᑦ ᐱᑕᖃᖅᑎᑦᑎᓗᑎ ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᑐᑭᓯᒋᐊᑭᑎᓂᑦ ᑕᑯᔭᐅᖃᑦᑕᖅᑐᑦ ᖁᕝᕙᓯᓐᓂᖏᓐᓄᑦ ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ ᐊᒻᒪ ᐋᖅᑭᔅᓯᒪᓂᖓ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ ᓇᓄᓇᐃᖅᑕᐅᓂᖓᓄᑦ ᑐᖀᖅᑕᐅᔪᑦ ᐊᒥᓰᓂᖏᑦ ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᑦ ᐲᖅᑕᐅᓗᑎ ᐊᕐᕋᒍᑕᓖᑦ. ᐃᓚᒋᐊᕐᓗᒍ, ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐱᑕᖃᖅᑎᑕᐅᓂᐊᖅᑐᑦ ᖃᓄᐃᑑᓂᖃᖅᑎᑕᐅᓗᓂ *ᑎᓕ* (ᐊᒪᕈᖅ) ᐲᖅᑕᐅᓂᖓ ᑐᓐᐊᕕᖃᖅᑐᓂ (i) ᑎ ᑕᑯᔭᐅᖃᑦᑕᕐᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᖃᐅᔨᓴᕐᓂᐅᔪᓂᑦ ᐊᒻᒪ (ii) ᓴᖅᑮᔭᕈᓐᓇᕐᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᑎᓕᓄᑦ ᐊᑦᑐᐊᓃᑦ ᖃᓂᒋᔭᖏᓐᓃᑦᑐᓄᑦ ᑐᑦᑐᓄᑦ ᐅᑭᐅᙳᑎᓪᓗᒍ.

ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᔅ ᓯᓚᐃᕝ ᑎᓕ ᐊᙳᓇᓱᐊᒃᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᙳᔪᖅ ᐊᑐᖅᑕᐅᔪᖅ ᐊᑐᖅᑕᐅᓂᖏᓐᓄᑦ ᑎᓕ ᒌᖅᑕᐅᓂᖏᓐᓄᑦ ᐅᑭᐊᓪᓕᕕᖏᓐᓂ ᑰᑮᑎ ᐊᒻᒪ Sahtì ekwǫ̀ *(ᓵᑎ ᐅᐊᒃᕗ)* (ᐳᓘᓅᔅ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᑦ). ᑖᓐᓇ ᐱᓕᕆᐊᖅ ᐃᑲᔪᕐᓂᖃᑦᑎᐊᕋᓗᐊᕐᒪᖖᖅ ᐱᐅᖅᓱᐊᕋᓱᓐᓂᕐᒧᑦ ᑰᑮᑎ ᐃᐊᒃᕗ, ᑲᑎᒪᔩᑦ ᐊᑐᓕᕐᑯᔾᓚᐅᖅᑐᑦ ᓇᒦᓐᓂᖏᑦ ᐊᒻᒪ ᐊᒥᓰᓂᖏᑦ ᑎᓕᓄᑦ ᑐᑦᑐᑕᐅᙱᑦᑐᑦ ᐱᑕᖅᑲᖅᑎᑕᐅᓗᑎᑦ ᑲᑎᒪᔨᓄᑦ ᐊᕐᕋᒍᑕᓖᑦ ᐊᒻᒪ ᖃᓄᐃᓕᖓᓂᖏᑦ ᓴᖅᑭᖅᑎᑕᐅᓗᑎ ᖃᐅᔨᓴᕐᓗᑎᑦ ᐊᑐᑦᑎᐊᕐᓂᖓᓄᑦ ᐱᓕᕆᐊᖅ, ᑐᓐᖓᕕᖃᖅᑐᑎ ᖃᐅᔨᓴᖅᑎᓂᑦ ᐊᒻᒪ ᓄᓇᖃᖅᑳᖅᓯᒪᔪᓄᑦ ᖃᐅᔨᒪᔭᐅᔪᓂᑦ.

ᑎᑞᓱ ᓚᙱᒪᖓᓚᑦ (TG) ᐊᐅᓚᑦᑎᔪᑦ *ᓄᓇᓕᐅᔪᒥ ᑎᓕ ᐊᙳᓇᓯᒃᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᖅ* ᐊᒻᒪ ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕐᑯᔾᓚᐅᖅᑐᑦ ᓇᒦᓐᓂᖏᑦ ᐊᒻᒪ ᐊᒥᓰᓂᖏᑦ ᑎᓕ ᑐᑦᑐᑕᐅᙱᑦᑐᑦ ᐱᑕᖅᑲᖅᑎᑕᐅᓗᑎ ᑲᑎᒪᔨᓄᑦ ᐊᒻᒪᓗᑦᑕᐅᖅ ᖃᐅᔨᓴᕐᓗ ᖃᓄᖅ ᐃᓕᓐᓂᐊᑎᑦᑎᓂᐅᔪᖅ ᐃᑲᔪᕐᓂᖃᓂᐊᕐᓂᖓᓄᑦ ᓯᕗᓂᔅᓴᒥ ᙯᒋᓕ ᑐᑦᑐᑕᐅᙱᑦᑐᓂᑦ ᐊᒻᒪ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ. ᐃᓚᒋᐊᕐᓗᒍ, ᑲᑎᒪᔩᑦ ᐊᑐᓕᕐᑯᔾᓚᐅᖅᑐᑦ ᑖᒃᑯᐊ ᑎᑞᓱ ᓚᙱᒪᖓᓚᑦ (TG) ᐊᒻᒪ ᓄᓇᕖᐊᑉ ᓚᙱᒪᖓᓚᑦ ᐊᐅᓚᑦᑎᓗᑎ *ᓄᓇᓕᐅᔪᒥ ᑎᓕ ᐊᙳᓇᓯᒃᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᖅ* ᓇᓄᓇᐃᕐᓗᒍ ᐊᑐᕐᓂᖏᑦ ᐲᖅᑕᐅᓗᑎᑦ ᑐᖀᖅᑕᐅᓯᒪᔪᑦ ᐊᒥᓰᓂᖏᑦ ᑎᓕ.

ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᒫᓐᓇᐅᔪᒥᑦ ᐃᖅᑲᓇᐃᔭᖅᑐᑦ *ᓵᐊᓰ* (ᐊᒃᓴᐃᑦ) ᖃᐅᔨᓴᖅᑕᐅᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᓈᒻᒪᓐᓂᖓᓄᑦ ᖃᐅᔨᓴᓂᕐᒥᑦ. ᐱᐅᓯᑎᒋᐊᕈᓐᓇᓂᐊᕐᓗᒋᑦ ᐊᐅᓚᓂᖃᑦᑎᐊᖅᑐᑦ, ᑲᑎᒪᔩᑦ ᐊᑐᓕᕐᑯᔾᔪᑦ ᑖᒃᑯᐊ *ᓈᕐᕼᐊ* (ᖃᕝᕕᒃ) ᐱᖃᓯᐅᔾᔨᐅᔭᓄᑎᑦ ᑕᕝᕙᓂ ᖃᐅᔨᓴᕐᓂᐅᔪᒥᑦ.

ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᓇᐹᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓕᓴᖅᓯᔪᑦ ᐅᖓᓯᓐᓂᖏᓐᓅᖃᑦᑕᖅᑕᖏᑦ ᑯᔾᔨᑎ ᐊᒻᒪ ᓵᑎ ᐃᐊᒃᕗ ᐅᖓᑕᐅᔾᔨᔪᑦ ᓄᐃᑮᔾ ᐊᒻᒪ ᓄᓇᖁᐊᖅ. ᑭᓯᐊᓂᓕ, ᐱᕙᓪᓕᐊᓂᖃᑦᑎᐊᖅᓯᒪᖏᑦᑐᑦ ᑲᑐᑎᔪᓂᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᑐᑦᑐᓂᑦ ᓂᕆᖃᑦᑕᖅᑐᓂᑦ ᐊᒻᒪ ᓄᓇᒥᑦ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᓄᓇᖁᐊᒥ ᐊᒻᒪ ᓄᓇᕗᒻᒥ ᑭᓪᓕᖏᓪᓄᑦ. ᑕᐃᒪᐃᓐᓂᖓᓄᑦ, ᑲᑎᒪᔩᑦ ᐊᑐᓕᕐᑯᔾᔪᑦ ᑖᒃᑯᐊ ᓄᓇᖁᐊᑉ ᓚᙱᒪᖓᓚᑦ ᐊᒻᒪ ᑎᑞᓱ ᓚᙱᒪᖓᓚᑦ (TG) ᓴᖅᑭᑎᑦᑎᓗᑎ ᑎᑎᕋᕆᐊᓐᖓᖅᓯᒪᔪᓂᑦ ᐊᖏᕈᑎᒥᑦ ᐊᒻᒪ ᖃᖓᒃᑰᓂᖏᓐᓄᑦ ᑲᑐᑎᓗᑎ ᐊᐅᓚᑦᑎᓗᑎ ᑰᑮᑎ ᐊᒻᒪ ᓵᑎ ᐃᐊᒃᕗ ᐱᓕᕆᖃᑎᖃᕐᓗᑎ ᐊᓯᖏᓐᓂᑦ ᐊᐅᓚᑦᑎᔨᐅᖃᑎᖏᑦᑐᓂᑦ.

ᑎᓖᓱ ᓄᓇᓕᒻᒥᐅᑕᐃᑦ ᐊᒻᒪᓗᑦᑕᐅᖅ ᑭᒃᑯᑐᐃᓐᓇᐃᑦ ᖃᐅᔨᒪᑎᑕᐅᔭᕆᐊᓖᑦᖃᕈᐃᓕᖓᓕᕐᓂᖏᓐᓂᑦ ᐃᐊᒃᕗ ᐊᒻᒪ ᖃᐅᔨᒪᑎᑕᐅᔭᕆᐊᓖᑦ ᐱᓇᓱᐊᕐᓂᕆᔭᐅᔪᓂᑦ ᓄᖅᑲᖅᑎᑕᐅᓗᓂ ᖃᑦᑏᓐᓇᕈᖅᐸᓪᓕᐊᓂᖏᓐᓄᑦ. ᕗᐃᑮ ᓄᓇᒥᐅᑕᓕᕆᔮᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᐊᑐᓕᖅᑯᔮᔪᑦ ᑲᔪᓯᑎᐊᖅᓯᒪᔪᑦ ᐊᒻᒪ ᐊᔅᓱᕈᕈᑕᐅᔪᑦ ᕿᓖᓱ ᒐᕙᒪᖓᑦ Ekwǫ̀ Nàxoède K'è (ᐃᐊᒃᕗ ᓇᐋᔾᐅᐃᑎ ᑲ'ᐃ [ᑲᒫᓘᒃ ᓄᓇᒥ]) ᐱᓕᕆᐊᖅ ᑐᓴᐅᒪᔾᔪᑎᑕᐅᓗᓂ ᑎᓖᓱ ᓄᓇᓕᓐᓄᑦ ᐊᒻᒪ ᐃᓕᓐᓂᐊᕐᕕᓐᓄᑦ.

ᖃᑦᑏᓐᓇᕈᓇᐊᕐᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᑦᑐᐃᓂᖃᖅᑐᑦ ᖃᓄᐃᖏᑎᐊᕐᓂᖏᓐᓄᑦ ᑎᓖᓱᒥᐅᑕᓄᑦ ᐊᒻᒪ ᑲᑎᒪᔩᑦ ᐊᑐᓕᖅᑯᔮᔪᑦ ᑖᒃᑯᐊ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᕙᐊᒃ ᒐᕙᒪᖓᑦ ᐅᖃᐅᓯᖃᕐᓗᑎ ᓯᕗᓪᓕᐅᔾᔮᐅᔭᕆᐊᓕᓐᓂᑦ ᐊᒻᒪ ᐋᖅᑭᒍᑎᓂᑦ ᓂᕿᓄᑦ ᐊᑦᑕᓇᐃᖅᓯᒪᓂᕐᒧᑦ. ᑲᑎᒪᔩᑦ ᐊᑐᓕᖅᑯᔩᒻᒥᔪᑦ ᑖᒃᑯᐊ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᕙᐊᒃ ᒐᕙᒪᖓᑦ ᑐᓂᓯᖃᑦᑕᐅᑎᓗᑎ ᑐᑭᓯᒋᐊᕈᑎᓂᑦ ᐱᔾᔪᑎᖃᖅᑐᓂᑦ ᐅᐊᒃᐳ ᐱᔾᔪᑎᖏᓐᓄᑦ ᐊᑎᓪᓕᒋᐊᕐᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐱᔾᔪᑕᐅᔪᑦ ᐊᑦᑐᐃᓂᖃᖅᐸᓪᓕᐊᖏᓐᓇᖅᑐᑦ ᐊᑎᓪᓕᒋᐊᕐᓂᖏᓐᓄᑦ.

ᒫᓐᓇᐅᓕᖅᑐᖅ ᐱᕙᓪᓗᐅᓂᖓ ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᐳ ᐊᒻᒪ ᑲᑎᒪᔩᑦ ᐃᑲᔪᖅᓱᓚᐅᖅᑐᑦ ᖁᕝᕙᓇᐊᕐᓂᖏᓐᓄᑦ ᐊᒥᓲᓂᖏᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᓂᑦ ᐊᕐᕌᒍᓐᓂᒃ ᒪᕐᕉᓐᓂᑕᒫᑦ ᑭᓯᐊᓂ ᓇᓗᓇᐃᖅᓯᔪᑦ ᐱᓇᓱᐊᕐᓂᖃᕆᐊᖖᑦ ᓴᖅᑭᖃᑦᑕᕐᓗᑎ ᑐᖏᓕᓃᑦᑕᕐᓗᑎ ᓴᓂᓪᓕᖏᓐᓄᑦ ᓵᑎ ᐃᐊᒃᐳ ᐊᒻᒪ ᐱᐊᓘᓕ/ᐊHᐃᐊᒃ ᑐᑦᑐᖏᑦ. ᑲᑎᒪᔩᑦ ᐃᑲᔪᖅᓱᓚᐅᖅᑐᑦ ᐊᑐᓕᖅᑎᑕᐅᓂᖓ ᓇᔾᔩᔪᓂᑦ ᖃᐅᔨᓴᕐᓂᖅ ᐱᓕᕆᐊᖅ ᐊᑐᖅᑐᖅ ᐊᓇᖏᓐᓂ ᓄᐊᑕᐅᓂᖏᓐᓄᑦ.

ᑲᑎᒪᔩᑦ ᐊᑐᓕᖅᑯᔨᔪᑦ ᑎᓖᓱ ᖃᐅᔨᓴᓂᕐᒧᑦ ᐊᒻᒪ ᖃᐅᔨᓴᖃᑦᑕᓂᕐᒧᑦ ᐱᓕᕆᐊᖅ ᐊᑐᓕᖅᑎᑕᐅᓗᓂ ᑖᒃᑯᐊ ᑕᒪᒃᑭ ᐃᐊᒃᐳ ᐊᒻᒪ ᐃᐊᒃᐳ ᓇᔪᖃᑦᑕᑕᖏᑦ ᖃᐅᔨᓴᖅᑕᐅᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᐊᒻᒪ ᐱᓪᓚᓇᐅᔪᓂᑦ ᑐᑦᑐᑕᐅᕙᑦᑐᓂᑦ ᓈᓴᐅᑎᓂᑦ ᑎᑎᕋᖅᑕᐅᓗᑎ ᐱᖅᑯᓯᓄᑦ ᓈᒻᒪᑦᑐᓂᑦ ᐃᑲᔪᕐᓂᖃᕐᓗᓂ ᐊᑐᓕᕈᓐᓇᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ. ᑲᑎᒪᔩᑦ ᐊᑐᓕᖅᑯᔨᔪᑦ ᑖᒃᑯᐊ Ekwò ᐃᐊᒃᐳ ᓇᐋᔾᐅᐃᑎ ᑲ'ᐃ ᓄᐊᑦᑎᓗᑎ ᓄᓇᒦᑦᑐᓂᑦ ᓯᓚᐅᒃ ᐊᓯᔾᔨᕐᓂᖓᓄᑦ ᖃᐅᔨᔭᐅᔪᓂᑦ ᐊᑐᓕᕈᓐᓇᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᓴᓇᓯᒪᓂᖓᓄᑦ.

ᑲᑎᒪᔩᑦ ᐊᑐᓕᖅᑯᔨᔪᑦ ᑖᒃᑯᐊ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪ ᓄᓇᕙᐊᒃ ᒐᕙᒪᖓᑦ ᐱᓕᕆᖃᑎᖃᖅᑐᑎ ᕗᐃᑮ ᓄᓇᒥᐅᑕᓕᕆᔮᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᓴᖅᑭᑎᑦᑎᓗᑎ ᑐᑦᑐᓄᑦ ᓇᓗᓇᐃᖅᓯᒪᔪᓄᑦ ᐊᑐᓕᖅᑕᐅᔪᓐᓇᖅᑐᒥᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᓴᓇᓯᒪᓂᖓᓂᑦ ᐊᒥᓲᓗᑎ ᑲᑎᓐᓇᖓᓂᖅᑲᖅᑐᑦ ᓇᓗᓇᐃᖅᓯᒪᔪᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᐃᓕᓯᒋᐊᕈᑏᑦ.

ᑰᑮᑎ ᐃᐊᒃᐳ ᑐᑦᑐᖏᑦ ᐱᒻᒪᕆᐅᔪᒥᑦ ᖃᓄᐃᓕᖓᓂᖃᓕᖅᑎᓪᓗᒋᑦ, ᑐᐊᕕᕐᓇᖅᑐᑦᑲᖅᑐᖅ ᐊᑐᓕᖅᑎᑕᐅᓗᓂ ᐊᐅᓚᑦᑎᑎᐊᓂᕋᑦ ᖃᓄᐃᓕᓯᒋᐊᓂᕐᒧᑦ ᓄᖅᑲᖅᑎᑕᐅᓗᓂ ᖃᑦᑎᓐᓇᕈᖅᐸᓪᓕᐊᓂᖏᑦ ᕿᓚᒥᐅᔪᒃᑯᑦ. ᑲᑎᒪᔩᑦ ᐃᓱᒪᓕᐅᖅᑕᖓ ᑕᕝᕙᓂ ᐅᓂᒃᑳᓂᑦ ᓵᓇᔭᐅᓯᒪᔪᑦ ᐊᑦᑐᐃᓂᖃᖏᓐᖑᓗᑎ ᐅᐊᒃᐳ ᐊᑐᖃᑦᑕᖅᑐᓄᑦ ᐊᒻᒪ ᐃᑲᔫᓯᐊᓐᖑᓂᐊᖅᑐ ᐃᐊᒃᐳᓄᑦ, ᒫᓐᓇᐅᔪᒥᑦ ᐱᑕᖃᖅᑎᒍᓐᓇᖅᑕᐳᑦ.

"... ᐃᓅᓯᐅᓪᓗᓂ, ᐊᑦᑐᐊᓂᓖᑦ ᓇᓗᓇᐃᔭᖅᑕᐅᔪᑦ ᑎᓖᓱ ᐊᖏᕈᒻᒥᑦ, ᐅᓇᐅᔪᖅ 12.1.1, ᐊᑕᖏᔪᑦ ᐃᓗᐊᓃᑐᓂ ᐃᓅᓯᑦᑎᓐᓂ ᐊᒻᒪ ᑕᒪᓐᓇ ᐱᓇᓱᐊᖅᐸᑦᑕᕗᑦ ᐊᖏᕈᑎᑦᑎᓐᓂ ᓇᓗᓇᐃᖅᓯᒪᑦᑎᐊᖁᓪᓗᒍ ᐊᑦᑐᐊᓂᖃᐃᓐᓇᓂᐊᕐᓂᕗᑦ ᑐᑦᑐᓄᑦ, ᐱᓕᕆᔭᐅᔪᑦ ᑐᑦᑐᐃᑦ ᒥᔅᓵᓄᑦ ᐊᒻᒪ ᓇᓪᓕᐅᓂᖅᓯᐅᕐᓂᖃᓂᕐᒧᑦ ᐱᓐᖑᐊᕐᓂᐅᔪᑦ ᑕᐃᒪᐃᖃᑦᑕᖅᑐᑦ -- ᑐᑦᑐᐃᑦ ᐊᒻᒪ ᐊᐅᓪᓚᖃᑦᑕᕐᓂᖅ. ᑭᓯᓕᒫᑦ -- ᐱᓯᒪᓚᐅᖅᑕᕗᑦ ᐊᑦᑐᐊᓂᖃᓚᐅᖅᑐᑦ ᑐᑦᑐᓄᑦ".
~ Dr. ᔮᓐ B. ᔩ, 2019

ᐊᑐᖃᑦᑕᖅᑐᑦ, ᐊᐅᓚᑦᑎᔩᑦ ᐊᒻᒪ ᒐᕙᒪᐃᑦ ᖃᓄᐃᓕᓯᒋᐊᕆᐊᖃᓕᖅᑐᑦ ᒫᓐᓇ, ᖃᓄᑐᐃᓐᓇᓕᒫᑦᑎᐊᖅ, ᓴᐳᒻᒥᓗᒋᑦ ᑐᑦᑐᐃᑦ ᐊᒻᒪ ᓇᔪᖃᑦᑕᖅᑕᖏᑦ ᓯᕗᓂᔅᓴᒥ ᐅᑎᕈᓐᓇᓂᐊᕐᓂᖏᓐᓄᑦ. ᐱᔭᐅᔭᕆᐊᖃᕐᓂᖓ ᑐᐊᕕᕐᓇᖅᑐᖅ. ᑰᑮᑎ ᐃᐊᒃᐳ ᑐᑦᑐᖏᑦ ᐊᑎᓪᓕᒋᐊᖅᓯᒪᔪᑦ ᑎᑭᑦᑐᑎᑦ ᐃᓚᖏᑦ ᐊᕐᓇᐃᑦ, ᐱᐅᖏᒥᑦ ᐱᕈᐃᕕᕆᔪᓐᓇᖅᑕᖏᓐᓄᓐᖑᖅᓯᒪᑐᐃᓐᓇᓇᐊᖏᑦ ᓄᕋᖏᓐᓄᑦ, ᓅᔅᓯᒪᔪᑦ ᖃᓂᒋᔭᖓᓄ ᑐᑦᑐᐃᑦ ᓄᕋᑖᕐᕕᖏᓐᓄᑦ. ᑖᒃᑯᐊ

ᐊᓯᔾᔨᖅᑐᑦ ᖁᕝᕙᓇᐊᖅᑎᑦᑎᔪᑦ ᓇᓗᓇᕈᑎᐅᔪᓂᑦ ᐊᐅᓚᑦᑎᖃᑎᒌᑦᑐᓄᑦ ᐊᒻᒪ ᒐᕙᒪᓄᑦ. ᐱᓕᕆᖃᑎᒌᓐᓂᖅ ᐊᒻᒪ ᐊᑐᓕᕈᓐᓇᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐱᑕᖃᓇᐊᖃᓪᓚᓇᑦᑐᖅ ᓯᕗᓂᔅᓴᖏᓐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ.

ᑎᓵᓱ ᑎᐊᒃ’ᐃᑌᕗ

ᑎᓵᓱ ᒐᕙᒪᖓᑦ

Government of
Northwest Territories Gouvernement des
Territoires du Nord-Ouest

Northwest Territories Gouvernement des
Territoires du Nord-Ouest

Mr. Joseph Judas, Chair (ᒥᔅᑕ ᔫᓯᕝ ᔫᑕᔅ, ᐃᒃᓯᕙᐅᑕᖅ)
Wek’eezhii Renewable Resources Board
(ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ)
4504 49TH AVENUE
ᔭᓗᓇᐃ ᓄᓇᕗᑦ XIA 1A7

ᑎᓯᐱᕆ 06 2019

ᑐᕌᖅᑐᑦ ᒥᔅᑕ ᔫᓯᕝ ᔫᑕᔅᒧᑦ:

ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐱᔾᔪᑎᒋᓯᒪᔭᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᖃᕐᓂᕐᒥᓂ ᑭᖑᓪᓕᖅᐹᒥᒃ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓄᑦ – *Kok’èetı ekwǫ* (ᑰᑮᑎ ᐃᐊᒃᕗ) ᐊᒥᕐᕋᑯᑎᖏᓐᓄᑦ

Tłıchǫ (ᑎᓵᓱ) ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑳᓂᕈᓐᓇᖅᑐᓕᕆᔨᖏᑦ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᓂ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑎᖃᖅᓯᒪᓕᕐᑐᑦ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐅᓂᒃᑳᓕᐊᕆᓯᒪᔭᖏᓐᓄᑦ ᑕᐃᔭᐅᓪᓗᑎᒃ ” *Wek’èezhìi (ᕗᐃᑭᔩ) ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐱᔾᔪᑎᒋᓯᒪᔭᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᖃᕐᓂᕐᒥᓂ ᑐᕌᖓᔪᓄᑦ ᑲᑐᔾᔨᓂᖅᑲᖅᓱᑎᒃ ᐃᓱᒪᓕᐅᕈᑎᑦ ᐊᐅᓚᕝᓯᓂᖅᑲᕐᓂᕐᒧᑦ ᑰᑮᑎ ᐃᐊᒃᕗ (ᕿᖕᒐᐅᑦ ᑐᒃᑐᖏᑦ) ᐊᒥᕐᕋᑯᑎᖏᓐᓄ”* ᐱᔭᐅᓯᒪᓕᓚᐅᖅᑐᑦ ᐅᑐᐱᕆ 4, 2019.

ᐊᑏ ᕿᓂᕐᓗᒋᑦ ᑖᒃᑯᓄᖓ ᐃᓕᔭᐅᖃᑕᐅᓯᒪᔪᑦ ᑲᑐᔾᔨᓂᖅᑲᖅᓱᑕ ᑭᐅᔾᔪᑎᒋᔭᑦᑎᓐᓄᑦ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐃᓱᒪᓕᐅᕈᑎᒥᓐᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᓄᑦ ᐊᒻᒪᓗ ᐃᓱᒪᓕᐅᕈᑎᖏᑦ ᐊᑐᓕᖅᑎᑕᐅᖁᓪᓗᒋᑦ ᐃᓕᔭᐅᖃᑕᐅᓯᒪᔪᑦ ᑭᖑᓪᓕᖅᐹᑦ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂ. ᓂᕆᐅᖕᓂᖅᑲᖅᐳᒧᑦ ᐱᓕᕆᐊᖃᑎᖃᕐᓕᓂᐊᕐᓂᑦᑎᓐᓂᒃ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᑲᔪᓯᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕝᓯᓂᖅᑲᕐᓂᕐᓂ ᑰᑮᑎ ᐃᐊᒃᕗ (ᕿᖕᒐᐅᑦ ᑐᒃᑐᖏᑦ) ᐊᒥᕐᕋᑯᑎᖏᓂᒃ.

ᑎᑎᕋᖅᑐᖅ,

ᐊᖏᔪᖅᑳᖅ ᔨᐊᔅ ᒪᑭᐊᓐᓯ
ᑎᓵᓱ ᒐᕙᒪᖓᑦ

ᓴᐃᓐ ᑖᒻᓴᓐ
ᒥᓂᔅᑕ
ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑳᓂᕈᓐᓇᖅᑐᓕᕆᔨᖏᑦ

ᐊᔾᔨᖓᓂᒃ ᐱᑎᑕᐅᔪᑦ

ᐊᔾᔨᖏᓂᒃ: ᒥᔅ ᓴᐃᓖᓐ ᕗᑦᕗᐊᕐᑦ
ᐃᓱᒪᑕᐅᓪᓗᓂ ᑎᑎᕋᖅᑎ

ᒥᔅᑕ ᒫᕐᑎᓐ ᒍᓪᓪᓂ
ᑎᑎᕋᖅᑎ ᒥᓂᔅᑕᓄᑦ/ᒥᓂᔅᑕᐅᑉ ᑐᙵᓕᙵ
ᐃᓱᒪᑖᒪᓅᑦ ᐊᒻᒪᓗ ᓄᓇᕐᑲᖅᑳᕐᑐᓕᕆᔾᔪᑦ

ᒥᔅ ᓵᓐ ᒪᑳᓐ
ᐃᓇᖏᖅᓯᓯᒪᑲᐃᓐᓇᕐᑐᖅ ᐃᓱᒪᑕᐅᓪᓗᓂ ᑎᑎᕋᖅᑎᐅᑉ ᑐᙵᓕᙵᓄᑦ
ᓄᓇᕐᑲᖅᑳᕐᓯᒪᔪᓕᕆᔨᑦ ᐊᒻᒪᓗ ᖃᕆᒪᓕᕆᔾᔪᖏᑦ
ᐃᓱᒪᑖᒪᓅᑦ ᐊᒻᒪᓗ ᓄᓇᕐᑲᖅᑳᕐᑐᓕᕆᔾᔪᑦ

ᒥᔅ ᐃᐊᕆ ᑭᐊᓕ, ᕐᑯᑦᑎᖕᓂᖅᐹᓂᒃ ᐃᓕᓐᓂᐊᕌᓂᒃᓯᒪᐅᑎᓕᒃ.
ᐃᓇᖏᖅᓯᓯᒪᑲᐃᓐᓇᕐᑐᖅ ᒥᓂᔅᑕᐅᑉ ᑐᙵᓕᙵᑕ
ᐃᑲᔪᖅᑎᙵᓄᑦ
ᐊᖑᑎᓕᕆᔾᔪᑦ ᓄᓇᒥᐅᑕᓕᕆᔾᔪᓪᓗ ᐱᕈᒃᑲᓐᓂᕈᓐᓇᖅᑐᓕᕆᔨᑦ

ᒥᔅᑕ ᐳᕆᑦ ᐃᐊᓪᑭᓐ
ᐃᓇᖏᖅᓯᓯᒪᑲᐃᓐᓇᕐᑐᖅ ᒥᓂᔅᑕᐅᑉ ᑐᙵᓕᙵᓂᒃ, ᐊᐅᓚᑦᓯᓂᕐᓂ
ᐊᖑᑎᓕᕆᔾᔪᑦ ᓄᓇᒥᐅᑕᓕᕆᔾᔪᓪᓗ ᐱᕈᒃᑲᓐᓂᕈᓐᓇᖅᑐᓕᕆᔨᑦ

ᒥᔅᑕ ᕌᐸ ᕚᐅ
ᐃᓇᖏᖅᓯᓯᒪᑲᐃᓐᓇᕐᑐᖅ ᐃᓱᒪᑕᖅ, ᐆᒪᔪᓕᕆᔨᑦ ᐊᒻᒪᓗ ᐃᕐᑲᓪᓕᕐᑭᔨᑦ
ᐊᖑᑎᓕᕆᔾᔪᑦ ᓄᓇᒥᐅᑕᓕᕆᔾᔪᓪᓗ ᐱᕈᒃᑲᓐᓂᕈᓐᓇᖅᑐᓕᕆᔨᑦ

ᒥᔅᑕ ᐳᕓᓄ ᑯᕌᕝᑦ
ᐃᓱᒪᑕᙵᓄᑦ, ᓄᐊᔅ ᓯᓚᐃᕝ ᐊᕙᒃᑐᖅᓯᒪᓂᙵᓂ
ᐊᖑᑎᓕᕆᔾᔪᑦ ᓄᓇᒥᐅᑕᓕᕆᔾᔪᓪᓗ ᐱᕈᒃᑲᓐᓂᕈᓐᓇᖅᑐᓕᕆᔨᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᑭᓕᕗᕐᑦ ᑖᓂᐅᓪᔅ
ᓄᓇᓕᐅᔪᒥ ᖃᕆᒪᐅᔪᑦ ᐱᐅᓰᑏ
ᑎᓖᓱ ᖃᕆᒪᙵᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᑕᐃᕙᑦ ᕙᐊᑕᕙᓐ
ᓄᓇᓕᐅᔪᒥ ᖃᕆᒪᐅᔪᑦ ᕼᒥᐊᑏ
ᑎᓖᓱ ᖃᕆᒪᙵᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᓵᕐᓕ ᕗᑦᐹᓪ
ᓄᓇᓕᐅᔪᒥ ᕗᐃᑭᔏ ᖃᕆᒪᙵᑦ
ᑎᓖᓱ ᖃᕆᒪᙵᑦ

.../3

ᐃᓱᒪᑖᒪᓇᒃ ᐃᐊᓪᕖᓐᔅ ᓂᑦᓯᔅ
ᓄᓇᓕᐅᕙᒥ ᕗᐊᑏ ᒐᕙᒪᖕᒑᑦ
ᑎᓖᓱ ᒐᕙᒪᖕᒑᑦ

ᒥᔅ ᓗᐊᕋ ᑕᓐᑲᓐ
ᑎᓖᓱ ᐃᓱᒪᑖᒪᓇᐅᕙᖅ
ᑎᓖᓱ ᒐᕙᒪᖕᒑᑦ

ᒥᔅ ᑕᒥ ᓯᑕᐃᓐᕖᓐ-ᑎᐊᔅᓹᒫᕝᑦ
ᐃᓱᒪᑦᖕᒐᑦ, ᐱᐅᓯᑐᕐᑲᓕᓇᓂᕐᒥ ᐊᒻᒪᓗ ᓄᓇᐃᑦ ᒥᐊᓂᓇᔾᐅᓂᖕᒋᓐᓄᑦ
ᑎᓖᓱ ᒐᕙᒪᖕᒑᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᒧᐊᓈᔅ ᓲᓯᔅ
ᐱᐸᑦᔁᐊ ᑏ ᐃᖅᑭᓖᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᐃᐊᑦᕗᑦ ᓴᐃᖕᓇᔅ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ ᑲᑎᒪᔨᖕᒋᑦ
ᔾᓗᓇᐃᒥ ᑎᓐᓃᑦ ᐃᖅᑭᓕᖕᒋᑦ (ᑎᐊᑕ)

ᐃᓱᒪᑖᒪᓇᒃ ᐆᕐᓂᔅᑦ ᐱᐊᓯᓇ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ ᑲᑎᒪᔨᖕᒋᑦ
ᔾᓗᓇᐃᒥ ᑎᓐᓃᑦ ᐃᖅᑭᓕᖕᒋᑦ (ᐃᓐ'ᑎᓪᓗ)

ᐃᓱᒪᑖᒪᓇᒃ ᑎᐊᕈᓪ ᒫᕐᓘ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ ᑲᑎᒪᔨᖕᒋᑦ
ᓗᑦᓯᐊᓪ'ᐄ ᑎᓐᓂ ᐃᖅᑭᓕᖕᒋᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᓗᐃ ᐱᐊᓪᓯᓕ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ ᑲᑎᒪᔨᖕᒋᑦ
ᑎᓐᓂᓄ ᑭᐅ ᐃᖅᑭᓕᖕᒋᑦ

ᒥᔅ ᐃᓱᓪ ᓕᔅᒃ
ADFN-ᑯᑦ ᐊᖕᒋᕐᑲᑎᒌᒐᓱᐊᕐᓂᖕᒋᓄᑦ ᐋᖅᑭᒃᓱᐃᔨ
ᐊᑲᐃᑦᓲ ᑎᓐᓂ ᐃᖅᑭᓕᖕᒋᑦ

ᐃᓱᒪᑖᒪᓇᒃ ᑕᐃᕝᑦ ᐳᐃᑦᕋᔅ
ᓹᓪᑦ ᓇᕗᕐ ᐃᖅᑭᓖᑦ #195

ᐃᓱᒪᑖᒪᓇᒃ ᒐᑢᑎᔅ ᓄᐊᕐᕓᔨᓐ
ᑎᐊᓲ ᐃᖅᑭᓕᖕᒋᑦ

ᐊᖏᔪᖅᑳᖅ ᒍᐃᓕᐊᒻ (ᐱᐅᓪ) ᐃᖕ
ᓄᐊᔅ ᓯᓚᐃᕝ ᐊᓪᓚᐃᖕᒐᔪᑦ ᑲᑐᔾᔨᖅᑲᑎᒌᖕᒋᑦ

ᐊᖏᔪᖅᑳᖅ ᒋᐊᓇ ᐸᐃᓕ
ᓄᓇᑦᓯᐊᕐᒥ ᐊᓪᓚᐃᖕᒐᔪᑦ ᐃᖅᑭᓕᖕᒋᑦ

ᐊᖏᔪᖅᑳᖅ ᑭᓕᒻ ᐹᓪ
ᒪᐅᓐᑎᓐ ᓚᐃᐊᓐᒥ ᐊᓪᓚᐃᖕᒐᔪᑦ

ᒥᔅ ᔩᐅᑎ ᐱᓪᓕᔅᓯ
ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖕᒋᑦ

ᒥᔅᑕ ᔪᐊᔾ ᐹᕐᓇᐱ
ᐃᒃᓯᕙᐅᑕᓇᔭᐅᑲᐃᓐᓇᖅᑐᖅ
ᓵᑑ ᓄᓇᒥᐅᑕᓕᕆᔨᑯᑦ ᑲᑎᒪᔨᖕᒋᑦ

ᒥᔅ ᑎᑉᐳᕋ ᓯᒥᓐᔅ
ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᓵᑑ ᓄᓇᒥᐅᑕᓕᕆᔨᑯᑦ ᑲᑎᒪᔨᖕᒋᑦ

ᒥᔅᑕ ᔩᔨᕝ ᑳᕐᓄᒎᕐᔅᑭ
ᐃᒃᓯᕙᐅᑕᖅ
ᑯᐃᑦᓯᓐ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖕᒋᑦ

ᒥᔅ ᐊᐃᒥ ᐋᓘᔅ
ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᑯᐃᑦᓯᓐ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖕᒋᑦ

ᒥᔅᑕ ᓯᐊᓇ ᑳᐱᓐᑐᕐ
ᐃᒃᓯᕙᐅᑕᖅ
ᐆᒪᔪᓕᕆᓂᕐᓂ ᐊᐅᓚᑦᓯᔨᑦ ᐅᖃᐅᔾᔪᐃᕆᐊᖅᑎᐅᓪᓗᑎᒃ ᑲᑎᒪᔨᑦ-ᓄᓇᑦᓯᐊᖅ

ᒥᔅ ᔩᐅᑎ ᐱᓪᓕᔅᓯ
ᐅᖃᐅᔨᕆᐊᖅᑎᑦ ᑲᑎᒪᔨᕋᓛᑦ ᐱᓕᕆᖅᑲᑎᒌᓐᓂᕐᒧᑦ ᐆᒪᔪᓂᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ

ᒥᔅᑕ ᕘᕐᓇᓐ ᐊᐃᓘᔅ
ᐃᒃᓯᕙᐅᑕᖅ
ᐃᓄᕕᐊᓗᐃᑦ ᐆᒪᔪᓕᕆᔨᑦ ᑲᑎᒪᔨᖕᒋᑦ

.../5

ᒥᔅ ᔫᐅᑎᑎ ᒥᐊᓇᖕ
ᐃᑲᔪᕈᑎᒃᓴᓄᑦ ᐋᖅᑭᒃᓱᐃᔨ
ᐆᒪᔪᓕᕆᓂᕐᓂ ᐊᐅᓚᑦᓯᔨᑦ ᐅᖃᐅᔾᔪᐃᒋᐊᖅᑎᐅᓪᓗᑎᒃ ᑲᑎᒪᔨᑦ (ᓄᓇᑦᓯᐊᖅ)

ᒥᔅᑕ ᖀᓐ ᐴᐃᓛᑦ
ᐃᓱᒪᑕᒻᒪᓇᐅᑦᑐᓂ ᐊᖏᖅᑲᑎᒌᒍᓱᐊᖅᑎ ᐊᒻᒪᓗ ᐊᖏᔪᖅᑳᖅ
ᐋᓴᐹᔅᑲ ᑎᓐᓂᓲᓛᓐ ᓃᐊ ᓃᐊ ᓄᓇᓕᓇᔨᑦ ᑯᐊᐳᓈᓴᖕᖑᑦ

ᒥᔅᑕ ᑖᓂᐅᑉ ᓯᐅᑦᓴᒃ
ᐃᒃᓯᕙᐅᑕᖅ
ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ

ᒥᔅ ᐊᓗᑭ ᑰᑦᑎᖅ
ᐊᖏᔪᖅᑳᖅ
ᓄᓇᕗᑦ ᑐᙵᕕᒃ ᑎᒥᖁᑎᖓᑦ

ᒥᔅᑕ ᓕᐊᓇ ᐋᑦᔪᓐ
ᐃᒃᓯᕙᐅᑕᖅ
ᖁᖅᓗᖅᑑᖅ ᐊᖑᓇᓱᒃᑏᑦ ᒥᑭᒋᐊᖅᑏᑦᓗ ᑲᑐᔾᔨᖅᑲᑎᒌᖏᑦ

ᒥᔅᑕ ᓵᒻ ᑲᐳᓚᒃ
ᐃᒃᓯᕙᐅᑕᖅ
ᐴᖕᓴᐃᑦ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᖅᑎᒃᑯᑦ ᑲᑐᔾᔨᖅᑲᑎᒌᖏᑦ (ᐅᒥᖕᒪᒃᑑᖅ)

ᒥᔅᑕ ᐲᑕ ᑲᐳᓚᒃ
ᐃᒃᓯᕙᐅᑕᖅ
ᐅᒥᖕᒪᒃᑑᖅ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᖅᑎᒃᑯᑦ ᑲᑐᔾᔨᖅᑲᑎᒌᖏᑦ (ᖅᑭᖕᖑᐅᑦ)

ᒥᔅᑕ ᐊᑦᑎᒪ Hᐋᑕᓇ
ᐃᒃᓯᕙᐅᑕᖅ
ᖅᑭᑎᖅᒥᐅᑦ ᐊᕕᒃᑐᖅᓯᒪᓂᖓᓂ ᐆᒪᔪᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ

ᒥᔅᑕ ᓯᑖᓐᓕ ᐊᓇᑉᓚᒃ
ᐊᖏᔪᖅᑳᖅ
ᖅᑭᑎᖅᒥᐅᑦ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖅᑲᑎᒌᖏᑦ

ᒥᔅᑕ ᔨᒥ ᓅᐳᑦ ᓄᑲᕐᔪᖅ
ᒥᓂᔅᑕᐅᑉ ᑐᙵᓕᙵ
ᐊᕙᑎᓕᕆᔨᒃᑯ, ᓄᓇᕗᑦ ᒐᕙᒪᙵᑦ

ᒥᔅᑕ ᓱᑏᑉ ᐱᖕᑲᓴᓐ
ᒥᓂᔅᑕᐅᑉ ᑐᙵᓕᙵᑕ ᐃᑲᔪᖅᑎᙵ
ᐊᕙᑎᓕᕆᔨᒃᑯ, ᓄᓇᕗᑦ ᒐᕙᒪᙵᑦ

ᒥᔅᑕ ᑐᓅᑲᔅ ᔨᓯᖕ
ᐆᒪᔪᓕᕆᔨᑦ ᐃᓱᒪᑕᙵᑦ
ᐊᕙᑎᓕᕆᔨᒃᑯ, ᓄᓇᕗᑦ ᒐᕙᒪᙵᑦ

.../7

ᑎᑎᕋᖅᑕᐅᓯᒪᔪᑦ ᐃᔾᔪᐊᖅᑕᐅᓯᒪᔪᓄᑦ

ᐃᑯᒪᑕᒻᒪᕆᒃ ᑭᓕᕗᕐᑦ ᑖᓂᐅᓪᔅ, ᐱᐅᓵᑳ
ᑎᓖᑯ ᒐᕙᒪᖓᑦ
clifforddaniels@tlicho.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᑕᐃᕖᑦ ᕖᐊᑕᕖᓐ, ᒐᒥᐊᑏ
ᑎᓖᑯ ᒐᕙᒪᖓᑦ
davidwedawin@tlicho.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᓵᕐᓕ ᕗᑦᐹᓪ, ᕗᐃᒃᕖᑎ
ᑎᓖᑯ ᒐᕙᒪᖓᑦ
charliefootball@tlicho.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᐃᐊᓪᕚᓐᔅ ᓂᑦᓯᔅ, ᕗᐊᑏ
ᑎᓖᑯ ᒐᕙᒪᖓᑦ
alfonznitsiza@tlicho.com

ᒥᔅ ᓗᐊᕋ ᑕᓐᑲᓐ
ᑎᓖᑯ ᐃᑯᒪᑕᒻᒪᕆᐅᔪᖅ
ᑎᓖᑯ ᒐᕙᒪᖓᑦ
lauraduncan@tlicho.com

ᒥᔅ ᑕᒥ ᓯᑕᐃᓐᕚᓐ-ᑎᐊᔅᓵᒻᐉᕐᑦ
ᐃᑯᒪᑕᖓᑦ, ᐱᐅᓯᑐᕐᑲᓕᕆᓂᕐᒥ ᐊᒻᒪᓗ ᓄᓇᐃᑦ
ᒥᐊᓂᕆᔭᐅᓂᖏᓐᓄᑦ
ᑎᓖᑯ ᒐᕙᒪᖓᑦ
TammySteinwand@tlicho.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᒧᐊᓰᔅ ᓵᓯᔅ
ᐱᐸᑦᓵᐊ ᑮ ᐃᖅᑭᓖᑦ
Pkfn2017chiefmoses@outlook.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᐃᐊᑦᕗᑦ ᓴᐃᖕᓇᔅ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ
ᑲᑎᒪᔨᖏᑦ
ᔭᓗᓇᐃᒥ ᑎᓐᓃᑦ ᐃᖅᑭᓕᖏᑦ
(ᑎᐊᑖ)
esangris@ykdene.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᐆᕐᓂᔅᑦ ᐱᐊᓯᓇ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ
ᑲᑎᒪᔨᖏᑦ
ᔭᓗᓇᐃᒥ ᑎᓐᓃᑦ ᐃᖅᑭᓕᖏᑦ
(ᓐ’ᑎᓘ)
ebetsina@ykdene.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᑎᐊᕈᓪ ᒫᕐᓘ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ
ᑲᑎᒪᔩᑦ
ᓗᑦᓯᐊᓪ’ᐃ ᑎᓐᓂ ᐃᖅᑭᓕᖏᑦ
Chief.lkdfn@gmail.com

ᐃᑯᒪᑕᒻᒪᕆᒃ ᓗᐃ ᐱᐊᓪᓯᓕ ᐊᒻᒪᓗ ᐃᖅᑭᓖᑦ
ᑲᑎᒪᔨᖏᑦ
ᑎᓐᓂᓗ ᑭᐅ ᐃᖅᑭᓕᖏᑦ
admin@dkfn.ca

ᒥᔅ ᐃᑯᓪ ᓕᔅᒃ
ADFN-ᑯᑦ ᐊᖏᕐᑲᑎᑏᒐᓱᐊᕐᓂᖏᓄᑦ ᐋᖅᑭᒃᓱᐃᔨ
ᐊᑲᐃᑦᓲ ᑎᓐᓂ ᐃᖅᑭᓕᖏᑦ
ethel@akaitcho.info

ᐃᑯᒪᑕᒻᒪᕆᒃ ᑕᐃᕖᑦ ᐳᐃᑦᕋᔅ
ᓵᓪᑦ ᕆᕗᕐ ᐃᖅᑭᓖᑦ #195
chief.srfn@northwestel.net

ᐃᑯᒪᑕᒻᒪᕆᒃ ᒐᓛᑎᔅ ᓄᐊᕐᕖᔨᓐ
ᑎᐊᓵ ᐃᖅᑭᓕᖏᑦ
Gladys_norwegian@dehcho.org

ᐊᖏᔪᖅᑳᖅ ᒍᐃᓕᐊᒻ (ᐱᐅᓪ) ᐃᖕ
ᓄᐊᔅ ᓯᓚᐃᙵ ᐊᓪᓚᐃᖕᒐᔪᑦ ᑲᑐᔾᔨᕐᑲᑎᒌᖏᑦ
general@nsma.net

ᐊᖏᔪᖅᑳᖅ ᒋᐊᕆ ᐸᐃᓕ
ᓄᓇᑦᓯᐊᕐᒥ ᐊᓪᓚᐃᖕᒐᔪᑦ ᐃᖅᑭᓕᖏᑦ
Garry.bailey@nwtmetis.ca

ᐊᖏᔪᖅᑳᖅ ᑭᓕᒻ ᐹᓪ
ᒪᐅᓂᓐ ᓚᐃᐊᓐᒥ ᐊᓪᓚᐃᖓᔪᑦ
Clem.paul@hotmail.com

ᒥᔅ ᔩᐅᑎ ᐱᓪᓕᔅᓯ
ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ
jpellissey@wrrb.ca

ᒥᔅᑕ ᔪᐊᔾ ᐹᖅᓇᐱ
ᐃᒃᓯᕙᐅᑕᖅ
ᓵᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᑯᑦ ᑲᑎᒪᔩᖏᑦ
agbarnaby@hotmail.com

ᒥᔅ ᑎᑉᐳᕐ ᓯᒥᓐᔅ
ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᓵᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᑯᑦ ᑲᑎᒪᔩᖏᑦ
director@srrb.nt.ca

ᒥᔅᑕ ᔩᔨᕝ ᑳᖅᓄᔫᖕᑭ
ᐃᒃᓯᕙᐅᑕᖅ
ᑯᐃᑦᓯᓐ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ
chair@grrb.nt.ca

ᒥᔅ ᐊᐃᒥ ᐋᒨᔅ
ᐊᓪᓚᕕᖕᒥ ᐃᓱᒪᑕᖅ
ᑯᐃᑦᓯᓐ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ
aamos@grrb.nt.ca

ᒥᔅᑕ ᓕᐊᓇ ᑳᐱᓐᑐᖅ
ᐃᒃᓯᕙᐅᑕᖅ
ᐆᒪᔪᓕᕆᓂᖅᓂ ᐊᐅᓚᑦᓯᔨᑦ ᐅᖅᑲᐅᔾᔪᐃᒋᐊᖅᑎᐅᓪᓗᑎᒃ
   ᑲᑎᒪᔨᑦ
(ᓄᓇᑦᓯᐊᖅ)
wmac-c@jointsec.nt.ca

ᒥᔅ ᔩᐅᑎᑎ ᒥᐊᓇᖕ
ᐃᑲᔪᕈᑎᒃᓴᓄᑦ ᐋᖅᑭᒃᓱᐃᔨ
ᐆᒪᔪᓕᕆᓂᖅᓂ ᐊᐅᓚᑦᓯᔨᑦ ᐅᖅᑲᐅᔾᔪᐃᒋᐊᖅᑎᐅᓪᓗᑎᒃ
   ᑲᑎᒪᔨᑦ
(ᓄᓇᑦᓯᐊᖅ)
wmacnwt@jointsec.nt.ca

ᒥᔅᑕ ᕘᖅᓇᓐ ᐊᐃᔫᔅ
ᐃᒃᓯᕙᐅᑕᖅ
ᐃᓄᕕᐊᓗᐃᑦ ᐆᒪᔪᓕᕆᔨᑦ
   ᑲᑎᒪᔩᖏᑦ
igc-js@jointsec.nt.ca
igc-c@jointsec.nt.ca

ᒥᔅᑕ ᕿᓐ ᐹᐃᓛᑦ
ᐃᓱᒪᑖᒻᒪᕆᐅᓪᓗᓂ ᐊᖏᖅᑲᑎᒌᒐᓱᐊᖅᑎ
ᐋᓵᔅᑲ ᑎᓐᓂᓰᓛᓐ ᓅᐊ ᓅᐊ ᓄᓇᓕᕆᔨᑦ
   ᑯᐊᐳᕇᓴᖓᑦ
rrobillard@adnlc.ca

ᒥᔅᑕ ᑖᓂᐅᓪ ᓯᐅᑦᓴᒃ
ᐃᒃᓯᕙᐅᑕᖅ
ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᖅᔪᐊᑦ ᑲᑎᒪᔩᖏᑦ
receptionist@nwmb.com

ᒥᔅ ᐊᓗᑭ ᑰᑦᑎᖅ
ᐊᖏᔪᖅᑳᖅ
ᓄᓇᕗᑦ ᑐᓐᖓᕕᒃ ᑎᒥᖅᑯᑎᖓᑦ
president@tunngavik.com

ᒥᔅᑕ ᓕᐊᓇ ᐋᑦᔪᓐ
ᐃᒃᓯᕙᐅᑕᖅ
ᖁᖅᓗᖅᑑᖅ ᐊᖑᓇᓱᒃᑏᑦ ᒥᑭᒋᐊᖅᑏᓪᓗ
   ᑲᑐᔾᔨᖅᑲᑏᖏᑦ
larryadjun63@gmail.com

ᒥᔅᑕ ᓵᒻ ᑲᐳᓚᒃ
ᐃᒃᓯᕙᐅᑕᖅ
ᐆᖅᓴᐃᑦ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᖅᑎᒃᑯᑦ
   ᑲᑐᔾᔨᖅᑲᑏᖏᑦ
(ᐅᒥᖕᒪᒃᑑᖅ)
ehtocb@qiniq.ca

ᒥᔅᑕ ᐋᑕ ᑲᐳᓚᒃ
ᐃᒃᓯᕙᐅᑕᖅ
ᐅᒥᖕᒪᒃᑑᖅ ᐊᖑᓇᓱᒃᑏᑦ ᒥᑭᑭᐊᖅᑏᓪᓗ ᑲᑐᔾᔨᕆᑎᒌᖕᒋᑦ
(ᕿᖕᒑᐅᑦ)
chimo@kitikmeothto.ca

ᒥᔅᑕ ᐊᑦᑎᒪ ᕼᐋᑕᓇ
ᐃᒃᓯᕙᐅᑕᖅ
ᕿᑎᕐᒥᐅᑦ ᐊᖕᒃᑐᖅᓯᒪᓂᖕᒐᓂ ᐆᒪᔪᓕᕆᔨᑦ ᑲᑎᒪᔨᖕᒋᑦ
krwb@niws.ca

ᒥᔅᑕ ᓯᑖᓐᓕ ᐊᓇᑉᓚᒃ
ᐊᖏᔪᖅᑳᖅ
ᕿᑎᕐᒥᐅᑦ ᐃᓄᐃᑦ ᑲᑐᔾᔨᕆᑎᒌᖕᒋᑦ
president@kitia.ca

ᒥᔅᑕ ᓯᑏᕝ ᐱᖕᒃᓴᓐ
ᒥᓂᔅᑕᐅᑉ ᑐᖕᒐᓕᖕᒑᑕ ᐃᑲᔪᖅᑎᖕᒑ
ᐊᕙᑎᓕᕆᔨᒃᑯᑦ
ᓄᓇᕗᑦ ᒐᕙᒪᖕᒑᑦ
SPinksen@gov.nu.ca

ᒥᔅᑕ ᑐᐃᓚᒃᔅ ᔨᓯᖕ
ᐆᒪᔪᓕᕆᔨᒃᑯᑦ ᐃᓱᒪᑕᖕᒑᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᓐᓂ
ᓄᓇᕗᑦ ᒐᕙᒪᖕᒑᑦ
DGissing@gov.nu.ca

ᑭᐅᔪᐃᓐ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐱᔪᑎᒋᓯᒪᔭᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᖃᕐᓂᕐᒥᓐᓂ ᑐᕌᖓᔪᓄᑦ ᑲᑐᔾᔨᓂᖃᖅᓯᑎᒃ ᐃᓱᒪᓕᐅᕈᑎᑦ ᐊᐅᓚᓯᓂᖃᕐᓂᕐᒧᑦ ᑰᑭᑎ ᐃᐊᒃᕗ (ᕿᖓᐅᑦ ᑐᒃᑐᖏᑦ) ᐊᒥᕐᕋᕐᑯᑎᖏᓄ

ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᖏᑦ

ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᖏᑦ <u>ᐃᓱᒪᓕᐅᕈᑎᖃᕐᓂᖅ #1-2019</u> (Kǫ̀k'èetì ekwǫ̀ [ᑰᑭᑎ ᐃᐊᒃᕗ][ᕿᖓᐅᑦ ᑐᑦᑐᖏᑦ])
ᑲᑎᒪᔩᖏᑦ ᐃᓱᒪᓕᐅᖅᓯᒪᕗᑦ ᑲᑎᙵᒋᑦ ᐱᑕᕐᕕᐅᔪᓐᓇᖅᑐᑦ (TAH) ᐱᑕᕐᕕᐅᔪᓐᓇᙱᓐᓂᖏᑕ ᑕᒪᐃᓐᓄᑦ ᐊᑐᖅᐸᑦᑐᓄᑦ ᑰᑭᑎ ᐃᒃᕗᑦ ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓂᒃ ᐅᑭᐅᖏᑦ 2019/2020 ᐊᒻᒪᓗ 2020/2021 ᐊᖑᓇᓱᐊᕐᕕᐅᔪᓐᓇᕐᓂᖏᑦ ᐊᑐᖅᑎᙱᒋᑦ. ᓇᓗᓇᐃᖅᐋᒃᑲᓐᓂᕐᓂᐊᕐᓗᒍ, ᖃᔅᓯᐅᙱᓕᖅᑲᓐᓂᖏᑦ ᐃᒃᕗ (ᑐᒃᑐᑦ), ᐱᑕᖅᑕᐅᔪᓐᓇᖅᑐᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓂᑦ ᕗᐃᑭᔩᒥ ᐱᑕᖅᕕᐅᔪᓐᓇᙱᒻᒪᑕ

<u>ᑭᐅᔪᑎᖏᑦ:</u> ᓈᒻᒪᒋᔭᐅᔪᑦ

<u>ᐱᔪᑎᒋᔭᐅᔪᑦ:</u> ᑎᓖᑦ ᒐᕙᒪᖓᑦ (TG) ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑖᔅᓱᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᒥᒃ ᔪᐃᑮᔩᓄᑦ ᓈᒻᒪᒃᓴᐃᓯᒪᕗᑦ ᐊᒻᒪᓗ ᖁᔭᓕᒃᑲᓐᓂᖅᓯᑎᒃ ᑲᑎᒪᔩᐅᔪᓄᑦ ᓴᙱᓂᖅᑐᒥᒃ ᑐᕌᕝᕙᒃᓴᖅᑎᑦᓯᓯᒪᓂᕐᒥᓄᑦ ᒥᐊᓂᕆᔭᐅᓯᒪᓕᖁᑦᑐᒋᑦ ᐊᒻᒪᓗ ᑭᒡᓕᖅᑲᓕᖅᑎᑕᐅᔭᕆᐊᖅᑲᖅᓂᖏᑕ ᐊᖑᓇᓱᐊᒃᑕᐅᕙᑦᑐᓄᑦ ᖃᔅᓯᐅᔪᓂᒃ ᑖᒃᑯᓈᙵᑦ ᐊᒥᓲᔪᕐᓃᖅᐸᑦᓚᐊᔪᓂᑦ ᐊᒥᕐᕋᕐᑯᑎᓂᑦ. ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑲᓂᕈᓐᓇᖅᑐᓕᕆᔩᖏᑦ (ENR) ᐋᖅᑮᒋᐊᕐᓂᐊᖅᑐᑦ ᒪᓕᒃᑕᐅᒋᐊᓕᕐᑯᑎᓂᒃ ᐋᖅᑮᒋᐊᖃᓕᕌᖓᒥᒃ ᐊᑐᓕᖅᑎᑦᓯᓂᐊᕐᓂᕐᒥ ᑖᔅᓱᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᕗᐃᑭᔩᒧᑦ ᐊᒻᒪᓗ ᐃᓚᖏᓄᑦ ᐱᔪᑎᖃᖅᑐᓄᑦ ᑐᒃᑐᓂᒃ ᐊᐅᓚᓯᓂᖅᕙᐅᓪᓗᑎᒃ ᐊᕙᑎᒋᔭᐅᔪᓄᑦ ᐱᕕᒃᓴᖃᕐᑐᐊᕈᑎᒃ.

ᐊᑐᓕᖅᑎᑕᐅᖁᔭᐅᓪᓗᑎᒃ

<u>ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #1-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ):</u> ᐊᑐᕐᓂᖅᑲᖅᓂᖏᑦ ᐅᐊᔭᕝᕕᐅᔪᓐᓇᖅᑐᓂ
ᖃᐅᔨᒋᐊᕐᓂᐊᕐᓗᒋᑦ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᕿᖓᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᐅᓚᓂᖅᑦᓯᐊᕋᓗᐊᕆᐊᖏᑕ ᐱᔪᑎᖃᖅᑎᑕᐅᓂᐊᓚᐅᕐᓂᕐᒥᑦᑎᒍᑦ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᑦ ᒐᕙᒪᖓᑦ (TG) ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᖃᓄᑎᒋ ᖃᓕᓈᓕᖅᓯᒪᓂᖃᕐᕕᐅᔪᓂᒃ ᐊᓯᖏᓂᑦ ᐊᒥᕐᕋᕐᑯᑎᒋᔭᐅᔪᓄᑦ ᐅᑭᐅᕌᖅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐅᑭᐅᓪᓚᕆᐅᓕᖅᑎᓪᓗᒍ ᐱᔭᕇᖅᓯᒪᓕᕈᑎᒋᓂᐊᕋᒥᒋᑦ ᐊᒥᓲᓂᕆᔭᐅᔪᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᒋᓂᐊᖅᑕᒥᓐᓄᑦ ᐃᖏᕋᕆᑎᐊᕐᒪᖓᑕ ᕿᖓᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᒻᒪᓗ ᐱᔮᕆᓇᑎᒃ ᐱᑕᖅᓯᒪᓂᖅᑲᕈᓐᓇᕐᓂᕐᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓂᒃ ᐊᒻᒪᓗ ᓴᖅᑮᓯᒪᓕᕐᓂᐊᕐᓗᑎᒃ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᖃᐅᔨᒋᐊᕈᑎᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓯᕗᓪᓕᖓᓂ ᕖᕝᕗᐊᕆ 1, 2020.

<u>ᑭᐅᔪᑎᖏᑦ:</u> ᐊᔾᔨᒌᙱᓐᓂᖅᑲᖅᕕᐅᔪᑦ

ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᓕᐅᕈᑎᖏᑦ ᐊᔾᔨᒋᔭᐅᙱᓐᓂᖅᑲᖅᑐᑦ "ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #1-2019"-ᒥ ᐅᖃᖅᑕᐅᓯᒪᔪᓂ ᐃᒪᓐᓇ:

ᖃᐅᔨᒋᐊᕐᓂᐊᕐᓗᒋᑦ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᕿᖓᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᐅᓚᓂᖅᑦᓯᐊᕋᓗᐊᕆᐊᖏᑕ ᐱᔪᑎᖃᖅᑎᑕᐅᓂᐊᓚᐅᕐᓂᕐᒥᑦᑎᒍᑦ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᑦ ᒐᕙᒪᖓᑦ (TG) ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᖃᓄᑎᒋ ᖃᓕᓈᓕᖅᓯᒪᓂᖃᕐᕕᐅᔪᓂᒃ ᐊᓯᖏᓂᑦ ᐊᒥᕐᕋᕐᑯᑎᒋᔭᐅᔪᓄᑦ ᐅᑭᐅᕌᖅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐅᑭᐅᓪᓚᕆᐅᓕᖅᑎᓪᓗᒍ ᐱᔭᕇᖅᓯᒪᓕᕈᑎᒋᓂᐊᕋᒥᒋᑦ ᐊᒥᓲᓂᕆᔭᐅᔪᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᒋᓂᐊᖅᑕᒥᓐᓄᑦ ᐃᖏᕋᕆᑎᐊᕐᒪᖓᑕ ᕿᖓᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᒻᒪᓗ ᐱᔮᕆᓇᑎᒃ ᐱᑕᖅᓯᒪᓂᖅᑲᕈᓐᓇᕐᓂᕐᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓂᒃ ᐊᒻᒪᓗ ᓴᖅᑮᓯᒪᓕᕐᓂᐊᕐᓗᑎᒃ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᖃᐅᔨᒋᐊᕈᑎᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᓯᕗᓪᓕᖓᓂ ᒫᓯ 31, 2020.

__ᐱᔾᔪᑎᒋᓭᐅᔪᑦ:__ ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ (GNWT) ᐊᖏᖃᑎᒌᒃᓯᒪᔪᑦ ᐃᖏᕋᕐᓯᐊᖅᑑᓂᖓᑕ ᐅᐊᔾᔨᓇᖅᑐᓂ ᕿᖓᐅᑦ ᑑᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᖃᐅᔨᒋᐊᖅᑕᐅᕙᒋᐊᖃᒻᒪᑦ ᐊᑕᐃᓐᓇᖅᑐᒥᒃ. ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ (GNWT) ᒫᓐᓇᐅᔪᖅ ᓯᕗᓪᓕᖅᐹᓂᒃ ᐅᓂᒃᑳᓕᐅᓕᖅᓯᒪᕗᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᖏᑦ ᐅᖃᐅᓯᖃᖅᓯᓂᒃ ᐋᖅᑭᒃᓯᐃᕙᓪᓚᐊᓂᕐᒥᒃ ᐅᐊᔾᔨᓇᖅᑐᓂ ᕿᖓᐅᑦ ᑑᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᔪᒥᒃ (MCBCCA) ᑕᐃᒪᙵᓂ 2015 ᐅᑭᐅᖓᓂᑦ, ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐃᓗᓕᖃᕐᒥᔪᑦ ᐃᖏᕋᕐᓯᐊᕐᓂᖃᕆᐊᖏᓂᒃ ᑖᒃᑯᐊ ᐱᓕᕆᐊᖃᕈᑎᐅᔪᑦ. ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐃᓗᓕᖃᕐᓂᐊᖅᑐᑦ ᓄᓇᙳᐊᓕᐊᖑᓯᒪᔪᓂᒃ ᖃᓕᓃᓕᖅᓯᒪᓂᖃᕝᕕᐅᔪᓂᒃ ᕿᖓᐅᑉ ᐊᒥᕐᕋᑐᑎᖏᑕ ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᑐᑎᐅᔪᓄᑦ ᑐᕌᖓᑎᓪᓗᒋᑦ ᐅᐊᔾᔨᓇᖅᑐᓂ ᐊᕙᑎᐅᔪᒧᑦ. ᐅᓂᒃᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐱᔭᕇᖅᑕᐅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓂᑦ (GNWT) ᐊᒻᒪᓗ ᑐᓂᔭᐅᓯᒪᓕᕐᓗᑎᒃ ᕗᐃᑭᔾ ᓄᓇᒥᐅᑕᓕᕆᔾᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᓂᖓᓂ ᒫᑦᓯ 31, 2020.

__ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #2-2019__ (ᑰᑮᑎ ᐃᐊᒃᕗ)

ᐊᑐᖅᑕᐅᓕᕐᑯᓪᓗᒋᑦ ᐊᖑᓇᓱᐊᖅᑏᑦ ᖃᐅᔨᒪᓂᖃᕐᓂᖏᓂᒃ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓕᖅᑎᓪᓗᒋᑦ ᖃᓄᑐᐃᓐᓇᖅ ᐱᔮᓇᓱᑎᒃ ᐱᑕᖅᑐᕐᑲᕐᑕᓇᐊᒥᒃ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕋᕐᑯᑎᖏᓂᑦ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᖅᑲᓇᐃᔭᖅᑎᑖᖅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓯᑕᒪᓂᒃ ᓄᓇᓕᐅᔪᓂ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᐊᖅᑐᓂᒃ ᐊᑐᓂ ᓄᓇᓕᐅᔪᓂᑦ ᑲᑎᖅᓱᐃᔨᐅᓗᑎᒃ ᐊᒻᒪᓗ ᓴᖅᑮᔨᐅᕙᓐᓂᐊᕐᓗᑎᒃ ᐊᖑᓇᓱᒃᑕᐅᕙᑦᑐᓄᑦ ᑐᑭᓯᒋᐊᕐᕕᒃᓴᕐᑯᑎᓂᒃ ᑕᖅᑭᑕᒫᑦ ᐅᑭᐅᖏᑦ 2019/2020 ᐊᒻᒪᓗ 2020/2021 ᐊᖑᓇᓱᐊᕐᕕᐅᕙᑦᑐᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ.

__ᑭᐅᔾᔪᑎᖏᑦ:__ ᐊᔾᔮᒌᙱᓐᓂᖃᕐᕕᐅᔪᑦ

__ᐱᔾᔪᑎᒋᓭᐅᔪᑦ:__ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᙱᒋᑕᖏᑎᒎᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #2-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᒋᑦ:

ᐊᑐᖅᑕᐅᓕᕐᑯᓪᓗᒋᑦ ᐊᖑᓇᓱᐊᖅᑏᑦ ᖃᐅᔨᒪᓂᖃᕐᓂᖏᓂᒃ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓕᖅᑎᓪᓗᒋᑦ ᖃᓄᑐᐃᓐᓇᖅ ᐱᔮᓇᓱᑎᒃ ᐱᑕᖅᑐᕐᑲᕐᑕᓇᐊᒥᒃ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕋᕐᑯᑎᖏᓂᑦ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᖅᑲᓇᐃᔭᖅᑎᑖᖅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᐊᑕᐅᓯᕐᒥᒃ ᓄᓇᓕᐅᔪᒥ ᓇᐅᑦᓯᖅᑐᐃᔨᒥᒃ ᐊᑐᓂ ᓄᓇᓕᐅᔪᓂᑦ ᑲᑎᖅᓱᐃᔨᐅᓂᐊᖅᑐᒥᒃ ᐊᒻᒪᓗ ᓴᖅᑮᔨᐅᓂᐊᖅᑐᒥᒃ ᐊᖑᓇᓱᒃᑕᐅᕙᒃᑐᓄᑦ ᑐᑭᓯᒋᐊᒃᕕᒃᓴᕐᑯᑎᓂᒃ ᑕᖅᑭᑕᒫᑦ ᐅᑭᐅᖏᑦ 2019/2020 ᐊᒻᒪᓗ 2020/2021 ᐊᖑᓇᓱᐊᕐᕕᐅᕙᑦᑐᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ.

__ᐱᔾᔪᑎᒋᓭᐅᔪᑦ:__ ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐃᓯᒪᕗᑦ ᐃᖅᑲᓇᐃᔭᖅᑎᑖᕐᓯᒪᓕᕋᓭᕈᑎᒃ ᑎᑭᓪᓗᒋᑦ 16-ᓄᑦ ᐃᓄᓐᓂᒃ ᓴᖅᑮᔨᐅᓂᐊᖅᑐᓂᒃ ᐊᖑᓇᓱᐊᖅᑕᐅᕙᑦᑐᓕᖅᑎᓂᕐᒥ ᕿᖓᐅᑉ ᐊᒥᕋᕐᑯᑎᖏᓐᓂᑦ ᑲᑎᓪᓗᒋᑦ ᐱᑕᕐᕕᐅᔪᓐᓇᖅᑐᑦ (TAH) ᐱᑕᕐᕕᐅᔪᓐᓇᙱᓐᓂᖏᑕ ᒪᓕᒃᑎᑕᐅᓗᑎᒃ ᓈᒻᒪᒐᓭᙱᒻᒪᑕ ᑮᓇᐅᔭᓂᒃ ᐊᑐᓗᐊᓕᕋᓭᕐᓂᖏᑕ ᑕᒪᒃᑯᓄᖓ. ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᑐᑦᕋᕐᕕᒃᓴᖅᑐᑦ ᐱᓕᕆᓂᕐᒥᓐᓂ ᑕᐃᒃᑯᐊ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᔪᑦ ᓴᖅᑮᕙᒍᓐᓇᕐᐊᕐᓂᖏᓂᒃ ᑕᒪᐃᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒥ ᐱᓕᕆᓂᐅᕙᑦᑐᓂᑦ ᐊᒻᒪᓗ ᐱᑕᕐᕕᐅᕙᓐᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕋᕐᑯᑎᖏᓂᑦ ᑭᓯᒥᑐᐃᓐᓇᐅᑎᓐᓇᒋᑦ.

__ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #3-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ): ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓐᓂᖏᑦ__

ᑎᑭᓯᒪᓕᖅᑎᓪᓗᒍ ᑎᓯᐱᕆ 1, 2019-ᒧᑦ, ᐱᑕᖃᓕᖅᑎᕚᓯᒪᕐᑯᓪᓗᒋᑦ ᕗᐃᑮ ᓄᓇᒥᐅᑕᓕᕆᔾᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓇᓗᓇᐃᔭᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑕ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕋᕐᑯᑎᖏᑦ, ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐱᑕᖃᖅᑎᕙᓯᒪᔭᕆᐊᓖᑦ, ᑐᑭᓯᓇᕙᐊᖅᑐᑎᒧᑦ, ᐃᓕᖓᓐᓂᕆᓕᖅᑕᒥᓐᓂᒃ ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓐᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕋᕐᑯᑎᖏᓂ, ᐊᓯᖏᓄᑦ ᐊᒥᕋᕐᑯᑎᐅᔪᓄᑦ, ᐊᒻᒪᓗ ᖃᓄᖅ ᑕᒪᓐᓇ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓐᓂᖏᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᓕᕐᓂᐊᕐᒪᖔᑕ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕙᓂᐅᔪᓄᑦ.

__ᑭᐅᔾᔪᑎᖏᑦ:__ ᐊᔾᔮᒌᙱᓐᓂᖃᕐᕕᐅᔪᑦ

ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔮᒌᙱᓐᓂᖃᕐᕕᖏᑦ "ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #3-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓂᖏᓂ:

ᑎᑭᓯᒪᓕᖅᑎᓪᓗᒍ ᕕᕝᕗᐊᕆ 28, 2020, ᐱᑕᖃᓕᖅᑎᑦᓯᓯᒪᕐᑯᓪᓗᒋᑦ ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓇᓗᓇᐃᔭᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑕ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᑦ, ᓄᓇᕘᑦ ᒐᕙᒪᖓ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓯ ᒐᕙᒪᖓ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᔭᕆᐊᓖᑦ, ᑐᑭᓯᓇᕐᓯᐊᖅᑐᑎᒍᑦ, ᐃᓕᖓᓂᕆᓕᖅᑕᒥᓂᒃ ᐱᔪᑎᒋᓪᓗᒋᑦ ᓄᑎᖅᓯᒪᓕᖅᐸᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᓂ, ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᕐᑯᑎᐅᔪᓄᑦ, ᐊᒻᒪᓗ ᖃᓄᖅ ᑕᒪᓇ ᓄᑎᖅᓯᒪᓕᖅᐸᓂᖏᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᓕᕐᓂᐊᕐᒪᖔᑕ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᐅᔪᓄᑦ.

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᐊᒥᓱᕐᓚᐅᒻᒪᑕ ᐱᓕᕆᐊᕆᔭᐅᓕᕈᒪᔪᑦ ᐅᕐᑲᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᑕᒪᒃᑯᓇᓂ ᐃᓱᒪᓕᐅᕈᑎᓂ ᐃᓚᕐᑲᖅᓱᑎᒃ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᐅᕐᑲᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐃᓗᐊᓂ ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐱᔾᔪᑎᒋᓯᒪᔭᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᔭᐅᓯᒪᔪᓄᑦ ᑭᖑᓪᓕᕐᒥᒃ ᐅᓂᒃᑳᓕᐊᕐᒍᓯᒪᔪᓂ – Sahtì Ekwǫ̀ (ᓵᑎ ᐃᐊᒃᕗ) (ᐳᓘᓃᔅ-ᑲᓇᓐᓇᒥ) ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓄᑦ ᓯᕗᓪᓕᖅᐸᐅᑎᑕᐅᔭᕆᐊᕐᑲᕐᓂᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐊᖏᕚᒻᒪᕆᒻᒥᒃ ᐱᓕᕆᕙᐅᔭᕆᐊᕐᑲᕐᓂᐊᖅᓱᑎᒃ. ᐅᐱᒍᓱᑦᑎᐊᖅᓱᑕ ᐊᑯᓂᐅᓂᖅᓴᒥᒃ ᑭᐅᓯᒪᓕᕈᑎᒃᓴᑦᑎᓐᓂᒃ ᑖᔅᓱᒨᖓ ᐃᓱᒪᓕᐅᕈᑎᒎᑦ ᐋᖅᑭᒃᓱᐃᔪᓐᓇᖅᑎᑕᐅᔪᒪᕗᒍᑦ.

<u>ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #4-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ): ᓂᕿᑐᖅᐸᒃᑐᑦ ᐆᒪᔪᐃᑦ ᓇᐅᑦᓯᖅᑐᒐᐅᓂᖏᑦ</u>
ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐊᖏᕐᓕᕆᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓂᕿᑐᖅᐸᒃᑐᑦ ᐃᓕᖅᑯᓯᓇᕙᒃᑕᖏᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᓪᓗᑎᒃ ᐊᒥᕐᕋᕐᑯᑏᑦ ᐊᒥᓲᔪᖕᓃᖅᐸᓪᓕᐊᓂᖏᑕ ᐊᒻᒪᓗ ᐊᒥᓱᕈᖅᓯᒪᓕᕐᓂᖏᑕ ᐃᓐᓇᐅᔪᑦ ᐊᒻᒪᓗ ᓄᕋᐃᑦ ᐊᓐᓇᒍᑎᕆᕙᑦᑕᖏᓄᑦ, ᓄᓇᕘᑦ ᒐᕙᒪᖓ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓯ ᒐᕙᒪᖓ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᒪᑯᓂᖓ ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB):

1) ᑕᑯᖃᑦᑕᕐᓂᐅᔪᑦ ᑎᒐ, ᓵᐊᓲ, ᕐᑯᖅᓱᐊᖓᔪᑦ ᑎᐊᑦᐅᔅᓲ, ᐊᒪᓗ ᓅᐅ ᒫ ᕐᑯᑦᑎᒃᑑᓂᖏᑕ ᐊᖅᑰᓴᕙᐅᕙᑦᑐᓂᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᓂᑦ, ᖃᓄᐃᑦᑑᓂᖏᓄᑦ ᖃᐅᔨᓴᐃᓂᕐᑲᖅᐸᓪᓗᑎᒃ ᓯᕗᓪᓕᓂ ᑎᓯᐱᕆ 1 ᐊᑐᓂ ᐅᑭᐅᓂ, ᐱᒋᐊᕐᕙᕐᑲᓪᓗᑎᒃ 2019 ᐅᑭᐅᖓᓂ, ᐊᒻᒪᓗ
2) ᐱᓕᕆᐊᒃᓴᐅᓂᐊᖅᑐᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᐊᕐᓗᑎᒃ ᖃᔅᓯᐅᓂᖏᑕ ᓂᕿᑐᖅᐸᒃᑐᑦ ᐆᒪᔪᐃᑦ ᑐᕌᕙᐅᓯᒪᓕᕐᓂᐊᕐᒪᑕ ᐅᑭᐅᑕᒫᑦ ᐋᔭᖅᑕᐅᓯᒪᓕᕐᓂᒃᓴᖏᑕ, ᑕᐃᒪᓐᓇ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᕐᓂᖅᐸᑕ, ᓯᕗᓪᓕᓂ ᑎᓯᐱᕆ 1, 2020.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᐊᔾᔨᒌᙱᓐᓂᕐᑲᕐᕙᐅᔪᑦ

ᑎᓵᓯ ᒐᕙᒪᖓ ᐊᒻᒪᓗ ᓄᓇᕘᑦ ᒐᕙᒪᖓ (GNWT) ᐊᔾᔨᒌᙱᓐᓂᕐᑲᕐᕙᖏᑦ “ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #4-2019”-ᒧᑦ ᐃᒪᓐᓇ ᐅᕐᑲᖅᓯᒪᓂᖏᓂ:

ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐊᖏᕐᓕᕆᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓂᕿᑐᖅᐸᒃᑐᑦ ᐃᓕᖅᑯᓯᓇᕙᒃᑕᖏᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᓪᓗᑎᒃ ᐊᒥᕐᕋᕐᑯᑏᑦ ᐊᒥᓲᔪᖕᓃᖅᐸᓪᓕᐊᓂᖏᑕ ᐊᒻᒪᓗ ᐊᒥᓱᕈᖅᓯᒪᓕᕐᓂᖏᑕ ᐃᓐᓇᐅᔪᑦ ᐊᒻᒪᓗ ᓄᕋᐃᑦ ᐊᓐᓇᒍᑎᕆᕙᑦᑕᖏᓄᑦ, ᓄᓇᕘᑦ ᒐᕙᒪᖓ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓯ ᒐᕙᒪᖓ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᒪᑯᓂᖓ ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB):

1) ᐅᑭᐅᑕᒫᑦ ᑕᑯᖃᑦᑕᕐᓂᐅᔪᑦ ᑎᒐ, ᓵᐊᓲ, ᕐᑯᖅᓱᐊᖓᔪᑦ ᑎᐊᑦᐅᔅᓲ, ᐊᒪᓗ ᓅᐅ ᒫ ᕐᑯᑦᑎᒃᑑᓂᖏᑕ ᐊᖅᑰᓴᕙᐅᕙᑦᑐᓂᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᕐᑯᑎᖏᓂᑦ, ᖃᓄᐃᑦᑑᓂᖏᓄᑦ ᖃᐅᔨᓴᐃᓂᕐᑲᖅᐸᓪᓗᑎᒃ ᐊᒻᒪᓗ ᑎᓵᓯ ᒐᕙᒪᖓ Ekwò Nàxoède K’è (ᐃᐊᒃᕗ ᓇᐋᔅᐅᐃᑎ ᑲ’ᐃ [ᑲᒫᓘᒃ ᓄᓇᒥ]) ᐱᓕᕆᐊᖓᓐᓄᑦ ᐱᒋᐊᖅᑎᑕᐅᓗᑎᒃ ᑎᓯᐱᕆ 2020-ᒥ;
2) ᐱᓕᕆᐊᒃᓴᐅᓂᐊᖅᑐᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᐊᕐᓗᑎᒃ ᖃᔅᓯᐅᓂᖏᑕ ᑎᒐ ᑐᕌᕙᐅᓯᒪᓕᕐᓂᐊᕐᒪᑕ ᐅᑭᐅᑕᒫᑦ ᐋᔭᖅᑕᐅᓯᒪᓕᕐᓂᒃᓴᖏᑕ, ᑕᐃᒪᓐᓇ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᕐᓂᖅᐸᑕ, ᓯᕗᓪᓕᓂ ᑎᓯᐱᕆ 1, 2020

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᑐᕌᕙᐅᔪᔅᓴᐅᓂᐊᖅᑐᑦ ᓄᖑᑎᖅᑕᐅᓯᒪᓕᕐᓂᐊᕐᓂᖏᑕ ᑎᒐ ᑮᓇᐅᔭᑎᒍᑦ ᐊᑐᕐᓂᕐᑲᕐᓂᐊᕐᒪᑕ ᑎᑭᓪᓗᒋᑦ ᑎᓯᐱᕆ 2020-ᒧᑦ, ᑭᓯᐊᓂᓗ ᖃᐅᔨᒪᓇᓪᓚᓂᙱᒻᒪᑕ ᑕᒪᑐᒪᓂ ᑐᕌᕙᐅᔪᒪᓂᐊᖅᑐᑦ ᐅᑭᐅᑕᒫᑦ ᓄᖑᑎᓂᕙᓐᓂᐊᕐᓂᕐᒥᒃ ᐊᒃᓚᓂᒃ, ᑲᔪᖅᑐᑦ ᓇᒃᑐᕋᓖᑦ, ᐊᒻᒪᓗ ᖃᕝᕕᑦ ᐋᖅᑭᒃᓱᖅᑕᐅᓯᒪᓕᕈᓐᓇᕐᒪᑕ ᐱᔭᕌᖅᑕᐅᕙᒃᓴᖏᑦ ᖃᐅᔨᓴᐃᓂᐅᓇᔭᖅᑐᑦ ᓯᕗᖓᓂ. ᑕᒪᕐᒥᐅᓪᓗᑎᒃ ᓄᓇᕘᑦ ᒐᕙᒪᖓ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓯ ᒐᕙᒪᖓ (TG) ᐃᓱᒪᓂᕐᑲᕐᒪᑕ ᓄᖑᑎᖅᑕᐅᔭᕆᐊᕐᑲᕐᓂᐊᕋᓱᒋᙱᑦᓱᒋᑦ ᓇᒃᑐᕋᓖᑦ, ᐊᒃᓚᐃᑦ, ᖃᕝᕕᑦ, ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᖅᑕᕗᑦ ᐊᒻᒪᖅᑯᓂᒃ ᐊᐅᓚᓯᓂᕐᒥ ᐸᕐᓇᐅᑎᒋᔭᐅᓯᒪᔪᑦ ᐃᑲᔪᕈᑎᐅᔪᓐᓇᕐᒪᖔᑕ ᖃᓄᖅ ᕐᑯᑦᑎᒃᑎᒋᔪᒥᒃ ᑎᒐ ᑐᕌᖅᑕᐅᓯᒪᓗᑎᒃ ᓄᖑᑎᖅᑕᐅᔭᕆᐊᕐᑲᕐᓂᐊᕐᓂᖏᑕ.

ᓄᓇᕘᑦ ᒐᕙᒪᖓ (GNWT) ᑲᔪᓯᑎᑦᓯᓯᒪᓗᑎᒃ ᑲᑐᔾᔨᓂᕐᑲᕐᑲᑎᕐᑲᕐᓂᕐᒥᓐᓂᒃ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓂᒃ ᐱᓕᕆᐊᕐᑲᕐᓂᕐᒥ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᔨᐅᓂᕐᒧᑦ ᓂᕿᑐᖅᐸᒃᑐᓂᒃ ᐆᒪᔪᕐᑯᑎᓂᒃ ᐊᒃᑐᐃᓯᒪᓕᕈᓐᓇᖅᑐᓂᒃ ᕿᖓᐅᑦ ᐊᒻ ᐳᓘᓃᔅ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᑕ ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓂᒃ.

<u>ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #5-2019 (ᑰᑉᐱᑎ ᐃᐊᒃᕗ): ᑎᒐ ᐱᑕᖅᕕᐅᔪᓐᓇᖅᑐᑦ</u>

ᑎᒐ ᐱᑕᖅᓂᐅᕙᑦᑐᑦ ᐃᑲᔪᖅᓂᖅᑲᓕᖅᑎᑕᐅᖅᑯᓪᓗᒋᑦ ᒥᐊᓂᕆᔭᐅᓯᒪᓂᖏᑕ ᑰᑉᐱᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᖅᑯᑎᖏᑕ:

1) ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᑕᖅᑲᖅᑎᕐᓯᓂᐊᖅᑐᑦ ᕗᐃᑮᓐ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᖃᔅᓯᐅᔪᑦ ᑎᒍᑦ (ᐊᒪᕈᑦ) ᑐᕌᖅᑕᐅᓯᒪᓗᑎᒃ ᓄᖑᑎᖅᑕᐅᓂᐊᕐᒪᖔᑕ ᐊᖑᓇᓱᐊᕐᕕᐅᔪᓐᓇᖅᓯᓯᒪᑎᓪᓗᒍ ᑰᑉᐱᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᖅᑯᑎᖏᓂᒃ; ᐅᑭᐅᒥ ᓇᔪᖅᑕᐅᕙᒃᑐᓂ ᓯᕗᓪᓚᓂ ᑎᓯᐱᕆ 1 ᐅᑭᐅᑕᒫᑦ, ᐱᒋᐊᖅᓗᑎᒃ 2019;
2) ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᓕᐅᕈᑎᖅᑲᖅᓯᒪᒋᐊᓖᑦ ᖃᔅᓯᓂᒃ ᑎᒐ ᓄᖑᑎᕆᔭᕆᐊᖅᑲᖅᓂᐊᖅᓂᖅᒥᒃ ᑐᙵᕝᕕᖅᑲᖅᑎᓪᓗᒋᑦ (i) ᑕᑯᖅᑲᑦᑕᖅᓯᒪᓂᖅᓄᑦ ᑎᒐ ᐊᖅᑯᓭᖅᕕᐅᕙᑦᑐᓂ ᑰᑉᐱᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᖅᑯᑎᖏᓐᓂᑦ, ᖃᓄᐃᓐᓂᖏᓄᑦ ᖃᐅᔨᓴᐃᔾᔪᑎᐅᓯᒪᔪᓂᑦ ᐊᒻᒪᓗ (ii) ᖃᓂᓗᐊᓕᖅᓯᒪᔪᓐᓇᖅᓂᖏᑕ ᑰᑉᐱᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᖅᑯᑎᖏᑦ ᑎᒎᓄᑦ (ᐊᒪᕈᑦ) ᑐᕌᖓᓪᓗᑎᒃ ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᖅᑯᑎᐅᔪᓄᑦ ᐅᑭᐅᖑᑎᓪᓗᒍ; ᐊᒻᒪᓗ,
3) ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐋᖅᑭᒃᓱᐃᓯᒪᓕᖅᓂᐊᖅᑐᑦ *ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᔅ ᓯᓚᐃᕝ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ* ᐊᒻᒪᓗ *ᓄᓇᓕᐅᔪᒥ ᑎᒐ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓪᓚᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᖅ* ᐃᓱᒪᓕᐅᕈᑎᒋᓯᒪᓕᖅᓂᐊᖅᓗᒍ ᓱᓇᓂᒃ ᐱᓕᕆᐊᖅᑲᖅᑎᐅᕙᓐᓂᐊᖅᓂᖏᑕ ᑐᕌᖅᕕᐅᓯᒪᓪᓗᑎᒃ ᖃᔅᓯᓂᒃ ᑎᒐ ᓄᖑᑎᕆᕙᓐᓂᖅᓄᑦ.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᐊᔾᔨᒋᙱᓐᓂᖅᑲᖅᕕᐅᔪᑦ

ᐊᔾᔨᒋᙱᓐᓂᖅᑲᖅᕕᐅᔪᑦ – ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒋᙱᓐᓂᖅᑲᖅᕕᖏᑦ "ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #5-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓂᖏᓂ:

ᐊᖑᓇᓱᒃᑕᐅᕙᓐᓂᖏᑦ ᑎᒍᑦ (ᐊᒪᕈᑦ) ᐃᑲᔪᖅᓂᖅᑲᓕᖅᑎᑕᐅᓯᒪᖅᑯᓪᓗᒋᑦ ᒥᐊᓂᖅᓯᓯᒪᓕᖅᓂᐅᔪᓄᑦ ᑰᑉᐱᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᖅᑯᑎᖏᑕ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᓇᓗᓇᐃᔭᐃᓯᒪᓕᖅᓂᐊᖅᑐᑦ ᐊᒻᒪᖅᑯᓄᑦ ᐊᐅᓚᑦᓂᖅᑲᖅᓂᖅᒥ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᕿᓚᒍᐅᑦ ᐊᒻᒪᓗ ᐳᓘᓃᔅ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᑦ, ᑐᕌᖅᕕᐅᓪᓗᑎᒃ ᖁᑦᑎᖕᓂᕆᔭᐅᔪᑦ ᐊᒻᒪᖅᑯᑦ ᓄᖑᑎᖅᑕᐅᖅᑯᓪᓗᒋᑦ, ᐊᐅᓚᖅᓯᓂᖅᑲᖅᓂᖅᒥ ᐱᓕᕆᐊᖑᔪᑦ/ᐱᓕᕆᐊᖑᓕᖅᓯᒪᔪᑦ ᐊᒻᒪᖅᑯᓂᒃ ᓄᖑᑎᕆᓯᒪᓕᖅᓂᒃᓴᒧᑦ ᐊᒻᒪᓗ ᖃᐅᔨᕆᐊᖅᓯᒪᔾᔪᑦ ᐊᒻᒪᖅᑯᑦ ᓄᖑᑎᖅᑕᐅᕙᓐᓂᖏᑦ ᐊᑐᖅᓂᖅᑲᖅᑐᑎᒧᑦ ᐱᓕᕆᐊᖑᒻᒪᖔᑕ ᐊᑐᖅᓗᑎᒃ ᑕᒪᒃᑭᓐᓂᒃ ᑐᒃᑐᓄᑦ ᑐᕋᖓᑎᑕᐅᓯᒪᔪᓂᒃ (ᓲᕐᓗ ᐊᒥᓲᓂᖏᑕ ᐊᖏᓂᖏᓐᓂᒃ, ᐊᓐᓇᐅᒪᔪᓐᓇᖅᓂᖏᑕ ᖁᑦᑎᖕᓂᕆᔭᖏᓂᒃ) ᐊᒻᒪᓗ ᐊᒻᒪᖅᑯᓄᑦ ᑐᕋᖓᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᓇᓗᓇᐃᒃᑯᑕᕆᔭᐅᔪᑦ (ᓲᕐᓗ ᐱᑕᖅᑕᐅᕙᑦᑐᑦ ᖃᔅᓯᐅᓂᖏᑦ, ᐱᓕᕆᓂᐅᔪᓂ ᖃᔅᓯᓂᒃ ᐱᑕᖅᓯᒪᓕᖅᑯᒃᐸᓐᓂᐅᔪᓂ ᐊᑐᓂ).

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᒫᓐᓇᐅᔪᖅ ᐋᖅᑭᒃᓱᐃᕙᓪᓕᐊᓂᖅᑲᖅᒪᑕ ᐊᒻᒪᖅᑯᓂᒃ ᐊᐅᓚᖅᓯᓂᖅᑲᖅᓂᖅᒥ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᕿᓚᒍᐅᑦ ᐊᒻᒪᓗ ᐳᓘᓃᔅ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᓂᒃ. ᑖᒃᑯᐊ ᐊᐅᓚᖅᓯᓂᖅᑲᖅᓂᖅᒥ ᐃᓱᒪᓕᐅᕈᑎᐅᔪᑦ ᐃᓚᖅᑲᖅᓂᐊᖅᑐᑦ ᓇᐅᑦᓯᖅᑐᐃᓂᖅᒥᒃ ᐊᒻᒪᖅᑯᓂᒃ ᐊᖑᓇᓱᐊᖅᑕᐅᕙᑦᑐᓂᒃ ᐊᒻᒪᓗ ᐱᓕᕆᐊᒃᓴᐅᓂᐊᖅᑐᓂᒃ ᖃᐅᔨᕆᐊᖅᐸᓐᓂᖅᒥ ᑕᒪᒃᑯᓂᖓ ᓄᖑᑎᕆᓂᐅᔪᑦ ᐃᑲᔪᖅᓂᖅᑲᒪᖔᑕ, ᐊᑐᖅᓗᒋᑦ ᓇᓗᓇᐃᒃᑯᑕᕆᐊᖑᓯᒪᔪᑦ ᐊᒻᒪᖅᑯᓄᑦ ᐊᒻᒪᓗ ᓇᓗᓇᐃᒃᑯᑕᕆᐊᖑᓯᒪᔪᑦ ᑐᒃᑐᓄᑦ. ᐅᑭᐅᑕᒫᑦ ᐅᓂᒃᑳᓕᐊᖑᕙᑦᑐᓂᒃ ᓇᐃᒡᓕᒋᐊᖅᓯᒪᓪᓗᑎᒃ ᐅᖃᐅᓯᖅᑲᖅᑐᓂᒃ ᐊᒻᒪᖅᑯᑦ ᓄᖑᑎᖅᑕᐅᓂᖏᓐᓄᑦ ᐊᒻᒪᓗ ᖃᐅᔨᕆᐊᕈᑎᐅᔪᓄᑦ ᐱᓕᕆᐊᖑᔪᖅ ᐊᑐᖅᓂᖅᑲᒪᖔᑦ ᐋᖅᑭᒃᓱᐃᓯᒪᓕᖅᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᐊᑐᐃᓐᓇᐅᓕᖅᑎᕐᓯᓗᑎᒃ ᕗᐃᑮᓐ ᓄᓇᒥᐅᑕᓕᕆᔩᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB). ᑖᒃᑯᐊ ᐃᓚᖅᑲᖅᓂᐊᖅᑐᑦ ᑕᒪᐃᓂᒃ ᐱᔾᔪᑎᒋᔭᐅᓯᒪᔪᓂᒃ ᐊᒻᒪᖅᑯᓄᑦ ᐱᓕᕆᐊᒥ, ᐱᖅᑲᓯᐅᑎᓗᒋᑦ ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐱᓕᕆᐊᓂᒃ ᐊᒻᒪᓗ ᑎᓖᓯ ᐊᖑᓇᓱᒃᑎᓂᒃ ᐱᓪᓚᒃᓴᐃᓂᖅᑲᖅᓂᖅᒧᑦ ᐱᓕᕆᐊᒥᒃ.

ᐊᑐᓕᕐᑯᑐᐅᓪᓗᑎᒃ #6-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ): *ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᕐ ᓯᓚᐃᖕ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᖅ*
ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓐᓂᕐᑯᓪᓗᒋᑦ ᐊᑐᕐᓂᖅᖅᑑᓂᖏᑕ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) *ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᕐ ᓯᓚᐃᖕ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ* ᑰᑮᑎ ᐃᐊᒃᕗ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᐱᑕᖅᑎᕗᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᐊᒥᓯᐃᓕᖓᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂᒃ ᐱᓕᕆᐊᖑᔪᒧᑦ ᕗᐃᑮᔾ ᓄᓇᒥᐅᑕᓕᕆᔾᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᓯᕗᕐᖓᓂ ᒪᐃ 31 ᐅᑭᐅᑕᖏᑦ. ᐃᓗᓕᖏᑦ ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐋᖅᑭᒃᓱᐊᖑᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᐱᓕᕆᕐᑲᑎᒋᓯᒪᓗᒋᑦ ᑲᑎᒪᔩᐅᔪᑦ ᐊᒻᒪᓗ ᐃᓚᕐᑲᖅᑎᑕᐅᓂᐊᖅᓱᑎᒃ, ᑭᓱᐊᓂᓗ ᑭᒡᓕᕐᑲᖅᑎᑕᐅᓇᑎᒃ ᑕᒪᒃᑯᓄᖓ, ᒪᑯᓂᖓ ᑐᓴᖕᖕᕐᑯᑎᓂᒃ:
1) ᐱᑕᕐᑲᖅᑎᕚᓗᑎᒃ ᓇᓂ ᐊᒻᒪᓗ ᕐᑲᔪᓂᒃ ᑎᒐ ᐱᑕᓚᐅᖅᓯᒪᓂᕐᓄᑦ ᐃᓚᖅᑎᑕᐅᔪᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ; ᐊᒻᒪᓗ,
2) ᐱᑕᕐᑲᖅᑎᕚᓗᑎᒃ ᓇᓗᓇᐃᕙᐊᖅᑐᓂᒃ ᐱᓕᕆᐊᒃᓴᐅᔪᓂᒃ ᕐᑲᐅᔨᒋᐊᕈᑎᐅᕙᓐᓂᐊᕐᓗᑎᒃ ᐊᑐᕐᓂᕐᑲᒻᒪᖖᑖᑕ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᑉ ᑐᙱᕝᕕᕐᑲᖅᑎᑕᐅᓯᒪᑎᓪᓗᒋᑦ ᓱᓇᑐᐃᓐᓇᓂᒃ ᕐᑲᐅᔨᓴᐃᓂᐅᕙᑦᑐᓄᑦ ᐊᒻᒪᓗ TK-ᕐᑯᑎᓄᑦ.

<u>**ᑭᐅᔾᔪᑎᖏᑦ:**</u> ᐊᔾᔨᒌᙱᓐᓂᕐᑲᕐᕕᐅᔪᑦ

ᐊᔾᔨᒌᙱᓐᓂᕐᑲᕐᕕᐅᔪᑦ – ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒌᙱᓐᓂᕐᑲᕐᕕᖏᑦ "ᐊᑐᕐᓕᕐᑯᑐᐅᓪᓗᑎᒃ #6-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᕐᑲᖅᓯᒪᓂᖏᓂ:

ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓐᓂᕐᑯᓪᓗᒋᑦ ᐊᑐᕐᓂᖅᖅᑑᓂᖏᑕ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) *ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᕐ ᓯᓚᐃᖕ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ* ᑰᑮᑎ ᐃᐊᒃᕗ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᐱᑕᕐᑲᖅᑎᕗᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᐊᒥᓯᐃᓕᖓᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂᒃ ᐱᓕᕆᐊᖑᔪᒧᑦ ᕗᐃᑮᔾ ᓄᓇᒥᐅᑕᓕᕆᔾᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᓯᕗᕐᖓᓂ ᐋᒡᒌᓯ 1 ᐅᑭᐅᑕᖏᑦ. ᐅᑭᐅᑕᖏᑦ ᐅᓂᒃᑳᓕᐊᖑᕙᑦᑐᑦ ᐃᓗᓕᖏᓂ ᐅᕐᑲᐅᓯᕐᑲᖅᓯᒪᓂᐊᖅᑐᑦ ᑕᒪᐃᓂᒃ ᐊᒪᖅᑯᓂᒃ ᐊᐅᓚᕙᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᓂᒃ ᐊᑐᓂ ᐅᑭᐅᓂ. ᑖᒃᑯᐊ ᐃᓚᕐᑲᕐᓂᐊᖅᑐᑦ ᑕᒪᐃᓂᒃ ᐃᓚᐅᑎᑕᐅᓯᒪᔪᓂᒃ ᐃᓱᒪᓕᐅᕈᑎᓄᑦ ᐱᕐᑲᓱᐅᑎᓗᒋᑦ:
1) ᐱᑕᖅᑕᐅᕙᑦᑐᑦ ᕐᑯᕙᕝᓂᕆᔭᖏᓂᒃ ᑕᐃᒪᓐᓇᐃᓚᕿᑎᑕᐅᓪᓗᑎᒃ ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᕐ ᓯᓚᐃᖕ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᑦ ᐊᒻᒪᓗ ᐊᓯᖏᓂᑦ ᐱᓕᕆᓂᐅᓕᖅᓯᒪᔪᓂᑦ;
2) ᑎᓕᐅᕆᔾᔪᑎᐅᓯᒪᔪᓂᒃ ᓄᖑᑎᖅᑕᐅᓂᒃᓴᖏᑦᑕ ᑐᒃᑐᐃᑦ ᐊᒥᕐᕋᕐᑯᑎᖏᑦᑕ ᓇᔪᖅᐸᒃᑕᖏᓂᑦ;
3) ᕐᑲᐅᔮᐅᓯᒪᓕᖅᑐᑦ ᕐᑲᐅᔨᓴᐃᓂᕐᑲᕐᓂᕐᒥ ᐊᒻᒪᓗ ᓇᐅᕐᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᐊᓄᑦ (ᓈᓚᐅᑎᓕᖅᑐᐃᕙᓐᓂᕐᓄᑦ ᐊᒻᒪᓗ ᕐᑲᐅᔨᓴᒐᕐᕋᓂᒃ ᑲᑎᖅᓱᐃᓂᕐᑲᖅᐸᓐᓂᕐᓂᑦ); ᐊᒻᒪᓗ,
4) ᕐᑲᐅᔨᒋᐊᖅᑕᐅᓯᒪᔪᓂᒃ ᐊᑐᕐᓂᕐᑲᕐᒪᖖᑦ ᐱᓕᕆᐊᖑᔪᖅ ᐅᑭᐅᖓᓂ ᐊᑐᖅᑎᓪᓗᒋᑦ ᑕᒃᑭᓐᓂᒃ ᑐᒃᑐᓄᑦ ᑐᕌᖓᑎᑕᐅᓪᓗᑎᒃ ᐊᒻᒪᓗ ᐊᒪᖅᑯᓄᑦ ᑐᕌᖓᑎᑕᐅᓪᓗᑎᒃ ᓇᓗᓇᐃᒃᑯᑕᓂᒃ.

<u>**ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:**</u> ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᒻᒪᑕ ᓈᒻᒪᖕᓂᖅᓴᐅᓇᔭᕋᓱᒋᓪᓗᒍ ᐊᒻᒪᓗ ᐊᑐᕐᓂᕐᑲᕐᓂᖅᓴᐅᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂᒃ ᑐᓂᓯᓯᒪᓕᖅᐸᒐᔭᖅᐸᑕ ᐃᓗᐃᒃᑳᐅᓪᓗᑎᒃ ᐊᒪᖅᑯᓂᒃ ᐊᐅᓚᕙᓂᕐᒥ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᐅᑭᐅᑕᖏᑦ.

<u>ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #7-2019</u> (ᑳᑮᑎ ᐃᐊᒃᑯ)
ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓐᓂᖅᑯᓪᓗᑏᑦ ᐊᑐᖅᓂᖃᖅᑰᓂᕐᒥᑕ ᑎᓴᓯ ᒐᕙᒪᖓᑦ (TG) ᓄᓇᓕᐅᔪᒥ ᑎᒐ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᖅ, ᑎᓴᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕚᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒥᓱᐃᓕᖕᒐᔫᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᕐᖑᓯᒪᔪᓂᒃ ᐱᔾᔪᑎᒋᓪᓗᑏᑦ ᐱᓕᕆᐊᖅ ᐱᑕᖃᖅᑎᕚᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᕗᐃᑭᐦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᕐᖓᓂ ᒪᐃ 31-ᒥ ᐅᑭᐅᑕᒫᑦ. ᐃᓗᓕᖏᑦ ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᕐᖑᓯᒪᔪᑦ ᐋᖅᑭᒃᓱᐊᕐᖑᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᐱᓕᕆᕐᑲᑎᒋᓯᒪᓗᑏᑦ ᑲᑎᒪᔨᐅᔪᑦ ᐊᒻᒪᓗ ᐃᓚᖅᑲᖅᑎᑕᐅᓂᐊᖅᓱᑎᒃ, ᑭᓱᐊᓂᓗ ᑭᒡᓕᖅᑲᖅᑎᑕᐅᓇᑎᒃ ᑕᒪᒃᑯᓄᖓ, ᒪᑯᓂᖓ ᑐᓴᒐᔅᓴᖅᑯᑎᓂᒃ:

1) ᐱᑕᖅᑲᖅᑎᕙᓗᑎᒃ ᓇᓂ ᐊᒻᒪᓗ ᖃᔅᓯᓂᒃ ᑎᒐ ᐱᑕᓚᐅᖅᓯᒪᓂᕐᓄᑦ ᐃᓚᖅᑎᑕᐅᔪᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ; ᐊᒻᒪᓗ,
2) ᐱᑕᖅᑲᖅᑎᕙᓗᑎᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᓄᖅ ᐱᓕᒻᒪᒃᓴᐃᓂᖅ ᐃᑲᔪᕐᓂᖃᕋᔭᕆᐊᖓᓄᑦ ᓯᕗᓂᕐᒥ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᓄᑦ ᐊᒻᒪᓗ ᐊᐅᓚᓯᓂᐅᔪᓄᑦ.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᐊᔾᔨᒋᙱᓐᓂᖅᑲᖅᕚᐅᔪᑦ

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᓄᓇᕚᐊᑉ ᒐᕙᒪᖓᓂᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓴᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᒌᙱᑕᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #7-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᑦ:

ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓐᓂᖅᑯᓪᓗᑏᑦ ᐊᑐᖅᓂᖃᖅᑰᓂᕐᒥᑕ ᑎᓴᓯ ᒐᕙᒪᖓᑦ (TG) ᓄᓇᓕᐅᔪᒥ ᑎᒐ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᖅ, ᑎᓴᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕚᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒥᓱᐃᓕᖕᒐᔫᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᕐᖑᓯᒪᔪᓂᒃ ᐱᔾᔪᑎᒋᓪᓗᑏᑦ ᐱᓕᕆᐊᖅ ᐱᑕᖃᖅᑎᕚᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᕗᐃᑭᐦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᕐᖓᓂ ᔪᓚᐃ 31-ᒥ ᐅᑭᐅᑕᒫᑦ. ᐃᓗᓕᖏᑦ ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᕐᖑᓯᒪᔪᑦ ᐋᖅᑭᒃᓱᐊᕐᖑᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᐱᓕᕆᕐᑲᑎᒋᓯᒪᓗᑏᑦ ᑲᑎᒪᔨᐅᔪᑦ ᐊᒻᒪᓗ ᐃᓚᖅᑲᖅᑎᑕᐅᓂᐊᖅᓱᑎᒃ, ᑭᓱᐊᓂᓗ ᑭᒡᓕᖅᑲᖅᑎᑕᐅᓇᑎᒃ ᑕᒪᒃᑯᓄᖓ, ᒪᑯᓂᖓ ᑐᓴᒐᔅᓴᖅᑯᑎᓂᒃ:

1) ᐱᑕᖅᑲᖅᑎᕙᓗᑎᒃ ᓇᓂ ᐊᒻᒪᓗ ᖃᔅᓯᓂᒃ ᑎᒐ ᐱᑕᓚᐅᖅᓯᒪᓂᕐᓄᑦ ᐃᓚᖅᑎᑕᐅᔪᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ; ᐊᒻᒪᓗ,
2) ᐱᑕᖅᑲᖅᑎᕙᓗᑎᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᓄᖅ ᐱᓕᒻᒪᒃᓴᐃᓂᖅ ᐃᑲᔪᕐᓂᖃᕋᔭᕆᐊᖓᓄᑦ ᓯᕗᓂᕐᒥ ᑎᒐ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᓄᑦ ᐊᒻᒪᓗ ᐊᐅᓚᓯᓂᐅᔪᓄᑦ

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᔪᓚᐃ 31 ᐅᓪᓗᖓ ᓈᒻᒪᖕᓂᖅᓴᐅᓇᔭᕐᒪᑦ ᐅᓪᓗᓈᔭᐅᑎᑕᐅᐸᐸ ᐱᔾᔪᑎᓪᓗᒍ ᐱᔭᓈᕈᔫᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᐅᓂᖏᑦ ᓄᓇᓕᐅᔪᒥ ᑎᒐ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓕᒻᒪᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᒧᑦ. ᑕᐃᒪᓐᓇᐃᑎᕋᓗᑎᒃ ᐆᒻᒪᖅᑎᑦᑎᕆᐊᒃᑲᓐᓂᕈᓐᓇᕐᓂᐊᕐᒪᑕ ᐱᓕᕆᐊᒥᒃ.

<u>ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #8-2019</u> (ᑳᑮᑎ ᐃᐊᒃᑯ)
ᖃᐅᔨᓯᒪᓕᕈᒪᓪᓗᑏᑦ ᐅᓪᓗᒥᐅᔪᒥ ᖃᓄᑎᒋ ᐱᑕᖃᕐᓂᖏᑕ, ᖃᓄᐃᓕᐅᕈᓯᖃᓕᖅᓯᒪᓂᖏᑕ ᐊᒻᒪᓗ ᓯᐊᒻᒪᒃᑎᖅᓯᒪᓂᖏᑕ ᓅ ᒫᐊ, ᓄᓇᕚᐊᑉ ᒐᕙᒪᖓᑦ ᐊᒻᒪ ᑎᓴᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᑎᖅᓱᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ TK-ᖅᑯᑎᓄᑦ ᐊᒻᒪᓗ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᓂᐅᕙᑦᑐᓄᑦ ᑐᓴᒐᒃᓴᖅᑯᑎᓂᒃ ᓅ ᒫᐊ-ᖑᔪᓄᑦ ᓄᓇᕚᐊᕐᒥ ᐊᒻᒪᓗ ᓄᓇᕗᒻᒥ ᐱᔾᔪᑎᒋᓗᑎᑦ ᑯᒃ'ᐋᑎ ᐊᒻᒪᓗ ᓵᑎ ᐃᐊᒃᑯ ᓇᔪᖅᐸᒃᑕᖏᓂ ᐋᐳᓗ 1, 2020 ᐅᓪᓗᖓᑕ ᓯᕗᕐᖓᓂ. ᑐᑭᓯᒋᐊᕐᕕᒃᓴᖅᑯᑏᑦ ᐊᑐᖅᑕᐅᓕᖅᓂᐊᕐᒪᑕ ᐊᒃᓚᐃᑦ ᐆᒪᔪᖅᑯᑎᓂᒃ ᐊᒻᒪᓗ ᐊᐅᓚᓯᓂᐅᔪᑦ ᑮᓇᐅᔭᑎᒎᑦ ᐊᑐᖅᓂᖃᓇᐊᖏᑕ ᐱᓕᕆᐊᖅᖃᖅᑎᖏᓂᑦ ᐊᖏᓪᓕᒋᐊᑎᓯᒪᓕᕐᓂᐊᕐᓗᑎᑦ ᑲᑐᔾᔨᓂᖅᑲᖅᓱᑎᒃ ᓴᐊᓲ ᐅᒪᔪᖅᑯᑎᓂᒃ ᐊᒻᒪᓗ ᐊᐅᓚᓯᔾᔪᑎᓂᒃ ᑮᓇᐅᔭᑎᒎᑦ ᐊᑐᖅᓂᐊᕆᐊᖏᑕ ᖃᐅᔨᒋᐊᖅᓂᐅᔪᑦ ᐃᓚᖃᓕᖅᑎᑕᐅᖅᑯᓪᓗᑏᑦ ᓅ ᒫᐊᓂᒃ.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᓈᒻᒪᒋᔭᐅᔪᑦ

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᓄᓇᕚᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐅᔾᔨᕈᓱᒃᑐᑦ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᔨᐅᔪᑦ ᓇᑯᓇᐃᖅᓯᒪᓕᖅᑕᖏᑦ ᒫᓐᓇᒧᑦ ᓇᑯᓇᐃᖅᓯᓯᒪᙱᒻᒪᑕ ᖃᕝᕕᓐᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᓂᒃ ᐊᖏᔫᓪᓗᑎᒃ ᐱᑕᖅᐸᓐᓂᖏᑕ ᓄᓇᐃᓐᓇᕐᒥ ᑑᒃᑐᖅᑯᑎᐅᔪᓂᒃ. ᖃᕝᕖᑦ ᐆᒪᔪᖅᑯᑎᐅᔪᑦ ᓯᕗᓪᓕᕐᒥᒃ ᑐᖅᑯᖓᓕᖅᑐᓂᒃ ᓂᖅᑭᑦᔭᒃᓴᖅᓱᐅᖅᐸᓐᓂᖏᑕ ᐊᒻᒪᓗ ᒫᓐᓇᐅᔪᒥ ᓇᑐᓇᐃᖅᑕᐅᓯᒪᔪᑦ ᓇᑐᓇᐃᖅᓯᓯᒪᔫᔭᕐᒪᑕ ᐊᒥᓲᓂᖔᖏᑦ ᕿᖓᒐᐅᑦ ᐊᒥᖅᕿᖅᑯᑎᖏᑕ ᓇᒧᖅᐸᒃᑕᖏᓂ ᐊᒥᓲᔪᖕᓃᖅᐸᓪᓕᐊᓯᒪᓂᖏᑕ ᐱᔾᔪᑎᒋᓪᓗᒍ ᐊᒥᖅᕿᖅᑯᑎᐅᔪᑦ ᐊᒥᓲᔪᖕᓃᖅᐸᓪᓕᐊᓯᒪᓂᖏᑦ. ᐱᓕᕆᔾᔪᓯᐅᕙᑦᑐᓂ ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᖃᕝᕖᑦ ᐊᒥᓲᓂᖏᑕ ᐊᒻᒪᓗ ᓯᐊᒻᒪᒃᑎᖅᓯᒪᓂᖏᑕ ᐱᓕᕆᔾᔪᑎᖅᑲᖅᑕᖅᓯᒪᒻᒪᑕ ᓇᑮᙶᖅᓯᒪᓂᖏᓄᑦ ᓇᑐᓇᐃᒃᑯᑕᑎᒍᑦ-ᖃᐅᔨᓴᕝᕙᓂᒃ ᐱᓯᒪᓕᒃᑲᓂᖅᐸᓐᓂᖅᑎᒍᑦ, ᓄᓇᕚᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)

ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᓂᖅᑳᖅᓯᒪᓕᖅᑐᑦ ᑎᐊᕆᖕ ᓃᒃ ᑕᓱᐊᑕ ᐊᕙᑎᓕᔾᖓᓂ ᐊᒻᒪᓗ ᓱᑎᓂᖅᐹᓂᒃ ᐅᔾᖅᑲᓂᒃ ᐅᔾᕿᑖᕆᐊᖅᑎᒃᑯᑦ ᐋᔾᔩᓚᖏᓂᒃ ᐱᓕᕆᓂᖅᑳᖅᓯᒪᓕᕐᓯᑎᒃ ᐊᕙᑎᓕᔾᒥᓐᓂ. ᓄᓇᕗᑦᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐅᔾᔨᕈᓯᒃᑐᑦ ᑕᒪᕐᒥᒃ ᐊᑐᐃᓐᓇᐅᑎᑕᐅᓯᒪᔪᑦ ᑐᓴᒐᓴᐃᑦ ᑎᑭᑦᓯᒋᑦ 2014-ᒧᑦ ᐅᖃᐅᓯᐅᓯᒪᒻᒪᑕ ᐃᓗᐊᓂ ᐆᒪᔪᕐᑯᑎᐅᔪᑦ ᖃᓄᐃᓕᖓᓕᕐᓂᖏᓄᑦ ᐅᓂᒃᑳᓕᐊᕚᓯᒪᔪᑦ ᖃᖓᕙᓐᓂᑦ (ᔫᓗ ᔫᓗ) ᓄᓇᑦᓯᐊᕐᒥ.

<u>ᐊᑐᓕᕐᑯᔾᔭᐅᓪᓗᑎᒃ #9-2019</u> (ᑰᑮᑎ ᐃᐊᒃᑬ)
ᑲᑎᒪᔩᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᖃᖅᐳᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓯ ᒐᕙᒪᖓᑦ (TG) ᐋᖅᑭᒃᓱᐃᓱᒪᓕᕐᑯᓪᓗᒋᑦ ᓱᕗᓪᓕᖅᐹᕐᓯᐅᑎᓂᒃ ᐊᖏᕈᑎᓂᒃ, ᐊᒻᒪᓗ ᐱᕙᒃᓴᖅᑎᑕᐅᓂᖏᑦ ᑲᑐᔾᔨᓂᖅᓱᑎᒃ ᐊᐅᓚᑦᓯᓂᖅᑲᓂᕐᒥ ᐱᓕᕆᐊᕐᕗᔪᓄᑦ ᐊᐅᓚᑦᓯᔾᔪᑎᐅᓪᓗᑎᒃ ᑰᑮᑎ ᐃᐊᒃᑬ ᐊᒻᒪᓗ ᓇᔪᖅᐸᒃᑕᖏᓂᒃ ᓱᕗᕐᖓᓂ ᕖᕝᕗᐊᕆ 29, 2020. ᓱᕗᓪᓕᖅᐹᕐᓯᐅᑎᓂᒃ ᐊᖏᕈᑎᑦ ᑖᒃᑯᐊ ᐋᖅᑭᒃᓱᐊᕐᕗᓯᒪᔭᕆᐊᖃᖅᐳᑦ ᐱᓕᕆᖃᑎᒋᓯᒪᓗᒋᑦ BCAC-ᑯᓐᓂᒃ, ᐅᖃᐅᔨᒋᐊᖅᑎᑦ ᑲᑎᒪᔩᑦᓛᑦ ᐱᓕᕆᖃᑎᒌᓐᓂᖏᓐᓄᑦ ᐆᒪᔪᓂᑦ ᐊᐅᓚᑦᑎᓂᖏᑦ, ᐊᒻᒪᓗ ᐅᖃᓪᓚᐅᓯᕆᔭᐅᖕᓴᐅᑎᒋᓗᑎᒃ ᓄᓇᕗᑦ ᒐᕙᒪᖓᑕ ᐆᒪᔪᓕᕆᔩᑦ ᐃᓱᒪᑕᒻᒪᕆᒋᔭᕆᓐᓄᑦ ᐊᒻᒪᓗ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓂᒃ ᐊᐅᓚᑦᓯᔩᑦ ᑲᑎᒪᔩᖏᓐᓂᒃ (NWMB).

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᐋᔩᕈᓐᖏᓐᓂᖅᑲᖃᐅᔪᑦ
ᐋᔩᕈᓐᖏᓐᓂᖅᑲᖃᐅᔪᑦ – ᑎᓵᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐋᔩᕈᓐᖏᓐᓂᖅᑲᖃᖏᑦ "ᐊᑐᓕᕐᑯᔾᔭᐅᓪᓗᑎᒃ #9-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᐅᓯᕆᓂᖏᓐᓂ:

ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᓕᕆᖃᑎᖃᕐᓂᐊᖅᑐᑦ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓐᓂᒃ (GN) ᐋᖅᑭᒃᓱᐃᓱᒪᓕᒃᑲᓐᓂᕐᓂᐊᕐᓗᑎᒃ ᑕᐃᒪᐅᓕᐊᓂᑦᑐᓂᒃ ᑐᑭᓯᐅᒪᑐᕋᐅᓐᓂᕐᒧᑦ ᑎᑎᖅᑲᕐᑯᑎᓂᒃ (MOU) ᑲᑐᔾᔨᓂᖅᑲᕐᓗᑎᒃ ᐊᐅᓚᑦᓯᖃᑎᒌᓐᓂᕐᒥ ᐱᓕᕆᐊᒃᓴᐅᔪᓂᒃ ᐆᒪᔪᖅᑯᑎᓄᑦ ᐱᖃᓯᐅᑎᓗᒋᑦ ᓄᓇᐃᓐᓇᒥ ᑐᒃᑐᖅᑯᑎᐅᔪᑦ ᐊᒻᒪᓗ ᓇᔪᖅᐸᒃᑕᖏᑦ ᓱᕗᕐᖓᓂ ᒫᑦᓯ 31, 2020.

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u>
ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑐᑭᓯᐅᒪᑐᕋᐅᓐᓂᕐᒧᑦ ᑎᑎᖅᑲᕐᑯᑎᓂᒃ (MOU) ᐱᓱᒪᕐᑲᑎᕐᑲᒪᑕ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓐᓂᒃ (GN) ᓇᐅᑦᓯᖅᑐᐃᕙᓐᓂᕐᒥ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᖅᑲᓂᕐᒥ ᑐᒃᑐᑦ ᐊᒥᕐᖁᕐᑯᑎᖏᓂᒃ ᐊᒥᖅᑯᖅᑲᑎᒌᓐᓂᕐᓄᑦ, ᐊᒻᒪᓗ ᑖᒃᑯᓂᖓ ᑐᑭᓯᐅᒪᑐᕋᐅᓐᓂᕐᒧᑦ ᑎᑎᖅᑲᕐᑯᑎᓂᒃ (MOU) ᐋᖅᑭᒃᓱᐃᖅᑲᑎᖅᑲᒃᑲᓐᓂᕐᓂᐊᖅᑐᑦ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓐᓂᒃ (GN) ᓇᓗᓇᐃᔭᖅᓯᒪᓕᕐᓂᐊᕐᓗᒋᑦ ᓱᕗᓪᓕᖅᐸᐅᑎᑦᓴᐅᓂᐊᖅᑐᑦ ᐅᑭᐅᖑᓂᐊᖅᑐᓄᑦ ᓱᕗᓂᑦᑎᓐᓂ. ᑲᑐᔾᔨᓂᖅᑲᕐᓗᑎᒃ ᐱᓕᕆᖃᑎᒌᓐᓂᖏᑦ ᓴᓇᕐᕈᑎᑎᒍᑦ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᓐᓂᑦ (GNWT) ᐊᒻᒪᓗ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓐᓂᑦ (GN) ᑐᒃᑐᐃᑦ ᖃᐅᔨᓴᖅᑕᐅᕙᓐᓂᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐊᓯᖏᓂᒃ ᐱᓕᕆᐊᓂᒃ ᐊᖏᕚᒪᕆᐅᒪᑕ, ᐊᒻᒪᓗ ᒥᓂᔅᑕᐅᔪᑉ ᖁᑦᑎᖕᓂᖕᖓᑎᒍᑦ ᑲᑎᒪᓂᖃᓚᐅᖅᓯᑎᒃ ᐃᐳᓗ 2019-ᒥ ᐊᒻᒪᓗ ᑲᑎᒪᓂᖅᑲᒃᑲᓐᓂᕐᓂᐊᕐᓂᕐᒧᑦ ᑕᖅᑭᐅᓂᐊᖅᑐᓂᒃ ᐋᖅᑮᓯᒪᓕᓚᐅᕐᒥᔪᑦ ᐱᔾᔪᑎᖃᕐᓂᐊᕐᓯᑎᒃ ᐊᐅᓚᑦᓯᓂᖅᑲᕐᓂᕐᓄᑦ ᐊᒥᖅᑲᕈᐅᔪᓄᑦ ᑐᒃᑐᐃᑦ ᐊᒥᕐᖁᕐᑯᑎᖏᓐᓄᑦ.

<u>ᐊᑐᓕᕐᑯᔾᔭᐅᓪᓗᑎᒃ #10-2019</u> (ᑰᑮᑎ ᐃᐊᒃᑬ)
ᐊᖏᕐᓕᕆᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓄᓇᓕᐅᔪᒥ ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐱᓕᕆᐊᕐᕗᓕᖅᓯᒪᔪᓄᑦ ᑰᑮᑎ ᐃᐊᒃᑬ ᑐᒃᑐᖏᑦ (ᕿᖑᓚᐅᑦ ᑐᒃᑐᖏᑦ) ᑐᕌᖑᓪᓗᑎᒃ, ᑎᓵᓯ ᒐᕙᒪᖓᑦ (TG) ᐅᑭᐅᑕᒫᑦ ᓴᖅᑮᓯᒪᓕᖅᐸᓐᓂᐊᖅᑐᑦ ᐃᖏᕐᕿᑦᑎᐊᕐᓂᖏᑕ ᐊᒻᒪᓗ ᐱᔭᕆᑐᓂᖏᑕ ᐃᐊᒃᑬ ᓇᐋᔾᐅᐃᑎ ᑲ'ᐃ ᑎᓵᓯ ᓄᓇᓕᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐃᓕᓐᓂᐊᕐᕕᖏᓐᓄᑦ.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᓈᒻᒪᒋᔭᐅᔪᑦ

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᑎᓵᓯ ᒐᕙᒪᖓᑦ (TG) ᑖᒃᑯᓂᖓ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᒋᑦ ᓈᒻᒪᒃᓴᐃᓱᒪᕗᑦ.

ᐊᑐᓕᕐᑯᓯᐅᓪᓗᑎᒃ #11-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)
ᑎᓖᓱ ᓄᓇᓕᒋᔅᖏᓐᓂᕐᒥᐅᑦ ᐱᓯᒪᓕᕈᓐᓇᖅᐸᕐᑯᓪᓗᒋᑦ ᓂᕿᑦᓯᐊᕙᓐᓂᒃ, ᖃᓄᐃᓐᓇᙱᑦᑐᓂᒃ ᓂᕿᓂᒃ ᐃᓅᓯᖏᓐᓄᑦ ᓈᒻᒪᑦᓯᐊᖅᑐᓂᒃ ᐊᒻᒪᓗ ᐅᑭᐅᓗᒃᑖᒧᑦ ᐋᓐᓂᐊᖃᙱᑦᓯᐊᕈᑎᒋᔪᓐᓇᕐᓗᒋᑦ ᓂᕿᒃᓴᖅᑲᖅᑎᑕᐅᕙᒃᓗᑎᒃ, ᐊᒻᒪᓗ ᐃᓱᒪᒋᓗᒍ ᐱᑕᕈᓐᓇᙱᑦᓕᕐᓂᐅᔪᖅ ᑰᑮᑎ ᐃᐊᒃᕗ (ᕿᖓᐅᑉ ᑐᒃᑐᖏᑦ) ᑐᒃᑐᖏᓂᒃ, ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᓯᕗᓪᓕᖅᐸᐅᑎᑕᐅᔭᕆᐊᖅᑲᕐᓂᖏᓂᒃ ᐊᒻᒪᓗ ᐋᖅᑭᐊᕈᑎᐅᓇᔭᖅᑐᓂᒃ ᓂᕿᒋᔭᒃᓴᓂᒃ ᐱᓯᒪᓕᕈᓐᓇᖅᐸᓐᓂᖅ ᐱᕙᓪᓕᐊᔪᓕᕆᓂᐅᔪᓂᒃ ᐅᖃᓪᓚᓯᖃᖃᑎᒌᓕᕐᓂᐊᖅᐳᑦ, ᓱᕐᓗ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᐅᔫᑲᓗᐊᓂᑦ ᐊᓯᐊᑎᒍᑦ ᓂᕿᒋᔭᐅᕙᒃᑐᑐᖃᕐᓂᖅ ᐊᒻᒪᓗ/ᐅᖅᕙᓘᓐᓃᑦ ᐊᑐᓕᖅᑎᑦᓯᓯᒪᒋᐊᒥᓐᓄᑦ ᓂᕿᓪᓚᑦᑖᓄᑦ ᐃᓇᖏᕈᑎᐅᔪᓐᓇᖅᑐᓂᒃ ᐱᓕᕆᐊᓂᒃ, ᐊᑐᓂ ᑎᓖᓱ ᓄᓇᓕᒋᔅᖏᓂ ᒫᑦᓯ 31, 2020 ᓯᕗᕐᖓᓂ.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᓈᒻᒪᒋᔭᐅᔪᑦ

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᑖᔅᓯᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᒥᒃ ᓈᒻᒪᒃᓴᐃᓯᒪᕗᑦ ᐊᒻᒪᓗ ᑎᒃᑯᐊᖅᓯᓯᒪᓪᓗᑎᒃ ᑲᑐᔾᔨᓂᖅᖅᓱᑎᒃ ᑭᐅᔾᔪᑎᒋᓯᒪᔭᖏᓐᓂᒃ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᕐᑯᓯᐅᓪᓗᑎᒃ #8-2019 (ᕌᑎ ᐃᐊᒃᕗ) ᑐᒃᑐᖏᓐᓄᑦ (ᐳᓘᒃ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᓐᓄᑦ). ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᓇᓗᓇᐃᔭᕐᕕᐅᔪᒪᓚᐅᖅᑐᑦ ᕗᐃᑭᒌ ᓄᓇᒥᐅᑕᓕᓈᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᖃᓄᖅ ᑐᑭᖃᖅᑎᑕᐅᒪᖖᒋᑦ “ᓂᕿᓪᓚᑦᑖᓄᑦ ᐃᓇᖏᕈᑎᐅᔪᓐᓇᖅᑐᓂᒃ” ᐱᓕᕆᐊᖅ.

ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓯᑎᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᐃᑲᔪᖅᑐᐃᓂᕐᒥᓐᓂᒃ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᑮᓇᐅᔭᕐᑯᑎᒃᓴᖅᑲᖅᑎᑦᓯᕙᓐᓂᕐᑎᒍᑦ ᑕᐃᒪᐅᑎᑕᐅᕙᒃᑐᓂᒃ ᐊᓯᙵᑎᒍᑦ ᓂᕿᒋᔭᐅᕙᑦᑐᑐᖃᕐᓂᖅ ᐱᑕᖃᖅᑎᑦᓯᓂᐅᕙᑦᑐᓄᑦ ᐃᓚᖃᖅᑎᓪᓗᒋᑦ, ᑭᓯᐊᓂᓗ ᑭᓪᓕᖅᑲᕋᑎᒃ, ᑐᒃᑐᕙᓐᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᓂᒃ, ᑎᒃᓯᓕᐅᑉ ᑐᒃᑐᕐᑯᑎᖏᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᓂᒃ, ᒪᑦᑎᑕᐅᑎᓄᑦ ᐃᖃᓪᓕᐊᖅᐸᓐᓂᕐᓂᒃ, ᐊᓯᖏᓂᒃᓗ. ᑖᓐᓇ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᖅ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓯᐅᓪᓗᓂ ᐃᓚᖓᒍᑦ ᐱᓕᕆᐊᖑᓂᐊᖅᑐᖅ ᐊᑐᓕᖅᑎᑦᓯᓂᒃᑯᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑲᓐᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᓐᓇᐅᒪᔾᔪᑎᒃᓴᓂᒃ ᐱᓕᕆᐊᒧᑦ ᐸᕐᓇᐅᑎᖏᓂᒃ ᑲᑐᔾᔨᓂᖅᓗᑎᒃ ᐱᓕᕆᐊᖅᑲᑎᖅᓗᑎᒃ ᐊᒥᓱᓂᒃ ᐱᓕᕆᐊᖅᑎᐅᔪᓂᒃ. ᐱᓕᕆᐊᖑᓕᕐᑯᓯᐅᓪᓗᓂ ᐸᕐᓇᐅᑎᓕᐊᖑᓯᒪᔪᖅ ᑖᓐᓇ ᓇᓗᓇᐃᔭᐃᓯᒪᕗᖅ ᐱᓕᕆᐊᖑᓕᕈᓐᓇᖅᑐᓂᒃ ᑐᕌᖓᑎᓪᓗᒋᑦ ᓂᕿᒋᔭᐅᕙᒃᑐᑦᑲᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᓄᑦ, ᐋᖅᑭᒃᓱᐃᓯᒪᓕᕐᓂᒃᓴᒧᑦ ᐊᖑᓇᓱᒃᑎᐅᓂᕐᒧᑦ ᑐᑭᒨᒃᑎᑦᓯᔮᖅᑲᕐᓂᖅ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᓂᒃ, ᐱᓕᕆᓂᖅᑲᐅᓕᕈᓐᓇᖅᑐᓂᒃ ᒪᒃᑯᒃᑐᓂᑦ, ᐊᒻᒪᓗ ᓄᓇᓕᐅᔪᒥ ᓂᕿᒋᔭᒃᓴᓕᕆᓂᕐᒥ ᐸᕐᓇᐅᑎᓕᐅᕐᓂᖅ, ᑕᒪᕐᒥᒃᓗ ᐃᓚᖅᑎᑕᐅᔪᓐᓇᖅᓱᑎᒃ ᑐᕌᖓᔪᓂᒃ ᐊᓯᒋᔅᖏᓂᒃ ᐆᒪᔪᕐᑯᑎᐅᔪᓂᒃ ᓂᕿᒋᔭᐅᕙᒍᓐᓇᖅᑐᓂᒃ.

ᐊᑐᓕᕐᑯᓯᐅᓪᓗᑎᒃ #12-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)
ᐊᖏᒡᓕᒋᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᑭᒃᑯᐃᓐᓇᓂᑦ ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐱᑦᑲᓕᕆᐊᖅᑲᕐᓂᖓᓂᒃ ᐃᐊᒃᕗ (ᑐᒃᑐᑦ) ᐊᐅᓚᑕᐅᓂᖏᓐᓄᑦ ᐱᓕᕆᐊᓂᒃ, ᐱᒋᐊᖅᑎᑕᐅᓗᑎᒃ ᔫᓄᐊᕆ 2020-ᒥ, ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᒪᓐᓇ ᐱᓕᕆᖃᑎᒌᓐᓂᐊᖅᑐᑦ:

1) ᑐᓂᓯᖃᑦᑕᐅᑎᓗᑎᒃ ᑐᕌᒃᓴᖅᑯᑎᓂᒃ ᑐᕋᖓᓪᓗᑎᒃ ᑰᑮᑎ ᐊᒻᒪᓗ ᕌᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᓐᓄᑦ, ᑎᓖᓱ ᓄᓇᓕᒋᔅᖏᓐᓄᑦ, ᐱᓕᕆᐊᖃᖅᑎᐅᓪᓗᑎᒃ ᑎᒥᖁᑎᐅᔪᑎᒍᑦ ᐊᒻᒪᓗ ᓄᓇᓕᐅᔪᓂ ᑲᑎᒪᓂᖃᖅᑎᑦᓯᕙᓐᓂᖅᑎᒍᑦ; ᐊᒻᒪᓗ,
2) ᐋᖅᑭᒃᓯᐃᓯᒪᓕᖅᓗᑎᒃ ᐊᒻᒪᓗ ᓯᐊᒻᒪᖅᑎᓇᓯᒪᓕᖅᓗᑎᒃ ᐃᓕᓐᓂᐊᖅᑎᑦᓯᔾᔪᑎᒃᓴᓂᒃ ᑎᑎᖅᑲᑕᐅᓯᒪᔪᓂᒃ, ᓈᓚᐅᑎᑎᒍᑦ, ᑕᓚᕖᓴᑎᒍᑦ, ᑐᓴᒃᓴᓕᕆᔨᑎᒍᑦ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓯᓐᓈᑦ ᑲᑎᒪᓂᖃᖅᑎᑦᓯᕙᓐᓂᖅᑎᒍᑦ, ᑭᒃᑯᐃᓐᓇᓂᒃ ᓱᓇᑦ ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᑰᑮᑎ ᐊᒻᒪᓗ ᕌᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᑦ ᐊᒥᓲᔭᓐᓃᖅᐸᓪᓕᐊᒻᒪᖔᑕ ᐊᒻᒪᓗ ᓱᓇᑦ ᐃᓚᐅᖃᑕᐅᔪᑦ ᐊᒃᑐᐃᓯᒪᖃᑕᐅᒪᖔᑕ ᐊᒥᓲᔫᖕᓃᖅᐸᓪᓕᐊᓂᐅᔪᓄᑦ, ᐃᓚᖃᖅᑎᓪᓗᒋᑦ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓐᓂᖏᓐᓄᑦ ᑐᒃᑐᑦ.

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᓈᒻᒪᒋᔭᐅᔪᑦ

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᑦᓯᓂᐊᖅᑐᑦ ᐊᕕᒃᑐᖅᓯᒪᓂᖏᑦ 1-ᖓᓂᒃ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᓂ ᐊᒻᒪᓗ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ ᐊᑐᓕᖅᑎᑦᓯᑎᓪᓗᒋᑦ ᐊᕕᒃᑐᖅᓯᒪᓂᖏᑦ 2-ᖓᓂᒃ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᓂ.

<u>ᐊᑐᓕᕐᑯᙳᐅᓪᓗᑎᒃ #13-2019 (ᑰᑮᑎ ᐃᐊᒃᕓ): ᖃᔅᓯᐅᓂᖏᓐᓄᑦ ᐊᒥᓲᓂᖏᑕ ᖃᐅᔨᓴᐃᓃᑦ</u>
ᑭᖑᕙᑎᑕᐅᓯᒪᙱᓪᓗᑎᒃ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᔪᑎᒍᑦ ᐊᐅᓚᑦᓯᓂᖃᓕᕝᕕᐅᕐᑯᓪᓗᑦ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᖃᓄᖅ ᐊᒥᓲᓂᖃᕐᑎᑦᒪᖕᒫᑕ ᖃᐅᔨᓴᐃᓂᖅᖬᓐᓂᐊᖅᑐᑦ ᑰᑮᑎ ᐃᐊᒃᕓᑦ (ᕿᖓᐅᑦ ᑐᒃᑐᖏᑦ) ᐅᑭᐅᑦ ᒫᕐᕉᒃ ᓈᓯᒪᓕᕌᖓᑎᒃ ᑕᐃᒪᓗᑦᑕᐅᖅ ᐊᑕᐅᑦᓯᒃᑰᕐᑎᒻᒥᓗᑦ ᓵᑎ ᐃᐊᒃᕓ (ᐳᓘᓅᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᑦ) ᐊᒻᒪᓗ ᑎᒃᔭᓕᐅᑉ/ᐊHᐃᐊᑉ ᑐᒃᑐᖏᓂᒃ ᖃᐅᔨᓴᐃᓂᖅᖬᑉᒥᓗᑎᒃ. ᑕᐃᒪᓗ, ᐊᒥᓲᓂᖃᕐᑎᕆᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᐃᓂᖃᕈᒫᓕᕐᒥᔪᑦ ᔫᓂ 2020-ᒥ.

<u>**ᑭᐅᔾᔪᑎᖏᑦ:**</u> ᐊᔾᔨᒌᙱᓐᓂᖃᕝᕕᐅᔪᑦ

ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑲᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᔾᔨᙱᑕᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᕐᑯᙳᐅᓪᓗᑎᒃ #13-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᒃ:

ᑭᖑᕙᑎᑕᐅᓯᒪᙱᓪᓗᑎᒃ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᔪᑎᒍᑦ ᐊᐅᓚᑦᓯᓂᖃᓕᕝᕕᐅᕐᑯᓪᓗᑦ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᖃᓄᖅ ᐊᒥᓲᓂᖃᕐᑎᑦᒪᖕᒫᑕ ᖃᐅᔨᓴᐃᓂᖅᖬᓐᓂᐊᖅᑐᑦ ᑰᑮᑎ ᐃᐊᒃᕓᑦ (ᕿᖓᐅᑦ ᑐᒃᑐᖏᑦ) ᐅᑭᐅᑦ ᒫᕐᕉᒃ ᓈᓯᒪᓕᕌᖓᑎᒃ ᑕᐃᒪᓗᑦᑕᐅᖅ ᐊᑕᐅᑦᓯᒃᑰᕐᑎᒻᒥᓗᑦ ᓵᑎ ᐃᐊᒃᕓ (ᐳᓘᓅᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᑦ) ᐊᒥᒃᑯᕐᑯᑎᖏᓂᒃ ᖃᐅᔨᓴᐃᓂᖃᕐᓂᕐᒥᓐᓂ. ᑕᐃᒪᓗ, ᐊᒥᓲᓂᖃᕐᑎᕆᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᐃᓂᖃᕈᒫᓕᕐᒥᔪᑦ ᔫᓂ 2020-ᒥ.

<u>**ᐱᔾᔪᑎᕆᔭᐅᔪᑦ:**</u> ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᓕᐅᖅᓯᒪᒻᒪᑕ ᖃᓄᖅ ᐊᒥᓲᓂᖅᖬᑎᕆᓂᖏᑕ ᑰᑮᑎ ᐃᐊᒃᕓᑦ (ᕿᖓᐅᑦ ᑐᒃᑐᖏᑦ) ᐊᒻᒪᓗ ᓵᑎ ᐃᐊᒃᕓ (ᐳᓘᓅᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᑦ) ᐊᒥᕐᑯᕐᑯᑎᖏᓂᒃ ᖃᐅᔨᓴᐃᓂᖅᖬᓐᓂᐊᕐᓂᕐᒥᓐᓄᑦ ᐅᑭᐅᑦ ᒫᕐᕉᒃ ᓈᓯᒪᓕᕌᖓᑕ, ᓱᕐᓗ ᓇᓗᓇᐃᔭᖅᑕᐅᓯᒪᒻᒪᑕ ᑲᑐᔾᔨᓂᖅᓱᑎᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂ. ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ ᓱᕗᓕᖅᑎᐅᖃᑦᑕᖅᓯᒪᒻᒪᑕ ᖃᓄᖅ ᐊᒥᓲᓂᖅᖬᑎᕆᓂᖏᑕ ᖃᐅᔨᓴᐃᖃᑦᑕᖅᓯᒪᓂᕐᓄᑦ ᑎᒃᔭᓕᐅᑉ ᑐᑐᕐᑯᑎᖏᓂᒃ. ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓯᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓂᒃ (GN) ᑲᑐᔾᔨᓂᖃᕐᓗᑎᒃ ᓇᐅᑦᓯᖅᑐᐃᕙᓐᓂᕐᓂᒃ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᐅᕙᒃᑐᓂᒃ ᑖᒃᑯᓂᖓ ᐊᒥᕐᑯᕐᑯᑎᐅᔪᓂᒃ.

<u>ᐊᑐᓕᕐᑯᙳᐅᓪᓗᑎᒃ #14-2019 (ᑰᑮᑎ ᐃᐊᒃᕓ): ᓄᕐᕋᒃᓴᖅᑐᓂᒃ ᓇᐅᑦᓯᖅᑕᐃᕙᓐᓂᖅ</u>
ᐱᐅᓂᖅᓴᑎᒍᑦ ᓇᐅᑦᓯᖅᑐᐃᓂᖃᕐᑯᓪᓗᑦ ᓄᕐᕋᒃᓴᖅᑐᑦ ᖁᑦᓯᖕᓂᖅᔭᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕓ ᐊᒥᕐᑯᕐᑯᑎᖏᓂ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᑦᓯᔭᕆᐊᖃᖅᐳᑦ ᑰᑮᑎ ᐃᐊᒃᕓ ᓄᕐᕋᒃᓴᖅᑐᓂᒃ ᓇᐅᑦᓯᖅᑐᐃᓂᖃᕈᑎᐅᓇᔭᖅᑐᓂᒃ ᐊᓇᖏᓂᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᖅᑎᒍᑦ ᐅᑭᐅᖑᑎᓪᓗᒍ ᑕᖅᑭᖏᓂ, ᐅᑭᐅᑖᒫᑦ ᐱᒋᐊᕐᓗᑎᒃ ᔫᓄᐊᕆ 2020. ᓄᓇᓕᐅᔪᓂ ᐃᓕᒋᔭᐅᔪᐃᑦ ᐃᓚᐅᖃᑕᐅᔪᓐᓇᖅᑎᑕᐅᔭᕆᐊᓖᑦ ᑲᑎᖅᓱᐃᓂᐅᕙᒃᑐᓄᑦ ᐊᓇᖏᓂᒃ ᑰᑮᑎ ᐃᐊᒃᕓ ᑐᒃᑐᖏᑕ ᐅᑮᕝᕕᒋᕙᒃᑕᖏᓂ.

<u>**ᑭᐅᔾᔪᑎᖏᑦ:**</u> ᐊᔾᔨᒌᙱᓐᓂᖃᕝᕕᐅᔪᑦ

ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑲᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᔾᔨᙱᑕᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᕐᑯᙳᐅᓪᓗᑎᒃ #14-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᒃ:

ᐱᐅᓂᖅᓴᑎᒍᑦ ᓇᐅᑦᓯᖅᑐᐃᓂᖃᕐᑯᓪᓗᑦ ᓄᕐᕋᒃᓴᖅᑐᑦ ᖁᑦᓯᖕᓂᖅᔭᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕓ ᐊᒥᕐᑯᕐᑯᑎᖏᓂ, ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᑦᓯᔭᕆᐊᖃᖅᐳᑦ ᑰᑮᑎ ᐃᐊᒃᕓ ᓄᕐᕋᒃᓴᖅᑐᓂᒃ ᓇᐅᑦᓯᖅᑐᐃᓂᖃᕈᑎᐅᓇᔭᖅᑐᓂᒃ ᐊᓇᖏᓂᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᖅᑎᒍᑦ ᐅᑭᐅᖑᑎᓪᓗᒍ ᑕᖅᑭᖏᓂ, ᐅᑭᐅᑖᒫᑦ ᐱᒋᐊᕐᓗᑎᒃ ᔫᓄᐊᕆ 2020. ᐱᔪᓐᓇᕐᓂᓕᒫᒥᑎᒍᑦ, ᓄᓇᓕᐅᔪᓂ ᐃᓕᒋᔭᐅᔪᐃᑦ ᐃᓚᐅᖃᑕᐅᔪᓐᓇᖅᑎᑕᐅᔭᕆᐊᓖᑦ ᑲᑎᖅᓱᐃᓂᐅᕙᒃᑐᓄᑦ ᐊᓇᖏᓂᒃ ᑰᑮᑎ ᐃᐊᒃᕓ ᑐᒃᑐᖏᑕ ᐅᑮᕝᕕᒋᕙᒃᑕᖏᓂ.

ᐱᔾᔪᑎᒋᔭᐅᔪᕐ: ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᔪᓯᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᑐᙵᕝᕙᖃᖃᑦᑕᕐᓂᕐᒥᓐᓂᒃ ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑰᑭᑎ ᐃᐊᒃᕗᑦ (ᕿᖓᐅᑦ ᑐᒃᑐᕆᑦ) ᑐᒃᑐᕆᓂ ᓄᕋᒃᓴᖃᖅᑐᓂᒃ ᓇᐅᑦᓯᖅᑐᐃᓂᕆᐊᑉᑕᕆᓐᓄᑦ ᐊᓇᕆᓂᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᖅᑎᒍᑦ ᐱᓕᕆᐊᕐᒎᕝᑐᓂᒃ ᐱᓕᕆᓂᐅᕙᑦᑐᓄᑦ ᖁᓕᒥᒨᓕᒃᑎᒍᑦ ᐅᑭᐅᖅᓯᒪᔪᑐᖃᐅᓕᖅᑎᓪᓗᒍ ᖃᐅᔨᓴᐃᓂᐅᕙᑦᑐᓄᑦ ᐃᓚᐅᑎᑕᐅᓗᓂ. ᓄᓇᑦᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓗᑎᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᐊᖅᑐᑦ ᑐᒃᑐᑦ ᐊᓇᕆᓂᒃ ᖃᐅᔨᓴᒐᒃᓴᐅᓂᐊᑐᓂᒃ ᐅᑭᐅᑐᖃᐅᑎᓪᓗᒍ ᑐᒃᑐᓂᒃ ᖃᐅᔨᓴᐃᓂᐅᕝᕒᑐᓄᑦ ᐃᓚᒋᔭᐅᖃᑕᐅᓗᑎᒃ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᖁᑎᕆᓐᓂᑦ, ᐱᒋᐊᕐᓗᑎᒃ ᒫᓯ 2020, ᐱᓗᐊᖅᑐᒥᒃ ᐱᓯᒪᓕᕆᐊᖅᐸᓪᓗᑎᒃ ᓈᒻᒪᒃᑐᓂᒃ ᖃᐅᔨᓴᒐᒃᓴᐅᓂᐊᖅᑐᓂᒃ ᐊᒻᒪᓗ ᓈᒻᒪᒃᑐᓂᒃ ᐊᕙᑎᒋᔾᔭᒐᓂ ᐱᓕᕆᓂᖃᕐᓂᐅᔪᓄᑦ. ᓯᕗᓂᑦᑎᓐᓂ ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᑎᖅᓱᐃᔪᓐᓇᓕᖁᔭᖅᐸᑕ ᑐᒃᑐᑦ ᐊᓇᕆᓂᒃ ᖃᐅᔨᓴᒐᐅᔪᒃᓴᓂᒃ ᓄᓇᓕᐅᔪᒥ ᐱᓕᕆᔾᔪᓯᐅᕙᒃᑐᑎᒍᑦ, ᑕᐃᒃᑯᐊ ᑲᑎᖅᓱᐊᕐᔪᓯᒪᔪᑦ ᐃᓚᒋᐊᖅᑕᐅᔾᔪᑎᐅᔪᓐᓇᖁᔭᕐᒪᑕ ᑲᑎᖅᓱᐊᕐᔪᓯᒪᓕᓚᐅᖅᑐᓂᑦ ᐅᑭᐅᑐᖃᐅᓕᖅᑎᓪᓗᒍ ᖁᓕᒥᒨᓕᒃᑯᑦ ᖃᐅᔨᓴᐃᓂᖃᖅᑎᓪᓗᒋᑦ.

<u>ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #15-2019</u> (ᑰᑭᑎ ᐃᐊᒃᕗ)

ᑕᒪᕐᒥᒃ ᐃᐊᒃᕗ ᑐᒃᑐᑦ ᐊᒻᒪᓗ ᐃᐊᒃᕗᑦ ᑐᒃᑐᐃᑦ ᓇᔪᖅᐸᒃᑕᕆᑕ ᖃᐅᔨᓴᖅᑕᐅᕙᖁᓪᓗᑎᑦ, ᐊᒻᒪᓗ ᖃᓄᐃᓪᓕᕆᒃᐸᓐᓂᕆᑎᒍᑦ ᐊᖑᓇᓱᒃᑕᐅᕙᒃᑐᑦ ᖃᖓᔮᓂᕆᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓪᓚᒃᑐᑦ ᐱᐅᓯᑐᖃᒃᑯᑦ ᓈᒻᒪᒋᔭᐅᓯᒪᔪᑎᒍᑦ, ᐊᒻᒪᓗ ᐃᑲᔪᕐᓂᖅᑲᖅᓯᒪᖁᓪᓗᑎᑦ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᑦᓯᓂᐅᔪᓄᑦ ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᑦᓯᓂᐊᖅᑐᑦ ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ, ᐱᒋᐊᖅᑎᑕᐅᓗᑎᒃ ᔫᓄᐊᕆ 2020-ᒥ (ᑕᑯᓗᑎᑦ ᐅᐃᒍᕆᑦ H-ᖓ).

ᑭᐅᔾᔪᑎᖏᑦ: ᐊᔾᔨᒌᙱᓐᓂᖅᑲᕝᕙᐅᔪᑦ

ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᙳᖏᑕᕆᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #15-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᑦ:

ᑕᒪᕐᒥᒃ ᐃᐊᒃᕗ ᑐᒃᑐᑦ ᐊᒻᒪᓗ ᐃᐊᒃᕗᑦ ᑐᒃᑐᐃᑦ ᓇᔪᖅᐸᒃᑕᕆᑕ ᖃᐅᔨᓴᖅᑕᐅᕙᖁᓪᓗᑎᑦ, ᐊᒻᒪᓗ ᖃᓄᐃᓪᓕᕆᒃᐸᓐᓂᕆᑎᒍᑦ ᐊᖑᓇᓱᒃᑕᐅᕙᒃᑐᑦ ᖃᖓᔮᓂᕆᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓪᓚᒃᑐᑦ ᐱᐅᓯᑐᖃᒃᑯᑦ ᓈᒻᒪᒋᔭᐅᓯᒪᔪᑎᒍᑦ, ᐊᒻᒪᓗ ᐃᑲᔪᕐᓂᖅᑲᖅᓯᒪᖁᓪᓗᑎᑦ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᑦᓯᓂᐅᔪᓄᑦ ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᕿᒥᕐᕈᐃᓯᒪᓕᒃᑲᓂᕐᓂᐊᖅᐳᑦ 2007-ᒥ ᐅᓂᒃᑳᓕᐊᖑᓚᐅᖅᑐᓂᒃ ᐃ. ᓕᒍᕐᒥᑦ ᑕᐃᔭᐅᓪᓗᑎᒃ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᖅ" ᐱᔾᔪᑎᖃᕐᓗᑎᒃ ᖃᐅᔨᕆᐊᖅᓯᒪᓕᕐᓂᐊᕐᓗᑎᑦ ᑐᕌᕝᕙᒃᓴᐅᑎᑕᐅᓪᓗᑎᒃ ᐅᖃᖅᑕᐅᓯᒪᓪᓚᐅᖅᑐᑦ ᑖᒃᑯᓄᖓ ᐊᑐᓕᖅᑎᑕᐅᓯᒪᙱᑦᑐᓂᑦ ᓱᓕ ᐊᑐᕐᓂᖅᑲᖅᓯᒪᙵᑕ.

ᐱᔾᔪᑎᒋᔭᐅᔪᕐ: ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᑭᐅᔾᔪᑎᒋᓚᐅᖅᑕᒥᓐᓂᒃ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #16-2019 (ᓵᑎ ᐃᐊᒃᕗ (ᐳᓘᓅᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᕆᑦ) ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᑕᐃᒪᓐᓇᑦᓴᐃᓐᓇᖅ ᑭᐅᓚᐅᖅᐳᑦ ᐊᒻᒪᓗ ᐅᖃᖅᓯᑎᒃ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖓᑦ" ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᐅᓚᐅᕐᒪᑕ ᑎᓕᓯ ᒐᕙᒪᖓᓂᑦ (TG) ᐅᑭᐅᕆᑦ 2010-ᒥᑦ 2012-ᒧᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ ᐊᒻᒪᓗ ᑖᒃᑯᐊ ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᐱᒋᐊᖅᑎᑦᓯᓯᒪᓕᓚᐅᕐᓂᕆᑕ ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᕐᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕝᕙᖓᓂᒃ (TRTI) ᐅᕝᕙᓘᓐᓃᑦ ᑎᑖᔅᐋᑦᓴᐋ. ᑎᑖᔅᐋᑦᓴᐋ ᐱᔾᔪᑎᖃᕐᒪᑦ ᐊᕆᔪᕐᒪᓇᐅᓪᓗᓂ ᐱᐅᓯᑐᖅᑲᒃᑯᑦ ᐅᔭᖅᑲᓂᒃ ᑎᓕᓯ ᓄᓇᕆᓐᓂ ᐃᓄᖁᑎᕆᑕ ᐃᓕᖅᑯᓯᑐᖃᒥᓐᓂ ᐊᑐᖅᐸᒃᓯᒪᔭᑐᖃᖓᓐᓂᒃ ᐱᕈᐃᓂᐊᕌᖓᒥᒃ ᐊᒻᒪᓗ ᐱᓯᒪᓕᒃᑲᓐᓂᖅᑲᕆᓂᐊᖅᓯᕆᑦ ᓱᓇᖁᑎᒃᓴᓐᓂᒃ/ᐱᖁᑎᒃᓴᓐᓂᒃ ᐅᐊᔭᕐᓗᑎᒃ ᓄᓇᐃᓐᓇᒧᑦ ᐊᒻᒪᓗ ᐅᑎᒧᑦ. ᐊᑎᖓ ᑖᓐᓇ ᑎᒍᔭᐅᓯᒪᓕᓚᐅᕐᒪᑦ ᑕᐃᔭᐅᔾᔪᓯᐅᓂᐊᖅᓯᓂ ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᕐᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕝᕙᖓᓄᑦ (TRTI) ᐱᔾᔪᑎᒋᓪᓗᒍ ᓇᓗᓇᐃᖅᓯᔾᔪᑎᐅᓂᖓᑕ ᐱᖁᑎᖃᕝᕙᐅᕙᑦᑐᓄᑦ, ᐱᑖᕝᕙᐅᒃᑲᓂᖅᐸᑦᑐᓄᑦ ᐊᒻᒪᓗ ᑭᖑᓂᐊᓂ ᐊᑐᖅᑕᐅᕙᓪᓚᐅᖅᓯᓂ ᑎᓕᓯ ᖃᐅᔨᒪᔭᑐᖃᕆᓐᓄᑦ. ᑎᑖᔅᐋᑦᓴᐋ (ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᕐᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕝᕙᖓᑦ) ᐱᒋᐊᖅᑎᑕᐅᓕᓚᐅᖅᓯᒪᒻᒪᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑎᖃᕐᓂᕐᒥᑦ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖓᓂᒃ". ᔫᑦᑖᖅ ᓕᒍᑦ ᐱᓕᕆᐊᕆᑦ ᐱᑕᖃᖅᑎᑦᓯᓯᒪᓕᓚᐅᖅᐳᑦ ᑐᙵᕝᕙᐅᔪᓂᒃ ᐅᓪᓗᒥ ᐱᓕᕆᐊᖑᓕᖅᑐᒧᑦ ᑕᐃᔭᐅᓪᓗᓂ ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᕐᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕝᕙᖓᑦ (TRTI), ᐊᒻᒪᓗ ᑭᖑᓂᐊᓂ ᐱᒋᐊᖅᑎᑕᐅᓯᒪᓕᓚᐅᖅᑐᒧᑦ ᑕᐃᔭᐅᓗᓂ ᑎᑖᔅᐋᑦᓴᐋ, ᐊᓯᔾᔨᕆᐊᖅᓯᒪᓂᖅᑲᓕᖅᑐᖅ ᑕᐃᒪᓐᓇ. ᑕᐃᒪᓗ, ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᓂᖅᑲᓕᖅᑐᑦ ᐱᔾᔪᑎᐅᓗᐊᖅᑑᓪᓗᑎᒃ ᐃᓚᒋᔭᐅᔪᑦ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊ", ᐊᕆᔪᒥᒃ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᐅᓯᒪᓕᐊᓂᓐᓂᖓᑕ ᐊᒻᒪᓗ ᐊᑐᓕᖅᑎᑕᐅᕙᓕᐊᓕᖅᓯᑎᒃ.

<u>ᐊᑐᓕᖅᑯᕗᐅᓪᓗᑎᒃ #16-2019</u> (ᑰᑮᑎ ᐃᐊᒃᑯ)
ᐱᐅᓂᖅᓴᑎᒍᑦ ᑐᑭᓯᐅᒪᔫᐅᓕᖅᑯᓪᓗᒋᑦ ᓯᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓄᑦ ᐃᓕᙱᐃᑎᑦᓯᓯᒪᓕᕐᓂᐅᔪᓄᑦ ᐃᐊᒃᑯ ᑐᒃᑐᓂᒃ, ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐱᓕᕆᔾᔪᑎᑎᒍᑦ ᑲᑎᖅᓱᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓄᓇᒥᑦ ᓯᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓂᑦ ᕿᒥᕐᕈᔫᐅᓯᒪᔪᓂᒃ ᐃᓚᖃᖅᑎᓪᓗᒋᑦ ᑭᓯᐊᓂᓗ ᑕᒪᒃᑯᓄᖓ ᑭᒡᓕᖃᖅᑎᑕᐅᓯᒪᓇᑎᒃ (i) ᐸᓂᓗᐊᓕᖅᓂᖓᓂᒃ, (ii) ᓄᓇᐅᑉ ᐃᑯᐊᓛᖅᓂᖃᓕᖅᓂᖓᓂᒃ, ᐊᒻᒪᓗ (iii) ᐱᕈᖅᑐᖃᙱᓗᐊᓕᖅᓂᖓᓂᒃ, ᐃᐊᒃᑯ ᓇᐋᔾᐅᐃᑎ ᑳ'ᐃ ᐱᓕᕆᐊᒥᒃ ᐱᓕᕆᓂᖃᖅᑎᓪᓗᒋᑦ ᐊᒻᒪᓗ ᑎᓪᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ ᐱᓕᕆᓂᖃᖅᑎᓪᓗᒋᑦ. ᖃᐅᔨᔭᐅᓯᒪᓕᖅᑐᑦ ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᐊᓂᑦ ᐋᖅᑭᒃᓱᐊᕐᒍᕆᐊᖃᕐᓚᑦ ᐃᑲᔪᕈᑎᐅᓕᖅᓂᐊᕐᓗᑎᒃ ᐋᖅᑭᕆᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᑐᙱᕝᕕᐅᓕᖅᓂᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐅᑭᐅᑕᓖᑦ ᓴᖅᑭᑕᐅᕙᓐᓂᐊᕐᓗᑎᒃ ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᙱᑦ (WRRB) ᐊᒻᒪᓗ ᓄᓇᕙᐊᑉ ᒐᕙᒪᖓᓄᑦ (GNWT).

<u>ᑭᐅᔾᔪᑎᖏᑦ:</u> ᐊᔾᔩᙱᓐᓂᖃᖅᕕᐅᔪᑦ

ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᙱᑕᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᖅᑯᕗᐅᓪᓗᑎᒃ #16-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᒋᑦ:

ᐱᐅᓂᖅᓴᑎᒍᑦ ᑐᑭᓯᐅᒪᔫᐅᓕᖅᑯᓪᓗᒋᑦ ᓯᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓄᑦ ᐃᓕᙱᐃᑎᑦᓯᓯᒪᓕᕐᓂᐅᔪᓄᑦ ᐃᐊᒃᑯ ᑐᒃᓂᒃ, ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᑎᖅᓱᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓄᓇᒥᑦ ᓯᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓂᑦ ᕿᒥᕐᕈᔫᐅᓯᒪᔪᓂᒃ ᐃᐊᒃᑯ ᓇᐋᔾᐅᐃᑎ ᑳ'ᐃ ᐱᓕᕆᐊᒥᒃ ᐱᓕᕆᓂᖃᖅᑎᓪᓗᒋᑦ. ᖃᐅᔨᔭᐅᓯᒪᓕᖅᑐᑦ ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᐊᓂᑦ ᐋᖅᑭᒃᓱᐊᕐᒍᕆᐊᖃᕐᓚᑦ ᐃᑲᔪᕈᑎᐅᓕᖅᓂᐊᕐᓗᑎᒃ ᐋᖅᑭᕆᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᑐᙱᕝᕕᐅᓕᖅᓂᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐅᑭᐅᑕᓖᑦ ᓴᖅᑭᑕᐅᕙᓐᓂᐊᕐᓗᑎᒃ ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᙱᑦ (WRRB) ᐊᒻᒪᓗ ᓄᓇᕙᐊᑉ ᒐᕙᒪᖓᓄᑦ (GNWT).

<u>ᐱᔾᔪᑎᒋᔭᐅᔪᑦ:</u> ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᕈᒪᙱᑕᕋᓗᐊᖓᑦ ᐅᖃᕈᓯᐅᔪᖅ "ᐱᓕᕆᔾᔪᑎᑎᒍᑦ", ᐱᔾᔪᑎᒋᓪᓗᒍ ᒃᑖᑦ ᔫ ᐊᖑᓇᓱᒃᑎᐅᔪᑦ ᐊᑐᖅᐸᓐᓂᐊᕐᒪᑕ ᑕᒪᐃᑎᒎᓕᖓᓪᓗᑎᒃ ᖃᐅᔨᒪᓂᕆᔭᐅᔪᓂᒃ "ᑕᑯᓯᒪᒋᐊᖅᓂᖏᓐᓂ" ᐊᓯᔾᔨᖅᓯᒪᓕᕐᓂᐅᔪᓂᒃ ᓄᓇᒥ. ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᒋᔭᖅᑲᒪᑕ ᐱᓕᕆᔾᔪᑎᖃᕈᑎᒃ "ᐱᓕᕆᔾᔪᑎᑎᒍᑦ" ᑲᑎᖅᓱᐃᓂᖏᓐᓂ ᑐᑭᓯᐊᖅᕝᕕᒃᓴᖅᑯᑎᐅᓂᐊᖅᑐᓂᒃ ᐱᓕᕆᐊᖑᓕᕋᔭᖅᓂᖏᑕ ᓴᓇᕈᑎᓂᒃ ᑎᑎᕋᕈᑎᓂᒃ ᐊᑐᖅᐸᒃᑐᑎ (ᓲᖅᑐ, ᑐᑭᓯᐊᖅᕝᕕᒃᓴᖅᑯᑎᓂᒃ ᑎᑎᕋᖅᕝᕕᒃᓴᓂᒃ, ᓯᓚᐅᑉ ᐆᓇᖅᓂᖓᓄᑦ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ, ᐊᓯᖏᓂᒃᑐ) ᐱᔾᔪᑎᐅᓗᐊᖅᐸᙱᒻᒪᑕ ᐊᖏᓂᖅᓴᐅᔪᒥᒃ ᑕᒪᐃᑎᒎᓕᖓᓪᓗᑎᒃ ᐱᓕᕆᐊᖃᕈᓯᐅᕙᒃᑐᓂᑦ ᑐᙱᕝᕕᖃᖅᑎᑕᐅᓪᓗᑎᒃ ᑎᓪᓯ ᖃᐅᔨᒪᓂᕆᔭᖅᑲᖏᓐᓄᑦ. ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᒋᔭᖅᑲᒥᔪᑦ "ᓇᐅᑦᓯᖅᑐᐃᕙᓐᓂᖅ" ᓄᓇᒥ ᐃᑯᐊᓛᖅᓂᖃᓕᖅᓯᒪᔪᓂᒃ ᐱᔭᕆᑐᔪᒻᒪᕆᐅᓪᓗᓂ ᐱᓕᕆᐊᒃᓴᐅᕙᓐᓂᙱᒻᒪᑕ ᐊᒻᒪᓗ ᐃᓯᒪᓪᓗᑎᒃ ᐅᖓᓯᒃᑐᒥᑦ ᖃᐅᔾᔨᑎᐅᕙᑦᑐᑦ ᐊᑐᖅᓂᖅᑲᖅᓂᖅᓴᐅᓇᔭᖅᓯᒋᓪᓗᒋᑦ ᑕᒪᒃᑯᓂᖓ ᐱᓕᕆᓂᖅᑲᖅᓂᐊᖅᑐᓂ. ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐱᓯᒪᓕᕋᓯᐊᖅᓂᐊᖅᑐᑦ ᑐᑭᓯᐅᒪᓕᖅᓂᑎᒃ ᖃᓄᖅ ᐱᓕᕆᐊᕆᓴᐅᔪᑦ ᐃᑲᔪᕈᑎᐅᓕᕈᓐᓇᕋᔭᖅᒪᖔᑕ ᓇᐅᑦᓯᖅᑐᐃᕙᓐᓂᖅᓄᑦ ᓄᓇᒥ ᐃᑯᐊᓛᖅᓂᖃᖅᓯᒪᔪᓂᒃ ᐱᐅᓯᑐᖅᑲᒥ ᐃᓯᒪᔾᔪᓯᐅᕙᒃᑐᑎᒍᑦ ᐱᓕᕆᐊᖑᕙᓐᓂᖏᓂ.

<u>ᐊᑐᓕᖅᑯᕗᐅᓪᓗᑎᒃ #17-2019</u> (ᑰᑮᑎ ᐃᐊᒃᑯ)
ᑭᖑᕙᖅᑎᑕᐅᓯᒪᓕᖅᓇᑎᒃ ᐊᑐᓕᖅᑎᑕᐅᓂᖏᑦ ᐊᐅᓚᑦᓯᓂᐅᔪᓄᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᓂᖓᓄᑦ ᐱᓕᕆᐊᖑᔪᑦ, ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᙱᑦ (WRRB), ᑎᓪᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕙᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᑐᔾᔨᓂᖃᖅᓗᑎᒃ ᐱᓕᕆᓂᖃᖅᓂᐊᖅᑐᑦ ᐋᖅᑭᒃᓯᐃᓂᕐᒥ ᐊᒥᖅᑫᖅᑯᑎᓄᑦ ᑐᕌᖓᑎᑕᐅᓪᓗᑎᒃ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᑦᓯᓂᖅᒧᑦ ᑐᙱᕝᕕᖅᑯᑎᒃᓴᓂᒃ ᐊᑦᑕᖅᑕᖅᓯᒪᓂᖃᖅᑎᑕᐅᓗᑎᒃ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᑦᓯᓂᒥ ᐱᓕᕆᐊᖑᔪᓄᑦ ᓯᕗᓂᖓᓂ ᔫᓄᐊᕆ 2020, ᕗᐃᑮᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᙱᑦ (WRRB) ᓯᕗᓕᖅᑎᒋᔭᐅᑎᓪᓗᒋᑦ ᐊᒥᖅᑫᖅᑯᑎᐅᔪᓄᑦ ᕗᐃᑮᔩᒥ. ᑐᙱᕝᕕᐅᓕᖅᑐᑦ ᐃᓚᖃᖅᑎᑕᐅᓯᒪᓂᐊᖅᑐᑦ ᑎᓪᓯ ᐊᒻᒪᓗ ᓯᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒥ ᐱᓕᕆᔨᐅᕙᑦᑐᑦ ᖃᐅᔨᒪᓂᕆᔭᖏᓂᒃ, ᑕᐃᒪᐅᓕᐊᓂᒃᓯᑎᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᒋᔭᐅᓯᒪᔪᓂᒃ, ᐊᒻᒪᓗ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᑲᑎᒪᔩᐅᔪᓂᑦ ᐊᒻᒪᓗ ᒐᕙᒪᒋᔭᐅᔪᓂᑦ.

ᑭᐅᔾᔪᑎᖏᑦ: ᓈᒻᒪᒋᔭᐅᔪᑦ

ᐱᔾᔪᑎᒋᔭᐅᔪᑦ: ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᑖᔅᓱᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᒥᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᔭᐅᓪᓗᓂ ᓈᒻᒪᒃᓴᐃᓯᒪᕗᕐ. ᑭᓯᐊᓂᓗ, ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐅᔾᔮᕈᓯᑉᐳᑦ ᑖᒃᑯᐊ ᕗᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᓕᖅᑎᐅᑎᑕᐅᓂᖏᑦ ᐊᒥᕐᕋᕐᑯᑎᐅᔫᓄᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕐᓯᓂᖅᑳᕐᓂᕐᒥ ᑐᙵᕝᕕᕐᑯᑎᐅᔪᑦ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᓂᖏᑕ ᐱᔭᕇᖅᑕᐅᓯᒪᕝᕕᒃᓴᖅᑲᖅᑎᑕᐅᓂᖓᓐᓄᑦ ᔫᓄᐊᕆ 2020-ᒧᑦ ᐊᒻᒪᓗ ᐊᐱᕆᓪᓗᑎᒃ ᐱᔭᕇᖅᑕᐅᓯᒪᓕᕐᕕᒃᓴᖓᑦ ᑐᕌᖓᑎᑕᐅᓯᒪᒻᒪᖐᑕ ᐅᖃᓪᓚᐅᓯᕆᔭᐅᓕᕐᕕᒃᓴᖓᓄᑦ ᐱᖓᓱᐃᖑᓪᓗᑎᒃ ᐱᓕᕆᐊᖃᖅᑎᐅᔪᑦ ᑲᑎᙵᓂᖃᓕᖅᐸᑕ ᑲᑐᔾᔨᓂᖃᕐᓗᑎᒃ ᐅᖃᓪᓚᐅᓯᖃᖃᑎᒌᓐᓂᕐᓄᑦ.

ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #18-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ): ᐊᑐᓕᖅᑎᕐᓯᓂᖅ

ᓯᕗᒻᒧᒃᐸᓪᓕᐊᑎᑕᐅᓂᖓᓂᒃ ᐊᑐᓕᖅᑎᕐᓯᕙᓪᓕᐊᓂᕐᓂ ᑲᑎᒪᔩᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᓯᒪᔭᖏᓐᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᑎᑦ ᓇᓃᓕᕐᓂᖏᑕ ᖃᐅᔨᒪᓕᕈᑎᒃᓴᓂᒃ, ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᑕᕐᑲᖅᑎᕐᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᕗᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᒪᑯᓂᖓ:

1) ᐊᑐᓕᖅᑎᑕᐅᕙᓪᓗᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᕐᒎᓯᒪᔪᓂᒃ 2019 ᐅᑭᐅᖓᓂ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᓚᐅᖅᑐᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᔭᐅᓪᓗᑎᒃ ᑐᓂᓯᓯᒪᓕᕐᓗᑎᒃ ᓯᕗᕐᖓᓂ ᔫᓄᐊᕆ 31, 2020
2) ᓇᐃᒻᓕᒋᐊᖅᓯᒪᓪᓗᒋᑦ ᐅᓂᒃᑳᓕᐊᕐᒎᓯᒪᔪᓂᒃ, ᐅᑭᐅᑉ ᐊᑕᐅᓯᐅᑉ ᐃᓗᐊᓂ ᓈᒻᒪᒋᔭᐅᓯᒪᓕᓚᐅᕐᓂᖓᓂᑦ ᐅᕙᑦᔫᓐᓃᑦ ᐊᔾᔨᙳᕆᓂᕐᑲᕐᕕᐅᓂᖓᓂᑦ ᑲᑎᒪᔩᑦ 2019-ᒥ ᐃᓱᒪᓕᐅᕈᑎᒋᓚᐅᖅᑕᖏᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᒋᑦ, ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕐᓯᓂᕐᑲᕐᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᓂᑦ, ᐃᓚᕐᑲᖅᑎᓪᓗᒋᑦ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓄᑦ ᐊᑐᓕᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕐᓯᓂᖅᑳᕐᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᑦ ᐃᖏᕐᕋᕐᓯᐊᕐᓯᒪᓂᖏᓐᓄᑦ; ᐊᒻᒪᓗ
3) ᒫᓐᓇᒧᑦ ᑎᑭᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᑐᓕᖅᑎᑕᐅᕙᓪᓕᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᕐᒎᓯᒪᔪᓂᒃ 2010-ᒥᑦ 2016-ᒧᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᕐᒎᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓂᒃ ᑕᒪᐃᑕ ᐱᓕᕆᐊᕐᒎᓯᒪᙱᑦᑐᓄᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᕐᒎᓯᒪᓕᓚᐅᖅᑐᓂᑦ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᑎᑦ ᓯᕗᕐᖓᓂ ᔫᓄᐊᕆ 31, 2020.

ᑭᐅᔾᔪᑎᖏᑦ: ᐊᔾᔨᒌᙱᓐᓂᕐᑲᕝᕕᐅᔪᑦ

ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑲᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᔾᔨᙱᑦᑕᖏᑎᒧᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #18-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᑦ:

ᓯᕗᒻᒧᒃᐸᓪᓕᐊᑎᑕᐅᓂᖓᓂᒃ ᐊᑐᓕᖅᑎᕐᓯᕙᓪᓕᐊᓂᕐᓂ ᑲᑎᒪᔩᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᓯᒪᔭᖏᓐᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᑎᑦ ᓇᓃᓕᕐᓂᖏᑕ ᖃᐅᔨᒪᓕᕈᑎᒃᓴᓂᒃ, ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᑕᕐᑲᖅᑎᕐᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᕗᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᒪᑯᓂᖓ:

1) ᐊᑐᓕᖅᑎᑕᐅᕙᓪᓕᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᕐᒎᓯᒪᔪᓂᒃ 2019 ᐅᑭᐅᖓᓄᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᓚᐅᖅᑐᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᑎᑦ ᓯᕗᕐᖓᓂ ᐋᐳᓗ 30, 2020;
2) ᓇᐃᒻᓕᒋᐊᖅᓯᒪᓪᓗᒋᑦ ᐅᓂᒃᑳᓕᐊᕐᒎᓯᒪᔪᓂᒃ, ᐅᑭᐅᑉ ᐊᑕᐅᓯᐅᑉ ᐃᓗᐊᓂ ᓈᒻᒪᒋᔭᐅᓯᒪᓕᓚᐅᕐᓂᖓᓂᑦ ᐅᕙᑦᔫᓐᓃᑦ ᐊᔾᔨᙳᕆᓂᕐᑲᕐᕕᐅᓂᖓᓂᑦ ᑲᑎᒪᔩᑦ 2019-ᒥ ᐃᓱᒪᓕᐅᕈᑎᒋᓚᐅᖅᑕᖏᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᒋᑦ, ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕐᓯᓂᕐᑲᕐᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᓂᑦ, ᐃᓚᕐᑲᖅᑎᓪᓗᒋᑦ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓄᑦ ᐊᑐᓕᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᕐᓯᓂᖅᑳᕐᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᑦ ᐃᖏᕐᕋᕐᓯᐊᕐᓯᒪᓂᖏᓐᓄᑦ; ᐊᒻᒪᓗ
3) ᒫᓐᓇᒧᑦ ᑎᑭᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᑐᓕᖅᑎᑕᐅᕙᓪᓕᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᕐᒎᓯᒪᔪᓂᒃ 2010-ᒥᑦ 2016-ᒧᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᕐᒎᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓂᒃ ᑕᒪᐃᑕ ᐱᓕᕆᐊᕐᒎᓯᒪᙱᑦᑐᓄᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᕐᒎᓯᒪᓕᓚᐅᖅᑐᓂᑦ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᑎᑦ ᓯᕗᕐᖓᓂ ᐋᐳᓗ 30, 2020.

ᐱᔾᔪᑎᒋᔭᐅᔪᑦ: ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕐᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᖏᕐᑲᑎᒌᒃᓯᒪᔪᑦ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓕᕆᐊᕐᑲᕐᓂᖏᑕ ᑕᒪᕐᒥᒃ ᑲᑎᒪᔩᔪᓂᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᓚᐅᖅᑐᑦ ᐊᑐᓕᖅᑎᑕᐅᕐᑯᓪᓗᑎᑦ ᑭᓯᐊᓂᓗ ᒪᕐᕉᓪᓗᑎᒃ ᒐᕙᒪᒋᔭᐅᔫᒃ ᐊᑯᓂᐅᓂᖅᓴᒥᒃ ᐱᓕᕆᓂᕐᑲᕝᕕᒃᓴᖅᑲᖅᑎᐅᔭᕆᐊᖃᖅᑐᑦ ᑲᑎᒪᔩᔪᓄᑦ ᑐᓂᓯᓯᒪᓕᕐᕝᕕᒃᓴᒥᓐᓂᒃ ᒫᓐᓇᒧᑦ ᑎᑭᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᑐᓕᖅᑎᕐᓯᕙᓪᓕᐊᓂᕐᒥ ᐸᕐᓇᐅᑎᓕᐊᕐᒎᓯᒪᓕᓚᐅᖅᑐᓄᑦ.

Reasons for Decisions Related to a Joint Proposal for the Management of the Kǫk'èetì Ekwǫ̀ (Bathurst Caribou) Herd

Wek'èezhìı Renewable Resources Board

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

BCAC	Bathurst Caribou Advisory Committee
BGCTWG	Barren-ground Caribou Technical Working Group
CARC	Canadian Arctic Resources Committee
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
ENR	Environment & Natural Resources
GN	Government of Nunavut
GNWT	Government of the Northwest Territories
INAC	Indigenous and Northern Affairs Canada
LKDFN	Łutsel K'e Dene First Nation
MCBCCA	Mobile Core Bathurst Caribou Conservation Area
NWMB	Nunavut Wildlife Management Board
TAH	Total Allowable Harvest
TG	Tłı̨chǫ Government
TK	Tłı̨chǫ Knowledge; traditional knowledge
WRRB	Wek'èezhìı Renewable Resources Board

LIST OF TŁĮCHǪ TERMS

det'ǫcho	eagle
dìga	wolf
ʔekwǫ̀	barren-ground caribou
ʔįk'ǫǫ̀	spiritual power
Kǫk'èetì	Contwoyto Lake
Kǫk'èetì Ekwǫ̀	Bathurst caribou
Mǫwhì Gogha Dè Nįįtłèè	traditional area of the Tłįchǫ, described by Chief Monfwi during the signing of Treaty 11 in 1921
nǫ̀gha	wolverine
nǫʔokè	water crossings
sahcho	grizzly bear
Sahtì Ekwǫ̀	Bluenose-East caribou
tataa	corridors between bodies of water; land bridges
Wek'èezhìı	management area; within the boundaries of

1.0. Executive Summary

The Wek’èezhìı Renewable Resources Board (WRRB) is responsible for wildlife management in Wek’èezhìı and shares responsibility for managing and monitoring the *Kǫ̀k’èetì ekwǫ̀* (Bathurst caribou) herd. In November 2018, the Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) reported that, in their view, the Kǫ̀k’èetì ekwǫ̀ herd had continued to decline significantly and that further management actions were required.

In January 2019, the Tłı̨chǫ Government (TG) and GNWT submitted the *Joint Proposal on Management Actions for the Bathurst ʔekwǫ̀ (Barren-ground caribou) Herd 2019-2021* to the Board, outlining proposed management actions for the Kǫ̀k’èetì ekwǫ̀ herd in Wek’èezhìı. The management actions proposed by TG and GNWT in the Joint Proposal were grouped under the five categories: harvest, predators, habitat and land use, and education as well as research and monitoring. More specifically, TG and ENR proposed continuing a herd-wide total allowable harvest of zero for the Kǫ̀k’èetì ekwǫ̀ herd. Following an initial assessment of the management proposal, the Board determined that a Level 2 review was appropriate, as per its Rule for Management Proposals. Therefore, the Board established a proceeding and an online public registry on February 4, 2019.

The WRRB concluded, based on current evidence and its decision made in 2016, that a serious conservation concern continues to exist for the Kǫ̀k’èetì ekwǫ̀ herd and that additional management actions are vital for herd recovery. In making its decision about harvest limitations, the WRRB considered the risks to the herd from a recent high rate of decline, uncertainties about the underlying mechanisms for the decline and the importance of *ʔekwǫ̀* (barren-ground caribou) for Tłı̨chǫ citizens to thrive – physically, spiritually, and culturally.

The WRRB determined that a TAH of zero shall be continued for all users of the Kǫ̀k’èetì ekwǫ̀ herd within Wek’èezhìı for the 2019/20 and 2020/21 harvest seasons.

As the Mobile Core Bathurst Caribou Conservation Area (MCBCCA) continues to be utilized to implement the zero TAH, the WRRB recommended that the effectiveness of the zone in achieving Kǫ̀k’èetì ekwǫ̀ conservation goals be quantitatively assessed while considering both overlap with adjacent herds and inadvertent harvesting. As monitoring of the Kǫ̀k’èetì ekwǫ̀ harvest is crucial for management decisions, the Board recommended that TG hire additional community monitors.

The 2018 calving ground survey report made it clear that emigration has become a significant factor contributing to the decline of the Kǫ̀k’èetì ekwǫ̀ herd. This information is new and adds a deeper level of uncertainty to the future of the herd. The WRRB recommended that TG and GNWT provide a plain language description of their positions regarding the implication of emigration on Kǫ̀k'èetì ekwǫ̀, and how it will influence adaptive management of the herd.

To improve our understanding of the role of predators on the decline of the Kǫ̀k'èetì ekwǫ̀ herd, the WRRB recommended that TG and GNWT provide the WRRB with information on the sighting rates of predator and the criteria to be used in determining the targeted number of predators to be removed annually. Additionally, the WRRB is to be provided with the criteria for *Dìga* (wolf) removal based on (i) dìga sightings during Kǫk'èetì ekwǫ̀ composition surveys and (ii) likely exposure of Kǫk'èetì ekwǫ̀ to dìga associated with neighbouring herds during the winter season.

The *Enhanced North Slave Dìga Harvest Incentive Program* is being used as a method of dìga removal on the winter range of Kǫ̀k'èetì and *Sahtì ekwǫ̀* (Bluenose-East caribou). To ensure that this program is contributing to conservation efforts of Kǫ̀k'èetì ekwǫ̀, the Board recommended that the location and number of dìga harvested are provided to the Board each year and that criteria are developed to measure the effectiveness of the program, based on scientific and traditional knowledge.

TG runs a *Community-based Harvest Training Program* and the WRRB recommended that the location and number of dìga harvested be provided to the Board as well as an assessment of how the training will contribute to future dìga harvesting and management. Additionally, the Board recommended that TG and GNWT coordinate the *Enhanced North Slave Dìga Harvest Incentive Program* and the *Community-based Dìga Harvest Training Program* to determine their role in removing the targeted number of dìga.

The WRRB is currently working on a *Sahcho* (grizzly bear) biological and management feasibility assessment. In order to improve efficiencies, the Board recommended that *Nǫ̀gha* (wolverine) be included in this assessment.

The WRRB acknowledged that the range of the Kǫ̀k'èetì and Sahtì ekwǫ̀ extends beyond Wek'èezhìı and the Northwest Territories. However, there has been a lack of progress on the joint management of predators and land management across territorial borders. As such, the Board recommended that GNWT and TG develop a draft agreement and timelines to jointly manage the Kǫ̀k'èetì and Sahtì ekwǫ̀ in cooperation with other co-managers.

Tłı̨chǫ community members as well the general public should be made aware of the status of the ʔekwǫ̀ and should be made aware about efforts being made to halt their decline. The WRRB recommended that the successes and challenges of TG's ekwǫ̀ Nàxoède K'è program be communicated to the Tłı̨chǫ communities and schools.

The decline of Kǫ̀k’èetì ekwǫ̀ affects the well-being of Tłı̨chǫ citizens and the Board recommended that TG and GNWT discuss priorities and solutions for food security. The Board also recommends that TG and GNWT exchange information about ʔekwǫ̀ regarding the reasons for the declines and the factors which continue to affect the declines.

Time is now of the essence for the management of Kǫ̀k’èetì ekwǫ̀ and the Board supported the increase of population surveys to every two years but notes that efforts should be made to have them occur concurrently with neighbouring Sahtì ekwǫ̀ and Beverly/Ahiak herds. The Board also supported the implementation of a pregnancy monitoring program utilizing fecal pellet collection.

The Board recommended the Tłı̨chǫ Research and Monitoring Program be implemented to ensure that both ʔekwǫ̀ and ʔekwǫ̀ habitat monitoring and realistic harvesting numbers are recorded in a culturally appropriate manner while feeding into adaptive management. The Board recommended that the Ekwǫ̀ Nàxoède K’è collect on-the-ground climate change observations to be incorporated into an adaptive management framework.

The Board recommended that TG and GNWT collaborate with the WRRB to develop a herd-specific adaptive management framework with thresholds linked to specific management actions.

2.0. Introduction

By 2018, the Kǫk’èetì ekwǫ̀ herd was at its lowest recorded size, with GNWT and TG stating that *“the current small and declining number of mature caribou in the Bathurst herd is a critical conservation status”*.[1] The herd has declined from approximately 472,000 in 1986 to about 8,200 in 2018, based on the latest calving ground survey in June 2018 (Figure 1). This is an unprecedented decline in herd size, approximately 98% over the last 32 years. While the small herd size is startling, the Board is more alarmed by the accelerated rate of decline of 29% per year since 2015 and what the future holds for the Kǫk’èetì ekwǫ̀ herd.

[1] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

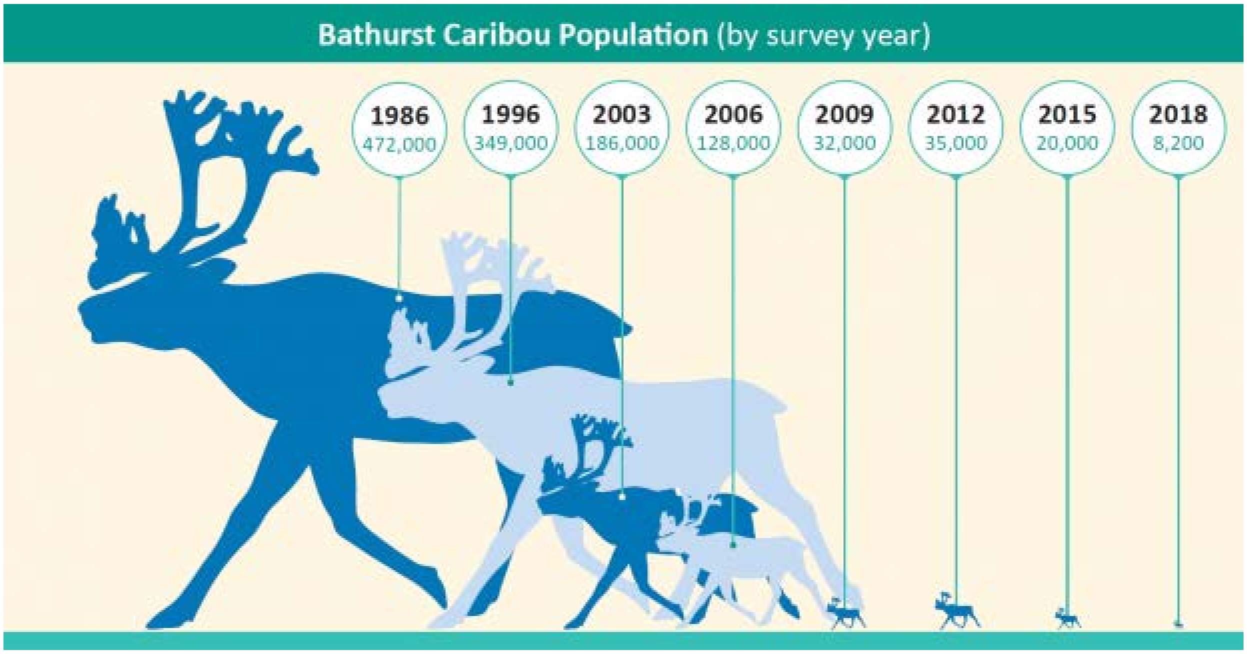


Figure 1. Bathurst Caribou Population (by survey year).[2]

Despite best efforts to halt it, the decline of the Kǫk'èetì ekwǫ̀ herd has continued. The herd rapidly declined from 2006-2009 and the WRRB made the difficult decision to severely restrict harvests in 2010. The decision seemed to be justified when the herd's numbers stabilized between 2009 and 2012.[3] Unfortunately, the decline again accelerated and, in 2016, the WRRB determined that the total allowable harvest (TAH) should be zero, which caused distress and hardship for harvesters. Despite halting harvest, the decline in the Kǫk'èetì ekwǫ̀ herd continued, which indicated that harvesting was not the only cause of low adult ʔekwǫ̀ survival. As such, the WRRB, in 2016, made recommendations to increase ʔekwǫ̀ survival and offset natural hardships for ʔekwǫ̀ by increasing dìga harvesting, conducting a feasibility assessment for dìga management, and supporting habitat conservation and monitoring.

In 2019, the Board received evidence that the causes of the decline are now more complicated as some collared cows moved to the neighboring Beverly/Ahiak herd's calving ground in 2018 and 2019, which has added emigration as a cause of the decline in Kǫk'èetì ekwǫ̀ herd size.

The reduced herd size and extent of the decline, as of June 2018, is reported in the 2019 Joint Proposal, entitled *"Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021"* (the "Joint Proposal") (Appendix A).[4]

---

[2] https://www.enr.gov.nt.ca/en/services/caribou-de-la-toundra/bathurst-herd.
[3] Ibid.
[4] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

TG and GNWT submitted the Joint Proposal on January 22, 2019. Since the Board was not required to consider a change in harvest restrictions, i.e. the TAH remained at zero, the WRRB undertook a Level 2 management proposal review, as per its Rule for Management Proposals.[5] The Board implemented review procedures, which included an open public comment period from February 4 to April 5, 2019.

The short-term goal of the 2019 Joint Proposal's proposed management actions is to halt the Kǫk'èetì ekwǫ̀ herd's decline and promote recovery over the period of 2019 to 2021. The long-term goal of the Joint Proposal is recovery of the herd to a level which meets community needs and where sustainable harvesting is once again possible within Mǫwhì Gogha Dè Nįįtłèè.

The Joint Proposal is clear that the Kǫk'èetì ekwǫ̀ herd is in *"a critical conservation status that requires implementation of an integrated suite of recovery management actions"*.[6] Despite these goals, the Joint Proposal also states that the proposed specific management actions will not halt the decline.[7] This puts the herd in a fragile and perilous position.

This report describes the WRRB's assessment of the evidence on the record and is the basis for the Board's determinations and recommendations.

3.0. The Board and Its Authorities

3.1. WRRB Mandate & Authorities

The WRRB is responsible for the wildlife management functions set out in the Tłįchǫ Agreement in Wek'èezhìı [8] and shares responsibility for the management and monitoring of the Kǫk'èetì ekwǫ̀ herd. The WRRB is a co-management tribunal established by the Tłįchǫ Agreement to exercise advisory and decision-making responsibilities related to wildlife, forest, plant and protected areas management in Wek'èezhìı (Figure 2). The Board's legal authorities came into effect at the time the Tłįchǫ Agreement was ratified by Parliament.[9] Section 12.1.5 of the Agreement requires the Parties[10] to manage wildlife based on the principles of conservation, on an

[5] https://www.wrrb.ca/sites/default/files/REV%20FINAL%20Rule%20-%20Management%20Proposals%20-%2016oct18.pdf.
[6] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[7] Ibid.
[8] Section 12.1.2 of the Land Claims and Self-Government Agreement Among the Tłįchǫ and the Government of the Northwest Territories and the Government of Canada, Indian Affairs and Northern Development, Ottawa, 2003 (hereinafter the "Tłįchǫ Agreement").
[9] Tłįchǫ *Land Claims and Self-Government Act*, S.C. 2005, c.1. Royal assent February 15, 2005. See s.12.1.2 of the Tłįchǫ Agreement.
[10] This includes the Tłįchǫ Government, the Government of the Northwest Territories and the Government of Canada.

ecosystemic basis and in an adaptive fashion.[11] The WRRB's major authorities and responsibilities in relation to wildlife are further set out in Chapter 12 of the Tłı̨chǫ Agreement.[12]

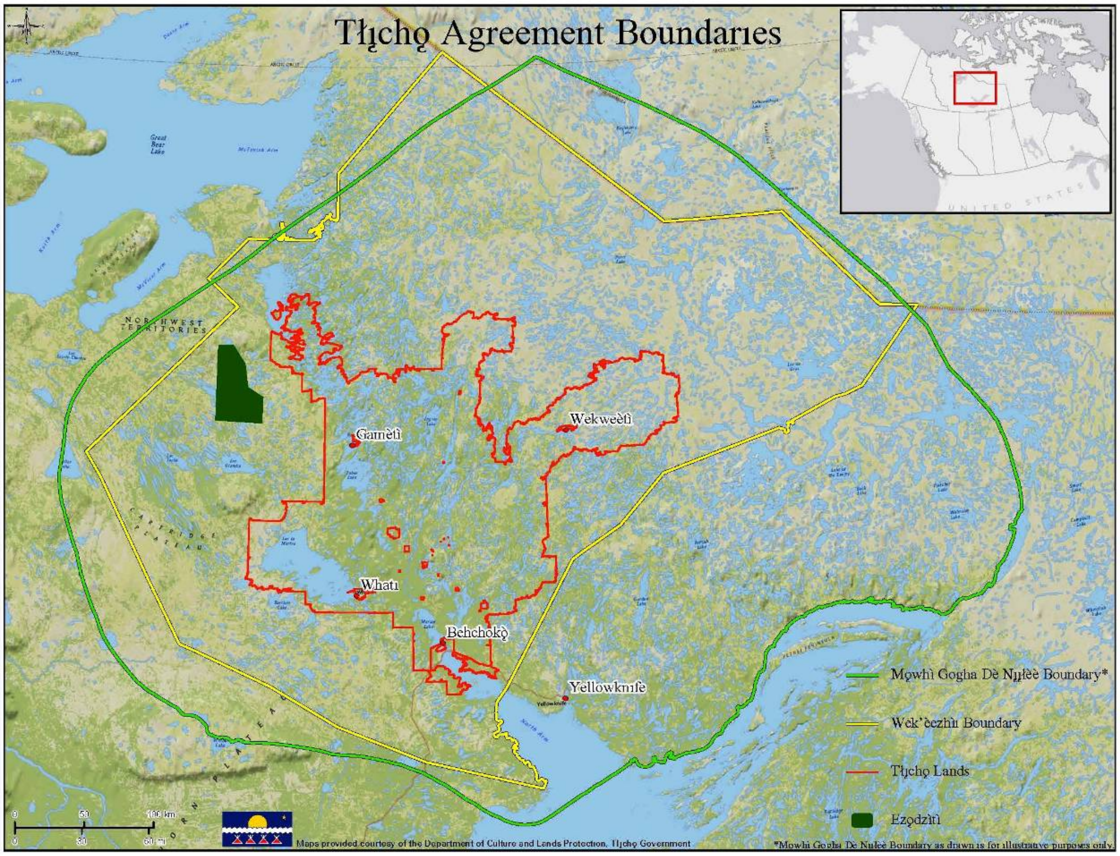


Figure 2. Wek'èezhìı Management Area.[13]

As required by Sections 12.5.1 and 12.5.4 of the Tłı̨chǫ Agreement, any Party[14] proposing a wildlife management action in Wek'èezhìı must submit a management proposal to the WRRB for review. This includes the establishment or adjustment of a TAH. Prior to making a recommendation, the WRRB must consult with any body that has authority over that wildlife species both inside and outside of Wek'èezhìı. Under Section 12.5.5 of the Agreement, the WRRB has sole responsibility for making a final determination with respect to a TAH for Wek'èezhìı.

[11] See Section 12.1.5 paragraphs (a) and (d) of the Tłı̨chǫ Agreement.
[12] See Section 12 of the Tłı̨chǫ Agreement.
[13] Department of Culture & Lands Protection, Tłı̨chǫ Government. 2014.
[14] As defined in the Tłı̨chǫ Agreement, "Parties" mean the Parties to the Agreement, namely the Tłı̨chǫ, as represented by the Tłı̨chǫ Government, the Government of the Northwest Territories and the Government of Canada.

The WRRB acts in the public interest. It is an institution of public government, which makes its decisions on the basis of consensus. Part 12.1 of the Tłı̨chǫ Agreement requires the coordination of the functions of governments (authorities whose responsibilities include wildlife management among other functions).[15] The WRRB works closely with Tłı̨chǫ communities, TG, and GNWT. The Board also collaborates with other territorial government departments, such as Lands and Industry, Tourism and Investment, and federal government departments, such as Environment and Climate Change Canada, Fisheries and Oceans Canada, and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). In addition, the WRRB works with other wildlife management authorities, Indigenous organizations and stakeholders.

Wildlife management is a central and vital component of the Tłı̨chǫ Agreement.[16] The rights of Tłı̨chǫ citizens to use wildlife for sustenance, cultural, and spiritual purposes are protected by the Tłı̨chǫ Agreement and the Constitution[17], subject to the management framework set out in Chapter 12.

The WRRB is bound by the Tłı̨chǫ Agreement if it is contemplating any limitation to Tłı̨chǫ citizens' harvesting, including any limitation to the harvesting of Kǫk'èetì ekwǫ̀. More specifically, Section 12.6.1 specifies that a TAH level shall be determined for conservation purposes only and only to the extent required for such purposes.[18] The Tłı̨chǫ Agreement defines conservation as follows:

> *"conservation" means*
>
> > *(a) the maintenance of the integrity of ecosystems by measures such as the protection and reclamation of wildlife habitat and, where necessary, restoration of wildlife habitat; and*
> > *(b) the maintenance of vital, healthy wildlife populations capable of sustaining harvesting under the Agreement.*

In addition to the substantive legal protection for Tłı̨chǫ citizens' harvesting rights set out in the Tłı̨chǫ Agreement, the WRRB is also bound by the requirements of fairness. Section 12.3.10 gives the Board the authority to order a public hearing on a wildlife management proposal and makes it mandatory for the WRRB to hold a public hearing when it intends to consider establishing a TAH in respect of a species or a population such as the Kǫk'èetì ekwǫ̀ herd.

[15] See Section.12.1.4 of the Tłı̨chǫ Agreement.
[16] See Section.12.1.1 of the Tłı̨chǫ Agreement.
[17] *Constitution Act.* 1982. Section 35.
[18] See Section 12.6.1 of the Tłı̨chǫ Agreement.

3.2. Rule for Management Proposals

Under Section 12.3.6, the WRRB has the authority to make rules respecting the procedure for making applications to the Board. The WRRB has developed a Rule for Management Proposals[19] as a guide for making management proposal submissions, including actions taken in the issuance of licences, permits and other authorizations.

Section 12.5.1 of the Tłı̨chǫ Agreement is mandatory. Except in an emergency situation as set out in 12.5.14, it requires that a Party, before taking "*any action for management of wildlife in Wek'èezhìı submit its proposals to the WRRB for review under 12.5.4*". This section of the Agreement is intended to be broadly inclusive of wildlife management initiatives.

The WRRB, depending on the nature, content and context of a management proposal, will undertake one of three levels of review:

- Level 1 – will require Board or Board Staff (as directed by the Board) review but no public consultation;
- Level 2 – will require Board review and Board-led public consultation (no public hearing); or,
- Level 3 – will required Board review and Board-led public consultation with a public hearing.

Except where in the Board's view the proposal will require the establishment of a TAH as stated in Section 12.3.10 of the Tłı̨chǫ Agreement, all submissions are treated initially as a Level 1 review. Following assessment, the Board has the discretion to increase the level of review as it deems appropriate. For Level 2 management proposals, the Board may establish a proceeding and an online public registry. Notification of the proceeding and a request for comments will be made via its website, newspaper, social media and radio advertisements with a reasonable period granted to allow affected stakeholders and the public to provide comment.

Following closure of the public comment period, the WRRB reviews and provides recommendations. Level 2 management proposals may require up to 90 days for consultation, review and response. As per Section 12.5.8 of the Tłı̨chǫ Agreement, the Board *"shall give public notice of their recommendations"* by posting them on their website (www.wrrb.ca).

[19] https://www.wrrb.ca/sites/default/files/REV%20FINAL%20Rule%20-%20Management%20Proposals%20-%2016oct18.pdf.

WRRB determinations are final but recommendations made by the Board may be accepted, rejected or varied by the Party with the jurisdiction affected by the recommendation. However, once a recommendation is accepted, that Party doing so must implement it *"to the extent of its power under legislation"*.[20] This framework and these relationships are central to effective wildlife management in Wek'èezhìı.

Following submission of its recommendations to a Party, the Board expects a response within 42 days of receipt of its recommendations for a Level 1 or Level 2 management proposal. Section 12.5.11 of the Tłı̨chǫ Agreement states that *"each Party with power under its laws to implement a recommendation of the WRRB made under 12.5.5, 12.5.6, 12.5.7, 13.4.1 or 14.4.1 shall accept, reject or vary such recommendation"*. A Party must tell the Board whether its recommendation has been accepted. If a recommendation is varied, the Party must provide reasons for that decision, and, in addition, provide the change in wording so that the Board and all affected persons are clear about the final outcomes of the Board proceeding and necessary implementation actions. This ensures clarity with respect to the obligations under Section 12.5.12 of the Tłı̨chǫ Agreement, that *"each Party shall, to the extent of its power under legislation or Tłı̨chǫ laws, establish or otherwise implement a) a determination of the WRRB under 12.5.5 or 12.5.6; and b) any recommendation of the Board as accepted or varied by it".*

If a recommendation is rejected, the Party must provide specific reasons and an explanation of why the rejection has occurred.

4.0. Previous WRRB Ɂekwǫ̀ Determinations & Recommendations

The objective of Chapter 12, Wildlife Harvesting Management, of the *Tłı̨chǫ Agreement* is to recognize the importance of wildlife and its habitat to the Tłı̨chǫ First nation well-being, way of life and land-based economy.[21] The WRRB takes this objective seriously while making its decisions. The Board also acknowledges the tremendous importance that Kǫ̀k'èetì ekwǫ̀ play in the language, culture, and way of life of the Tłı̨chǫ people. The Board has kept this in mind over the last 14 years, since receiving the first management proposal for Kǫ̀k'èetì ekwǫ̀, by making determinations and recommendations using scientific and Tłı̨chǫ knowledge. Outlined below are the Board's determinations and recommendations from the 2007, 2010, and 2016 proceedings to demonstrate the effort the WRRB has put in to halt the decline of Kǫ̀k'èetì ekwǫ̀.

[20] See Sections 12.5.11 and 12.5.12 of the Tłı̨chǫ Agreement.
[21] See Section 12.1.1 of the Tłı̨chǫ Agreement.

4.1. 2007 Proceeding

In June 2006, GNWT conducted a calving ground photographic survey and estimated the Kǫ̀k’èetì ekwǫ̀ herd size was about 128,047 ʔekwǫ̀. The WRRB became fully operational in August 2006 and received its first management proposal, entitled *“Bathurst Caribou Herd Harvest Reductions”* from the GNWT on December 14, 2006 to reduce Kǫ̀k’èetì ekwǫ̀ herd harvest levels. The proposed management actions, based on the 2006 calving ground photographic survey results, were intended to limit the harvest to 4% of the 2006 estimated herd size for a total of 5120 Kǫ̀k’èetì ekwǫ̀. This included eliminating all commercial meat tags held by Tłı̨chǫ communities, reducing the number of tags for non-resident and non-resident alien hunters from 2 to 1, and reducing tags for all outfitters from 1559 to a total of 350.

Due to the significance of the management actions proposed, and the fact that the WRRB, as a new organization, had not yet heard from other Parties affected by the Department of Environment and Natural Resources (ENR), GNWT proposal, the Board decided to conduct a public hearing in March 2007 before making any decisions on the proposal. The WRRB held the public hearing on March 13-14, 2007 in Behchokǫ̀, NT. Once the evidentiary phase of the proceeding was completed, the Board decided to adjourn the proceeding in order to give ENR and the Tłı̨chǫ Government time to initiate a consultation process.

On April 17, 2007, the Minister of ENR advised the Tłı̨chǫ Government and the WRRB that the Big Game Hunting Regulations had been amended to reduce the number of tags available for outfitted hunts for ʔekwǫ̀ in Unit “R” to 750 for the 2007 season. The letter noted that this decision was made under the authority of Section 12.5.14 of the Tłı̨chǫ Agreement as ENR considered its action necessary due to an emergency situation regarding declining populations of the ʔekwǫ̀.

On May 30, 2007 and June 4, 2007 respectively, the Tłı̨chǫ Government and ENR submitted letters to the Board indicating that they were making substantial progress but required an extension to September 28, 2007 in order to develop a new joint ʔekwǫ̀ management proposal. The WRRB was concerned that any further adjournments could adversely affect the interests of other Parties affected by the proposal. ENR had already taken steps to implement portions of its proposal on the grounds that an emergency situation existed. Further extension of the proceeding to accommodate consultation which, in the Board’s view should have taken place before the proposal was advanced, seemed inconsistent with the urgency asserted by ENR. For these reasons, the WRRB decided not to grant a further adjournment of its proceeding.

Based on the WRRB’s review of the evidence presented during the proceedings, the Board recommended that ENR’s proposal to undertake management actions to reduce the harvest of the Bathurst ʔekwǫ̀ herd not be implemented as submitted. The WRRB strongly encouraged ENR and the Tłįchǫ Government to continue their consultations towards the development of a Joint Proposal for the management of the Bathurst ʔekwǫ̀ herd. Additionally, the WRRB indicated that any future management actions that propose to limit any component of the harvest to a particular number, including zero, would be treated as a proposal for the establishment of a TAH.

Additional details of the 2007 proceeding can be found in Appendix B.

4.2. 2010 Proceeding

In June 2009, GNWT conducted a calving ground photographic survey and estimated the Kǫ̀k'èetì ekwǫ̀ herd size was about 31,900 ʔekwǫ̀. On November 5, 2009, TG and GNWT submitted a *Joint Proposal on Caribou Management Actions in Wek'èezhìı*, which proposed nine management actions and eleven monitoring actions, including harvest limitations, for the Kǫ̀k'èetì, Sahtì and Beverly/Ahiak ekwǫ̀ herds. While TG and GNWT agreed on the majority of actions set out in the proposal, there was no agreement reached on the proposed levels of Indigenous harvesting.

Upon review of the proposal, the WRRB held that any restriction of harvest or component of harvest to a specific number of animals would constitute a TAH. Thus, the Board ruled that it was required to hold a public hearing. Registered Parties were notified on November 30, 2009 of the Board's decision to limit the scope of the public hearing to Actions 1 through 5 of the Joint Proposal, which prescribed limitations on harvesting. All other proposed actions were addressed through written submissions to the Board. Originally scheduled for January 11-13, 2010, the public hearing on Action 1 to 5 took place March 22-26, 2010 in Behchokǫ̀, NT. Once the evidentiary phase of the proceeding was completed, TG requested the WRRB adjourn the hearing in order to give TG and GNWT time to work collaboratively to complete the joint management proposal.

On May 31, 2010, TG and GNWT submitted the *Revised Joint Proposal on Caribou Management Actions in Wek'èezhìı*. This revised proposal changed the original management and monitoring actions and incorporated an adaptive co-management framework and rules-based approach to harvesting levels. TG and GNWT were able to reach an agreement on Indigenous harvesting. Therefore, the WRRB reconvened its public hearing on August 5-6, 2010 in Behchokǫ̀, NT, where final presentations, questions and closing arguments were made.

On October 8, 2010, the WRRB submitted its final recommendations and reasons for decision report to TG and GNWT.[22] Many of the recommendations were related to the Kǫ̀k'èetì ekwǫ̀ herd and relevant management actions vital for herd recovery, including harvest restrictions. The Board also made harvest recommendations for the Sahtì ekwǫ̀ and Beverly/Ahiak ekwǫ̀ herds.

The Board recommended a harvest target of 300 (± 10%) Kǫ̀k'èetì ekwǫ̀ per year for harvest seasons 2010/11, 2011/12, and 2012/13 in Wek'èezhìı. Further, the Board recommended that the ratio of bulls harvested to cows should be 85:15. Although the evidence suggested that even if all harvest of the Kǫ̀k'èetì ekwǫ̀ herd stopped there was no guarantee that the herd would stabilize and begin to grow, the Board concluded that a limited harvest of 270-330 Kǫ̀k'èetì ekwǫ̀ with 60 or fewer cows was an appropriate management option to help Indigenous peoples maintain important cultural linkages with ʔekwǫ̀ while minimizing the impact of harvest on the herd. Additionally, the WRRB recommended that all commercial, outfitted and resident harvesting of the Sahtì ekwǫ̀ herd in Wek'èezhìı be set to zero.

The WRRB made additional ʔekwǫ̀ management and monitoring recommendations to TG and GNWT, specifically implementation of detailed scientific and Tłı̨chǫ knowledge (TK) monitoring actions and implementation of an adaptive co-management framework.

The WRRB also recommended to the Minister of CIRNAC (formerly Indian and Northern Affairs Canada) and GNWT to collaboratively develop best practices for mitigating effects on ʔekwǫ̀ during calving and post-calving, including the consideration of implementing mobile ʔekwǫ̀ protection measures, and for monitoring landscape changes, including fires, industrial exploration, and development, to assess potential impacts to ʔekwǫ̀ habitat.

The Board recommended that the harvest of dìga should be increased through incentives but that focused dìga control not be implemented. The Board understood if TG and GNWT were to plan for focused dìga control in the future, a management proposal would be required for WRRB consideration.

Of the 57 recommendations made in 2010 and accepted or varied by TG and GNWT, the Board has evidence that only 18 have been fully implemented. Specifically, the closure of commercial, outfitted and resident harvesting for the Kǫ̀k'èetì, Sahtì and Beverly/Ahiak ʔekwǫ̀ herds; the establishment and allocation of a harvest target for the Kǫ̀k'èetì ekwǫ̀ herd; the implementation of monitoring the density of cows on the calving grounds; the development and implementation of a scientific conservation education program; the establishment of the Barren-ground Caribou Technical Working Group

[22] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.

(BGCTWG); the ongoing discussions with the Government of Nunavut (GN) to identify opportunities for calving ground protection; the collaborative work to meet the obligations of Section 12.11 of the Tłı̨chǫ Agreement; the hiring of a TG Wildlife Coordinator to increase capacity to ensure full participation in monitoring and management of ɂekwǫ̀; the removal of GNWT's Emergency Interim Measures following the implementation of recommendations by January 1, 2011; the consultation with Tłı̨chǫ communities about Board recommendations prior to January 1, 2011; the development of a detailed implementation and consultation plan; and the development and implementation of an effective enforcement and compliance program.

Implementation of the remaining accepted recommendations appears to the WRRB to be incomplete, including the development of a government position regarding reinstatement of outfitting and resident harvesting in Wek'èezhìı; the negotiation of harvesting overlap agreements with the Sahtú and Nunavut; the implementation of the *Special Project, Using Tłı̨chǫ Knowledge to Monitor Barren Ground Caribou* of the overall Tłı̨chǫ Research and Monitoring Program; the implementation of TK and scientific ɂekwǫ̀ monitoring actions; the development of criteria to evaluate when management actions are to be revised; and the development of a land use plan for Wek'èezhìı.

Additional details of the 2010 proceeding can be found in Appendix C and a review of the 2010 WRRB Recommendations is found in Appendix D.

4.3. 2016 Proceeding

In June 2015, GNWT conducted a calving ground photographic survey and estimated the Kǫ̀k'èetì ekwǫ̀ herd had declined to 19,769 ɂekwǫ̀. In December 2015, TG and GNWT submitted the *Joint Proposal on Caribou Management Actions for the Bathurst Herd: 2016-2019* to the Board outlining proposed management actions for the Kǫ̀k'èetì ekwǫ̀ herd in Wek'èezhìı, including new restrictions on hunter harvest, predator management, and ongoing monitoring. More specifically, TG and GNWT proposed implementing a herd wide TAH of zero ɂekwǫ̀ and conducting a feasibility assessment of a full range of dìga management actions. The WRRB considered the proposed restriction of harvest as the establishment of a TAH and, therefore, was required to hold a public hearing. The public hearing took place February 23-24, in Yellowknife, NT.

In order to allow careful consideration of all the evidence on the record and to meet deadlines for legislation to implement a Board decision, the WRRB decided to prepare two separate reports to respond to the proposed management actions in the joint management proposal. The first report, Part A, dealt with the proposed harvest management actions that required regulation changes in order for new regulations to be in place for the start of the 2016/17 harvest season, as well as the proposed dìga feasibility assessment. The second report, Part B, dealt with additional predator management actions, biological and environmental monitoring, and cumulative effects.

On May 26, 2016, the WRRB submitted its final determinations and recommendations and Part A Reasons for Decision Report to TG and GNWT.[23] The WRRB determined that a TAH of zero ʔekwǫ̀ should be implemented for all users of the Kǫ̀k'èetì ekwǫ̀ herd within Wek'èezhìı for the 2016/17, 2017/18, 2018/19 harvest seasons.

The Board recommended that TG and GNWT agree on an approach for designating zones for aerial and ground-based surveillance throughout the fall and winter harvest seasons from 2016 to 2019. Additionally, the WRRB recommended weekly communication updates and timely implementation of hunter education programs for all harvesters of the Kǫ̀k'èetì ekwǫ̀ herd.

The WRRB recommended that the dìga feasibility assessment set out in the proposal be led by the Board with input and support from TG and GNWT. The Board continued to support the implementation of the Community-based Dìga Harvesting Project as a training program, subject to several conditions

On September 27, 2016, the WRRB submitted its final recommendations and Part B Reasons for Decision Report to TG and GNWT.[24] The WRRB recommended consultations with Tłı̨chǫ communities to determine a path forward for implementation of Tłı̨chǫ laws to continue the Tłı̨chǫ way of life and maintain their cultural and spiritual connection with ʔekwǫ̀.

In addition, the WRRB recommended several TK research and monitoring programs focusing on dìga, *Sahcho* (grizzly bear), stress and other impacts on ʔekwǫ̀ from collars and aircraft over-flights, and an assessment of quality and quantity of both summer and winter forage.

The Board recommended a biological assessment of sahcho as well as requesting that the BGCTWG prioritize biological monitoring indicators and develop thresholds under which management actions can be taken and evaluated. All scientific and TK monitoring data will be provided to BGCTWG annually to ensure ongoing adaptive management.

The WRRB recommended the implementation of Tłı̨chǫ Land Use Plan Directives as well as completing a Land Use Plan for the remainder of Wek'èezhìı. In addition, the completion of the Bathurst Caribou Range Plan and the long-term Bathurst Caribou

[23] PR (BATH 2019): 040 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A.
[24] PR (BATH 2019): 041 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.

Management Plan were requested with measures to be implemented in the interim to provide guidance to users and managers of the Kǫ̀k'èetì ekwǫ̀ herd range.

The Board also recommended the development of criteria to protect key ɂekwǫ̀ habitat, including *Nǫɂokè* (water crossings) and *Tataa* (corridors between bodies of water), using the Conservation Area approach in the NWT's *Wildlife Act*, offsets and value-at risks in a fire management plan. Additionally, the WRRB recommended the continued refinement of the Inventory of Landscape Change, the integration of Wildlife and Wildlife Habitat Protection Plans and Wildlife Effects Monitoring Programs objectives for monitoring the effects of development on ɂekwǫ̀ in Wek'èezhìı, and the development of monitoring thresholds for climate indicators

Of the one determination made by the Board and 25 recommendations accepted or varied by TG and GNWT, only the determination and seven recommendations have been fully implemented. Specifically, the establishment of a zero harvest for the Kǫ̀k'èetì ekwǫ̀ herd; the establishment and implementation of the Mobile Core Bathurst Caribou Conservation Area (MCBCCA); the regular provision of updates on aerial and ground-based compliance surveillance of the Kǫ̀k'èetì ekwǫ̀ herd; the implementation of the GNWT's Hunter Education Program; the completion of a collaborative feasibility assessment of options for dìga management; the completion of the Bathurst Caribou Range Plan (BCRP); the update and refinement of the Inventory of Landscape Change; and, the completion and implementation of the Wildlife Management and Monitoring Plan guidelines.

The remaining accepted recommendations appear to the Board to be incomplete, including providing regular harvest updates; conducting TK research on sahcho predation on ɂekwǫ̀, and their relationship with ɂekwǫ̀, other wildlife and people; conducting a collaborative sahcho biological assessment; conducting TK research about stress and impacts on ɂekwǫ̀ and people related to collars and aircraft over-flights; prioritizing biological monitoring indicators in order of need for effective management and developing thresholds under which management actions can be taken and evaluated; developing a land use plan for Wek'èezhìı; investigating the potential use of offsets for ɂekwǫ̀ recovery; conducting a TK monitoring project with elders to document how climate conditions have affected preferred summer forage and impacted ɂekwǫ́ fitness; and developing monitoring thresholds for climate indicators.

Additional details of the 2016 proceeding can be found in Appendix E and a review of the 2010 WRRB Recommendations are in Appendix F.

5.0. Summary of 2019 Wildlife Management Proposal and Board Process

On January 22, 2019, the TG and GNWT submitted the *"Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021"* to the Board outlining proposed management actions for the Kǫk'èetì ekwǫ̀ herd in Wek'èezhìı.[25] The management actions proposed by TG and GNWT in the Joint Proposal were grouped under the five categories: harvest, predators, habitat and land use, and education as well as research and monitoring.

More specifically, TG and GNWT proposed the following:

- Harvest: maintaining a TAH of zero (0) for Kǫk'èetì ekwǫ̀; continuing use of the MCBCCA; continuing regular aerial and ground-based surveillance of the MCBCCA through the fall and winter seasons; maintaining frequent contact with Government of Nunavut regarding harvest of Kǫ̀k'èetì ekwǫ̀ in Nunavut;
- Predators: submitting a separate TG-GNWT joint management proposal on reduction of *dìga* numbers on the Sahtì and Kǫ̀k'èetì ekwǫ̀ herd ranges; increasing incentives for dìga harvesters in an area centered on the collar locations of wintering Kǫ̀k'èetì ekwǫ̀; continuing to develop a program to train dìga harvesters using culturally acceptable methods on the winter range; collaborating with GN about predator management;
- Habitat & Land Use: finalizing, endorsing and implementing the Bathurst Caribou Range Plan (BCRP) by 2019; supporting Indigenous governments and organizations to conduct additional work to identify key landscape features and areas of significance to ʔekwǫ̀ in order to better conserve and manage ʔekwǫ̀ habitats;
- Education: increasing education and public awareness to improve knowledge of ʔekwǫ̀, promoting respectful hunting practices to reduce wastage and wounding; expanding TG on-the-land programs focused on continued use and maintenance of traditional sites and trails; and,
- Research & Monitoring: increasing biological monitoring of the Kǫ̀k'èetì ekwǫ̀ herd, including conducting population surveys carried out at two-year intervals, increasing radio collars to 70, suspending June calving reconnaissance surveys in years between photo survey years, conducting annual composition surveys in June, October and March/April to assess productivity and mortality rates; continuing accurate harvest reporting and improving body condition assessment of harvested ʔekwǫ̀; supporting the expansion of the Tłı̨chǫ Ekwǫ̀ Nàxoède K'è (formerly the Boots on the Ground) program; supporting continued research into factors contributing to ʔekwǫ̀ declines.

[25] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

The Board initiated its 2019 Bathurst Caribou Herd Proceeding on January 30, 2019 and established an online public registry: http://www.wrrb.ca/public-information/public-registry. On February 4, 2019, public notice of the WRRB decision to open a proceeding for the Kǫk'èetì ekwǫ̀ herd was provided to potentially interested organizations in and out of Wek'èezhìı via email, WRRB website, social media and radio. The WRRB requested parties to provide written comments on the Joint Management Proposal by March 15, 2019.

The Board received a letter from the Minister of ENR on February 26, 2019, which requested parties on the distribution list to provide written comments on the Joint Management Proposal by April 5, 2019. As such, on March 4, 2019, the WRRB gave notice of its revised proceeding schedule, extending its public comment period to April 5, 2019. The Board received public comment from Canadian Arctic Resources Committee (CARC) on January 29, 2019, Alternatives North on February 27, 2019 and the Łutsel K'e Dene First Nation (LKDFN) on April 5, 2019.

On March 14, 2019, a letter was sent to the Nunavut Wildlife Management Board (NWMB) informing them of the WRRB's Kǫ̀k'èetì ekwǫ̀ proceeding. Sine the Kǫ̀k'èetì ekwǫ̀ herd is a migratory species that moves between the Northwest Territories and Nunavut, the WRRB is requested that the NWMB identify whether further consultation by the Board was required prior to a final decision on TG and GNWT's joint management proposal. Additionally, the NWMB was requested to update the WRRB on any processes related to the Kǫ̀k'èetì ekwǫ̀ herd that were underway in Nunavut. To date, no response has been received.

The proceeding was conducted in accordance with the WRRB's *Rules of Procedure, June 14, 2017*.[26] The Board requested that GNWT provide a compilation of any comments received through its consultations by April 10, 2019. The GNWT confirmed that no comments were received in response to their consultation letter on April 12, 2019. As such, the public record was closed on April 12, 2019.

Throughout the proceeding, GNWT assured the WRRB that submission of the 2018 Bathurst Caribou Calving Ground Survey Report was imminent. Unfortunately, as of June 7, 2019, the report was not available from the GNWT; therefore the WRRB adjourned the 2019 Bathurst Caribou Herd Proceeding until July 19, 2019 to allow GNWT the time necessary to complete and provide the 2018 Bathurst Caribou Calving Ground Survey Report. The report was provided to the WRRB on July 17, 2019.

[26] https://wrrb.ca/sites/default/files/WRRB%20Rules%20of%20Procedure%2014jun2017_1.pdf.

The Board reopened the record in this proceeding to post the 2018 Bathurst Calving Ground Survey Report as well as additional documents to the registry to assist with the completion of the final Reasons for Decision Report.

The public record was closed again on September 3, 2019 and the WRRB's deliberations followed.

6.0. Is there a Conservation Concern for the Kǫk'èetì Ekwǫ̀ Herd?

Based on the WRRB's review of Sections 12.6.1 and 12.6.2 of the Tłı̨chǫ Agreement, the first question which must be answered is whether there is a conservation concern with respect to the Kǫk'èetì ekwǫ̀ herd. If the WRRB is not convinced that there is a Kǫk'èetì ekwǫ̀ management problem, it does not have the authority to recommend harvest limitations on Tłı̨chǫ citizens.

During its 2016 Kǫk'èetì ekwǫ̀ proceeding, the Board repeatedly heard from governments, communities and members of the public of their concerns over the continued decrease of the Kǫk'èetì ekwǫ̀ herd, including recognition of the rapid rate of the decline. Vital rates associated with the herd, including the cow survival rate, calf recruitment, and pregnancy rate, all indicated that the herd would likely continue to decline. Despite the uncertainty, GNWT noted that to facilitate herd recovery and to once again provide harvesting opportunities for traditional users, that *"timely conservation-based management actions are needed"*.[27] Additionally, TG stated that *"in a time of crisis for caribou – closure of Aboriginal harvesting of caribou … are difficult but necessary actions"*.[28]

Despite all of the management actions taken over the past 12 years, the Kǫk'èetì ekwǫ̀ herd is still declining, and recovery of the herd remains uncertain. Additionally, in 2016, the Committee on the Status of Endangered Wildlife in Canada assessed ʔekwǫ̀ as Threatened. The status of ʔekwǫ̀ under federal Species at Risk legislation is currently under review. Within the NWT, ʔekwǫ̀ were assessed by the Species at Risk Committee as Threatened in 2017 and were later listed as Threatened under the NWT *Species at Risk Act* in 2018.[29] A draft ʔekwǫ̀ recovery strategy is currently undergoing public review.

The Board also notes that there is no current management or action plan for the Kǫk'èetì ekwǫ̀ herd. The Bathurst Caribou Advisory Committee (BCAC) was established in 2016 to advise on the management of the Kǫk'èetì ekwǫ̀ herd and its habitat,

[27] PR (BATH 2019): 040 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A.
[28] Ibid.
[29] https://www.nwtspeciesatrisk.ca/species/barren-ground-caribou.

including addressing and reconciling the various factors affecting the herd, including harvest, predation, environmental conditions, and land disturbance. In May 2019, the BCAC hired a technical writer to prepare a management plan as well as an action plan to implement the actions outlined in the management plan. At this time, a draft is not yet available.

The Kǫk'èetì ekwǫ̀ herd continues to decline at a rapid rate. Ɂekwǫ̀ have been both nationally and territorially assessed as threatened as well as listed as threatened in the Northwest Territories. Currently, there are no recovery documents available nor any management or action plans in place. Therefore, the WRRB continues to believe that there is a serious conservation concern for the Kǫk'èetì ekwǫ̀ herd.

7.0. WRRB's Recommendations

7.1. Introduction

The WRRB is highly concerned about the need for effective and timely actions and this was a substantial consideration in the development of the determinations and recommendations outlined in this report.

Consistent with the requirements of the Tłįchǫ Agreement, the WRRB is taking a precautionary approach[30] as well as learning from the experience of the 2016 TAH, which did not on its own achieve the objective of halting the decline. Reducing harvest and predation are the two management actions that most directly and immediately affect ɂekwǫ̀ survival rates.

While the WRRB was previously most concerned about harvest and predation reducing Kǫk'èetì ekwǫ̀ survival, the Board is now also concerned with the need for a precautionary approach to management given that the rapid decline has partly been caused by the emigration of cows abandoning their traditional Kǫk'èetì ekwǫ̀ calving ground. The Board also recognizes the importance of a healthy habitat, efficient and effective monitoring that can rapidly inform management decisions (adaptive management), and the support and understanding of an informed public. Therefore, in addition to the urgency of actions to halt the decline, the WRRB has recommendations on habitat, adaptive management, and education. In particular, the WRRB is concerned that the need to protect calving cows and newborn calves is more essential than ever.

[30] Section 12.1.5(c) of the Tłįchǫ Agreement.

7.2. Harvest & Harvest Monitoring

7.2.1. Introduction

A TAH is defined in the Tłı̨chǫ Agreement, *"in relation to a population or stock of wildlife, the total amount of that population or stock that may be harvested annually". S*ection 12.5.5(a)(i) of the Tłı̨chǫ Agreement sets out that the WRRB has sole responsibility for making a final determination with respect to a TAH for Wek'èezhìı.[31]

In 2016, the Board had determined that the seriousness of the Kǫk'èetì ekwǫ̀ herd's decline warranted a TAH of zero in Wek'èezhìı for the 2016/17, 2017/18, and 2018/19 harvest seasons despite the difficulties this was sure to cause for people. However, the zero TAH has not been accompanied by a halt in the decline and, in 2019, TG and GNWT proposed continuing the zero harvest of Kǫk'èetì ekwǫ̀. A difficulty in enforcing the harvest restriction is that, in some winters, ʔekwǫ̀ from neighboring herds may overlap with the Kǫk'èetì ekwǫ̀ herd. GNWT and TG proposed in 2016 and again in 2019 that a core mobile zone was the most effective way to differentiate between ʔekwǫ̀ herds when their winter distribution overlapped.

7.2.2. Proponent's Evidence

The Joint Proposal compared the 2015 and 2018 estimates of herd size based on calving ground aerial photographic surveys to report an accelerated decline in the Kǫk'èetì ekwǫ̀ herd size. The herd has declined by half from 19,769 in 2015 to 8,207 in 2018. Therefore, the rate of decline from 2015 to 2018 is approximately 29% a year.[32] Given the current herd size and rate of decline, TG and GNWT proposed to maintain the zero TAH and to rely on the MCBCCA.

TG and GNWT outlined in the Joint Proposal that currently, adaptive management is used in managing the MCBCCA. Established in 2011, the Barren-ground Caribou Technical Working Group (BGCTWG), which reviews annual biological monitoring information, is composed of representatives from TG, GNWT and the WRRB.[33] The BGCTWG is responsible for managing the MCBCCA, including developing and implementing the *"Rules for Definition of the Mobile Core Bathurst Caribou Conservation Area"* The Rule includes specific thresholds where changes to the MCBCCA are made, and the rule is updated annually. The current rule, revised in November 2018, recommends that 40 or more collars should be placed on the Kǫk'èetì

[31] Section 12.5.5(a)(i) of the Tłı̨chǫ Agreement.
[32] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[33] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.

ekwǫ̀ herd to define its distribution for purposes of the mobile zone and that TG and GNWT should jointly evaluate effectiveness of the Mobile Core Area in 2019.[34]

The Joint Proposal states that *"the current small and declining number of mature ʔekwǫ̀ in the Bathurst herd is a critical conservation status that requires implementation of an integrated suite of recovery management actions that continue and support the Total Allowable Harvest (TAH) of zero (0) established in 2016 (Determination #1-2016 in WRRB 2016a) along with enhanced monitoring."*[35]

The Joint Proposal lists that the key population processes in the Kǫk'èetì ekwǫ̀ herd that have likely contributed to its continued rapid decline are:

1) relatively low rates of survival (i.e. high rates of mortality) in adult female ʔekwǫ̀; and
2) low and variable rates of productivity that generally reflect a combination of low fecundity and poor calf survival rates (i.e. calf recruitment).[36]

The Joint Proposal also mentions as a third factor the emigration of cows from the Kǫk'èetì ekwǫ̀ calving ground.

TG and GNWT recommend that the TAH for the Kǫk'èetì ekwǫ̀ herd remain at zero in the Northwest Territories, and be reviewed within two years, following completion of the next Kǫk'èetì ekwǫ̀ herd calving ground survey and analyses of available demographic data (as per WRRB Determination #1-2016; WRRB 2016a).

TG and GNWT recommend the continuation of the MCBCCA as the means for managing and implementing the TAH of zero for the Kǫk'èetì ekwǫ̀ herd.

7.2.3. Other Parties' Evidence

Alternatives North stated that they couldn't find evidence that the TAH of the Kǫ̀k'èetì ekwǫ̀ herd is zero.[37] They noted that there is no assessment for the accuracy of reporting numbers in sex and composition of harvested Sahtì ekwǫ̀ from the overlapping range; as such, it is most likely that Kǫ̀k'èetì ekwǫ̀ are getting harvested as well.[38]

> *"Given the state of the Bathurst Herd, we ask the Board to ensure much more clarity and certainty that harvest of these animals is actually zero, or what the*

[34] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021. Appendix A.
[35] Ibid.
[36] Ibid.
[37] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[38] Ibid.

sex, age and size of the unintended harvest is. These numbers should be compiled and publicly reported."[39]

CARC believes that reliance upon the untested MCBCCA as a method to control harvest is ineffective. CARC identified the vulnerability to errors due to the proponent's identification of *"few Bathurst or Bluenose-East caribou were taken"*.[40]

LKDFN does not believe subsistence harvesting is the cause of the rapid decline, as the harvest restrictions were put in place almost 10 years ago and the decline of the Kǫk'èetì ekwǫ̀ herd is still increasing.[41] LKDFN stated that GNWT does not report the effectiveness of the zero TAH or the MCBCCA.[42] LKDFN requests that this information become available in order to ascertain the effectiveness. Based on information from LKDFN environmental monitor reports from early March 2019, Kǫ̀k'èetì ekwǫ̀ were being killed on the boundary of the MCBCCA and the ice road.[43] This creates issues as the GNWT can't check carcasses of already deceased animals and cannot stop people from using the ice road. LKDFN would like to see the TAH of zero continue to be enforced for the next two years and carried over across the border into Nunavut as well.[44]

7.2.4. Analysis and Recommendation

The evidence available to the Board is that the decline of the Kǫk'èetì ekwǫ̀ herd has accelerated since 2015 and that the underlying mechanisms have changed and become more complex. The evidence for the decreasing trend in herd size is from population estimates from aerial photographic and visual surveys over the Kǫk'èetì ekwǫ̀ herd's calving grounds in 2015 and 2018.[45] The Board finds that the survey methods and analyses for estimated herd size are clear and consistent with previous surveys.

The 2018 calving ground survey report concluded that adult cow survival was low, and that productivity was low and annually variable.[46] However, the 2019 Joint Proposal only used information up to 2015.[47] More recent information and analyses became

[39] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[40] PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.
[41] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] PR (BATH 2019): 020 – An Estimate of Breeding Females and Analyses of Demographics for the Bluenose-East Herd of Barren-ground caribou: 2015 Calving Ground Photographic Survey; and PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[46] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[47] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

available in July 2019 as part of the June 2018 calving ground survey report which showed that survival rates for adult cows have increased since 2015.[48] As illustrated in Figure 3 for 2015-2018, adult cow survival averages 85% a year which is close to the 88% required for a stable herd when productivity (pregnancy rate and calf survival) is 0.31 (the average for 2015-2017).[49] The WRRB notes that adult cow survival has improved since 2015 and the season of mortality has shifted from the summer to the winter (Figure 4).

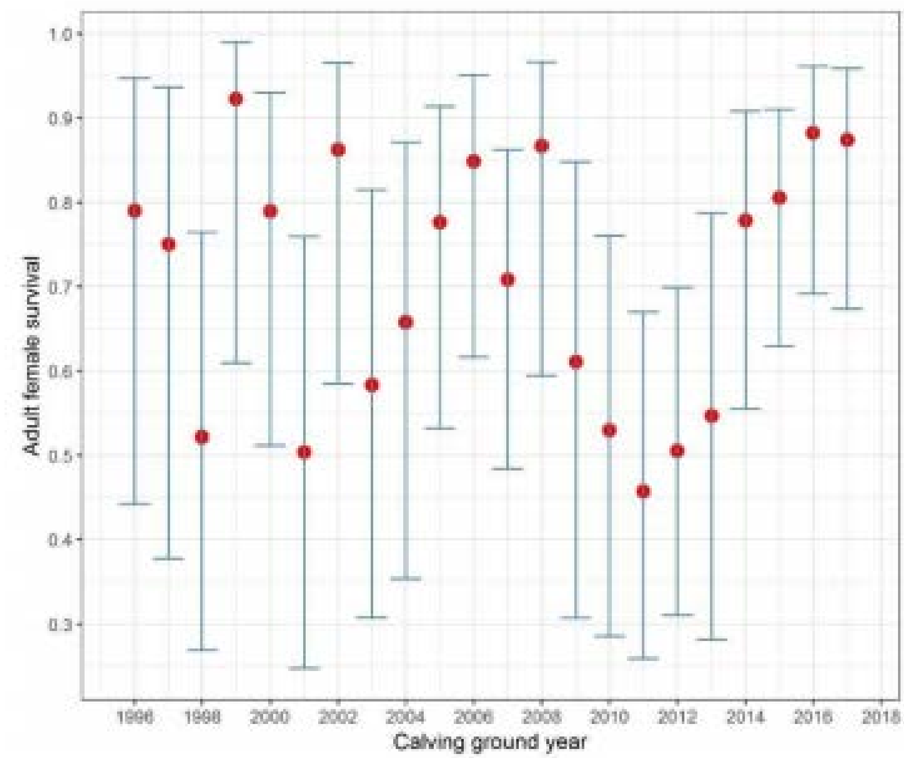


Figure 3. Annual Survival rate estimates 1996-2018 for Kǫk'èetì Ekwǫ̀ adult females based on collared female ʔekwǫ̀.[50]

[48] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[49] Ibid.
[50] Ibid.

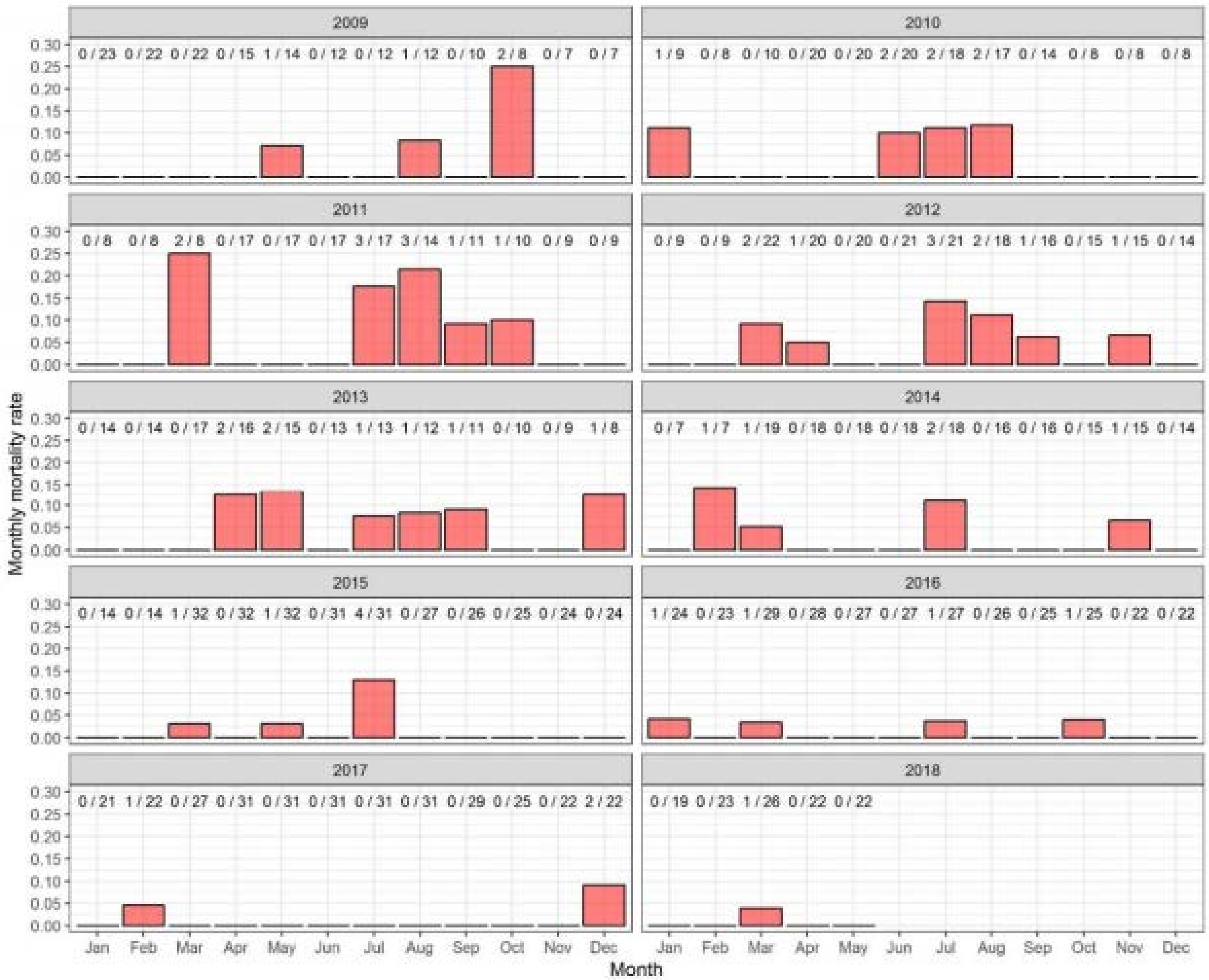


Figure 4. Summary of monthly collared cow mortality data for Kǫk'èetì Ekwǫ̀ 2009-2018.[51]

In summary, while adult cow survival has increased since 2015, the Joint Proposal indicates that fecundity (percentage of breeding aged cows that calve) and calf survival are still less than that needed for recovery of the herd.[52] In addition, emigration has become a factor in the accelerated decline. Although the Joint Proposal acknowledged a role for emigration, analyses were not included but became available in July 2019.[53]

In June 2018, the Kǫk'èetì ekwǫ̀ calving ground, for the first recorded time since about 1990, had low densities on either side of Bathurst Inlet. 2018 was also the first year that

[51] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[52] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[53] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.

3 of the 11 collared cows, identified as Kǫk'èetì ekwǫ̀ cows based on their 2017 calving location, moved to the neighboring Beverly/Ahiak's calving ground.[54] Subsequently, one of these cows died in July and the other two cows stayed with the Beverly/Ahiak herd. In June 2019, three different cows (of 17 cows collared) with previous calving locations on the Kǫk'èetì ekwǫ̀ calving ground moved to and calved on the Beverly/Ahiak herd's calving ground.[55]

GNWT used both computer modelling and field data to report on how the aforementioned emigration may represent almost a third of the breeding cows in 2018 emigrating to the Beverly/Ahiak calving ground.[56] The Board concludes that this emigration is contributing to the rate of decline for the Kǫk'èetì ekwǫ̀ herd. The Board does question however, the harvest levels used in modelling, which are a constant rate for 2010 to 2018 of 5 cows and 70 bulls compared to 5000 cows and 2000 bulls for 2001 to 2009.[57]

The Board acknowledges the encouraging trend for 2015-2017 in increased survival of adult cows but notes that pregnancy and calf survival vary annually. Given the continued decline and very small size of the Kǫk'èetì ekwǫ̀ herd, and despite the uncertainty about under-lying causes and the implications of emigration, the Board has no evidence to revise its 2016 determination for the zero TAH.

Determination #1-2019 (Kǫk'èetì Ekwǫ̀): Total Allowable Harvest
The Board determines that a TAH of zero for all users of the Kǫk'èetì ekwǫ̀ herd for 2019/20 and 2020/21 harvest seasons. For further clarification, the absolute number of ekwǫ̀ that can be harvested from the Kǫk'èetì ekwǫ̀ herd in Wek'èezhìı is zero.

The TG and GNWT Joint Proposal did not include evidence on the effectiveness of monitoring the zero TAH. While the Joint Proposal did acknowledge that *"few Bathurst or Bluenose-East Caribou were taken (based on the locations of reported kills relative to distributions of collared ʔekwǫ̀)"*[58] but no details were provided or referenced. The Joint Proposal did not provide a summary or reference to reports about the effectiveness of community monitors, check stations, patrols or monitoring results for the MCBCCA. The Joint Proposal also did not summarize or refer to evidence about the frequency and extent of overlap in neighboring herd's wintering distribution.

[54] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[55] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[56] Ibid.
[57] Ibid.
[58] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021. Appendix A.

The Joint Proposal's lack of evidence for the effectiveness of the harvest monitoring and whether the MCBCCA reduces the risk of inadvertent harvesting creates difficulties for the WRRB. Of particular concern is that the Joint Proposal does not assess or reference assessments of the annual degree of overlap of neighboring herds during the winter, which may increase the risk of inadvertent harvest of Kǫk'èetì ekwǫ̀. The Board is aware that given the herd's current low numbers and high rate of decline, even a low number of ʔekwǫ̀ inadvertently harvested could increase risk to the Kǫk'èetì ekwǫ̀ herd. The Board also notes that LKDFN and CARC questioned the effectiveness of the MCBCCA.[59]

While the Board notes that TG and GNWT propose to evaluate the MCBCCA and to report to WRRB sometime in 2019, the Board needs to be confident that the evaluation will meet the Board's concerns. To be specific, the Board has two concerns:

I. The annual variation and any trends in the extent and definition of the overlap in the winter distribution of neighboring herds; and,
II. How the community-based harvest monitoring and check stations are integrated into describing the effectiveness of the MCBCCA.

Recommendation #1-2019 (Kǫk'èetì Ekwǫ̀): Effectiveness of Mobile Zone
To determine if the MCBCCA is functioning as intended, GNWT and TG will analyze the extent of overlap of neighboring herds during early to late winter in order to complete a quantitative assessment to evaluate the effectiveness of the MCBCCA and the risk of inadvertent harvesting of Kǫk'èetì Ekwǫ̀ and report to the WRRB with this assessment by February 1, 2020.

The uncertainty about the harvest levels and why they vary so much annually will not be solved simply by improved reporting and analyses. The reported variability also suggests that a better understanding of harvesting from the community perspective is essential. This can be achieved by an increase in community monitoring and more detailed reporting.

Harvest monitors not only provide critical information on harvest, but they are also a link between communities and responsible governments. Harvest monitors are on the front lines and can collect real-time information from harvesters on the health of the animals, and the herd. However, if ʔekwǫ̀ are abundant around the community, harvest monitors can be overworked, which can be a safety concern.

[59] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal; and PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.

Recommendation #2-2019 (Kǫk'èetì Ekwǫ̀): Community Monitors
To utilize the expertise of harvesters to monitor any inadvertent harvest of Kǫk'èetì ekwǫ̀, TG will hire up to four community monitors per community to collect and report on harvest data monthly throughout the 2019/20 and 2020/21 harvest seasons.

7.3. Predators and Emigration

7.3.1. Introduction

Ɂekwǫ̀ have always been subject to predation, but during a decline, the role of predators can become a contributing factor to the decline. While most of the attention is often focused on dìga as they follow the ɂekwǫ̀ year round, sahcho are also effective predators, especially on the calving grounds and during the summer. Nǫ̀gha and golden det'ǫcho are also predators for ɂekwǫ̀ but are rarely the focus of wildlife management. Predation of ɂekwǫ̀ has been a recurring theme in the Board's proceedings since 2010 as elders, managers, and the public have sometimes held divergent views on managing predation.

In addition to the problems posed by predation, emigration of caribou to neighbouring herds is a new and compounding factor. The TG and GNWT Joint Proposal outlines that Kǫk'èetì ekwǫ̀ emigration to neighboring herd's calving grounds started in 2018 after the herds had shared their winter range.[60] Just over a quarter of the collared cows emigrated in 2018, and then again in 2019, which suggests that emigration is a factor in the accelerated rate of decline and also, likely a consequence of the severity of the decline itself.[61] Typically, cows calve together on the traditional calving ground because there is protection from predators by being together; strength in numbers. For the Kǫk'èetì ekwǫ̀ herd, the number of cows on the calving ground is now so reduced that it is feasible to think that some cows are seeking this protection by moving to neighboring herd's calving grounds. It is worth remembering that in 2010 and 2016 hearings, emigration was discussed at length.

In May 2010, TG and GNWT recommended a targeted increase in dìga removal from about 40 dìga to 80-100 a year using a phased approach. This included increased hunting and trapping effort, and a wolf removal program if harvesting did not meet the annual dìga harvest targets and the Kǫk'èetì ekwǫ̀ herd continued to decline.[62] The removal program was to be focused at den sites and on the winter range, and included developing survey and monitoring methodology as well as experimental design for

[60] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[61] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[62] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.

removal of dìga on the winter range and at den sites by fall 2010.[63] The WRRB recommended the training and incentives for the harvesting but not the targeted removals.

During the 2016 public hearings, the public expressed frustration over the failure to manage predation while harvest was so strictly restricted.[64] The Board supported community-based dìga harvesting as a training program.[65] By November 2017, as a collaborative effort, a technical feasibility assessment for dìga management options was completed and made available to the public through WRRB's web site.[66]

7.3.2. Proponent's Evidence

The Joint Proposal suggests that the accelerated decline of the Kǫk'èetì ekwǫ̀ herd, despite the zero TAH, likely reflects predation reducing calf and adult survival.[67] However, evidence of this in the 2019 Joint Proposal is limited. The trend for Kǫk'èetì ekwǫ̀ numbers is based on calving ground surveys and included the 2018 data. The data for adult and calf survival in the proposal were only up to 2015 and the Board had to wait until July 2019 to see the most recent data and analysis.

The 2019 Joint Proposal lists five proposed management actions for dìga:

(a) Joint dìga management proposal for Kǫk'èetì and Sahtì ekwǫ̀ ranges;
(b) Continued TG program to train dìga harvesters;
(c) Kǫk'èetì ekwǫ̀ dìga management feasibility assessment 2017;
(d) Increased GNWT incentives for dìga harvesters; and,
(e) Collaboration between NWT and NU managers about predator management.[68]

Three of these proposed actions, (b), (c) and (d) above, were carried over from 2010 and 2016. An additional proposed action is that TG and GNWT will provide a dìga management proposal in 2019 to recommend increasing the dìga harvest using more intensive dìga management techniques to a level that will influence ʔekwǫ̀ survival rates.[69] A second additional proposed action is that GNWT and TG are continuing on-

---

[63] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek'èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.
[64] PR (BATH 2019): 040 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A.
[65] Ibid.
[66] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd.
[67] Ibid.
[68] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[69] Ibid.

going discussions with Nunavut over predator management on the Kǫk'èetì ekwǫ̀ range.[70]

The Joint Proposal states that there have been a series of discussions between the GNWT and GN about the potential for collaboration centered on predator reduction on the Nunavut ranges of the Kǫk'èetì and Sahtì ekwǫ̀ herds. As the GNWT, TG, WRRB and other management organizations in the NWT have no management authority in Nunavut, potential predator management would need to consider the rights of Nunavut harvesters and Nunavut wildlife management processes.

7.3.3. Other Parties' Evidence

Alternatives North noted that one of the first considerations for intensive predator control is the assurance that TAH is at zero. The expansive range of the Kǫk'èetì ekwǫ̀ herd makes it very difficult to conduct predator controls. Alternatives North is concerned with predators multiplying if not all of the predators are harvested. They note that previous studies assessing the efficiency of predator control have been conducted on a small scale, while the area proposed to be managed to protect the Kǫk'èetì ekwǫ̀ is very large, which may cause it to be ineffective.[71]

LKDFN stated that based on their TK the dìga are not the cause of the Kǫk'èetì ekwǫ̀ herd's steep and steady decline and that dìga removal may at best slow the decline. LKDFN also requested GNWT report on the effectiveness of the dìga harvest incentive program since 2010.[72]

CARC did not raise concerns about the proposed predator control initiatives as presented in the Joint Proposal.

7.3.4. Analysis and Recommendations

The Joint Proposal stated that the cash incentives to increase dìga harvesting were ineffective.[73] However, no details were included. The role of the Tłı̨chǫ training program is not assessed. The Joint Proposal did not include evidence from dìga monitoring, and it was unclear if there was any such monitoring underway. The sighting rate of dìga and other predator observations during ʔekwǫ̀ surveys were not explained. The Joint Proposal also did not make use of the evidence in the dìga technical feasibility

[70] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[71] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[72] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.
[73] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

assessment, which identified a sharp decline in dìga abundance and productivity on the summer ranges.
The Joint Proposal did not provide any evidence beyond that provided in the 2016 hearings where the evidence clearly indicated a long-term trend of more sahcho than dìga sightings on the Kǫk'èetì ekwǫ̀ calving grounds from 2006-2015. In June 2018, the sighting of six sahcho to each dìga seen on the Kǫk'èetì ekwǫ̀ calving ground is consistent with the information presented during the 2016 hearings.[74]

The 2019 Joint Proposal did not suggest management actions for sahcho, but the 2018 calving ground survey report suggested predator studies may be undertaken.[75] In 2016, TG and Tłı̨chǫ elders referred to sahcho predation on the summer range and the Board recommended further documentation of TK and a collaborative sahcho biological assessment once the dìga technical assessment was completed.[76]

The evidence for emigration of Kǫk'èetì ekwǫ̀ collared cows and how it has added to the decline in herd size is mentioned in the Joint Proposal but was only analysed in the 2018 calving ground survey report. That report also notes that the emigration continued in June 2019.[77] The analyses are clear and thoughtful and include details of how the densities of the cows have sharply declined on the calving grounds. However, neither the Joint Proposal nor the calving ground survey report give thoughts on the implications of the emigration on management of the Kǫk'èetì or Beverly/Ahiak ekwǫ̀ herds other than that emigration may reduce the likelihood of recovery.

Increasingly, Kǫk'èetì ekwǫ̀ may be faced with a changing situation regarding predation; however, not all the required information is available for management actions by governments or the Board. First, there is a gap in understanding what the ʔekwǫ̀ decline has meant to the predators and their levels of ʔekwǫ̀ predation. It is possible that dìga predation has declined on the summer range, which is reflected by higher adult ʔekwǫ̀ survival. The reduced dìga numbers may leave sahcho predation on the calving ground and summer range proportionately more important as a factor in low calf survival.

Secondly, the 2018 calving ground survey report suggests that emigration is a significant part of the 2018 and 2019 decline.[78] This analysis is a new development in

[74] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey; and PR (BATH 2019): 041 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.
[75] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[76] PR (BATH 2019): 041 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.
[77] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[78] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.

the story of the Kǫk'èetì ekwǫ̀ and there are implications for management of the Kǫk'èetì ekwǫ̀ herd, as well as the Beverly/Ahiak herd, which has received the immigrant cows. While the 2018 calving ground survey report provides detailed evidence describing the extent of emigration in 2018 and 2019, GNWT and TG did not offer any suggestions in the Joint Proposal on how the effects of emigration could be integrated into an adaptive management process. Given the scale of emigration, the WRRB is concerned especially by the failure of the governments to offer leadership in how to address emigration.

Recommendation #3- 2019 (Kǫk'èetì Ekwǫ̀): Emigration
By December 1, 2019, in order to provide the WRRB clarity on the status of the Kǫk'èetì ekwǫ̀, GNWT and TG are to provide, in plain language, their positions regarding the implications of emigration of Kǫk'èetì ekwǫ̀ to other herds, and how this emigration will influence adaptive management.

In 2014, when GNWT terminated monitoring of dìga at their dens, the monitoring had been showing marked decreases in the number of dens occupied and in pup survival.[79] Between 2006 and 2012, a computer model suggested a 95% decline in dìga on the Kǫk'èetì ekwǫ̀ summer range.[80] The Kǫk'èetì ekwǫ̀ summer range had contracted, and the dìga struggled to find enough ʔekwǫ̀. Unfortunately, the 2015 and 2018 calving ground survey reports only listed predators seen on the calving ground. These observations were not provided, as a sighting rate, and thus trends cannot be assessed.[81] The 2019 Joint Proposal did not provide any evidence of dìga population numbers or trends in the dìga sighting rate for late winter during the ʔekwǫ̀ sex and age surveys.

> "*And so, as -- as to how -- if the wildlife -- if we're going to harvest the wolves, we -- we really need to kind of annually know exactly how many numbers that we need to harvest, how many wolves we need to harvest. And if we're harvesting wolves annually, is it -- will it show how well we know that we are helping the caribou?"*[82] (Elder Joseph Judas, 2016)

Besides not having information on trends in dìga numbers as the ʔekwǫ̀ have declined, the Board also faces uncertainty in trends of the ʔekwǫ̀ winter distribution. The Joint

79 PR (BATH 2019): 041 – Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.
80 Ibid.
81 PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey; and PR (BATH 2019): 020 – An Estimate of Breeding Females and Analyses of Demographics for the Bluenose-East Herd of Barren-ground Caribou: 2015 Calving Ground Photographic Survey.
82 PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd. Note: In 2016, Joseph Judas was a member of the Tłı̨chǫ Assembly and was not the Chair of the WRRB.

Proposal did not include or reference a report analyzing if there is a trend in overlap in the winter distribution of neighboring herds. If dìga accompany the herds to the overlap area, it is possible that dìga predation rates could increase. Additionally, it is difficult, when herds overlap, to predict how the increased dìga harvest will change adult ʔekwǫ̀ survival rates.

The trend for the decline based on the calving ground surveys is statistically robust and well- documented. The 2018 calving ground survey report included an updated analysis of adult survival which suggested that it had increased from 2015 to 2018 and had shifted from summer to winter timing of mortalities, although possible causes were not described.[83] Fall calf:cow ratios are not analysed in detail but appear relatively stable while late calf:cow ratios have higher annual variability. It is premature to relate the increase and change in timing of adult survival with a decline of dìga on the summer range, but it is a possibility.

The WRRB works within a broad ecological context and for that reason the Board is concerned about how the role of other predators may have changed as dìga populations have declined in response to the ʔekwǫ̀ decline. The role of scavengers such as nǫ̀gha will have changed, and nǫ̀gha may have become a more significant predator. Det'ǫcho are effective predators for newborn calves; as are sahcho. TK describes sahcho predation as extending outside of the calving grounds. Nǫ̀gha, sahcho and det'ǫcho are all relatively long-lived species and are opportunistic in their diet, which raises the possibility that their numbers could be slower to respond to the decline of the Kǫk'èetì ekwǫ̀ herd. The Board notes that there is a lack of information regarding nǫ̀gha, sahcho and det'ǫcho and, where information exists, it has not been compiled and shared. The Board is also conscious that as the herd has reached such low numbers, the herd trend may be more vulnerable to previously minor causes of ʔekwǫ̀ deaths.

After the Board had received the TG and GNWT Joint Proposal in January 2019, the Board was seriously concerned about the lack of progress on the role of predators relative to the ʔekwǫ̀ declines. Consequently, in February 2019, the Board reinforced the urgency and the extent of the decline of both the Kǫk'èetì and Sahtì ekwǫ̀ herds, by advancing its recommendations on predators to TG and GNWT. These recommendations and the response from TG and GNWT are included in Table 1 and Appendix G.

[83] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.

Table 1. WRRB Predator recommendation and TG/GNWT responses

	WRRB February 2019 predator recommendations	TG/GNWT Response	Variation (if applicable)
1	The WRRB supports continuing the ENR's dìga harvest incentive program and the TG's Community Based Dìga Harvesting Project as an education tool.	Accepted	
2	The WRRB recommends that dìga monitoring be undertaken so that population estimates, or indexes are generated. In addition, as much information as possible, including condition, diet, and reproductive status, should be collected from each harvested dìga.	Accepted	
3	The WRRB recommends that dìga management be undertaken in Wek'èezhìı. TG and ENR should review the *"Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd"* submitted in November 2017 to determine the most effective, humane and cost-efficient methods that would have the least impact and disturbance on the ekwǫ̀ herds themselves.	Accepted	
4	The WRRB recommends that dìga management should be closely monitored for effectiveness of halting or slowing the decline of the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds in order to provide future harvesting opportunities.	Accepted	
5	The WRRB recommends that the GNWT and TG work with the Government of Nunavut to enact predator management actions on the calving grounds of sahtì ekwǫ̀ and kokètì ekwǫ̀ in Nunavut.	Varied	Replace 'enact' with 'discuss'
6	The WRRB commits to striking a working group to begin work on a *sahcho* (grizzly bear) biological assessment by June 2019, specifically on the sahtì ekwǫ̀ and kokètì ekwǫ̀ herds herd ranges. This working group will include at minimum the GNWT, TG and the Government of Nunavut. WRRB staff recommend that sahcho are monitored in order to determine if pressures are increasing on ekwǫ.	Varied	Accepted the Working Group Replace 'enact' with 'discuss
7	WRRB staff recommend that golden det'ǫcho (golden eagle) are monitored in order to determine if pressures of golden det'ǫcho are increasing on ekwǫ̀. WRRB staff recommends that TG and the GNWT work with the Government of Nunavut to support golden det'ǫcho monitoring.	Varied	Replace 'work with 'discuss'

Subsequent to the Board receiving TG and GNWT's responses to the Board's predator recommendations, the Board received further evidence in July 2019 when GNWT released its June 2018 calving ground survey report.[84] Given the way the evidence is presented, the Board remains concerned about the lack of reporting about the decline in dìga on the Kǫk'èetì ekwǫ̀ summer range, whether or how this decline will modify the level of dìga predation on the Kǫk'èetì ekwǫ̀ herd, and how it could affect the harvest of dìga. The importance of monitoring dìga was highlighted in the *"Wolf Tłı̨chǫ Knowledge and Perspective"* TK study where Tłı̨chǫ participants agreed it would be helpful to monitor dìga as *"packs of wolves usually follow caribou herds because they are part of the food chain for wolves so we need a good monitoring program for both animals*".[85] A first step toward integrating the different sets of information (rate of predator sightings, ʔekwǫ̀ winter distribution, and the two dìga harvest programs) is the basis for the following recommendations additional to the February 2019 recommendations.

Recommendation #4-2019 (Kǫk'èetì Ekwǫ̀): Predator Monitoring
To improve the understanding of the role of predators on the decline of the herd and increase adult and calf survival, GNWT and TG will provide the following to the WRRB: (1) sighting rates of dìga, sahcho, golden det'ǫcho, and nǫ̀gha during Kǫk'èetì ekwǫ̀ composition surveys by December 1 each year, beginning in 2019; and, (2) A set of criteria that will determine the numbers of predators to be targeted for annual removal, should the decision be made to do so, by December 1, 2020.

Recommendation #5-2019 (Kǫk'èetì Ekwǫ̀): Dìga Harvest
To ensure that harvest of dìga is contributing to the conservation of Kǫk'èetì ekwǫ̀: (1) TG and GNWT should provide to the WRRB the number of dìga to be targeted for removal during the harvest season from the Kǫk'èetì ekwǫ̀ winter range by December 1 each year, beginning in 2019; (2) TG and GNWT should determine the number of dìga to be targeted for removal based on (i) dìga sightings during Kǫk'èetì ekwǫ̀ composition surveys and (ii) likely exposure of Kǫk'èetì ekwǫ̀ to dìga associated with neighbouring herds during the winter season; and, (3) TG and GNWT will coordinate the *Enhanced North Slave Dìga Harvest Incentive Program* and the *Community-based Dìga Harvest Training Program* to determine their role in removing the targeted number of dìga.

[84] PR (BATH 2019): 015 - Estimates of Breeding Females & Adult Herd Size and Analyses of Demographics for the Bathurst Herd of Barren-Ground Caribou: 2018 Calving Ground Photographic Survey.
[85] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd.

Recommendation #6-2019 (Kǫk'èetì Ekwǫ̀): ***Enhanced North Slave Dìga Harvest Incentive Program***
To help the Board understand the effectiveness of the GNWT's *Enhanced North Slave Dìga Harvest Incentive Program* on Kǫk'èetì ekwǫ̀, TG and GNWT will provide a comprehensive report on the program to the WRRB by May 31 each year. The contents of this report will be developed in collaboration with the Board and will include, but not be limited to, the following information: (1) provide the location and number of dìga harvested as a part of the Harvest Incentive Program; and, (2) provide clear criteria to measure the effectiveness of the Harvest Incentive Program based on both scientific and TK.

Recommendation #7-2019 (Kǫk'èetì Ekwǫ̀): ***Community-based Dìga Harvest Training Program***
To help the Board understand the effectiveness of the TG's *Community-based Dìga Harvest Training Program*, TG and GNWT will provide a comprehensive report on the program to the WRRB by May 31 each year. The contents of this report will be developed in collaboration with the Board and will include, but not be limited to, the following information: (1) provide the location and number of dìga harvested as a part of the Harvest Training Program; and, (2) provide an assessment of how the training will contribute to future dìga harvesting and management

While dìga pose significant threats to Kǫk'èetì ekwǫ̀ survival rates, nǫ̀gha, golden det'ǫcho, and sahcho are other predators which need to be assessed. TG and GNWT's Joint Proposal included no evidence on predator sighting rates on the calving grounds nor did the 2018 calving ground survey report. But the Joint Proposal did recommend increased support for predator monitoring as well as for on-the-land traditional monitoring programs like the Tłı̨chǫ Ekwǫ̀ Nàxoède K'è (formerly the Boots on the Ground) program.[86] GNWT's recommendation leads the WRRB to recommend monitoring predators on the calving grounds in collaboration with GN. In an effort to reduce disturbance to ʔekwǫ̀, this work should be done on the ground, and not via aircraft.

Nǫ̀gha can be found where their food is located. Some may consider nǫ̀gha to be a scavenger however, it is known that nǫ̀gha also actively hunt for their food. Nǫ̀gha share the barren-lands with ʔekwǫ̀ and, therefore, ʔekwǫ̀ can make up a significant portion of the nǫ̀gha diet through direct hunting or from carrion left by sahcho or dìga.

[86] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

As nǫ̀gha scavenge for ʔekwǫ̀, they tend to follow behind the ʔekwǫ̀ and dìga as they migrate through the barren-lands.[87]

Recommendation #8-2019 (Kǫk'èetì Ekwǫ̀): Nǫ̀gha (wolverines)
To determine the current abundance, trend and distribution of nǫ̀gha, GNWT and TG will compile existing TK and scientific information for nǫ̀gha in the NWT and Nunavut on the Kǫk'èetì and Sahtì ekwǫ̀ ranges by April 1, 2020. The data will be used by the Grizzly Bear Biological and Management Feasibility Working Group to expand the collaborative sahcho biological and management feasibility assessment to include nǫ̀gha.

The Board is disappointed by the lack of progress among TG, GNWT and GN in relation to management actions on predation and land management for the Kǫk'èetì ekwǫ̀ calving ground and summer ranges within Nunavut. These delays may be affecting the Kǫk'èetì ekwǫ̀ population. The Joint Proposal states that there has been *"a series of discussions involving GNWT and GN wildlife staff and more senior officials (ministers and deputy ministers) about the potential for collaboration centered on predator reduction on the NU ranges of the Bluenose-East and Bathurst herds"*.[88] While the Board is aware that NWT management authorities have no authority in Nunavut and any actions taken in Nunavut would need to be approved by the NWMB, GNWT and TG committed to pursuing these discussions further to develop and implement coordinated dìga removals across the Sahtì and Kǫk'èetì ekwǫ̀ herds.[89] The 2016 and 2019 Joint Proposals both stated that GNWT will remain in frequent contact with GN on these issues and participate where possible in the NWMB process on harvest issues.[90]

Recommendation #9-2019 (Kǫk'èetì Ekwǫ̀): Joint Management Agreement
The Board recommends GNWT and TG develop a draft agreement and timelines for joint management efforts to manage the Kǫk'èetì and Sahtì ekwǫ̀ and their ranges by February 29, 2020. This draft agreement should be developed in cooperation with the BCAC, the Advisory Committee for Cooperation on Wildlife Management, and discussed with the GN wildlife officials and NWMB as soon as possible.

[87] Species at Risk Committee. 2014. Species Status Report for Wolverine (Gulo gulo) in the Northwest Territories. Species at Risk Committee, Yellowknife, NT.
https://www.nwtspeciesatrisk.ca/sites/default/files/wolverine_status_report_and_assessment_final_dec_2014_v2.pdf.
[88] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[89] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[90] Ibid.

7.4. Habitat and Land Use

7.4.1. Introduction

The annual range of Kǫk'èetì ekwǫ̀ encompasses land in both the NT and Nunavut, which introduces jurisdictional complexity. Calving and post-calving ranges in Nunavut do not have protection. Key habitats in the NWT also remain unprotected despite the WRRB recommendations in 2010 and 2016. The WRRB has consistently stated that the Kǫ̀k'èetì ekwǫ̀ will require intact habitat for recovery and sustained use.

The WRRB recognizes that habitat is complex as it includes more than vegetation. Habitat also is the landscapes that allow ʔekwǫ̀ to make choices to reduce risks from predators, parasites and other threats including weather. The elders consider anything linked to ʔekwǫ̀ as their habitat. This includes things such as *ʔįk'ǫ̀ǫ̀* (spiritual power); human behaviour; predators, such as dìga and people; pests, such as mosquitoes and flies; landscapes, such as muskeg, eskers, and smooth bedrock leading to areas to cross water; weather conditions that create particular kinds of snow and ice conditions; water, wind, and temperature; and favoured vegetation.[91] When suitable habitat is limited, pregnancy rates and calf survival can be reduced, which reduces the potential for herd recovery.

7.4.2. Proponent's Evidence

The Joint Proposal mentions ʔekwǫ̀ range contraction but does not provide evidence on changes in seasonal distribution or how changes in distribution may reflect changes in habitat. The 2019 Joint Proposal did identify habitat loss and change as a factor in the herd's decline as they stated that *"other factors including predation, disturbance from mining activities and infrastructure, roads, and climate factors have likely been key to the herd's continued decline since harvest restrictions"*.[92] The joint proposal mentions the need to identify important areas and critical habitat as the steps potentially leading to interim or long term habitat protection.

The Joint Proposal's primary proposed management action is the endorsement and implementation of the Bathurst Caribou Range Plan (BCRP).[93] Implementation actions outlined in the BCRP are to develop and apply effective policies within an adaptive management framework in order to address cumulative effects of range disturbance on the Kǫk'èetì ekwǫ̀ range. TG and GNWT outline the four main objectives of the BCRP are to ensure the integrity of important habitats; ensure connectivity between seasonal

[91] PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłįchǫ Knowledge and Perspectives on ekwǫ̀ (Barrenland Caribou)
[92] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[93] Ibid.

ranges; ensure the amount of human-caused land disturbance is kept below certain levels; and, ensure the development, design and use of roads is managed with consideration of ʔekwǫ̀.[94]

7.4.3. Other Parties' Evidence

Alternatives North expressed their surprise to see the proponents recommend more work to identify key habitats for Kǫ̀k'èetì ekwǫ̀. With years of research already conducted, and resource development increasing, Alternatives North question the need for more work to assess the Kǫ̀k'èetì ekwǫ̀ range.[95] It is noted that the BCRP is mentioned in the Joint Proposal; however, there are no actions relating to habitat protections.

CARC also indicated its surprise to see the proponents calling for the identification of critical habitat as there is already critical habitat identified. CARC was happy to see the BCRP endorsed; however, they noted that there is no plan for how the BCRP will be approved and implemented.[96]

LKDFN supported aspects of the BCRP, such as protecting ʔekwǫ̀ habitat, the increased connectivity within the Kǫ̀k'èetì ekwǫ̀ range and mitigating resource exploration; however, LKDFN noted that it can not endorse the BCRP because the plan recommends additional disturbance as permissible despite the urgent conservation concerns with the Kǫ̀k'èetì ekwǫ̀.[97]

7.4.4. Analysis and Recommendations

The WRRB acknowledges that the BCRP is a comprehensive plan built on the knowledge of many people. However, the Board notes there are no dates for implementation of BCRP policies nor is there any framework or timelines to judge how or when this plan is expected to contribute to ʔekwǫ̀ recovery. In this, the Board agrees with Alternatives North and CARC. In order for the BCRP to be implemented, legal protections are required, and the Board is not aware of any advancement towards these requirements. The WRRB also notes that there should be an urgency to the implementation of the BCRP as two of five range assessment areas require enhanced management responses to address increased levels of disturbance.[98] In addition, the Board has previously recommended the need for calving and post-calving ground

---

[94] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[95] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.
[96] PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.
[97] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.
[98] https://www.enr.gov.nt.ca/sites/enr/files/resources/bathurst_caribou_range_plan_2019_-_plan_pour_laire_de_repartition_des_caribous_de_bathurst_2019.pdf.

protection, which depends on Nunavut land managers. The BCRP does acknowledge this but the Joint Proposal indicates clearly to the WRRB that the need for habitat protection is now urgent.[99] In addition, the abandoning of traditional calving grounds may be further evidence of the need for protection and limiting of disturbance.

TG and GNWT's Joint Proposal offered no evidence about the state of the Kǫ̀k'èetì ekwǫ̀ habitat, such as the cumulative winter range modified by fire or the total linear length of roads. As TG and GNWT have identified in the Joint Proposal that they are working on the implementation of the BCRP, the WRRB accepts this and does not, at this time, have any further recommendations on habitat and land use.

7.5. Education

7.5.1. Introduction

Communications with, and the education of, harvesters, Tłı̨chǫ citizens, and the public is crucial in the management of Kǫk'èetì ekwǫ̀. These initiatives aim to increase compliance, improve hunter practices, and reduce wounding and wastage.

7.5.2. Proponent's Evidence

The proposal did include a table listing proposed educational activities including annual and possible meetings, GNWT website updates, posters, and radio interviews.[100] The Joint Proposal emphasized the importance of supporting on-the-land activities, which focus on the continued use and maintenance of traditional sites. TG plans to expand on their current on-the-land programs.[101]

7.5.3. Other Parties' Evidence

LKDFN expressed their belief that public awareness and education, based on the best available traditional and scientific knowledge, are essential to improve the public's understanding of Kǫk'èetì ekwǫ̀, as well as the management tools that are being used to protect them. LKDFN recommend that the GNWT share the results of the bi-annual population survey and the composition surveys in a meaningful way at in-person meetings in all communities.[102]

Alternatives North and CARC did not raise concerns about the proposed communication and education initiatives as presented in the Joint Proposal.

[99] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[100] Ibid.
[101] Ibid.
[102] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou Proposal.

7.5.4. Analysis and Recommendations

TG and GNWT's Joint Proposal offered no evidence about the frequency and effectiveness of education activities since the 2010 and 2016 proposals. Continuing efforts to increase awareness among Tłı̨chǫ communities and the public about the status of NWT ʔekwǫ̀ herds, the need for conservation actions and how harvesters can contribute to conservation, such as harvesting alternative species, is essential to promote recovery of the Kǫk'èetì ekwǫ̀ herd.

Recommendation #10-2019 (Kǫk'èetì Ekwǫ̀): Successes and Challenges of Ekwǫ̀ Nàxoède K'è
To increase community understanding of work being done for Kǫk'èetì ekwǫ̀, TG will report annually on the successes and challenges of Ekwǫ̀ Nàxoède K'è to Tłı̨chǫ communities and schools.

Recommendation #11-2019 (Kǫk'èetì Ekwǫ̀): Food Security
To ensure Tłı̨chǫ communities have access to nutritious, safe food that fits their lifestyle and provides a healthy diet throughout the year, and in light of a closed harvest on Kǫk'èetì ekwǫ̀, TG and GNWT will discuss priorities and solutions for food security issues, such as harvesting alternative country foods and/or implementing meat replacement programs, with each Tłı̨chǫ community by March 31, 2020.

Recommendation #12-2019 (Kǫk'èetì Ekwǫ̀): Public Consultation
To increase public understanding of the need for ʔekwǫ̀ management actions, starting in January 2020, TG and GNWT will: (1) exchange information about Kǫk'èetì and Sahtì ekwǫ̀ with Tłı̨chǫ communities, via focus groups and community meetings; and, (2) produce and distribute educational materials, via radio, television, social media and workshops, to the general public about the reasons for the Kǫk'èetì and Sahtì ekwǫ̀ population declines and the factors affecting the declines, including emigration.

7.6. Research and Monitoring

7.6.1. Introduction

Ongoing research and monitoring actions are required to make informed and timely management decisions for the Kǫk'èetì ekwǫ̀, including the proposed implementation of the Tłı̨chǫ Research and Monitoring Program. Adaptive management is the mechanism whereby monitoring results are used to inform management decisions as well as to determine the effectiveness of management actions. The WRRB already utilizes adaptive management principles in its operations and decision-making. However, an adaptive management framework with clear thresholds may lead to specific management actions that could lead to timelier implementation of management and monitoring actions. The WRRB is aware that as the Kǫk'èetì ekwǫ̀ herd continues to decline, the urgency of effective management increases.

7.6.2. Proponent's Evidence

TG and GNWT's Joint Proposal describes (a) biological monitoring; (b) an expansion of TG's Ekwǫ̀ Nàxoède K'è program; (c) support for research on the drivers of changes in ʔekwǫ̀ abundance; and, (d) an adaptive management framework under the Bathurst Caribou Range Plan.[103] More specifically, the proposed actions are:

> (a) The biological monitoring included a change to calving ground surveys taking place every two years rather than every three years; an increase in the number of collars to 70; an increase to annual monitoring of calf survival; harvest compliance monitoring; dropping the calving ground reconnaissance surveys and the addition of pregnancy monitoring.[104]
>
> (b) TG is proposing to expand the Ekwǫ̀ Nàxoède K'è program to span the entire ice-free period on the lakes.[105]
>
> (c) TG and GNWT recognize the need for research into the complexity of factors driving the declines of ʔekwǫ̀ herds using both TK and science as well as university partners.[106]
>
> (d) Implementation actions outlined in the BCRP should be initiated in 2019 to develop and apply effective policies and practices within an adaptive management framework and 5-year review interval, which will help address potential cumulative effects of range (habitat) disturbance and land use on Kǫk'èetì ekwǫ̀.[107]

7.6.3. Other Parties' Evidence

Alternatives North is concerned that with the increasing impacts related to climate change that the herd is facing, any harvest of the herd at all will increase their vulnerability significantly.[108]

---

[103] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[104] Ibid.
[105] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[106] Ibid.
[107] Ibid.
[108] PR (BATH 2019): 006 - Alternatives North Submission to 2019 Bathurst Caribou Proposal.

CARC noted that with a greater than 50% decline of Kǫ̀k’èetì ekwǫ̀ between the last two surveys and an overall decrease of 95% from peak levels, it indicates the *“desperately inadequate management over the past 10 years plus and the need for critical review”.*[109]

LKDFN supports biological monitoring; however, they would like to see other Indigenous governments and organizations engaged in the harvest compliance monitoring. Additionally, LKDFN believes that Indigenous monitors should be trained in fecal sample collections. LKDFN supports the expansion of the Ekwǫ̀ Nàxoède K’è (Boots on the Ground) program and would like to see the GNWT support the LKDFN’s Caribou Stewardship Plan. They support collaborative research partnerships; however, LKDFN notes that the time needed to conduct routine studies is too long for Kǫ̀k’èetì ekwǫ̀.[110]

7.6.4. Analysis and Recommendations

The WRRB’s approach to making monitoring and research recommendations was developed in response to three requirements. First, delays in government implementation of management actions do not slow the decline in ʔekwǫ̀ numbers. This is the basis for the WRRB’s recommendation to improve the implementation of adaptive management. Secondly, the WRRB is also concerned as to how TK and community experience is used in monitoring and adaptive management. Third, there is the requirement to balance the perspective of respecting and leaving the ʔekwǫ̀ alone against the need for monitoring information for management.

The Board is put in a difficult position trying to balance the apparent need for more monitoring of ʔekwǫ̀ and the elders who say we should leave the ʔekwǫ̀ alone. Evidence from Tłı̨chǫ elders during the 2007 TG workshop, suggest a willingness to restrict harvest, and leave the ʔekwò alone.[111] Leaving ʔekwǫ̀ alone, to the elders, includes all activities that stress or bother those remaining. As Elder Romie Wetrade summarizes:

> *“White people raise animals. So they are always thinking about what to do with them. Tłı̨chǫ do not raise animals. Caribou migrate all over the land. Because of white people we are now talking negatively about caribou. For me that is not right. Talking all the time about how we will fix it. How will they migrate back to us? What will happen to the young? We should leave them alone and let them be.”*[112]

The Board also notes the difficulty of reconciling views over collaring ʔekwǫ̀. However, the Board acknowledges that increasing the number of collars on cows provides more

[109] PR (BATH 2019): 004 - CARC to WRRB Re: Joint Management Proposal for Bathurst Caribou.
[110] PR (BATH 2019): 012 - Łutsel K'e Dene First Nation Submission to 2019 Bathurst Caribou. Proposal.
[111] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[112] PR (BATH 2019): 029 - Monitoring the Relationship between People and Caribou.

reliable annual estimates of cow survival rates, as well as determining the effectiveness of the MCBCCA and overlap in winter distribution, assigning harvest to herds reliably, and providing evidence for emigration. The BGCTWG has stated that an effective MCBCCA requires, at minimum, 40 collars and biological monitoring will need a total of 70 collars on cows and bulls.

As a rationale for increasing the frequency of the calving ground estimates to every two years, the GNWT cites the rapid decline of the herd and possible dìga management implementation.[113] The Board understands that increasing the frequency of calving ground surveys is potentially a mixed blessing as statistical differences in population numbers may be more difficult to detect. However, the WRRB considers that this possible disadvantage of the increased survey frequency can be reduced by using rates of adult and calf survival to also interpret trends. Thus, the WRRB agreed with the management action proposed by GNWT and TG.

Recommendation #13-2019 (Kǫk'èetì Ekwǫ̀): Population Surveys
To ensure timely adaptive management, GNWT will conduct population surveys for Kǫk'èetì ekwǫ̀ every two years at the same time as Sahtì ekwǫ̀ and Beverly/Ahiak surveys. Therefore, the next population surveys will take place in June 2020.

While GNWT did refer to a change in tracking seasonal calf survival three times a year, they did not mention the need to increase sample size to reliably monitor pregnancy rates, which is the first step in monitoring calf survival.[114] Hence, the need for WRRB's agreement that pregnancy rates should be monitored through fecal pellet sampling. Dene harvesters are comfortable with the collection of fecal pellets to determine genetic material as well as monitoring pregnancy.[115] This is especially relevant when Dene experts' knowledge of ʔekwǫ̀ histories, movements and identities is respected. When knowledges are heard, respected and used, individuals are more likely to accept the results of others.[116] In the not so distant past, fecal pellets were examined in conjunction with examining vegetation in the months and stomachs of ʔekwǫ̀.[117] The WRRB also notes that pregnancy rates are a sensitive indicator to conditions including climate change on the summer ranges and thus can be related to observations from TG's Ekwǫ̀ Nàxoède K'è program.

---

[113] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[114] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[115] PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłįchǫ Knowledge and Perspectives on ekwò˛ (Barrenland Caribou).
[116] PR (BATH 2019): 31 - Łeghágots'enetę (learning together): the importance of indigenous perspectives in the identification of biological variation
[117] PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłįchǫ Knowledge and Perspectives on ekwò˛ (Barrenland Caribou).

Recommendation #14-2019 (Kǫk'èetì Ekwǫ̀): Pregnancy Monitoring
To better monitor the pregnancy rates of the Kǫk'èetì ekwǫ̀ herd, GNWT and TG should implement Kǫk'èetì ekwǫ̀ pregnancy monitoring through fecal pellet collection in the winter months, every year starting January 2020. Community members should have the opportunity to participate in the collection of fecal pellets on the Kǫk'èetì ekwǫ̀ winter range.

Indigenous people across Canada emphasize they monitor the land by living with it. In other words, using the natural resources it offers on a regular basis and, in doing so, watch everything on the land.[118] The elders' stories tell of change in the past. Harvesters must have ongoing, daily experiences and spiritual relations with all that is part of the ecosystem so they can watch for and see inconsistencies and change – whether rapid or slow.[119] This is maintained through walking and watching ʔekwǫ̀ habitat and harvesting in culturally appropriate ways.

Tłı̨chǫ participants in the *"Wolf Knowledge and Perspective"* TK study questioned the effectiveness of using GNWT's techniques, *"wolves are not going to wait to be monitored; they are very smart and fast"*.[120] In contrast to periodic scientific monitoring, monitoring based on Tłı̨chǫ experiential knowledge – observing, experiencing and sharing stories – is done on a regular and consistent basis by harvesters who know the land.[121]

By putting the Tłı̨chǫ Research and Monitoring Program in place, harvesters and elders will once again be in their intellectual and spiritual role to watch and experience the land so they can share what they observe and ensure people can respond quickly to occurrences that will impact their lives.

[118] PR (BATH 2019): 023 - "These Trees Have Stories to Tell" Linking Denésǫliné Knowledge and Dendroecology in the Monitoring of Barren-ground Caribou Movements in the Northwest Territories, Canada; PR (BATH 2019): 027 - Tłı̨chǫ Knowledge of Environmental Changes: Implications for Caribou Hunting; PR (BATH 2019): 028 - Caribou Migration and the State of their Habitat: Tłı̨chǫ Knowledge and Perspectives on ekwǫ̀ (Barrenland Caribou); PR (BATH 2019): 029 - Monitoring the Relationship between People and Caribou; PR (BATH 2019): 030 - Renewing our traditional laws through joint ekwǫ (caribou) management; 031 - Łeghágots'enetę (learning together): the importance of indigenous perspectives in the identification of biological variation; PR (BATH 2019): 033 - Boots on the Ground Caribou Monitoring Program 2017 Results; PR (BATH 2019): 034 - Boots on the Ground Caribou Monitoring Program - Monitoring Results 2016; PR (BATH 2019): 035 - "We Watch Everything" A Methodology for Boots on the Ground Caribou Monitoring; and PR (BATH 2019): 036 - Ekwò zò gha dzô nats'êdè "We Live Here For Caribou" Cumulative Impacts Study on the Bathurst Caribou.
[119] PR (BATH 2019): 029 - Monitoring the Relationship between People and Caribou; PR (BATH 2019): 030 - Renewing our traditional laws through joint ekwǫ (caribou) management; PR (BATH 2019): 032 - "We monitor by living here": Developing monitoring methods based in Indigenous knowledge; PR (BATH 2019): 033 - Boots on the Ground Caribou Monitoring Program 2017 Results; PR (BATH 2019): 034 - Boots on the Ground Caribou Monitoring Program - Monitoring Results 2016; and PR (BATH 2019): 035 - "We Watch Everything" A Methodology for Boots on the Ground Caribou Monitoring.
[120] PR (BATH 2019): 038 - Wolf Technical Feasibility Assessment: Options for Managing Wolves on the Range of the Bathurst Barren-ground Caribou Herd.
[121] Ibid.

"We find our voices in the land where we have something to say, where we can contribute something."[122] (Dr. John B. Zoe, 2019)

Recommendation #15-2019 (Kǫk'èetì Ekwǫ̀): Tłı̨chǫ Research and Monitoring Program
To ensure that both ʔekwǫ̀ and ʔekwǫ̀ habitat monitoring, and realistic harvesting numbers are recorded in a culturally appropriate manner, and to contribute adaptive management, TG will implement the Tłı̨chǫ Research and Monitoring Program, starting in January 2020 (See Appendix H).

The WRRB is aware that the effects of climate change are already being felt and that the changes on the ʔekwǫ̀ ranges are measurable. The question now is what can be done about the effects of climate change on ʔekwǫ̀, and their ecological relationships, including people. The WRRB sees this as best answered by having more observers on the ground[123] and then ensuring that their observations are integrated into adaptive management for the herd. The WRRB believes that using more people on the ground (as indexed, for example by the number of observer days) is essential for adaptive management.

Tłı̨chǫ harvesters' and elders' holistic knowledge of the environment allows them to place the behaviour of humans into the ecosystem, which is why they can understand the reality of climate change.[124] Tłı̨chǫ harvesters and elders know that ʔekwǫ̀ will not migrate to places where there is no food. For example, dry conditions (high temperatures and low precipitation), wildfires, and lack of vegetation are indicators of climate change that harvesters can see on the land.

Recommendation #16-2019 (Kǫk'èetì Ekwǫ̀): Climate Change
To better understand the effects of climate change on ʔekwǫ̀, TG will systematically collect on-the-ground climate change observations including but not limited to (i) dry conditions, (ii) wildfires, and (iii) lack of vegetation, during the Ekwǫ̀ Nàxoède K'è program and the Tłı̨chǫ Research and Monitoring Program. Results of the monitoring programs should be designed to contribute an adaptive management framework and be reported to the WRRB and GNWT annually.

The Joint Proposal's Table 4 summarises the biological monitoring indicators, frequency, rationale, and options for management actions.[125] In the context of adaptive management, the WRRB finds that only four of the nine biological indicators in Table 4

[122] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[123] PR (BATH 2019): 033 - Boots on the Ground Caribou Monitoring Program 2017 Results.
[124] PR (BATH 2019): 027 - Tłı̨chǫ Knowledge of Environmental Changes: Implications for Caribou Hunting).
[125] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.

have corresponding adaptive monitoring options and even those four are generalized rather than specific actions. The table is similar to that proposed for the Sahtì ekwǫ̀ in the 2019 Joint Proposal. When asked during the public hearing about the possibility of expanding and revising the table to make it more detailed and responsive for that herd, GNWT stated that they would need to discuss with their senior level management and pointed to the *Taking Care of Caribou Management Plan.*[126]

Given the 29% annual rate of decline for the Kǫk'èetì ekwǫ̀ herd, there is an urgent need to increase the speed in which managers react to changes in the herd and implement management actions. The WRRB is concerned about delays in implementation of management actions and the failure to implement the majority of the WRRB's recommendations. TG and GNWT acknowledged the need to speed up management responses. In the Joint Proposal, they propose increasing reviews of management actions from every three years to annually.[127] However, no mechanism is proposed. An adaptive management framework could minimize delay in the implementation of management action and proposals. An adaptive management framework must involve the Board for the reasons set out in Section 12.5.1 of the Tłįchǫ Agreement.[128] Such an approach provides for pre-identified management actions based on thresholds agreed to by management authorities, which then can be implemented in a timelier matter.

Adaptive management is now a standard part of management although in practice, it has sometimes struggled in the implementation phase.[129] The WRRB is of the view that such a framework can be developed in collaboration with governments. The Joint Proposal has already provided a rationale for specific monitoring thresholds and the management decisions that those thresholds trigger.[130]

The Joint Proposal refers to an *"integrated suite of recovery management actions"* but does not supply a mechanism for integration.[131] There is no evidence which describes how the individual management actions will be integrated, which is problematic as there will be trade-offs between them depending on monitoring results. The WRRB suggests that the integration of management actions should be achieved through an adaptive management framework. The framework should also identify how to integrate on-the-ground observations and climate change into management activities. The strength of an

---

[126] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[127] Ibid.
[128] See Section 12.5.1 of the Tłįchǫ Agreement.
[129] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd.
[130] PR (BATH 2019): 001 - Joint Proposal on Management Actions for the Bathurst Ekwǫ̀ (Barren-ground caribou) Herd: 2019 – 2021.
[131] Ibid.

adaptive management framework is to build it collaboratively, which is the basis of the WRRB recommendation.

Recommendation #17-2019 (Kǫk’èetì Ekwǫ̀): Adaptive Management Framework
To ensure timelier implementation of management and monitoring actions, WRRB, TG and GNWT will collaborate to develop a herd-specific adaptive management framework with the thresholds linked to specific management actions by January 2020, with the WRRB taking a lead role for herds in Wek’èezhìı. The framework will take into consideration Tłı̨chǫ and scientific knowledge, existing management plans, and decisions and recommendations from Boards and governments.

7.7. Implementation of Recommendations from 2010, 2016 and 2019

The WRRB is troubled by the time it has taken governments to implement approved Board recommendations given that the Kǫk’èetì ekwǫ̀ herd has been declining by 19 to 29% every 3 years since 2012.

Based on the Board’s previous proceedings, 60 recommendations were submitted in 2010 to TG and GNWT.[132] In 2016, the WRRB submitted 26 recommendations and one determination to the two governments.[133] The Board notes that, to date, only the determination and 25 of the 82 recommendations accepted or varied by TG and GNWT have been fully implemented (Appendix D and F). Consequently, the WRRB is of the view that perhaps a different approach will be more effective. The Board believes that a more intensive application of an adaptive management framework is needed to capitalize on the Board’s and government’s collective efforts. Given the urgency of decisive management action for the Kǫk’èetì ekwǫ̀ herd, it is the Board’s opinion that an adaptive management framework would lead to more timely and effective management actions, which are essential to address the herd’s decline.

Recommendation #18-2019 (Kǫk’èetì Ekwǫ̀): Implementation
To track the progress of implementation of the Board’s recommendations, TG and GNWT will provide to the WRRB the following: (1) an implementation plan for the 2019 recommendations by January 31, 2020; (2) a summary report, within one year of the acceptance or variance of the Board’s 2019 recommendations, on proposed management actions, including an evaluation of the success of implementation of management actions; and,

[132] PR (BATH 2019): 037 - Report on a Public Hearing Held by the Wek’èezhìı Renewable Resources Board 22-26 March 20105-6 August 2010 Behchokǫ̀, NT.
[133] PR (BATH 2019): 040 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part A; and PR (BATH 2019): 041 - Reasons for Decisions Related to a Joint Proposal for the Management of the Bathurst ekwǫ̀ (Barren-ground caribou) Herd - Part B.

(3) an updated implementation plan for the 2010 and 2016 recommendations and an evaluation of all outstanding recommendations by January 31, 2020.

The Board notes that continued implementation of the TK recommendations is both mandatory and essential to ensure that the WRRB and other wildlife managers in Wek’èezhìı have appropriate information to make balanced decisions.

8.0. Conclusion

With the Kǫk’èetì ekwǫ̀ herd in a critical state, there is an urgent need to implement effective management actions to halt the decline as soon as possible. The Board’s decisions in this report have been structured to have the least impact on ʔekwǫ̀ users and the greatest benefit to ʔekwǫ̀ that we can provide at this time.

> *“… a way of life, in relation to the caribou is described in the Tłįchǫ Agreement, which is 12.1.1, which encompasses our livelihood and we try to capture that in our agreement to ensure that we always have a connection to the caribou, the activity around the caribou and the ceremonial games that happen around the -- the caribou and the travel. Everything that we -- that we had was in relation to the caribou”.*[134] (Dr. John B. Zoe, 2019)

Users, managers and governments must act now, in whatever way possible, to protect the herd and its habitat so that future recovery may be possible. The need is urgent. The Kǫk’èetì ekwǫ̀ herd has declined to the point where some cows, possibly to have the best chance to raise their calves, have emigrated to a neighboring herd’s calving ground. These changes increase uncertainty for co-managers and governments. A collaborative and adaptive management is essential to ensure a future for Kǫk’èetì ekwǫ̀.

[134] PR (BATH 2019): 039 - WRRB Reasons for Decision Final Report w/ Corrected Appendix – Sahtì Ekwǫ̀ (Bluenose-East Caribou) Herd

APPENDIX A 2019 Joint Proposal

APPENDIX B Review of 2007 Proceeding & Decisions

B.1. Receipt of 2006 Joint Proposal

In December 2006, ENR submitted a management proposal recommending management actions to reduce harvest levels in a manner consistent with the Tłı̨chǫ Agreement and the Bathurst Caribou Management Plan for the WRRB's consideration. The proposed management actions were intended to limit the harvest to 4% of the 2006 herd size for a total of 5120 ʔekwǫ̀, including eliminate all commercial meat tags held by Tłı̨chǫ communities, reduce number of tags for non-resident hunters and non-resident alien hunters from 2 to 1, and reduce tags for all non-Hunters' & Trappers' Association (HTA) and HTA outfitters from 1559 to a total of 350.

Due to the significance of the management actions proposed, and the fact that the WRRB, as a new organization, had not yet heard from other Parties affected by the ENR proposal, the Board decided to conduct a public hearing before making any decisions on the proposal. The WRRB held the public hearing on March 13-14, 2007 in Behchokǫ̀, NT.

During the course of the hearing, ENR officials admitted that the Minister and Department had not consulted the Tłı̨chǫ Government about their proposal, as required in the Tłı̨chǫ Agreement, before it was submitted to the Board. Once the evidentiary phase of the proceeding was completed, the Board decided to adjourn the proceeding in order to give ENR and the Tłı̨chǫ Government time to initiate a consultation process. Specifically, ENR and the Tłı̨chǫ Government were directed to report to the WRRB on the outcome of their consultations by April 23, 2007.

On April 20, 2007 and April 23, 2007 respectively, the Tłı̨chǫ Government and ENR filed letters with the WRRB indicating that the consultation process had not been concluded, thereby requiring an additional 90 days to finish the consultations. The WRRB advised ENR and the Tłı̨chǫ Government, in early May 2007, that it had decided to extend the period of adjournment in the proceeding by 30 days to permit the Parties to conclude the consultations by June 1, 2007. The Board indicated that if the consultation efforts were not producing substantial progress, it would bring the proceeding to a close and prepare its Recommendations Report for submission to the Minister of ENR and the Tłı̨chǫ Government.

B.2. Emergency Measure

On April 17, 2007, the Minister of ENR advised the Tłı̨chǫ Government and the WRRB that the Big Game Hunting Regulations had been amended to reduce the number of tags available for outfitted hunts for ʔekwǫ̀ in Unit "R" to 750 for the 2007 season. The letter noted that this decision was made under the authority of Section 12.5.14 of the Tłı̨chǫ Agreement as ENR considered its action necessary due to an emergency situation regarding declining populations of the ɂekwǫ̀.

B.3. 2007 Board Decision

On May 30, 2007 and June 4, 2007 respectively, the Tłı̨chǫ Government and ENR submitted letters to the Board indicating that they were making substantial progress but required an extension to September 28, 2007 in order to develop a new joint ɂekwǫ̀ management proposal. The WRRB was concerned that any further adjournments could adversely affect the interests of other Parties affected by the proposal. ENR had already taken steps to implement portions of its proposal on the grounds that an emergency situation existed. Further extension of the proceeding to accommodate consultation which, in the Board's view should have taken place before the proposal was advanced, seemed inconsistent with the urgency asserted by ENR. For these reasons, the WRRB decided not to grant a further adjournment of its proceeding.

Based on the WRRB's review of the evidence presented during the proceedings, the Board recommended that ENR's proposal to undertake management actions to reduce the harvest of the Bathurst ɂekwǫ̀ herd not be implemented as submitted. The WRRB strongly encouraged ENR and the Tłı̨chǫ Government to continue their consultations towards the development of a Joint Proposal for the management of the Bathurst ɂekwǫ̀ herd. Additionally, the WRRB indicated that any future management actions that propose to limit any component of the harvest to a particular number, including zero, would be treated as a proposal for the establishment of a total allowable harvest.

B.4. Barren-ground Outfitter's Association Tag Request

In October 2007, the Barren-ground Caribou Outfitter's Association requested that the tag quota for ɂekwǫ̀ outfitters be restored to 1260 for the non-HTA outfitters and 396 for the HTA outfitters due to financial hardships experienced by the outfitters and supporting businesses. The Board did not recommend the tag increase to the GWNT as the WRRB is not mandated to address issues of economic viability. Further, the WRRB considered any requests for changes to tag quotas to be premature prior to the submission of a Joint Proposal regarding the management of ɂekwǫ̀ in Wek'èezhìı by ENR and Tłı̨chǫ Government.

APPENDIX C Review of 2010 Proceeding & Decisions

C.1. Receipt of 2009 Joint Proposal

On November 5, 2009, TG and GNWT submitted the *Joint Proposal on Caribou Management Actions in Wek'èezhìı*, which proposed nine management actions and eleven monitoring actions, including harvest limitations, for the Bathurst, Bluenose-East and Ahiak ʔekwǫ̀ herds. While there was agreement on the majority of actions proposed, there was no agreement reached on the proposed levels of Indigenous harvesting.

Upon review of the proposal, the WRRB held that any restriction of harvest or component of harvest to a specific number of animals would constitute a TAH. Thus, the Board ruled that it was required to hold a public hearing. Registered Parties were notified on November 30, 2009 of the Board's decision to limit the scope of the public hearing to Actions 1 through 5 of the Joint Proposal, which prescribed limitations on harvest. All other proposed actions were addressed through written submissions to the Board.

On January 1, 2010, GNWT implemented interim emergency measures, which included the closure of ʔekwǫ̀ commercial, outfitted,[135] and resident harvesting in the North Slave regions. In addition, all harvest was closed in a newly established no-hunting conservation zone (Figure B-1). This decision was made by the Minister of GNWT under the authority of Section 12.5.14 of the Tłı̨chǫ Agreement. The Board was informed of the Minister's decisions on December 17, 2009.

[135] Non-residents and non-resident aliens require an outfitter to hunt big game (but not small game). Outfitters provide licenced guides for the hunters they serve. A non-resident is a Canadian citizen or landed immigrant who lives outside the NWT or has not resided in the NWT for 12 months; a non-resident alien is an individual who is neither an NWT resident nor a non-resident. GNWT. 2015. Northwest Territories Summary of Hunting Regulations, July 1, 2015 to June 30, 2016.

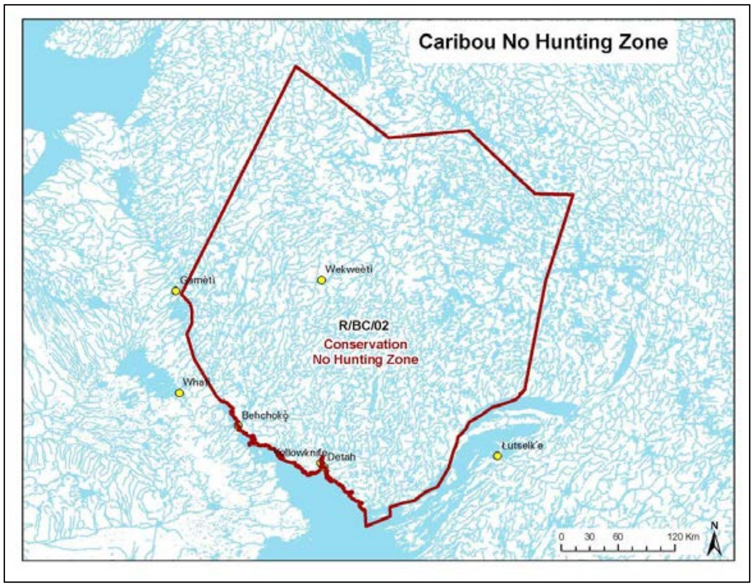


Figure C-1. No-Hunting Conservation Zone, R/BC/02, January 1, 2010 to December 8, 2010.[136]

Originally scheduled for January 11-13, 2010, the public hearing took place March 22-26, 2010 in Behchokǫ̀, NT. Once the evidentiary phase of the proceeding was completed, TG requested the WRRB adjourn the hearing in order to give TG and GNWT time to work collaboratively to complete the joint management proposal. The Board agreed to grant the application for adjournment with the condition that any revised proposal be filed by May 31, 2010 and that such a proposal address both harvest numbers and allocation of harvest for both the Bathurst and Bluenose-East ʔekwǫ̀ herds.

On May 31, 2010, TG and GNWT submitted the *Revised Joint Proposal on Caribou Management Actions in Wek'èezhìı*. This revised proposal changed the original management and monitoring actions and incorporated an adaptive co-management framework and rules-based approach to harvesting. TG and GNWT were able to reach an agreement on Indigenous harvesting. Following review of the information and comments from registered Parties, the WRRB accepted the revised proposal. Therefore, the WRRB reconvened its public hearing on August 5-6, 2010 in Behchokǫ̀, NT, where final presentations, questions and closing arguments were made.

C.2. 2010 Board Decision

On October 8, 2010, the WRRB submitted its final recommendations and Reasons for Decision Report to TG and GNWT. Many of the recommendations were related to the

[136] GNWT-GNWT 2010. http://www.GNWT.gov.nt.ca/_live/documents/content/No-Hunting_Conservation_Zone_Map.pdf

Bathurst ʔekwǫ̀ herd and relevant management actions vital for herd recovery, including harvest restrictions.

The Board recommended a harvest target of 2800 (± 10%) Bluenose-East ʔekwǫ̀ per year for harvest seasons 2010/11, 2011/12, and 2012/13 in Wek'èezhìı. Further, the Board recommended that the ratio of bulls harvested to cows should be 85:15. Although the evidence suggested that the Bluenose-East herd had not continued to decline, the Board concluded that a limited harvest of 2520-3080 ʔekwǫ̀ with 420 or fewer cows was a cautious management approach based on the current herd size and trend.

The Board recommended that all commercial, outfitted and resident harvesting of the Bluenose-East ʔekwǫ̀ herd in Wek'èezhìı be set to zero. The Board also made harvest recommendations for the Ahiak ʔekwǫ̀ herd.

The WRRB made additional ʔekwǫ̀ management and monitoring recommendations to TG and GNWT, specifically implementation of detailed scientific and Tłı̨chǫ knowledge monitoring actions and implementation of an adaptive co-management framework.

The WRRB also recommended to the Minister of CIRNAC (formerly Indian and Northern Affairs Canada (INAC)) and GNWT to collaboratively develop best practices for mitigating effects on ʔekwǫ̀ during calving and post-calving, including the consideration of implementing mobile ʔekwǫ̀ protection measures, and for monitoring landscape changes, including fires and industrial exploration and development, to assess potential impacts to ʔekwǫ̀ habitat.

The Board recommended that the harvest of dìga should be increased through incentives but that focused dìga control not be implemented. The Board understood if TG and GNWT were to plan for focused dìga control in the future, a management proposal would be required for WRRB consideration.

The Minister's emergency interim measures remained in effect until the WRRB's recommendations on ʔekwǫ̀ management in Wek'èezhìı were implemented on December 8, 2010. On January 13, 2011, TG and GNWT responded to the Board's recommendations, accepting 35, varying 22 and rejecting three of the 60 recommendations. TG and GNWT submitted an implementation plan to the WRRB on June 17, 2011, which the Board formally accepted on June 30, 2011.

APPENDIX D Review of 2010 WRRB Recommendations

Review of 2010 WRRB Recommendations				
No.	**WRRB Recommendation**	**TG/GNWT Response**	**Management Objective**	**Status**
1	TG and GNWT report annually on the overall success of the harvest target approach in meeting the objectives of effective collaborative management and the long-term recovery of the Bathurst caribou herd.	Accepted - GNWT and TG will provide a report on the overall success of the harvest target approach in June 2011.	Increase communication among the management authorities. Provide an opportunity to review the efficacy of management actions and make revisions if necessary.	Incomplete; no recommendations provided
2	All commercial harvesting of Bathurst caribou within Wek’èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bathurst caribou herd and set priority to Aboriginal harvest.	Completed
3	All outfitted harvesting of Bathurst caribou within Wek’èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bathurst caribou herd and set priority to Aboriginal harvest.	Completed
4	GNWT and TG, prior to the next survey of the Bathurst caribou herd, provide the Board and make public their positions with regard to the reinstatement of outfitting within Wek’èezhìı.	Varied - This will be addressed in the development of a long-term management plan for the Bathurst herd. The target date for the long-term management plan is the end of 2012.	Make criteria for reinstating Outfitted and Resident harvest public.	Incomplete; no criteria developed
5	All resident harvesting of Bathurst caribou within Wek’èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bathurst caribou herd and set priority to Aboriginal harvest.	Completed
6	GNWT and TG, prior to the next survey of the Bathurst caribou herd, provide the Board and make public their positions with regard to the reinstatement of resident harvesting within Wek’èezhìı. In developing this position, the Governments will review, assess, and implement, where conservation permits, a limited-entry draw system to facilitate the reinstatement of resident harvesting at the earliest opportunity.	Varied - This will be addressed in the development of a long-term management plan for the Bathurst herd. The target date for the long-term management plan is the end of 2012.	Make criteria for reinstating Outfitted and Resident harvest public.	Incomplete; no criteria developed

7	Establishment of a harvest target of 300 Bathurst caribou per year for 2010-2013.	Accepted - This was implemented on December 8, 2010 through a regulation change that established limited harvest zones inside and outside of Wek’èezhìı to reflect the current wintering area for the Bathurst caribou herd.	Set a level of harvest that can be sustained by the Bathurst herd.	Completed
8	Allocating the annual harvest target of Bathurst caribou between Tłįchǫ Citizens (225) and members of an Aboriginal people with rights to hunt in Mǫwhì Gogha Dè Nįįtłèè (75)	Varied - As per prior agreement with TG to share a limited harvest of Bathurst caribou equally (150 animals for Tłįchǫ citizens and 150 caribou outside of Wek’èezhìı)	Establish a sharing of harvest between the Tłįchǫ and other Aboriginal hunters that is equitable.	Completed
9	The harvest of Bathurst caribou should target an 85:15 bull/cow ratio, i.e. the annual harvest of Bathurst caribou cows should be less than 45	Varied - GNWT and TG both agree that the harvest should focus on bulls but would prefer to use a target ratio of 80:20 males: females as agreed in revised Joint Proposal (cow harvest of 60). The modeling projections suggest that small changes in the harvest sex ratio would have negligible impacts on the Bathurst herd’s likely trend.	Set a harvest sex ratio that can be sustained by the Bathurst herd.	Incomplete (excludes unknowns); target exceeded in all three years
10	TG and GNWT have information to suggest that the harvest of Bathurst caribou has <u>or will in the near future</u> exceed the harvest target of 300 by 10% or more, then regulations should be put in place to close all harvesting in areas occupied by the Bathurst herd.	Accepted - GNWT and TG will be closely monitoring harvest levels throughout the fall and winter hunting seasons and will keep communities and the WRRB informed.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Not required
11	TG and GNWT have information to suggest that the harvest of Bathurst caribou has <u>or will or in the near future</u> materially exceed 45 cows, then regulations should be put in place to close all harvesting in areas occupied by the Bathurst herd.	Varied (as per response #9) - GNWT and the TG will monitor the sex ratio of the harvest and work with hunters to target male caribou, wherever possible.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Incomplete; targets exceeded, and no regulations implemented

12	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual fall hunt, areas within which the harvest will be attributed to the Bathurst caribou herd.	Accepted - There will be ads in the local newspaper to inform the public about the new management zones within which Bathurst caribou harvest is limited. Detailed information on recent locations of radio-collared caribou will not be publicized.	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
13	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual winter hunt, areas within which the harvest will be attributed to the Bathurst caribou herd.	Accepted - There will be ads in local newspaper to inform the public about the new management zones where Bathurst caribou harvest is limited.	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
14	All commercial, outfitted and resident harvesting from the Bluenose-East caribou herd within Wek'èezhìı be set to zero for 2010-2013.	Accepted - As per changes to the Big Game Hunting Regulations made on January 1, 2010.	Reduce harvest of the Bluenose-East caribou herd and set priority to Aboriginal harvest.	Completed
15	Establishment of a harvest target of 2800 Bluenose-East caribou per year for 2010-2013, with the annual harvest target and its allocation finalized in discussions between the existing wildlife co-management boards and Aboriginal governments in the Sahtú, Dehcho and Tłı̨chǫ.	Varied - Based on new 2010 estimate of the Bluenose-East herd's size, wildlife co-management boards are reviewing information and the proposed harvest targets recommended by the WRRB. GNWT and TG will be working together to promote harvest of bulls, monitor the harvest closely throughout the winter and keep the communities, as well as WRRB, SRRB and Nunavut informed.	Set a level of harvest that can be sustained by the Bluenose-East herd. Establish as sharing of harvest between the Tłı̨chǫ and other Aboriginal hunters that is equitable.	Incomplete
16	The harvest of Bluenose-East caribou should target an 85:15 bull/cow ratio, i.e. the annual harvest of Bluenose-East caribou cows should be less than 420 – Original recommendation varied to 80:20 bull/cow harvest (cow harvest of 560)	Varied (as per response #9 and #15) - GNWT and TG agree the harvest should focus on bulls but would prefer a target of 80:20 males: females as agreed to in the revised joint proposal.	Set a harvest sex ratio that can be sustained by the Bluenose-East herd.	Incomplete (excludes unknowns); target exceeded in 2 of 3 years

17	TG and GNWT have information to suggest that the harvest of Bluenose-East caribou has or will in the near future exceed the target by 10% or more, then regulations should be put in place to close all harvesting in areas occupied by the Bluenose-East herd.	Varied - Based on new 2010 estimate of the Bluenose-East herd, wildlife co-management boards and Aboriginal governments are reviewing information and the proposed target recommended by the WRRB and plan to develop a strategy which will be shared with affected wildlife co-management boards.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Incomplete; targets exceeded, and no regulations implemented
18	TG and GNWT have information to suggest that the harvest of Bluenose-East caribou has or will or in the near future materially exceed 420 cows, then regulations should be put in place to close all harvesting in areas occupied by the Bluenose-East herd.	Varied (as per response #15) - Based on new 2010 estimate of the Bluenose-East herd, wildlife co-management boards are reviewing information and proposed harvest targets recommended by WRRB.	Closely monitor and report harvest such that if it exceeds the target, actions can be taken to ensure no further harvest occurs	Incomplete; targets exceeded, and no regulations implemented
19	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual fall hunt, areas within which the harvest will be attributed to the Bluenose-East caribou herd.	Accepted (as per response # 12)	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
20	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual winter hunt, areas within which the harvest will be attributed to the Bluenose-East caribou herd.	Accepted (as per response #13)	Ensure that the public know where the Bathurst and Bluenose-East caribou herds reside such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time

21	TG and GNWT do not provide harvester assistance and/or incentives to access the Bluenose-East herd.	Rejected - GNWT and TG agree that conservation measures for the Bluenose-East herd are required. However, GNWT had previously agreed to provide support to construct a winter road to Hottah Lake so that people from Wekweètì could access the Bluenose-East herd as a measure to reduce pressure on Bathurst caribou herd, whose numbers are still very low.	Allow for alternative harvest opportunities while not placing undo pressure on adjacent herds.	Recommendation rejected - CHAP funding provide to assist harvesters for fall hunts to access Bluenose-East caribou.
22	TG consider negotiating caribou harvesting overlap agreements with Nunavut and the Sahtú region to make certain that existing relationships endure.	Varied - TG will consider.	Ensure informal traditional harvest sharing agreements among Aboriginal groups continue to be respected into the future.	Incomplete; no agreements negotiated
23	All commercial, outfitted and resident harvesting from the Ahiak caribou herd within Wek'èezhìı be set to zero in order to prevent incidental harvest of Bathurst caribou for 2010-2013.	Accepted	Reduce harvest of the Ahiak caribou herd and set priority to Aboriginal harvest. Reduce incidental harvest of Bathurst caribou herd.	Completed
24	TG and GNWT do not provide harvester assistance and/or incentives to access the Ahiak herd.	Rejected - GNWT and TG did not provide support for fall caribou harvests in 2010. However, for GNWT, it may be necessary to provide some assistance as part of accommodation for limiting harvest of the Bathurst herd. GNWT is working with harvesters to carefully monitor the harvest of the Ahiak herd.	Allow for alternative harvest opportunities while not placing undo pressure on adjacent herds.	Recommendation rejected - CHAP funding provide to assist harvesters for fall hunts to access Ahiak caribou.
25	TG consider negotiating caribou harvesting overlap agreements with Nunavut and the Akaitcho region to make certain that existing relationships endure.	Varied (as per recommendation # 22 for overlap agreements with Nunavut) - TG currently has a boundary agreement with Akaitcho.	Ensure informal traditional harvest sharing agreements among Aboriginal groups continue to be respected into the future.	Incomplete; no agreement negotiated with Nunavut; overlap agreement in place with Akaitcho.

26	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual <u>fall</u> hunt, areas within which the harvest will be attributed to the Ahiak caribou herd.	Accepted (as per response #12)	Ensure that the public know where the Ahiak caribou herd resides such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
27	GNWT should, in discussion with TG and other Aboriginal groups, identify and make public, prior to the annual <u>winter</u> hunt, areas within which the harvest will be attributed to the Ahiak caribou herd.	Accept (as per response #13)	Ensure that the public know where the Ahiak caribou herd resides such that requirements for harvest restrictions and reporting are known.	Incomplete; information not consistently provided on time
28	TG implement the Special Project, Using Tłı̨chǫ Knowledge to Monitor Barren Ground Caribou of the overall TK Research and Monitoring Program.	Varied - TG will be implementing the project based on its obligations and commitments pursuant to the provisions in the Tłı̨chǫ Agreement. Start date of the TK Research and Monitoring Program is anticipated in summer 2011.	Harvest monitoring to be controlled at community level and done in a manner that is consistent with Tłı̨chǫ cultures of sharing information and building knowledge.	Incomplete; not implemented

PREAMBLE: (#29-39) - The Tłįchǫ Government agrees with the recommendations 28-42 of the Recommendation Report related to the Revised Joint Proposal on Caribou Management Actions in Wek'èezhìı. We are committed to documenting and reporting on observations and trends observed by caribou harvesters and elders. Implementation of the Tłįchǫ Knowledge Research and Monitoring Program: Special Project, Using Tłįchǫ Knowledge (to Monitor Barren Ground Caribou' will take approximately eight months. The traditional monitoring system continues among the harvesters and elders. Nevertheless, the logistics of realizing a system that will rigorously and accurately document and report harvesters' observations and trends have yet to be initiated. The program requires trained Tłįchǫ researchers, offices, and equipment, all of which requires a realistic annual budget and extensive fundraising with those who will also benefit from Tłįchǫ knowledge research and monitoring.				
29	TG and GNWT implement the *spring calf survival* monitoring action as identified for TK and SK.	Scientific: Accepted - GNWT will provide the Board with a power analysis of how frequently spring composition surveys are required. GNWT has not recently used collars to assess cow mortality rate. GNWT would appreciate any suggestions from the Board on alternative methods to estimate cow mortality. Because the existing numbers of radio-collars on the Bathurst herd are insufficient to reliably monitor cow mortality rates, the Joint Proposal emphasized annual calving reconnaissance surveys to monitor the trend in the herd's numbers of breeding cows. High mortality rates in cows would translate to a declining trend in numbers of cows on the calving ground: low cow mortality rates would translate to increasing numbers of cows on the calving ground. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not implemented SK - Completed

30	TG and GNWT implement the *health and condition* monitoring action as identified for TK and SK.	Scientific: Accepted - GNWT expects that some Bathurst cows will be taken by hunters; therefore, sample kits will be available to all hunters to record basic information on health, condition and pregnancy rates of cows. Details of samples to be collected will be provided to TG community caribou monitors and GNWT staff. Typically, community hunts are an opportune time to take such samples. TK – See Preamble	Monitor the health and condition of Bathurst, Bluenose-East and Ahiak caribou in a way that does not increase the harvest of cows or take away from community harvest of cows.	TK - Incomplete; Special Project not implemented SK -Incomplete; no systematic approach
31	TG and GNWT implement the *birth rate* monitoring action as identified for TK and SK.	Scientific: Varied - Birth rate information will be collected in different ways for different herds. - For example, the size of the Ahiak and Bathurst caribou herds is estimated using the calving ground photo census surveys. Birth rate is estimated from a composition survey that is conducted on the calving ground right after the photo census. - This photo census technique is not usually used for the Bluenose-East herd (rather, herd size is estimated from a post-calving ground photo census survey). Instead, pregnancy rates are based on information collected from harvested Bluenose-East cows, and indirectly from composition surveys that assess the calf:cow ratio. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not completed SK - Completed

32	TG and GNWT implement the *adult sex ratio and fall calf survival* monitoring action as identified for TK and SK.	Scientific: Accepted - The result of the fall composition survey is one of the parameters used to determine a population estimate for the Bathurst and Ahiak herds. Fall adult sex ratio surveys for these herds are planned for 2011 and 2012 prior to photographic survey scheduled for 2011 (Ahiak/Beverly) and 2012 (Bathurst). The next Bluenose-East fall adult sex ratio survey is planned for 2011 to get more basic information on the number of bulls and cows for this herd. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not implemented SK - Incomplete; survey not conducted annually
33	TG and GNWT implement the *estimate of herd size* monitoring action as identified for TK and SK.	Scientific: Accepted - GNWT will work with all partners to undertake the: • Bathurst calving ground photo survey in June 2012. • Ahiak calving ground photo survey in 2011. • Bluenose-East post calving ground survey in 2012 or 2013. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	TK - Incomplete; Special Project not implemented SK - Completed

34	TG and GNWT implement the *wolf abundance (den occupancy)* monitoring action as identified by TK and SK.	Scientific: Varied - GNWT will continue with current wolf den surveys, which provide an index of wolf abundance. GNWT in consultation with the TG will provide a proposal with potential options and costings that are relevant to wolf monitoring, research, and management. The Parties will continue to explore new options with respect to monitoring and managing wolves. TK – See Preamble	Monitor wolf abundance as well as health and condition as it relates to productivity.	TK - Incomplete; Special Project not implemented SK - Completed
35	TG and GNWT implement the *wolf condition and reproduction* monitoring action as identified by TK and SK.	Scientific: Accepted - Through the Genuine Mackenzie Valley Fur Program the GNWT provides harvesters $200 for each intact wolf carcass and will provide a collection report to the WRRB and TG in June 2011 on the carcass collection. TK – See Preamble	Monitor wolf abundance as well as health and condition as it relates to productivity.	TK - Incomplete; Special Project not implemented SK - Completed, but no report
36	TG and GNWT implement the *wolf harvest* monitoring action as identified by TK and SK.	Scientific: Accepted - GNWT will provide a report to the WRRB and TG in June 2011 on wolf harvest data. TK – See Preamble	Monitor wolf harvest to assess if harvest incentives have led to changes in harvest.	TK - Incomplete; Special Project not implemented SK - Completed
37	TG and GNWT implement the *state of habitat* monitoring action as identified by TK and SK.	Scientific: Varied - GNWT will continue to provide an annual report to the WRRB and TG on fire activity. GNWT expects a number of research projects investigating the impact of fires on caribou habitat to be completed in 2012 and will provide an annual progress report to the WRRB and TG. GNWT will continue to explore new ways to monitor landscape change	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	TK - Incomplete; Special Project not implemented SK - Incomplete; no report provided

		driven by industrial exploration and development with our partners (e.g., INAC). TK – See Preamble		
38	TG and GNWT implement the *pregnancy rate* monitoring action as identified by TK and SK.	Scientific: Accepted - Note: GNWT will make available, sample kits to hunters so that any Bathurst or Bluenose-East cows that are harvested can be tested to determine pregnancy rates. The community hunts are opportune times to do this work. TK – See Preamble	Monitor the health and condition of Bathurst, Bluenose-East and Ahiak caribou in a way that does not increase the harvest of cows or take away from community harvest of cows.	TK - Incomplete; Special Project not implemented SK -Completed
39	GNWT implement the *density of cows on calving ground* monitoring action as identified.	Scientific: Varied - GNWT will undertake these surveys for the Bluenose-East, Bathurst and Ahiak herd in 2011 and 2012. TK – See Preamble	Ensure scientific monitoring of the Bathurst, Bluenose-East and Ahiak herds is conducted on an annual cycle such that management authorities can assess the status of the herd with the best available information at hand. This includes spring composition, calving reconnaissance, calving ground composition and fall composition. Calving or post-calving population surveys are to be completed in spring/summer 2012.	Completed
40	TG implement the *caribou harvest* monitoring action as identified.	Varied - GNWT and TG will continue to work with harvesters to report harvests. Methods will be based on the last 2 years of harvest monitoring in the Tłı̨chǫ communities. A community-based program will be developed in the 2010/11 season.	Harvest monitoring to be controlled at community level and done in a manner that is consistent with Tłı̨chǫ cultures of sharing information and building knowledge.	Incomplete; information not consistently provided

41	TG and GNWT reporting on monitoring results to the WRRB and the general public a minimum of three times per year in April, September and December. April meeting changed to late-May.	Accepted -To make information available to the public, GNWT will also post reports provided to the WRRB on the GNWT website.	Share information in a timely manner with management authorities and the public.	Incomplete; information not consistently provided
42	TG develop and implement a TK conservation education program to support the relationship and respect Tłı̨chǫ have for caribou.	Accepted - TG has developed a Tłı̨chǫ Ekwo Working Group (TEWG) which held its orientation workshop on Dec 13-15. This group will assess and make recommendations for the TK conservation education program.	Ensure Tłı̨chǫ and other Aboriginal harvesters follow traditional practices with respect to appropriate harvest practices. Ensure that harvesters are not wasting or wounding animals that are not retrieved.	Incomplete; not implemented
43	GNWT develop and implement a scientific conservation education program to foster an increased appreciation of the resource.	Accepted - GNWT will undertake this work jointly with TG in Wek'èezhìı and with other Aboriginal groups outside of Wek'èezhìı. GNWT will prepare facts sheets that will be posted on the GNWT website. GNWT has developed an interactive Caribou Educational Program that can be used in schools for youth to learn about scientific management practices.	Ensure Tłı̨chǫ and other Aboriginal harvesters follow traditional practices with respect to appropriate harvest practices. Ensure that harvesters are not wasting or wounding animals that are not retrieved.	Completed
44	TG and GNWT implement a process of information flow, review and assessment.	Varied - The flow chart from the WRRB recommendation on page 44 suggests that the TK and scientific programs will be developed independently of one another. TG and GNWT would like to see a more integrated strategy between science and TK as discussed in the joint revised proposal.	Establish a process for sharing information in a timely manner among management authorities, to discuss the implementation of management actions and how well they are working. Increase communication among the management authorities. Provide an opportunity to review the efficacy of management actions	Completed: Barren-ground Caribou Technical Working Group created

			and make revisions if necessary.	
46	Criteria be developed by TG and GNWT for assessing success or failure that would indicate when management actions are to be revised, including reinstatement of harvest for residents, outfitters and commercial tags.	Accepted - As per recommendations #4 and #6, these criteria will be developed as part of a long-term management plan.	Establish a process for sharing information in a timely manner among management authorities, to discuss the implementation of management actions and how well they are working. Increase communication among the management authorities. Provide an opportunity to review the efficacy of management actions and make revisions if necessary.	Incomplete; criteria not developed
47	GNWT continue discussions with the Government of Nunavut for identifying opportunities for calving ground protection.	Accepted - Note: This issue is also being raised in Nunavut by the Beverly and Qamanirjuaq Caribou Management Board (BQCMB). INAC is the primary land manager in the NWT and Nunavut. Discussion will need to take place with INAC and Nunavut.	Make progress on opportunities for minimizing impacts of development on the Bathurst, Bluenose-East and Ahiak caribou herds.	Completed; ongoing
48	GNWT and INAC collaboratively develop best practices for mitigating effects on caribou during calving and post-calving, including the consideration of implementing mobile caribou protection measures.	Varied - This can be tied into the long-term management plan. Discussion will be needed to take place with INAC and Nunavut.	Ensure development on calving and post-calving ranges of the Bathurst, Bluenose-East and Ahiak herds does not unduly affect the sustainability of these herds.	Incomplete; not implemented
49	TG work towards development and implementation of a land use plan for Wek’èezhìı, including the consideration of thresholds for industrial land use.	Rejected - As per chapter 22.5 of the Tłı̨chǫ Agreement, it is the responsibility of Canada or GNWT to develop and implement a land use plan for Wek’èezhìı.	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	Recommendation rejected - GNWT responsibility; Tłı̨chǫ Land Use Plan completed

50	GNWT and INAC monitor landscape changes, including fires and industrial exploration and development, to assess potential impacts to caribou habitat.	Varied (as per response #37) - GNWT has carried out some cumulative effects modeling to assess effects to date of diamond mines on the Bathurst herd, and will continue to build on this modeling.	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	Incomplete; Bathurst Caribou Range Plan completed but not implemented
51	TG and GNWT assess the need for forest fire control in areas of important caribou habitat.	Accepted	Ensure the landscape is managed in such a way that considers the sustainability of the Bathurst, Bluenose-East and Ahiak caribou herds.	Incomplete; no assessment completed
52	Harvest of wolves should be increased through the suggested incentives, except for assisting harvesters to access wolves on wintering grounds.	Accepted	Increase harvest of wolves to reduce predation pressure on Bathurst caribou herd.	Incomplete; incentives unsuccessful
53	Focused wolf control should not be implemented. If TG and GNWT believe that focused wolf control is required, a management proposal shall be provided to the WRRB for its consideration.	Accepted	Allow for assessment and review of wolf harvest incentives on an annual basis.	Incomplete; feasibility assessment completed but no management proposal submitted
54	TG and GNWT submit a joint management proposal for wood bison in Wek’èezhìı by the fall of 2011 to substantiate the establishment of zones and quotas made through the Interim Emergency Measure.	Varied - 10-year Wood Bison Management Plans for the Nahanni, Slave River Lowland, and Mackenzie herds are set to be completed by the winter of 2012. Development of these plans will review current interim harvest measures for Wood Bison in Wek’èezhìı. Draft plan will be provided to WRRB for approval. In December 2010, GNWT completed a regulation change to extend the season to September 1st.	Allow for harvest of wood bison to offset hardship of reduced Bathurst caribou harvest. Ensure bison harvest is sustainable in the long term through a management planning process.	Incomplete; not submitted

55	TG and GNWT work collaboratively to meet the obligations of Section 12.11 of the Tłı̨chǫ Agreement with support from WRRB staff as needed and a meeting be convened by January 2011.	Accepted	Develop guidance on managing caribou herds through abundance cycles by undertaking a collaborative management planning process.	Completed; ongoing
56	TG increase their capacity to ensure full participation in monitoring and management of caribou.	Accepted	Provide a forum for discussion of scientific and traditional ways of understanding caribou ecology. Allow for Tłı̨chǫ communities to be partners in management and decision-making.	Completed; Wildlife Coordinator hired
57	GNWT, TG and INAC implement its recommendations no later than January 1, 2011. GNWT's Emergency Interim Measures, put into effect on January 1, 2010, should remain in place until then.	Varied - Will be incorporated as part of the implementation plan.	Ensure timely implementation of management actions and that they are understood by Tłı̨chǫ and other Aboriginal harvesters.	Completed
58	TG and GNWT conduct consultations regarding the Recommendations Report prior to January 1, 2011.	Accepted	Ensure timely implementation of management actions and that they are understood by Tłı̨chǫ and other Aboriginal harvesters.	Completed
59	TG and GNWT develop a detailed implementation and consultation plan incorporating the WRRB's recommendations as soon as possible.	Accepted	Ensure timely implementation of management actions and that they are understood by Tłı̨chǫ and other Aboriginal harvesters.	Completed
60	GNWT develop and implement an effective and continuing enforcement and compliance program.	Accepted - The current protocol for GNWT enforcement and compliance program is effective. However, given the scope of the issues GNWT has enhanced its program to be a partnership with other affected Aboriginal organizations.	Ensure that harvest limits are respected, and that wastage and wounding loss is minimized.	Completed

APPENDIX E Review of 2016 Proceeding & Decisions

E.1 Receipt of 2015 Joint Proposal

On December 15, 2015, the TG and ENR submitted the *"Joint Proposal on Caribou Management Actions for the Bathurst Herd: 2016-2019"* to the WRRB outlining proposed management actions for the Bathurst ʔekwǫ̀ herd in Wek'èezhìı, including new restrictions on hunter harvest, predator management to reduce dìga populations on the winter range of the Bathurst ʔekwǫ̀ herd and ongoing monitoring. More specifically, TG and ENR proposed the closure of all harvesting of the Bathurst ʔekwǫ̀ herd and the development of mobile dìga-hunter camps. The WRRB considered the proposed restriction of harvest as the establishment of a TAH and, therefore, was required to hold a public hearing.

The Board initiated its 2016 Bathurst Caribou Herd Proceeding on January 18, 2016 and established an online public registry: http://www.wrrb.ca/public-information/public-registry. The public hearing took place February 23-24, 2016 in Yellowknife, NT. Final written arguments were submitted by registered intervenors on March 8, 2016, and by TG and ENR on March 11, 2016. The public record was closed on March 18, 2016 and the WRRB's deliberations followed.

E.2. 2016 Board Decision

The WRRB concluded, based on all available Aboriginal and scientific evidence, that a serious conservation concern exists for the Bathurst ʔekwǫ̀ herd and that additional management actions are vital for herd recovery. However, in order to allow careful consideration of all of the evidence on the record and to meet legislated timelines, the WRRB decided to prepare two separate reports to respond to the proposed management actions in the joint management proposal.

The first report, Part A, dealt with the proposed harvest management actions that required regulation changes in order for new regulations to be in place for the start of the 2016/17 harvest season, as well as the proposed dìga feasibility assessment. The second report, Part B, dealt with additional predator management actions, biological and environmental monitoring, and cumulative effects.

On May 27, 2016, the WRRB submitted its final determinations and recommendations and Part A Reasons for Decision Report to TG and GNWT. The WRRB determined that a total allowable harvest of zero shall be implemented for all users of the Bathurst ʔekwǫ̀ herd within Wek'èezhìı for the 2016/17, 2017/18, 2018/19 harvest seasons. As monitoring of the ʔekwǫ̀ wildlife management units and Bathurst ʔekwǫ̀ harvest are intricately linked to the implementation of a TAH, the Board recommended that TG and

ENR agree on an approach to designating zones for aerial and ground-based surveillance throughout the fall and winter harvests seasons from 2016 to 2019. Additionally, the WRRB recommended timely implementation of hunter education programs in all Tłı̨chǫ communities.

The Community-based Dìga Harvesting Project, proposed by TG and ENR as a pilot training program, was to train Tłı̨chǫ harvesters, in a culturally appropriate manner, to hunt and trap dìga on the Bathurst herd range. The Board continued to support the Project as a training program, with recommendations related to implementation and assessment.

The WRRB also recommended that the dìga feasibility assessment set out in the proposal be led by the Board with input and support from TG and ENR. The feasibility assessment would primarily be an examination of all options for dìga management, including costs, practicality and effectiveness.

On September 27, 2016, the WRRB submitted its final recommendations and Part B Reasons for Decision Report to TG and GNWT. The WRRB recommended consultations with Tłı̨chǫ communities to determine a path forward for implementation of Tłı̨chǫ laws to continue the Tłı̨chǫ way of life and maintain their cultural and spiritual connection with ʔekwǫ̀.

In addition, the WRRB recommended several Tłı̨chǫ Knowledge (TK) research and monitoring programs focusing on dìga, sahcho, stress and other impacts on ʔekwǫ̀ from collars and aircraft over-flights, and an assessment of quality and quantity of both summer and winter forage.

The Board recommended a biological assessment of sahcho as well as requesting that the Barren-ground Caribou Technical Working Group (BGCTWG) prioritize biological monitoring indicators and develop thresholds under which management actions can be taken and evaluated. All scientific and TK monitoring data will be provided to BGCTWG annually to ensure ongoing adaptive management.

The WRRB recommended the implementation of Tłı̨chǫ Land Use Plan Directives as well as completing a Land Use Plan for the remainder of Wek'èezhìı. In addition, the completion of the Bathurst Caribou Range Plan and the long-term Bathurst Caribou Management Plan are requested with measures to be implemented in the interim to provide guidance to users and managers of the Bathurst ʔekwǫ̀ herd range.

The Board recommended the development of criteria to protect key ʔekwǫ̀ habitat, including water crossings and *tataa* (corridors between bodies of water), using the Conservation Area approach in the NWT's *Wildlife Act*, offsets and value-at risks in a fire management plan. Additionally, the WRRB recommended the continued refinement of the Inventory of Landscape Change (ILC), the integration of Wildlife and Wildlife Habitat Protection Plans (WWHPP) and Wildlife Effects Monitoring Programs (WEMP) objectives for monitoring the effects of development on ʔekwǫ̀ in Wek’èezhìı, and the development of monitoring thresholds for climate indicators.

APPENDIX F Review of 2016 WRRB Determinations and Recommendations

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
Determination #1-2016	A total allowable harvest of zero for all users of the Bathurst ʔekwǫ̀ herd within Wek’èezhìı be implemented for the 2016/17, 2017/18, 2018/19 harvest seasons. For further clarification, the absolute number of caribou that can be harvested from the Bathurst herd is zero.	Accepted	♦ Completed
Recommendation #1-2016:	The Board recommends that TG and ENR come to an agreement on whether the MCBCMZ or Wildlife Management Units Subzones is the most effective way to differentiate between ʔekwǫ̀ herds, and then implement the approach with criteria for managing any overlaps between herds, for the 2016/17, 2017/18, and 2018/19 harvest seasons.	Accepted	♦ Completed
Recommendation #2-2016	The Board recommends that TG and ENR provide weekly updates to the WRRB and the general public on aerial and ground-based surveillance of the Bathurst ʔekwǫ̀ herd throughout the fall and winter harvest seasons for the 2016/17, 2017/18, and 2018/19.	Accepted	♦ Completed
Recommendation #3-2016	The Board recommends that TG and ENR increase public education efforts and implement ENR’s recently developed Hunter Education program in all Tłı̨chǫ communities.	♦ Accepted	♦ Completed
Recommendation #4-2016	The WRRB continues to support the implementation of the Community-based Dìga Harvesting Project, as a training program only, subject to the following conditions: a) If the Project is to be expanded to other Tłı̨chǫ communities, a management proposal must be submitted to the WRRB for review and approval. b) If the Project is to be expanded in scope, prior to the submission of a management proposal to the	 a) Accepted b) Accepted	♦ Incomplete

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	WRRB, an index of changing wolf abundance must be available and research on habitat quality and quantity on the Bathurst ʔekwǫ̀ herd range must be conducted; c) TG and ENR must inform the WRRB of the following prior to the start of the Project: i. How aerial and/or ground-based to disturbance to Bathurst ʔekwǫ̀ will be prevented or minimized? How will this potential disturbance be measured, assessed, and mitigated?; ii. How will unintentional or accidental harvest of Bathurst ʔekwǫ̀, by the Tłı̨chǫ dìga harvesters, be prevented? If a Bathurst ʔekwǫ̀ is harvested, how will TG and ENR report to the WRRB?; and, iii. How will the facilitation of wolf movements through the wolves' use of skidoo trails be prevented or minimized?; d) TG and ENR must communicate regularly about the Project with Tłı̨chǫ communities and the WRRB. Specifically, the Board requests an update prior to start up of the Project in December 2016 and a follow-up on the success of the Project in May 2017. As well, TG and ENR must report monthly on the Project, including numbers, age, sex and pregnancy rates of wolves harvested and location of wolf harvest, to the WRRB; e) The Project must be curtailed or stopped should negative impacts to the Bathurst ʔekwǫ̀ occur; and, f) TG and ENR must establish a threshold or criteria to evaluate	c) Accepted d) Accepted e) Accepted f) Accepted	

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	the success of the program, i.e. the effectiveness of training a core set of wolf harvesters, the acceptance of the Project by Tłı̨chǫ communities, continued program implementation and reaching the target number of dìga harvested.		
Recommendation #5-2016	The WRRB recommends TG and ENR support a collaborative feasibility assessment of options for dìga management, led by the Board.	♦ Varied	♦ Completed
Recommendation #1B-2016	The WRRB recommends that TG consult with Tłı̨chǫ communities, by March 2017, to ensure Tłı̨chǫ laws are implemented with respect to ʔekwǫ̀ harvesting practices to maintain the Tłı̨chǫ way of life and their relationship with ʔekwǫ̀.	♦ Varied – remove implementation piece	♦ Incomplete
Recommendation #2B-2016	WRRB recommends that TG conduct TK research to define, from the Tłı̨chǫ perspective, types of dìga, their behavior and their annual range, and their relationship with ʔekwǫ̀ and people by March 2017.	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one comprehensive study	♦ Incomplete
Recommendation #3B-2016	The WRRB recommends that TG conduct TK research on sahcho predation on ʔekwǫ̀, and their relationship with ʔekwǫ̀, other wildlife and people by June 2017.	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one comprehensive study	♦ Incomplete
Recommendation #4B-2016	The WRRB recommends that TG and ENR conduct a collaborative sahcho biological assessment, following the completion of the ongoing dìga feasibility assessment. The assessment should include summarizing available information on sahcho abundance, movement and diet for the Bathurst ʔekwǫ̀ herd's seasonal ranges as well as including TK collected in Recommendation #3B-2016.	♦ Varied – Will complete SARC report and engage with GN to discuss current information available in Nunavut	♦ Incomplete - Ongoing
Recommendation #5B-2016	The WRRB recommends that TG conduct TK research about stress and impacts on ʔekwǫ̀ and people related to collars and aircraft over-flights by	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one	♦ Incomplete

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	September 2017, which should be considered in determining number of collars deployed in 2018 and beyond.	comprehensive study	
Recommendation #6B-2016	The WRRB recommends that ENR determine whether reconnaissance surveys should be conducted during non-photo survey years with renewable resource boards, Aboriginal governments and other affected organizations in the NWT and Nunavut prior to conducting the next reconnaissance survey in June 2017.	♦ Varied- BGCTWG will review the value. BCAC should review survey methods once formed.	♦ Incomplete; no longer required as eliminated per 2019 proposed action
Recommendation #7B-2016	The WRRB recommends that TG and ENR provide a summary of scientific and TK monitoring data, including harvest and collar mortalities, as soon as available each year, to the BGCTWG.	♦ Accepted	♦ Incomplete – inconsistent reporting
Recommendation #8B-2016	The WRRB recommends that the BGCTWG prioritize biological monitoring indicators in order of need for effective management and develop thresholds under which management actions can be taken and evaluated. Implementation of this recommendation should be completed by no later than the end of March 2017.	♦ Varied – BGCTWG to review biological indicators to assess priorities for monitoring, particularly under budget constraints.	♦ Incomplete - to be addressed as part of the adaptive management framework.
Recommendation #9B-2016	The WRRB recommends that TG refine and implement Tłı̨chǫ Land Use Plan Directives, under Chapter 6 related to ʔekwǫ̀, land use and cumulative effects by March 2018.	♦ Accepted ♦ TG acknowledges suggestion and advises the Board that it intends to refine and implement the Tlicho LUP directives related to caribou. TG notes that land use planning in Wek'èezhìı is beyond the jurisdiction of the Board.	♦ Incomplete
Recommendation #10B-2016	The WRRB recommends that TG and ENR initiate, develop and implement	♦ Rejected	♦ n/a - rejected

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	a land use plan for Wek'èezhìı by March 2019.	♦ GNWT vary. Suggests that GNWT work collaboratively with TG, federal government, and other Aboriginal Government Organizations and planning partners to initiate, develop and implement a government-led approach to land use planning for public lands in Wek'èezhìı. GNWT notes that this suggestion goes beyond the authority of the Board (should be a suggestion, not a recommendation). ♦ TG agrees in substance with GNWT.	
Recommendation #11B-2016	The WRRB recommends ENR complete the Bathurst Caribou Range Plan, with an implementation strategy, by March 2018. In the interim, the Board recommends that ENR develop interim thresholds for developments and other human activities within the range of the Bathurst ʔekwǫ̀ herd by March 2017.	♦ Varied – draft thresholds will be provided by March 2017, and final draft by March 2018	♦ Completed
Recommendation #12B-2016	The WRRB recommends that TG and ENR complete and implement a long-term Bathurst Caribou Management Plan, with associate Action Plan, by March 2018.	♦ Varied – will include other parties with lead from the Bathurst Caribou Herd Cooperative Advisory Committee	♦ Incomplete - Ongoing
Recommendation #13B-2016	The WRRB recommends TG and ENR develop criteria under which the Conservation Area approach in the NWT's *Wildlife Act* will be used to	♦ Varied –Bathurst caribou range planning process to determine when	♦ Incomplete; conservation areas noted as tool in

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	protect key ʔekwǫ̀ habitat by March 2018.	to protect key habitat by March 2018.	Bathurst Caribou Range Plan
Recommendation #14B-2016	The WRRB recommends that TG and ENR develop criteria to protect ʔekwǫ̀ water crossings and tataa from exploration and development activities in the NWT. The criteria should be developed by March 2018 and included in the Bathurst Caribou Range Plan and Tłı̨chǫ Land Use Plan.	♦ Accepted	♦ Incomplete; conservation areas noted as tool in Bathurst Caribou Range Plan
Recommendation #15B-2016	The WRRB recommends TG and ENR investigate and report to the WRRB and other stakeholders on the potential use of offsets for ʔekwǫ̀ recovery to compensate for losses caused by exploration and development activities by March 2018. A set of criteria should be developed to assess the effectiveness of each type of offset as it is investigated.	♦ Accepted	♦ Incomplete
Recommendation #16B-2016	The WRRB recommends that ENR continue to refine and update the Inventory of Landscape Change to ensure a comprehensive and standardized database of human and natural disturbance in the NWT.	♦ Accepted	♦ Completed
Recommendation #17B-2016	The WRRB recommends that TG and ENR integrate WEMP and WWHPP objectives and standardize approaches for monitoring the effects of development on ʔekwǫ̀ in Wek'èezhìı	♦ Accepted	♦ Completed
Recommendation #18B-2016	The WRRB recommends that TG and ENR complete and implement a fire management plan with criteria identifying under which the key ʔekwǫ́ habitat is defined as a value-at-risk by March 2018.	♦ Varied – involve community members in identifying important caribou habitat. Caribou habitat lower priority for habitat protection than property	♦ Incomplete
Recommendation #19B-2016	The WRRB recommends TG conduct a TK monitoring project with elders to	♦ Varied – combined 2B, 3B,	♦ Incomplete

Recommendation #	WRRB Recommendations	TG/GNWT Responses	Status
	document how climate conditions have affected preferred summer forage and impacted ʔekwǫ̀ fitness by September 2018.	5B, 19B, and 20B into one comprehensive study	
Recommendation #20B-2016	The WRRB recommends that TG conduct TK monitoring to assess the quality and quantity of winter forage by September 2018.	♦ Varied – combined 2B, 3B, 5B, 19B, and 20B into one comprehensive study	♦ Incomplete
Recommendation #21B-2016	The WRRB recommends that the BGCTWG develop monitoring thresholds for climate indicators by March 2017.	♦ Varied – Need clarity on what is meant by climate indicators but agrees the research is necessary	♦ Incomplete – to be addressed as part of the adaptive management framework.

APPENDIX G WRRB Predator Management Recommendations and Government Response

APPENDIX H Tłı̨chǫ Research and Monitoring Program

ᕿᖓᒑᐅᑦ ᑐᒃᑐᖏᑦ (Kǫk’èetì Ekwǫ [ᑰᑮᑎ ᐃᐊᒃᕗ])

ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᖏᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑮᐅᔾᔪᑎᖏᑦ	ᑮᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖅᑖᓪ	ᐱᓕᕆᒻᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓛᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᑲᑎᒪᓪᓗᒋᑦ ᐱᑕᕐᕕᐅᔪᓐᓇᖅᑐᑦ						
ᕗᐃᑮᓰ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐃᓱᒪᓕᐅᕈᑎᖏᑦ #1-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)	ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᓕᐅᖅᓯᒪᕗᑦ ᑲᑎᓪᓗᒋᑦ ᐱᑕᕐᕕᐅᔪᓐᓇᖅᑐᑦ (TAH) ᐱᑕᕐᕕᐅᔪᓐᓇᙱᓐᓂᖏᑕ ᑕᒪᐃᓐᓄᑦ ᐊᑐᖅᐸᑦᑐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓐᓂᒃ ᐅᑭᐅᖏᑦ 2019/2020 ᐊᒻᒪᓗ 2020/2021 ᐊᖑᓇᓱᐊᕐᕕᐅᔪᓐᓇᕐᓂᖏᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ. ᓇᓗᓇᐃᕆᐊᒃᑲᓂᕐᓂᐊᕐᓗᒍ, ᖃᔅᓱᐅᓪᓚᕆᓐᓂᖏᑦ ᐃᐊᒃᕗ, ᐱᑕᖅᑕᐅᔪᓐᓇᖅᑐᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓐᓂᑦ Wek’èezhìı (ᕗᐃᑮᓰᒥ) ᐱᑕᖅᕕᐅᔪᓐᓇᙱᒻᒪᑕ.	ᓈᒻᒪᒋᔭᐅᔪᑦ	Tłįchǫ (ᑎᓖᓯ) ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑕᒪᑐᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᒥᒃ ᐱᔾᔪᑎᒋᓪᓗᒍ ᕗᐃᑮᓲᓐᓂᑦ ᓈᒻᒪᒃᓴᐃᓯᒪᒻᒪᑕ ᐊᒻᒪᓗᒃᑲᓂᖅ ᖁᔭᓕᓯᒪᓪᓗᑎᒃ ᑲᑎᒪᔨᐅᔪᓄᑦ ᓴᙱᓂᖅᓯᐊᖅᑐᒥᒃ ᐸᐸᑭᓂᖅᑫᓯᐊᕐᓂᖏᓐᓄᑦ ᐊᒻᒪᓗ ᑭᒡᓕᖅᑲᓕᖅᑎᑦᓯᖁᔨᓂᖏᓐᓄᑦ ᐱᑕᖃᖅᑕᐅᔪᓐᓇᖅᑐᓂᒃ ᑖᒃᑯᓇᙵᑦ ᓄᖑᕙᓪᓕᐊᓪᓗᑎᒃ ᐊᒥᕐᕋᑦᑎᐅᔪᓂᑦ. ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᑲᓂᕈᓐᓇᖅᑐᓕᕆᔨᖏᑦ (ENR) ᐋᖅᑮᕆᐊᕐᓂᐊᖅᑐᑦ ᒪᓕᒃᑕᐅᕆᐊᓕᕐᑯᑎᓂᒃ ᐋᖅᑮᕆᐊᖃᓕᕐᖓᒥᒃ ᐃᑐᓕᖅᑎᖁᓂᐊᕐᓂᕐᒥ ᑖᓯᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᕗᐃᑮᓲᑦ ᐊᒻᒪᓗ ᐃᓚᖏᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᓄᑦ ᑐᒃᑐᓂᒃ ᐊᐅᓚᔪᓂᖅᕕᐅᓪᓗᑎᒃ ᐊᕙᑎᒋᔭᐅᔪᓄᑦ ᐱᕕᒃᓴᖃᑐᐊᕈᑎᒃ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᐊᑐᓕᖅᑎᑕᐅᓯᒪᓂᖓᑦ ᑎᓯᐱᕆ 10, 2019	ᐃᓗᐃᒃᑯᐅᔪᑦ

ᐊᑐᓕᖅᑎᑕᐅᖁᔭᐅᓪᓗᑎᒃ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑮᐅᔾᔪᑎᖏᑦ	ᑮᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖅᑖᓪ	ᐱᓕᕆᒻᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓛᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᐊᑐᕐᓂᖅᑲᓂᖏᑦ ᐅᐊᔭᕕᐅᔪᓐᓇᖅᑐᓂ						
ᕗᐃᑮᓰ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #1-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)	ᖃᐅᔨᒋᐊᕐᓂᐊᕐᓗᒋᑦ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᕿᖓᒑᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᐅᓚᓂᖅᑏᐊᕋᓗᐊᕆᐊᖏᑕ ᐱᔾᔪᑎᖃᖅᑎᑕᐅᓂᐊᓚᐅᕐᓂᕐᒥᑦᑎᒍᑦ, ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᖃᓄᑎᒋ ᖃᓕᕇᓕᖅᓯᒪᓂᖅᑲᖅᕕᐅᔪᓂᒃ ᐊᓯᖏᓂᑦ ᐊᒥᕐᕋᑦᑎᕆᔭᐅᔪᓄᑦ ᐅᑭᐅᒫᖅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐅᑭᐅᓪᓚᕆᐅᓕᖅᑎᓪᓗᒍ ᐱᔭᕇᖅᓯᒪᓕᕈᑎᒋᓂᐊᕋᒥᑦ ᐊᒥᓲᓂᕆᔭᐅᔪᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᐅᔨᒋᐊᕈᒥᓂᐊᖅᑕᒥᓐᓄᑦ ᐃᖏᕋᕐᑎᐊᕐᒪᖕᓕᑦ ᕿᖓᒑᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᒻᒪᓗ ᐱᔭᕆᓇᑎᒃ ᐱᑕᖅᓯᒪᓂᖅᑲᕈᓐᓇᕐᓂᕐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓂᒃ ᐊᒻᒪᓗ ᓴᖅᑮᓯᒪᓕᕐᓂᐊᕐᓗᒋᑦ ᕗᐃᑮᓰ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᖃᐅᔨᒋᐊᕈᑎᓕᐅᖅᑕᒥᓐᓂᒃ ᓯᕗᓂᖓᓂ ᕕᕗᐊᕆ 1, 2020	**ᐊᔾᔨᒌᙱᓐᓂᖅᑲᖅᕕᐅᔪᑦ** – ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒋᔭᐅᙱᓐᓂᖅᑲᖅᑐᑦ “ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #1-2019”-ᒥ ᐅᖃᖅᑕᐅᓯᒪᔪᓂ ᐃᒪᓐᓇ: ᖃᐅᔨᒋᐊᕐᓂᐊᕐᓗᒋᑦ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᕿᖓᒑᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᐅᓚᓂᖅᑏᐊᕋᓗᐊᕆᐊᖏᑕ ᐱᔾᔪᑎᖃᖅᑎᑕᐅᓂᐊᓚᐅᕐᓂᕐᒥᑦᑎᒍᑦ, ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᖃᓄᑎᒋ ᖃᓕᕇᓕᖅᓯᒪᓂᖅᑲᖅᕕᐅᔪᓂᒃ ᐊᓯᖏᓂᑦ ᐊᒥᕐᕋᑦᑎᕆᔭᐅᔪᓄᑦ ᐅᑭᐅᒫᖅᑎᓪᓗᒍ ᐊᒻᒪᓗ ᐅᑭᐅᓪᓚᕆᐅᓕᖅᑎᓪᓗᒍ ᐱᔭᕇᖅᓯᒪᓕᕈᑎᒋᓂᐊᕋᒥᑦ ᐊᒥᓲᓂᕆᔭᐅᔪᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᐅᔨᒋᐊᕈᒥᓂᐊᖅᑕᒥᓐᓄᑦ ᐃᖏᕋᕐᑎᐊᕐᒪᖕᓕᑦ ᕿᖓᒑᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᐊᒻᒪᓗ ᐱᔭᕆᓇᑎᒃ ᐱᑕᖅᓯᒪᓂᖅᑲᕈᓐᓇᕐᓂᕐᓄᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓂᒃ ᐊᒻᒪᓗ ᓴᖅᑮᓯᒪᓕᕐᓂᐊᕐᓗᒋᑦ ᕗᐃᑮᓰ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᖃᐅᔨᒋᐊᕈᑎᓕᐅᖅᑕᒥᓐᓂᒃ ᓯᕗᓂᖓᓂ ᒫᔾ 31, 2020.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᖏᖃᑎᒌᒃᓯᒪᔪᑦ ᐃᖏᕋᕐᓯᐊᖅᑑᓂᖓᑕ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᕿᖓᒑᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᑉ ᐊᕙᑎᖓᓂ (MCBCCA) ᖃᐅᔨᒋᐊᖅᑕᐅᕙᕆᐊᖃᕐᒪᑦ ᐊᑕᐃᓐᓇᖅᑐᒥᒃ. ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᒫᓐᓇᐅᔪᖅ ᓯᕗᓪᓕᖅᐹᓂᒃ ᐅᓂᒃᑳᓕᐅᕐᓕᖅᓯᒪᕗᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᖏᑦ ᐅᖃᐅᓯᖃᖅᓯᒪᓂᒃ ᐋᖅᑭᒃᓯᐃᕙᓪᓕᐊᓂᕐᒥᒃ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᕿᖓᒑᐅᑦ ᑐᒃᑐᓂᒃ ᒥᐊᓂᖅᓯᕝᕕᐅᔪᒥᒃ (MCBCCA) ᑕᐃᒪᙵᓂ 2015 ᐅᑭᐅᖓᓂᑦ, ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐃᓗᓕᖅᑲᖅᑏᑦ ᐃᖏᕋᕐᓯᐊᕐᓂᖅᑲᐅᓇᐊᖏᓐᓂᒃ ᑖᒃᑯᐊ ᐱᓕᕆᐊᖃᕈᑎᐅᔪᑦ. ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐃᓗᓕᖅᑲᓂᐊᖅᑐᑦ ᓄᓈᕈᐊᓕᐊᖑᓯᒪᔪᓂᒃ ᖃᓕᕇᓕᖅᓯᒪᓂᖅᑲᖅᕕᐅᔪᓂᒃ ᕿᖓᒑᐅᑉ ᐊᒥᕐᕋᑦᑎᖏᑕ ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᑦᑎᐅᔪᓄᑦ ᑐᕌᖓᑎᓪᓗᒋᑦ ᐅᐊᔭᕈᓐᓇᖅᑐᓂ ᐊᕙᑎᐅᔪᒧᑦ. ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐱᔭᕇᖅᑕᐅᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᓂᑦ (GNWT) ᐊᒻᒪᓗ ᑐᓂᔭᐅᓯᒪᓕᕐᓗᑎᒃ ᕗᐃᑮᓰ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᓂᖓᓂ ᒫᔾ 31, 2020.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕐᔪᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᒫᔾ 31, 2020	ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑮᐅᔾᔪᑎᖏᑦ	ᑮᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖅᑖᓪ	ᐱᓕᕆᒻᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓛᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᓄᓇᓕᐅᔪᓂᑦ ᓇᐅᑦᓯᖅᑐᐃᔮᖅᑲᕐᓂᖅ						
ᕗᐃᑮᓰ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #2-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)	ᐊᑐᖅᑕᐅᓕᕐᑯᓪᓗᒋᑦ ᐊᖑᓇᓱᐊᖅᑏᑦ ᖃᐅᔮᒪᓂᖅᑲᖅᑎᒍᑦ ᓇᐅᑦᓯᖅᑐᐃᔮᐅᓕᖅᑎᓪᓗᒋᑦ ᖃᓄᑐᐃᓐᓇᖅ ᐱᔭᕆᓇᓯᑎᒃ ᐱᑕᖅᑐᖅᑲᖅᑕᕆᐊᒥᒃ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓐᑦ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᖅᑲᓇᐃᔭᖅᑎᑦᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓯᑕᒪᓂᒃ ᓄᓇᓕᐅᔪᓂ ᓇᐅᑦᓯᖅᑐᐃᔮᐅᓂᐊᖅᑐᓂᒃ ᐊᑐᓂ ᓄᓇᓕᐅᔪᓂᑦ ᑲᑎᖅᓯᐃᔮᐅᓗᑎᒃ ᐊᒻᒪᓗ ᓴᖅᑮᔮᕆᓐᓂᐊᕐᓗᑎᒃ ᐊᖑᓇᓱᒃᑕᐅᕆᑦᑐᓄᑦ ᑐᑭᓯᕆᐊᒃᕕᒃᓴᖁᑎᓂᒃ ᑕᖅᑭᑖᑦ ᐅᑭᐅᖏᑦ 2019/2020 ᐊᒻᒪᓗ 2020/2021 ᐊᖑᓇᓱᐊᕐᕕᐅᕙᑦᑐᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ	**ᐊᔾᔨᒌᙱᓐᓂᖅᑲᖅᕕᐅᔪᑦ** – ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᒌᙱᑦᑐᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᔫᑦ “ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #2-2019”-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᒃ: ᐊᑐᖅᑕᐅᓕᕐᑯᓪᓗᒋᑦ ᐊᖑᓇᓱᐊᖅᑏᑦ ᖃᐅᔮᒪᓂᖅᑲᖅᑎᒍᑦ ᓇᐅᑦᓯᖅᑐᐃᔮᐅᓕᖅᑎᓪᓗᒋᑦ ᖃᓄᑐᐃᓐᓇᖅ ᐱᔭᕆᓇᓯᑎᒃ ᐱᑕᖅᑐᖅᑲᖅᑕᕆᐊᒥᒃ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓐᑦ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᖅᑲᓇᐃᔭᖅᑎᑦᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᐊᑕᐅᓯᕐᒥᒃ ᓄᓇᓕᐅᔪᒥ ᓇᐅᑦᓯᖅᑐᐃᔮᒥᒃ ᐊᑐᓂ ᓄᓇᓕᐅᔪᓂᑦ ᑲᑎᖅᓯᐃᔮᐅᓂᐊᖅᑐᒥᒃ ᐊᒻᒪᓗ ᓴᖅᑮᔮᐅᓂᐊᖅᑐᒥᒃ ᐊᖑᓇᓱᒃᑕᐅᕆᑦᑐᓄᑦ ᑐᑭᓯᕆᐊᒃᕕᒃᓴᖁᑎᓂᒃ ᑕᖅᑭᑖᑦ ᐅᑭᐅᖏᑦ 2019/2020 ᐊᒻᒪᓗ 2020/2021 ᐊᖑᓇᓱᐊᕐᕕᐅᕙᑦᑐᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐃᓱᒪᕗᑦ ᐃᖅᑲᓇᐃᔭᖅᑎᑦᓯᓕᕈᓐᓇᕐᓂᖅ ᑎᑭᑦᑐᒋᑦ 16-ᓄᑦ ᐃᓄᓐᓂᒃ ᓴᖅᑮᔮᓂᐊᖅᑐᓂᒃ ᐊᖑᓇᓱᐊᖅᑕᐅᕙᑦᑐᓂᒃ ᕿᖓᒑᐅᑉ ᐊᒥᕐᕋᑦᑎᖏᓐᓂᑦ ᑲᑎᓪᓗᒋᑦ ᐱᑕᕐᕕᐅᔪᓐᓇᖅᑐᑦ (TAH) ᐱᑕᕐᕕᐅᔪᓐᓇᙱᓐᓂᖏᑕ ᒪᓕᒃᑎᑕᐅᓗᑎᒃ ᓈᒻᒪᓚᔪᙱᒻᒪᑕ ᑮᓇᐅᔭᓂᒃ ᐊᑐᓗᐊᓕᕋᔭᕐᓂᖏᑕ ᑕᒪᒃᑯᓇᖓ. ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᑐᕌᕝᕕᒃᓴᖅᑐᑦ ᐱᓕᕆᓂᕐᒥᓂ ᑕᐃᒃᑯᐊ ᓇᐅᑦᓯᖅᑐᐃᔮᐅᔪᑦ ᓴᖅᑮᕙᒍᓇᕐᐊᕐᓂᖏᓐᓂᒃ ᑕᒪᐃᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒥ ᐱᓕᕆᓂᐅᕙᑦᑐᓐ ᐊᒻᒪᓗ ᐱᑕᕐᕕᐅᕙᓐᓂᖏᑦ ᑰᑮᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑦᑎᖏᓐᓂᑦ ᑭᓯᒥᑐᐃᓐᓇᐅᑎᓐᓇᒋᑦ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ	2019-2020/2020-2021 ᐊᖑᓇᓱᐊᕐᕕᐅᕙᑦᑐᑦ	ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᒃ/ᐱᓕᕆᐊᖑᔪᒃ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓱᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᖅᑐᑦ	ᐱᓕᕆᐊᒃᓴᖃᖅᑎᑕᐅᓂᕐᒧᑦ ᑐᑭᒧᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑦ
ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓂᖓᑦ						
ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #3-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᑎᑭᓯᒪᓕᖅᑎᓪᓗᒍ ᑎᓯᐱᕆ 1, 2019-ᒧᑦ, ᐱᑕᖃᓕᖅᑎᑦᓯᓯᒪᖁᓪᓗᑎᒃ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓇᓗᓇᐃᔭᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑕ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᑦ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᔭᕆᐊᖁᑦ, ᑐᑭᓯᓇᕐᓯᐊᖅᑐᑎᒧᑦ, ᐃᓚᖓᓂᕆᓚᖅᑕᒥᓂᒃ ᐱᔾᔪᑎᓕᓪᓗᒋᑦ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓂᖓᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᑕ, ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᑯᑎᐅᔪᓄᑦ, ᐊᒻᒪᓗ ᖃᓄᖅ ᑕᒪᓇ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓂᖓᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᓕᕐᓂᐊᕐᒪᖔᑦ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ	**ᐊᔾᔨᒌᖕᒋᓐᓂᖃᖅᐳᑦ** – ᑎᓖᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒌᖕᒋᓐᓂᖃᖅᐳᑦ “ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #3-2019”-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓂᖏᓂ: ᑎᑭᓯᒪᓕᖅᑎᓪᓗᒍ ᕕᕗᐊᕆ 28, 2020-ᒧᑦ, ᐱᑕᖃᓕᖅᑎᑦᓯᓯᒪᖁᓪᓗᑎᒃ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓇᓗᓇᐃᔭᖅᑕᐅᓯᒪᔪᓂᒃ ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑕ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᑦ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᔭᕆᐊᖁᑦ, ᑐᑭᓯᓇᕐᓯᐊᖅᑐᑎᒧᑦ, ᐃᓚᖓᓂᕆᓚᖅᑕᒥᓂᒃ ᐱᔾᔪᑎᓕᓪᓗᒋᑦ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓂᖓᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᓂ, ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᑯᑎᐅᔪᓄᑦ, ᐊᒻᒪᓗ ᖃᓄᖅ ᑕᒪᓇ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓂᖓᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᓕᕐᓂᐊᕐᒪᖔᑦ ᐋᖅᑭᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᐅᔪᓄᑦ.	ᐊᒥᓱᓕᐅᒻᒪᑦ ᐱᓕᕆᐊᕆᔭᐅᓕᕈᒪᔪᑦ ᐅᖃᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᑕᒪᒃᑯᓇ ᐃᓱᒪᓕᐅᕈᑎᓂ ᐃᓚᖃᖅᓯᑎ ᐃᓱᒪᓕᐅᕈᑎᒃ ᐅᖃᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐃᓗᐊᓂ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐱᔾᔪᑎᒋᓯᒪᔪᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᔭᐅᓯᒪᔪᓄᑦ ᑭᖑᓪᓕᖕᒥᒃ ᐅᓂᒃᑲᓕᐊᖑᓯᒪᔪᓂ – Sahtì Ekwǫ̀ (ᓴᑎ ᐃᐊᒃᕗ) (ᐳᓘᓅᓴ-ᑲᓇᓐᓇᒥ) ᐊᒥᕐᕋᑯᑎᖏᓐᓄᑦ ᓱᕗᓕᖅᐸᐅᑎᑕᐅᔭᕆᐊᖃᕐᓂᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐊᖏᕐᓛᒪᕆᓚᕆᒃ ᐱᓕᕆᕕᐅᔭᕆᐊᖃᕐᓂᐊᖅᓯᑎᒃ. ᐅᐱᒍᓯᑦᑎᐊᖅᓯᑕ ᐊᑯᓂᐅᓂᖅᓴᒥᒃ ᑭᐅᓯᒪᕈᑎᒃᓴᑎᓐᓂᒃ ᑖᓯᒧᖓ ᐃᓱᒪᓕᐅᕈᑎᒧᑦ ᐋᖅᑭᓱᐃᓐᓇᖅᑎᑕᐅᔪᒪᒍᑦ.	ᑎᓖᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᕕᕗᐊᕆ 28, 2020	ᐱᔭᕇᖅᑕᐅᓯᒪᖕᒋᑦᑐᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᒃ/ᐱᓕᕆᐊᖑᔪᒃ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓱᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᖅᑐᑦ	ᐱᓕᕆᐊᒃᓴᖃᖅᑎᑕᐅᓂᕐᒧᑦ ᑐᑭᒧᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑦ
ᓂᕿᑐᖅᐸᒃᑐᑦ ᐆᒪᔪᐃᑦ ᓇᐅᓯᖅᑐᒐᐅᓂᖏᑦ						
ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #4-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐊᖏᒡᓕᒋᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓂᕿᑐᖅᐸᒃᑐᑦ ᐃᓕᖅᑯᓯᕆᐊᖅᑕᖏᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᓪᓗᑎᒃ ᐊᒥᕐᕋᑯᑏᑦ ᐊᒥᓲᔾᔪᓃᖅᐸᓪᓕᐊᓂᖏᑦ ᐊᒻᒪᓗ ᐊᒥᓱᕈᖅᓯᒪᓕᕐᓂᖏᑦ ᐃᓐᓇᐅᔪᑦ ᐊᒻᒪᓗ ᓄᕋᐃᑦ ᐊᓐᓇᒍᑎᒋᐊᕐᑕᖏᓄᑦ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᒪᑯᓂᖓ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB): (1) ᑕᑯᖃᑦᑕᕐᓂᐅᔪᑦ ᑎᒥ, ᓵᐊᓱ, ᖁᖅᓱᐊᖓᓂᔪᑦ ᑎᐊᑦᐅᓭ, ᐊᒻᒪᓗ ᓅᐅ ᒫ ᖁᑦᑎᒃᑑᓂᖏᑦ ᐊᖅᑯᓭᕙᐅᕙᑐᓂᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᓂᑦ, ᖃᓄᐃᑑᓂᖏᓄᑦ ᖃᐅᔨᓴᐃᓂᖃᖅᐸᓪᓗᑎᒃ ᓱᕗᓪᓕᓂ ᑎᓯᐱᕆ 1 ᐊᑐᓂ ᐅᑭᐅᓂ, ᐱᒋᐊᕕᖃᓪᓗᑎᒃ 2019 ᐅᑭᐅᖓᓂ, ᐊᒻᒪᓗ (2) ᐱᓕᕆᐊᒃᓴᐅᓂᐊᖅᑐᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᐊᕐᓗᑎᒃ ᖃᔅᓯᐅᓂᖓᑕ ᓂᕿᑐᖅᐸᒃᑐᑦ ᐆᒪᔪᐃᑦ ᑐᕌᕕᐅᓯᒪᓕᕐᓂᐊᕐᒪᑕ ᐅᑭᐅᑕᒫᑦ ᐲᔭᖅᑕᐅᓯᒪᓕᕐᓂᒃᓴᖏᑕ, ᑕᐃᒪᓐᓇ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᕐᓂᖅᐸᑕ, ᓱᕗᕐᖓᓂ ᑎᓯᐱᕆ 1,	**ᐊᔾᔨᒌᖕᒋᓐᓂᖃᖅᐳᑦ** – ᑎᓖᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒌᖕᒋᓐᓂᖃᖅᐳᑦ “ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #4-2019”-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓂᖏᓂ: ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐊᖏᒡᓕᒋᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓂᕿᑐᖅᐸᒃᑐᑦ ᐃᓕᖅᑯᓯᕆᐊᖅᑕᖏᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᓪᓗᑎᒃ ᐊᒥᕐᕋᑯᑏᑦ ᐊᒥᓲᔾᔪᓃᖅᐸᓪᓕᐊᓂᖏᑦ ᐊᒻᒪᓗ ᐊᒥᓱᕈᖅᓯᒪᓕᕐᓂᖏᑦ ᐃᓐᓇᐅᔪᑦ ᐊᒻᒪᓗ ᓄᕋᐃᑦ ᐊᓐᓇᒍᑎᒋᐊᕐᑕᖏᓄᑦ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐱᑕᖃᖅᑎᑦᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᒪᑯᓂᖓ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB): 1) ᐅᑭᐅᑕᒫᑦ ᑕᑯᖃᑦᑕᕐᓂᐅᔪᑦ ᑎᒥ, ᓵᐊᓱ, ᖁᖅᓱᐊᖓᓂᔪᑦ ᑎᐊᑦᐅᓭ, ᐊᒻᒪᓗ ᓅᐅ ᒫ ᖁᑦᑎᒃᑑᓂᖏᑦ ᐊᖅᑯᓭᕙᐅᕙᑐᓂᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᓂᑦ, ᖃᓄᐃᑑᓂᖏᓄᑦ ᖃᐅᔨᓴᐃᓂᖃᖅᐸᓪᓗᑎᒃ ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ Ekwò Nàxoède K’è (ᐃᐊᒃᕗ ᓇᐋᔾᐅᐃᑎ ᑲ’ᐃ[ᑲᒫᓘᒃ ᓄᓇᒥ]) ᐱᓕᕆᐊᖓᓐᓄᑦ ᐱᒋᐊᖅᑎᑕᐅᓗᑎᒃ ᑎᓯᐱᕆ 2020-ᒥ; 2) ᐱᓕᕆᐊᒃᓴᐅᓂᐊᖅᑐᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓂᐊᕐᓗᑎᒃ ᖃᔅᓯᐅᓂᖓᑕ ᖁᑦᑎᒃᑑᓂᖏᓂ ᑎᒥ ᐅᑭᐅᑕᒫᑦ ᓄᖑᑎᖅᑕᐅᕙᕆᐊᖃᖅᑐᓂᖏᓂ, ᑕᐃᒪᓐᓇ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᕐᓂᖅᐸᑕ, ᓱᕗᕐᖓᓂ ᑎᓯᐱᕆ 1, 2020	ᑐᑦᓯᕋᐅᔾᔪᓴᐅᓂᐊᖅᑐᑦ ᓄᖑᑎᖅᑕᐅᓯᒪᓕᕐᓂᐊᕐᓂᖏᑕ ᑎᒥ ᑮᓇᐅᔭᑎᒧᑦ ᐊᑐᕐᓂᖅᑲᕐᓂᐊᕐᒪᑕ ᑎᑭᑦᑐᒋᑦ ᑎᓯᐱᕆ 2020-ᒧᑦ, ᑭᓯᐊᓂᓗ ᖃᐅᔨᒪᓇᓪᓚᕆᖕᒋᓪᓗᑕ ᑕᒪᑐᒪᓂ ᑐᑦᓯᕋᐅᔪᒪᓂᐊᖅᑐᑦ ᐅᑭᐅᑕᒫᑦ ᓄᖑᑎᕆᑫᓐᓂᐊᕐᓂᐊᕐᓂᒃ ᐊᒃᓚᓂᒃ, ᑲᔪᖅᑐᑦ ᓇᒃᑐᕋᓖᑦ, ᐊᒻᒪᓗ ᖃᕝᕕᑦ ᐋᖅᑭᒃᓯᖅᑕᐅᓯᒪᓕᕈᓐᓇᕐᓗᑎᑦ ᐱᔭᕇᖅᑕᐅᕙᓚᖓ ᖃᐅᔨᓴᐃᓂᐅᓇᔭᖅᑐᑦ ᓱᕗᕐᖓᓂ. ᑕᒪᕐᒥᐅᓪᓗᑎᒃ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᓂᖅᑲᑦ ᓄᖑᑎᖅᑕᐅᔭᕆᐊᖅᑲᖅᑐᐊᕆᖕᒋᑦᓯᒋᑦ ᓇᒃᑐᕋᓖᑦ, ᐊᒃᓚᐃᑦ, ᖃᕝᕕᑦ, ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᖅᑕᕗᑦ ᐊᒪᖅᑯᓂᒃ ᐊᐅᓚᑦᓯᓂᕐᒥ ᐸᕐᓇᐅᑎᒋᔭᐅᓯᒪᔪᑦ ᐃᑲᔫᑎᐅᓂᐊᖅᓯᓚᐅᕐᒪᑕ ᖃᓄᓕ ᖁᑦᑎᒃᑎᑦᑎᓯᒪᓪᓗᒍ ᑐᑦᓯᕋᖅᑕᐅᓯᒪᓗᑎᒃ ᓄᖑᑎᖅᑕᐅᔭᕆᐊᖃᖅᑐᓂᒃ. ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓯᑎᑦᓯᓯᒪᓗᑎᒃ ᑲᑐᔾᔨᓂᖃᖃᑎᖃᕐᓂᖏᓐᓂᒃ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓂᒃ ᐱᓕᕆᐊᖃᕐᓂᖏᓐᓂ ᓇᐅᓯᖅᑐᐃᓐᓇᐅᓂᖏᑦ ᐊᒻᒪᓗ ᐊᐅᓚᓯᔨᓐᓇᐅᓂᖏᑦ ᓂᕿᑐᖅᐸᒃᑐᓂᒃ ᐆᒪᔪᖁᑎᓂᒃ ᐊᒃᑐᐃᓯᒪᓕᕈᓐᓇᖅᑐᓂᒃ ᑭᖑᐊᓂ ᐊᒻᒪ ᐳᓘᓅᓴ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᑕ ᐊᒥᕐᕋᑯᑎᖏᓂᒃ.	ᑎᓖᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᑎᓯᐱᕆ 1, 2020	1) ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ, 2) ᐱᔭᕇᖅᓯᒪᖕᒋᑦᑐᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᒃ/ᐱᓕᕆᐊᖑᔪᒃ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓱᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᖅᑐᑦ	ᐱᓕᕆᐊᒃᓴᖃᖅᑎᑕᐅᓂᕐᒧᑦ ᑐᑭᒧᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑦ
ᑎᒥ ᐱᑕᖃᐅᔪᓐᓇᖅᑐᑦ						
ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #5-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᑎᒥ ᐱᑕᖃᕐᓂᐅᕙᑐᑦ ᐃᑲᔪᖅᓯᖃᕐᓂᖅᑕᐅᖁᓪᓗᑎᒃ ᒥᐊᓂᕆᔭᐅᓯᒪᓂᖓᑕ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖓᑕ: (1) ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᑕᖃᖅᑎᑦᓯᓂᐊᖅᑐᑦ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᖃᔅᓯᐅᔪᑦ ᑎᒥᑦ ᑐᑦᓯᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᓄᖑᑎᖅᑕᐅᓂᐊᕐᒪᖔᑕ ᐊᖑᓇᓱᐊᕐᕕᐅᔪᓐᓇᖅᓯᓯᒪᑎᓪᓗᒍ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᓐ; ᐅᑭᐅᒥ ᓇᔪᖅᑕᐅᕙᒃᑐᓂ ᓱᕗᕐᖓᓂ ᑎᓯᐱᕆ 1 ᐅᑭᐅᑕᒫᑦ, ᐱᒋᐊᕐᓗᑎᒃ 2019-ᒥ; (2) ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᓕᐅᕈᑎᖃᖅᓯᒪᓕᒋᐊᓖᑦ ᖃᔅᓯᓂᒃ ᑎᒥ ᓄᖑᑎᕆᔭᕆᐊᖃᕐᓂᐊᕐᓂᖏᒃ ᑐᙵᕝᕕᖃᖅᑎᓪᓗᒋᑦ (i) ᑕᑯᖃᑦᑕᖅᓯᒪᓂᖓᓄᑦ ᑎᒥ ᐊᖅᑯᓭᕙᐅᕙᑐᓂ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᓐᓂᑦ, ᖃᓄᐃᓐᓂᖏᓄᑦ ᖃᐅᔨᓴᐃᔾᔪᑎᐅᓯᒪᔪᓂᑦ ᐊᒻᒪᓗ (ii) ᖃᓂᓗᐊᓕᖅᓯᒪᔫᓇᕐᓂᖏᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᑦ ᑎᒪᓄᑦ (ᐊᒪᕈᑦ) ᑐᑦᓯᖓᓪᓗᑎᒃ ᐊᓯᖏᓄᑦ ᐊᒥᕐᕋᑯᑎᐅᔪᓄᑦ ᐅᑭᐅᖑᑎᓪᓗᒍ; ᐊᒻᒪᓗ, (3) ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐋᖅᑭᒃᓯᐃᓱᒪᓕᕐᓂᐊᖅᑐᑦ ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᕐ ᓯᓚᐃᕝ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ ᐊᒻᒪᓗ ᓄᓇᓕᐅᔪᒥ ᑎᒥ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓖᒪᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᒃ ᐃᓱᒪᓕᐅᕈᑎᒋᓯᒪᓕᕐᓂᐊᕐᓗᒍ ᓱᓇᓂᒃ ᐱᓕᕆᐊᖃᖅᑎᐅᕙᓐᓂᐊᕐᓂᖓᑕ ᑐᑦᓯᕋᐅᓯᒪᓪᓗᑎᒃ	**ᐊᔾᔨᒌᖕᒋᓐᓂᖃᖅᐳᑦ** – ᑎᓖᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒌᖕᒋᓐᓂᖃᖅᐳᑦ “ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #5-2019”-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓂᖏᓂ: ᐊᖑᓇᓱᒃᑕᐅᕙᓐᓂᖏᑦ ᑎᒥᑦ ᐃᑲᔪᖅᓯᖃᕐᓂᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᒥᐊᓂᖅᓯᓯᒪᓕᕐᓂᐅᔪᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᕐᕋᑯᑎᖏᑕ, ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᓇᓗᓇᐃᔭᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᐊᒪᖅᑯᓄᑦ ᐊᐅᓚᑦᓯᓂᖃᕐᓂᒥ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᕿᖑᓪᓕᐅᑦ ᐊᒻᒪᓗ ᐳᓘᓅᓴ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᑦ, ᑐᑦᓯᕋᐅᑎᓪᓗᒋᑦ ᖁᑦᑎᖕᓂᕆᔭᐅᔪᑦ ᐊᒪᖅᑯᑦ ᓄᖑᑎᖅᑕᐅᖁᓪᓗᒋᑦ, ᐊᐅᓚᓯᓂᖃᕐᓂᖏᓐᓂ ᐱᓕᕆᐊᖑᔪᑦ/ᐱᓕᕆᐊᖑᓕᖅᓯᒪᔪᑦ ᐊᒪᖅᑯᓂᒃ ᓄᖑᑎᕆᓯᒪᓕᕐᓂᖅᓴᒧᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᓯᒪᔾᔪᑦ ᐊᒪᖅᑯᑦ ᓄᖑᑎᖅᑕᐅᕙᓐᓂᖏᑦ ᐊᑐᕐᓂᖅᑐᑎᒧᑦ ᐱᓕᕆᐊᖑᒻᒪᖔᑕ ᐊᑐᕐᓗᑎᒃ ᑕᒪᒃᑭᓐᓂᒃ ᑐᒃᑐᓄᑦ ᑐᕌᖓᑎᑕᐅᓯᒪᔪᓂᒃ (ᓲᕐᓗ ᐊᒥᓲᓂᖏᑕ ᐊᖏᓂᖏᓐᓂᒃ, ᐊᓐᓇᐅᒪᔪᓐᓇᕐᓂᖏᑦ ᖁᑦᑎᖕᓂᕆᔭᖏᓐᓂᒃ) ᐊᒻᒪᓗ ᐊᒪᖅᑯᓄᑦ ᑐᑦᓯᕋᐅᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᓇᓗᓇᐃᒃᑕᕆᔭᐅᔪᑦ (ᓲᕐᓗ ᐱᑕᖃᖅᑕᐅᕙᑦᑐᑦ ᖃᔅᓯᐅᓂᖏᑦ, ᐱᓕᕆᓂᐅᔪᑎ ᖃᔅᓯᓂᒃ ᐱᑕᖅᓯᒪᓕᕋᓱᒃᐸᓐᓂᐅᔪᑎ ᐊᑐᓂ).	ᑎᓖᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᒫᓐᓇᐅᔪᖅ ᐋᖅᑭᒃᓯᐃᕙᑦᑕᐅᓂᖃᖅᑐᑦ ᐊᒪᖅᑯᓂᒃ ᐊᐅᓚᑦᓯᓂᖃᖅᑐᓂ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᕿᖑᓪᓕᐅᑦ ᐊᒻᒪᓗ ᐳᓘᓅᓴ–ᑲᓇᓐᓇᒥ ᑐᑦᑐᖏᓐᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᑎ. ᑖᒃᑯᐊ ᐊᐅᓚᑦᓯᓂᖃᖅᑐᓂᒃ ᐃᓱᒪᓕᐅᕈᑎᐅᔪᑦ ᐃᓚᖃᖅᑐᓂᒃ ᓇᐅᓯᖅᑐᐃᓂᕐᒥᒃ ᐊᒪᖅᑯᓂᒃ ᐊᖑᓇᓱᐊᖅᑕᐅᕙᑦᑐᓂ ᐊᒻᒪᓗ ᐱᓕᕆᐊᒃᓴᐅᓂᐊᖅᑐᓂ ᖃᐅᔨᒋᐊᖅᐸᓐᓂᒥ ᑕᒪᒃᑯᓇ ᓇᓗᓇᐃᖅᓯᓂᖃᕐᓂᖅᓴᒧᑦ, ᐊᑐᕐᓂᖅᑲᓕᐅᑦ ᐊᒪᖅᑯᓄᑦ ᓇᓗᓇᐃᒃᑕᕋᓱᐊᕐᕕᖃᖅᑐᓂᒃ ᑐᒃᑐᓄᑦ. ᐅᑭᐅᑕᒫᑦ ᐅᓂᒃᑲᓕᐊᖑᕙᑦᑐᓂ ᓇᐃᓪᓕᒋᐊᖅᓯᒪᓪᓗᑎᒃ ᐅᖃᐅᓯᖃᖅᑐᓂ ᐊᒪᖅᑯᑦ ᓄᖑᑎᖅᑕᐅᓂᖏᓐᓄᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᕈᑎᐅᔪᓄᑦ ᐱᓕᕆᐊᖑᔪᒃ ᐊᑐᕐᓂᖅᓯᒪᓂᖏᓐᓄᑦ ᐋᖅᑭᒃᓯᐃᓱᒪᓕᕐᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᐊᑐᐃᓐᓇᐅᓕᖅᑎᑦᓯᓗᑎᒃ ᕗᐃᑭᐣ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB). ᑖᒃᑯᐊ ᐃᓚᖃᕐᓂᐊᖅᑐᑦ ᑕᒪᐃᓂᒃ ᐱᔾᔪᑎᒋᔭᐅᓯᒪᔪᓂᒃ ᐊᒪᖅᑯᓄᑦ ᐱᓕᕆᐊᒥ, ᐱᖃᓯᐅᑎᓪᓗᒋᑦ ᐱᐅᓯᒋᐊᖅᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐱᓕᕆᐊᓂᒃ ᐊᒻᒪᓗ ᑎᓖᓱ ᐊᖑᓇᓱᒃᑎᓂᒃ ᐱᓖᒪᒃᓴᐃᓂᖃᖅᑐᓂᒃ ᐱᓕᕆᐊᒥᒃ.	ᑎᓖᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᑲᔪᓯᑎᑕᓚᖅᑐᖅ	1) ᐱᔭᕇᖅᓯᒪᖕᒋᑦᑐᑦ, 2) ᐱᔭᕇᖅᓯᒪᖕᒋᑦᑐᑦ 3) ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᒃ/ᐱᓕᕆᐊᖑᔪᒃ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓪᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᐊᕐᕕᒃᓴᖅᑎᑕᐅᓂᖏᓐ ᑐᑭᓕᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓪᓚᕆᓂᖓᑦ
ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᒃ ᓯᓚᐃᑉ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᖅ						
᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓚᐅᖅᑐᑦ #6-2019 (ᑯᑭᑎ ᐃᐊᒃᑦ)	ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓂᖁᓪᓗᒋᑦ ᐊᑐᕐᓂᒃᖃᖅᑑᓂᖏᑦᑕ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᒃ ᓯᓚᐃᑉ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ ᑯᑭᑎ ᐃᐊᒃᑦ, ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᐱᑕᖃᑎᒌᑦᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᐊᒥᓱᐃᓕᖓᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂᒃ ᐱᓕᕆᐊᖑᔪᒧᑦ ᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᓯᕗᓂᖓᓂ ᒪᐃ 31 ᐅᑭᐅᑖᕐᖓ. ᐃᓗᓕᖏᑦ ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐋᖅᑭᒃᓱᐊᖑᓯᒪᓕᖅᓂᐊᖅᑐᑦ ᐱᓕᕆᖃᑎᒋᓯᒪᓗᒋᑦ ᑲᑎᒪᔨᔪᑦ ᐊᒻᒪᓗ ᐃᓚᖃᖅᑎᑕᐅᓂᐊᖅᓯᑎᒃ, ᑭᓯᐊᓂᓗ ᑭᒡᓕᖃᖅᑎᑕᐅᓇᑎᒃ ᑕᒪᒃᑯᓄᖓ, ᒪᑯᓂᖓ ᑐᓴᕐᓴᖅᑯᑎᓂᒃ: (1) ᐱᑕᖃᑎᒋᔪᑎᒃ ᓇᓂ ᐊᒻᒪᓗ ᖃᖓᓂᒃ ᑎᒥ ᐱᑕᓚᐅᖅᓯᒪᓂᖃᑦ ᐃᓚᖅᑎᑕᐅᔪᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ; ᐊᒻᒪᓗ, (2) ᐱᑕᖃᑎᒋᔪᑎᒃ ᓇᓗᓇᐃᖅᓯᐊᖅᑐᓂᒃ ᐱᓕᕆᐊᒃᓴᐅᔪᓂᒃ ᖃᐅᔨᒋᐊᕈᑎᐅᕙᓂᐊᖅᑐᑎᒃ ᐊᑐᖅᓂᖃᕐᓚᖓᑕ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᑉ ᑐᖅᓴᕘᖃᖅᑎᑕᐅᓯᒪᓕᖁᑎᑦ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᓂᐅᕙᑐᓄᑦ ᐊᒻᒪᓗ TK-ᖑᑎᓄᑦ.	**ᐊᔾᔨᒌᙱᓐᓂᖃᖅᑲᐅᔪᑦ** – ᑎᓵᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒌᙱᓐᓂᖃᖅᑲᖏᑦ "ᐊᑐᓕᖁᔭᐅᓚᐅᖅᑐᑦ #6-2019"-ᒧᑦ ᐃᒪᓇ ᐅᖃᖅᓯᒪᓂᖏᓐᓂ: ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓂᖁᓪᓗᒋᑦ ᐊᑐᕐᓂᒃᖃᖅᑑᓂᖏᑦᑕ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᒃ ᓯᓚᐃᑉ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ ᑯᑭᑎ ᐃᐊᒃᑦ, ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᐱᑕᖃᑎᒌᑦᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᐊᒥᓱᐃᓕᖓᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐱᓕᕆᐊᖑᔪᒧᑦ ᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᓯᕗᓂᖓᓂ ᐋᒌᓯ 1 ᐅᑭᐅᑖᕐᖓ. ᐅᑭᐅᑖᕐᖓ ᐅᓂᒃᑳᓕᐊᖑᕙᒻᒪᑕ ᐃᓗᓕᖏᓐᓂ ᐅᖃᐅᓯᖃᖅᓯᒪᓂᐊᖅᑐᑦ ᑕᒪᐃᓂᒃ ᐊᒪᖅᑯᓂᒃ ᐊᐅᓚᑦᓯᓂᖏᑦ ᐱᓕᕆᐊᖑᔪᓂᒃ ᐊᑐᓂ ᐅᑭᐅᓂ. ᑖᒃᑯᐊ ᐃᓚᖃᖅᓂᐊᖅᑐᑦ ᑕᒪᐃᓂᒃ ᐃᓚᐅᑎᑕᐅᓯᒪᔪᓂᒃ ᐃᓯᒪᓕᐅᕈᑎᓄᑦ ᐱᖃᓯᐅᑎᓗᒋᑦ: 1) ᐊᖑᓇᓱᐊᖅᑕᐅᕙᑦᑐᑦ ᖁᑦᑎᖓᓂᕆᔭᕆᓂᒃ ᑕᐃᒪᓐᓇᐃᓚᕿᑎᑕᐅᓪᓗᑎᒃ ᐱᐅᓯᕆᐊᖅᑎᑕᐅᓯᒪᔪᑦ ᓄᐊᒃ ᓯᓚᐃᑉ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ ᐊᓯᕆᓂᒃᑯ ᐱᓕᕆᐊᓂᒃ; 2) ᑎᓕᐅᕆᔾᔪᑎᐅᓯᒪᔪᓂᒃ ᓄᖑᑎᖅᑕᐅᓂᒃᓴᖏᑦ ᑐᒃᑐᐃᑦ ᐊᒥᕐᕋᖁᑎᖏᑦ ᓇᔪᖅᐸᒃᑕᕆᓂᑦ; 3) ᖃᐅᔨᓴᐅᓯᒪᓕᖅᑐᑦ ᖃᐅᔨᓴᐃᓂᖃᖅᑎᒥ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᐊᓄᑦ (ᓈᓚᐅᑎᓕᖅᑐᐃᕙᓂᖅᓂᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᓯᓂᒃ ᑲᑎᖅᓱᐃᓂᖅᑲᖅᑲᓂᖅᓂᑦ); ᐊᒻᒪᓗ, 4) ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᔪᓂᒃ ᐊᑐᖅᓂᖃᕐᓚᖓᑕ ᐱᓕᕆᐊᖑᔪᖅ ᐅᑭᐅᖓᓂ ᐊᑐᖅᑎᓪᓗᒋᑦ ᑕᒪᒃᑭᓂᒃ ᑐᒃᑐᓄᑦ ᑐᕌᖓᑎᑕᐅᓪᓗᑎᒃ ᐊᒻᒪᓗ ᐊᒪᖅᑯᓄᑦ [illegible]	ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᒪᑕ ᓈᒻᒪᓂᖅᓴᐅᓇᓱᒋᓯᒥᓪᓗᒍ ᐊᒻᒪᓗ ᐊᑐᕐᓂᖃᕐᓂᖅᓴᐅᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᑐᓂᓯᓯᒪᓕᖅᐸᒐᔭᖅᐸᑕ ᐃᓗᐃᒃᑲᐅᑐᑎᒃ ᐊᒪᖅᑯᓂᒃ ᐊᐅᓚᑦᓯᓂᒥ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᐅᑭᐅᑖᕐᖓ.	ᑎᓵᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᐋᒌᓯ 1 ᐊᑐᓂ ᐅᑭᐅᓄᑦ	ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᒃ/ᐱᓕᕆᐊᖑᔪᒃ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓪᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᐊᕐᕕᒃᓴᖅᑎᑕᐅᓂᖏᓐ ᑐᑭᓕᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓪᓚᕆᓂᖓᑦ
ᓄᓇᓕᐅᔪᒥ ᑎᒥ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓪᓗᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᒃ						
᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᖏᑦ ᐊᑐᓕᖁᔭᐅᓚᐅᖅᑐᑦ #7-2019 (ᑯᑭᑎ ᐃᐊᒃᑦ)	ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓂᖁᓪᓗᒋᑦ ᐊᑐᕐᓂᒃᖃᖅᑑᓂᖏᑦᑕ ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᓄᓇᓕᐅᔪᒥ ᑎᒥ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓪᓗᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᒃ, ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒥᓱᐃᓕᖓᔫᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᐱᓕᕆᐊᒃ ᐱᑕᖃᑎᒌᑦᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᓂᖓᓂ ᒪᐃ 31-ᒥ ᐅᑭᐅᑖᕐᖓ. ᐃᓗᓕᖏᑦ ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐋᖅᑭᒃᓱᐊᖑᓯᒪᓕᖅᓂᐊᖅᑐᑦ ᐱᓕᕆᖃᑎᒋᓯᒪᓗᒋᑦ ᑲᑎᒪᔨᔪᑦ ᐊᒻᒪᓗ ᐃᓚᖃᖅᑎᑕᐅᓂᐊᖅᓯᑎᒃ, ᑭᓯᐊᓂᓗ ᑭᒡᓕᖃᖅᑎᑕᐅᓇᑎᒃ ᑕᒪᒃᑯᓄᖓ, ᒪᑯᓂᖓ ᑐᓴᕐᓴᖅᑯᑎᓂᒃ: (1) ᐱᑕᖃᑎᒋᔪᑎᒃ ᓇᓂ ᐊᒻᒪᓗ ᖃᖓᓂᒃ ᑎᒥ ᐱᑕᓚᐅᖅᓯᒪᓂᖃᑦ ᐃᓚᖅᑎᑕᐅᔪᓂᒃ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ; ᐊᒻᒪᓗ, (2) ᐱᑕᖃᑎᒋᔪᑎᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᓄᖅ ᐱᓪᓗᒃᓴᐃᓂᖅ ᐃᑲᔪᖅᑕᐅᕙᓚᐊᖓᓄᑦ ᓯᕗᓂᒥ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᐅᔪᓄᑦ.	**ᐊᔾᔨᒌᙱᓐᓂᖃᖅᑲᐅᔪᑦ** – ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᓐᓂᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᙱᖦᖢᑎᒃ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᖁᔭᐅᓚᐅᖅᑐᑦ #7-2019"-ᒧᑦ ᐃᒪᓇ ᐅᖃᖅᓯᒪᓚᐅᖅᑐᑦ: ᑐᑭᓯᐅᒪᓕᕆᐊᖅᑎᑕᐅᒃᑲᓂᖁᓪᓗᒋᑦ ᐊᑐᕐᓂᒃᖃᖅᑑᓂᖏᑦᑕ ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᓄᓇᓕᐅᔪᒥ ᑎᒥ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓪᓗᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᒃ, ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒥᓱᐃᓕᖓᔫᓪᓗᓂ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᐱᓕᕆᐊᒃ ᐱᑕᖃᑎᒌᑦᓯᒪᓕᕐᐸᓐᓂᐊᖅᑐᑦ ᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᓯᕗᓂᖓᓂ ᔪᓚᐃ 31-ᒥ ᐅᑭᐅᑖᕐᖓ. ᑖᒃᑯᐊ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᐃᓗᓕᖏᑦ ᐃᒪᓐᓇᐃᓐᓂᐊᖅᑐᑦ ᐋᖅᑭᒃᓱᐊᖑᓯᒪᓕᖅᓂᐊᖅᑐᑦ ᐱᓕᕆᖃᑎᒋᓯᒪᓗᒋᑦ ᑲᑎᒪᔨᔪᑦ ᐊᒻᒪᓗ ᐃᓚᖃᖅᑎᑕᐅᓂᐊᖅᓯᑎᒃ, ᑭᓯᐊᓂᓗ ᑭᒡᓕᖃᖅᑎᑕᐅᓇᑎᒃ ᑕᒪᒃᑯᓄᖓ, ᒪᑯᓂᖓ ᑐᓴᕐᓴᖅᑯᑎᓂᒃ: 1) ᐱᑕᖃᑎᒋᔪᑎᒃ ᓇᓂ ᐊᒻᒪᓗ ᖃᖓᓂᒃ ᑎᒥ ᐱᑕᓚᐅᖅᓯᒪᓂᖃᑦ ᐃᓚᖅᑎᑕᐅᔪᓂᒃ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓪᓗᒃᓴᐃᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ; ᐊᒻᒪᓗ, 2) ᐱᑕᖃᑎᒋᔪᑎᒃ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ ᖃᓄᖅ ᐱᓪᓗᒃᓴᐃᓂᖅ ᐃᑲᔪᖅᑕᐅᕙᓚᐊᖓᓄᑦ ᓯᕗᓂᒥ ᑎᒥ ᐊᖑᓇᓱᐊᖅᐸᓐᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᐅᔪᓄᑦ	ᔪᓚᐃ 31 ᐅᓪᓗᖓ ᓈᒻᒪᓂᖅᓴᐅᓇᓱᒋᓪᓗ ᐅᓪᓗᓇᓱᐅᑎᑕᐅᑉᐸ ᐱᔾᔪᑎᒋᓪᓗᒍ ᐱᓯᕆᑐᒌᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᐅᓂᖏᑦ ᓄᓇᓕᐅᔪᒥ ᑎᒥ ᐊᖑᓇᓱᒃᐸᓐᓂᕐᒧᑦ ᐱᓪᓗᒃᓴᐃᓂᒧᑦ ᐱᓕᕆᐊᒧᑦ. ᑕᐃᒪᓐᓇᐃᑎᓯᔪᑎᒃ ᐆᒪᖅᑎᑦᑎᕆᐊᒃᑲᓂᕈᓐᓇᕐᓂᐊᕐᒪᑕ ᐱᓕᕆᐊᒥᒃ.	ᑎᓵᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᔪᓚᐃ 31 ᐊᑐᓂ ᐅᑭᐅᓂ	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᒃ/ᐱᓕᕆᐊᖑᔪᒃ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓪᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᐊᕐᕕᒃᓴᖅᑎᑕᐅᓂᖏᓐ ᑐᑭᓕᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓪᓚᕆᓂᖓᑦ
ᓈᕼᐊ (ᖃᕝᕕᑦ)						
᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓚᐅᖅᑐᑦ #8-2019 (ᑯᑭᑎ ᐃᐊᒃᑦ)	ᖃᐅᔨᓯᒪᓕᕈᒪᓪᓗᑎᑦ ᐅᓪᓗᒥᐅᔪᒥ ᖃᓄᑎᒥ ᐱᑕᖃᕐᓂᖏᑦ, ᖃᓄᐃᓕᐅᕈᓯᖃᓕᖅᓯᒪᓂᖏᑦ ᐊᒻᒪᓗ ᓯᐊᒻᒪᒃᑎᖅᓯᒪᓂᖏᑦ ᓇ ᒫᐊ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᑎᓵᓱ ᒐᕙᒪᖓᑦ (TG) ᑲᑎᖅᓱᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ TK-ᖑᑎᓄᑦ ᐊᒻᒪᓗ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᓂᐅᕙᑐᓄᑦ ᑐᓴᒃᓴᖑᑎᓂᒃ ᓇ ᒫᐊ-ᖑᔪᓄᑦ ᓄᓇᕗᐊᕐᒥ ᐊᒻᒪᓗ ᓄᓇᕘᒥ ᐱᔾᔪᑎᒋᓗᑦ ᑯᒃ'ᐋᑎ ᐊᒻᒪᓗ ᓵᑎ ᐃᐊᒃᑦ ᓇᔪᖅᐸᒃᑕᕆᓂ ᐃᐳᓗ 1, 2020 ᐅᓪᓗᖓᑕ ᓯᕗᓂᖓᓂ. ᑐᑭᓯᒋᐊᕐᕕᒃᓴᖁᑏᑦ ᐊᑐᖅᑕᐅᓕᕐᓂᐊᕐᒪᑕ ᐊᒡᓚᐃᑦ ᐆᒪᔪᖁᑎᓂᒃ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᐅᔪᑦ ᑮᓇᐅᔭᑎᒧᑦ ᐊᑐᕐᓂᖃᓐᓇᐊᖅᑐᑎᒃ ᐱᓕᕆᐊᒃᑲᖅᑎᒋᓂᑦ ᐊᖏᕐᓕᒋᐊᑎᓯᒪᓕᕐᓂᐊᕐᒧᑦ ᑲᑐᔾᔨᓂᖅᓯᒋᑦ ᓵᐊᓃ ᐆᒪᔪᖁᑎᓂᒃ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᔾᔪᑎᓂᒃ ᑮᓇᐅᔭᑎᒧᑦ ᐊᑐᖅᓂᐊᓇᐊᖅᑐᑦ ᖃᐅᔨᒋᐊᖅᓂᐅᔪᑦ ᐃᓚᖃᖅᑐᑦᖅᑎᑕᐅᑦᑐᑦ ᓈᕼᐊ.	ᓈᒻᒪᒋᔭᐅᔪᑦ	ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐅᔾᔨᕈᓱᒃᑐᑦ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᔨᐅᔪᑦ ᓇᓗᓇᐃᖅᓯᒪᓕᖅᑕᕐᕕᑦ ᒫᓇᒧᑦ ᓇᓗᓇᐃᖅᓯᔾᔨᒪᕆᒻᒪᑕ ᖃᕝᕕᓐᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᓂᒃ ᐊᕐᕌᒍᖅᑐᑎᒃ ᐱᑕᖅᐸᓐᓂᕐᒥ ᓄᓇᐃᓐᓇᕐᒥ ᑐᒃᑐᖁᑎᐅᔪᓂᒃ. ᖃᕝᕕᑦ ᐆᒪᔪᖁᑎᐅᔪᑦ ᓯᕗᓪᓕᕐᒥᒃ ᑐᖁᕐᕋᓕᖅᑐᓂᒃ ᓂᕿᑭᔭᒃᓴᖅᓯᐅᖅᐸᓐᓂᖏᑦ ᐊᒻᒪᓗ ᒫᓇᐅᔪᒥ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᑦ ᓇᓗᓇᐃᖅᓯᓯᒪᓕᖅᑐᓯᒪᓪᓗ ᐊᒥᓲᓂᕆᓲᑦ ᕿᖑᕐᒪᑦ ᐊᒥᖅᖁᑎᖏᑦ ᓇᒧᖅᐸᒃᑕᖏᓐᓂ ᐊᒥᓲᔪᓐᓇᖅᐸᓚᐊᓯᒪᓂᖏᑦ ᐱᔾᔪᑎᒋᓗᒍ ᐊᒥᖅᖁᑎᖏᑦ ᐊᒥᓲᔪᓐᓇᖅᐸᓚᐊᓯᒪᓂᖏᑦ. ᐱᓕᕆᔾᔨᓯᐅᕙᑦᑐᓂ ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᖃᕝᕕᑦ ᐊᒥᓲᓂᖏᑦ ᐊᒻᒪᓗ ᓯᐊᒻᒪᒃᑎᖅᓯᒪᓂᖏᑦ ᐱᓕᕆᔾᔪᑎᖃᖃᑦᑕᖅᓯᒪᓪᓗᑕ ᓇᑭᙵᖅᓯᒪᓂᖏᓐᓄᑦ ᓇᓗᓇᐃᒃᑕᑎᒍᑦ-ᖃᐅᔨᓴᖅᑕᐅᓂᖏᑦ ᐱᓯᒪᓕᖅᑲᓂᖅᐸᓂᖅᑎᒍᑦ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᓂᖅᓴᖅᓯᒪᓕᕐᒪᑦ ᑎᐊᕆᖕ ᑖᒃ ᑕᓯᐊᑕ ᐊᕙᑎᒋᔭᖓᓂ ᐊᒻᒪᓗ ᓯᑎᓂᖅᐹᓂᒃ ᐅᔭᖅᑲᓂᒃ ᐅᔭᕐᑕᕆᐊᖅᑎᒃᑯᑦ ᐊᔾᔨᙳᕐᓂᖓᓂ ᐱᓕᕆᓂᖅᓴᖅᓯᒪᓕᕐᓯᑎᒃ ᐊᕙᑎᒋᔭᒥᓂ. ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐅᔾᔨᕈᓱᒃᑐᑦ ᑕᓕᕐᒥᒃ ᐊᑐᐃᓐᓇᐅᑎᑕᐅᓯᒪᔪᑦ ᑐᓴᒃᓴᐃᑦ ᑎᑭᕐᓯᕐᒥᑦ 2014-ᒧᑦ ᐅᖃᐅᓯᐅᓯᒪᓪᓚᑕ ᐃᓗᐊᓂ ᐆᒪᔪᖁᑎᐅᔪᑦ ᖃᓄᐃᓕᖓᓪᓚᕆᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᑦ ᖃᕝᕕᓐᓂᑦ (ᒍᓗ ᒍᓗ) ᓄᓇᕗᐊᕐᒥ.	ᑎᓵᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᐄᐳᓗ 1, 2020	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᕐᑌᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᕝᕕᒃᓴᖃᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓗᐊᕈᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᑲᑐᔾᔨᓂᖃᖅᓱᑎᒃ ᐊᐅᓚᕐᓯᓂᕐᒧᑦ ᐊᖏᕈᑎᒋᔭᐅᓯᒪᔪᑦ						
ᔭᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #9-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᓕᐅᕈᑎᖃᖅᐳᑦ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐋᖅᑭᒃᓯᐃᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓱᕗᓪᓕᖅᐹᕐᓯᐅᑎᓂᒃ ᐊᖏᕈᑎᓂᒃ, ᐊᒻᒪᓗ ᐱᕚᒃᓭᖅᑎᑕᐅᓂᖏᑦ ᑲᑐᔾᔨᓂᖃᕐᓗᑎᒃ ᐊᐅᓚᕐᓯᓂᖃᕐᓂᒥ ᐱᓕᕆᐊᕐᑌᓄᑦ ᐊᐅᓚᕐᓯᔾᔪᑎᐅᓪᓗᑎᒃ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒻᒪᓗ ᓇᔪᖅᐸᒃᑕᖏᓂᒃ ᓱᕗᖓᓂ ᕿᕙᐊᓇ 29, 2020. ᓱᕗᓪᓕᖅᐹᕐᓯᐅᑎᓂᒃ ᐊᖏᕈᑎᑦ ᑖᒃᑯᐊ ᐋᖅᑭᒃᓱᐊᕐᑌᓯᒪᔭᕆᐊᖃᖅᐳᑦ ᐱᓕᕆᖃᑎᒌᒃᓯᒪᓗᑎᑦ BCAC-ᑯᓐᓂᒃ, ᐅᖃᐅᓯᕆᐊᖅᑎᑦ ᑲᑎᒪᔪᕋᓛᑦ ᐱᓕᕆᖃᑎᒋᓐᓂᖏᓐᓄᑦ ᐆᒪᔪᓂᑦ ᐊᐅᓚᕐᑎᓂᖏᓐᓄᑦ, ᐊᒻᒪᓗ ᐅᖃᓪᓚᐅᓯᕆᔭᐅᕝᕚᐅᑎᒋᓗᑎᒃ ᓄᓇᕗᑦ ᒐᕙᒪᖓᑕ ᐆᒪᔪᓕᕆᔨᑦ ᐃᓯᒪᑖᒻᒪᕆᒃᓴᖏᓐᓄᑦ ᐊᒻᒪᓗ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓂᒃ ᐊᐅᓚᕐᓯᔨᑦ ᑲᑎᒪᔨᖏᓐᓂᒃ (NWMB).	**ᐊᔾᔨᒌᖕᖏᓐᓂᖃᕐᕕᐅᔪᑦ** – ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᔾᔨᒌᖕᖏᓐᓂᖃᕐᕕᖏᑦ "ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #9-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓂᖏᓐᓂ: ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᓕᕆᖃᑎᖃᕐᓂᐊᖅᑐᑦ ᓄᓇᕘᑦ ᒐᕙᒪᖓᓂᒃ (GN) ᐋᖅᑭᒃᓯᐃᓯᒪᓕᒃᑲᓂᕐᓂᐊᕐᓗᑎᒃ ᑕᐃᒪᐃᓕᐊᓂᕐᑐᓂᒃ ᑐᑭᓯᒪᑐᕌᓂᕐᒧᑦ ᑎᑎᖅᑲᖃᑎᒌᒍᑎᒥᑦ (MOU) ᑲᑐᔾᔨᓂᖃᕐᓗᑎᒃ ᐊᐅᓚᕐᓯᖃᑎᒌᓐᓂᒥ ᐱᓕᕆᐊᒃᓴᐅᔪᓂᒃ ᐆᒪᔪᑎᒍᓄᑦ ᐱᖃᓯᐅᑎᓗᒋᑦ ᓄᓇᐃᓐᓇᒥ ᑐᑐᑎᑭᐅᔪᑦ ᐊᒻᒪᓗ ᓇᔪᖅᐸᒃᑕᖏᑦ ᓱᕗᖓᓂ ᒫᓯ 31, 2020.	ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑐᑭᓯᒪᑐᕌᓂᕐᒧᑦ ᑎᑎᖅᑲᖃᑎᒌᒍᑎᒥᑦ (MOU) ᐱᓯᒪᕐᑲᑎᕐᑲᒪᑕ ᓄᓇᕘᑦ ᒐᕙᒪᖓᓐᓂᒃ (GN) ᓇᐅᓯᖅᑐᐃᕙᓂᒥ ᐊᒻᒪᓗ ᐊᐅᓚᕐᓯᓂᕐᑲᕐᓂᒥ ᑐᒃᑐᑦ ᐊᒥᕐᕋᕐᑯᑎᖏᓐᓂᒃ ᐊᒥᖅᑯᕐᑲᑎᒋᐊᓂᕐᓄᑦ, ᐊᒻᒪᓗ ᑖᒃᑯᓂᖓ ᑐᑭᓯᒪᑐᕌᓂᕐᒧᑦ ᑎᑎᖅᑲᖃᑎᒌᒍᑎᒥᑦ (MOU) ᐋᖅᑭᒃᓯᐃᕐᑲᑎᕐᑲᒃᑲᓂᕐᓂᐊᖅᑐᑦ ᓄᓇᕘᑦ ᒐᕙᒪᖓᓂᒃ (GN) ᓇᓗᓇᐃᔭᖅᓯᒪᓕᕐᓂᐊᕐᓗᑎᑦ ᓱᕗᓪᓕᖅᐸᐅᑎᑕᒃᓴᐅᓂᐊᖅᑐᑦ ᐅᑭᐅᖑᓂᐊᖅᑐᓄᑦ ᓱᕗᓂᕐᑎᓐᓂ. ᑲᑐᔾᔨᓂᕐᑲᕐᓗᑎᒃ ᐱᓕᕆᕐᑲᑎᒌᓐᓂᖏᑦ ᓴᓇᕐᕈᑎᑎᒍᑦ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᓐᓂᑦ (GNWT) ᐊᒻᒪᓗ ᓄᓇᕘᑦ ᒐᕙᒪᖓᓐᓂᑦ (GN) ᑐᒃᑐᐃᑦ ᖃᐅᔨᓴᖅᑕᐅᕙᓂᖏᓄᑦ ᐊᒻᒪᓗ ᐊᓯᖏᓐᓂᒃ ᐱᓕᕆᐊᓂᒃ ᐊᖏᕐᔪᒪᓇᐅᒪᓚᑦ, ᐊᒻᒪᓗ ᒥᓂᔅᑕᐅᔪᑦ ᑯᑎᖅᑎᓂᖓᑎᒍᑦ ᑲᑎᒪᓂᕐᑲᓚᐅᕐᓯᒪᑎᒃ ᐃᐳᓗ 2019-ᒥ ᐊᒻᒪᓗ ᑲᑎᒪᓂᕐᑲᒃᑲᓂᕐᓂᐊᕐᓂᕐᒧᑦ ᑕᑯᔭᕐᓂᐊᖅᑐᓂᒃ ᐋᖅᑭᒃᓯᒪᓕᓚᐅᕐᒥᔪᑦ ᐱᔾᔪᑎᕐᑲᓂᐊᕐᓯᒪᑎᒃ ᐊᐅᓚᕐᓯᓂᕐᑲᓂᕐᓄᑦ ᐊᒥᖅᑲᕆᐅᔪᓄᑦ ᑐᒃᑐᐃᑦ ᐊᒥᖅᑯᕐᑲᑎᒋᐊᓂᕐᓄᑦ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᒫᓯ 31, 2020	ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ
ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᕐᑌᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᕝᕕᒃᓴᖃᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓗᐊᕈᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᐃᖏᕐᕋᑎᐊᕐᓂᖏᑦ ᐊᒻᒪᓗ ᐱᔭᕆᐅᓂᖏᑦ ᐃᐊᒃᕗ ᓇᐋᔾᔨᐅᐃᑎ ᑲ'ᐋ (ᑲᒫᔫᒃ ᓄᓇᒥ)						
ᔭᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #10-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᐊᖏᕐᓕᕆᐊᖅᑎᑕᐅᓯᒪᓕᕐᑯᓪᓗᒋᑦ ᓄᓇᓕᐅᔪᒥ ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐱᓕᕆᐊᕐᑌᕐᓯᒪᔪᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᑦ (ᕿᖓᒃᐅᑦ ᑐᒃᑐᖏᑦ) ᑐᕌᖓᓪᓗᒋᑦ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐅᑭᐅᑕᒫᑦ ᓴᖅᑮᓯᒪᓕᖅᐸᓐᓂᐊᖅᑐᑦ ᐃᖏᕐᕋᑎᐊᕐᓂᖏᑕ ᐊᒻᒪᓗ ᐱᔭᕆᐅᓂᖏᑕ ᐃᐊᒃᕗ ᓇᐋᔾᔨᐅᐃᑎ ᑲ'ᐋ ᑎᓖᓯ ᓄᓇᓕᖏᓐᓄᑦ ᐊᒻᒪᓗ ᐃᓕᓐᓂᐊᕐᕕᖏᓐᓄᑦ.	**ᓈᒻᒪᒋᔭᐅᔪᑦ**	ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᑖᒃᑯᓂᖓ ᐃᓱᒪᓕᐅᕈᑎᓂᒃ ᐊᑐᓕᖅᑎᑕᐅᑦᑐᓪᓗᒋᑦ ᓈᒻᒪᒃᓴᐃᓯᒪᕗᑦ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ	ᐅᑭᐅᑕᒫᑦ	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ
ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᕐᑌᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᕝᕕᒃᓴᖃᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓗᐊᕈᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᓂᕿᒋᔭᒃᓴᓂᒃ ᐱᓯᒪᓕᕈᓐᓇᖅᐸᓂᖅ						
ᔭᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #11-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᑎᓖᓯ ᓄᓇᓕᒋᔭᖏᓐᓂᖏᒥᐅᑦ ᐱᓯᒪᓕᕈᓐᓇᖅᐸᖕᑯᓪᓗᒋᑦ ᓂᕿᑦᓯᐊᕙᓐᓂᒃ, ᖃᓄᐃᓐᓇᕐᓂᑦᑐᓂᒃ ᓂᕿᓂᒃ ᐃᓅᓯᖏᓐᓄᑦ ᓈᒻᒪᓯᐊᖅᑐᓂᒃ ᐊᒻᒪᓗ ᐅᑭᐅᓗᒃᑖᒧᑦ ᐋᓐᓂᐊᖃᖏᓯᐊᕈᑎᓯᐊᕙᐅᓗᑎᑦ ᓂᕿᒃᓴᖃᖅᑎᑕᐅᕙᓪᓗᑎᒃ, ᐊᒻᒪᓗ ᐃᓱᒪᒋᓗᒍ ᐱᑕᕈᓐᓇᖏᓐᓂᕐᓂᐅᔪᖅ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᓐᓂᒃ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᓱᕗᓪᓕᖅᐸᐅᑎᑕᐅᓇᓂᐊᖅᑕᕐᓂᖏᓐᓂᒃ ᐊᒻᒪᓗ ᐋᖅᑭᒋᐊᕈᑎᐅᓇᔭᖅᑐᓂᒃ ᓂᕿᒋᔭᒃᓴᓂᒃ ᐱᓯᒪᓕᕈᓐᓇᖅᐸᓂᖅ ᐱᕙᓪᓕᐊᔪᓕᕆᓂᐅᔪᓂᒃ ᐅᖃᓪᓚᐅᓯᖃᖅᑎᓪᓕᓂᐊᕐᓂᐊᖅᐳᑦ, ᐱᓱᒍ ᐊᕐᕌᓱᐊᖅᐸᓐᓂᐅᔾᔪᒐᐊᓂᑦ ᐊᓯᐊᑎᒍᑦ ᓂᕿᒋᔭᐅᕙᒃᑐᖃᖅᑕᕐᓂᖅ ᐊᒻᒪᓗ/ᐅᕙᕙᓘᓐᓃᑦ ᐊᑐᓕᖅᑎᓯᒪᓕᕆᐊᒥᓄᑦ ᓂᕿᓕᕐᑖᓄᑦ ᐃᓇᖏᕈᑎᐅᓇᓂᐊᖅᑐᓂᒃ ᐱᓕᕆᐊᓂᒃ, ᐊᑐᓂ ᑎᓖᓯ ᓄᓇᓕᒋᔭᖏᓐᓂ ᒫᓯ 31, 2020 ᓱᕗᖓᓂ.	**ᓈᒻᒪᒋᔭᐅᔪᑦ**	ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᑖᓯᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᒥᒃ ᓈᒻᒪᒃᓴᐃᓯᒪᕗᑦ ᐊᒻᒪᓗ ᑎᒃᑯᐊᖅᓯᓯᒪᓪᓗᑎᒃ ᑲᑐᔾᔨᓂᖃᖅᓱᑎᒃ ᑭᐅᔾᔪᑎᒋᓯᒪᔭᖏᓐᓂᒃ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #8-2019 (ᓵᑎ ᐃᐊᒃᕗ) ᑐᒃᑐᖏᓐᓄᑦ (ᐳᓘᓃᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᓐᓄᑦ). ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᓇᓗᓇᐃᔭᕐᕕᐅᔪᒪᓚᐅᖅᑐᑦ ᔭᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᖃᓄᖅ ᑐᑭᖃᖅᑎᑕᐅᒪᖔᑦ "ᓂᕿᓪᓚᑦᑖᓄᑦ ᐃᓇᖏᕈᑎᐅᔪᓇᖅᑐᓂᒃ" ᐱᓕᕆᐊᖅ. ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓯᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᐃᑲᔪᖅᑐᐃᓂᕐᒥᓐᓂᒃ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᑮᓇᐅᔭᑦᑯᑎᒃᓴᖅᑎᑦᓯᕙᓐᓂᕐᑎᒍᑦ ᑕᐃᒪᐅᑎᑕᐅᕙᒃᑐᓂᒃ ᐊᓯᖏᑎᒍᑦ ᓂᕿᒋᔭᐅᕙᑦᑐᑦᑲᕐᓂᖅ ᐱᑕᖅᑎᑦᓯᓂᐅᕙᑦᑐᓄᑦ ᐃᓚᖅᑎᑦᑐᒋᑦ, ᑭᓯᐊᓂᓗ ᑭᓪᓕᖅᑲᕆᑎᒃ, ᑐᒃᑐᕙᓂᒃ ᐊᖑᓇᓯᐊᖅᐸᓐᓂᕐᓂᒃ, ᑎᖅᓯᓕᐅᑉ ᑐᒃᑐᕐᑯᑎᖏᓐᓂᒃ ᐊᖑᓇᓯᐊᖅᐸᓐᓂᕐᓂᒃ, ᒪᑎᑕᐅᑎᓄᑦ ᐃᖃᓪᓕᐊᖅᐸᓐᓂᕐᓂᒃ, ᐊᓯᖏᓂᒃᓗ. ᑖᓐᓇ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᖅ ᐃᓚᖓᒍᑦ ᐱᓕᕆᐊᕐᑌᓂᐊᖅᑐᖅ ᐊᑐᓕᖅᑎᓯᓂᒃᑯᑦ ᐊᕙᑎᓕᕆᔩᑦ ᓄᓇᒥᐅᑕᓕᕆᔩᑦᑯ ᐱᕈᖅᑲᓂᕈᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᓇᐅᒪᔾᔪᑎᒃᓴᓂᒃ ᐱᓕᕆᐊᒧᑦ ᐸᕐᓇᐅᑎᖏᓐᓂᒃ ᑲᑐᔾᔨᓂᖅᑲᐅᑎᒃ ᐱᓕᕆᐊᖅᑲᖅᑎᖅᑲᐅᑎᒃ ᐊᒥᓱᓂᒃ ᐱᓕᕆᐊᖅᑲᖅᑎᐅᔪᓂᒃ. ᐱᓕᕆᐊᕐᑌᓕᖅᑯᔭᐅᓪᓗᓂ ᐸᕐᓇᐅᑎᓕᐊᕐᑌᓯᒪᔪᖅ ᑖᓐᓇ ᓇᓗᓇᐃᔭᐃᓯᒪᔪᖅ ᐱᓕᕆᐊᕐᑌᓕᕈᓐᓇᖅᑐᓂᒃ ᑐᕌᖓᑎᓪᓗᒋᑦ ᓂᕿᒋᔭᐅᕙᑦᑐᑲᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᓄᑦ, ᐋᖅᑭᒃᓯᐃᓯᒪᓕᕐᓂᒃᓴᒧᑦ ᐊᕐᕌᓱᒃᑎᐅᓂᕐᒧᑦ ᑐᑭᒧᐊᒃᑎᕐᓯᔨᖃᕐᓂᖅ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐱᓕᕆᐊᕐᑌᔾᔪᑎᓂᒃ, ᐱᓕᕆᓂᖃᕐᕕᐅᓕᕈᓐᓇᖅᑐᓂᒃ ᒪᒃᑯᒃᑐᓂᑦ, ᐊᒻᒪᓗ ᓄᓇᓕᐅᔪᒥ ᓂᕿᒋᔭᒃᓴᓕᕆᓂᒥ ᐸᕐᓇᐅᑎᓕᐅᕐᓂᖅ, ᑕᒪᕐᒥᒃᑯ ᐃᓚᖃᖅᑎᑕᐅᔪᓇᖅᓯᒍᑎ ᑐᕌᖓᔪᓂᒃ ᐊᓯᒋᔭᖏᓐᓂᒃ.	ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG)	ᒫᓯ 31, 2020	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ

ᑭᒃᑐᐃᓐᓇᓂᑦ ᖃᐅᔨᒋᐊᕐᕕᖃᕐᓂᖅ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᑏᑦ	ᐱᓕᕆᐊᕝᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓕᐊᖑᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #12-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᐊᖏᓪᓕᒋᐊᖅᑎᑕᐅᓯᒪᓕᖅᑯᓪᓗᒋᑦ ᑭᒃᑐᐃᓐᓇᓂᑦ ᑐᑭᓯᐅᒪᓂᐅᔪᑦ ᐱᑦᖃᓕᕆᐊᖃᖅᓂᖓᓂᒃ ᐃᐊᒃᕗ (ᑐᒃᑐᑦ) ᐊᐅᓚᑕᐅᓂᖏᓄᑦ ᐱᓕᕆᐊᓂᒃ, ᐱᒋᐊᖅᑎᑕᐅᓗᑎᒃ ᔮᓄᐊᕆ 2020-ᒥ, ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᒪᓐᓇ ᐱᓕᕆᖃᑎᒌᓐᓂᐊᖅᑐᑦ: (1) ᑐᓂᓯᖃᑦᑕᐅᑎᓗᑎᒃ ᑐᓴᒃᑳᖅᑯᑎᓂᒃ ᑐᕌᖓᓪᓗᑎᒃ ᑰᑭᑎ ᐊᒻᒪᓗ ᓵᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᓐᓄᑦ, ᑎᓖᓯ ᓄᓇᓕᒋᔭᖏᓐᓄᑦ, ᐱᓕᕆᐊᖃᖅᑎᐅᓪᓗᑎᒃ ᑎᒥᖅᑯᑎᐅᔪᑎᒍᑦ ᐊᒻᒪᓗ ᓄᓇᓕᐅᔪᓂ ᑲᑎᒪᓂᖃᖅᑎᓯᕙᓐᓂᖅᑎᒍᑦ; ᐊᒻᒪᓗ, (2) ᐋᖅᑭᒃᓱᐃᓯᒪᓕᖅᑐᑎᒃ ᐊᒻᒪᓗ ᓱᐊᒻᒪᖅᑎᕆᓯᒪᓕᖅᑐᑎᒃ ᐃᓕᓐᓂᐊᖅᑎᓯᔾᔪᑎᒃᓴᓂᒃ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᓂᒃ, ᓈᓚᐅᑎᑎᒍᑦ, ᑕᓚᕖᓴᑎᒍᑦ, ᑐᓴᒃᓴᓕᕆᔨᑎᒍᑦ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓯᓐᓈᑦ ᑲᑎᒪᓂᖅᑲᖅᑎᓯᕙᓐᓂᖅᑎᒍᑦ, ᑭᒃᑐᐃᓐᓇᓂᒃ ᓱᓇᑦ ᐱᔾᔪᑎᒋᓪᓗᒋᑦ ᑰᑭᑎ ᐊᒻᒪᓗ ᓵᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᑦ ᐊᒥᓲᓐᖑᕐᓃᖅᐸᓪᓕᐊᒻᒪᖕᒫᑕ ᐊᒻᒪᓗ ᓱᓇᑦ ᐃᓚᐅᖃᑕᐅᔪᑦ ᐊᒃᑐᐃᓯᒪᖃᑕᐅᒻᒪᖕᒫᑕ ᐊᒥᓲᖕᓃᖅᐸᓪᓕᐊᓂᐅᔪᓄᑦ, ᐃᓚᖃᖅᑎᓪᓗᒋᑦ ᓄᒃᑎᖅᓯᒪᓕᖅᐸᓂᖏᓄᑦ ᑐᒃᑐᑦ.	ᓈᒻᒪᒋᔭᐅᔪᑦ	ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᕌᓂᐊᖅᑐᑦ ᐊᕕᒃᑐᖅᓯᒪᓂᖏᑦ 1-ᖓᓂᒃ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᓂ ᐊᒻᒪᓗ ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ ᐊᑐᓕᖅᑎᕌᑎᓪᓗᒋᑦ ᐊᕕᒃᑐᖅᓯᒪᓂᖏᑦ 2-ᖓᓂᒃ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᓂ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ	ᔮᓄᐊᕆ 2020	1) ᐊᒻᒪᓗ 2) ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ

ᖃᔅᓯᐅᓂᖏᓐᓄᑦ ᐊᒥᓲᓂᖏᑕ ᖃᐅᔨᓴᐃᓃᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᑏᑦ	ᐱᓕᕆᐊᕝᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓕᐊᖑᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #13-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᑭᖑᕙᑎᑕᐅᓯᒪᙱᓕᖅᑐᑎᒃ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᔪᑎᒍᑦ ᐊᐅᓚᕰᓂᖅᑲᓕᕝᕕᐅᖅᑯᓪᓗᒋᑦ, ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᖃᓄᖅ ᐊᒥᓲᓂᖅᑲᖅᑎᕆᒻᒪᖔᑕ ᖃᐅᔨᓴᐃᓂᖅᑲᖅᐸᓐᓂᐊᖅᑐᑦ ᑰᑭᑎ ᐃᐊᒃᕗᑦ ᐅᑭᐅᑦ ᒪᕐᕉᒃ ᓈᓯᒪᓕᕐᕌᖓᒃ ᑕᐃᒪᓗᑦᑕᐅᖅ ᐊᑕᐅᓯᒃᑯᖅᑎᒻᒥᒎᑦ ᓵᑎ ᐃᐊᒃᕗ ᐊᒻᒪᓗ ᑎᒃᔭᓕᐅᑉ/ᐊHᐃᐊᑉ ᑐᒃᑐᖏᓂᒃ ᖃᐅᔨᓴᐃᓂᖅᑲᖅᐸᒻᒥᒎᑎᒃ. ᑕᐃᒪᓗ, ᐊᒥᓲᓂᖅᑲᖅᑎᒋᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᐃᓂᖃᕇᓕᕆᔪᑦ ᔫᓂ 2020-ᒥ.	**ᐊᔾᔨᒋᙱᓐᓂᖃᖅᕕᐅᔪᑦ** – ᐋᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᓴᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᔾᔨᙳᕆᑦᕆᑎᒍᑦ ᐅᖃᖅᓯᒪᕚᑦ "ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #13-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᒋᑦ: ᑭᖑᕙᑎᑕᐅᓯᒪᙱᓕᖅᑐᑎᒃ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᔪᑎᒍᑦ ᐊᐅᓚᕰᓂᖅᑲᓕᕝᕕᐅᖅᑯᓪᓗᒋᑦ, ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᖃᓄᖅ ᐊᒥᓲᓂᖅᑲᖅᑎᕆᒻᒪᖔᑕ ᖃᐅᔨᓴᐃᓂᖅᑲᖅᐸᓐᓂᐊᖅᑐᑦ ᑰᑭᑎ ᐃᐊᒃᕗᑦ (ᑭᖕᒐᐅᑦ ᑐᒃᑐᖏᑦ) ᐅᑭᐅᑦ ᒪᕐᕉᒃ ᓈᓯᒪᓕᕐᕌᖓᒃ ᑕᐃᒪᓗᑦᑕᐅᖅ ᐊᑕᐅᓯᒃᑯᖅᑎᒻᒥᒎᑦ ᓵᑎ ᐃᐊᒃᕗ (ᐳᓘᕗᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᑦ) ᐊᒃᖃᖅᑯᑎᖏᓂᒃ ᖃᐅᔨᓴᐃᓂᖃᖅᑲᕐᓂᐊᖅᑲᕐᓂ. ᑕᐃᒪᓗ, ᐊᒥᓲᓂᖅᑲᖅᑎᒋᓂᖏᓐᓄᑦ ᖃᐅᔨᓴᐃᓂᖃᕇᓕᕆᔪᑦ ᔫᓂ 2020-ᒥ.	ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐃᓱᒪᓕᐅᖅᓯᒪᓪᓚᑕ ᖃᓄᖅ ᐊᒥᓲᓂᖅᑲᖅᑎᕆᒻᒪᖔᑕ ᑰᑭᑎ ᐃᐊᒃᕗᑦ (ᑭᖕᒐᐅᑦ ᑐᒃᑐᖏᑦ) ᐊᒻᒪᓗ ᓵᑎ ᐃᐊᒃᕗ (ᐳᓘᕗᔅ-ᑲᓇᓐᓇᒥ ᑐᒃᑐᖏᑦ) ᐊᒃᖃᖅᑯᑎᖏᓂᒃ ᖃᐅᔨᓴᐃᓂᖅᑲᖅᑲᕐᓂᐊᖅᑲᕐᓂᒥᓄᑦ ᐅᑭᐅᑦ ᒪᕐᕉᒃ ᓈᓯᒪᓕᕐᕌᖓᑦ, ᓱᕐᕈᓇᐃᔭᖅᑕᐅᓯᒪᓪᓚᑕ ᑲᑐᔾᔨᓂᖅᑲᖅᓯᒪᑎᒃ ᐊᐅᓚᕰᓂᖅᑲᖅᑎᓯᒪᓗᑎᒃ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂ. ᓄᓇᕗᑦ ᒐᕙᒪᖓᑦ ᓯᕗᓕᖅᑎᐅᖃᑦᑕᖅᓯᒪᓪᓚᑕ ᖃᓄᖅ ᐊᒥᓲᓂᖅᑲᖅᑎᕆᒻᒪᖔᑕ ᖃᐅᔨᓴᐃᖃᑦᑕᖅᓯᒪᓂᕐᓄᑦ ᑎᒃᔭᓕᐅᑉ ᑐᒃᑐᖁᑎᖏᓂᒃ. ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓯᑎᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᓄᓇᕗᑦ ᒐᕙᒪᖓᓂᒃ (GN) ᑲᑐᔾᔨᓂᖅᑲᖅᑐᑎᒃ ᓇᐅᓯᖅᑐᐃᕙᓐᓂᕐᓂᒃ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᓂᐅᕙᒃᑐᓂᒃ ᑖᒃᑯᓂᖓ ᐊᒥᖅᑯᖅᑎᐅᔪᓂᒃ.	ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᐱᒋᐊᖅᑐᑎᒃ ᔫᓂ 2020	ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ

ᓄᕐᖃᖅᑲᖅᑐᓂᒃ ᓇᐅᓯᖅᑕᐃᕙᓂᖅ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒋᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᑏᑦ	ᐱᓕᕆᐊᕝᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓕᐊᖑᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
᠀ᐃᑭᔮ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #14-2019 (ᑰᑭᑎ ᐃᐊᒃᕗ)	ᐱᐅᓂᖅᓴᑎᒍᑦ ᓇᐅᓯᖅᑐᐃᓂᖅᑲᖅᑯᓪᓗᒋᑦ ᓄᕐᖃᒃᓴᖅᑐᑦ ᖁᓯᖕᓂᕆᔭᖏᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᖅᑯᑎᖏᓂ, ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᓯᔭᕆᐊᖃᖅᐳᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᓄᕐᖃᒃᓴᖅᑐᓂᒃ ᓇᐅᓯᖅᑐᐃᓂᖅᑲᕈᑎᐅᓇᔭᖅᑐᓂᒃ ᐊᓇᖏᓂᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᖅᑎᒍᑦ ᐅᑭᐅᖑᑎᓪᓗᒍ ᑕᖅᑭᖏᓂ, ᐅᑭᐅᑕᒫᑦ ᐱᒋᐊᕐᓗᑎᒃ ᔮᓄᐊᕆ 2020. ᓄᓇᓕᐅᔪᓂ ᐃᓚᒋᔭᐅᔪᐃᑦ ᐃᓚᐅᖃᑕᐅᔪᓐᓇᖅᑕᐅᓗᐊᓕᑦ ᑲᑎᖅᓱᐃᓂᐅᕙᒃᑐᓄᑦ ᐊᓇᖏᓂᒃ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᑦᑕ ᐅᑮᖕᕕᕆᕙᒃᑕᖏᓂ.	**ᐊᔾᔨᒋᙱᓐᓂᖃᖅᕕᐅᔪᑦ** – ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᐋᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓪᓗ ᐱᕈᒃᓴᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᔾᔨᙳᕆᑦᕆᑎᒍᑦ ᐅᖃᖅᓯᒪᕚᑦ "ᐊᑐᓕᖅᑯᔭᐅᓪᓗᑎᒃ #14-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᒋᑦ: ᐱᐅᓂᖅᓴᑎᒍᑦ ᓇᐅᓯᖅᑐᐃᓂᖅᑲᖅᑯᓪᓗᒋᑦ ᓄᕐᖃᒃᓴᖅᑐᑦ ᖁᓯᖕᓂᕆᔭᖏᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᖅᑯᑎᖏᓂ, ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᓯᔭᕆᐊᖃᖅᐳᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᓄᕐᖃᒃᓴᖅᑐᓂᒃ ᓇᐅᓯᖅᑐᐃᓂᖅᑲᕈᑎᐅᓇᔭᖅᑐᓂᒃ ᐊᓇᖏᓂᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᖅᑎᒍᑦ ᐅᑭᐅᖑᑎᓪᓗᒍ ᑕᖅᑭᖏᓂ, ᐅᑭᐅᑕᒫᑦ ᐱᒋᐊᕐᓗᑎᒃ ᔮᓄᐊᕆ 2020. ᐱᔪᓐᓇᕐᓂᓚᒦᒥᑎᒍᑦ, ᓄᓇᓕᐅᔪᓂ ᐃᓚᒋᔭᐅᔪᐃᑦ ᐃᓚᐅᖃᑕᐅᔪᓐᓇᖅᑕᐅᓗᐊᓕᑦ ᑲᑎᖅᓱᐃᓂᐅᕙᒃᑐᓄᑦ ᐊᓇᖏᓂᒃ ᑰᑭᑎ ᐃᐊᒃᕗ ᑐᒃᑐᖏᑦᑕ ᐅᑮᖕᕕᕆᕙᒃᑕᖏᓂ.	ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᔪᓯᑎᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᑐᙵᕕᖃᖃᑦᑕᕐᓂᒥᓂᒃ ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑰᑭᑎ ᐃᐊᒃᕗᑦ (ᑭᖕᒐᐅᑦ ᑐᒃᑐᖏᑦ) ᑐᒃᑐᖏᓂ ᓄᕐᖃᒃᓴᖅᑐᓂᒃ ᓇᐅᓯᖅᑐᐃᓂᕆᕙᒃᑕᖏᓄᑦ ᐊᓇᖏᓂᒃ ᑲᑎᖅᓱᐃᕙᓐᓂᖅᑎᒍᑦ ᐱᓕᕆᐊᖑᕙᒃᑐᓂᒃ ᐱᓕᕆᓂᐅᕙᒃᑐᓄᑦ ᖁᓕᒥᒎᓕᒃᑎᒍᑦ ᐅᑭᐅᖅᓯᒪᔪᑐᖅᑲᓕᖅᑎᖅᑎᒍᑦ ᖃᐅᔨᓴᐃᓂᕙᒃᑐᓄᑦ ᐃᓚᐅᑎᑕᐅᓗᓂ. ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᔪᓯᑎᑦᓯᓯᒪᓂᐊᖅᑐᑦ ᑲᑎᖅᓱᐃᕙᓐᓂᖏᓐᓂᒃ ᑐᒃᑐᑦ ᐊᓇᖏᓂᒃ ᖃᐅᔨᓴᖅᑕᐅᔪᒃᓴᓂᒃ ᐅᑭᐅᖅᓯᒪᔪᑐᖅᑲᓕᖅᑎᖅᑎᒍᑦ ᑐᒃᑐᓂᒃ ᖃᐅᔨᓴᐃᓂᐅᕙᒃᑐᓄᑦ ᑰᑭᑎ ᐃᐊᒃᕗ ᐊᒥᖅᑯᑎᖏᓂᒃ, ᐱᒋᐊᖅᑎᓯᓗᑎᒃ ᒫᓯ 2020, ᐱᔾᔪᑎᒋᓗᒋᐊᖅᓯᒪᓗᒋᑦ ᐱᓯᒪᓕᕆᐊᕐᓂᒥᒃ ᓈᒻᒪᒃᑐᓂᒃ ᖃᐅᔨᓴᕐᕕᐅᔪᓂᐊᖅᑐᓂᒃ ᐊᒻᒪᓗ ᓈᒻᒪᒃᑐᓂᒃ ᐋᕐᕿᐅᔪᑦ ᐊᖏᕐᓂᕆᔭᖓᓂᑦ. ᓯᕗᓂᖏᓐᓂ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᑎᖅᓱᐃᔪᓐᓇᓕᖅᓯᒪᓕᖅᑐᑦ ᑐᒃᑐᑦ ᐊᓇᖏᓂᒃ ᖃᐅᔨᓴᕐᕕᐅᔪᓐᓇᖅᑐᓂᒃ ᓄᓇᓕᐅᔪᒥ ᐱᓕᕆᔪᓐᓇᖅᑐᓂᒃ, ᑕᐃᒃᑯᐊ ᑲᑎᖅᓱᐃᔪᓐᓇᖅᑐᑦ ᐃᓚᒋᐊᖅᑕᐅᔪᑎᖃᕐᓂᐊᖅᓯᒪᓕᑕ ᑲᑎᖅᓱᐃᔪᓐᓇᓕᓚᐅᖅᑐᓂᒃ ᐅᑭᐅᑐᖅᑲᓕᖅᑎᖅᑎᒍᑦ ᖁᓕᒥᒎᓕᒃᑯᑦ ᖃᐅᔨᓴᐃᓂᖅᑎᖅᑐᒋᑦ	ᓄᓇᓯᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᓖᓯ ᒐᕙᒪᖓᑦ (TG)	ᐱᒋᐊᕐᓗᑎᒃ ᔮᓄᐊᕆ 2020	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒌᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᕝᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓗᐊᕈᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑦ
ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖓᑦ						
ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #15-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)	ᑕᒪᕐᒥᒃ ᐃᐊᒃᕗ ᑐᒃᑐᑦ ᐊᒻᒪᓗ ᐃᐊᒃᕗᑦ ᑐᒃᑐᐃᑦ ᓇᔪᖅᐸᒃᑕᖏᑕ ᖃᐅᔨᓴᖅᑕᐅᕙᕐᑯᓪᓗᑎᑦ, ᐊᒻᒪᓗ ᖃᓄᐃᓪᓚᕆᒃᐸᓐᓂᖏᑎᒍᑦ ᐊᖑᓇᓱᒃᑕᐅᕙᒃᑐᑦ ᖃᔾᔨᐅᓂᖏᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓕᖅᐸᒃᑐᑦ ᐱᐅᓯᑐᕐᖃᒃᑯᑦ ᓈᒻᒪᒋᔭᐅᓯᒪᔪᑎᒍᑦ, ᐊᒻᒪᓗ ᐃᑲᔪᕐᓂᖃᖅᓯᒪᕐᑯᓪᓗᑎᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᔾᔨᓂᐅᔪᓄᑦ ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᓕᖅᑎᑦᓯᓂᐊᖅᑐᑦ ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ, ᐱᒋᐊᖅᑎᑕᐅᓪᓗᑎᒃ ᔫᓄᐃᕆ 2020-ᒥ (ᑕᑯᓗᑎᑦ ᐅᐃᒍᖅᑎᑦ H-ᖓ).	**ᐊᔾᔨᒌᖕᒋᓐᓂᖃᕐᕕᐅᔪᑦ** – ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᒦᖏᑦᑕᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #15-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᑦ: ᑕᒪᕐᒥᒃ ᐃᐊᒃᕗ ᑐᒃᑐᑦ ᐊᒻᒪᓗ ᐃᐊᒃᕗᑦ ᑐᒃᑐᐃᑦ ᓇᔪᖅᐸᒃᑕᖏᑕ ᖃᐅᔨᓴᖅᑕᐅᕙᕐᑯᓪᓗᑎᑦ, ᐊᒻᒪᓗ ᖃᓄᐃᓪᓚᕆᒃᐸᓐᓂᖏᑎᒍᑦ ᐊᖑᓇᓱᒃᑕᐅᕙᒃᑐᑦ ᖃᔾᔨᐅᓂᖏᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓕᖅᐸᒃᑐᑦ ᐱᐅᓯᑐᕐᖃᒃᑯᑦ ᓈᒻᒪᒋᔭᐅᓯᒪᔪᑎᒍᑦ, ᐊᒻᒪᓗ ᐃᑲᔪᕐᓂᖃᖅᓯᒪᕐᑯᓪᓗᑎᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᔾᔨᓂᐅᔪᓄᑦ ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᕿᒥᕐᕈᐃᓯᒪᓕᒃᑲᓂᕐᓂᐊᖅᐳᑦ 2007-ᒥ ᐅᓂᒃᑳᓕᐊᖑᓚᐅᖅᑐᓂ ᐄ. ᓕᐆᒥᑦ ᑕᐃᔭᐅᓪᓗᑎᒃ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᖅ" ᐱᔾᔪᑎᒋᓪᓗᑎᒃ ᖃᐅᔨᒋᐊᖅᓯᒪᓕᕐᓂᐊᕐᓗᑎᑦ ᑐᕌᕝᕕᒃᓴᐅᑎᑕᐅᓪᓗᑎᒃ ᐅᖃᖅᑕᐅᓯᒪᓚᐅᖅᑐᑦ ᑖᒃᑯᓇᖓ ᐊᑐᓕᖅᑎᑕᐅᓯᒪᙱᑦᑐᓂᑦ ᓱᓕ ᐊᑐᕐᓂᖃᕋᔭᕐᒪᖔᑕ.	ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᑭᐅᔾᔪᑎᒋᓚᐅᖅᑕᖓᓂᒃ ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #16-2019 (ᓴᑎ ᐃᐊᒃᕗ (ᐳᓖᓐ-ᑲᓇᖕᓇᒥ ᑐᒃᑐᖏᑦ) ᐱᔾᔪᑎᒋᓪᓗᑎᒃ ᑕᐃᒪᖕᓇᕐᕋᐃᖕᓇᖅ ᑭᐅᓚᐅᖅᐳᑦ ᐊᒻᒪᓗ ᐅᖃᖅᓯᒋᑦ ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖓᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᓚᐅᕐᒪᑕ ᑎᓕᓯ ᒐᕙᒪᖓᓂᑦ (TG) ᐅᑭᐅᖏᑦ 2010-ᒥᑦ 2012-ᒧᑦ ᐊᑐᖅᑎᓪᓗᒋᑦ ᐊᒻᒪᓗ ᑖᒃᑯᐊ ᐱᔾᔪᑎᓪᓗᒋᑦ ᐱᒋᐊᖅᑎᕐᔪᒪᓕᓚᐅᕐᓂᖏᑕ ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕐᕕᖓᓂᒃ (TRTI) ᐅᕝᕙᓘᓐᓃᑦ ᑎᑖᕕᖕᖄ. ᑎᑖᕕᖕᖅ ᐱᔾᔪᑎᒋᕙᑦ ᐊᖏᕐᔪᒪᕆᐅᓚᐅᖅᑐᓂ ᐱᐅᓯᑐᕐᖃᒃᑯᑦ ᐅᔾᔮᖃᓂᒃ ᑎᓕᓯ ᓄᓇᖏᓐᓂ ᐃᓄᖁᑎᖏᑦ ᐃᓕᖅᑯᓯᑐᕐᖃᒥᓐᓂ ᐊᑐᖅᐸᒃᓯᒪᔭᕆᖅᑲᖓᓐᓂᒃ ᐱᕈᓃᓂᐊᕈᓯᐊᖓᒥᒃ ᐊᒻᒪᓗ ᐱᓯᒪᓕᒃᑲᓐᓂᕐᕕᒋᓂᐊᖅᓯᒋᑦ ᓱᓇᕐᑯᑎᒃᓯᒥᓐᓂᒃ/ᐱᕐᑯᑎᒃᓯᒥᓐᓂᒃ ᐅᐊᔭᕐᑐᑎᒃ ᓄᓇᐃᓐᓇᒧᑦ ᐊᒻᒪᓗ ᐅᑎᒧᑦ. ᐊᑎᖓ ᑖᓐᓇ ᑎᒍᔭᐅᓯᒪᓕᓚᐅᕐᒪᑦ ᑕᐃᔭᐅᔾᔪᓯᐅᓂᐊᖅᓯᓂ ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕐᕕᖓᓄᑦ (TRTI) ᐱᔾᔪᑎᒋᑐᒍ ᓇᑯᓇᐃᖅᓯᔾᔪᑎᐅᓂᖓᑕ ᐱᕐᑯᑎᖃᕐᕕᐅᕙᕐᑐᓄᑦ, ᐱᑖᕐᕕᐅᒃᑲᓂᖅᐸᕐᑐᓄᑦ ᐊᒻᒪᓗ ᑭᖑᓂᐊᓂ ᐊᑐᖅᑕᐅᕙᓕᓚᐅᖅᓯᓂ ᑎᓕᓯ ᖃᐅᔨᒪᔭᑐᖃᖏᓐᓄᑦ. ᑎᑖᕕᖕᖄ (ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕐᕕᖓ) ᐱᒋᐊᖅᑎᑕᐅᓕᓚᐅᖅᓯᒪᓪᓚᑦ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑎᖃᕐᓂᒥᑦ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᖓᓂᒃ". ᑑᑦᑖᕐᒃ ᓕᒫᑦ ᐱᓕᕆᐊᖏᑦ ᐱᑕᖃᖅᑎᑦᓯᓯᒪᓚᐅᖅᐳᑦ ᑐᙵᕝᕕᐅᔪᓂᒃ ᐅᓪᓗᒥ ᐱᓕᕆᐊᖑᓕᖅᑐᒧᑦ ᑕᐃᔭᐅᓪᓗᓂ ᑎᓕᓯ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐱᓕᒻᒪᒃᓴᐃᓂᕐᒧᑦ ᐃᖅᑲᓇᐃᔭᕐᕕᖓ (TRTI), ᐊᒻᒪᓗ ᑭᖑᓂᐊᓂ ᐱᒋᐊᖅᑎᑕᐅᓯᒪᓕᓚᐅᖅᑐᒧᑦ ᑕᐃᔭᐅᓪᓗᓂ ᑎᑖᕕᖕᖄ, ᐊᓯᔾᔨᕆᐊᖅᓯᒪᓂᖃᕐᑐᖅ ᑕᐃᒪᓐᓇ. ᑕᐃᒪᓗ, ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᓂᖃᕐᑐᑦ ᐱᔾᔪᑎᐅᓗᐊᖅᑑᓪᓗᑎᒃ ᐃᓚᒋᔭᐅᔪᑦ "ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊ", ᐊᖏᔪᒥᒃ ᐃᓱᒪᒃᓴᖅᓯᐅᕈᑕᐅᓯᒪᓕᕐᐊᓂᖕᓂᖓᑕ ᐊᒻᒪᓗ ᐊᑐᓕᖅᑎᑕᐅᕙᓪᓕᐊᓕᖅᓯᑎᒃ.	ᑎᓕᓯ ᒐᕙᒪᖓᑦ	ᐱᒋᐊᕐᓗᑎᒃ ᔫᓄᐊᕆ 2020	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ
ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᖑᔪᖅ	ᑭᐅᔾᔪᑎᖏᑦ	ᑭᐅᔾᔪᑎᐅᔪᓄᑦ ᐱᔾᔪᑎᒌᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᓂᑦ	ᐱᓕᕆᕝᕕᒃᓴᖅᑎᑕᐅᓂᕐᓄᑦ ᑐᑭᓗᐊᕈᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖓᑦ
ᓱᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓ						
ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #16-2019 (ᑰᑮᑎ ᐃᐊᒃᕗ)	ᐱᐅᓂᖅᓴᑎᒍᑦ ᑐᑭᓯᐅᒪᔭᐅᓕᕐᑯᓪᓗᑎᑦ ᓱᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓄᑦ ᐃᓕᙳᐃᑎᑦᓯᓯᒪᓕᕐᓂᐅᔪᓄᑦ ᐃᐊᒃᕗ ᑐᒃᑐᓂᒃ, ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐱᓕᕆᔾᔪᑎᑎᒍᑦ ᑲᑎᖅᓱᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓄᓇᒥᑦ ᓱᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓂᑦ ᕿᒥᕐᕈᔭᐅᓯᒪᔪᓂᒃ ᐃᓚᕐᒃᖅᑎᓪᓗᑎᑦ ᑭᓯᐊᓂᓗ ᑕᒪᒃᑯᓇᖓ ᑭᓪᓕᕐᒃᖅᑎᑕᐅᓯᒪᓇᑎᒃ (i) ᐸᓂᕐᓗᐊᓕᕐᓂᖓᓂᒃ, (ii) ᓄᓇᐅᑉ ᐃᑯᐊᓛᕐᓂᖃᕐᓂᖓᓂᒃ, ᐊᒻᒪᓗ (iii) ᐱᕈᖅᑐᖃᖏᓗᐊᓕᕐᓂᖓᓂᒃ, ᐃᐊᒃᕗ ᓇᐋᕐᐅᐃᑎ ᑲ'ᐋ ᐱᓕᕆᐊᒥᒃ ᐱᓕᕆᓂᖃᖅᑎᓪᓗᒋᑦ ᐊᒻᒪᓗ ᑎᓕᓯ ᖃᐅᔨᓴᐃᔨᐅᓂᕐᒧᑦ ᐊᒻᒪᓗ ᓇᐅᑦᓯᖅᑐᐃᔨᐅᓂᕐᒧᑦ ᐱᓕᕆᐊᒥᒃ ᐱᓕᕆᓂᖃᖅᑎᓪᓗᒋᑦ. ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒧᑦ ᐱᓕᕆᐊᓂᑦ ᖃᓄᐃᓕᕐᓂᖏᓂᒃ ᖃᐅᔨᔭᐅᓯᒪᓕᖅᑐᑦ ᐋᖅᑭᒃᓯᐊᖑᕙᕆᐊᖃᕐᒪᑕ ᐃᑲᔫᑎᐅᓕᕐᓂᐊᕐᓗᑎᒃ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᔾᔨᓂᕐᒧᑦ ᑐᙵᕕᐅᓕᕐᓂᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐅᑭᐅᑖᓪᓚᑦ ᓴᖅᑭᑕᐅᕙᓐᓂᐊᕐᓗᑎᒃ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐊᒻᒪᓗ ᓄᓇᕝᕙᐃᑉ ᒐᕙᒪᖓᓄᑦ (GNWT).	**ᐊᔾᔨᒌᖕᒋᓐᓂᖃᕐᕕᐅᔪᑦ** – ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᔾᔨᒦᖏᑦᑕᖏᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᕐᑯᔭᐅᓪᓗᑎᒃ #16-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᑦ: ᐱᐅᓂᖅᓴᑎᒍᑦ ᑐᑭᓯᐅᒪᔭᐅᓕᕐᑯᓪᓗᑎᑦ ᓱᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓄᑦ ᐃᓕᙳᐃᑎᑦᓯᓯᒪᓕᕐᓂᐅᔪᓄᑦ ᐃᐊᒃᕗ ᑐᒃᑐᓂᒃ, ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᑲᑎᖅᓱᐃᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᓄᓇᒥᑦ ᓱᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐊᓂᖓᓂᑦ ᕿᒥᕐᕈᔭᐅᓯᒪᔪᓂᒃ ᐃᐊᒃᕗ ᓇᐋᕐᐅᐃᑎ ᑲ'ᐋ ᐱᓕᕆᐊᒥᒃ ᐱᓕᕆᓂᖃᖅᑎᓪᓗᒋᑦ. ᖃᐅᔨᔭᐅᓯᒪᓕᖅᑐᑦ ᓇᐅᑦᓯᖅᑐᐃᓂᕐᒥ ᐱᓕᕆᐊᓂᑦ ᐋᖅᑭᒃᓯᒪᐅᔭᕆᐊᖃᕐᒪᑕ ᐃᑲᔫᑎᐅᓕᕐᓂᐊᕐᓗᑎᒃ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᔾᔨᓂᕐᒧᑦ ᑐᙵᕕᐅᓕᕐᓂᐊᖅᑐᓄᑦ ᐊᒻᒪᓗ ᐅᑭᐅᑖᓪᓚᑦ ᓴᖅᑭᑕᐅᕙᓐᓂᐊᕐᓗᑎᒃ ᕗᐃᑭᔩ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ (WRRB) ᐊᒻᒪᓗ ᓄᓇᕝᕙᐃᑉ ᒐᕙᒪᖓᓄᑦ (GNWT).	ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐊᑐᕈᒪᙱᒋᑦᑎᑐᐊᖓᑦ ᐅᖃᕈᓯᐅᔪᖅ "ᐱᓕᕆᔾᔪᑎᑎᒍᑦ", ᐱᔾᔪᑎᒋᓪᓗᒍ ᒃᑖᑦ ᔩ ᐊᖑᓇᓱᒃᑎᐅᔪᑦ ᐊᑐᖅᐸᓐᓂᐊᕐᒪᑕ ᑕᒪᐃᑎᒎᓕᖓᓪᓗᑎᒃ ᖃᐅᔨᒪᓂᕆᔭᐅᔪᒃ "ᑕᑯᓯᒪᕆᐊᕐᓂᕐᒥᓐᓂ" ᐊᓯᔾᔨᖅᓯᒪᓕᕐᓂᐅᔪᒃ ᓄᓇᒥ. ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᒋᔭᕐᑲᕐᒪᑕ ᐱᓕᕆᔾᔪᑎᖅᑳᕐᑎᒃ "ᐱᓕᕆᔾᔪᑎᑎᒍᑦ" ᑲᑎᖅᓱᐃᓂᕐᒥᓐᓂ ᑐᐱᓕᕆᐊᕐᕕᒃᓴᖅᑐᐊᖅᑐᑦ ᐱᓕᕆᐊᖑᓕᕋᔭᕐᓂᖓᑕ ᓴᓇᕐᑭᑎᓂᒃ ᑎᑎᕋᕐᑎᓂᒃ ᐊᑐᖅᐸᒃᑐᑎ (ᓱᕐᓗ, ᑐᑭᓯᒋᐊᕝᕕᒃᓴᖅᑯᑎᓂᒃ ᑎᑎᕋᕝᕕᒃᓴᓂᒃ, ᓱᓚᐅᑉ ᐆᓇᕐᓂᖓᓄᑦ ᖃᐅᔨᒋᐊᕈᑎᓂᒃ, ᐊᓯᖏᓂᒃᓗ) ᐱᔾᔪᑎᐅᓗᐊᖅᐸᙱᓪᓚᑕ ᐊᖏᓂᖅᓴᐅᔪᒥᒃ ᑕᒪᐃᑎᒎᓕᖓᓪᓗᑎᒃ ᐱᓕᕆᐊᖃᕈᓯᐅᕙᒃᑐᑦ ᑐᙵᕝᕕᒃᓴᖅᑎᑕᐅᓪᓗᑎᒃ ᑎᓕᓯ ᖃᐅᔨᒪᓂᖃᕐᓴᑐᖃᖏᓐᓄᑦ. ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐃᓱᒪᒋᔭᕐᑲᕐᓂᑦ "ᓇᐅᑦᓯᖅᑐᐃᕙᓂᖅ" ᓄᓇᒥ ᐃᑯᐊᓛᕐᓂᖃᕐᓂᖓᓄᑦ ᐱᓯᑐᔪᓪᓚᕆᑦᓗᑎ ᐱᓕᕆᐊᖅᓴᐅᕙᓐᓂᖓᑕ ᐊᒻᒪᓗ ᐃᓱᓕᑦᓗᑎᒃ ᐅᖓᓯᒃᑐᒥᑦ ᖃᐅᔨᔪᑎᐅᕙᑦᑐᑦ ᐊᑐᕐᓂᖅᑎᕐᓂᖅᐅᓇᔭᕐᓯᒋᐊᖅᑐᑎᑦ ᑕᒪᑐᒥᖓ ᐱᓕᕆᓂᖅᑎᕐᓂᐊᓪᓗᓂ. ᑎᓕᓯ ᒐᕙᒪᖓᑦ (TG) ᐱᓯᒪᓕᖅᓯᐊᕐᓂᐊᖅᑐᑦ ᑐᑭᓯᒪᓕᕐᓂᑎᒃ ᖃᓄᖅ ᐱᓕᕆᐊᕆᔭᐅᔪᑦ ᐃᑲᔪᕈᑎᐅᓕᕆᓇᕐᓴᕐᒪᖔᑕ ᓇᐅᑦᓯᖅᑐᐃᕙᓐᓂᕐᓄᑦ ᓄᓇᒥ ᐃᑯᐊᓛᕐᓂᖃᕐᓂᖓᓄᑦ ᐱᐅᓯᑐᕐᒥ ᐃᓱᒪᒃᓯᐅᕐᕕᒋᔪᑦ ᐱᓕᕆᐊᖑᕙᕐᓂᖏᓐᓂ.	ᑎᓕᓯ ᒐᕙᒪᖓᑦ	ᐱᒋᐊᖅᑎᑕᐅᓂᖓᓂ ᐃᐊᒃᕗ ᓇᐋᕐᐅᐃᑎ ᑲ'ᐋ 2020 ᐱᓕᕆᐊᖑᔪᖅ	ᐱᔭᕇᖅᑕᐅᓯᒪᙱᑦᑐᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᒃᑲᖅ	ᑭᐅᔾᔨᑎᖏᑦ	ᑭᐅᔾᔨᑎᐅᔪᓄᑦ ᐱᔾᔨᑎᕆᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᑐᑦ	ᐱᓕᕆᕝᕕᒃᓴᖅᑖᖅᑎᑕᐅᓂᖏᓐᓄᑦ ᑐᑭᒧᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓕᖅᑐᑎᒃ ᐊᐅᓚᓯᓂᖃᕐᓂᕐᓄᑦ ᑐᙵᓚᕝᕕᑯᑎᒃᓴᓕᐅᕐᓂᖅ						
ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #17-2019 (ᑰᐲᑎ ᐃᐊᒃᕗ)	ᑭᙳᕙᖅᑎᑕᐅᓯᒪᓕᕐᓇᑎᒃ ᐊᑐᓕᖅᑎᑕᐅᓂᖏᑦ ᐊᐅᓚᓯᓂᐅᔪᓄᑦ ᐊᒻᒪᓗ ᓇᐅᓯᖅᑐᐃᓂᕐᓄᑦ ᐱᓕᕆᐊᒃᑲᑦ, ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB), ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᑲᑐᔾᔨᓂᖅᑲᐅᑎᒃ ᐱᓕᕆᓂᖅᑲᓂᐊᖅᑐᑦ ᐋᖅᑮᓯᐃᓂᕐᒥ ᐊᒥᕐᖁᑎᓄᑦ ᑑᕐᖓᑎᑕᐅᓪᓗᑎᒃ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᕐᒧᑦ ᑐᙵᓚᕝᕕᑯᑎᒃᓴᓂᒃ ᐊᑦᑕᑦᑕᖅᓯᒪᓂᖅᑲᖅᑎᑕᐅᓪᓗᑎᒃ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᕐᒥ ᐱᓕᕆᐊᒃᑲᓄᑦ ᓱᕗᕐᖓᓂ ᔮᓄᐊᕆ 2020, ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᓱᕗᓕᖅᑎᕆᔭᐅᑎᓪᓗᒋᑦ ᐊᒥᕐᖁᑎᐅᔪᓄᑦ ᕗᐃᑭᐲᒥ. ᑐᙵᕕᐅᓕᖅᑐᑦ ᐃᓚᖃᖅᑎᑕᐅᓯᒪᓂᐊᖅᑐᑦ ᑎᒋᓱ ᐊᒻᒪᓗ ᓱᓇᑐᐃᓐᓇᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒥ ᐱᓕᕆᔩᐅᕙᑦᑐᑦ ᖃᐅᔨᒪᓂᖃᖅᑐᓂᒃ, ᑕᐃᒪᐅᓕᐊᓂᒃᓯᑎᒃ ᐊᐅᓚᓯᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᒋᔭᐅᓯᒪᔪᓂᒃ, ᐊᒻᒪᓗ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᔪᓂᒃ ᑲᑎᒪᔨᐅᔪᓂᑦ ᐊᒻᒪᓗ ᒐᕙᒪᒋᔭᐅᔪᓂᑦ.	ᓈᒻᒪᒋᔭᐅᔪᑦ	ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᑖᔅᓱᒥᖓ ᐃᓱᒪᓕᐅᕈᑎᒥᒃ ᐊᑐᓕᖅᑎᑦᑎᔭᐅᓕᖅᑐᓂ ᓈᒻᒪᒃᓴᐃᓯᒪᕗᑦ. ᑭᓯᐊᓂᓗ, ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᐅᔾᔨᕈᓱᑉᐳᑦ ᑖᒃᑯᐊ ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᓱᕗᓕᖅᑎᐅᑎᑕᐅᓂᖏᑦ ᐊᒥᕐᖁᑎᐅᔪᓄᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᖅᑲᓂᕐᒥ ᑐᙵᕕᐅᕐᖁᑎᐅᔪᑦ ᓇᒍᓇᐃᖅᑕᐅᓯᒪᓂᖏᑦᑕ ᐱᔭᕇᖅᑕᐅᓯᒪᓕᕝᕕᒃᓴᖅᑖᖅᑎᑕᐅᓂᖓᓄᑦ ᔮᓄᐊᕆ 2020-ᒧᑦ ᐊᒻᒪᓗ ᐊᐱᕆᓪᓗᑎᒃ ᐱᔭᕇᖅᑕᐅᓯᒪᓕᕐᕕᒃᓴᖓᑦ ᑐᕌᖓᑎᑕᐅᓯᒪᓪᓚᖓᑕ ᐅᖃᐅᓯᐅᑎᔭᐅᕙᓪᓕᐊᔪᓕᕐᕕᒃᓴᖏᓐᓄᑦ ᐱᖓᓱᐃᖑᐊᖅᑐᑎᒃ ᐱᓕᕆᐊᖃᖅᑎᐅᔪᑦ ᑲᑎᙵᓂᖃᕐᓂᖅᑕᑕ ᑲᑐᔾᔨᓂᖅᑲᐅᑎᒃ ᐅᖃᐅᓯᖃᖅᑲᐅᑎᖏᓐᓄᑦ.	ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᒻᒪᓗ ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG)	ᔮᓄᐊᕆ 2020	ᑲᔪᓯᑎᑕᐅᓯᒪᔪᑦ

ᓱᓇᐅᓂᖓ	ᐱᓕᕆᐊᖅ/ᐱᓕᕆᐊᒃᑲᖅ	ᑭᐅᔾᔨᑎᖏᑦ	ᑭᐅᔾᔨᑎᐅᔪᓄᑦ ᐱᔾᔨᑎᕆᔭᐅᔪᑦ	ᓯᕗᓕᖅᑎᐅᓪᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᖃᕐᑐᑦ	ᐱᓕᕆᕝᕕᒃᓴᖅᑖᖅᑎᑕᐅᓂᖏᓐᓄᑦ ᑐᑭᒧᐊᒍᑎᒃᓴᐃᑦ	ᖃᓄᐃᓕᖓᓕᕐᓂᖏᑦ
ᐊᑐᓕᖅᑎᓯᓂᖅ						
ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #18-2019 (ᑰᐲᑎ ᐃᐊᒃᕗ)	ᓱᕗᒫᒃᐸᑦᑕᐊᑎᑕᐅᓂᖓᓂᒃ ᐊᑐᓕᖅᑎᓯᕙᓪᓕᐊᓂᕐᓂ ᑲᑎᒪᔨᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᓯᒪᔭᖏᓐᓂᒃ ᐊᑐᓕᖅᑕᐅᖁᓪᓗᒋᑦ ᓇᓅᓕᕐᓂᖏᑦᑕ ᖃᐅᔨᒪᓕᕈᑎᒃᓴᓂᒃ, ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᑕᖃᖅᑎᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᒪᑯᓂᖓ: (1) ᐊᑐᓕᖅᑕᐅᕙᓪᓗᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᖑᓯᒪᔪᓂᒃ 2019 ᐅᑭᐅᖓᓂ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᓚᐅᖅᑐᓂᒃ ᐊᑐᓕᖅᑕᐅᖁᔭᐅᓪᓗᑎᒃ ᑐᓂᓯᒪᓕᕐᓗᑎᒃ ᓱᕗᕐᖓᓂ ᔮᓄᐊᕆ 31, 2020; (2) ᓇᐃᓪᓕᒋᐊᖅᓯᒪᓪᓗᑎᒃ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂᒃ, ᐅᑭᐅᑉ ᐊᑕᐅᓯᐅᑉ ᐃᓗᐊᓂ ᓈᒻᒪᒋᔭᐅᓯᒪᓕᓚᐅᕐᓂᖓᓂᑦ ᐅᑫᕘᓐᓃᑦ ᐊᔾᔨᒌᙱᒋᓐᓂᖅᑲᕐᐸᐅᓂᖓᓂᑦ ᑲᑎᒪᔪᑦ 2019-ᒥ ᐃᓱᒪᓕᐅᕈᑎᓚᐅᖅᑕᖏᓐᓂᒃ ᐊᑐᓕᖅᑕᐅᖁᓪᓗᒋᑦ, ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᖅᑲᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᓂᑦ, ᐃᓚᖅᑲᖅᑎᓪᓗᒋᑦ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓄᑦ ᐊᑐᓕᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᖅᑲᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᑦ ᐃᖏᕐᕋᓯᐊᖅᓯᒪᓂᖏᓐᓄᑦ; ᐊᒻᒪᓗ (3) ᒫᓐᓇᒧᑦ ᑎᑭᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᑐᓕᖅᑕᐅᕙᓪᓕᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᖑᓯᒪᔪᓂᒃ 2010-ᒥᑦ 2016-ᒧᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᖑᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓂᒃ ᑕᒪᐃᑕ ᐱᓕᕆᐊᖑᔪᒪᓐᖏᑦᑐᓄᑦ	**ᐊᔾᔨᒌᙱᒋᓐᓂᖅᑲᖅᐸᐅᔪᑦ** – ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᓗ ᐱᕈᖅᑳᓂᕈᓐᓇᖅᑐᓕᕆᓂᕐᒧᑦ (ENR) ᐊᔾᔨᒌᙱᑦᑐᕆᑎᒍᑦ ᐅᖃᖅᓯᒪᕗᑦ "ᐊᑐᓕᖁᔭᐅᓪᓗᑎᒃ #18-2019"-ᒧᑦ ᐃᒪᓐᓇ ᐅᖃᖅᓯᒪᓪᓗᑎᑦ: ᓱᕗᒫᒃᐸᑦᑕᐊᑎᑕᐅᓂᖓᓂᒃ ᐊᑐᓕᖅᑎᓯᕙᓪᓕᐊᓂᕐᓂ ᑲᑎᒪᔨᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᓯᒪᔭᖏᓐᓂᒃ ᐊᑐᓕᖅᑕᐅᖁᓪᓗᒋᑦ ᓇᓅᓕᕐᓂᖏᑦᑕ ᖃᐅᔨᒪᓕᕈᑎᒃᓴᓂᒃ, ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐱᑕᖃᖅᑎᓯᓯᒪᓕᕐᓂᐊᖅᑐᑦ ᕗᐃᑭᐲ ᓄᓇᒥᐅᑕᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔩᖏᑦ (WRRB) ᒪᑯᓂᖓ: 1) ᐊᑐᓕᖅᑕᐅᕙᓪᓗᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᖑᓯᒪᔪᓂᒃ 2019 ᐅᑭᐅᖓᓄᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᓚᐅᖅᑐᓂᒃ ᐊᑐᓕᖅᑕᐅᖁᔭᐅᓪᓗᑎᒃ ᓱᕗᕐᖓᓂ ᐄᐳᓗ 30, 2020; 2) ᓇᐃᓪᓕᒋᐊᖅᓯᒪᓪᓗᑎᒃ ᐅᓂᒃᑳᓕᐊᖑᓯᒪᔪᓂᒃ, ᐅᑭᐅᑉ ᐊᑕᐅᓯᐅᑉ ᐃᓗᐊᓂ ᓈᒻᒪᒋᔭᐅᓯᒪᓕᓚᐅᕐᓂᖓᓂᑦ ᐅᑫᕘᓐᓃᑦ ᐊᔾᔨᒌᙱᒋᓐᓂᖅᑲᕐᐸᐅᓂᖓᓂᑦ ᑲᑎᒪᔪᑦ 2019-ᒥ ᐃᓱᒪᓕᐅᕈᑎᓚᐅᖅᑕᖏᓐᓂᒃ ᐊᑐᓕᖅᑕᐅᖁᓪᓗᒋᑦ, ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᖅᑲᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᓂᑦ, ᐃᓚᖅᑲᖅᑎᓪᓗᒋᑦ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓄᑦ ᐊᑐᓕᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᐅᓚᓯᓂᖅᑲᓂᕐᒥ ᐱᓕᕆᓂᐅᔪᑦ ᐃᖏᕐᕋᓯᐊᖅᓯᒪᓂᖏᓐᓄᑦ; ᐊᒻᒪᓗ 3) ᒫᓐᓇᒧᑦ ᑎᑭᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᑐᓕᖅᑕᐅᕙᓪᓕᐊᔪᓄᑦ ᐸᕐᓇᐅᑎᓕᐊᖑᓯᒪᔪᓂᒃ 2010-ᒥᑦ 2016-ᒧᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᖑᓯᒪᔪᓂᒃ ᐊᒻᒪᓗ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓂᖏᓐᓂᒃ ᑕᒪᐃᑕ ᐱᓕᕆᐊᖑᔪᒪᓐᖏᑦᑐᓄᑦ ᐃᓱᒪᓕᐅᕈᑎᓕᐊᖑᓯᒪᓕᓚᐅᖅᑐᓂᑦ ᐊᑐᓕᖅᑕᐅᖁᔭᐅᓪᓗᑎᒃ ᓱᕗᕐᖓᓂ ᐄᐳᓗ 30, 2020.	ᑎᒋᓱ ᒐᕙᒪᖓᑦ (TG) ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT) ᐊᖏᖅᑲᑎᒋᔭᐅᓯᒪᔪᑦ ᖃᐅᔨᒋᐊᖅᑕᐅᓯᒪᓕᕐᓂᐊᖅᑕᕐᓂᖓᑕ ᑕᒪᕐᒥᒃ ᑲᑎᒪᔪᓂᑦ ᐃᓱᒪᓕᐅᕈᑎᐅᓯᒪᓕᓚᐅᖅᑐᑦ ᐊᑐᓕᖅᑕᐅᖁᓪᓗᒋᑦ ᑭᓯᐊᓂᓗ ᒪᕐᕉᖁᓪᓗᑎᒃ ᒐᕙᒪᒃᑯᕝᕗᑦ ᐊᑯᓂᐅᓂᖅᓴᒥᒃ ᐱᓕᕆᓂᖅᑲᕙᓪᓚᖓᖅᑲᐅᑎᒃ ᐱᓕᕆᐊᖃᕐᓂᐊᖅᑐᑦ ᑲᑎᒪᔪᓄᑦ ᑐᓂᓯᒪᓕᕐᕙᓪᓚᖓᒥᓂᒃ ᒫᓐᓇᒧᑦ ᑎᑭᑎᑕᐅᓯᒪᓪᓗᑎᒃ ᐊᑐᓕᖅᑎᓯᕙᓪᓕᐊᓂᕐᒥ ᐸᕐᓇᐅᑎᓕᐊᖑᓯᒪᓕᓚᐅᖅᑐᓄᑦ.	ᑎᒋᓱ ᒐᕙᒪᖓᑦ ᐊᒻᒪᓗ ᓄᓇᕗᐊᑉ ᒐᕙᒪᖓᑦ (GNWT)	ᐄᐳᓗ 30, 2020	1) ᐱᔭᕇᖅᓯᒪᔪᑦ 2) ᐱᔭᕇᖅᓯᒪᓐᖏᑦᑐᑦ 3) ᐱᔭᕇᖅᓯᒪᓐᖏᑦᑐᑦ

Yellowknives Dene First Nation
P.O. Box 2514
Yellowknife, NT X1A 2P8

Dettah
Telephone: (867) 873-4307
Facsimile: (867) 873-5969

Ndilo
Telephone: (867) 873-8951
Facsimile: (867) 873-8545

February 14, 2020

Nunavut Wildlife Management Board
P.O. Box 1379
Iqaluit, Nunavut
X0A 0H0

Intervention Submission: Proposal to Decrease the Total Allowable Harvest for Bathurst Caribou from 30 to 0

The Yellowknives Dene First Nation (YKDFN) is pleased to provide this written intervention to the Nunavut Wildlife Management Board (the Board) regarding the proposed change in total allowable harvesting of Bathurst Caribou.

Since time immemorial, generation after generation of the Yellowknives Dene have harvested and survived from the Bathurst Caribou Herd. The Herd has provided us the sustenance we required to survive, especially in times of need when food was scarce. They are our lifeline to the land, they are our lifeline to our ancestors, and they are our lifeline to the creator. Today, the population of the Bathurst Caribou is at an all-time low. We have never seen such low numbers. This is an unprecedented crisis and action must be taken by all parties to ensure the survival of the herd.

According to our Elders, the Yellowknives Dene and the Caribou have survived as one since creation. During the summer months we would survive on fish, plants, and berries around the Yellowknife area until fall time when ice begins to form. We relied on the Caribou to arrive in the early winter to begin our annual migration up to the Barren Lands (present day Nunavut). After following the herd north into the Barren Lands, we would survive until springtime, then make our way back south of the tree line. This harvesting migration is how we lived our nomadic lifestyle, and it's derived from the caribou migration.

Our traditions and cultural practices have been shaped by the Caribou. One of our most significant traditional objects is our drum. It's created from the hide of the Caribou, along with the sinew. The drum provides us with a connection to the Creator and has guided us spiritually from generation to generation. Many of our tools come from the bones of the Caribou. Our clothing for warmth and protection came from the Caribou's hide and sinew as well. These items have provided us with the necessities of survival.

Each part of Caribou has a use, and nothing is wasted. We take special care in ensuring that the life the Caribou has given us is used entirely. Much of who we are would have ceased to exist had it not been for the caribou to guide us.

As I'm sure the Board is aware, we, the Yellowknives Dene have overlap in land use and have formed long-standing relationships with our Inuit neighbors. This overlap is evident from the place names of lakes and areas presently in the Nunavut Territory. Contwoyto Lake for example is a Chipewyan word, given from our Dene ancestors.

The Dene people share with the Inuit a great respect for the animal that has kept us all healthy for generations. Now we must stand together to protect them, just as they have protected us. It is of the utmost importance to protect the Bathurst Caribou Herd for both the future generations of Dene and Inuit.

Through our mutual relationship with caribou, both Dene and Inuit are rights-bearing Indigenous peoples with constitutionally protected relationships to the Caribou. We understand the difficulty in food security this proposed change may create for residents of Nunavut, and we know the Board will listen carefully to the thoughts of the Inuit and the Dene on this proposal.

It is our understanding that some of the total allowable harvest of Bathurst Caribou is used for big game hunting, including trophy hunting. The YKDFN cannot support this unnecessary form of harvesting. We ask the Board to consider only allowing harvesting for sustenance as an immediate action. We look forward to reassessing and increasing the harvest of Bathurst Caribou in the future when their population increases. However, the generation of today must protect the herd for the generation of tomorrow.

We reiterate the importance of Caribou and the absolute necessity to ensure their survival for the future generations. However, it is well known that Dene and Inuit harvesting is not the root cause of the decline of the Bathurst Caribou herd. Changes in the Indigenous harvesting will not reverse the decline of the herd. Nonetheless, present day harvesters are limiting their traditional activities based on the necessity to protect the herd.

The YKDFN would greatly appreciate the Boards involvement in reducing disturbance to the Bathurst Caribou regarding development projects proposed within both jurisdictions (Nunavut and NWT) as they will contribute to cumulative effects across the Bathurst Herd range. It is all party's responsibility to ensure the Bathurst Caribou recover; as such, industry must pay the toll that Traditional Harvesters continually have to pay. There must be action on all fronts to reduce the disturbance to the Bathurst Caribou.

In addition to working with industry, we request the Board to continue to advocate for protection and perseverance of the Bathurst Caribou herd with other Government of Nunavut (GN) agencies and public institutions such as the Nunavut Impact Review Board (NIRB). The YKDFN will continue to seek protection for the herd across its range, especially in the Northwest Territories.

To better mitigate the consequences of restricting harvesting and to ensure the protection and conservation of the Bathurst Caribou Herd, the YKDFN would be pleased to meet with Nunavut and Northwest Territories rights holders and the respective Nunavut and Northwest Territories Governments and Industry to discuss potential traditional and scientific solutions to achieve these goals as a consortium. We also believe that by having ongoing Nation-to-Nation and inter-territorial meetings we would be able to join insights otherwise unavailable to us working independently. We look forward to initiating regular meetings to this end.

In addition to having meetings on harvesting and conservation, the YKDFN would like to support cultural exchanges between our peoples. The Dene and Inuit have lived side by side for many generations and historically we would exchange cultural items of significance. We are hopeful that we can build a stronger relationship between our peoples by reviving these activities in near future.

The Yellowknives Dene thank the Board and the other Intervenors for their time and effort in making a very important decision. The outcomes of the decisions we make today will have a significant impact on our future generations. As such, we trust that the board will stand true in preserving such a critical resource.

Mahsi Cho (Thank You),

CEO Jason Snaggs,
Yellowknives Dene First Nation

Chief Ernest Betsina
Yellowknives Dene First Nation

Cc.
Jason Snaggs, CEO, YKDFN
Johanne Black, Director of Governance, YKDFN
Sarah Gillis, Director Environment and Wildlife, YKDFN
William Lines, Community Liaison and Technical Advisor, YKDFN

ADVENTURE NORTWEST

ᑐᓂᓯᔪᑦ ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ

ᕿᓐᖓᐅᑦ ᑐᑦᑐᖏᑕ ᒥᓵᓄᑦ ᑭᒃᑯᓕᒫᓂᑦ ᑲᑎᒪᑎᑦᑎᓂᖅ

ᐃᖃᓗᒃᑑᑦᑎᐊᖅ

ᒫᔾᔨ 5 – 6, 2020

ᐆᒪᔪᓕᕆᔨᕐᔪᐊᒃᑯᓐᓄᑦ;

ᖁᔭᓐᓇᒦᒃ ᐅᓂᒃᑳᕈᓐᓇᖅᑎᑕᐅᒐᒪ ᑖᕝᕙᓂ ᓈᓚᑦᑎᑦᑎᑎᓪᓗᓯ.

ᐅᕙᓃᑦᑐᒍᑦ ᐅᓪᓗᒥ ᐅᖃᐅᓯᖃᕆᐊᖅᑐᖅᑐᑕ ᑐᑦᑐᐃᑦ ᒥᔅᓵᓄᑦ. ᖃᐅᔨᒪᔪᐃᓐᓇᐅᕙᑦᑕ ᐱᒻᒪᕆᐊᓘᒻᒪᑕ ᑐᑦᑐᐃᑦ ᐃᓄᓐᓄᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒪᓪᓗᑕ ᐊᐅᓚᑕᐅᒋᐊᖃᓕᕐᕙᑕ ᑕᒪᒃᑯᐊ ᑐᑦᑐᐃᑦ ᖃᑦᑑᓐᓇᕈᖅᐸᓪᓕᐊᓕᕐᓂᖏᓐᓄᑦ.

ᐅᓪᓗᒥ ᐅᕙᓃᑦᑐᖓ ᑕᑯᕐᕈᔾᔫᔭᖅᑐᖅᑐᖓ ᓱᒻᒪᑦ ᐱᒻᒪᕆᐅᒻᒪᖕᖔᖅ ᑕᐃᒪᐃᓕᖕᖓᑎᑕᐅᑐᐃᓐᓇᖁᓗᑦ ᐊᒥᖏᓂᖏᓐᓂ ᐱᔭᐅᔪᓐᓇᖅᑐᑦ ᕿᓐᖓᑦ ᑐᑦᑐᖏᑦ 30−ᒥ, ᐊᒻᒪᓗ ᖃᓄᖅ ᐊᑦᑐᐃᓂᕐᓗᒃᑲᔭᖕᖓᑕ ᑐᑦᑐᓂᑦ 0−ᒨᕈᕕᐅᒃ.

ᐊᒥᓯᓂᑦ ᐱᔾᔪᑎᖃᖅᑐᑎᑦ ᑐᑦᑐᐃᑦ ᑐᖁᕙᒻᒪᑕ. ᐃᓚᖏᑦ ᐊᖏᔫᑏᑦ, ᑐᑐᑦᑕᐅᕙᑦᑐᑦ ᐆᒪᔪᓄᑦ, ᐃᓚᖏᑦ ᐃᓄᓐᓄᑦ, ᓯᓚᒧᑦ, ᐃᐱᔪᓪᓗ ᐊᒻᒪᓗ ᖃᓂᒪᓂᒃᑯᑦ.

ᖃᑦᑏᓐᓇᕈᖅᐹᓪᓕᑎᑦᑎᑦᑕᐃᓕᒪᓇᓯᐊᖅᑐᑕ ᑐᑦᑐᓂᑦ, ᐃᓅᓪᓗᑕ ᐊᑦᑐᐃᓂᖃᕈᓐᓇᕋᑦᑕ ᑭᓯᐊᓂ ᐃᒫᒃ ᒪᕿᓐᓂᒃ. 1, ᐊᐅᓚᓗᒋᑦ ᐊᒥᓲᓂᖏᑦ ᑐᑐᑦᑕᐅᕙᑦᑐᑦ ᐃᓄᓐᓄᑦ ᐊᒻᒪᓗ 2, ᐊᐅᓚᓪᓗᒋᑦ/ᖃᑦᑏᓐᓇᕈᖅᐹᓪᓕᖅᑐᑎᑦ ᐆᒪᔪᕐᓄᑦ ᑐᑐᑦᑕᐅᕙᑦᑐᑦ - ᑭᓯᐊᓂ ᑐᑐᑦᑕᐅᕙᑦᑐᐃᑦ ᐊᒥᓲᓂᖏᓐᓂ ᐊᓯᔾᔨᓪᓗᑎᑦ.

ᐅᐊᑦᑎᐊᕈᓕ ᐊᒻᒪᓗ ᒫᓐᓇ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᖏᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᖃᖃᑦᑕᕐᖓᑕ ᐃᓄᓐᓄᑦ ᑐᑐᑦᑕᐅᕙᑦᑐᑦ ᖃᑦᑏᓐᓇᕈᓇᐊᖅᑕᐅᓪᓗᑎᑦ. ᑖᒪᓂ ᑐᑐᖃᑦᑕᕐᑯᔨᒎᓐᓂᕐᖓᑕ ᑭᓯᐊᓂᓕ ᐊᓯᖏᓐᓄᑦ ᐆᒪᔫᑕᐅᖃᑦᑕᕐᓂᖏᑦ ᓱᕐᕋᔾᔮᖏᑦᑐᑦ ᐅᕝᕙᔫᓐᓃᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᓂᖏᑦ.

ᑲᒪᓇᓪᓚᕆᑦᑐᖅ ᑕᐃᒃᑯᐊᔅᓴᐃᓐᓇᐃᑦ ᑲᑐᔾᔨᔪᑦ ᐊᐅᓚᑦᑎᓇᓯᐊᖅᑐᑦ ᑐᑐᑦᑕᐅᕙᑐᓂ ᑕᐃᒃᑯᐊᔅᓴᐃᓐᓇᐅᓪᓗᑎᑦ ᐊᒥᓲᓗᐊᓐᖏᑦᑐᓂᑦ ᓂᕕᖓᑖᕐᓂᑦ ᐊᑐᐃᓐᓇᕈᐃᕙᑦᑐᑦ ᑐᑐᑦᑕᐅᔪᓐᓇᖅᑐᓂᑦ ᐊᒻᒪᓗ ᑕᐃᒃᑯᐊᔅᓴᐃᓐᓇᐅᓪᓗᑎᑦ ᑐᑐᓗᐊᖅᑎᑦᑎᒐᓯᐊᓐᖏᑦᑐᓂᑦ!

ᑕᒪᒃᑯᐊ ᐊᒪᕈᖅᑕᐅᖃᑦᑕᕐᓗᑎᑦ ᑐᑐᑦᑎᑦᑎᖃᑦᑕᕐᓗᑎᓪᓗ. ᐊᕐᕌᓂ ANW ᐊᒻᒪᓗ ᑖᒃᑯᐊ ᐱᓕᕆᖃᑎᖏᑦ JV ᐊᒪᕈᓚᐅᖅᓯᒪᔪᑦ 12−ᓂᑦ, ᑎᓴᒪᓂᑦ ᐅᑭᐊᖀᖓᓂᓄᓇᕗᒻᒥ ᐊᒻᒪᓗ ᑎᓴᒪᐅᔪᖅᑐᓂᑦ ᐅᑭᐅᒃᑯᑦ ᓄᓇᑦᑎᐊᕐᒥ. ᐊᑐᓂ ᐊᒪᕈᑦ ᓂᕆᖃᑦᑕᖅᓯᒪᔪᒥᓂᐅᓂᕋᖅᑕᑦ 15-ᓄᑦ 25−ᓄᑦ ᑐᑦᑐᓂᑦ ᐊᕐᕋᒍᑕᒫᑦ ᑕᐃᒫᒃ ᑐᑐᑦᑕᐅᓪᓗᑎᑦ ᐊᕙᑎᑦ ᐊᓇᕐᓯᓪᓗᑕ 180-ᓂᑦ 300−ᒧᑦ ᑐᑦᑐᓂᑦ.

ᑐᑭᓯᔪᓐᓇᖏᓐᓇᑦᑕ ᖃᓄᐊᓗ ᓂᕖᖓᑖᕐᓂᑦ ᐆᖅᓯᓗᑎᑦ ᑐᑦᑐᖃᕐᓂᖅᓴᐅᓕᕋᔭᕐᓂᖏᓐᓂ. ᐃᓚᒃ, ᐊᐅᓚᑦᑎᑦᑎᐊᓐᖏᓂᖅᓴᐅᓕᖕᖒᕋᔭᕐᖓᑕ ᑐᑦᑐᓂᑦ.

ᐊᐃᑉᐸᖏᓪᓕ ᑐᑦᑐᓂᑦ ᓂᕖᖓᑖᖅᑖᖅᐸᑦᑐᑦ ᑕᐃᒫᔅᓴᐃᓐᓇᐅᕗᒃᑭᓪᓗᑎᑦ. ᓂᕖᖓᑖᑦ ᖃᐅᔨᒪᔭᑦᑎᓂᓪᓕ ᑐᓂᔭᐅᓪᓗᑎᑦ ᐃᓄᓐᓄᑦ ᐊᖑᑎᓄᑦ ᐊᒻᒪᓗ ᓄᓕᐊᕐᒥᔪᑦ ᑲᓐᑐᕙᐃᑐᒥᐅᑕᕐᓄᑦ (Contowoyto Lk) ᑕᐃᑲᓃᑦᑐᖅ ᕿᓐᖓᐅᑦ ᐃᓗᐊᓂ ᑐᑦᑕᓕᓐᓂᑦ. ᑖᓐᓇ ᐊᖑᑦ (ᔮᓐ ᐹᕋᓐᑭᓕ) ᐊᒥᓯᕐᔪᐊᕌᓗᓐᓂᑦ ᐊᒪᕈᓐᓂᓚᐅᖅᓯᒪᔪᖅ (ᐅᑭᐅᓄᑦ 60−ᓂᑦ ᐊᕐᕌᓂ. ᑕᒪᐃᑦᑑᕙᓪᓚᐃᔪᖅ). ᖁᕕᐊᕆᔭᐅᕆᐊᓕᐅᒐᓗᐊᖅ ᐃᑲᔪᕐᓂᖅᓴᐅᒪᑦ ᕿᓐᖓᐅᑦ ᑐᑦᑐᖏᓐᓂ ᐃᓚᓐᖖᓄᓐᖏᓂᖅᓴᐅᒪᑦ ᑕᐃᒃᑯᓇᓐᖓᓪᓚ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᖏᓐᓂ ᑭᓯᐊᓂᓚ ᐊᖅᖠᖅᓯᒍᒪᓪᓗᑎᑦ ᐊᒥᓲᓗᐊᓐᖏᑦᑐᕈᓗᓐᓂᑦ ᓂᕖᖓᑖᕐᓂᑦ. ᑕᐃᒪᓐᓇᓚ ᑐᑦᑐᓂᑦ ᐊᐅᓚᑦᑎᖏᑦᑐᖅ.

ᑐᔅᓯᕋᖅᑐᒍᑦ ᑲᑎᒪᔩᓄᑦ ᑐᑦᑐᐃᑦ ᓂᕕᖓᑖᑦ ᐱᙱᑕᖔᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᓃᓪᓗᑎᑦ ᖃᓄᖅ ᑐᑦᑐᑖᖅᑎᑦᑎᙱᓪᓕᐊᒻᒪᖔᑕᓗ ᑕᑯᔅᓴᐅᑎᑦᑎᓗᑎᑦ. ᐊᒪᕈᖃᑦᑕᕐᓂᐊᖅᑯᒍᑦ ᖃᑦᑏᓐᓇᐅᓂᖅᐹᓂᑦ ᖁᓚᐅᖃᑦᑕᕐᓗᒋᑦ ᐊᕐᕿᒍᑕᒫᑦ ᑕᐃᑲᓂ ᕿᓐᖓᐅᒻᒥ ᐊᐅᔾᑯᑦ ᐅᑭᐅᒃᑯᓪᓗ ᑕᒦᓂᖃᐃᑦ 20−ᓂᑦ 30−ᒧᑦ ᑎᑭᓪᓗᒍᓘᓐᓃᑦ. ᐃᓄᐃᑦ ᐱᓕᕆᖃᑎᖏᑦ ᐊᒻᒪᓗ ᑲᒻᐸᓂᖏᑦ ᒪᑭᒪᔾᔪᑎᔅᓴᓂᑦ ᐃᖅᑲᓇᐃᔩᕐᓂᑦ ᑕᑯᔅᓴᐅᑎᑦᑎᖃᑦᑕᕐᓗᑎᑦ ᐃᖅᑲᓇᐃᔾᓐᓂᑦ ᐃᑲᔪᕐᓂᖃᖃᑦᑕᕐᖓᑦ ᓂᕿᖃᖅᑎᑕᐅᓪᓗᑎᓪᓗ.

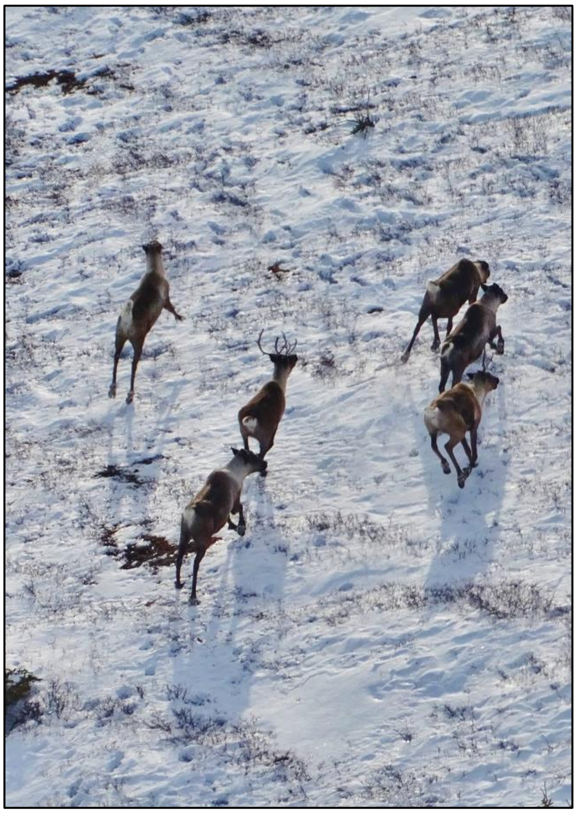
ᓇᓗᓇᓐᖏᑦᑐᖅ ᑕᒪᓐᓇ ᓇᓪᓕᐊᒎᕋᓗᐊᖅᑲᑦ ᐱᐅᓂᐅᓴᑐᐃᓐᓇᕐᓂᐊᖅᑐᖅ ᑐᑦᑐᓄᑦ.

ᑲᒪᓂᖔᑦ ᐊᔾᔨᐅᖏᒻᒪᑦ ᐊᒪᕈᖅᑎᑦᑎᖃᑦᑕᕈᓐᓇᖅᑐᑕ ᓄᓇᖔᒻᒥ ᓄᓇᑦᑎᐊᕐᒥᓪᓗ.

ᐊᒪᕈᐃᑦ ᖃᑦᑏᓐᓇᕈᖅᐹᓪᓕᑎᑕᐅᑎᓪᓗᒋᑦ ᐃᑲᔪᕐᓂᖃᖅᓯᒪᒻᒥᔪᖅ ᑐᑦᑐᐃᑦ ᐊᒥᓲᓂᖅᓴᐅᓕᖅᑐᑎᑦ. ᓄᓇᑦᑎᐊᕐᒥ (ᐅᑕᖅᑭᓯᒪᓕᖅᑐᑦ ᐅᑭᐅᓄᑦ 12−ᓄᑦ) ᖃᑦᑏᓐᓇᕈᖅᐹᓪᓕᑎᑦᑎᑕᐃᓐᓇᓱᓕᖅᑐᑦ ᐊᒪᕈᕐᓂᑦ. ᓄᓇᖔ ᖁᙱᒃᑯᖕᒋᑦ ᑕᐃᒫᒃ ᐸᕐᓇᓯᒪᓐᖏᒻᒪᙳᑦᑐᖅ ᐊᒻᒪᓗ ᑐᔅᓯᕋᑐᐃᓐᓇᖅᑐᑦ ᐊᑦᑐᖅᑕᐅᑦᑕᐃᓕᒪᑎᒐᐊᓱᕐᓗᒋᑦ ᒪᕐᕉᓕᖅᑲᖓᔪᑦ ᑐᑦᑐᐃᑦ ᖃᑦᑏᓇᕈᖅᐹᓪᓕᑎᑦᑎᑦᑕᐃᓕᒪᕐᓂᒧᑦ, ᑕᒪᓇᓗ ᑐᑦᑐᓂᑦ ᐊᐅᓚᑦᑎᓂᐅᒐᓱᑦᑕᕋᓗᐊᖅ.

ᖃᐅᔨᒪᔪᒍᑦ ᑲᑎᒪᔨᓯ ᑕᑯᓂᐊᖅᑐᑦ ᖃᓄᖅ ᑲᑎᑦᑐᒋᑦ ᐱᔭᐅᔪᓐᓇᖅᑐᑦ ᑕᐃᒪᐃᓕᖕᖑᑐᐃᓐᓇᕆᐊᖃᕐᓂᖕᒋᓐᓂ ᒫᓐᓇ ᐊᒥᓲᓂᖕᒋᑦ ᐊᒻᒪᓗ ᕿᕐᖑᐅᑦ ᑐᑦᑐᒋᓪᓗᓄᑦ ᐃᑲᔫᑎᖃᕐᓂᐊᖅᑐᑦ. ᐊᒻᒪᓗ, ᒪᑭᒪᔾᔪᑎᑎᒍᑦ ᐊᔅᓱᕉᑕᐅᔾᔭᖕᒋᑦᑐᑦ ᐃᓄᓐᓄᑦ ᐅᕝᕙᓘᓐᓃᑦ JV ᐱᓕᕆᖃᑎᖕᒋᓐᓄᑦ ᐊᒻᒪᓗ ᐃᑲᔪᕐᓂᖃᕐᓂᐊᖅᑐᑎᑦ ᐃᓚᖕᒋᓐᓄᑦ ᓂᕿᓄᑦ ᐃᓄᓅᑦᑐᓂᑦ.

South Peace Caribou Recovery following Five Years of Experimental Wolf Reduction



Mike Bridger, R.P.Bio.

Wildlife Biologist | Northeast Region

BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development

August 2019

Executive Summary

Experimental wolf reduction has occurred over a five-year period (2015-2019) within the South Peace region of northeastern British Columbia, Canada, in an attempt to address the rapid decline of Central Mountain caribou populations. These caribou herds have declined drastically in response to landscape changes that altered predator-prey dynamics and led to high rates of predation by wolves. The decrease in wolf abundance across the South Peace treatment area has shown conclusive evidence that intensive wolf reduction has halted and reversed the declining trends of the Klinse-Za, Kennedy Siding, and Quintette caribou populations. Although the first year of wolf reduction did not occur at a high enough intensity to elicit a caribou population effect, the following three years were sufficiently intensive (i.e. wolf densities were reduced to below 2 wolves/1000 km^2) to elicit a strong, positive population response in all three treatment herds. The reduction of wolves during the fifth year is also expected to elicit a positive population response, but will not be measured until March 2020. As a result of wolf reduction, the South Peace caribou populations have increased by 49% from 166 individuals in 2016 to 247 individuals in 2019. The three herds combined had an average annual population growth rate of 15% following three effective years of wolf reductions and calf recruitment and adult female survival has increased in almost all cases in response to intensive wolf reductions. In contrast, prior to the implementation of wolf reduction, these three herds were declining at a rate of approximately 15% annually (625 to 166 individuals; 2002–2015). The adjacent, non-treatment caribou herds continued to show strong evidence of rapid declines over the same timeframe in the absence of wolf reduction.

Aerial wolf reduction has been shown to be the most targeted and effective method of intensively reducing wolf populations over large geographic areas to elicit strong population responses in caribou herds. Both the efficacy and efficiency of the South Peace wolf reduction program has increased over time. The success of the program is contingent on utilizing experienced and proficient removal crews, operating during optimal weather conditions, and maintaining a high level of operational oversight by provincial Ministry staff. Wolf reduction is a management tool that must be used responsibly and ethically, and implemented with the highest standards for humaneness and scientific rigour. Wolf reduction programs should be considered as an effective interim management tool for halting and reversing caribou declines, while the ultimate causes (i.e. habitat alteration) of such declines are addressed. Based on the findings of the five-year wolf reduction program in the South Peace, it is highly recommended that wolf reduction continue to be implemented to support these particular caribou herds towards meeting the ultimate management objective of self-sustaining populations.

Contents

List of Tables

List of Figures

1. Introduction

Throughout the 1990s and early 2000s, woodland caribou (*Rangifer tarandus caribou*) herds in the South Peace region of northeast British Columbia (BC) were presumed to be declining (Seip and Jones 2014). Increased monitoring efforts through the 2000s confirmed that these caribou herds were in fact decreasing at a rapid rate (Seip and Jones 2016). The status of the Central Mountain Designatable Unit (DU8; COSEWIC 2011) of woodland caribou found in the South Peace (Figure 1) has recently been updated to "Endangered" by the Committee on the Status of Endangered Wildlife in Canada. The South Peace herds include the Scott East and Moberly (which were combined in 2015 and are hereafter referred to as the Klinse-Za herd), Burnt Pine, Kennedy Siding, Quintette, Bearhole-Redwillow, and South Narraway (transboundary with Alberta). Within the South Peace region, these herds have further been grouped by local population units (LPUs), which includes the Pine LPU (composed of the Klinse-Za, Kennedy Siding, and former Burnt Pine herds), the Quintette LPU (composed of the Quintette herd), and the Narraway LPU (composed of the Bearhole-Redwillow and South Narraway herds). Prior to wolf reduction, all of these herds had been declining drastically, and the Burnt Pine herd was extirpated. These drastic declines followed extensive landscape change resulting from forest harvest, mining, oil and gas exploration, road construction and other industrial activities within or adjacent to caribou ranges. This has led to the direct loss of habitat and altered predator-prey dynamics. Many industrial activities promote early seral forests, which benefit species like moose (*Alces americanus*) and ultimately lead to increased wolf (*Canis lupus*) populations (moose are a primary prey species for wolves; Fuller et al. 2003). Such increases in wolf populations result in higher caribou mortality rates (Seip 1992), which can be further exacerbated by newly developed linear features that enhance wolf movement and provide access into caribou range. Wolf predation in the South Peace was occurring at rates that were unsustainable for caribou populations, leading to rapid population declines (Seip and Jones 2014).

Amongst the Central Mountain caribou herds found in the South Peace region, annual mortality rates of radio-collared adult females ranged from 12–24% (Seip and Jones 2014) prior to wolf reduction. Wolf predation accounted for 38% of all documented caribou mortalities, and 78% of all cases in which a conclusive cause of mortality was determined (Seip and Jones 2014). Calf recruitment ranged between 9–14% calves within the population (measured annually in late-March; Seip and Jones 2016), which was generally inadequate to compensate for adult mortality. The causes of calf mortality have not been investigated across the South Peace caribou herds; however, studies have shown wolves to be a significant predator of caribou calves in other jurisdictions (Gustine et al. 2006), and calf survival has been shown to increase in response to wolf reductions (Farnell and McDonald 1988, Seip 1992, Bergerud and Elliot 1998, Hayes et. al 2003). Previous research by Bergerud and Elliot (1986) concluded that wolf densities greater than 6.5 wolves/1000 km^2 resulted in caribou population declines. Furthermore, the Federal government's recovery strategy for woodland caribou recommends a target wolf density of less than 3 wolves/1000 km^2 across caribou range (Environment Canada 2014). Prior to the implementation of wolf reduction, wolf densities across the South Peace caribou herds were estimated at approximately 10–14 wolves/1000 km^2 (Seip and Jones 2014); well above the density thresholds associated with the persistence of caribou populations. The pre-reduction wolf density estimate has since been refined to 12.6 wolves/1000 km^2.

In response to dramatic caribou population declines, provincial wildlife managers from the BC Ministry of Environment and Ministry of Forests, Lands, Natural Resource Operations and Rural Development (hereafter referred to as the Province or Ministry) approved the implementation of predator management in the form of aerial wolf reduction. The initial approval was for a five-year aerial wolf reduction program, which commenced during the winter of 2014-2015, and has since completed its fifth year of reductions following the winter of

2018-2019. The wolf reduction program has occurred in combination with other recovery efforts, including maternal penning, supplemental feeding, and habitat restoration. In 2017-2018, the program was expanded to include the South Narraway caribou herd range. Wolf reduction was implemented as an interim management measure to assist the South Peace caribou herds in reaching self-sustaining status, with a population target of approximately 1,000 individuals (800 combined in the Pine and Quintette LPUs and 200 in the Narraway LPU). Serrouya et al. (2019) reported similar conclusions regarding population growth rates of the South Peace treatment herds; however, the following report has been developed to further investigate the mechanisms and drivers of caribou population change, such as variation in calf recruitment and adult survival, relative to wolf reduction treatments.

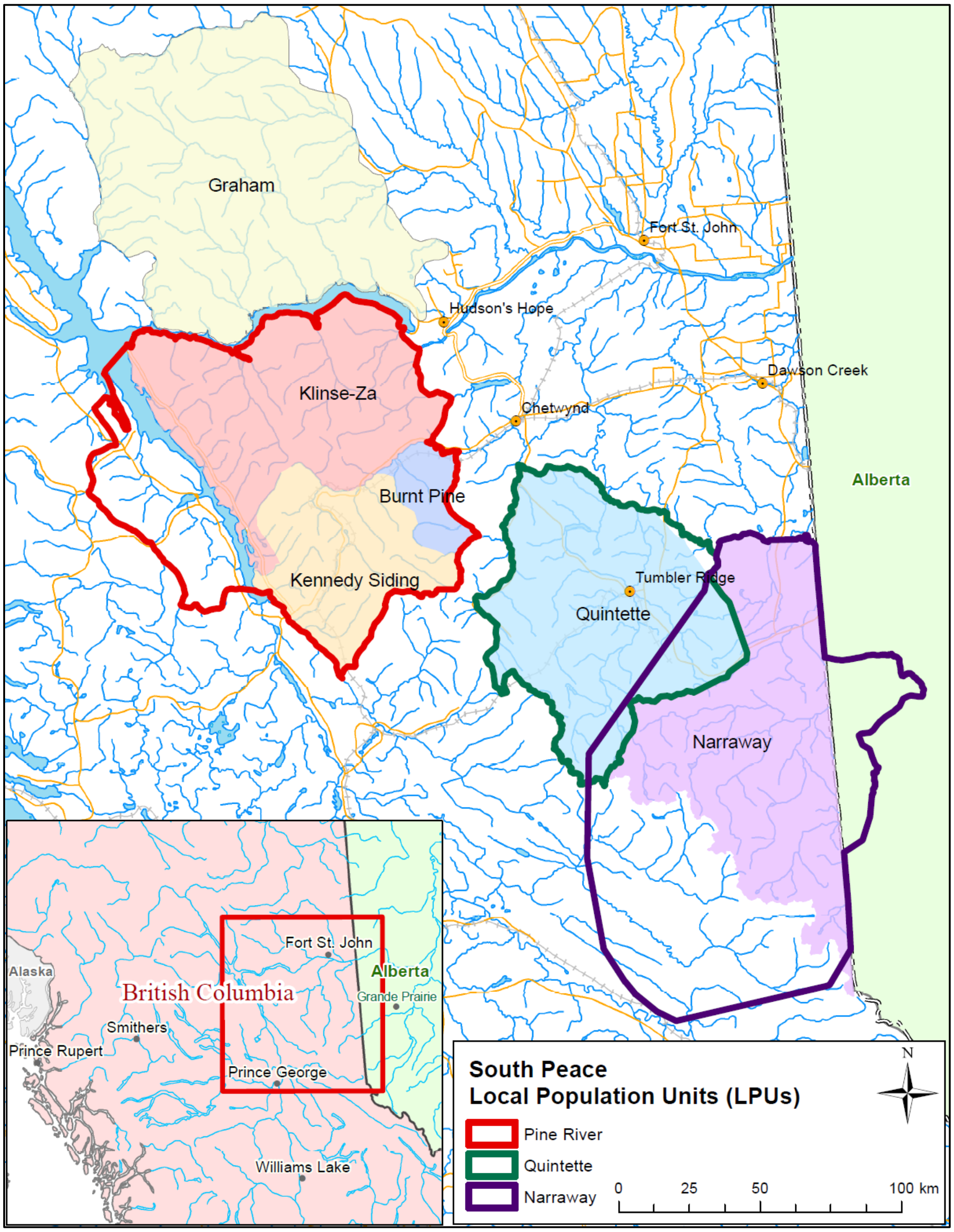


Figure 1. South Peace herd boundaries for Central Mountain caribou, including local population unit (LPU) boundaries in the Northeast Region of British Columbia, Canada.

2. Methods

Prior to the implementation of wolf reductions, baseline population data for both caribou and wolves were collected. These data were collected continually over the five-year study period to measure caribou population responses. Caribou population data, including population estimates and calf recruitment rates, were measured annually through aerial surveys. Adult female survival rates were calculated by monitoring a subsample of radio-collared individuals within the population, and cause of mortality was determined through mortality investigations of deceased radio-collared individuals. Wolf pack locations, habitat use, and density estimates were derived through radio-collaring of wolves. Additionally, the response by primary prey species (i.e. moose) to wolf reductions was also measured within and adjacent to the treatment areas through aerial surveys and radio-collaring studies.

The initial treatment area boundary was designed to encompass the majority of the Klinse-Za, Kennedy Siding, and Quintette caribou herd ranges; a wolf reduction zone of approximately 16,500 km^2 (Figure 2). Specifically, the boundary included the core high elevation and low elevation caribou habitat, and adjacent matrix habitat within the caribou ranges. The South Narraway treatment area was included in 2017-2018, with an additional area of approximately 1,600 km^2. These treatment areas formed the boundaries for intensive reduction of wolves using aerial gunning from helicopters, where the objective was to remove the majority of wolves within or immediately adjacent to the reduction zone and in doing so, reduce wolf densities to below 3 wolves/1000 km^2. Aerial gunning of wolves was deemed the most effective and humane method of removal, as properly applied shooting techniques results in wolves being quickly dispatched while eliminating the risk of bycatch. The reduction of wolves occurred during the winter months when snow levels facilitated optimal tracking conditions, and concentrated wolves' distribution at lower elevations. Reduction efficiency was increased by deploying radio-collars on individual wolves in all known wolf packs within or immediately adjacent to the treatment area boundary. This facilitated the relocation of the wolf packs and increased the likelihood of removing all wolves from each pack. The individual wolves were captured via helicopter net-gunning, which enabled crews to restrain the individuals and deploy GPS-satellite radio-collars, allowing for remote tracking of movements and locations, and relocation through the use of radio telemetry. The radio-collared individuals were often left alive following the conclusion of the winter reduction efforts in order to facilitate the location of wolves the following winter. Wolves that were found immediately adjacent to the reduction zone, or were tracked from within the boundary to adjacent areas were also removed (assuming these wolves had at least partial overlap with the treatment area).

Aerial wolf reduction was delivered primarily by external contractors, with operational oversight from Ministry staff. Overtime, the operational oversight was increased in order to ensure the efficacy and humaneness of the program and internal Ministry staff assisted with the delivery of the field operations as well. Initially, wolf removal crews attempted to retrieve the carcasses of deceased wolves; however, it was quickly determined to be an inefficient use of time, effort, and funds. Subsequently, the locations of accessible wolf carcasses were provided to First Nations and they retrieved those carcasses from the ground. The Province also collaborated with local First Nations to support wolf reduction through ground trapping programs. Although deemed ineffective on its own (Webb et al. 2011), ground trapping was thought to offer an additional source of wolf removal, while providing opportunities to collaborate with local First Nations communities. The ground trapping efforts were generally focused within the Klinse-Za caribou range, in close proximity to local First Nations communities and the caribou maternal penning site[1].

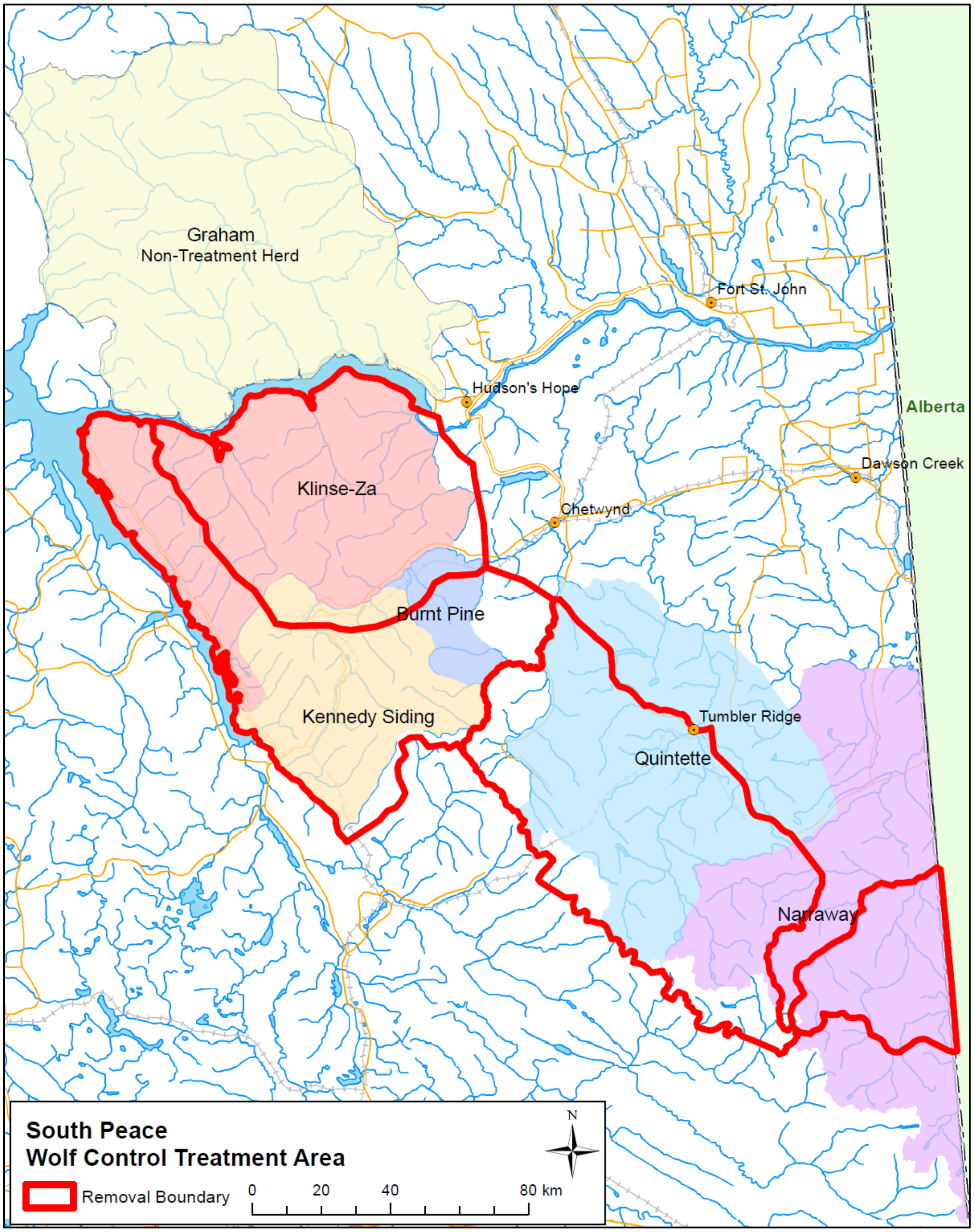


Figure 2. Treatment herds and wolf reduction boundaries across the South Peace caribou range in the Northeast Region of British Columbia, Canada.

[1] Maternal penning was an ongoing management initiative in the Klinse-Za caribou range that was occurring concurrently with wolf reduction (McNay et al. 2019)

The reduction of wolves occurred during five winters (2015-2019) and the response within caribou populations was measured during each of the following winters. Aerial surveys of most herds were conducted annually to estimate population size, calf survival/recruitment, and calculate population growth rates (also referred to as lambda λ; based on annual changes in population estimates). The Kennedy Siding herd was monitored via motion-sensitive cameras at supplemental feeding sites[2], allowing researchers to obtain total counts of the population, including population demographics (Heard and Zimmerman 2018). Additionally, a subsample of radio-collared female caribou was maintained in each herd during the five-year program to calculate adult female survival rates. Two adjacent, non-treatment herds (Graham and South Narraway herds) were identified as the experimental control populations for this program, allowing for population and demographic parameters to be compared between treatment and non-treatment herds over time. The South Narraway herd was subsequently removed as a non-treatment herd in 2017-2018 due to its continued rapid decline and urgent need for recovery measures (i.e. wolf reduction).

An initial wolf density estimate within the focal caribou herd ranges was derived through the radio-collaring of the majority of wolf packs in the area and through comparisons of previously recorded wolf densities observed in similar mountainous caribou ranges in neighbouring jurisdictions (Kuzyk 2002, Hayes et al. 2003). The estimates were further refined over the course of each winter's reduction efforts by documenting all wolves and wolf packs encountered during wolf removal flights. This allowed for relatively accurate documentation of the proportion of wolves removed each winter, and the subsequent density of wolves remaining following each winter's reduction efforts. The wolf density estimates were also calculated at the LPU level based on the number of wolves removed and number remaining following each winter season of wolf reduction. Similarly, wolf densities were also estimated across the non-treatment caribou herd ranges using a combination of radio collaring and extrapolation (i.e. Graham and South Narraway herds).

3. Results

Wolf Reductions

The wolf reduction program to support caribou recovery in the Klinse-Za, Kennedy Siding, and Quintette herds was initially approved during the winter of 2014-2015. The late approval for the program resulted in a delayed start to the field operations and an underspending of the budget (approximate cost of $200,000). This late start, combined with poor winter conditions (i.e. lack of snow) and relatively new removal crews, led to an ineffective wolf reduction effort. The initial wolf population estimate within or immediately adjacent to the treatment area was 208 wolves and a density of 12.6 wolves/1000 km^2. Overall, 57 wolves were removed from the reduction zone (41 removed by aerial gunning, 16 removed by ground trapping), equating to a reduction of only 27% of the wolf population. There was an estimated 151 wolves remaining in the treatment area, and a density of 9.4 wolves/1000 km^2 following the wolf reduction efforts. The remaining density estimates at the LPU scale were 10.8 wolves/1000 km^2 in the Pine LPU, and 6.5 wolves/1000 km^2 in the Quintette LPU.

Three external contractors were hired to deliver the majority of the field operations for the second year (2015-2016) of the wolf reduction program, with minimal operational oversight or field involvement from Ministry staff. Overall, 201 wolves were removed across the treatment area (155 removed by aerial gunning, 46 removed by ground trapping). The reduction rate was estimated at 97%, with only seven wolves remaining in the treatment area and a density estimate of 0.4 wolves/1000 km^2 following reduction efforts. At the LPU level, there was a remaining density estimate of 0.5 wolves/1000 km^2 in the Pine LPU, and 0.3 wolves/1000 km^2 in the

[2] Supplemental feeding is an ongoing management initiative in the Kennedy Siding caribou range (Heard and Zimmermann 2018)

Quintette LPU. Although the level of wolf reduction during the second year was very high, a lack of Ministry oversight resulted in inflated program costs of approximately $800,000.

The program was primarily delivered by two external contractors in the third year (2016-2017) of the program. There was a slight increase in operational oversight by Ministry staff, but minimal field involvement. Upon the conclusion of the third year of reduction efforts, an adequate number of wolves had been removed at a cost of approximately $475,000. Overall, 103 wolves were removed (62 by aerial gunning, 31 by ground trapping, and an additional 10 by ground shooting at den sites in the spring). The wolf reduction rate was estimated at 79%, with 27 wolves remaining in or adjacent to the treatment area and a density of 1.7 wolves/1000 km^2 following the reduction efforts. Within the Pine LPU, there was an estimated density of 2.0 wolves/1000 km^2 remaining, and 1.1 wolves/1000 km^2 remaining in the Quintette LPU.

The fourth year (2017-2018) of wolf reductions was delivered by one primary contractor and a secondary crew led by Ministry staff. The level of operational oversight by Ministry staff was increased significantly. The wolf reduction efforts upon conclusion of the winter season were highly successful, both in terms of reduction efficacy and cost efficiency (total cost of $376,000). Overall, 116 wolves were removed across the three treatment herds (all by aerial gunning; there were no conclusive reports of ground trapping removal). The wolf reduction rate was estimated at 92%, with only 10 wolves remaining within or immediately adjacent to the treatment area following the reduction efforts. This equated to a remaining density of 0.6 wolves/1000 km^2. At the LPU level, there was a density estimate of 0.3 wolves/1000 km^2 in the Pine LPU, and 1.1 wolves/1000 km^2 in the Quintette LPU. The winter of 2017-2018 also marked the first year of wolf reduction in the South Narraway caribou range. Fourteen wolves were removed on the BC side of the border (an additional 10 wolves were removed on the Alberta side). The reduction efforts in BC equated to an estimated reduction rate of 74%, with approximately five wolves remaining and a density of 3.1 wolves/1000 km^2. The total cost of conducting wolf reductions in the South Narraway was $81,000.

During the fifth year (2018-2019) of wolf reductions, field operations were delivered primarily by one contractor, with a high level of operational oversight from Ministry staff. The wolf reduction efforts were once again effective and relatively efficient, with a total cost of approximately $340,000. Overall, 61 wolves were removed (51 by aerial gunning, 10 by ground trapping). This equated to a reduction rate of 77%, with an estimated 18 wolves remaining within or immediately adjacent to the treatment area and a density of 1.1 wolves/1000 km^2. There was a remaining wolf density estimate of 1.0 wolves/1000 km^2 in the Pine LPU, and 1.3 wolves/1000 km^2 in the Quintette LPU. Within the South Narraway caribou range, it appeared that the wolf recovery rate was extremely low following the previous winter's reduction efforts. Only one wolf was removed from the BC side of the South Narraway range in 2018-2019, resulting in a remaining wolf density estimate of 1.9 wolves/1000 km^2.

Annual Caribou Population Results

The level of wolf reduction during the first year of wolf removals did not lead to a positive caribou population response, as evidenced by the population parameters reported the following year. Across the three caribou herds, the population had declined by an additional 13.5% ($\lambda = 0.865$) over the course of the year, the adult female survival rate was 78.7% (n = 41), and the proportion of calves in the population was 15.6% (measured late-March 2016). Within the Pine LPU, the population had increased by 14% ($\lambda = 1.14$), with an adult female survival rate of 85.7% (n = 24), but only 13.0% calves in the population. The Quintette LPU had declined by 38.0% ($\lambda = 0.62$), adult female survival was 64.7% (n = 17), however there were 20.0% calves in the population.

Following the second year of wolf reductions, the caribou population had increased across all three herds by 15.6% (λ = 1.156), the adult female survival was 92.7% (n = 41), and the proportion of calves in the population was 22.9%. Within the Pine LPU, the population had increased by 19.5% (λ = 1.195), with an adult female survival rate of 93.1% (n = 29) and 24.5% calves in the population. The Quintette LPU had increased by 10% (λ = 1.10), the adult female survival was 91.6% (n = 12) and 18.4% calves in the population.

Following the third year of wolf reduction, the caribou population increased by 6.7% (λ = 1.067), the adult female survival rate was 91.8% (n = 46), and the proportion of calves in the population was 18.6% (measured late-March 2018). Within the Pine LPU, the population had increased by 5.5% (λ = 1.055), with an adult female survival rate of 87.1% (n = 31) and 16.8% calves in the population. Within the Quintette LPU, the population increased by 9.0% (λ = 1.09), the adult female survival was 100% (n = 15), and 19.4% calves in the population.

The fourth year of wolf reductions led to a caribou population increase of 22.0% (λ = 1.22), the adult female survival rate was 89.2% (n = 46), and the proportion of calves in the population was 21.0% (measured late-March 2019). Within the Pine LPU, the population increased by 23.5% (λ = 1.235), with an adult female survival rate of 92.6% (n = 27), and 19.5% calves in the population. Within the Quintette LPU, the population increased by 18.9% (λ = 1.189), with an adult female survival rate of 77.8% (n = 9), and 25.0% calves in the population. Aerial survey efforts in the South Narraway documented a minimum observation of 38 caribou (up from 26 in March 2018), the adult female survival was 100% (n = 12), but only 13.2% calves in the population. The increase in caribou observations was likely explained by differences in survey efficacy between years.

Based on the results from previous years, the level of wolf reduction achieved during the fifth year of the program should be sufficient to elicit a strong, positive response in the caribou populations. The results of these reduction efforts, however, will not be measured until March 2020. According to the documented population trends, it is predicted that the fifth year of wolf reduction efforts will elicit approximately 15% caribou population growth (λ = 1.15), 90% adult female survival, and 21% calves in the population, across all three South Peace treatment herds. The effects of wolf reductions towards the South Narraway herd, and subsequent predictions, will require further investigation and monitoring.

Overall Caribou Population Results

The overall results measured during the five-year wolf reduction program suggest that the reduction of wolves to low densities can have significant, positive effects towards caribou populations. The level of wolf reduction during the first year did not lead to a caribou population response, however, the following three years of wolf reduction resulted in positive caribou responses in almost all population parameters measured (i.e. lambda, adult female survival, and calf recruitment) across all treatment herds (Table 1). The level of wolf reduction achieved in Year 5 is expected to elicit similar responses, but will not be measured until March 2020.

The total population size across the three treatment herds had increased from 166 individuals in 2016 to 247 individuals in 2019 (a 49% population increase). The average annual population growth rate following the three years of effective wolf reduction was 15% (λ = 1.15). The Pine LPU increased from 104 individuals to 159, with a total population increase of 53%. The Quintette LPU increased from 62 individuals to 88, with a total population increase of 42%. When forecasting the future population trend, assuming an average annual growth rate of 15% and considering density-dependent growth, the caribou population across the three treatment herds could double in size by year 2027 and approach the population objective (n = 800) by 2037 (Figure 3).

Table 1. Wolf reduction and caribou population results across all three South Peace caribou treatment herds in the Northeast Region of British Columbia, Canada.

	2015	2016	2017	2018	2019	2020
Caribou population estimate	192*	166	192	205	247	275**
Calf recruitment	15.5%*	15.6%	22.9%	18.6%	21.0%	21.0%**
Adult female survival	82.5%*	78.7%	92.7%	91.8%	89.2%	90.0%**
Annual population growth rate	-10.0%*	-14.0%	15.6%	6.7%	22.0%	15.0%**
Proportion of wolves reduced during previous winter	0%*	27%	97%	79%	92%	77%
Individual wolves remaining after previous winter's reduction	208*	151	7	27	10	18
Wolf density remaining after previous winter's reduction (wolves/1000 km^2)	12.6*	9.4	0.4	1.7	0.6	1.1

*Parameters measured prior to the implementation of wolf reduction

**Predicted caribou population response based on 2018-2019 wolf reduction

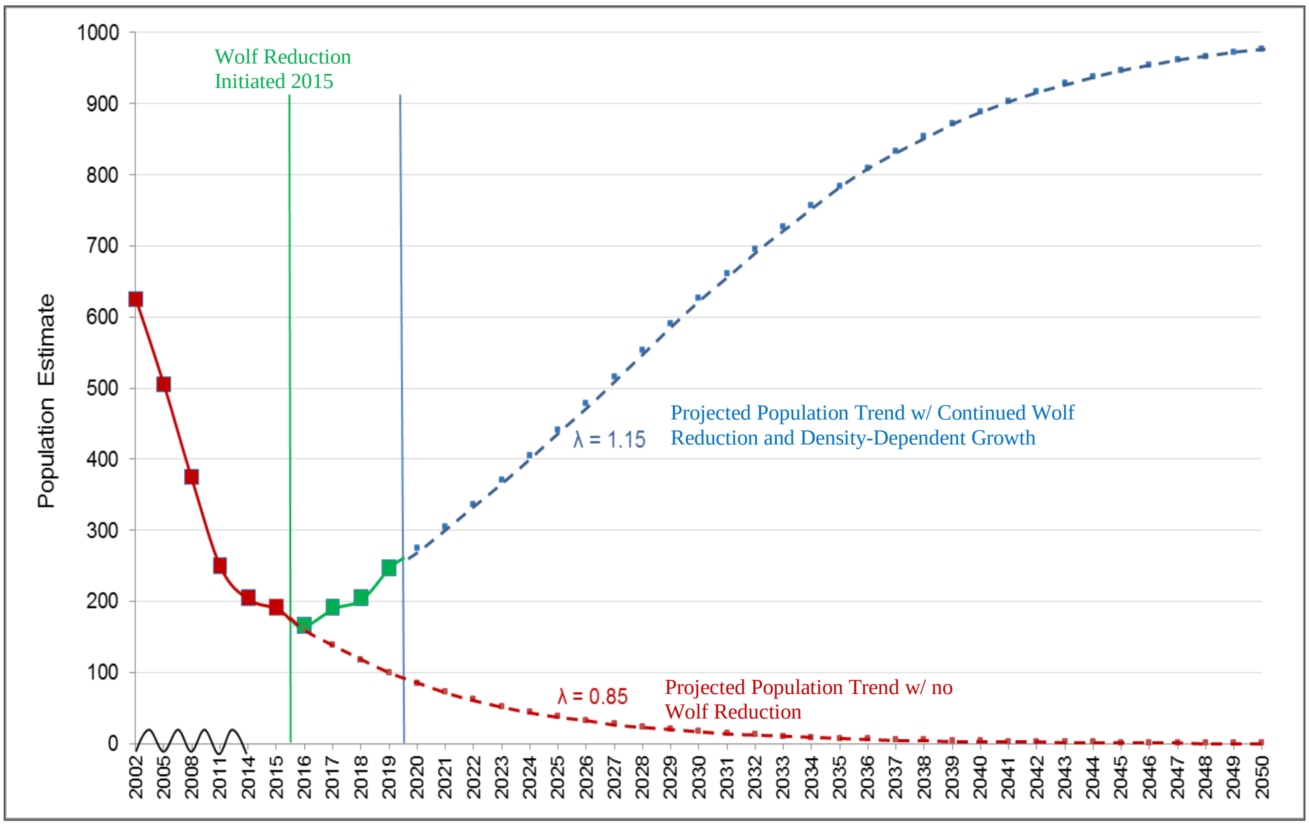


Figure 3. Population trends for three South Peace caribou herds (Klinse-Za, Kennedy Siding, and Quintette) prior to, and in response to, intensive wolf reductions.

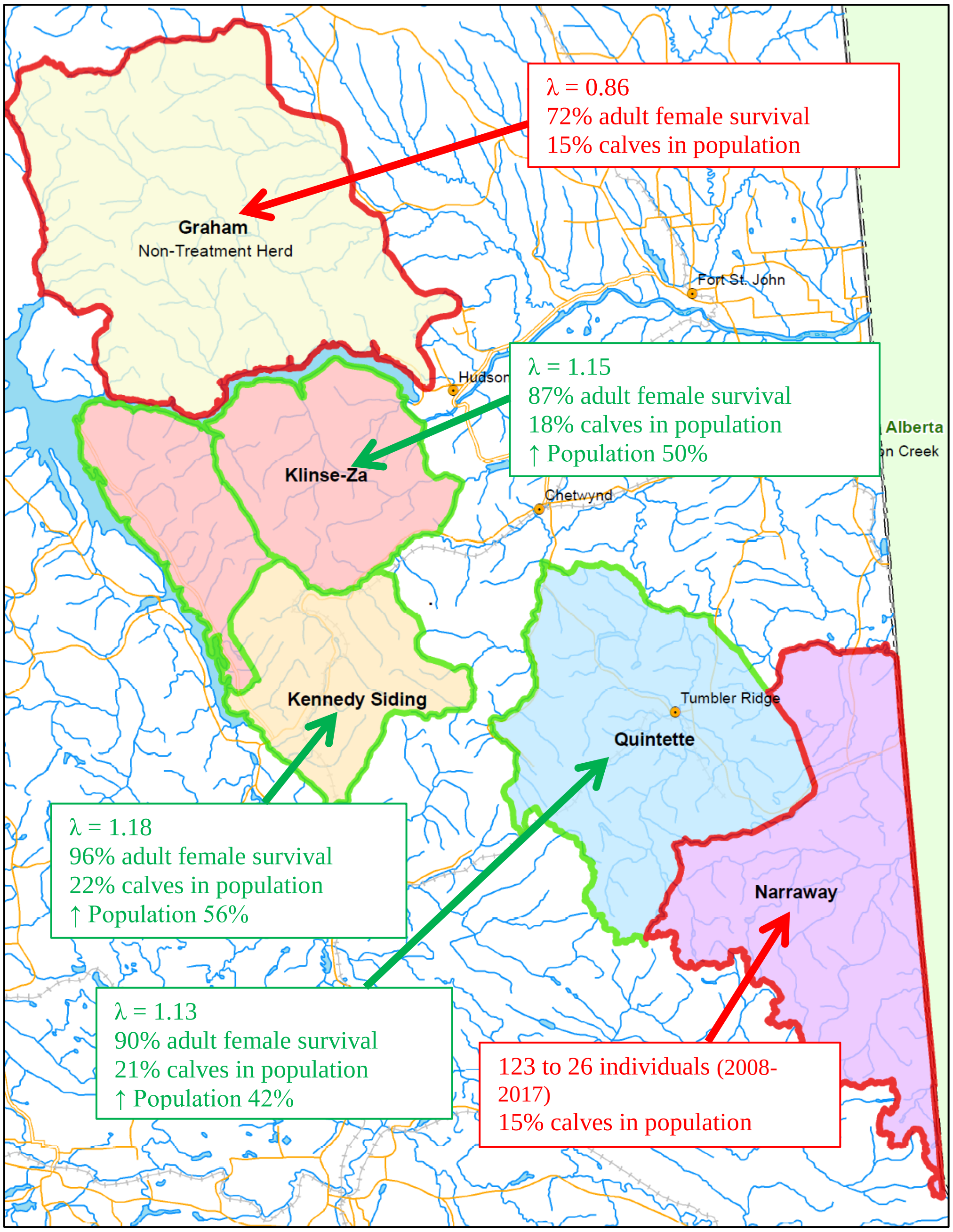


Figure 4. Average and overall population results for each treatment herd (green) in response to three years (2016-2018) of effective wolf reductions, and average population parameters for non-treatment caribou herds (red) over the same timeframe in the Northeast Region of British Columbia, Canada.

Prior to implementing wolf reductions (wolf density of 12.6 wolves/1000 km^2) and following an ineffective wolf reduction effort (Year 1 – wolf density of 9.4 wolves/1000 km^2), all measured caribou population parameters were indicative of declining populations. In each year following effective wolf reduction (i.e., reduction to two wolves/1000 km^2 or less), the population growth rate (Figure 5), calf recruitment (Figure 6), and adult female survival (Figure 7) were indicative of increasing caribou populations in all cases. The linear trend relating caribou population growth to wolf density appeared to suggest stable caribou populations could exist at a wolf density of approximately seven wolves/1000 km^2 (similar to the wolf density equilibrium reported by Bergerud and Elliot [1986]).

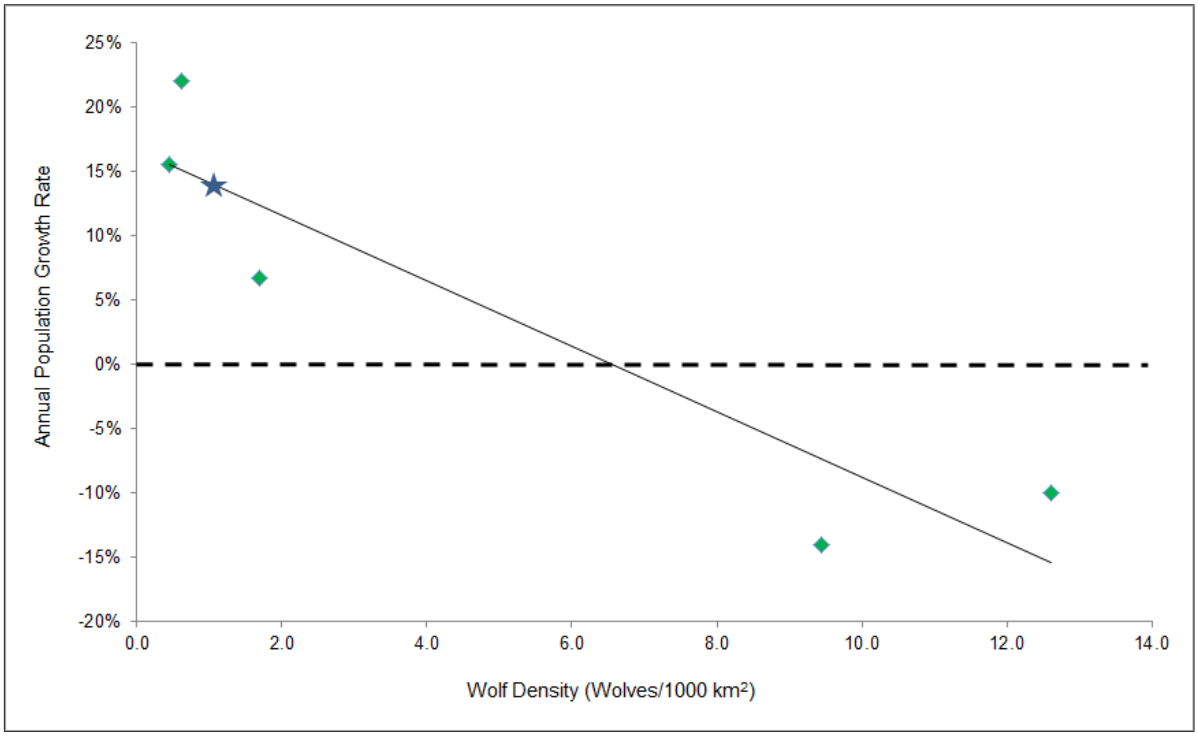


Figure 5. Annual caribou population growth rates relative to wolf density following reduction efforts across the three treatment herds. The "star" symbol represents the predicted response based on wolf reduction following the winter of 2018-2019. The linear trend line intersects with a stable population growth rate at a density of approximately 7 wolves/1000 km^2.

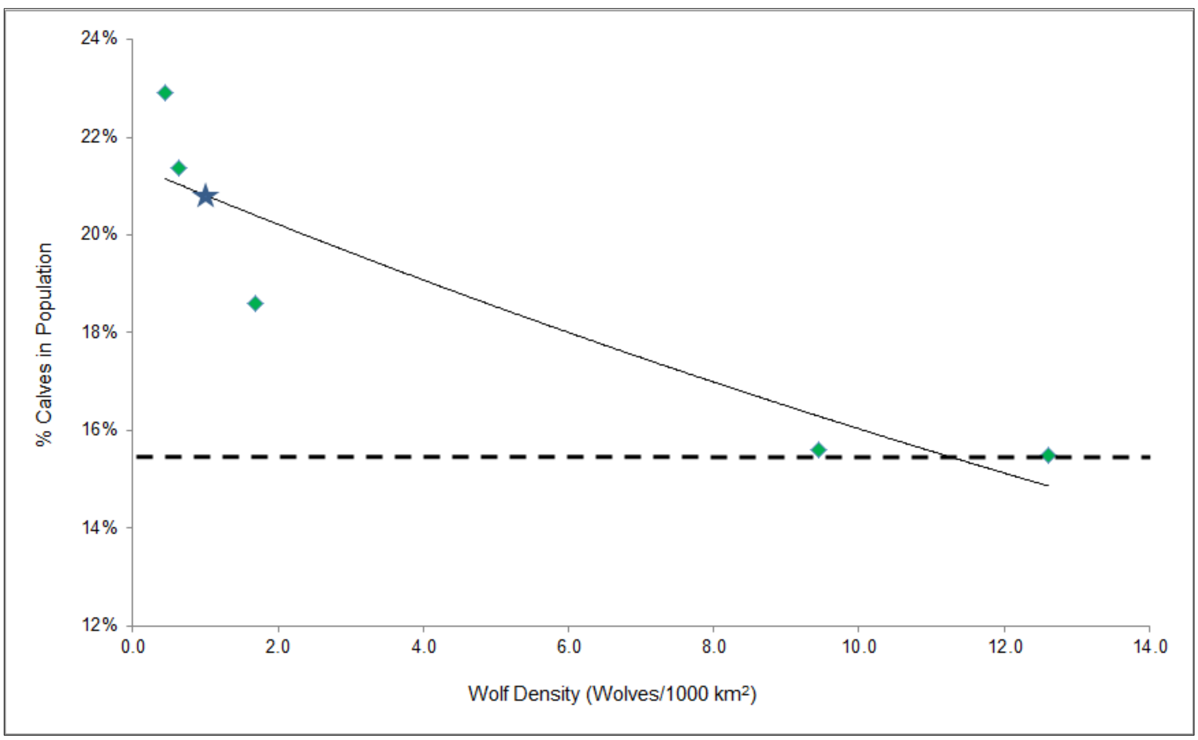


Figure 6. Proportion of caribou calves in the population relative to wolf density following reduction efforts across the three treatment herds. The "star" symbol represents the predicted response based on wolf reduction following the winter of 2018-2019. The proportion of calves in the population that represents population stability is approximately 15.5% (Bergerud 1992).

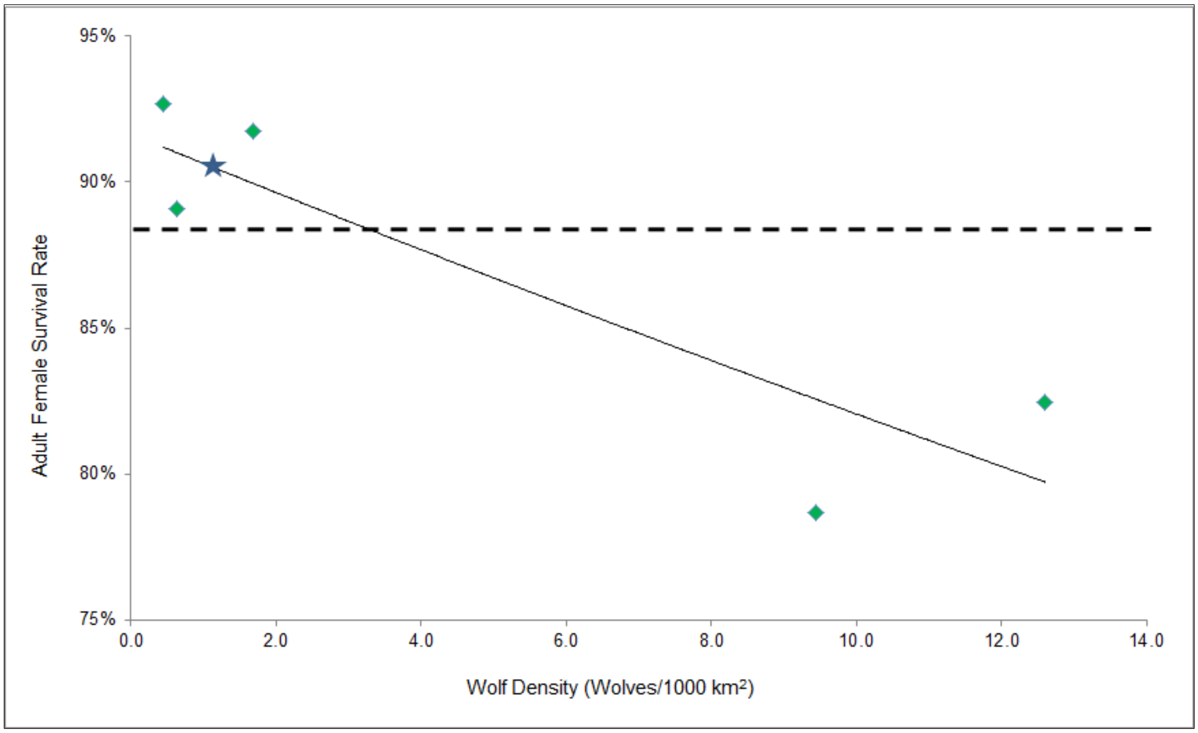


Figure 7. Adult female caribou survival rates relative to wolf density following reduction efforts across the three treatment herds. The "star" symbol represents the predicted response based on wolf reduction following the winter of 2018-2019. The adult female survival rate threshold for population stability is approximately 88% (Bergerud and Elliot 1986).

Adjacent, Non-Treatment Herds

During the years of wolf reduction across the South Peace caribou ranges, the adjacent non-treatment herds (i.e. Graham and South Narraway herds) showed demographic parameters suggestive of continued population declines. The wolf densities across the non-treatment herd ranges were assumed to have remained constant during that time, with an estimate of 12–14 wolves/1000 km^2 in the Graham caribou range and 11–12 wolves/1000 km^2 in the South Narraway core caribou range (FLNRORD *unpubl*.). During the years of effective wolf reduction in the treatment herds (2016-2019), the proportion of calves in the Graham herd ranged between 11.6–16.2% (compared to 16.8–25.0% in treatment herds; Figure 8). The adult female survival rate during that timeframe ranged between 60.0–80.8% (compared to 77.8–100% in treatment herds; Figure 9). The calf recruitment rate in the Graham herd was insufficient to compensate for the adult mortality rate, indicating a declining population trend. Calf recruitment in the South Narraway herd had ranged between 13.2–17.4%; however, there was an insufficient sample size of radio-collared caribou to monitor adult survival rates. The annual population growth rate for the Graham herd[3] had continued to suggest negative growth, declining between 10.3–31.9% annually (Figure 10), while the treatment herds exhibited positive population growth in all years following effective wolf reductions (5.5–23.5% population growth).

[3] Population estimates via aerial census had not been derived consistently for the Graham caribou herd. Lambda (λ) was calculated using Hatter and Bergeruds' (1991) recruitment-mortality equation, where: λ = *adult female survival rate/(1-recuitment)*

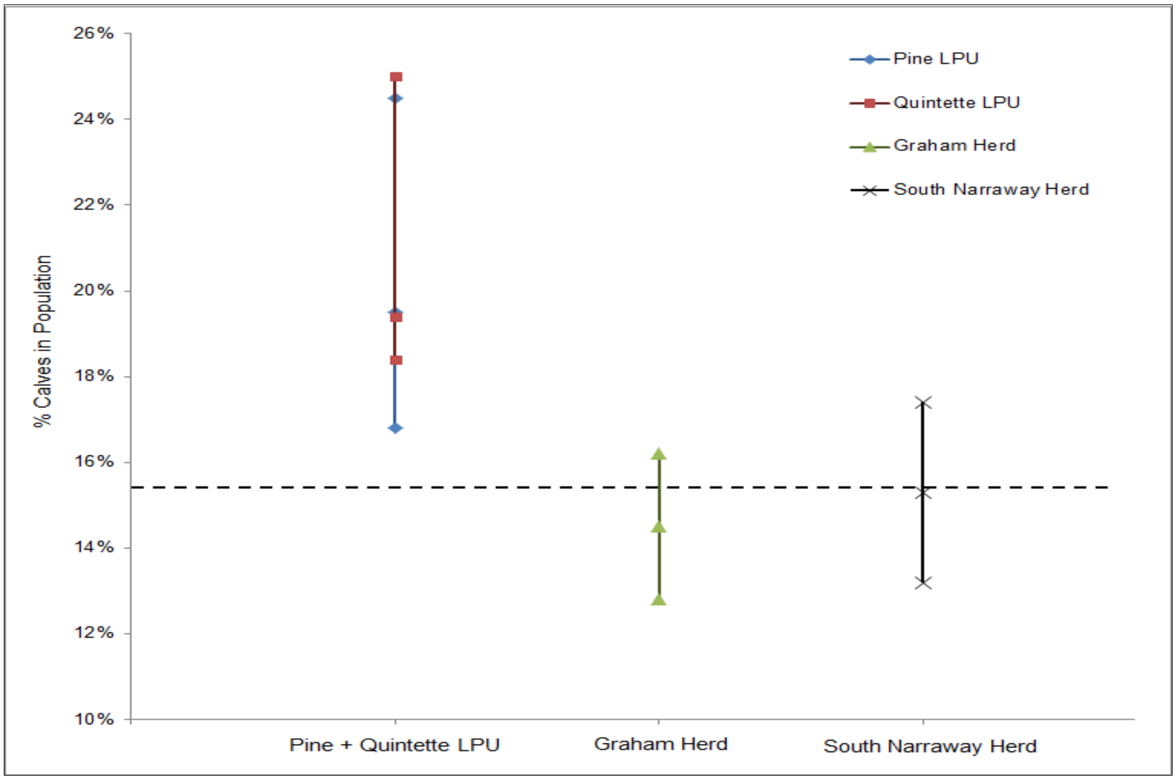


Figure 8. Proportion of calves in the treatment populations (Pine LPU and Quintette LPU) following three effective years of wolf reductions compared to the non-treatment populations (Graham herd and South Narraway herd).

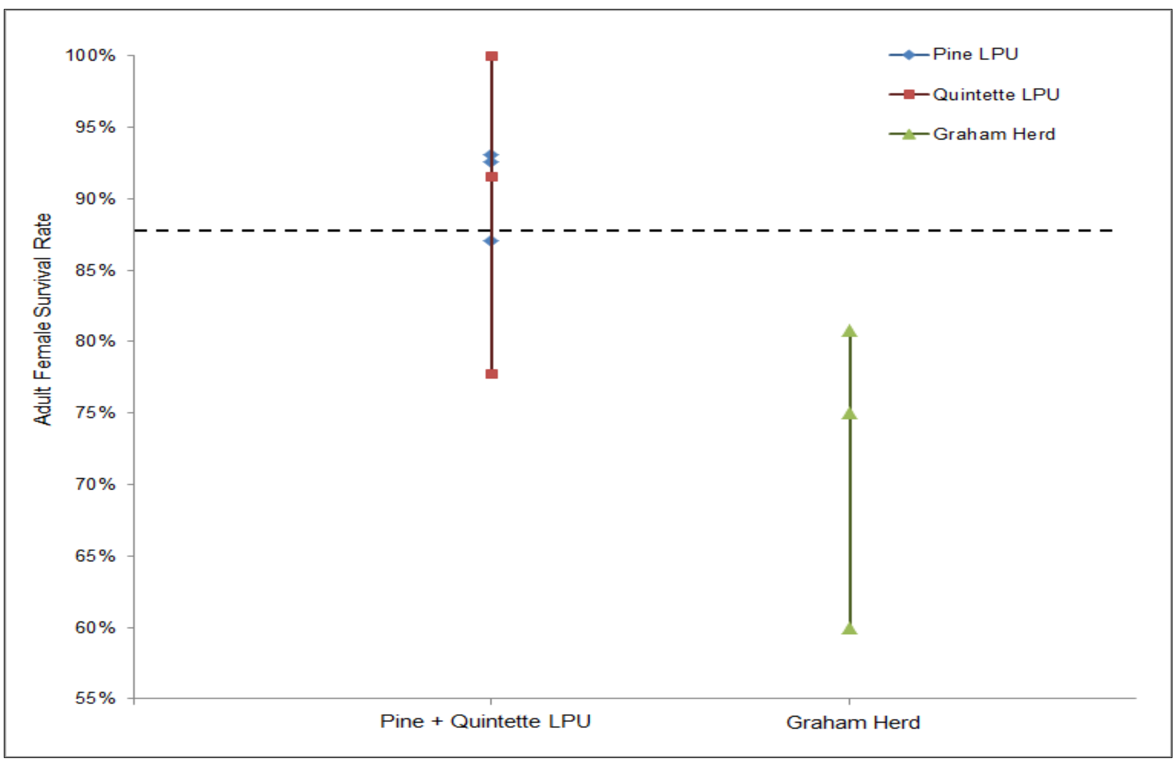


Figure 9. Adult female survival rate observed in the treatment populations (Pine LPU and Quintette LPU) following three effective years of wolf reductions compared to the non-treatment population (Graham herd).

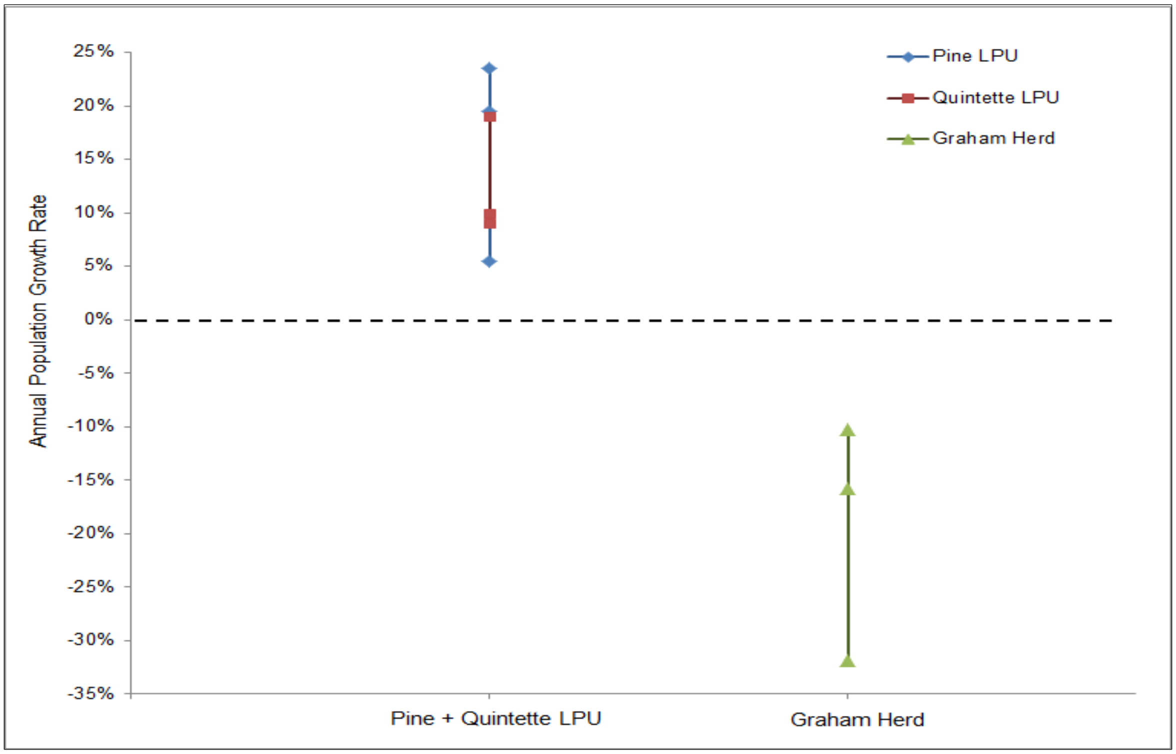


Figure 10. Annual caribou population growth rates observed in the treatment populations (Pine LPU and Quintette LPU) following three effective years of wolf reductions compared to the non-treatment population (Graham herd). Lambda was calculated in the Graham population using Hatter and Bergerud's (1991) recruitment-mortality equation.

Wolf Recovery Rates

The rate at which wolves recovered[4] in the treatment area relative to the initial population varied depending on the proportion of wolves that were removed during previous winters (Figure 11). Following wolf reduction in Year 1, when only 27% of wolves were removed, there appeared to be 100% recovery of wolves relative to the initial population. After removing approximately 97% of the wolves in Year 2, wolves recovered at a rate of 63% of the initial population the following winter, and a similar rate was observed following Year 3 (61% recovery relative to the initial population). After achieving a 92% wolf reduction in Year 4, wolves appeared to have recovered to only 38% of the initial population the following winter. The recovery rate after Year 5 of wolf reductions will be measured during the winter of 2019-2020. Over time, the results suggest that wolf recovery rates can be reduced with successive years of intensive reduction efforts.

Furthermore, the level of wolf reduction necessary to reduce wolf recovery rates on an annual basis appeared quite high (Figure 12). For example, the removal of 79% of wolves in Year 3 still resulted in a high annual recovery rate of approximately 97%. Only following winters when wolves were reduced by greater than 90% (Years 2 and 4) were annual wolf recovery rates reduced to approximately 63%. The preliminary results suggest that a reduction of over 85% of wolves each winter is required to reduce annual recovery rates.

[4] Either through population growth (i.e. producing litters) or recolonization (which occurs between the timeframe following the conclusion of wolf reduction at the end of the winter and commencement of wolf reduction at the beginning of the following winter)

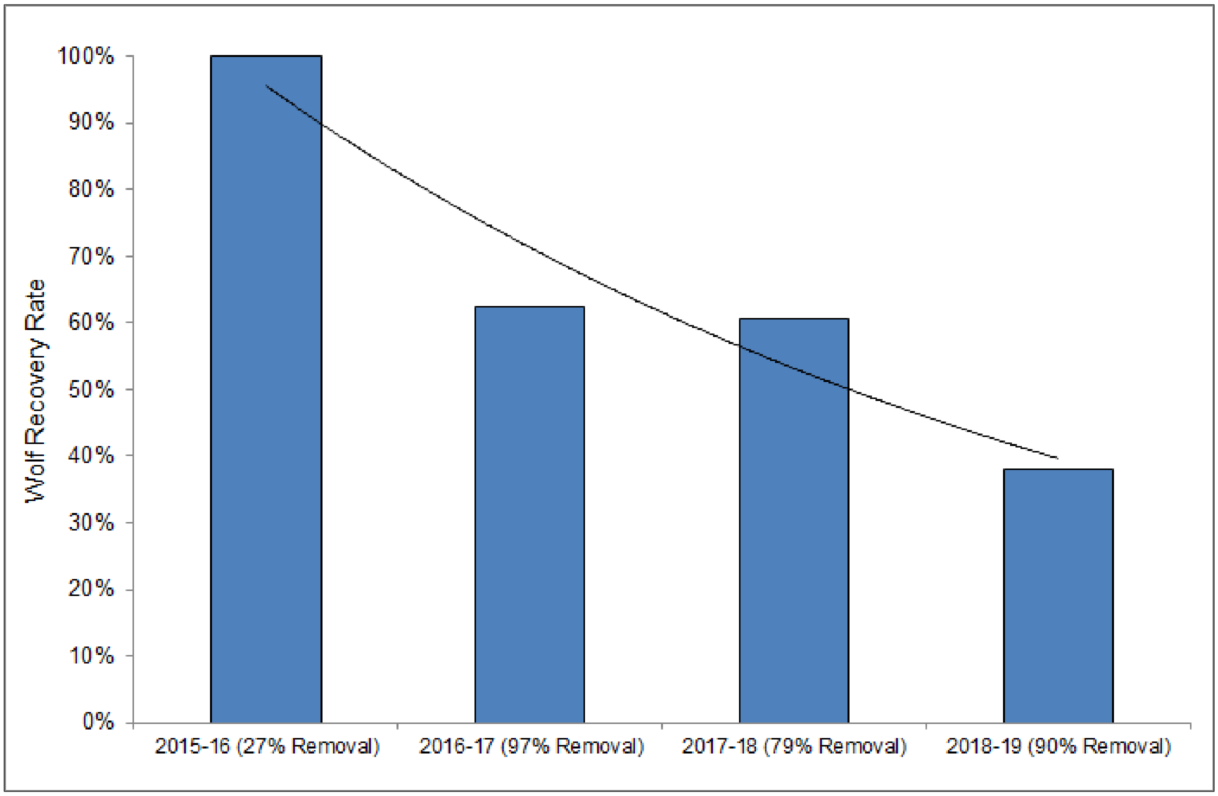


Figure 11. Wolf recovery rates relative to the initial population of wolves (n = 208) in the treatment area.

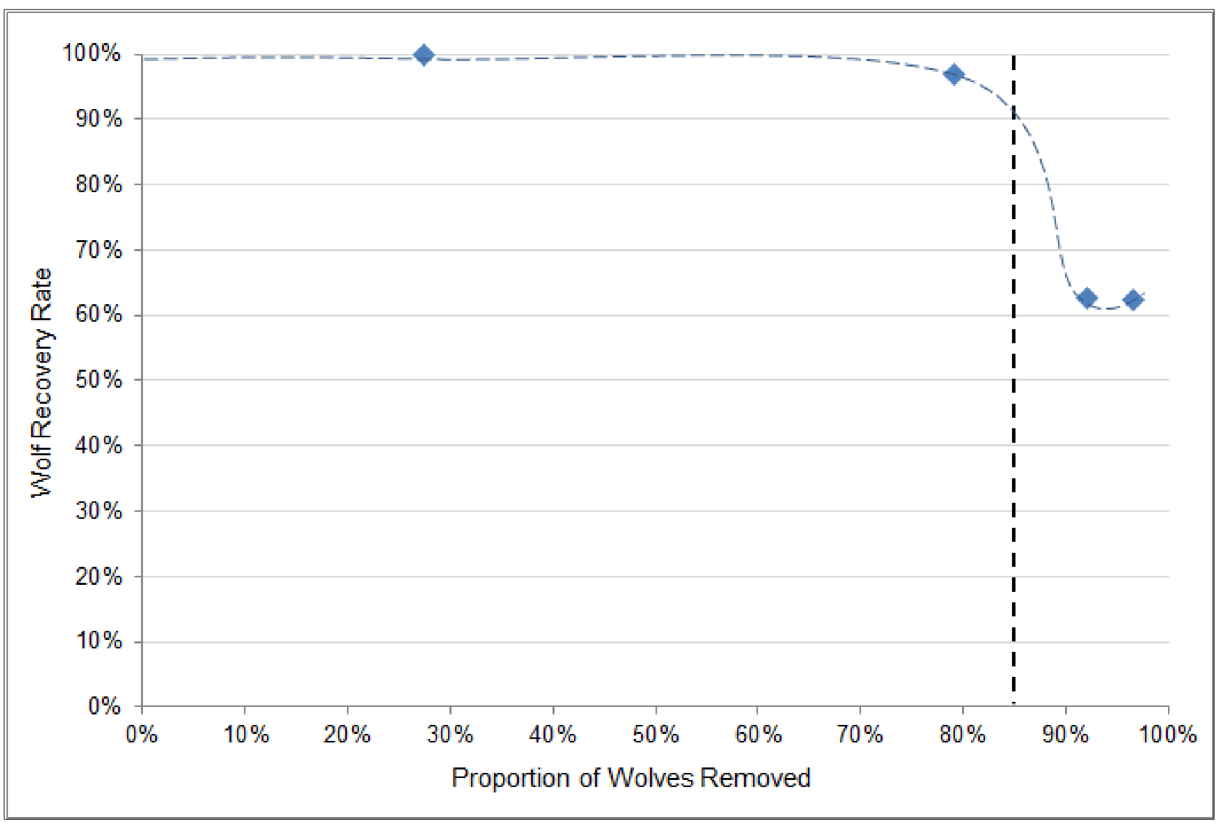


Figure 12. Annual wolf recovery rates following wolf reductions across the treatment area, with a threshold of greater than 85% indicating reduced annual recovery rates.

Primary Prey Response

Primary prey species, particularly moose, were expected to respond to wolf reductions at a level equal to, or greater than the response observed in the caribou populations. However, baseline data for moose populations across the entire treatment area were incomplete, making for difficult interpretation of population trends. Moose populations have been monitored more frequently in recent years since the implementation of wolf reductions. During the winter of 2016-2017, an aerial population composition survey for moose in the Quintette caribou range reported a ratio of 38 calf moose per 100 cow moose (FLNRORD *unpubl*.). This result does not suggest a rapidly increasing moose population (more likely stable to increasing); however, this result occurred following only one year of effective wolf reductions, thus additional data were required to inform population response. During the winter of 2018-2019, a comprehensive moose survey occurred within the Quintette caribou range and yielded a moose density estimate of 0.19 moose/km^2 and a ratio of 33 calves per 100 cows (FLNRORD *unpubl*.). Despite three years of intensive wolf reduction prior to the survey, the moose population density was relatively low with a calf ratio suggesting a stable population. Within the Kennedy Siding herd range, a moose inventory was conducted in 2015, just prior to the implementation of wolf reduction, but has not been surveyed since. At the time of the survey, there was a density estimate of 0.49 moose moose/km^2 and 36 calves per 100 cows (Klaczek et al. 2016).

Within the Klinse-Za caribou range, a moose survey in 2017-2018 (following two years of effective wolf reduction) reported a moose density estimate of 0.44 moose/km^2 (no significant change from the previous estimate in 2012-2013) and a calf ratio of only 21 calves per 100 cows (Sittler and McNay 2018). Additionally, a comprehensive moose survival study in the Klinse-Za caribou range had occurred concurrently with wolf reduction efforts, and compared moose population parameters in response to wolf reductions with those of an adjacent, non-treatment population of moose (Sittler 2019). Overall, adult female moose had a 7% greater survival rate in the Klinse-Za range than in the non-treatment moose population, including one year of 100% survival (n = 40) following Year 4 of wolf reduction (when 96% of wolves in the Klinse-Za range were removed). Adult female survival ranged from 92–100% following three years of effective wolf reduction, whereas survival in the non-treatment population ranged from 83–93%. Calf recruitment was lower than expected in two of the years following effective wolf reductions, with a higher calf recruitment rate observed in the non-treatment population. Calf recruitment in the treatment population has since increased to 35 calves per 100 cows in March 2019. Lambda calculations suggested positive population growth rates in all years following wolf reduction (as was observed in the non-treatment population). Over the course of the study, wolf predation was the cause of one of five (20%) moose mortalities in the Klinse-Za range, while wolf predation was the cause of four of 11 mortalities (36%) in the non-treatment population.

4. Discussion

Caribou Population Results

The positive response measured across the South Peace caribou population following intensive wolf reduction provides strong support for the use of wolf reduction as a tool to increase caribou herds. The results show a conclusive, positive response by the treatment herds following three years of effective wolf reductions, whereas non-treatment caribou herds continued to show evidence of rapid declines. It was evident that a high level of wolf reduction was required to elicit the positive response in treated caribou populations; reduction of wolf densities to < 7 wolves/1000 km^2 may contribute to population stability or growth, but reduction to < 2 wolves/1000 km^2 is required to elicit the strongest possible population response (Serrouya et al. 2019). The results achieved in the South Peace treatment herds have equalled, or surpassed, those achieved by other jurisdictions that have implemented wolf reduction to enhance caribou populations (Farnell and McDonald 1988, Boertje et al. 1996, Bergerud and Elliot 1998, Hayes et al. 2003, Hervieux et al. 2014). Wolf reduction as a caribou recovery tool may be particularly valuable for herds that require immediate recovery actions while the ultimate causes of caribou population declines (e.g. habitat alteration) are addressed.

Caribou calf recruitment remained lower than expected in the Klinse-Za herd despite intensive wolf reduction. This was further evidenced when comparing the survival rates of calves released from the maternal pen to those of the unpenned calves in the population (McNay et al. 2019). For example, in 2018, the annual survival rate of penned calves following their release was 77% versus only 17% survival amongst unpenned calves. Calf survival had increased substantially in the other South Peace treatment herds following effective wolf reduction, which suggests there were factors specific to the Klinse-Za range that were inhibiting calf survival. Bears (*Ursus spp*.) are believed to be abundant throughout the Klinse-Za range and have been shown to be significant predators of calf caribou (Adams et al. 1995). Similarly, calf recruitment observed in the South Narraway herd following one year of wolf reduction was lower than expected; however, further years of treatment may be required in order obtain stronger inferences. It would be beneficial to implement research studies to investigate the cause of low survival of unpenned wild calves in the Klinse-Za caribou herd.

Prior to population declines, it is believed that approximately 1,000 caribou inhabited the South Peace caribou range (approximately 800 amongst the Klinse-Za, Kennedy Siding, and Quintette herds, and 200 within the South Narraway herd; Ministry of Environment 2013, Seip and Jones 2014). Assuming continued annual population growth of approximately 15% (achieved solely through wolf reduction or in conjunction with other management initiatives), the treatment herds could double in size by 2026-2027 and the objective of 800 caribou in the Pine and Quintette LPUs could be met by 2036-2037. In order for those caribou herds to achieve a self-sustaining status, however, the ultimate causes of declines (i.e. industrial landscape change and apparent competition) must be addressed through habitat protection, recovery, and restoration. It is too early to determine whether the population target of 200 caribou in the South Narraway range can be achieved through wolf reduction.

Annual Wolf Recovery

Previous wolf reduction programs have experienced challenges with rapid population growth or recolonization by wolves on an annual basis (Bergerud and Elliot 1998, Hayes et al. 2003, Hervieux et al. 2014). During years of intensive wolf reduction in the South Peace, there were few or no breeding pairs remaining in the treatment area following the winter removal efforts (as determined by closely documenting wolf presence throughout the aerial reduction efforts), which reduced the likelihood of litter production during the spring. Thus, the subsequent recovery of wolves was occurring primarily through colonization of new wolves into the treatment area. Wolf recolonization is presumed to occur rapidly when primary prey within the treatment area remains abundant, and where there are few geographic barriers inhibiting wolf movement into the treatment area. In the South Peace, the low presence of linear disturbance (relative to many Boreal caribou ranges) combined with the mountainous landscape bordered by large waterbodies (on the western and northern extent) may slow the rate of wolf recolonization relative to those rates observed in highly disturbed and less mountainous landscapes (Hervieux et al. 2014). Additionally, wolf reduction occurring to the east of the treatment area in Alberta may also reduce the rate of wolf dispersal from neighbouring jurisdictions.

Wolf reductions in the South Peace have shown that annual population growth and recolonization rates by wolves were significant when less than 80% of wolves were removed during the winter. Following winters of intensive reduction (greater than 90% removal), the subsequent wolf populations had only amounted to approximately 65% of the previous year's population. Prior to reduction efforts in the winter of 2018-2019, the wolf population within the treatment area was only 38% of the initial wolf population present prior to the program's commencement in 2014-2015. These results suggest that continued, intensive wolf reduction can decrease the overall presence of wolves in a treatment area on an annual basis. As reported in similar studies (i.e. Bergerud and Elliot 1998), over the course of multiple years of reduction efforts wolves were recolonizing in smaller pack sizes; an expected result based on the breeding and dispersing behaviour of wolves (Fuller et al. 2003). Small and numerous wolf packs increase the difficulty of removing a high proportion of wolves, as they are more challenging to locate than larger packs and have less-established territories.

Primary Prey

Relative to caribou recovery, an increase in primary prey populations would be considered an undesirable side effect of wolf reductions, due to the apparent competition hypothesis (Seip 1992). In other jurisdictions, wolf reduction has been used as a management tool to deliberately increase primary prey populations for species such as moose, elk (*Cervus canadensis*), and thinhorn sheep (*Ovis dalli*) and has been successful in doing so in many cases (Boertje et al. 1996, Bergerud and Elliot 1998, Hayes et al. 2003, Keech et al. 2011). Based on the results of those programs, it is expected that primary prey species in the South Peace, particularly moose and to a lesser extent deer (*Odocoileus spp.*) and elk, would respond at an equal or greater level to that of the caribou populations. A lack of baseline data for moose populations across the treatment area makes for difficult interpretations of the response to wolf reduction; however, the available data do not suggest as strong of a response as expected. Although survival rates of adult moose have likely increased and positive population growth has occurred (i.e. within the Klinse-Za range; Sittler 2019), there has been a lesser response in calf moose survival and recruitment. This may indicate that there are other factors slowing the rate of population growth amongst moose, such as bear predation on neonate calves, or health factors (Kuzyk et al. 2018). Other jurisdictions within BC have recently reported high moose population growth and calf recruitment in response to wolf reduction (Serrouya and Legebokow 2018).

The response of primary prey to wolf reduction requires further monitoring, and wildlife managers must consider options for managing primary prey in order to reduce the recovery rates by wolves. This may be achieved through liberalized licensed hunting opportunities or managing habitat such that it is less suitable for primary prey species. Messier's (1994) numeric response model predicts that moose densities below 0.13 moose/km^2 are necessary for wolves to meet the threshold associated with caribou population stability (6.5 wolves/1000 km^2; Bergerud and Elliot 1986). Similar prey biomass equations estimate that moose densities below 0.3 moose/km^2 are required for wolf densities below 6.5 wolves/1000 km^2 (Fuller 1989, Wilson 2009), which is comparable to Bergerud's (1996) research which suggested caribou cannot persist when moose densities exceed 0.2–0.3 moose/km^2. Furthermore, moose densities of less than 0.2 moose/km^2 have been associated with reduced wolf recruitment (Messier 1985, Serrouya et al. 2017). Moose densities of greater than 0.2–0.3 moose/km^2 in the South Peace may not impede caribou recovery efforts so long as intensive wolf reduction continues to be used as a management option. However, it would be detrimental to allow moose abundance to occur beyond such densities, as it would continue to facilitate annual wolf recovery, and ultimately hinder caribou populations from achieving self-sustaining status. Furthermore, wolf reduction is not viewed as a long-term management tool, thus moose abundance should be addressed through active moose population management and caribou habitat recovery. It must be recognized that there are significant social and logistical challenges in maintaining or reducing moose densities through licensed hunting, particularly due to First Nations' desire for abundant moose populations to meet their food, social, and ceremonial rights.

Links to Other Caribou Recovery Initiatives

Wolf reduction as a caribou recovery tool is likely to achieve the greatest results when it occurs in conjunction with other recovery initiatives that address underlying causes of caribou population declines (Serrouya et al. 2019). The long-term recovery of caribou populations requires the recovery of caribou habitat to a state that resembles pre-disturbance conditions. Habitat change that has benefited primary prey species or enhanced wolf movement across the landscape must be addressed in order for the long-term caribou recovery objectives to be met. Across the South Peace caribou range, habitat protection and restoration initiatives are underway and continue to be pursued (MFLNRO 2017, Woods and McNay 2019). Such initiatives are necessary to support caribou recovery, particularly if and when wolf reduction is halted as a management tool for South Peace caribou. Furthermore, social acceptance for wolf reduction is contingent on the Ministry's ability to demonstrate commitment to addressing the ultimate causes of caribou population declines. Wolf reduction should be viewed as a short-term recovery tool that supports South Peace caribou herds while habitat conditions improve.

There are other short-term caribou recovery measures occurring in conjunction with wolf reduction across the South Peace caribou ranges. In the Kennedy Siding herd, supplemental feeding of caribou during the autumn and early winter has occurred for several years (Heard and Zimmermann 2018). While the positive effects of feeding caribou are somewhat inferred (i.e. improved nutritional status), the Kennedy Siding herd did not show a measurable population response to supplemental feeding in the absence of wolf reduction. Within the Klinse-Za caribou range, an ongoing maternal penning program has been underway since 2014 (McNay et al. 2019). Initial results from the maternal penning efforts, prior to the initiation of wolf reduction, suggested that penning was ineffective if wolf populations were not reduced. During the program's first year, five of nine calves were killed soon after their release from the pen (a higher mortality rate than unpenned calves) and adult mortality remained high (Seip and Jones 2016). However, when combined with intensive wolf reduction in subsequent years, calf survival has increased (Seip and Jones 2018, McNay et al. 2019). Calf survival of penned calves has been higher than that of unpenned calves in all years with concurrent wolf reduction, suggesting that the maternal penning efforts are contributing additional calves to the population that may otherwise have perished. The maternal penning project does retain some risk, however. The repeated capture, retention, and rearing of caribou can be stressful, result in injury and death, and may have short- and long-term health and behavioural implications. Additionally, the costs associated with maternal penning relative to population growth are significantly higher when compared to wolf reduction alone (i.e. the cost per caribou added to the population through maternal penning is approximately one order of magnitude greater than that of wolf reduction). In the South Peace, maternal penning is not supported, nor would it be expanded to include new caribou herds, in the absence of intensive, concurrent wolf reduction. Furthermore, the Kennedy Siding and Quintette caribou herds have shown comparable or greater annual population growth and calf recruitment than the Klinse-Za herd through wolf reduction alone.

Operational Considerations

Overall, the delivery of the wolf reduction program in the South Peace has increased in efficacy and efficiency over time as crews have gained more experience and familiarity with the treatment area and as the operational oversight by Ministry staff has increased. Cost efficiency is dependent on the experience and proficiency levels of the removal crews, weather conditions, and the abundance and pack sizes of wolves within the treatment area. The effort required to reduce wolf densities to a low level is substantial. Generally, greater than 225 hours of helicopter flight time are flown to achieve successful wolf reduction across the South Peace treatment area. This necessitates a substantial financial commitment, as well as commitment of time and capacity from the aerial removal crews and Ministry staff. A sufficient budget must be forecasted each year, as well as a multi-year funding commitment. Ministry staff capacity must also be forecasted, and wolf reduction crews with demonstrated proficiency must be identified and procured. The results reported during this program suggest that wolf reduction must be very intensive, and to implement a program that is anything less than intensive would be considered unethical. Scientific rigour is required to deliver the removal aspects of this program and accurately measure the response of both wolves and caribou to wolf reduction. Wolf reduction has proved to be most efficient and effective when conducted under optimal weather conditions that facilitate the tracking, locating, capturing and radio collaring, and ultimately the removal of the majority of wolves within the treatment area. The intensity of wolf reductions achieved during this program has generally exceeded those reported in other jurisdictions where wolf reduction has occurred (Bergerud and Elliot 1998, Hayes et al. 2003, Hervieux et al. 2014).

A critical factor to a successful program is the radio collaring of most, if not all, wolf packs within the treatment area. The deployment of radio-collars greatly reduces search times when locating wolf packs, and aids in the facilitation of complete pack removal. Wolves captured and fitted with new, active radio-collars were generally left alive following the reduction efforts in order to facilitate relocation of packs the following winter. Under most circumstances, the lone radio-collared wolves had not bred successfully, thus were not part of new family units the following winter. Furthermore, it was rare that these lone wolves were accepted into new packs that may have colonized the treatment area. The most common scenario was that radio-collared wolves partnered with other individuals or pairs of wolves to form new pairs or small groups. Most years, approximately half of the radio-collared wolves survived or remained within the treatment area by the following winter. Although the removal of the radio-collared wolves annually would have resulted in a lower wolf density at the end of each winter's reduction efforts, the value of leaving those wolves is believed to outweigh the benefits of removing them.

The concurrent ground removal programs implemented by First Nations (in the Klinse-Za range) provided an additional source of wolf reduction, as well as an opportunity to collaborate with local First Nations communities on caribou recovery initiatives. In treatment areas where there were no ground removal programs (i.e. Kennedy Siding and Quintette), the aerial removal on its own was shown to be sufficiently effective. There were also risks of actively trapping in conjunction with aerial removal, the primary risk being that a radio-collared individual could have been accidentally trapped and killed. Due to the elusive nature of wolves, their large home ranges and propensity for remote, inaccessible locations, trapping and hunting is unlikely to achieve wolf reduction targets as a standalone measure. Furthermore, the reduction of wolves through hunting or trapping has been shown to have little effect on wolf populations (Webb et al. 2011). Given these factors, it is unlikely that wolf reduction through hunting and/or trapping is sufficient to elicit positive responses in caribou populations.

The cost effectiveness of the South Peace wolf reduction can be measured using several variables. Most notably, the cost per caribou added[5] to the population following three years of effective wolf reduction equates to approximately $11,000 per caribou. During that time, there has been one caribou added to the population for every 2.9 wolves that have been removed. The cost per wolf removed (through aerial shooting) has averaged approximately $5,100 over the past five years; this cost has fluctuated annually and is dependent on the proficiency of the removal crews, weather conditions, abundance of wolves, and pack sizes (where more effort is required over time to remove numerous, but small packs). The overall cost to deliver wolf reduction in the South Peace treatment area may be lessened over time, provided the wolf recovery rate remains low, as was observed in 2018-2019. The program costs and number of wolves removed are largely independent of the

[5] Calculated by identifying the number of caribou added to the population as well as the number of caribou that would have been lost from the population in the absence of wolf reduction

caribou population size; thus, the cost and number of wolves removed annually may remain constant over time, but the number of caribou added annually will increase as the caribou population size increases (assuming similar lambda results are achieved). If primary prey populations (and their preferred habitats) are managed and caribou populations continue to increase at their current rate, it is possible that a lesser effort to reduce wolves could be applied on an annual basis, or wolf reductions could occur on two- or three-year cycles. As the caribou population increases, the cost per caribou added and the number of caribou added per wolf removed (presuming similar population growth rates are achieved)

During Years 1 and 2 of the reduction program, there were attempts made to retrieve the majority of wolf carcasses by helicopter in order to provide pelts to local First Nations. It soon became evident that the retrieval of carcasses was highly inefficient (required much additional helicopter flight time and time on the ground by removal crews), increased the safety risks for removal crews, and had low uptake from First Nations relative to utilization of the pelts. In the subsequent years of the program, Ministry staff and removal crews have coordinated the ground retrieval of wolf carcasses that were relatively accessible, which were then distributed to local First Nations. This has been a much more efficient method of retrieving and distributing carcasses, and has generally provided a sufficient number of pelts to First Nations to support their social and ceremonial interests.

Aerial shooting is the most effective method of reducing wolf densities over large geographic areas while eliminating the risk of bycatch and ensuring the highest likelihood of quickly dispatching wolves. The humaneness of wolf removal in the South Peace has been examined more thoroughly as Ministry staff has become more involved in the operational delivery. In 2018-2019, humaneness was examined by Ministry staff by documenting shooting proficiency, shot locations, and subsequent dispatch times of a large subsample of wolves removed during program delivery (including the South Peace and two other treatment areas in the region). Of the documented subsample of 98 wolf removals, the vast majority of wolves were dispatched instantaneously or within seconds following one well-placed shot or a quick succession of multiple shots. Only six wolves took longer than 30-seconds to expire after an initial shot, and only one wolf was never visually confirmed to have expired after being shot (although it appeared to have expired out of sight in a tree well). It is important that Ministry staff, working closely with the removal crews, continue to document the shooting proficiency and effectiveness during wolf reduction programs and adjust methods as necessary to ensure wolf reduction occurs at the highest possible level of humaneness.

5. Conclusion and Recommendations

The South Peace aerial wolf reduction program has demonstrated conclusively that the reduction of wolves across the treatment area has had a strong, positive effect on the caribou populations. Wolf reduction is a management tool that must be used responsibly and ethically, and implemented with the highest standards for humaneness and scientific rigour. Reducing wolf populations may be the most effective interim management measure for halting and reversing caribou population declines over the short-term while the ultimate causes of such declines are addressed through habitat protection and restoration and primary prey management. Wildlife managers and Ministry decision-makers should consider the following recommendations that have been identified during the five-year review of wolf reduction in the South Peace region:

1. Continue the intensive reduction of wolves across the South Peace treatment areas until caribou populations approach a self-sustaining status (approximately 1,000 individuals)
    - Consider approval of an additional five years of wolf reduction, followed by a comprehensive review of the program

  - Implement multiple management tools, including habitat protection and restoration, concurrently to help address the ultimate causes of population declines
2. Consider lessening the wolf reduction intensity if wolf recovery remains low and caribou continue to trend towards self-sustaining levels
   - Contingent on habitat restoration, protection, and maintenance of primary prey populations
3. Consider a "maintenance" approach to wolf reductions for the South Narraway caribou herd, provided wolf recovery remains low
   - This may be achieved through reducing the annual reduction effort, or conducting reductions on a two- to three-year cycle
4. Continue to use experienced and proficient removal crews that can be trusted to deliver wolf reduction in a professional and humane manner
5. Maintain Ministry staffs' responsibility and role in project coordination, operational oversight, and field involvement
6. Continue the intensive monitoring of caribou populations in response to wolf reductions, including the documentation of annual population estimates, population trend, calf recruitment, and adult female survival rates
7. Monitor the response by primary prey to wolf reductions, establish target densities for primary prey species (i.e. moose) within the treatment areas, and implement measures that can be used to achieve and maintain those objectives
   - Consider using licensed hunting to manage for moose population densities between 0.2–0.3 moose/km^2
8. Consider habitat protection and restoration measures such that habitat gain exceeds habitat loss within and adjacent to caribou core ranges
9. Continue to rigorously document the humaneness of the wolf reduction efforts
10. Continue to support the ground retrieval of carcasses to be distributed to local First Nations
11. Continue to implement a collaborative approach to wolf reduction by supporting ground trapping programs by local First Nations
12. Consider research opportunities to investigate causes of caribou calf mortality (i.e. predation by bears or other predators, health-related causes, etc.)
13. Continue to implement the Ministry's safe work practices for aerial shooting of wolves and net-gunning capture of wolves

6. Literature Cited

Adams, L. G., F. J. Singer, and B. W. Dale. 1995. Caribou calf mortality in Denali National Park, Alaska. Journal of Wildlife Management 59:584-594.

Bergerud, A.T. 1992. Rareness as an antipredator strategy to reduce predation risk for moose and caribou. *In* Wildlife 2001: populations. *Edited by* D.R. McCullough and R.B. Barrett. Elsevier, London, UK. pp 1008–1021.

Bergerud, A.T., and J.P. Elliot. 1986. Dynamics of caribou and wolves in northern British Columbia. Canadian Journal of Zoology 64:1515–1529.

Boertje, R. D., P. Valkenburg, and M. E. McNay. 1996. Increases in moose, caribou, and wolves following wolf control in Alaska. The Journal of Wildlife Management 60: 474–489.

COSEWIC. 2011. Designatable units for caribou (*Rangifer tarandus*) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON, Canada. 88 pp.

Environment Canada. 2014. Recovery strategy for the woodland caribou, southern mountain population (*Rangifer tarandus caribou*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa, ON, Canada. 68 pp.

Farnell, R., and J. McDonald. 1988. The demography of Yukon's Finlayson caribou herd, 1982 to 1987. Progress report, Yukon Renewable Resources, Whitehorse, YK, Canada.

Fuller, T. K. 1989. Population dynamics of wolves in north-central Minnesota. Wildlife Monographs 105:3–41.

Fuller, T. K., L. D. Mech, and J. F. Cochrane. 2003. Wolf population dynamics. *In* Wolves: behavior, ecology, and conservation. *Edited by* D. L. Mech and L. Boitani. University of Chicago Press, Chicago IL, USA. pp 161-19.1

Gustine, D.D., K.L. Parker, R.J. Lay, M.P. Gillingham, D.C. Heard. 2006. Calf survival of woodland caribou in a multi-predator ecosystem. Wildlife Monograph 165:1–32.

Hatter, I.W., and W. A. Bergerud. 1991. Moose recruitment, adult mortality and rate of change. Alces, 27:65–73.

Hayes, R.D., R. Farnell, R.M. Ward, J. Carey, M. Dehn, G.W. Kuzyk, A.M. Baer, C.L. Gardner, and M. O'Donoghue. 2003. Experimental reduction of wolves in the Yukon: ungulate responses and management implications. Wildlife Monographs 152:1–35.

Heard, D., and K. Zimmerman. 2018. Supplemental feeding of Kennedy Siding caribou, September 2017 to January 2018. Report for the Peace Northern Caribou Program. 21p.

Hervieux, D., M. Hebblewhite, D. Stepinksy, M. Bacon, and S. Boutin. 2014. Managing wolves (*Canis lupus*) to recover woodland caribou (*Rangifer tarandus caribou*) in Alberta. Canadian Journal of Zoology 92:1029–1037.

Keech, M. A., M. S. Lindberg, R. D. Boertje, P. Valkenburg, B. D. Taras, T. A. Boudreau, and K. B. Beckmen. 2011. Effects of predator treatments, individual traits, and environment on moose survival in Alaska. Journal of Wildlife Management 75:1361–1380.

Klaczek, M., S. Marshall, D. Heard, and A. Batho. 2016. Density and composition of moose (*Alces alces*) within the Pine and Mackenzie study area (WMU 7-23A and 7-30) in north-central British Columbia: winter 2015-2016. BC Ministry of Forests, Lands and Natural Resource Operations, Prince George, BC, Canada.

Kuzyk, G. 2002. Wolf distribution and movements on caribou range in West-central Alberta. M.Sc. thesis, University of Alberta.

Kuzyk, G., S. Marshall, C. Procter, H. Schindler, H. Schwantje, M. Gillingham, D. Hodder, S. White, and M. Mumma. 2018. Determining factors affecting moose population change in British Columbia: testing the landscape change hypothesis. 2018 Progress Report: February 2012–April 2018. BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Victoria, BC. Canada, Working Report No. WR-126. Pp. 64.

McNay, R.S., M. Erickson, and L. Giguere. 2019. Enhancing calf survival to help avert extirpation of the Klinse-Za caribou herd: annual report. Wildlife Infometrics Inc. Report No. 671. Wildlife Infometrics Inc., Mackenzie, BC, Canada.

Messier, F. 1985. Social organization, spatial distribution, and population density of wolves in relation to moose density. Canadian Journal of Zoology 63:1068–1077.

Messier, F. 1994. Ungulate population models with predation: a case study with the North American moose. Ecology 75:478–488.

Ministry of Environment. 2013. Implementation plan for ongoing management of South Peace northern caribou (*Rangifer tarandus caribou* pop. 15) in British Columbia. British Columbia Ministry of Environment technical report, Victoria, BC, Canada.

Ministry of Forests, Lands and Natural Resource Operations. 2017. British Columbia's Quintette strategic action plan – southern mountain caribou herd recovery. British Columbia Ministry of Forests, Lands and Natural Resource Operations technical report, Victoria, BC, Canada.

Seip, D. R. 1992. Factors limiting woodland caribou populations and their relationships with wolves and moose in southeastern British Columbia. Canadian Journal of Zoology 70:1494–1503.

Seip, D.R., and E. Jones. 2014. Population status of caribou herds in the Central Mountain Designatable Unit within British Columbia, 2014. Unpublished report. BC Ministry of Environment.

Seip, D.R., and E. Jones. 2016. Population status of central mountain caribou herds within British Columbia, 2015. Unpublished report. BC Ministry of Environment.

Serrouya, R.B., and C. Legebokow. 2018. Moose population monitoring in the Lake Revelstoke Valley (Management Units 4-38 and 4-39), February 2018. Unpublished Report, Columbia Mountains Caribou Project and BC Ministry of Forests, Lands, and Natural Resource Operations.

Serrouya, R., B. N. McLellan, H. van Oort, G. Mowat, and S. Boutin. 2017. Experimental moose reduction lowers wolf density and stops decline of endangered caribou. PeerJ 5:e3736.

Serrouya R., D.R. Seip, D. Hervieux, B.N. McLellan, R.S. McNay, R. Steenweg, D.C. Heard, M. Hebblewhite, M. Gillingham, and S. Boutin. 2019. Saving endangered species using adaptive management. PNAS 116: 6181–6186.

Sittler, K.L. 2019. Moose Limiting Factors Investigation: Annual Report 2018-19. Wildlife Infometrics Inc. Report No. 678. Wildlife Infometrics Inc., Mackenzie, BC, Canada.

Sittler, K.L. and R.S. McNay. 2018. Moose (*Alces americanus*) population density and composition around the Clearwater and Moberly River drainages (WMU 7-31), Northeastern BC. Wildlife Infometrics Inc. Report No. 623. Wildlife Infometrics Inc., Mackenzie, BC, Canada.

Webb, N. F., J. R. Allen, and E. H. Merrill. 2011. Demography of a harvested population of wolves (*Canis lupus*) in west-central Alberta, Canada. Canadian Journal of Zoology 89:744–752.

Wilson, S. F. 2009. Recommendations for predator-prey management to benefit the recovery of mountain caribou in British Columbia. Ministry of Environment – Environmental Stewardship Division. Victoria, BC, Canada.

Woods A.D., and R.S. McNay. 2019. Klinse-Za/Scott East caribou habitat restoration: 2018-19 annual report. Wildlife Infometrics Inc. Report No. 669. Wildlife Infometrics Inc., Mackenzie, BC, Canada.

ᑐᓴᕐᑎᑦᑎᔾᔪᑎᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᖏ ᓵᖓᖅᑎᕇᓪᓗᑎᒃ
ᐃᓄᓕᒫᓂᒃ ᓈᓚᓪᓗᑎᒃ

ᑐᓴᕐᑎᑦᑎᔾᔪᑎᕗᑦ ᑎᓯᐱᕆ 13, 2019 ᑖᒃᑯᐊ ᓄᓇᕗᑦ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᓕᐅᕆᓂᐊᖅᑐᑦ ᓵᖓᖅᑎᖅᑲᕐᓗᑎᒃ ᖃᐃᑎᑦᑎᓯᒪᓗᑎᒃ ᐃᓄᓕᒫᓂᒃ ᓈᓚᓪᓗᑎᒃ ᐃᓱᒪᒋᔭᐅᖁᓪᓗᒋᑦ ᓄᓇᕗᑦ ᒐᕙᒪᒃᑯᑦ - ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᓕᕆᕕᖕᒐᑦᑕ *ᑐᒃᓯᕋᐅᑖ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᖏ ᐃᓱᒪᓕᐅᕆᓇᖅᑯᓪᓗᒋᑦ ᐅᓄᕈᓐᓃᖓᐊᕐᓗᑎᒃ ᑐᒃᑐᑕᐅᔪᓐᓇᖅᑐᑦ ᕿᙵᐅᑉ ᑐᒃᑐᐃᑦ ᑕᒡᕙᖕᒐᑦ 30 ᑕᒡᕗᖓ 0.* ᑖᔅᓯᒥᖕᒐ ᓈᓚᖕᓂᖅ ᐃᓂᓕᐅᖅᓯᒪᕗᒍᑦ ᐃᖃᓗᒃᑑᑦᑎᐊᖅ, ᓄᓇᕗᑦ ᑕᐃᑲᓂ ᐱᙳᐊᕐᕕᖕᒐᓂ ᐃᖃᓗᒃᑑᑦᑎᐊᖅ ᒫᑦᓯ 5-ᒥᑦ 6-ᒧᑦ, 2020, ᐱᒋᐊᕐᓗᑎᒃ 9:00 ᐅᓪᓛᒃᑯᑦ ᑎᑭᓪᓗᒍ 5:00 ᐅᓐᓄᓴᒃᑯᑦ ᖃᐅᑕᒫᑦ. ᐅᑯᐊ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᑲᑎᒪᑎᑦᑎᔪᓐᓇᕐᒥᔪᑦ 7:00 ᐅᓐᓄᒃᑯᑦ ᑎᑭᓪᓗᒍ 9:00 ᐅᓐᓄᒃᑯᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᑯᓂᐅᒃᑲᓐᓂᕈᓐᓇᖅᑐᑦ ᑎᑭᓪᓗᒍ ᐅᓪᓛᖑᓄᑦ ᒫᑦᓯ 7, 2020, ᑕᐃᒪᓐᓇᐅᔭᕆᐊᖃᕈᑎᒃ.

ᑐᒃᓯᕋᐅᑎᑦ ᐊᒻᒪᓗ ᐊᓯᖏᑦ ᑎᑎᖅᑲᑦ ᐊᑑᑎᖃᖅᑐᑦ ᑕᒡᕗᖓ ᓈᓚᖕᓂᕐᒧᑦ ᐊᑐᐃᓐᓇᐅᔪᑦ ᖃᕆᓴᐅᔭᕐᓄᑦ ᐃᓕᔪᓐᓇᖅᑐᓂᑦ ᑕᐃᑲᖓᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᑦ ᖃᕆᓴᐅᔭᒃᑯᑦ ᑐᑭᓯᒋᐊᕐᕕᖕᒐᓂ (www.nwmb.com), ᐅᕝᕙᓘᓐᓃᑦ ᐅᖄᖃᑎᒋᓪᓗᒋᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᑦ ᑎᑎᕋᖅᓯᒪᔪᑦ ᐅᖃᓘᑎᖏᓪᓗ ᐊᑖᓂ ᑕᒡᕙᓂ ᑐᓴᕐᑎᑦᑎᔾᔪᑕᐅᔪᒥ.

ᑎᑎᖅᑲᓂᒃ ᑐᓂᓯᔭᕆᐊᖃᖅᐳᓯ:

ᐅᑯᐊ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᑦ ᖃᐃᖁᔨᕗᑦ ᐊᐅᓚᑦᓯᔨᓂᒃ ᐅᕝᕙᓘᓐᓃᑦ ᐃᓄᑐᐃᓐᓇᓂᒃ, ᑖᒃᑯᐊᓗ ᐃᓚᒋᔭᐅᓗᑎᒃ ᐃᓄᖏᓐᓂᑦ, ᑎᑎᕋᕐᓗᒋᑦ ᑭᐅᓯᔾᔪᑎᑦ ᑐᓂᔭᐅᓗᑎᒃ ᐊᒻᒪᓗ ᐃᑲᔫᑎᑦ ᑎᑎᖅᑲᑦ ᐱᔾᔪᑎᒋᓪᓗᒍ ᑐᒃᓯᕋᐅᑎ ᑎᑭᐅᑎᓚᐅᖕᒋᓐᓂᖓ **<u>5:00 ᐅᓐᓄᒃᑯᑦ ᐃᖃᓗᐃᑦ ᓯᖅᑭᖑᔪᖕᒐᑦᑎᒍᑦ ᕕᐳᐊᕆ 14, 2020.</u>** ᑭᓯᐊᓂ ᐱᔾᔪᑎᖃᑦᑎᐊᖅᐸᑕ ᑎᑎᕋᖅᓯᒪᓗᑎᒃ ᑭᖑᕚᖅᓯᒪᒐᓗᐊᕐᓗᑎᒃ ᑐᓂᔪᓐᓇᖅᑐᑦ ᑲᑎᒪᔨᓄᑦ, ᐅᑯᐊ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᑦ ᐃᓱᒪᓕᐅᕈᑎᒋᓂᐊᖕᒋᑕᖕᒋᑦ ᑎᑎᖅᑲᑦ ᑕᒡᕗᖓ ᓈᓚᖕᓂᕐᒧᑦ ᑐᓂᔭᐅᓯᒪᔪᑦ ᑭᖑᕚᖅᓯᒪᒃᐸᑕ. ᐅᑯᐊ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᑦ ᐃᓄᓕᒫᓄᑦ ᐊᑐᐃᓐᓇᐅᑎᓐᓂᐊᖅᑕᖕᒋᑦ ᑕᒪᕐᒥᒃ ᑎᑎᖅᑲᑦ ᑐᓂᔭᐅᔪᑦ, ᐊᑑᑎᖃᖅᑐᕐᒥᒃ ᒪᓕᒃᓯᒪᓂᐊᖅᑐᑦ ᑲᙳᓇᖅᑐᓕᕆᓂᕐᒧᑦ ᒪᓕᒐᕐᓂᒃ.

ᐃᒪᓐᓇ ᑐᓴᒃᓴᒐᓐᓂᕐᓂᒃ ᐱᔪᒪᒍᕕᑦ:

ᑐᑭᓯᑎᑕᐅᒐᓐᓂᕈᒪᓗᑎᑦ ᐱᔾᔪᑎᒋᓪᓗᒍ ᑎᑎᕋᓕᕆᓂᖅ ᑐᓂᓯᓂᕐᒧᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒍᓯᓂᕐᒧᑦ, ᐅᕝᕙᓘᓐᓃᑦ ᒪᓕᒋᐊᓕᑦ ᐊᑑᑎᖃᖅᑐᑦ ᑕᐃᑲᓃᑎᓪᓗᑎᑦ ᐃᓄᓕᒫᓂ ᓈᓚᒃᑎᓪᓗᒋᑦ, ᐊᐲ ᐅᖄᖃᑎᒋᓪᓗᒋᑦ ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᓂᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ:

ᓄᓇᕗᒻᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
ᑎᑎᖅᑯᕕᒃ 1379, ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ X0A 0H0
ᐅᖃᓘᑖ: (867) 975-7300
ᓱᒃᑲᔪᒃᑯᑦ: (888) 421-9832
ᖃᕆᓴᐅᔭᒃᑯᑦ: receptionist@nwmb.com
ᖃᕆᓴᐅᔭᕐᕕᖓ: www.nwmb.com

ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
Nunavunmi Anngutighatigut Aulapkaijitkut Katimajiat
Nunavut Wildlife Management Board

ᐱᓗᐊᑦᑕᐃᓕᓂᖅ ᐆᒪᔪᖅ ᐊᖅᑯᑎᒋᓗᒍ ᐊᑐᕐᑎᑕᐅᓂᖏᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᑎᒻᒪᕆᑦᑕ ᖃᐅᔨᒪᓂᖏᑦ
Tammaqtailinahuarniriit anngutighat atuqhugit Inuit qaujimajatuqangillu ilihimaniillu ilitquhiannin
Conserving wildlife through the application of Inuit Qaujimajatuqangit and scientific knowledge

ᑎᓯᒻᐱᕆ 13, 2019

ᓱᓕᔪᕐᓇᕐᑐᖅ ᔫᓇᑕᓐ ᕗᐃᐅᓪᑭᓐᓴᓐ
ᒥᓂᔅᑕᖕᒪᑦ ᐊᕙᑎᓕᕆᔨᑦ ᐊᒻᒪᓗ ᓯᓚᐅᑉ
ᐊᓯᔾᔨᕐᓂᖕᒪᓂᒃ ᑲᒪᔨᑦ ᑲᓇᑕᒥ,
ᒐᕙᒪᓐᑯᑦ ᑲᓇᑕᒥ

ᓱᓕᔪᕐᓇᕐᑐᖅ ᔫ ᓴᕕᑲᑖᖅ
ᒥᓂᔅᑕᖕᒪᑦ ᐊᕙᑎᓕᕆᔨᑦ
ᒐᕙᒪᓐᑯᑦ ᓄᓇᕗᑦᒥ

ᐊᓗᑭ ᑰᑦᑎᖅ
ᐊᖓᔪᖄᖅ ᓄᓇᕗᑦ
ᑐᙵᕕᒃ ᑎᒥᖓᑦ

ᐹᑉᐱ ᑭᓕᒡᒐᓘᕐ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔨᑦ
ᑲᑎᒪᔨᖏᑦ

ᓕᐅᕆ ᐊᑦᔪᓐ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᖁᖅᓗᖅᑐᖅ
ᐊᖑᓂᐊᑎᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ

ᓯᑖᓐᓕ ᐊᓇᑉᓚᒃ
ᐊᖓᔪᖄᖅ
ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ

ᐹᑉᐱ ᒍᕇᓐᓕ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᐃᖃᓗᒃᑑᑦᑎᐊᖅ
ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ

ᐱᑕ ᑲᐳᓚᒃ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᕿᙵᐅᑦ
ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ
ᑎᒥᖏᑦ

ᑳᓂ ᑲᐳᓚᒃ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᐅᒥᒻᒪᒃᑑᖅ ᐊᖑᓇᓱᒃᑏᑦ
ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ

ᕚᓯᕝ ᑲᐅᕐᓄᒌᖅᑭ, ᐃᑦᓯᕙᐅᑕ
Wek'èezhìi ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ

ᐱᓕᕆᖃᑎᒃᑲᐃ:

ᐱᓪᓗᒍ: **ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᑕᑯᓐᓇᖃᑎᒌᓪᓗᑎᒃ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᖏᑦ ᑲᒪᒋᓗᒋᑦ ᒐᕙᒪᓐᑯᑦ ᓄᓇᕗᒥ ᑐᑦᓯᕋᐅᑎᖓ ᐃᓄᐃᓴᓪᓕᒋᐊᕐᓗᒋᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔪᙱᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ ᐅᑲᙵᑦ 30 ᐅᕗᖓ 0.**

ᖃᐅᔨᒃᑲᐃᒍᑏᑦ

ᐅᕙᓂ ᑎᓯᐱᕆ 13, 2019, ᓄᓇᕗᒥ ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ (ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᐅᖅᑲᓘᓐᓃᑦ ᑲᑎᒪᔩᑦ) ᐊᓚᒃᑲᐃᓚᐅᕐᒪᑕ ᑭᒃᑯᓕᒫᓂᒃ ᑐᓴᕐᑎᑦᓯᒍᒻᒥᒃ ᐃᒫᒃ ᐊᑐᕐᓂᐊᕐᒥᒃ ᑕᑯᓐᓇᖃᑎᒌᓪᓗᑎᒃ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒥᒃ ᑲᒪᒋᓗᒋᑦ ᒐᕙᒪᓐᑯᑦ ᓄᓇᕗᒥ ᑐᑦᓯᕋᐅᑎᖓᑦ ᐃᓱᒪᓕᐅᕈᒻᒥᒃ ᓄᑖᙳᕆᐊᕐᓗᒋᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔪᙱᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ (ᐊᖑᓇᓱᒃᑕᐅᒍᓐᓇᕐᑐᑦ) ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ ᐅᑲᙵᑦ 30 ᐅᕗᖓ 0.

ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ ᑕᐃᒪᐃᒻᒪᑦ ᐊᑐᐃᓐᓇᐅᑎᑦᓯᕗᑦ ᐃᓕᑦᓯ ᐱᓕᕆᑉᕕᖕᒪᓂᒃ ᐅᖅᑲᓘᓐᓃᑦ ᑎᒥᖁᑎᖏᓐᓂᒃ ᑐᓂᓯᓂᕐᒥᒃ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ, ᑐᑭᓕᐅᕐᓯᒪᔪᓂᒃ ᐅᓂᒃᑳᓂᒃ ᐊᒻᒪᓗ ᐃᑲᔪᕈᑎᓂᒃ ᑎᑎᖅᑲᓂᒃ ᐅᕗᖓ ᑕᑯᓐᓇᖃᑎᒌᓪᓗᑎᒃ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᖅ.

ᑕᑯᓐᓇᖃᑎᒌᓪᓗᑎᒃ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᐅᑉ ᖃᓄᐃᓕᖓᓂᖓ

ᓈᓚᑦᑎᑦᓯᓂᖅ ᐱᑕᖃᕈᕐᑐᖅ ᐃᖃᓗᒃᑑᑦᑎᐊᖅ, ᓄᓇᕗᒥ, ᐅᕙᓂ ᒫᓯ 5 ᐊᒻᒪᓗ 6, 2020, ᐅᓐᓄᒃᑯᑦ ᑲᑎᒪᓂᖅᓱᓂ ᑕᐃᒪᐃᖅᓴᕆᐊᖅᑳᑦ, ᑕᐃᑲᓂ ᐃᖃᓗᒃᑑᑦᑎᐊᖅ ᐱᙳᐊᕐᕕᖕᒪᓂ. ᑕᐃᒪᐃᖅᓴᕆᐊᖅᑳᑦ, ᓈᓚᑦᑎᑦᓯᓂᖅ ᑲᔪᓯᕗᔅᓴᕐᑐᖅ ᐅᓪᓚᖕᒪᓂ ᒫᓯ 7, 2020.

ᐊᑐᕐᑐᑦ ᑐᓴᕐᓴᑦ ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᒪᓕᒐᖏᑦ

ᐃᓚᒌᓕᐅᓯᒪᔪᑦ ᐅᑯᓄᖓ ᑎᑎᖅᑲᓄᑦ ᐊᔾᔨᖏᑦ ᐅᑯᐊ ᐹᕙᒪᓐᑯᑦ ᓄᓇᕗᑦᒥ *ᑐᑦᓯᕋᐅᑦ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᐃᓱᒪᓕᐅᕆᑎᓪᓗᓂ ᐃᓄᐃᓴᑦᓯᒋᐊᕐᓗᒋᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔪᙱᑦᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᒥ ᖁᙱᐅᑦ ᑐᒃᑐᐃᑦ ᐅᕙᙵᑦ 30 ᐅᕝᕙ 0* (ᐅᐃᒍᖓ A) ᐊᒻᒪᓗ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᒪᓕᒐᖏᑦ (ᐅᐃᒍᖓ B). ᑖᒃᑯᐊ, ᐃᓚᖓᑐᓕ ᐊᓯᖏᓐᓂᒃ ᑎᑎᖅᑲᓂᒃ ᐱᑕᖃᕈᑕᐅᔪᓂᒃ ᓈᒻᒪᓂᕐᐸᑦ ᐊᑐᐃᓐᓇᐃᑦ ᑐᓴᕐᓴᑦ ᐅᓪᓗᒥᒧᑦ ᐊᑐᐃᓐᓇᐅᕆᕙᑦ ᐱᔭᐅᒍᓇᕐᑐᑎᒃ ᐅᕙᙵᑦ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᐃᑭᐊᓪᓇᕕᖓ (www.nwmb.com), ᐅᕝᕗᖔᓐᓃᑦ ᑐᓴᕐᑎᓪᓗᒋᑦ ᑲᑎᒪᔩᑦ ᐅᑯᓇᓂ ᑐᕌᕈᑎᓂ:

ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
ᑎᑎᖅᑲᒃᑯᕕᒃ 1379, ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ X0A 0H0
ᐅᖃᓚᐅᑦ: (867) 975-7300
ᓱᑲᑦᑐᒃᑯᕈᑦ: (888) 421-9832
ᖃᕋᓴᐅᔭᒃᑯᑦ ᑐᕌᕈᑖ: receptionist@nwmb.com

ᑲᒪᖃᑕᑦ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᐊᒻᒪᓗ ᐅᓂᒃᑳᑦ

ᑲᒪᖃᑕᑦ ᑖᕝᕙᓂ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᐃᓚᖃᕐᑐᑦ ᐅᑯᓂᖓ:

- ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥ
- ᓄᓇᕗᑦ ᑐᙵᕕᒃ ᑎᒥᖓᑦ
- ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᑦᔾᔨᖃᑎᒋᖏᑦ
- ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ
- ᖁᑦᑲᓪᓗᑦᑐᖅᒥ ᐊᖑᓂᐊᑎᑦ ᑲᑐᑦᔾᔨᖃᑎᒋᖏᑦ
- ᐅᒥᒃᒪᒃᑑᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ
- ᖁᙱᐅᑦ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ
- ᐃᖃᓗᑦᑑᑦᑎᐊᖅ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ
- ᒐᕙᒪᖓᑦ ᑲᓇᑕᒥ
- Wek’èezhìı ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ

ᑲᑎᒪᔩᑦ ᐊᑐᐃᓐᓇᐅᑎᑦᓯᕗᑦ ᑖᒃᑯᓄᖓ ᑲᒪᖃᑕᓄᑦ ᑎᑎᕋᕐᑕᐅᒪᔪᓄᑦ ᖁᓚᓕᕐᓂ ᑐᓂᓯᓂᕐᒥᒃ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᐅᓂᒃᑳᓂᒃ ᐊᒻᒪᓗ ᐃᑲᔪᕈᑎᓂᒃ ᑎᑎᖅᑲᓂᒃ ᐊᑕᔪᓂᒃ ᐅᑯᓄᖓ ᐊᖑᓇᓱᒃᑕᐅᒍᓐᓇᕐᑐᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐊᖑᓇᓱᓐᓂᕐᒧᑦ ᒪᓕᒐᑦ CHAᕐᐸᒃ ᑲᓐᓇᖓᓂ ᑐᒃᑐᓂᒃ ᒦᓂ ᓄᓇᕗᑦᒥ ᓄᓇᑖᕐᔪᓯᒪᔩᐸ ᓇᒌᓂ. ᑎᒥᐅᔪᑦ ᑎᑎᕋᕐᑕᐅᒪᙱᑦᑐᑦᑎ ᖁᓚᓕᕐᓂ ᑐᓂᓯᒍᓐᓇᕐᑐᑦ ᑐᑦᓯᕋᐅᓪᒥᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᑲᒪᖃᑕᐅᓂᕐᒧᑦ ᓇᓗᓇᐃᕐᓯᒍᓪᒥᒃ ᑲᑎᒪᔩᑦ ᑲᒪᒋᓂᐊᕐᑕᖓᑦ ᐅᕙᓂ <u>ᔮᓄᐊᕆ 31, 2020</u>. ᑐᓂᔭᐅᓗᓂ ᓈᓚᑦᑎᑦᓯᓂᕐᒧᑦ ᑲᒪᖃᑕᐅᓂᕐᒧᑦ ᓇᓗᓇᐃᕐᓯᒍᓪᒥᒃ, ᐱᒋᓱᐊᕐᑐᑦ ᐊᓚᒃᑲᐃᒋᐊᖏᑦ ᐃᒫᒃ ᓇᓪᒥᓂᖅ ᐊᑦᑐᕐᑕᐅᓚᖓᒐᒥᒃ ᐆᒍᖓ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᐃᓱᒪᓕᐅᕐᑯᑎᖓᑦ ᐱᓪᓗᒋᑦ ᖁᙱᐅᑦ ᑐᒃᑐᐃᑦ. ᐃᒪᐃᙱᑦᑐᑦ ᓈᓚᑦᑎᑦᓯᑎᓂᕐᒥ ᑲᒪᖃᑕᑦ ᑐᓂᓯᒍᓇᕐᒥᔪᑦ ᑐᓴᕐᓴᓂᒃ/ᓇᓗᓇᙱᒍᑎᓂᒃ ᑲᑎᒪᔨᓄᑦ ᑲᒪᒋᔭᐅᓂᐊᕐᑐᓂᒃ ᒪᓕᓪᓗᒋᑦ ᐊᔾᔨᖏᑦ ᕖᕝᕗᐊᕆ 14, 2020 ᑐᓂᓯᓯᒪᒃᕕᐅᒋᐊᖏᑦ ᒪᑯᓄᖓ ᑲᒪᖃᑕᑦ ᐅᓂᒃᑳᖏᑦ.

ᐃᓘᓐᓇᑎᒃ ᑎᑎᕋᓯᒪᔪᑦ ᑐᓂᔭᐅᒋᐊᖏᑦ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᓄᑦ – <u>ᐃᓄᒃᑎᑐᑦ ᐊᒻᒪᓗ ᖃᖏᓗᓈᑎᑐᑦ</u> – ᑎᑭᙱᓐᓂᖓᓂ <u>5:00 ᐅᓐᓄᓴᒃᑯᑦ (ᑲᓇᓐᓇᕐᒥ ᓯᕿᙱᔪᕐᖓᑐᑦ) ᐅᓇ ᕖᕝᕗᐊᕆ 14, 2020.</u> ᑎᑎᕋᓯᒪᔪᑦ ᐊᒥᒐᓐᓂᖅᓴᐅᐸᑕ ᖁᓕᓂᒃ ᒪᐸᕐᑐᒐᕐᓂᒃ ᑐᑭᓕᐅᕐᑕᐅᑦᓴᐃᓐᓇᓇᐊᖅᑲᙱᑦᑐᑦ ᑭᓯᐊᓂ ᐃᓚᖃᓇᐊᖏᑦ ᓯᓕᔪᓂᒃ ᓇᐃᓈᕈᑎᓂᒃ ᐃᓄᒃᑎᑐᑦ ᐊᒻᒪᓗ ᖃᖏᓗᓈᑎᑐᑦ.

ᐊᑏ ᖃᐅᔨᒪᒋᑦᓯ ᐃᒫᒃ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᑦ ᑭᓯᐊᓂ ᑲᒪᔫᕐᒪᑕ ᑎᑎᕋᓯᒪᔪᓂᒃ ᑖᕝᕙᓂ ᓈᓚᑦᑎᑦᓯᓂᕐᒥ ᑐᓂᔭᐅᐸᑕ ᓯᕗᓂᐊᒍᑦ ᑐᓂᓯᓯᒪᒃᕕᐅᒋᐊᓕᐅᑉ (ᕖᕝᕗᐊᕆ 14, 2020) ᐃᒪᐃᙱᑉᐸᑦ ᓯᕗᕐᖓᒍᑦ ᓱᓕᔪᓇᔭᐅᓕᕈᓐᓇᕐᑐᑦ ᐲᔪᑕᐅᔪᑦ ᑐᓂᔭᐅᓗᑎᒃ ᐆᒪᔪᓕᕆᔩᑦᔪᐊᓄᑦ ᑎᑎᕋᓯᒪᓗᑎᑦ ᑭᖑᕙᕐᑐᓂᒃ ᑐᓂᓯᓂᕐᒧᑦ.

ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
Nunavunmi Anngutighatigut Aulapkaijitkut Katimajiat
Nunavut Wildlife Management Board

ᐱᓗᐊᑦᑕᐃᓕᓂᖅ ᐆᒪᔪᕐᓂᒃ ᐊᖅᑯᑎᒋᓗᒍ ᐊᑐᕐᑎᑕᐅᓂᖏᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᓂᒃᑐᖃᖏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᑎᒻᒪᕇᑕ ᖃᐅᔨᒪᓂᖏᑦ
Tammaqtailinahuarniriit anngutighat atuqhugit Inuit qaujimajatuqangillu ilihimaniillu ilitquhiannin
Conserving wildlife through the application of Inuit Qaujimajatuqangit and scientific knowledge

ᐃᓱᒪᒋᓗᒋᑦ ᐊᑐᕐᑐᑦ ᒪᐅᖓᑐᐃᓐᓈᕆᐊᖃᙱᓐᓂᖏᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑲᙳᓇᕐᓂᖏᓐᓄᑦ ᐃᓱᓖᓗᒍᑏᑦ, ᐃᓘᓐᓇᑎᒃ ᐅᓂᒃᑳᑦ ᐊᒻᒪᓗ ᐃᑲᔪᕈᑏᑦ ᑎᑎᖃᑦ ᐃᓕᔭᐅᓂᐊᕐᑐᑦ ᐅᕗᖓ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐃᑭᐊᒡᕆᕙᖓ ᐊᒻᒪᓗ ᐊᑐᐃᓐᓇᐅᓗᑎᒃ ᐱᔭᐅᒍᓐᓇᕐᓗᑎᒃ.

ᐅᓂᒃᑳᑦ ᐊᒻᒪᓗ ᑖᒃᑯᓄᖓ ᐃᑲᔪᕈᑏᑦ ᑎᑎᖅᑲᑦ ᑐᓂᔭᐅᒍᓐᓇᕐᑐᑦ ᑲᑎᒪᔨᓄᑦ ᓇᒻᒥᓂᖅ, ᐊᔾᔭᕐᓯᔨᒃᑯᑦ, ᑎᑎᖅᑲᓂᐊᕐᕕᒃᑯᑦ ᐅᕝᕙᓘᓐᓃᑦ ᖃᕋᓴᐅᔾᔭᒃᑯᑦ. ᑐᑭᓯᓇᑦᓯᐊᕐᑐᒥᒃ ᓇᓗᓇᐃᕐᓯᒪᒋᐊᓖᑦ ᐱᔾᔪᑎᖃᕆᐊᖏᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑮᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᖏᓐᓂᒃ ᐱᓪᓗᒋᑦ "ᑕHᐃᕐᐸᒃ ᑲᓇᓐᖓᓂ ᑐᒃᑐᐃᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔪᙱᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ ᐊᒻᒪᓗ ᐊᖑᓇᓱᓐᓂᕐᒧᑦ ᒪᓕᒐᑦ ᐊᑐᓕᕐᑯᔭᑦ." ᑐᓂᓯᓂᖅ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᐅᕚᓈᕈᓐᓇᕐᒥᔪᖅ ᓱᑲᑦᑐᒃᑰᕈᑎᒃᑯᑦ, ᑭᓯᐊᓂ ᐱᓕᕆᕝᕕᓯ ᐅᕝᕙᓘᓐᓃᑦ ᑎᒥᕐᑯᑎᓯ ᓇᓗᓇᐃᕐᓯᐸᑕ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓄᑦ – ᓯᕗᕐᖓᒍᑦ ᑐᓂᓯᓯᒪᕝᕕᐅᕕᐊᓕᐅᑉ – ᐃᒫᒃ ᓈᓃᑦ ᐊᒻᒪᓗ ᑐᑭᓯᓇᕐᑐᑦ ᐊᔾᔨᖏᑦ ᑐᓂᔭᑦ ᐱᔭᐅᒐᓗᐊᕐᒪᖓᑕ ᑲᑎᒪᔨᓄᑦ. ᑎᑎᕋᕐᓯᒪᔪᑦ ᐃᓱᒪᒋᔭᐅᓂᐊᕐᐳᑦ ᑐᓂᔭᐅᒥᐊᖏᑕ ᑖᑉᕙᓂᓪᓕᕆᒃ ᐅᓪᓗᒥ ᐱᔭᐅᑉᕕᖓᓂ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓄᑦ.

ᐱᖃᑕᐅᓂᖏᑦ ᐊᑦᑐᕐᑕᑦ ᓄᓇᕗᑦᒥ ᓄᓇᓖᑦ

ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐊᑭᓖᓂᐊᕐᑐᑦ ᖃᖓᑦᑕᐅᑎᓂᒃ ᐊᒻᒪᓗ ᑐᔪᕐᒥᒍᑏᑦ ᐊᑭᖏᓐᓂᒃ ᐅᐸᑦᑐᓄᑦ ᖃᖓᑕᓗᑎᒃ ᐃᖃᓗᒃᑑᑦᑎᐊᖅᒧᑦ ᐅᑯᓈᙱᑦ ᐊᑦᑐᕐᑕᓂᒃ ᓄᓇᓕᓐᓂᒃ, ᐊᑐᕆᐊᖃᕐᐸᑕ: ᖁᒃᖢᒃᑐᖅ (ᒪᑉᐱᒃ ᐅᐸᑦᑑᒃ), ᕿᙵᐅᑦ (Burnside, ᒪᑉᐱᒃ ᐅᐸᑦᑑᒃ), ᐊᒻᒪᓗ ᐅᒥᒃᒪᑦᑑᖅ (ᐅᒥᒃᒪᒃᑑᖅ, ᒪᑉᐱᒃ ᐅᐸᑦᑑᒃ). ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᓂᕈᐊᕐᓂᐊᕐᑐᑦ ᐅᐸᑦᑐᓂᒃ ᑭᒡᓚᐅᔪᓂᒃ ᑖᒃᑯᓄᖓ ᐱᖓᓱᓄᑦ ᓄᓇᓕᓐᓄᑦ. ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐃᒪᐃᓐᓂᐊᕐᑐᑦ, ᑐᑦᓯᕋᕐᕙᐅᒍᑎᒃ, ᐊᒻᒪᓗ ᑎᑭᐅᑎᓗᒍ ᓈᒻᒪᑦᑐᖅ ᐊᔪᕐᓇᖏᕐᐸᑦ, ᐋᕿᑦᓱᐃᓗᑎᒃ ᐅᐸᓐᓂᖏᓐᓂᒃ ᐊᒻᒪᓗ ᐱᖃᑕᐅᓂᖏᓐᓂᒃ ᐊᖅᑯᑎᒋᓗᒍ ᐅᖃᓚᐅᑎᒃᑯᑦ ᑲᑎᒪᓂᒃ ᓄᓇᓕᓐᓂᒃ ᐊᒻᒪᓗ ᐃᓄᓐᓂᒃ ᐊᖑᓇᓱᒃᑎᓂᒃ ᐅᐸᒍᓐᓇᖏᑦᑐᓂᒃ ᓇᒻᒥᓂᖅ. ᑲᑎᒪᔩᑦ, ᑭᓯᐊᓂ, ᓇᓗᓇᐃᕐᓱᓐᓇᖏᑦᑐᑦ ᐱᐅᓂᐊᕐᒪᖔᑦ ᐅᖄᓚᐅᑎᒃᑯᑦ ᑐᓴᕐᑎᑦᓯᓂᖅ.

ᐱᒋᐊᖅᑲᕈᓯ ᑐᓵᑦᓴᑲᓐᓂᕐᓂᒃ ᐱᓪᓗᒍ ᓈᓚᑦᑎᑦᓯᓂᖅ, ᐊᐃᑦ ᖃᐅᔾᔭᖅᑕᐃᓕᓂᐊᕈᓯᐅᒃ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ.

ᓯᓚᔾᔨᒃ,

ᑖᓂᐊᓪ ᓯᐅᑦᓴᒃ
ᐃᑦᓯᔭᐅᑕᖅ ᐅᕙᓂ
ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ

ᐱᖃᑕᑦ: ᑐᓇᒃᑉ ᒋᓯᖕ, ᑐᑭᒧᐊᕐᑎᑦᓯᔨ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ, ᒐᕙᒪᖕᑯᑦ ᓄᓇᕗᑦᒥ, ᐱᓕᕆᕝᕙᖕᒐᑦ ᐊᕙᑎᓕᕆᔨᑦ;
ᐹᓪ ᐃᕐᖓᐅᑦ, ᑐᑭᒧᐊᕐᑎᑦᓯᔨ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ, ᓄᓇᕗᑦ ᑐᙵᕕᒃ ᑎᒥᖓᑦ;
ᐹᓪ ᐃᒥᙴᒃ, ᐊᐅᓚᑦᓯᔨ ᐊᓪᓚᕝᕕᒃᒥ, ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ;
ᑭᐅᕈᓚᐃᓐ ᓚᑦᑕᓇᐅᑉᑭ, ᑐᑭᒧᐊᕐᑎᑦᓯᔨ, ᐆᒪᔪᕐᓂᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᒍᑎᓂᒃ ᑲᒪᔩᑦ, ᑲᓇᑕᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ,
ᐊᕙᑎᓕᕆᔩᑦ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᔾᔨᕐᓂᖓᓂᒃ ᑲᒪᔩᑦ ᑲᓇᑕᒥ;
ᐋᒪ ᖃᒡᒍᑕᖅ, ᐊᕕᑦᑐᕐᓯᒪᔪᓂ ᐋᕿᑦᓱᐃᔨ, ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ;
ᐊᒫᓐᑕ ᑑᒫᓐᑦ, ᐊᐅᓚᑦᓯᔨ, ᖁᖅᖢᖅᑐᖅ ᐊᖑᓂᐊᑏᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ;
ᐱᐊᕗᕐᓕ ᒪᒃᓴᒃ, ᐊᐅᓚᑦᓯᔨ, ᐃᖃᓗᒃᑑᑦᑎᐊᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑦᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ;
ᔩᑦᑎ ᐱᓕᓯᔾ, ᐊᐅᓚᑦᓯᔨ ᐊᓕᓚᑉᕕᒥ, Wek’eezhii ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ;
ᑎᐊᑉᐳᕋ ᓯᒪᓐᓴ, ᐊᐅᓚᑦᓯᔨ ᐊᓕᓚᑦᑯᒥ, Sahtú ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ;
ᐃᐊᑦᕗᐊᕐᑦ ᓵᒍᕆ ᐊᒻᒪᓗ ᑲᑎᒪᔩᑦ, ᔮᐊᓗᓇᐃᕝᒥ ᐃᖅᑭᓖᑦ;
ᕗᐃᓕᐊᓪ ᐃᓐᒋ, ᐊᖓᔪᖄ, North Slave3 ᐊᓚᖓᔪᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ;
ᐊᖓᔪᖄ ᑎᐅᕈᓪ ᒫᕐᔫ ᐊᒻᒪᓗ ᑲᑎᒪᔩᑦ, Lutsel K’e ᐃᖅᑭᓖᑦ;
ᐸᓇᐊᑦ ᐃᐅᑉᑭᓐ, ᑐᑭᒧᐊᕐᑎᑦᓯᔨ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ, ᐊᕙᑎᓕᕆᔩᑦ ᐊᒻᒪᓗ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ, ᒐᕙᒪᖕᑯᑦ ᓄᓇᑦᓯᐊᖅᒥ;
ᐹᕈᓄ ᑯᕚᑦ, ᐊᖓᔪᖄ, North Slave, ᐊᕙᑎᓕᕆᔩᑦ ᐊᒻᒪᓗᓄᓇᒥᐅᑕᓕᕆᔩᑦ, ᒐᕙᒪᖕᑯᑦ ᓄᓇᑦᓯᐊᖅᒥ;
ᒪᐃᑯᓪ ᐆᕐᑏ, ᐊᐅᓚᑦᓯᔨ, ᓄᓇᒥᒃ ᓴᐳᒻᒦᔩᑦ ᐊᒻᒪᓗ ᓄᓇᓯᐅᑕᓕᕆᔩᑦ, Tłįchǫ ᒐᕙᒪᖏᑦ;

ᕉᓯ ᐱᔪᐊᕐᓴᓐ, DKFN ᐱᔭᑦᓴᓂᒃ ᐊᐅᓚᑦᓯᔨᓂ ᐋᕿᑦᓱᐃᔩ, Deninu Kue ᐃᖅᑭᓛᑦ;
ᑏᕝ ᐳᐊᑐᕇ, Salt River ᐃᖅᑭᓛᑦ;
ᑏᓇ ᔪᕉ, ᐆᒪᔪᓕᕆᔩ, Athabasca Denesuline.

ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
Nunavunmi Anngutighatigut Aulapkaijitkut Katimajiat
Nunavut Wildlife Management Board

ᐱᓗᐊᑦᑕᐃᓕᓂᕐᒃ ᐆᒪᔪᕐᓂᒃ ᐊᖅᑯᑎᒋᓗᒍ ᐊᑐᕐᑎᑕᐅᓂᖏᑦ ᐃᓄᐃᑦ ᕿᐅᔾᒪᓂᑐᕐᑲᖏᑦ ᐊᒻᒪᓗ ᕿᐅᔾᓭᕐᑎᒻᒪᕇᑕ ᕿᐅᔾᒪᓂᖏᑦ
Tammaqtailinahuarniriit anngutighat atuqhugit Inuit qaujimajatuqangillu ilihimaniillu ilitquhiannin
Conserving wildlife through the application of Inuit Qaujimajatuqangit and scientific knowledge

ᓅᕖᒻᐱᕆ 4, 2020

ᓱᓕᔪᕐᓇᕐᑐᖅ ᔫᓇᑕᓐ ᕗᐃᐅᑉᑭᓐᓴᓐ
ᒥᓂᔅᑕᖓᑦ ᐊᕙᑎᓕᕆᔨᑦ ᐊᒻᒪᓗ ᓯᓚᐅᑉ
ᐊᓯᔾᔨᕐᓂᖓᓂᒃ ᑲᒪᔨᑦ ᑲᓇᑕᒥ,
ᒐᕙᒪᖓᑦ ᑲᓇᑕᒥ

ᓱᓕᔪᕐᓇᕐᑐᖅ ᔫ ᓴᕕᑲᑖᖅ
ᒥᓂᔅᑕᖓᑦ ᐊᕙᑎᓕᕆᔨᑦ
ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥ

ᐊᓗᑭ ᑯᑦᑎᖅ
ᐊᖓᔪᖄᖅ ᓄᓇᕗᑦ
ᑐᙵᕕᒃ ᑎᒥᖓᑦ

ᐹᐸ ᑭᓕᒡᒐᓐᐳᖅ
ᐃᑦᓯᕙᐅᑕᖅ
ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ

ᓕᐅᕆ ᐊᔪᓐ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᖁᖅᓗᖅᑐᖅ
ᐊᖑᓂᐊᑎᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ

ᓱᑖᓐᓕ ᐊᓇᑉᓚᒃ
ᐊᖓᔪᖄᖅ
ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ

ᔩᓯᕝ ᔫᑦᑕᔅ
ᐃᑦᓯᕙᐅᑕᖅ Wek’èezhìi ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ

ᐲᑕ ᑲᐳᓚᒃ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᕿᙵᐅᑦ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ

ᑳᓂ ᑲᐳᓚᒃ
ᐃᑦᓯᕙᐅᑕᖅ ᐅᕙᓂ ᐅᒥᒃᒪᒃᑑᖅ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᓯᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ

ᐳᕆᐊᑦ ᐃᐅᑉᑭᓐ, ᑐᑭᒧᐊᕐᑎᑦᓯᔨ
ᐆᒪᔪᓕᕆᓂᕐᒧᑦ, ᐊᕙᑎᓕᕆᔨᑦ ᐊᒻᒪᓗ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ, ᒐᕙᒪᖓᑦ ᓄᓇᑦᓯᐊᖅᒥ

ᐳᐃᑦ ᕗᐊᕐᓄᕐ
ᐊᖓᔪᖄᖅ
ᐊᐅᓚᑎᑦᓯᔩᑦ ᓄᓇᑦᓯᐊᖅᒥ

ᐱᓕᕆᕐᑎᒃᑲᐃ:

ᐱᑦᑐᒍ: ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ ᑕᑯᓐᓇᕐᑲᑎᒋᑦᑐᑎᒃ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᖏᑦ ᑲᒪᒋᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥ ᑐᓯᕋᐅᑎᖓ ᐃᓄᐃᓴᑦᓕᕆᐊᕐᓗᒋᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔪᙱᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ ᐅᕙᙵᑦ 30 ᐅᕗᖓ 0.

ᖃᐅᔨᒃᑲᐃᒍᑏᑦ

ᐅᕙᓂ ᑏᓯᐱᕆ 13, 2019, ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ (ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐅᑲᕆᐅᖅᑐᖅᓃᑦ ᑲᑎᒪᔩᑦ) ᐊᓚᒃᑲᐃᓚᐅᕐᒪᑕ ᑭᒃᑯᓕᒫᓂᒃ ᑐᓴᕐᑎᓯᒍᒪᒥᒃ ᐃᒫᒃ ᐊᑐᕐᓂᐊᕋᒥᒃ ᑕᑯᓐᓇᕐᑲᑎᒋᑦᑐᑎᒃ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᑦᓯᓂᕐᒥᒃ ᑲᒪᒋᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥ ᑐᓯᕋᐅᑎᖓᑦ ᐃᓱᒪᓕᐅᕈᒻᒥᒃ:

- ᓄᑖᙳᕆᐊᕐᓗᒋᑦ ᑲᑎᑦᑐᒋᑦ ᐊᔪᙱᑕᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᕐᒥᒃ (ᐊᖑᓇᓱᒃᑕᐅᒍᓐᓇᕐᑐᑦ) ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ ᐅᕙᙵᑦ 30 ᐅᕗᖓ 0.

ᓈᓚᑦᑎᓯᓂᖅ ᐱᑕᖃᙱᕐᑐᖅ ᐃᖃᓗᒃᑑᑎᐊᖅ, ᓄᓇᕗᑦ, ᐅᕙᓂ ᒫᓯ 5 ᐊᒻᒪᓗ 6, 2020, ᐅᓐᓄᒃᑯᑦ ᑲᑎᒪᓂᖅᑲᕐᓗᓂ ᑕᐃᒪᐃᙵᓂᐊᕐᑲᕐᐸᑦ, ᑕᐃᑲᓂ ᐃᖃᓗᒃᑑᑎᐊᖅ ᐱᙳᐊᕐᕕᖓᓂ. ᑕᐃᒪᐃᙵᓂᐊᕐᑲᕐᐸᑦ, ᓈᓚᑦᑎᓯᓂᖅ ᑲᔪᓯᓚᔾᔪᖅ ᐅᑉᓚᖓᓂ ᒫᓯ 7, 2020.

ᑲᒪᕐᑲᑦ ᓈᓚᑦᑎᓯᓂᕐᒥ ᐊᒻᒪᓗ ᐅᓂᒃᑳᑦ

ᓯᕗᓪᓕᕐᓂ ᑎᑎᖅᑲᓂ ᐃᓕᓯ ᑎᒥᖏᓐᓄᑦ ᐱᑦᑐᒍ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᓯᓂᖅ ᑲᒪᒋᓗᒋᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᑦᒥ ᑐᓯᕋᐅᑎᖓᑦ

ᑎᑎᖅᑲᒃᑯᕕᒃ 1379
ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ X0A 0H0
☎ (867) 975-7300
(888) 421-9832

Titiqqap Turaarvia 1379
Iqaluit, NU X0A 0H0
☎ (867) 975-7300
(888) 421-9832

Box 1379
Iqaluit, NU X0A 0H0
☎ (867) 975-7300
(888) 421-9832

ᓄᐧᑖᖑᕆᐊᕐᓗᒋᑦ ᐊᖑᓇᓱᒃᑕᐅᒍᓐᓇᕐᑐᑦ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ, ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᓇᓗᓇᐃᕐᓯᓚᐅᕐᒪᑕ ᓱᕗᓪᓕᕐᓂᒃ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᓈᓚᑦᑎᕐᓯᓂᕐᒥ ᑲᒪᕐᑲᑕᓂᒃ ᐊᒻᒪᓗ ᐊᐱᕆᓪᓗᒋᑦ ᐊᓯᖏᑦ ᑎᒥᐅᔪᑦ ᑲᒪᕐᑲᑕᐅᒍᒪᔪᑦ ᓈᓚᑦᑎᕐᓯᓂᕐᒥ ᐱᒐᓱᐊᕐᑯᓪᓗᒋᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓄᑦ ᑎᑭᙵᕐᓂᖓᓂ ᔫᓐᓄᐊᕆ 31, 2020. ᑭᖑᓂᐊᒍᑦ ᑐᓂᓯᓯᒪᔅᕚᐅᒥᐊᓕᐅᑉ, ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᓄᐧᑖᖑᐃᒥᐊᕐᓯᒪᓕᕐᑐᑦ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᖃᓄᓕᒫᖅ ᑲᒪᕐᑲᑕᐅᓂᕐᒥᒃ ᐱᐅᓯᕐᑲᕐᓗᑎᒃ ᐃᓚᕐᑲᕐᑐᑦ ᐅᑯᓂᖓ:

- ᒐᕙᒪᖓᑦ ᓄᓇᕗᕐᒥ
- ᖁᖅᓗᖅᑐᖅᒥ ᐊᖑᓂᐊᑎᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ
- ᐅᒥᒃᒪᒃᑑᖅᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ
- ᕿᙵᐅᑦ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ
- ᐃᖃᓗᑦᑑᑦᑎᐊᖅ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᒋᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ
- ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᖏᑦ
- ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔾᑦ ᑲᑎᒪᔨᖏᑦ
- ᓄᓇᕗᑦ ᑐᙵᕙᒃ ᑎᒥᖓᑦ
- ᒐᕙᒪᖓᑦ ᓄᓇᓯᐊᖅᒥ
- Wek’èezhìı ᓄᓇᒥᐅᑕᓕᕆᔾᑦ ᑲᑎᒪᔨᖏᑦ
- ᐊᐅᓪᓚᑎᕐᓯᔾᑦ ᓄᓇᓯᐊᖅᒥ

ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐊᑐᐃᓐᓇᐅᑎᕐᓯᕗᑦ ᐃᔫᓐᓇᖏᓐᓄᑦ ᑲᒪᕐᑲᑕᓄᑦ ᐊᒻᒪᓗ ᖃᐅᔨᒪᒍᒪᔪᓄᑦ ᑲᒪᕐᑲᑕᐅᙱᑦᑐᓄᑦ ᑐᓂᓯᓂᕐᒥᒃ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ, ᑐᑭᓗᐅᕐᓯᒪᔪᓂᒃ ᐅᓂᒃᑳᓂᒃ ᐊᒻᒪᓗ ᐃᑲᔪᕈᑎᓂᒃ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᐅᕙᓂ ᑕᑯᓇᕐᑲᑎᒋᓪᓗᓂ ᑭᒃᑯᓕᒫᓂᒃ ᓈᓚᑦᑎᕐᓯᓂᖅ. ᐃᓅᓐᓇᑎᒃ ᑎᑎᕋᕐᓯᒪᔪᑦ ᑐᓂᔭᐅᒥᐊᓖᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᓄᑦ – <u>ᐃᓄᒃᑐᑦ ᐊᒻᒪᓗ ᖃᓪᓗᓈᑎᑐᑦ</u> – ᑎᑭᙵᕐᓂᖓᓂ **5:00 ᐅᓐᓄᓴᒃᑯᑦ (ᑲᓇᓐᓇᐅᑉ ᓯᕿᙳᔭᖓᑐᖅ) ᐅᓇ ᕖᕝᕗᐊᓂ 14, 2020.**

ᑎᑎᕋᕐᓯᒪᔪᑦ ᐊᒥᒫᓂᖅᓴᐅᑉᐸᑕ 10 ᒪᐱᕐᑐᒐᕐᓂᒃ ᑐᑭᓕᐅᕐᓯᒪᒋᐊᖃᙱᑦᑐᑦ, ᑭᓯᐊᓂ ᐃᓚᖃᕆᐊᓖᑦ ᓱᓕᔪᓂᒃ ᓇᐃᓈᕈᑎᓂᒃ ᐃᓄᒃᑯᑦ ᐊᒻᒪᓗ ᖃᓪᓗᓈᑎᑐᑦ. ᐊᑏ ᖃᐅᔨᒪᓂᐊᕐᐳᓯ ᐃᒫᒃ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᑭᓯᐊᓂ ᑲᒪᑦᑖᕐᒪᑕ ᑎᑎᕋᕐᓯᒪᔪᓂᒃ ᑖᕙᓂ ᓈᓚᑦᑎᕐᓯᓂᕐᒥ ᑐᓂᔭᐅᑉᐸᑕ ᓱᕗᖕᖑᒍᑦ ᑐᓂᓯᓯᒪᔅᕚᐅᒥᐊᓕᐅᑉ ᐃᓖᒃ ᓱᓕᔪᕐᓇᕐᑐᓂᒃ ᐱᔾᔪᑕᐅᔪᓂᒃ ᑐᓂᔭᐅᙱᑉᐸᑕ ᑲᑎᒪᔩᑦ ᑎᑎᖅᑲᑎᒍᑦ ᑭᖑᕙᕐᑐᓂᒃ ᑐᓂᓯᔪᖅᑲᕐᓂᐊᕆᐊᖓ ᓱᕗᖕᖑᒍᑦ ᑐᓂᓯᓯᒪᔅᕚᐅᒥᐊᓕᐅᑉ. ᐃᓱᒪᒋᓗᒋᑦ ᐊᑐᕐᑐᑦ ᒪᐅᖓᑐᐃᓐᓈᕆᐊᖃᙱᓐᓂᖏᑦ ᐅᕙᔫᓐᓃᑦ ᑲᙳᓇᕐᓂᖏᓐᓂᒃ ᐃᓱᒫᓗᒍᑏᑦ, ᐃᓅᓐᓇᑎᒃ ᐅᓂᒃᑳᑦ ᐊᒻᒪᓗ ᐃᑲᔪᕈᑏᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᐃᓕᔭᐅᓂᐊᕐᑐᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐃᑭᐊᕐᕆᕙᖓᓄᑦ ᐊᒻᒪᓗ ᐊᑐᐃᓐᓇᐅᓗᑎᒃ ᐱᔭᐅᒍᓐᓇᕐᓗᑎᒃ.

ᐱᔾᔪᑕᐅᓪᓗᑎᒃ ᐃᓂᓕᐅᕆᐊᓖᑦ, ᐊᑏ ᓇᓗᓇᐃᕐᓯᕆᓯ ᐊᑯᓂᐅᓂᖓᓂᒃ ᐱᕙᓪᓚᐅᕐ ᑐᓂᓗᒋᑦ ᐅᓂᒃᑳᓯ. ᖃᐅᔨᒪᓂᐊᕐᐳᓯ ᐃᒫᒃ ᐱᓕᕆᓂᐊᖃᓗᐊᕐᑐᒍᑦ ᐃᓂᖃᕐᑎᓪᓗᒋᑦ ᐃᓅᓐᓇᑎᒃ ᑐᓯᖃᐅᑏᑦ, ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐃᓱᒪᕐᓯᕐᐳᑦ ᐃᓂᓕᐅᕆᓂᕐᒥᒃ ᑕᐃᒫᒃ ᐱᑕᖃᕆᐊᖃᕐᐸᑦ, ᐱᓗᐊᕐᑐᒥᒃ ᐃᓱᒪᒋᓗᒍ ᒪᓃᓐᓂᒃ ᑭᖑᓕᕇᓐᓂᒃ ᓈᓚᑦᑎᕐᓯᓂᕐᓂᒃ ᐸᕐᓇᓯᒪᒐᑦᑕ ᑖᒪᓂᓴᐃᓐᓇᖅ ᐱᓇᓱᐊᕈᓯᕐ.

ᐃᑉᐱᒋᓗᒍ ᐃᒫᒃ ᐅᓂᒃᑳᑦ ᐱᑕᕐᑲᓂᐊᕈᓐᓃᑦ ᐊᑐᕐᓂᕐᐹᓂᒃ ᑐᓴᕐᓴᓂᒃ ᐱᓪᓗᖏᑦ ᕿᙵᐅᑦ ᑐᒃᑐᓂᒃ ᐊᖑᓇᓱᓐᓂᕐᒥᒃ ᐊᐅᓚᔾᔪᑎᑦ, ᑲᔪᒥᓴᐃᕗᒍᑦ ᑲᒪᕐᑲᑕᓂᒃ ᑕᑯᓇᕐᑯᓪᓗᒋᑦ ᑎᑎᕋᕐᓯᔭᒥᒃ ᐊᒻᒪᓗ ᐅᖃᐅᓯᒃᑯᑦ ᐅᓂᒃᑳᓂᒃ ᐱᓪᓗᒋᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᐱᔾᔪᑕᐅᔪᑦ ᓇᓗᓇᐃᑦᑕᖏᑦ ᐆᒪᔪᓕᕆᔨᕐᔪᐊᑦ ᐃᒫᒃ ᐊᑐᕐᑐᑦ ᒐᕙᒪᖓᑦ ᓄᓇᕗᕐᒥ ᑐᓯᖃᐅᑎᖓᓄᑦ ᓄᐧᑖᖑᕆᐊᕐᓗᒋᑦ ᐊᖑᓇᓱᒃᑕᐅᒍᓐᓇᕐᑐᑦ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ. ᑖᒃᑯᐊ ᐃᓚᕐᑲᕐᑐᑦ ᑭᓯᐊᓂ ᑖᒃᑯᓈᒐᑎᒃ ᐅᑯᓂᖓ:

- ᑭᐅᔾᔪᑏᑦ ᐊᒻᒪᓗ ᐅᖃᐅᑕᐅᒃᑲᓂᕐᑐᑦ ᐱᓪᓗᒋ ᓄᐧᑖᖑᓂᕐᐸᑦ ᖃᐅᓴᕐᑎᒻᒪᕆᑦ ᐱᑕᕐᑲᕐᑐᑦ ᖃᓄᐃᓪᓗᐊᕐᓂᖏᓐᓄᑦ ᒥᒃᓴᐅᓴᒍᑏᑦ ᕿᙵᐅᑦ ᑐᒃᑐᓂᒃ, ᐱᓗᐊᕐᑐᒥᒃ ᐱᓪᓗᒋᑦ:
  - ᒫᓐᓇᑭᓗᒃ ᐃᓄᐃᓭᓪᓚᕙᓪᓕᕐᓂᖏᑦ ᐱᑕᕐᑲᕐᑐᑦ ᖃᑦᓯᐅᓂᖏᓐᓂᒃ ᒥᒃᓴᐅᓴᒍᑏᑦ ᐅᕙᙱᑦ 19,769 ᒫᓂ 2015 ᐅᕗᖓ 8,207 ᒫᓂ 2018
  - ᐅᖃᐅᑕᐅᒃᑲᓂᕐᑐᑦ ᐃᓱᒪᒋᔭᑦ ᐊᑕᔪᑦ ᐅᑯᓄᖓ ᑭᑎᓯᒍᑏᑦ ᐆᑦᑐᖃᐅᑕᐅᔪᑦ ᐊᑐᕐᑕᑦ ᒥᒃᓴᐅᓴᒃᑐᓂ ᒫᓇ ᐱᑕᕐᑲᕐᑐᑦ ᖃᓄᐃᓪᓗᐊᕐᓂᖏᓐᓂᒃ

ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᓂᕐᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ
Nunavunmi Anngutighatigut Aulapkaijitkut Katimajiat
Nunavut Wildlife Management Board

ᐱᓗᐊᕐᑕᐃᓕᓂᖅ ᐆᒪᔪᓂᒃ ᐊᖅᑯᑎᒋᓗᒍ ᐊᑐᕐᑎᑕᐅᓂᖏᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᓂᖁᑎᖏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᑎᒧᒪᕇᑕ ᖃᐅᔨᒪᓂᖏᑦ
Tammaqtailinahuarniriit anngutighat atuqhugit Inuit qaujimajatuqangillu ilihimaniillu ilitquhiannin
Conserving wildlife through the application of Inuit Qaujimajatuqangit and scientific knowledge

- ᓇᓛ ᓈᓚᔭᖅ ᐊᒻᒪᓗ ᐊᑯᓂᐅᓂᖓ ᖃᖓᑕᔫᒃᑯᑦ ᖃᐅᔨᓴᕐᓂᑦ
- ᖃᓄᑎᒋ ᐃᓄᐃᑦ ᑲᒪᖃᑕᐅᓂᕐᒪᖔᑕ ᖃᐅᔨᓴᕐᓂᕐᒥ ᐊᒻᒪᓗ ᐊᑐᕐᑕᐅᓂᖏᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ ᐱᑕᕐᑲᕐᑐᓂ ᖃᐅᔨᓴᕐᓗᓂ.

• ᖃᓄᑐᐃᓐᓇᖅ ᑐᓴᕋᓱᑦ ᐊᑐᕐᑕᑦ ᓇᒦᓐᓂᖏᓐᓂᒃ ᐆᑦᑐᕋᐅᑏᑦ ᐃᓚᐅᓗᒋᑦ ᓇᓗᓇᙱᒍᑏᑦ ᐊᕐᓇᓂᒃ ᐊᒻᒪᓗ ᓄᙳᓕᐅᕈᓐᓇᕐᓂᖏᓐᓂᒃ/ᐃᓅᒍᓐᓇᕐᓂᖏᓐᓂᒃ, ᐊᒻᒪᓗ ᖁᖓᓯᕈᓕᕐᓯᒪᔪᑦ ᓅᑦᑕᕐᓂᖏᓐᓂᒃ ᓈᓴᐅᑏᑦ.

• ᓇᔪᒐᐃᑦ ᖃᓄᐃᑦᑑᓂᖏᑦ ᐊᒻᒪᓗ ᐊᑦᑐᐃᒍᓐᓇᕐᓂᖏᑦ ᐃᓄᐃᑦ ᐊᐅᓚᓂᖏᑕ ᐅᐸᒐᐅᔪᓂ ᒪᑯᓄᖓ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ.

ᑐᓴᕋᓱᑦ ᐱᓪᓗᒋᑦ ᐊᑕᓂᖏᑦ ᒪᑯᓄᖓ ᐊᕙᑖᑕ ᐊᓯᐦᐱᑕᕐᓂᖓᓄᑦ ᐊᒻᒪᓗ ᖃᓄᐃᒻᒪᖔᑕ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ.

• ᒐᕙᒪᒃᑯᑦ ᓄᓇᕗᒻᒥ ᐃᓱᒪᒋᔭᖓᑦ ᐊᖑᓇᓱᒃᑕᐅᒍᓐᓇᕐᑐᑦ ᐊᒻᒪᓗ ᖃᓄᑐᐃᓐᓇᖅ ᐊᓯᐊᒍᑦ ᐊᑐᓕᕐᑯᔭᑦ, ᐱᑕᕐᑲᕐᐸᑦ, ᐊᒻᒪᓗ ᓱᒻᒪᑦ.

• ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ ᐱᓪᓗᒋᑦ ᕿᙵᐅᑦ ᑐᒃᑐᐃᑦ, ᐊᑕᔪᑦ ᐅᑯᓄᖓ:
  - ᐃᓄᐃᑦ ᑲᒪᒍᓯᖏᑦ ᑐᒃᑐᓂᒃ ᐊᐅᓚᓯᓂᕐᒧᑦ ᓇᓪᓕᐅᓯᒪᐸᐸ ᐃᓄᐃᓴᓪᓕᕙᓪᓕᐊᓂᖏᑦ
  - ᐃᓅᓯᕐᒧᑦ–ᐆᓇᐅᔭᑎᒍᑦ ᐊᒻᒪᓗ ᐃᓕᖅᑯᓯᕐᒧᑦ ᓱᓕᔪᓇᔭᑦ ᐱᓪᓗᒋᑦ ᕿᙵᐅᑦ ᑐᑭᑐᐃᑦ ᐃᓄᓐᓄᑦ
  - ᖃᐅᔨᒪᓃᑦ ᑐᒃᑐᐃᑦ ᐃᓕᖅᑯᓯᖏᓐᓂᒃ, ᐱᓗᐊᕐᑐᒥᒃ ᐱᓪᓗᒋᑦ ᓇᒦᒻᒪᖔᑕ ᓄᓲᕋᓕᐅᕐᕕᖏᑦ ᐊᒻᒪᓗ ᐊᓯᐦᐲᕐᓂᖏᑦ ᐊᑯᓂᐅᔪᒥ

• ᐊᑕᐅᓯᐅᙳᕐᑐᑦ–ᐊᐅᓚᕐᓯᔮᐅᔪᑦ ᐃᓱᒪᒋᔭᖏᑦ ᐋᕿᑦᓯᐃᓗᓂ ᐊᐅᓚᕐᓯᓂᕐᒧᑦ ᑲᒪᒋᔭᓇᐊᓕᓐᓂᒃ ᐊᒥᖅᑳᕐᑕᓂᒃ ᑐᒃᑐᓂᒃ.

ᓂᕆᐅᓐᓂᖃᕐᐳᒍᑦ ᑕᑯᓂᐊᕐᓂᕐᒥᒃ ᐃᓕᑦᓯᓐᓂᒃ ᐃᖃᓗᑦᑑᑎᐊᖅᒥ ᐊᒻᒪᓗ ᐱᓕᕆᓗᑕ ᐃᑲᔪᕐᑎᕆᓪᓗᑕ ᓄᒍᓯᕙᓪᓕᐊᖏᓪᓗᓂ ᐊᐅᓚᓯᓂᕐᒥᒃ ᕿᙵᐅᑦ ᑐᒃᑐᓂᒃ ᐊᑎᕐᓗᒋᑦ ᓈᒻᒪᓂᕐᐹᑦ ᐊᑐᐃᓐᓇᐃᑦ ᖃᓪᓗᓈᑦ ᖃᐅᔨᓴᕐᑎᒻᒪᕇᑦ ᖃᐅᔨᒪᓂᖏᑦ ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔭᑐᖃᖏᑦ.

ᐱᓯᐊᕐᑲᕈᓯ ᑐᓴᕋᕐᓴᑲᓐᓂᕐᓂᒃ ᐱᓪᓗᒍ ᓈᓚᑦᑎᓯᓂᖅ, ᐊᑏ ᖃᐅᔾᔮᕐᑕᐃᓕᓂᐊᕋᓱᐅᒃ ᐆᒪᔪᓕᕆᔨᖏᑦ.

ᓱᓕᕗᒥᒃ,

ᑖᓂᐊᓪ ᓱᐅᑦᓴᒃ
ᐃᑦᓯᔭᐅᑕᖅ ᐅᕙᓂ
ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᓂᕐᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ

ᑎᑎᖅᑲᒃᑯᕝ 1379
ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ X0A 0H0
(867) 975-7300
(888) 421-9832

Titiqqap Turaarvia 1379
Iqaluit, NU X0A 0H0
(867) 975-7300
(888) 421-9832

Box 1379
Iqaluit, NU X0A 0H0
(867) 975-7300
(888) 421-9832

www.nwmb.com

ᓄᓇᕗᑦᒥ ᐆᒪᔪᓕᕆᔨᖏᔪᐊᑦ ᑲᑎᒪᔨᖏᑦ
Nunavunmi Anngutighatigut Aulapkaijitkut Katimajiat
Nunavut Wildlife Management Board

ᐱᓗᐊᑦᑕᐃᓕᓂᖅ ᐆᒪᔪᕐᓂᒃ ᐊᖅᑯᑎᒋᓗᒍ ᐊᑐᕐᑎᑕᐅᓂᖏᑦ ᐃᓄᐃᑦ ᖃᐅᔨᒪᓂᑐᖃᖏᑦ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᑎᒻᒪᕆᑦ ᖃᐅᔨᒪᓂᖏᑦ
Tammaqtailinahuarniriit anngutighat atuqhugit Inuit qaujimajatuqangillu ilihimaniillu ilitquhiannin
Conserving wildlife through the application of Inuit Qaujimajatuqangit and scientific knowledge

ᐱᖃᑕᑦ: ᑐᕆᑲᔅ ᑭᓯᖕ, ᑐᑭᒧᐊᕐᑎᕐᓯᔨ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ, ᒐᕙᒪᓐᑯᑦ ᓄᓇᕗᑦᒥ, ᐱᓕᕆᒡᕕᖕᒐᑦ ᐊᕙᑎᓕᕆᔾᑦ;
ᐹᓪ ᐃᕐᖖᒐᐅᑦ, ᑐᑭᒧᐊᕐᑎᕐᓯᔨ ᐆᒪᔪᓕᕆᓂᕐᒧᑦ, ᓄᓇᕗᑦ ᑐᙵᕕᒃ ᑎᒥᖓᑦ;
ᐹᓪ ᐃᒥᙵᒃ, ᐊᐅᓚᑦᓯᔨ ᐊᓪᓚᒡᕕᒃᒥ, ᕿᑎᕐᒥᐅᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᕐᑲᑎᒌᖏᑦ;
ᑭᐅᕈᓚᐃᓐ ᓚᑦᑕᓇᐅᔅᑭ, ᑐᑭᒧᐊᕐᑎᕐᓯᔨ, ᐆᒪᔪᕐᓂᒃ ᐊᐅᓚᑦᓯᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐊᐅᓚᑦᓯᒍᑎᓂᒃ ᑲᒪᔩᑦ, ᑲᓇᑕᒥ ᐆᒪᔪᓕᕆᔩᕐᔪᐊᑦ, ᐊᕙᑎᓕᕆᔩᑦ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᔾᔩᕐᓂᖓᓂᒃ ᑲᒪᔩᑦ ᑲᓇᑕᒥ;
ᐋᒪ ᖃᒡᒍᑕᖅ, ᐊᕕᑦᑐᕐᓯᒪᔪᓂ ᐋᕿᑦᓱᐃᔨ, ᕿᑎᕐᒥᐅᓂ ᐆᒪᔪᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ;
ᐊᒫᓐᑕ ᑑᒫᓐᑦ, ᐊᐅᓚᑦᓯᔨ, ᖁᕐᖢᕐᖢᑐᖅ ᐊᖑᓂᐊᕝᕖᑦ ᑲᑐᔾᔨᕐᑲᑎᒌᖏᑦ;
ᐱᐊᕗᕐᓕ ᒪᒃᓴᒃ, ᐊᐅᓚᑦᓯᔨ, ᐃᖃᓗᒃᑑᑦᑎᐊᕐᒥ ᐊᖑᓇᓱᒃᑏᑦ ᐊᒻᒪᓗ ᒥᑭᑦᐊᕐᓂᐊᕐᑏᑦ ᑎᒥᖏᑦ;
ᔩᑦᑎ ᐱᓪᓕᔾᔫ, ᐊᐅᓚᑦᓯᔨ ᐊᓪᓚᒡᕕᒃᒥ, Wek’eezhii ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ;
ᑎᐊᑉᐳᕋ ᓯᒪᓐᔅ, ᐊᐅᓚᑦᓯᔨ ᐊᓪᓚᒃᑯᒥ, Sahtú ᓄᓇᒥᐅᑕᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ;
ᐃᐊᑦᕗᐊᕐᑦ ᓵᒍᕼ ᐊᒻᒪᓗ ᑲᑎᒪᔩᑦ, ᔨᐊᓗᓇᐃᕝᒥ ᐃᖅᑲᓖᑦ;
ᕗᐃᓕᐊᒻ ᐃᓐᒋ, ᐊᖓᔪᖄᖅ, North Slave3 ᐊᓪᓚᖓᔪᑦ ᑲᑐᔾᔨᕐᑲᑎᒌᖏᑦ;
ᐊᖓᔪᖄᖅ ᑎᐅᕈᓪ ᒫᕐᔫ ᐊᒻᒪᓗ ᑲᑎᒪᔩᑦ, Lutsel K’e ᐃᖅᑲᓖᑦ;
ᐳᕈᓄ ᑯᕖᑦ, ᐊᖓᔪᖄᖅ, North Slave, ᐊᕙᑎᓕᕆᔩᑦ ᐊᒻᒪᓗ ᓄᓇᒥᐅᑕᓕᕆᔩᑦ, ᒐᕙᒪᓐᑯᑦ ᓄᓇᑦᓯᐊᖅᒥ;
ᒪᐃᑯᓪ ᔮᕐᓖ, ᐊᐅᓚᑦᓯᔨ, ᓄᓇᒥᒃ ᓴᐳᒻᒥᔾᔩᑦ ᐊᒻᒪᓗ ᓄᓇᓯᐅᑕᓕᕆᔩᑦ, Tłı̨chǫ ᒐᕙᒪᖏᑦ;
ᐲᓯ ᐱᔪᐊᕐᓴᓐ, DKFN ᐱᔮᖅᓴᓂᒃ ᐊᐅᓚᑦᓯᔨᓂ ᐋᕿᑦᓱᐃᔨ, Deninu Kue ᐃᖅᑭᓖᑦ;
ᑏᕝ ᐳᐊᑐᕆ, Salt River ᐃᖅᑭᓖᑦ;
ᑏᓇ ᔫᐲ, ᐆᒪᔪᓕᕆᔨ, Athabasca Denesuline.