

## **NWMB INTERIM REPORT**

**NWRT Project Number:** 2-13-22

**Title:** Nunavut Wildlife Survey from space: use of high resolution imagery to track population size and trends

### **Project Leader:**

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### **Summary:**

This project intends to use high resolution satellite imagery to detect polar bears. Comparing detection with concurrent population estimates following established protocols (mark-recapture and/or aerial survey with distance sampling) allow comparison between methods. The work is non-invasive and, if determined feasible, could be implemented for population monitoring to reduce disturbance to wildlife and take into account concerns about wildlife capture and handling.

### **Project Objectives:**

1. Assess the utility of very high resolution satellite imagery for estimating abundance of polar bears in rugged terrain;
2. Develop a practical monitoring strategy at a large scale;
3. Remove disturbance to wildlife while monitoring;
4. Obtain complete survey of areas and not rely on transects only as classic surveys do; and
5. Engage the public participation in science (reading of pictures made freely available)

Project objectives remain the same.

### **Materials and Methods:**

The aerial work was originally designed as an aerial survey to provide a population estimate; however, the Baffin Bay work was completed in conjunction with the mark-recapture work, and while this provides ground-truthing, it is not equivalent to an aerial survey for population estimation. No aerial survey was completed in fall 2013 in Foxe Basin on White and Vansittart Islands. High resolution imagery has been obtained for the Baffin Bay study area and is undergoing analysis.

Following the feasibility assessment, collaborators would consider targeting other wildlife species for remote sensing work. This is possible currently using archived satellite imagery (available at a fraction of the cost of custom scheduled imagery) and can be applied to recent surveys of muskox on Bathurst Island and/or King William Island, which were surveyed in May and September 2013 respectively.

### **Project Schedule:**

Pre-project consultation – complete.

Aerial surveys – not done for Foxe Basin; completed for Baffin Bay.

Satellite image interpretation – on-going  
Data analysis/report writing – on-going

**Preliminary Results/Discussion:**

The initial work in northern Foxe Basin (fall 2012) has been compiled as a manuscript and is currently In Review, and will be relevant to this project although the 2013 Foxe Basin work did not proceed. The Baffin Bay rugged terrain satellite image interpretation is currently on-going. Satellite imagery was ground-truthed during the mark-recapture work in Baffin Bay, with observers marking locations of bears encountered. Work on evaluating the spectral signature of polar bears using Rowley Island data is also on-going.

The University of Minnesota (UMN) received funding in 2012 and 2013 and purchased some imagery from both Foxe Basin (2012) and Baffin Bay (2013). Seth Stapleton (UMN) recently received the 2013 imagery, and is working with the Polar Geospatial Center to obtain additional archived imagery at no additional cost. Michelle LaRue (UMN) is also dedicating time to the remote sensing work. Our goal is to have some preliminary results from Baffin Bay and the spectral signature work by late spring.

Digital Globe, through collaborations with UMN, also recognizes the utility of remote sensing for other species such as muskox, and imagery will be available as in-kind support to follow up on this potential use of satellite imagery.

**Reporting to Communities:**

Consultations will be held with communities when results are available.

The utility of this method for muskox surveys will be discussed in April with Resolute Bay and Iviq (Grise Fiord) HTAs, pending HTA availability.

## NWMB INTERIM FINANCIAL REPORT

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**Original Project Budget:**

Item	Funds (\$K)
Pre-project consultation	5
Rotary-wing hours and positioning fees	45
HTO per diems (aerial survey)	3
Flights – biologist and tech	4
Accommodation – biologist and tech	3
Fuel	10
Satellite imagery	30
Post-project consultation	5
<b>TOTAL</b>	<b>105</b>

**Original Contributions:**

Item	Funds (\$K)
GN Department of Environment	25 confirmed
World Wildlife Fund	10 requested
GN Implementation funding	20 requested
Environment Canada	10 requested
USGS	25 requested
NWMB	15 confirmed
<b>TOTAL</b>	<b>105</b>

**Explanation of Changes:**

No aerial survey was completed for Foxe Basin in 2013. Ground-truthing in Baffin Bay was achieved by crews on another project (mark-recapture population estimate). Satellite imagery was obtained with UMN funding.

**Financial Report:**

Budget Item	Budgeted (\$K)	Disbursed	Variance
Pre-project consultation	5	0	
Rotary-wing hours and positioning fees	45	0	
HTO per diems (aerial survey)	3	0	
Flights – biologist and tech	4	0	
Accommodation – biologist and tech	3	0	
Fuel	10	0	
Satellite imagery	30	0	
Post-project consultation	5	0	
<b>TOTAL</b>	<b>105</b>		

Balance, if any, to be returned to NWMB: Any funds remaining by end of fiscal will be returned to the NWMB.

Note that UMN was able to acquire imagery through their collaborations and in-kind support. Ground-truthing was covered by the Baffin Bay polar bear mark-recapture survey. We are currently investigating ways in which this funding can be used to support the GIS work at UMN. Any funds that cannot be used by the lab for their continuing analysis in wildlife surveys through remote sensing, will be returned to the NWMB at the end of fiscal.

I certify that this is an accurate statement of the Board project funds received and disbursed in accordance with the joint contribution agreement.

Project leader signs:



(Morgan Anderson, as interim project leader following Lecomte's departure from the GN)