

**ADDENDUM TO THE SUBMISSION TO THE**  
**NUNAVUT WILDLIFE MANAGEMENT BOARD AND NUNAVIK MARINE**  
**REGION WILDLIFE BOARD**  
**FOR**

**Information:**

**Decision: X**

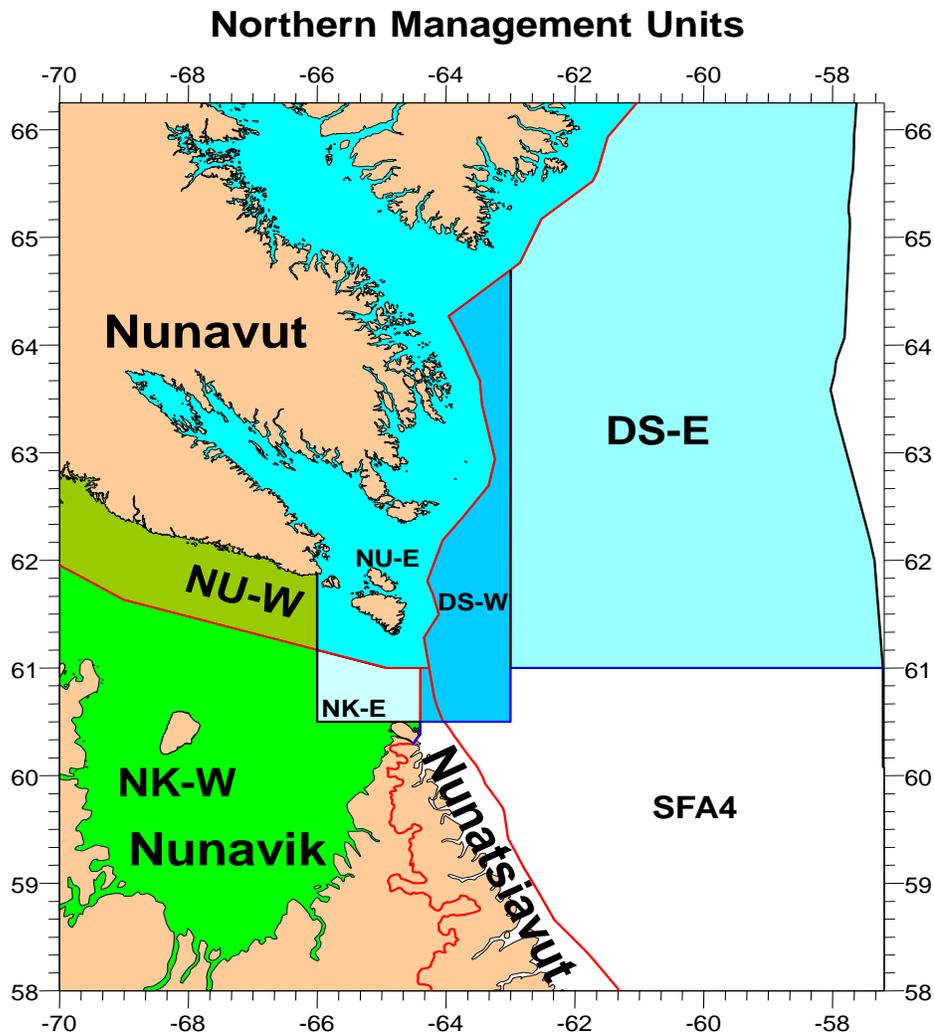
**Recommendation: X**

**Issue: 2020/21 Total Allowable Catch levels for Northern (*Pandalus borealis*) and Striped (*Pandalus montagui*) Shrimp in the Eastern and Western Assessment Zones**

**Map:**

Blue areas – Eastern Assessment Zone.

Green areas – Western Assessment Zone.



### Background

The Department submitted a Briefing Note to the Nunavut Wildlife Management Board and the Nunavik Marine Region Wildlife Board (the Boards) in February 2020 as a placeholder for their joint decisions and recommendations on two species of shrimp in the Western Assessment Zone (WAZ) and Eastern Assessment Zone (EAZ). The Science results from the 2019 multi species survey that will inform the 2020/21 Total Allowable Catches (TACs) were not available at the time of submission. The Department anticipated that precipitous changes (greater than 25%) in fishable biomass for one or more stocks might be observed, which would require an Addendum to be sent to the Boards.

Results from the 2019 survey are now available and indicate precipitous changes in fishable biomass for both species in the EAZ. *P. montagui* decreased by 59.3%, while *P. borealis* increased by 102.8%. The results for the WAZ indicate declines of fishable biomass for both *P. montagui* (19.5%) and *P. borealis* (3.4%) (Appendix 1).

The results of the Science update submitted through this Addendum (summary at Appendix 2) will present the Boards with the information necessary to provide recommendations and decisions to the Minister for the 2020/21 fishery.

### **Western Assessment Zone – For Decision**

#### Background Information

The WAZ occurs partially within the Nunavut Settlement Area (NSA) and partially within the Nunavik Marine Region (NMR). A new science survey for the WAZ began in 2014. While the survey time series was being established, the Boards' decisions were to maintain the TACs for both species in the WAZ. This resulted in exploitation rates (ERs) that ranged between 8% and 19.3% for *P. montagui*, and 7.3% and 19.8% for *P. borealis* (Appendix 3). Given the range of ERs during this time, the Department indicated that it was reasonable to establish 2019/20 TACs within the range of past ERs. The Boards' decisions in 2019/20 was to increase the TACs for both species to achieve a 15% ER.

The Department has previously communicated its commitment to develop a Precautionary Approach (PA) for both stocks in the WAZ. A Science peer-reviewed process will be undertaken in the spring, 2020 to develop a Limit Reference Point (LRP) for each stock. Resource Management will then work with Science, the Boards' staff and Nunavut and Nunavik industries to establish an Upper Stock Reference point (USR) and Harvest Decision Rules (HDRs) for each stock. All decisions on the PA, other than the establishment of the LRP which is unilaterally established by Science, will go to the Boards for decision. The Department will endeavor to finalize the full PA for both stocks for application to the 2021/22 TAC setting process, which coincides with the next full stock assessment for this area.

#### **WAZ *P. borealis***

- The 2019/20 TAC was 3,163t (15% ER), an increase of 52% from 2018/19.
- The 2019 survey indicates a fishable biomass decline of 3.4%, following a significant (101.1%) increase from the 2018 survey. The stock declined 20% and 54% in the 2017 and 2016 surveys, respectively.

- Maintaining the current TAC in 2020/21 would result in an ER of 15.5%.
- Maintaining the 15% ER in 2020/21 would result in a TAC of 3,057t (a decrease of 106t (3.4%)).

#### **WAZ *P. montagui***

- The 2019/20 TAC was 11,975t (15% ER), increased by 95% from 2018/19.
- The 2019 survey indicates a 19.5% decrease of fishable biomass, following a significant increase (77.7%) in the 2018 survey.
- A rollover of the current TAC would result in an ER of 18.6%.
- A rollover of the 15% ER would result in a TAC of 9,640t, a decrease of 19.5%.

#### Primary Considerations for the Boards' Decisions for the 2020/21 Fishery

- Science cannot detect trends for either stock at this time. There is no PA for either stock in the WAZ, i.e. the stock statuses are unknown.
- The development of reference points, coupled with observed significant fluctuations in biomass indicators may require TAC reductions in the future.
- A rollover of the current TACs would result in ERs within the previous ranges since 2013 for both species.
- The WAZ has generally been managed in the order of a 10% ER, however ERs for both stocks have been above this level since the 2017/18 fishery.
- A 20% ER for stocks in the Healthy Zone is the accepted maximum rate to maintain Marine Stewardship Council (MSC) certification.

#### **Recommendation for the WAZ:**

The Department requests that the Boards take into account the primary considerations as noted above in their decisions for TAC, Total Allowable Take (TAT) and Total Allowable Harvest (TAH) levels in the WAZ. The Department maintains its view from 2019/20 that the Boards could continue to establish the combined TAT and TAH levels at an ER that falls within the range since 2015/16 (7.3% - 19.8% for *P. borealis*, 8% - 19.3% for *P. montagui*) without impacting the sustainability of the stocks. A table is included at Appendix 3 to illustrate possible scenarios and ranges for each species.

#### **Eastern Assessment Zone – For Decision and Recommendation**

##### Background Information

The EAZ falls partially within the NSA, partially within NMR and partially outside of both. While the *P. borealis* stock is in the Healthy Zone of the Department's PA Framework, there is continued uncertainty associated with the *P. montagui* stock, which is currently in the Cautious Zone.

The 2019 science survey results indicate precipitous changes in fishable biomass for both species in the EAZ. In the EAZ, *P. montagui* is the directed fishery and *P. borealis* is taken as a bycatch species in the NU/NK East management units, while the reverse is true in the offshore Davis Strait management units. A separate decision note is currently with the Boards to define *P. borealis* as a directed species within the NU/NK E management units.

### **EAZ *P. montagui***

Since 2012, the *P. montagui* resource has fluctuated between the Healthy and Cautious Zones of the PA framework, while the fishable biomass has changed precipitously (up and down) every year since 2012. The status of the resource within the PA framework continues to be uncertain.

The TAC for this stock has been 840t since 2014, with the fishable biomass ranging between 3,534t and 24,957t. The current fishable biomass is 8,503t.

- The 2019/20 TAC was 840t and the ER was 4%.
- The fishable biomass decreased by 59.3% in the 2019 survey.
- Maintaining the current TAC (840t) would result in an ER of 9.9%.
- Applying a 15% increase would equal a TAC of 966t, resulting in an ER of 11.4%.
- The Boards, Nunavut and Nunavik industry and the offshore fleet have consistently recommended to maintain the TAC at 840t since 2014.

#### 2020/21 TAC Options for EAZ *P. montagui*:

Option 1: The Boards could consider recommending a 15% increase to the *P. montagui* TAC, resulting in a TAC of 966t and an ER of 11.4%

Option 2 (Recommended): Maintain the TAC at 840t (9.9% ER)

The Department requests decisions from the Boards on harvest levels within the NSA and NMR.

### **EAZ – *P. borealis***

The Science update results indicate a significant increase (102.8%) in fishable biomass to 95,138t, following a 19.6% increase in fishable biomass last year. The stock remains in the Healthy Zone of the PA framework. This stock has been certified as sustainable by the Marine Stewardship Council (MSC).

- The 2019/20 TAC was 8,610t and the ER was 18.4%, increased from 7,840t (20% ER) in 2018/19.
- Maintaining the current TAC would result in an ER of 9.1%.
- A 15% increase in TAC would result in a TAC of 9,901t (+1,292t) 10.4% ER.
- A 20% increase (+1,722t) would result in a TAC of 10,332t (10.9% ER).
- A 25% increase (2,153t) would result in a TAC of 10,763t (11.3% ER).
- A 15% ER would result in a TAC of 14,271t, a 65.7% increase.

#### 2020/21 TAC Options for EAZ *P. borealis*

Option 1: Increase the TAC by 15% (+1,292t) to 9,901t (10.4% ER).

Option 2: Increase the TAC by 20% to 10,332t (10.9% ER), given the significant increase in fishable biomass and the resulting low ER.

The Department requests decisions from the Boards on harvest levels within the NSA and NMR.

## **Northern Shrimp Advisory Committee**

The Northern Shrimp Advisory Committee (NSAC) will meet on March 5, 2020. At this meeting, the Department will consult with the offshore fleet and Nunavut and Nunavik industry on TACs in the EAZ. TACs in the EAZ and WAZ will be discussed with Nunavut and Nunavik industry at the Indigenous Pre-Meeting of NSAC on March 4. Options and any recommendations presented to the Boards in this Briefing Note will be shared at one or both meetings.

### **Summary of Request**

The Department is seeking the following decisions and recommendations from the Boards for the 2020/21 fishery:

- 1) A decision on TACs, TAH (NSA) and TAT (NMR) levels for both species in the WAZ, which infers the sharing arrangement between Nunavut and Nunavik.
- 2) The Department requests for the EAZ:
  - a) A recommendation on TACs for both species
  - b) A decision on TAH and TAT levels for, and sharing arrangements between, the Nunavut /Nunavik East management units for both species
  - c) Recommendations on the distribution of TACs between the Nunavut /Nunavik East and offshore Davis Strait management units.

**Prepared by: Ecosystems and Fisheries Management, Fisheries and Oceans Canada**

**Date:** February 27, 2020

## **APPENDIX 1**

*[Science Response 2020/014: Update of stock status indicators for Northern Shrimp, Pandalus Borealis, and Striped Shrimp, Pandalus montagui, in the Western and Eastern Assessment Zones, January 2020]*

**Science Response 2020/014****SUMMARY: Update of stock status indicators for Northern Shrimp, *Pandalus borealis*, and Striped Shrimp, *Pandalus montagui*, in the Western and Eastern Assessment Zones, January 2020****Update of Indicators****Eastern Assessment Zone – *P. borealis****Fishery*

The total catch of *P. borealis* in the EAZ reported in the Canadian Atlantic Quota Report (CAQR), as of 7 January 2020, was 4,687 t, which is 56% of the TAC (Table 1, Figure 2). The 2019/20 fishery runs until 31 March 2020, thus catch records should be considered preliminary for 2019/20.

*Biomass*

The fishable biomass index increased by 102.8% from 2018 to 2019 and is now at the highest level (95,138 t) since the time series began (Table 2, Figure 3a). The female SSB index showed an increase of 74.0% and is currently at the second highest level (57,143 t) (Table 2, Figure 3b).

*Exploitation*

The reported exploitation rate (ER) index for 2019/20, as of 7 January 2020, was 4.9% (Figure 4a). Since the fishery was still open at the time of the meeting, the reported ER may be higher at the end of the season. Should the entire TAC be taken this fishing season, the potential ER index for 2019/20 would be 8.8% (Figure 4b). The long term average of the potential ER is 15.4%, which is near the base target ER of 15% in the Healthy Zone for the EAZ (DFO, 2018).

*Current Outlook*

The female SSB index for *P. borealis* in the EAZ is well within the Healthy Zone of the PA Framework (Figure 5).

**Eastern Assessment Zone – *P. montagui****Fishery*

The total catch of *P. montagui* in the EAZ, as of 7 January 2020, was about 113 t (Table 1, Figure 6) and has been declining since 2001. The 2019/20 fishery runs until 31 March 2020, thus catch records are preliminary for 2019/20.

### *Biomass*

Biomass indices for *P. montagui* in the EAZ have oscillated around the long term mean, with the exception of a particularly high biomass reported in 2012 (Figure 7). Both the fishable biomass and the female SSB indices decreased in 2019 to 8,503 t and 4,415 t, respectively, and were below the long term mean (Table 3, Figure 7a,b).

### *Exploitation*

The reported ER index for 2019/20 was very low, 1.0%, due to low catches reported in the CAQR as of 7 January 2020 (Figure 8a). The potential ER index for this stock would be 9.9% if the entire TAC is taken (Figure 8b).

### *Current Outlook*

The female SSB index in the EAZ has declined in 2019 placing the stock in the Cautious Zone (Figure 9). Given the wide fluctuations in biomass indices for *P. montagui* observed in the past (e.g., between years 2011, 2012 and 2013, and also last year) the status of this resource is considered uncertain.

## **Western Assessment Zone – *P. borealis***

While all survey years are presented, only the last six years of survey data can be considered in the WAZ assessment because of the change in the surveys, resulting in the start of a new time series.

### *Fishery*

As of 7 January 2020, the CAQR records show that about 620 t, which equals to 19.6% of the TAC, have been taken (Table 1, Figure 10).

### *Biomass*

The fishable biomass and female SSB indices decreased from 2018 to 2019 by 3.4% and 8.1%, respectively (Table 4, Figure 11a,b). The fishable biomass index in 2019 was 20,378 t, which was in the close proximity of the time series mean. The female SSB index was 11,845 t, which was above the time series mean.

### *Exploitation*

The reported ER index for 2019/20 was relatively low, 3.4%, due to low catches reported in the CAQR as of 7 January 2020 (Figure 12a). As a consequence of the decline in the fishable biomass in 2019, the potential ER index has increased to about 15.5% (Figure 12b).

### *Current Outlook*

Currently, there is no PA framework for *P. borealis* in the WAZ. The establishment of reference points for this resource is planned for 2020, to be implemented in 2021 stock assessment. Historical records show that the TAC for this stock has rarely been fully taken.

## **Western Assessment Zone – *P. montagui***

While all survey years are presented, only the last six years of survey data can be considered in the WAZ assessment because of the change in the surveys, resulting in the start of a new time series.

### *Fishery*

The total catch of *P. montagui* was 6,884 t, which is 57.5% of the TAC as per 7 January 2020 CAQR (Table 1, Figure 13). The 2019/20 fishery runs until 31 March 2020 thus catch records should be considered preliminary for the 2019/20 season.

### *Biomass*

The fishable biomass index decreased by 19.5% from 2018 to 2019, with 64,268 t observed in 2019 (Table 5, Figure 14a), which was above the time series mean. A more pronounced biomass decrease (37.2%) was observed for the female SSB index, with 29,079 t estimated in 2019, which was in the close proximity of the time series mean (Figure 14b).

### *Exploitation*

Along with decreasing fishable biomass, the reported ER index in 2019/20 increased to 11.3% (Figure 15a). If the entire TAC was taken the potential ER index would be 18.6% (Figure 15b).

### *Current Outlook*

Currently, there is no PA framework for *P. montagui* in the WAZ. The establishment of reference points for this resource is planned for 2020, to be implemented in 2021 stock assessment. Historical records show that the TAC for this stock has often been nearly fully taken. With the recently increased TAC it is unlikely that it will be fully taken in 2019.

## **Conclusions**

### **Eastern Assessment Zone (EAZ)**

#### *Pandalus borealis*

- Currently, the *Pandalus borealis* resource is in the Healthy Zone of the Precautionary Approach Framework.
- In 2019, the fishable biomass and female spawning stock biomass indices recorded relatively large increases; the fishable biomass is at the highest level while the female spawning stock biomass is at the second highest level since the time series began.
- The potential Exploitation Rate (ER) index for 2019/20 is 8.8%. That is below both the long term mean of the potential ER (15.4%) and the base target ER of 15% in the Healthy Zone for the EAZ.

### ***Pandalus montagui***

- *Pandalus montagui* biomass indices have fluctuated widely in the past, adding to the uncertainty about the status of the stock in the EAZ.
- Following this year's decrease in the biomass, the *Pandalus montagui* resource is currently in the Cautious Zone of the Precautionary Approach Framework.
- The potential exploitation rate index if the entire TAC is taken in 2019/20 would be 9.9%.

### **Western Assessment Zone (WAZ)**

#### ***Pandalus borealis***

- The status of the stock is currently uncertain, as there is no Precautionary Approach Framework for *Pandalus borealis* in the WAZ.
- Both the fishable biomass and female spawning stock biomass indices declined slightly from 2018 to 2019.
- The reported exploitation rate index for 2019/20 is 3.4%. The current TAC equates to a potential exploitation rate index of 15.5%.

#### ***Pandalus montagui***

- The status of the stock is currently uncertain, as there is no Precautionary Approach Framework for *Pandalus montagui* in the WAZ.
- Both the fishable biomass and female spawning stock biomass indices decreased from 2018 to 2019.
- The reported exploitation rate index for 2019/20 is 11.3%; the potential exploitation rate index for 2019/20 is 18.6%.

**Past Total Allowable Catches, Fishable Biomass and Exploitation Rates in the Western Assessment Zone by Fishing Year Since the New Survey**

WAZ		2019/20	2018/19	2017/18	2016/17	2015/16
Montagui	FB (t)	79,834	44,915	31,724	55,194	77,078
	TAC (t)	11,975	6,138	6,138	6,138	6,138
	ER	15%	13.7%	19.3%	11.1%	8%
Borealis	FB (t)	21,088	10,487	13,116	28,532	21,713
	TAC (t)	3,163	2,080	2,080	2,080	2,080
	ER	15%	19.8%	15.9%	7.3%	9.6%

FB – Fishable Biomass

TAC – Total Allowable Catch

ER – Exploitation Rate

**Possible Scenarios / Ranges for 2020/21**

	Montagui				Borealis			
	TAC	Quota Change	Change in TAC	ER	TAC	Quota Change	Increase in TAC	ER
Rollover TAC	<b>11,975t</b>	<b>0</b>	<b>0</b>	18.6%	<b>3,168t</b>	<b>0</b>	<b>0</b>	15.5%
Rollover ER	9,640t	-2,335t	-19.5%	15%	3,057t	-106t	-3.4%	15%
Max ER*	12,404t	+429t	+3.6%	19.3%	4,035t	+872t	+27.6%	19.8%
Min ER*	<b>5,141t</b>	-6,834t	-57%	8%	<b>1,488t</b>	-1,675t	-53%	7.3%

\*Based on past ranges