



## STOCK STATUS UPDATE OF STRIPED SHRIMP (*PANDALUS MONTAGUI*) IN SFA 4

### Context

The last full assessment of Striped Shrimp (*Pandalus montagu*) in Shrimp Fishing Area (SFA) 4 took place in February, 2019 (DFO 2019a). Resource Management requested the current stock status update as the basis for harvest advice for the 2020/21 fishing season.

This Science Response Report results from the Science Response Process (SRP) of January 28, 2020 for the Northern and Striped Shrimp Update for the Eastern and Western Assessment Zones, and Striped Shrimp Update for SFA 4. Science advice for SFAs 4–6 Northern Shrimp (*Pandalus borealis*) in 2020/21 is provided through a full assessment process.

### Background

Stock status indicators for Striped Shrimp in SFA 4 were evaluated based on commercial catch and biomass indices from a Northern Shrimp Research Foundation (NSRF) summer shrimp survey in Northwest Atlantic Fisheries Organization (NAFO) Division 2G. Exploitation rate index, calculated using catch and the fishable biomass index, was also utilized. The fishing season is based on a fiscal year starting April 1 and ending on March 31. Subsequently, commercial catch and exploitation rate indices for 2019/20 are preliminary in this report.

### Analysis and Response

#### Fishery

Commercial catch of Striped Shrimp is taken as by-catch in the SFA 4 Northern Shrimp fishery and increased from 280 t in 2008 to a peak of 4,700 t in 2012, but has since declined.

Preliminary catch in 2019/20, as of the January 9, 2020 Canadian Atlantic Quota Report (CAQR) was 1,460 t. The by-catch limit of 4,033 t has not been taken since it was implemented in 2013/14 (Figure 1, Table 1). Until 2012, the sole source of catch information for Striped Shrimp was logbooks; however by-catch was recorded in the CAQR beginning in 2013.

#### Biomass

Some of the fluctuation of biomass indices likely results from transfer across management boundaries, particularly from the Western Assessment Zone (DFO 2019b) to the northwest corner of SFA 4, rather than local dynamics within a population. From 2005 to 2019, the fishable biomass index averaged 28,500 t and in 2019 the fishable biomass index was 38,700 t, a 29% decrease from 2018 (Figure 2, Table 2). From 2005 to 2019, the female biomass index averaged 22,300 t and in 2019 the female biomass index was 32,400, a 30% decrease from 2018 (Figure 2, Table 2)

The female Spawning Stock Biomass (SSB) that is relevant to a Precautionary Approach (PA) for managing stocks consists of the animals whose spawning products will ultimately be caught in that area (as opposed to the animals that spawn in that area). The strong currents that likely

**Newfoundland and Labrador Region**

---

affect all sizes of shrimp, especially larvae, in SFA 4 create challenges with estimating female SSB for this particular SFA. The true female SSB is likely different than the females observed by the survey within SFA 4.

**Exploitation**

The preliminary exploitation rate index (ERI), based upon the January 9, 2020 CAQR catch of 1,460 t, is 3.8% (Figure 3, Table 3) and has been relatively stable around this level for seven years. If the by-catch limit is taken, the exploitation rate index will be 10.4% in 2019/20.

**Current Outlook**

The status of this resource is uncertain because there is no Integrated Fisheries Management Plan (IFMP) PA Framework for this stock.

**Conclusions**

The overall status of the Striped Shrimp resource could not be determined because no PA Framework currently exists for this species in SFA 4. Additionally, there are large fluctuations in biomass from year to year, which are likely influenced by currents and tides in SFA 4. If the by-catch limit is taken, the exploitation rate index will be 10.4% in 2019/20.

**Contributors**

- Katherine Skanes, DFO Science, Newfoundland and Labrador Region
- Krista Baker, DFO Science, Newfoundland and Labrador Region
- Will Coffey, DFO Science, Newfoundland and Labrador Region
- Chantelle Sawatzky, DFO Science, Central & Arctic Region
- Wojciech Walkusz, DFO Science, Central and Arctic Region
- Erika Parrill, DFO Centre for Science Advice, Newfoundland and Labrador Region
- Martin Henri, DFO Resource Management, Newfoundland and Labrador Region
- Courtney D’Aoust, DFO Resource Management, National Capital Region
- Brittany Beauchamp, DFO Fish Population Science, National Capital Region

**Approved by**

J. Janes  
Regional Director Science  
DFO, NL Region  
February 9, 2020

**Sources of information**

DFO. 2019a. [An Assessment of Northern Shrimp \(\*Pandalus borealis\*\) in Shrimp Fishing Areas 4– 6 and of Striped Shrimp \(\*Pandalus montagui\*\) in Shrimp Fishing Area 4 in 2018](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2019/027.

DFO. 2019b. [Assessment of Northern Shrimp, \*Pandalus borealis\*, and Striped Shrimp, \*Pandalus montagui\*, in the Eastern and Western Assessment Zones, February 2019](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2019/011

## Appendix I: Tables

Table 1. Catches and by-catch limits for SFA 4 *Pandalus montagui*. Catches for 2019/20 are preliminary as of the January 9, 2020 CAQR.

Year	By-Catch Limit (t)	Catch (t)
2002	-	25
2003	-	0
2004	-	83
2005	-	813
2006	-	1,805
2007	-	2,182
2008	-	278
2009	-	617
2010	-	1,115
2011	-	3,236
2012	-	4,708
2013/14	4,033	1,611
2014/15	4,033	1,236
2015/16	4,033	2,135
2016/17	4,033	1,113
2017/18	4,033	2,611
2018/19	4,033	2,572
2019/20*	4,033	1,461

**Newfoundland and Labrador Region**

**Science Response: Stock Status Update  
of Striped Shrimp in SFA 4**

*Table 2. Fishable and female biomass indices for Pandalus montagui in SFA 4.*

Survey Year	Fishable Biomass Index Lower 95% CI (x1,000 t)	Fishable Biomass Index (x1,000 t)	Fishable Biomass Index Upper 95% CI (x1,000 t)	Change in Fishable Biomass Index From Last Year (%)	Female Biomass Index Lower 95% CI (x1,000 t)	Female Biomass Index (x1,000 t)	Female Biomass Index Upper 95% CI (x1,000 t)	Change in Female Biomass Index From Last Year (%)
2005	10.4	17.9	31.1	-	7.11	12.2	20.9	-
2006	7.84	13.7	23.2	-23.5	3.78	7.53	13.5	-38.3
2007	9.00	16.9	27.5	23.4	4.8	8.96	13.6	19.0
2008	22.3	36.6	55.5	116.6	16.6	28.5	45.1	218.1
2009	11.0	19.8	32.2	-45.9	8.14	15.7	26.2	-44.9
2010	8.34	14.1	23.3	-28.8	7.4	11.1	17.6	-29.3
2011	7.76	12.9	20.6	-8.5	5.71	8.9	14.8	-19.8
2012	11.0	24.8	38.6	92.2	13.1	21	31.6	136.0
2013	23.9	35.2	49.4	41.9	19.7	29.6	43.4	41.0
2014	21.8	30.0	45.1	-14.8	17.4	25	36.2	-15.5
2015	28.7	45.7	71.2	52.3	21.1	34.9	53.8	39.6
2016	17.1	23.1	36.8	-49.5	12.3	17.8	28.5	-49.0
2017	26.6	44.1	71.1	90.9	19.4	35.1	56.1	97.2
2018	36.7	54.4	79.7	23.4	29.3	46.5	71	32.5
2019	22.0	38.7	58.2	-28.9	18.7	32.4	50.5	-30.3

*Table 3. Exploitation Rate Indices for Pandalus montagui in SFA 4. Exploitation rate indices for 2019/20 are preliminary as of the January 9, 2020 CAQR.*

Management Year	Exploitation Rate Lower 95% CI (%)	Exploitation Rate Index (%)	Exploitation Rate Upper 95% CI (%)
2005	2.61	4.54	7.82
2006	7.78	13.2	23.0
2007	7.93	12.9	24.2
2008	0.50	0.76	1.25
2009	1.92	3.12	5.61
2010	4.79	7.91	13.4
2011	15.7	25.1	41.7
2012	12.2	19.0	42.8
2013/14	3.26	4.58	6.74
2014/15	2.74	4.12	5.67
2015/16	3.00	4.67	7.44
2016/17	3.02	4.82	6.51
2017/18	3.67	5.92	9.82
2018/19	3.23	4.73	7.01
2019/20*	2.51	3.78	6.64

Appendix II: Figures

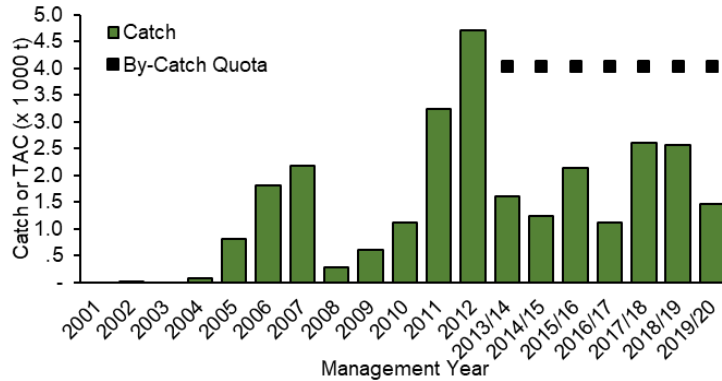


Figure 1. SFA 4 historical *Pandalus montagu* catches and by-catch quotas for the period 2001 – 2019/20 (2019/20 catches are preliminary as of the January 9, 2020 CAQR).

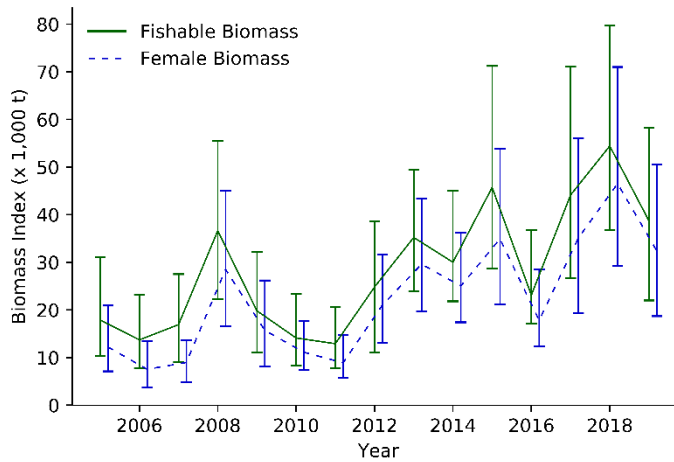


Figure 2. SFA 4 Striped Shrimp fishable biomass (green solid line) and female biomass (blue dashed line) indices. Error bars indicate 95% confidence intervals.

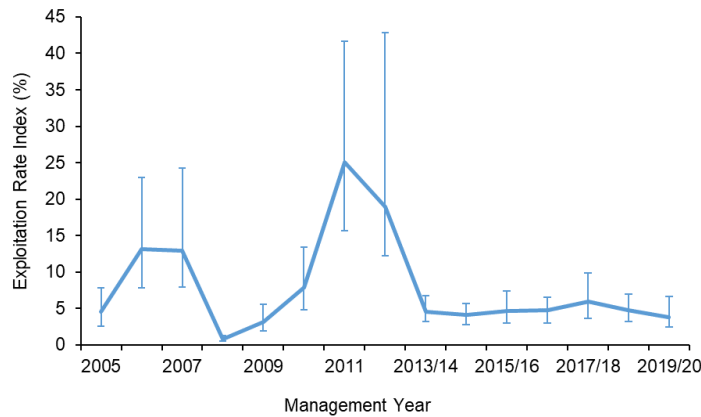


Figure 3. SFA 4 *Pandalus montagu* exploitation rate index based on total catch/fishable biomass index from the same year, expressed as a percentage. Error bars indicate 95% confidence intervals. The 2019/20 value is preliminary as of the January 9, 2020 CAQR.

**This Report is Available from the**

Center for Science Advice (CSA)  
Newfoundland and Labrador Region  
Fisheries and Oceans Canada  
PO Box 5667  
St. John's, NL A1C 5X1

Telephone: 709-772-8892

E-Mail: [DFONL\\_CentreforScienceAdvice@dfo-mpo.gc.ca](mailto:DFONL_CentreforScienceAdvice@dfo-mpo.gc.ca)

Internet address: [www.dfo-mpo.gc.ca/csas-sccs/](http://www.dfo-mpo.gc.ca/csas-sccs/)

ISSN 1919-3769

© Her Majesty the Queen in Right of Canada, 2020



Correct Citation for this Publication:

DFO. 2020. Stock status update of striped shrimp (*Pandalus montagui*) in SFA 4. DFO Can. Sci. Advis. Sec. Sci. Resp. 2020/016.

*Aussi disponible en français :*

*MPO. 2020. Mise à jour de l'état du stock de crevette ésope (*Pandalus montagui*) dans le ZPC 4. Secr. can. de consult. sci. du MPO, Rép. des Sci. 2020/016.*