

### c) Northern shrimp in Subarea 1 and Div. 0A

Advice September 2022 for 2023




#### Recommendation

In line with Greenland's stated management objective of maintaining a mortality risk of no more than 35% (subject to a risk of biomass being below  $B_{lim}$  of less than 1%), Scientific Council advises that catches in 2023 should not exceed 110 000 t.

With regard to the Canadian harvest strategy, Scientific Council notes that catches of 110 000 t in 2023 would result in less than 35% risk of exceeding  $Z_{msy}$  in 2023 and 2024, and a 35% risk of exceeding  $Z_{msy}$  in 2025, assuming catches at the same level as in 2023.

#### Management Objectives

A management plan and management objectives have been defined by the Government of Greenland in 2018. The objective is to maintain a mortality risk of no more than 35% (subject to a risk of biomass being below  $B_{lim}$  of less than 1%). Canada has a harvest strategy with the objective to maintain the stock in the Healthy Zone (>80% of  $B_{msy}$ ); when the biomass is above 80% of  $B_{msy}$ , the risk of being above  $Z_{msy}$  should be no more than 35%, based on the 3-year projections. Advice was also drafted to be consistent with the NAFO precautionary approach (FC Doc. 04-12).

<i>Objective</i>	<i>Status</i>	<i>Comment/consideration</i>
Maintain risk of being above $Z_{msy}$ at no more than 35%		The TAC set for 2022 equates to a risk of being above $Z_{msy}$ by the end of 2022 of 43%
Maintain the stock in the Healthy Zone (>80% of $B_{msy}$ )		The stock is above $B_{msy}$ in 2022
Maintain risk of biomass being below $B_{lim}$ of less than 1%		The risk of biomass in 2022 being below $B_{lim}$ is less than 1%



OK



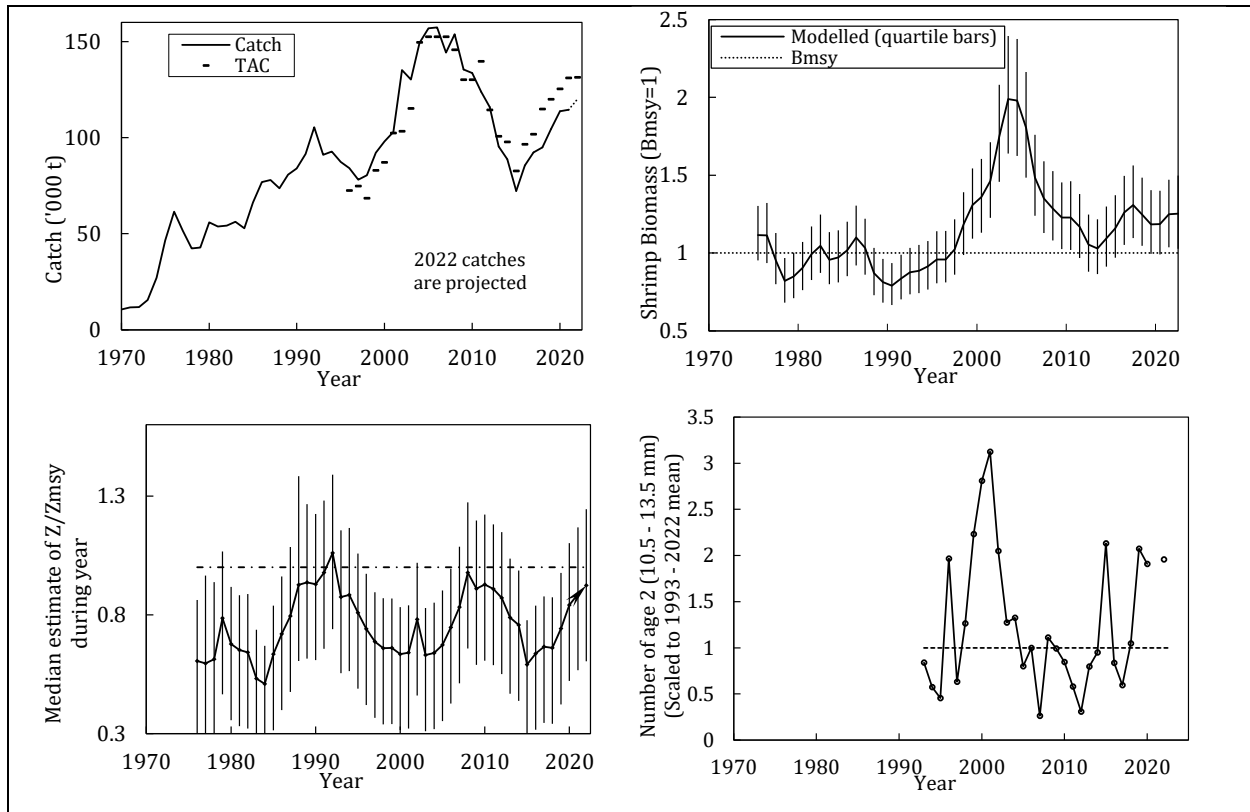
Intermediate

#### Management unit

The stock, considered distinct from all others, is distributed throughout Subarea 1, extends into Div. 0A east of 60°30'W, and is assessed as a single stock. In 2021, more than 99% of the landings were from Greenland.

#### Stock status

Biomass in 2022 is above  $B_{msy}$  and the probability of being below  $B_{lim}$  is very low (<1%). The probability of mortality in 2022 being above  $Z_{msy}$  is 43%. Recruitment (number of age-2 shrimp) in 2022 was above average.



**Reference points**

$B_{lim}$  has been established as 30%  $B_{msy}$ , and  $Z_{msy}$  has been set as the mortality reference point.  $B_{msy}$  and  $Z_{msy}$  are estimated directly from the assessment model.

**Projections**

Predicted probabilities of transgressing precautionary reference points in 2023 – 2025 under eight catch options and subject to predation by a cod stock with an effective biomass of 19 Kt.

19 Kt cod Risk of:	Catch option ('000 tons)							
	95	100	105	110	115	120	125	130
falling below $B_{msy}$ end 2023 (%)	24	24	23	25	25	25	26	26
falling below $B_{msy}$ end 2024 (%)	25	25	26	27	28	29	30	29
falling below $B_{msy}$ end 2025 (%)	25	27	27	29	30	32	33	33
falling below $B_{lim}$ end 2023 (%)	0	0	0	0	0	0	0	0
falling below $B_{lim}$ end 2024 (%)	0	0	0	0	0	0	0	0
falling below $B_{lim}$ end 2025 (%)	0	0	0	0	0	0	0	0
exceeding $Z_{msy}$ in 2023 (%)	22	25	29	32	36	39	43	46
exceeding $Z_{msy}$ in 2024 (%)	22	26	30	33	38	40	44	47
exceeding $Z_{msy}$ in 2025 (%)	23	27	30	34	38	42	45	49
falling below $B_{msy}$ 80% end 2023 (%)	8	8	8	8	9	9	9	9
falling below $B_{msy}$ 80% end 2024 (%)	9	9	10	11	11	11	13	12
falling below $B_{msy}$ 80% end 2025 (%)	10	11	12	13	14	13	16	16



## Assessment

Advice is based on risk analysis from a quantitative model. The analytical assessment was run in 2022 with updated input data series.

The next assessment is scheduled for 2023.

### *Human impact*

Mortality related to the fishery has been documented. Other human sources (e.g. pollution, shipping, oil-industry) are un-documented.

### *Biological and Environmental Interactions*

Cod is an important predator on shrimp. This assessment incorporates this interaction. Other predation is likely but not explicitly considered. Shrimps might be important predators on, for example, fish eggs and larvae.

## Fishery

Shrimps are caught in a directed trawl fishery. Bycatch of fish in the shrimp fishery is around 1% by weight. The fishery is regulated by TAC.

Recent catches and TACs (t) have been as follows:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Enacted TAC <sup>1</sup>	100 596	97 649	82 561	96 426	101 706	114 876	119 875	125 229	130 937	131 292
STATLANT 21	91 802	88 834	71 779	84 303	91 725	91 869	102 706	110 250	107 571	
NIPAG	95 381	88 765	72 256	85 527	92 584	94 878	104 314	113 758	114 569	120 000 <sup>2</sup>

<sup>1</sup> Sum of TACs autonomously set by Canada and Greenland.

<sup>2</sup> Projected to year end.

## Effects of the fishery on the ecosystem

Measures to reduce effects of the fishery on the ecosystem include area closures, moving rules and gear modifications to reduce damage to benthic communities and reduce bycatch.

## Special comment

From 1993 to 2010 the Greenlandic survey in the Canadian area (SFA1) was conducted annually. In that period, average biomass in that area was 2% of the total biomass estimated in Subarea 1 and Div. 0A. Since 2011, due to ice cover, there has only been sporadic information from the Greenlandic survey in the Canadian area (SFA1). The area was surveyed only in 2013 and 2017. In 2013, the biomass in that area (SFA1) was less than 1% of the total estimated biomass in Subarea 1 and Div. 0A, whereas it was about 2% in 2017.

SC recommends that the projection table should be given in projected catch increments of no less than 5 Kt due to uncertainty in calculating risk levels.

## Source of Information

SCS Doc 13/04, FC Docs 04-18, SCR Docs. 20/053, 20/057, 22/045, 22/046, 22/047, 22/048.