

### a) Northern Shrimp in Division 3M






Advice September 2022 for 2023





#### Recommendation

The indications of improved recruitment in 2020 did not result in an increase in stock biomass and the stock remains below  $B_{lim}$  in 2022. To be consistent with the NAFO precautionary approach, Scientific Council advises that no directed fishery should occur in 2023.

#### Management objectives

No explicit management plan or management objectives defined by the Commission. Convention general principles are applied. Advice is based on qualitative evaluation of biomass indices in relation to historic levels, and provided in the context of the precautionary approach framework (FC Doc. 04/18).

<i>Convention objectives</i>	<i>Status</i>	<i>Comment/consideration</i>
Restore to or maintain at $B_{msy}$		Stock below $B_{lim}$ . $B_{msy}$ is unknown.
Eliminate overfishing		No directed fishery
Apply Precautionary Approach		$B_{lim}$ defined. No fishing mortality reference point defined
Minimize harmful impacts on living marine resources and ecosystems		VME closures in effect, sorting grids mandatory
Preserve marine biodiversity		Cannot be evaluated

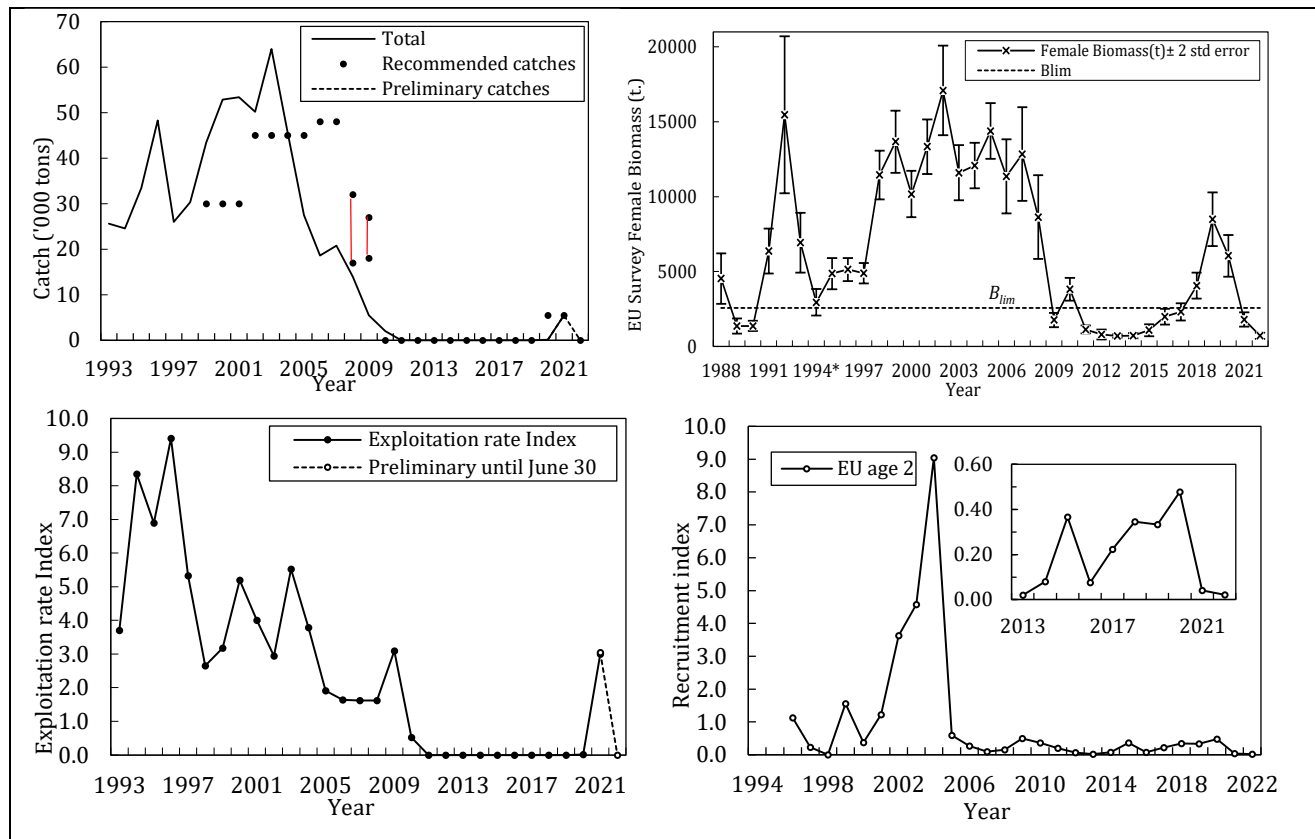
 OK  
 Intermediate  
 Not accomplished  
 Unknown

#### Management unit

The northern shrimp stock on Flemish Cap is considered to be a separate population.

#### Stock status

Since 2021 the biomass has been below  $B_{lim}$ . The abundance at age 2 in 2021 and 2022 were the lowest of the historical series. Due to the low female survey biomass levels and weak recruitments, there are concerns that the stock will remain at low levels in the short term.



### Reference points

Scientific Council considers that a female survey biomass index of 15% of its maximum observed level provides a proxy for  $B_{lim}$  (SCS Doc. 04/12). This corresponds to an index value of 2 564 t. A limit reference point for fishing mortality has not been defined.

### Projections

Quantitative assessment of risk at various catch options is not possible for this stock at this time.

### Assessment

No analytical assessment is available. Evaluation of stock status is based upon fishery and research survey data.

The next assessment will take place prior the NAFO Annual Meeting in September 2023.

### Human impact

Mainly fishery related mortality and low bycatch in other fisheries. Other sources (e.g. pollution, shipping, oil-industry) are un-documented.

### Biological and Environmental Interactions

Multispecies models (SCR Docs. 16-35, and 18-24), suggest that predation by cod and redfish, together with fishing, were the main factors driving the shrimp stock to the collapse after 2007.

Results of modelling suggest that, in unexploited conditions, cod and redfish would be expected to be a highly dominant component of the system, and high shrimp stock sizes like the ones observed in the 1998 – 2007 period would not be a stable feature in the Flemish Cap. It is uncertain whether this represents a causal relationship and/or covariance as a result of some environmental factor.

A 2018 summary of the state of the fish community in the Flemish Cap (3M) EPU indicated that this ecosystem has not experienced sustained reductions in overall productivity observed in other EPUs. With the exception of

a short-lived increase in 2005-2009, total biomass has remained fairly stable over time despite the changes in individual stocks.

### Fishery

This fishery is effort-regulated. A moratorium was imposed in 2011. The fishery was reopened in 2020. Fishing effort and catches were very low in 2020 but increased in 2021. Due to the moratorium in 2022, catch and effort data is expected to be zero. Recent catches and agreed effort by the NAFO Commission were as follows:

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NIPAG	0	0	0	0	0	0	0	79	6 042 <sup>3</sup>	0 <sup>1</sup>
STATLANT 21	0	0	0	0	0	0	0	0	5 905	N/A
Effort <sup>2</sup> (Agreed Days)	0	0	0	0	0	0	0	2 640	2 640	ndf
Effort days used								21	440	0 <sup>1</sup>
SC Recommended Catches (tonnes)	ndf	ndf	ndf	ndf	ndf	ndf	ndf	5 448	5 448	0

<sup>1</sup> preliminary until 30 June

<sup>2</sup> effort regulated

<sup>3</sup> CESAG method

### Effects of the fishery on the ecosystem

The fishery was closed to directed fishing from 2011 to 2019, and in 2022.

### Special comments

In September 2019, the Commission asked the SC to advise on the possible sustainable management measures for northern shrimp in Div. 3M, including quota, fishing effort, periods or other technical measures. In its response, SC recommended that the management of 3M shrimp be converted from the existing “effort regulation” to “catch regulation” in line with all other stocks in the NAFO Regulatory Area. Full detail of the response is available in SCS Doc. 19-023

SC notes that only about 17% of the allocated effort was used in 2021, but the advised catch for 2021 was slightly exceeded. If all fishing days were used, the catches advised by SC would be expected to be greatly exceeded.

### Source of Information

SCR Doc. 22/052