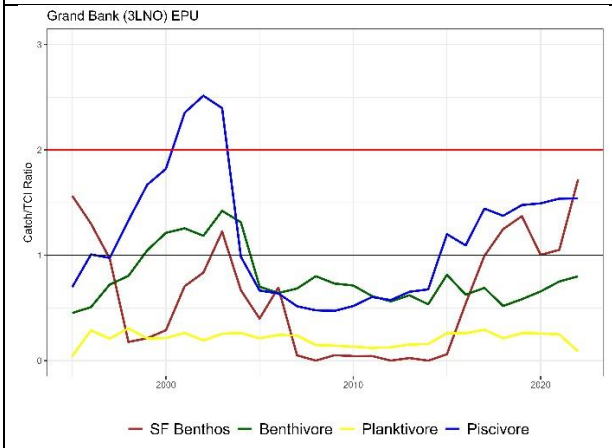
Roadmap Tier 1: Summary Report on Sustainability of Catches at the Ecosystem Level

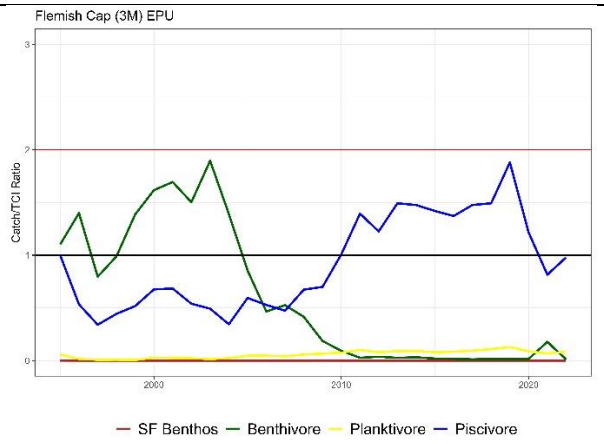
Since 2005 all Ecosystem Production Units (EPUs) evaluated (3M, 3LNO and 2J3K) have shown aggregate catch levels by functional guild which are consistent with the productivity of the EPUs and the risk level of ecosystem overfishing.

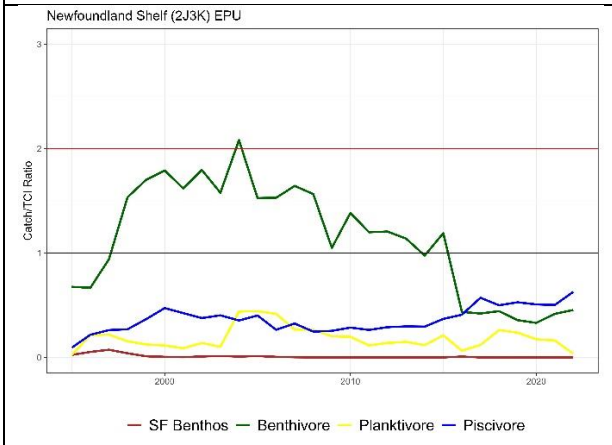
Approach:

Total Catch Index (TCI): This index is an indicator of the level of aggregated catch for a given functional guild (aggregate of species) that is consistent with the current productivity of the ecosystem (ecosystem sustainability). The comparison of aggregate catches with TCI is informative of the risk of ecosystem overfishing.

NAFO has adopted 2TCI as an ecosystem reference point to inform on ecosystem overfishing (EO).







Risk of ecosystem overfishing:

Catch > 2TCI: high risk of ecosystem overfishing

Catch between 1 and 2 TCI: intermediate risk of ecosystem overfishing

Catch < TCI: low risk of ecosystem overfishing

Summary:

Previous analyses demonstrated that, during 1960-1995, all the Ecosystem Production Units (EPUs) evaluated had experienced sustained catch levels consistent with ecosystem overfishing.

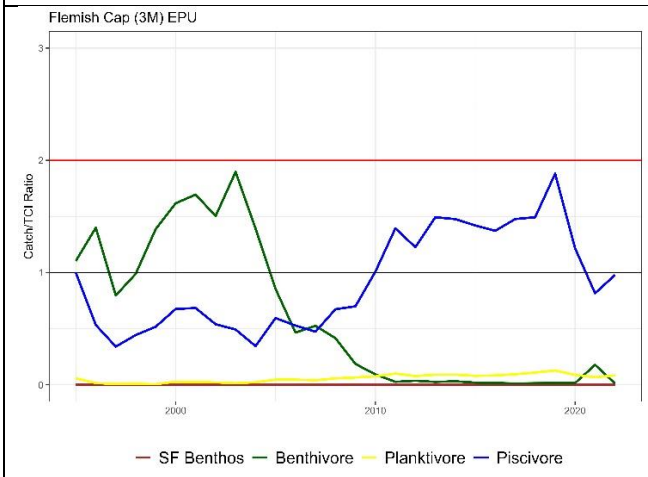
Since 2005 aggregated catches for all functional guilds have been below the 2TCI ecosystem reference point across all EPUs.

The catch levels for 2022 indicate a low risk of ecosystem overfishing on the Flemish Cap (3M) EPU and the Newfoundland Shelf (2J3K) EPU, and intermediate risk of ecosystem overfishing in the Grand Bank (3LNO) EPU.

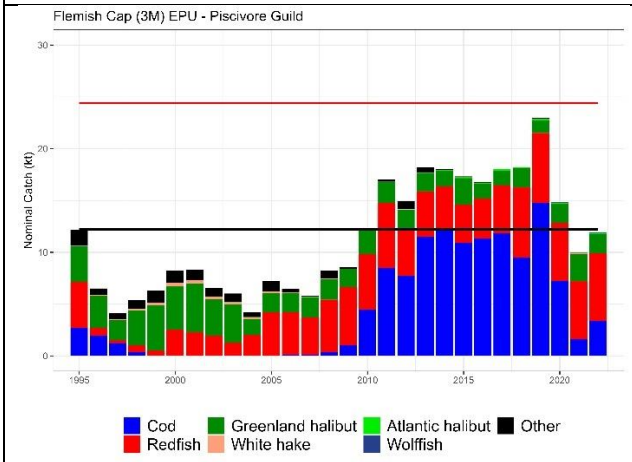
All catch levels are consistent with preventing a high risk of ecosystem overfishing.

Details by EPU

NAFO-managed stocks predominantly inhabit the Flemish Cap (3M) and Grand Bank (3LNO) EPUs, and typically belong to the Piscivore, Benthivore and Planktivore functional guilds. Details on catch composition in relation to TCI for these focal EPUs is provided below to complement stock-assessment advice, and further assist NAFO management discussions on appropriate TAC levels that can consider the risk of ecosystem overfishing (EO).

<table>
<tr><th colspan="2">Flemish Cap (3M) Ecosystem Production Unit (EPU)</th></tr>
<tr><td> 
</td><td>Overview

Catches for all functional guilds are below 2TCI, indicating that current fishing levels are consistent with preventing a high risk of ecosystem overfishing.

Catches for all functional guilds are currently below 1TCI, indicating a low risk of ecosystem overfishing.</td></tr>
<tr><td> 
</td><td>Piscivores Guild: low risk of EO

Current 2TCI=24kt

Catches are dominated by redfish, Greenland halibut and Atlantic cod.

Redfish (3M), Greenland halibut (2+3KLMNO) and Atlantic cod (3M) stocks are managed by NAFO.</td></tr>
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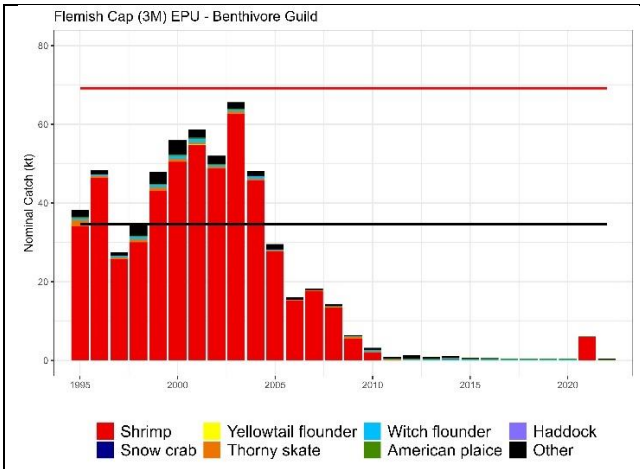
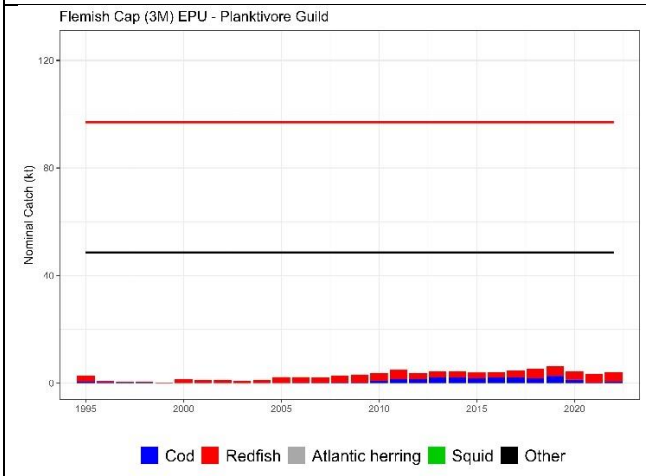
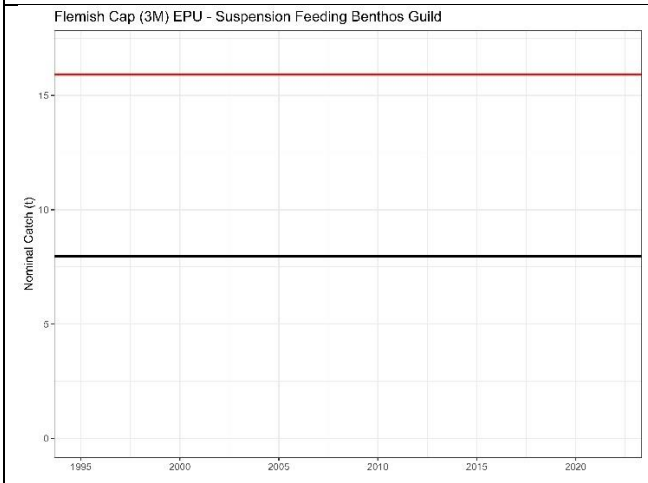
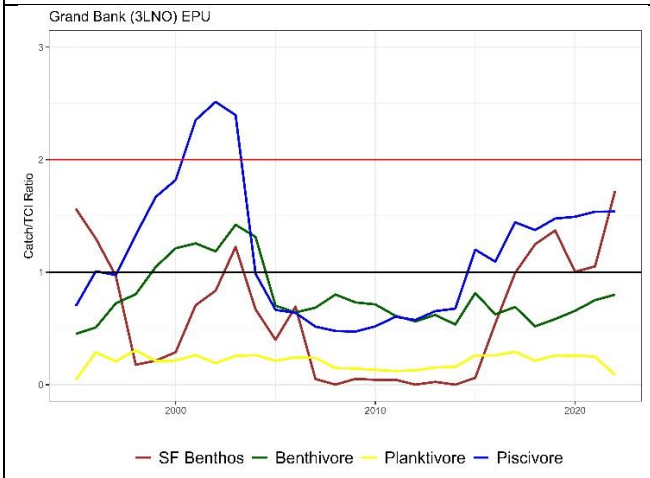
	**Benthivores Guild: low risk of EO** Current 2TCI=69kt Catches are dominated by shrimp. Shrimp (3M) stock is managed by NAFO.
	**Planktivore Guild: low risk of EO** Current 2TCI=97kt There are no fisheries directed on planktivores in this EPU. A fraction of Atlantic cod and redfish catches is mapped to this functional guild to account for production during the early part of their life histories. Catches are dominated by younger ages of Atlantic cod and redfish.
	**Suspension Feeding Benthos Guild: low risk of EO** Current 2TCI=159kt There are no fisheries directing for Suspension Feeding Benthos in this EPU.

Grand Bank (3LNO) Ecosystem Production Unit (EPU)

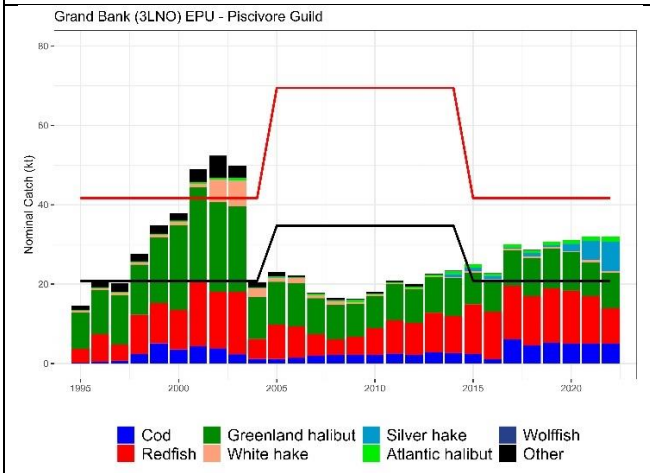


Overview

Catches for all functional guilds are below 2TCI, indicating that current fishing levels are consistent with preventing a high risk of ecosystem overfishing.

Catches for Piscivores and Suspension Feeding Benthos are between 1 and 2 TCI, indicating an intermediate risk of ecosystem overfishing.

Catches for Benthivores and Planktivores are below 1TCI, indicating a low risk of ecosystem overfishing.



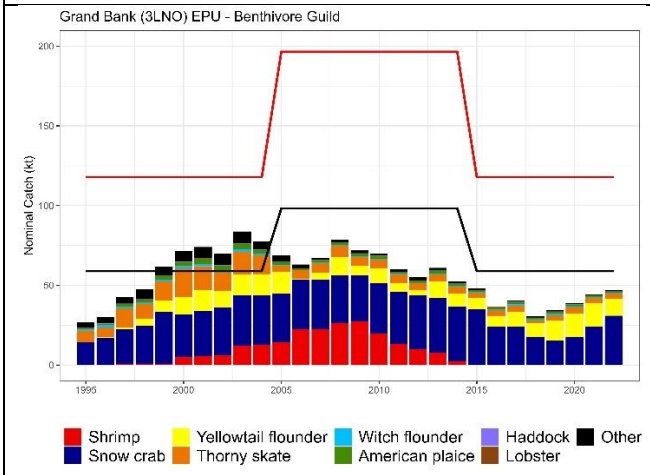
Piscivores Guild: intermediate risk of EO

Current 2TCI=42kt

Catches are dominated by redfish, Greenland halibut and Atlantic cod.

Redfish (3LN and 3O stocks), Greenland halibut (2+3KLMNO) and Atlantic cod (3NO -moratorium-) stocks are managed by NAFO, while the Atlantic cod (2J3KL -moratorium, Stewardship fishery only) stock is managed by Canada.

Catches of silver hake have noticeably increased since 2018, likely linked to ecosystem changes related to warming trends.

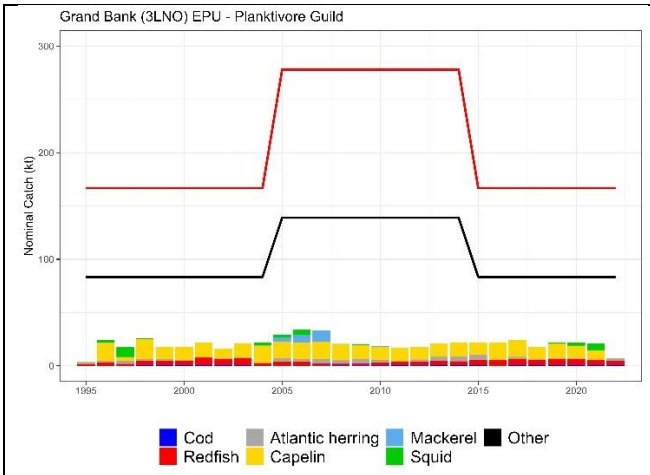


Benthivores Guild: low risk of EO

Current 2TCI=118kt

Catches are dominated by yellowtail flounder and snow crab.

Yellowtail flounder (3LNO) is managed by NAFO, while the snow crab (3L inshore, 3LNO offshore) is managed by Canada.



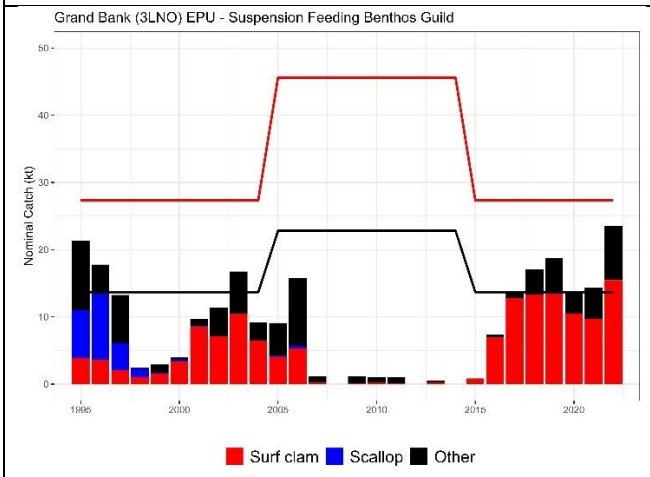
Planktivore Guild: low risk of EO

Current 2TCI=167kt

Catches are dominated by capelin (2J3KL).

Capelin (2J3KL) is managed by Canada.

A fraction of Atlantic cod and redfish catches is mapped to this functional guild to account for the planktivorous nature of these species during the early part of their life histories.



Suspension Feeding Benthos Guild: intermediate risk of EO

Current 2TCI=27kt

Catches are dominated by surf clam.

Surf clam is managed by Canada.