

SCIENTIFIC COUNCIL - SEPTEMBER 2025

Report of the Scientific Council and STACFIS Shrimp Assessment Meeting

9 to 11 September 2025
Halifax, Canada

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REPORT OF THE SCIENTIFIC COUNCIL AND STACFIS SHRIMP ASSESSMENT MEETING 9-11 September 2025, Halifax, Canada

Chair: Diana González-Troncoso (EU)

Rapporteur: NAFO Secretariat

I. PLENARY SESSIONS

Scientific Council met from 9 to 11 September 2025 at the NAFO Secretariat in Halifax, Canada to formulate management advice for Northern shrimp stocks. Representatives attended from Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Norway, the Russian Federation and Ukraine. A full list of participants is included in Appendix VI.

The Chair, Diana González-Troncoso (EU), opened the meeting at 08:46 on 9 September and welcomed participants. Scientific Council agreed to include the ICES ASC special session under agenda item 6 - Other Matters. The provisional agenda was revised and adopted as circulated. The NAFO Secretariat (Andrea Perreault) was appointed as rapporteur.

II. REVIEW OF SCIENTIFIC COUNCIL RECOMMENDATIONS IN 2024

Recommendations from 2024 are considered in the relevant sections of this report.

III. STANDING COMMITTEE ON FISHERIES SCIENCE (STACFIS)

The September 2025 STACFIS report is presented as Appendix I in this report.

IV. REFERENCE POINTS FOR STOCKS WITH FULL ASSESSMENTS IN 2025

A new NAFO Precautionary Approach Framework (PAF) was approved in September 2024. To fully implement this PAF, the PA-WG agreed that the Designated Experts (DEs) for the stocks that are scheduled to undergo a full assessment in a given year would work towards the development of Reference Points (RPs) that can be used in the revised PAF that year.

During the June 2025 SC meeting, it was proposed that for the shrimp stocks with full assessment this year (3LNO shrimp, and from the Coastal States requests, Northern shrimp in Denmark Strait and off East Greenland, and Northern shrimp in Subarea 0 and Subarea 1) the RPs be calculated during the September 2025 Scientific Council Shrimp Assessment Meeting.

1. Northern shrimp in Divisions 3LNO shrimp

A new understanding of Northern Shrimp population structure in the Northwest Atlantic, based upon their distribution, dispersal, and life history traits, has been shown to revise previous assumptions on the 3LNO stock. The 3LNO stock has been shown to be part of a much larger southern stock assessment region that also includes NAFO Divisions 2J and 3K (DFO 2025). A new assessment model taking into account these assumptions was accepted within Canada as the basis of the assessment of this stock. Using this model, new RPs for Canadian domestic stocks, consistent with the Canadian PAF, were adopted by the Canadian management authority in December 2024.

The assessment method used for the 3LNO shrimp stock in past years can no longer be applied as it is not consistent with the best available scientific information. It is also not possible at this stage to provide reference points consistent with the new NAFO PAF. Guidance from the Commission on how this stock is going to be assessed and feedback from the SC about the new assessment model approved by Canada for their domestic waters, are required.

SC **recommends** that, *once the guidance from the Commission is provided, the new assessment model be revised and eventually endorsed by the SC in plenary and to determine if the RPs derived from it would align with the NAFO PAF RPs.*

2. Northern shrimp off West Greenland (NAFO Subarea 0 and Subarea 1)

This stock is assessed via a Schaefer surplus-production model of population dynamics that includes a term for predation by Atlantic cod. The output of the assessment is Z_{msy} and F_{msy} is currently not estimated. The software has to be modified to give the value of F_{msy} . Due to time constraints, this was not possible during this meeting.

The value of Z_{msy} , B_{msy} , $B_{trigger}$ and B_{lim} can be derived directly from the model.

SC **recommends** that the value of F_{msy} be calculated before the September 2026 Scientific Council Shrimp Assessment Meeting. If possible, the F_{msy} value can be examined during the May 2026 PA-WG meeting with the results of the current assessment.

3. Northern shrimp in the Denmark Strait and off East Greenland (ICES Divisions 14b and 5a)

A surplus production model in continuous time (SPiCT) is used for assessing this stock. The model provides estimates of F_{msy} , B_{msy} , $B_{trigger}$ and B_{lim} . SC accepted the reference points as presented.

References

DFO. 2025. Northern Shrimp (*Pandalus borealis*) in North and South Stock Assessment Regions in 2024. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2025/042.

V. MANAGEMENT ADVICE

1. Request from the Commission

The Commission requests are given in Annex 1 of Appendix II. Requests relating to Northern shrimp were addressed in the present meeting, the remainder having been previously addressed during the Scientific Council June 2025 meeting (SCS Doc. 25/13).

a) Northern shrimp in Divisions 3LNO**Advice September 2025 for 2026 and beyond****Recommendation for 2026 and beyond**

A new understanding of Northern shrimp stock structure in the Northwest Atlantic indicates that the shrimp in 3LNO are part of a broader stock in a new South Stock Assessment Region, which also includes NAFO Divisions 2J3K.

The assessment method used for this stock in past years can no longer be applied as it is not consistent with the best available scientific information. It is also not possible at this stage to provide reference points consistent with the new NAFO Precautionary Approach Framework. For these reasons, no full assessment was carried out this year and no scientific advice can currently be provided.

Guidance from the Commission to Scientific Council is needed to determine the next steps for this stock, based on the management strategy the Commission intends to follow given the new available information.

b) Monitoring of Stocks for which Multi-year Advice was Provided in 2024

Interim monitoring update of Northern shrimp in Division 3M was conducted, and Scientific Council reiterates its previous advice, based on the previous NAFO PAF, as follows:

Northern shrimp in Division 3M: The stock remains below B_{lim} . To be consistent with the NAFO Precautionary Approach Framework, Scientific Council advises that no directed fishery should occur in 2025 and 2026.

2. Requests from Coastal States

Requests for management advice from Canada and Denmark (on behalf of Greenland) are presented in Annex 2 and 3 of Appendix II. Requests relating to Northern shrimp were addressed in the present meeting, the remainder having been previously addressed during the Scientific Council June 2025 meeting (SCS Doc. 25/13).

a) Northern shrimp in Subarea 0 and Subarea 1**Advice September 2025 for 2026****Recommendation for 2026**

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 2026 should not exceed 75 000 t.

With regard to the Canadian harvest strategy, Scientific Council notes that catches of 75 000 t in 2026 would result in a 33%, 31% and 30% risk of exceeding Z_{msy} in 2026, 2027 and 2028, respectively, assuming catches and the stock biomass at the same level as in 2026.

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 not exceed 35%, based on the 3-year projections. General principles from the *Convention on Cooperation in the Northwest Atlantic Fisheries* are applied.

<i>Objective</i>	<i>Status</i>	<i>Comment/consideration</i>
Maintain risk of being above Z_{msy} not exceeding 35%		The projected catches for 2025 equates to a risk of being above Z_{msy} by the end of 2025 of 45%. Scientific Council noted that the mortality is higher than the risk level of 35%.
Maintain the stock in the Healthy Zone (>75% of B_{msy})		The stock is below B_{msy} in 2025
Maintain risk of biomass being below B_{lim} of less than 1%		The risk of biomass in 2025 being below B_{lim} is less than 1%



OK



Intermediate



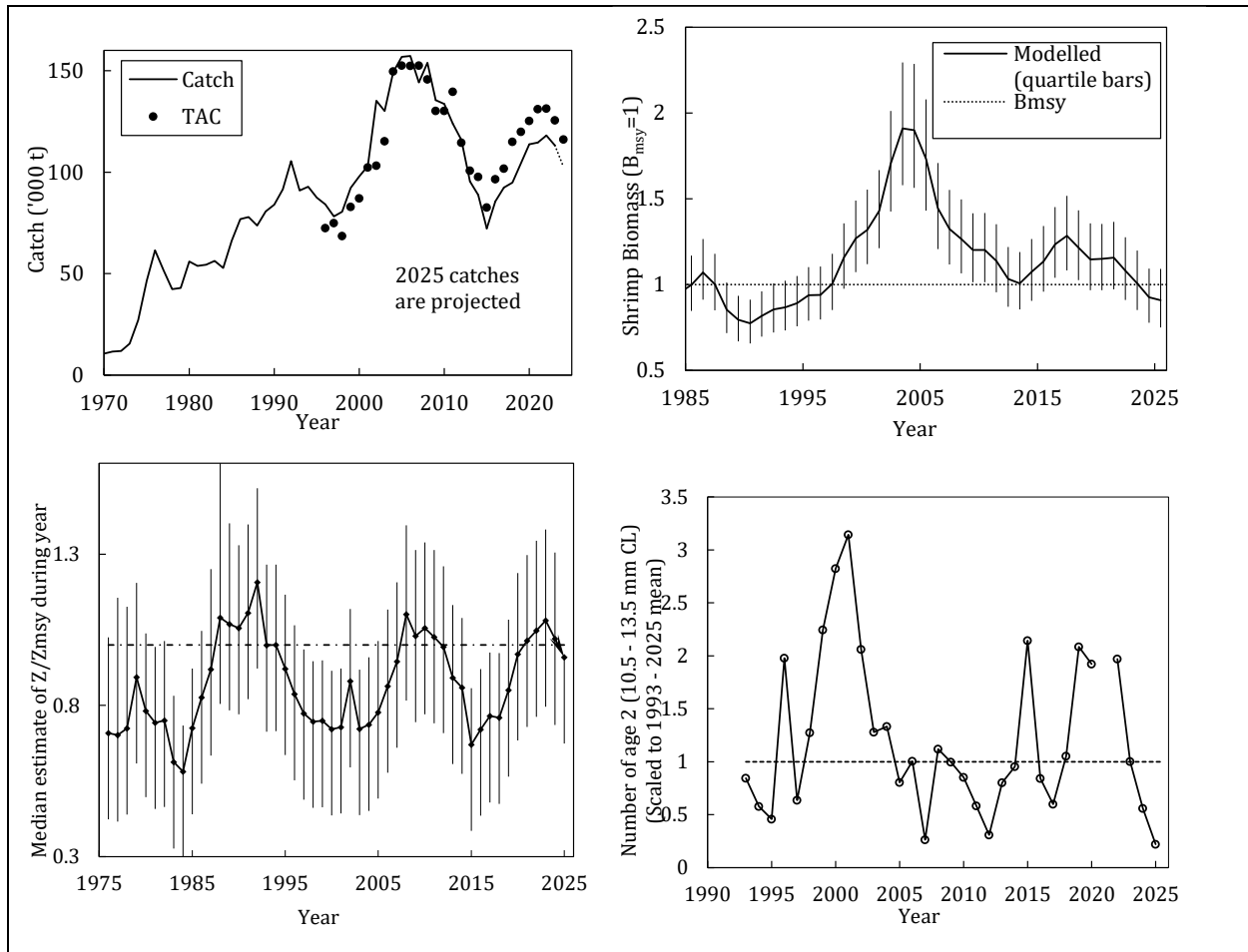
Not accomplished

Management unit

The stock is distributed throughout Subarea 1, extends into Div. 0A east of 60°30'W, and is assessed as a single stock. In 2024, more than 99% of the landings were from Greenland.

Stock status

At the end of 2025, we expect the stock to be in the Healthy Zone of the NAFO PA Framework. Biomass is below B_{msy} but above $B_{trigger}$. The probability of being below B_{lim} is very low (<1%). The probability of total mortality (Z) being above Z_{msy} is 45%. Recruitment (number of age-2 shrimp) in 2025 was below the time-series average.



Reference points

B_{lim} has been established as 30% of B_{msy} , $B_{trigger}$ is defined as 0.75 of 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 reference points in 2026-2028 under eight catch options and subject to predation by a cod stock with an effective biomass of 14 Kt were estimated.

14 000 t cod	Catch option ('000 tons)							
Risk of:	65	70	75	80	85	90	95	100
falling below B_{msy} end 2026 (%)	58	59	60	61	61	62	62	62
falling below B_{msy} end 2027 (%)	54	55	57	58	58	59	60	62
falling below B_{msy} end 2028 (%)	50	52	53	55	55	58	59	61
falling below B_{msy} end 2026 (%)	0	0	0	0	0	0	0	0
falling below B_{lim} end 2027 (%)	0	0	0	0	0	0	0	0
falling below B_{lim} end 2028 (%)	0	0	0	0	0	0	1	0
exceeding Z_{msy} in 2026 (%)	21	26	33	38	44	49	54	59
exceeding Z_{msy} in 2027 (%)	19	25	31	37	42	48	53	58
exceeding Z_{msy} in 2028 (%)	18	24	30	36	41	47	52	57
falling below B_{msy} 80% end 2026 (%)	30	30	31	32	32	33	34	35
falling below B_{msy} 80% end 2027 (%)	28	30	30	30	32	33	34	36
falling below B_{msy} 80% end 2028 (%)	27	27	30	30	31	35	36	37
falling below $B_{trigger}$ end 2026 (%)	23	24	24	24	25	26	27	27
falling below $B_{trigger}$ end 2027 (%)	21	23	24	25	25	27	28	29
falling below $B_{trigger}$ end 2028 (%)	21	21	24	24	26	28	29	31

Assessment

A Schaefer surplus-production model was used for the assessment of this stock.

The next assessment is scheduled for 2026.

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

There is no integrated summary information available on the structure, status and trends of the marine ecosystem for the area inhabited by this stock.

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

Ecosystem sustainability of catches

Shrimp is included in the benthivore guild. There are currently neither Ecosystem Production Units (EPUs) defined nor Total Catch Index (TCI) estimated for the distribution area of this stock.

Fishery

Shrimp are caught in a directed trawl fishery. The fishery is regulated by TAC.

Recent catches and TACs ('000 t) have been as follows:

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TAC										
SC Advised	90	90	105	105	110	115	115	110	95	80
Enacted GRL	82.8	87.9	99.9	103.4	108.3	113.7	113.8	109.1	101.7	82.3
*Greenland set aside to Canada	2.2	1.0	1.3	1.6	1.6	1.2	1.2	0.9	0.8	0.8
Enacted CAN	10.6	12.7	14.9	14.9	15.2	15.9	16.2	15.6	13.5	11.3
Enacted total	93.4	100.6	114.8	118.3	123.5	129.6	130.0	124.7	115.2	93.6
Catches (STACFIS)										
SA 1	84.4	89.4	93.2	102.0	113.1	114.3	118.1	113.0	99.8	83.0 ¹
Division 0A	1.2	3.2	1.7	2.5	0.6	0.2	0.0	0.0	0.0 ²	2.0 ¹
TOTAL	85.5	92.6	94.9	104.4	113.8	114.6	118.1	113.2	99.8	85.0 ¹
STATLANT 21										
SA 1	82.9	88.9	90.5	98.2	110.1	107.4	117.8	110.2	97.2	-
Division 0A	2.8	1.4	1.3	0.2	0.2	0.0	0.0	-	-	-

¹ Projected total catch for the year.

² Total catch in Canadian Shrimp Fishing Area 1 in Division 0A was 1.214 tons in 2024.

* Not included in enacted total

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

Scientific Council **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.*

STACFIS **recommends** *the continued development of reference points consistent with the NAFO PA Framework, notably F_{msy} .*

Source of Information

SCS Doc. 13/04, NAFO/COM-SC Doc. 24-03, SCR Docs. 20/053, 20/057, 22/045, 25/046, 25/052, 25/055.

b) Northern shrimp in Denmark Strait and off East Greenland**Advice September 2025 for 2026****Recommendation for 2026**

Scientific Council projected catches between 500 t – 3 000 t. Catches at 500 t kept the probability of B being below B_{lim} at less than 10% and catches of 1 000 t kept the probability of F being above F_{lim} at 30%.

Management objectives

No explicit management plan or management objectives have been defined by the Government of Greenland. General principles from the *Convention on Cooperation in the Northwest Atlantic Fisheries* are applied.

<i>Objective</i>	<i>Status</i>	<i>Comment/consideration</i>
Restore to or maintain at B_{msy}		$B_{lim} < B < B_{trigger}$
Eliminate overfishing		$F > F_{lim}$



OK



Intermediate



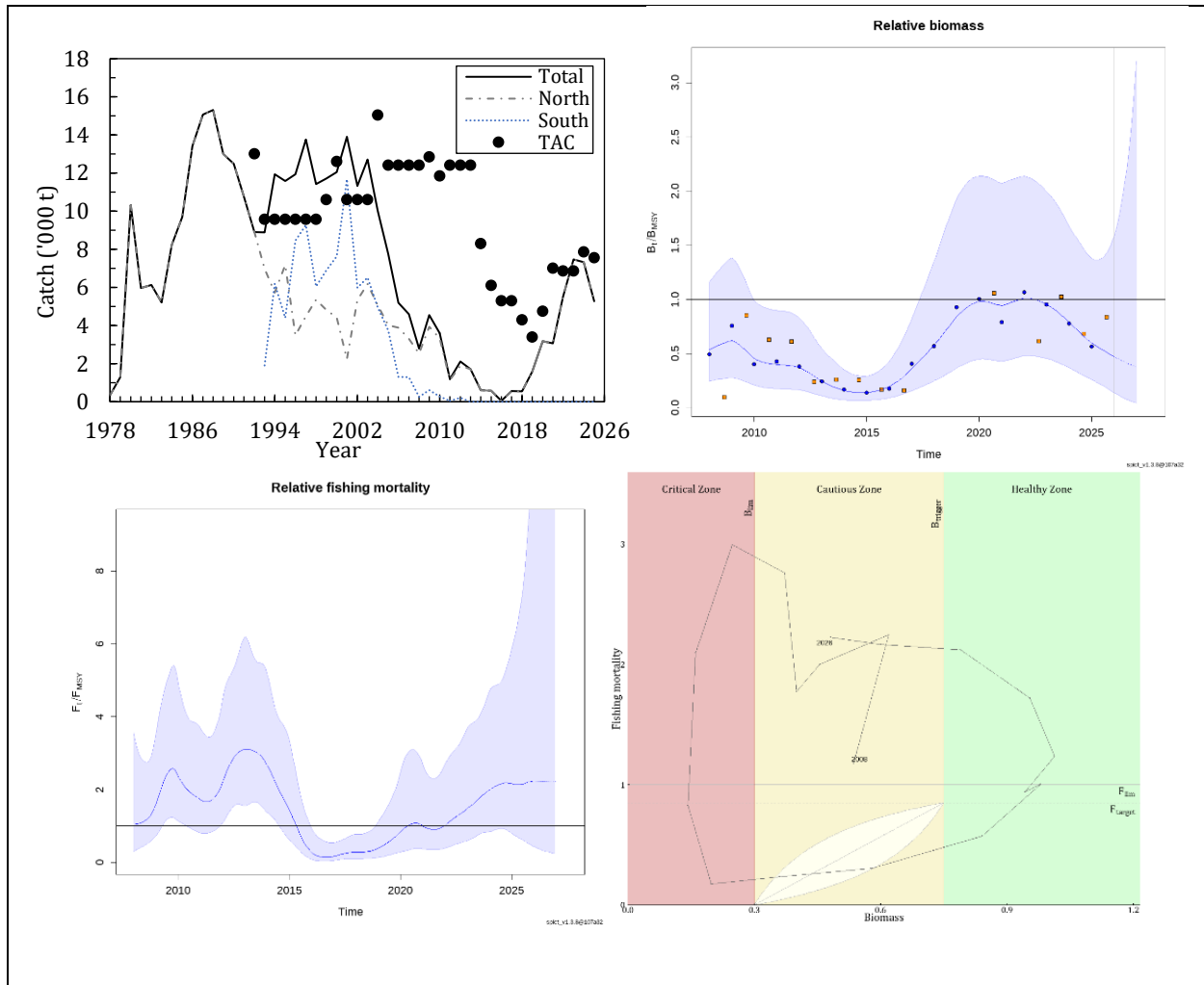
Not accomplished

Management unit

The shrimp stock is distributed off East Greenland in ICES Div. 14b and 5a and is assessed as a single stock.

Stock status

At the end of 2025, the stock is in the Cautious Zone of the NAFO PA Framework. The median biomass is below B_{msy} and $B_{trigger}$ ($B/B_{msy} = 0.48$) and the probability of being below B_{lim} is 23%. Fishing mortality is above F_{target} and F_{lim} ($F/F_{msy} = 2.22$). No estimates of recruitment are available.



Reference points

B_{lim} is defined as 30% of B_{msy} . $B_{trigger}$ is defined as 75% of B_{msy} . F_{lim} is defined as F_{msy} . F_{target} is defined as 85% of F_{msy} . The relative reference points B_{msy} and F_{msy} are estimated within the SPiCT model.

Projections

Predicted probabilities of transgressing reference points are estimated for six catch options for 2026 and the three scenarios as required for the stocks in the Cautious Zone of the NAFO PA Framework.

Catch 2025 = 7550 t											
			Cautious Zone			Catch Options (t)					
		F=0	F lower edge leaf	F midrib leaf	F upper edge leaf						
Yield	2026	0	291	628	1023	500	1000	1500	2000	2500	3000
$P(F > F_{lim})$	2026	0%	5%	17%	30%	12%	30%	45%	56%	66%	74%
$P(B < B_{lim})$	2026	4%	6%	9%	12%	8%	12%	18%	25%	32%	40%
$P(F > F_{target})$	2026	0%	6%	20%	36%	15%	35%	50%	62%	71%	78%
$P(B < B_{trigger})$	2026	48%	51%	55%	59%	53%	58%	63%	67%	70%	73%
$P(B_{end2026} > B_{end2025})$	2026	100%	100%	100%	97%	100%	97%	82%	62%	48%	38%
$(B_{end2026} - B_{end2025}) / B_{end2025}$		60%	54%	46%	35%	48%	35%	23%	10%	-4%	-17%

Catches above 2 500 t would result in a 30% or greater probability of B falling below B_{lim} and would likely result in continued decline of the stock.

Assessment

The Surplus Production in Continuous Time (SPiCT) model was used for the assessment of this stock.

The next assessment is scheduled for 2026.

Human impact

Mainly fishery related mortality has been documented. Other sources (*e.g.*, pollution, shipping, oil-industry) are considered un-documented.

Biological and Environmental Interactions

There is no integrated summary information available on the structure, status and trends of the marine ecosystem for the area inhabited by this stock. Atlantic cod is an important predator on shrimp, while the predation impact is unknown.

Ecosystem sustainability of catches

Shrimp is included in the benthivore guild. There are currently neither Ecosystem Production Units (EPUs) defined nor Total Catch Index (TCI) estimated for the distribution area of this stock.

Fishery

Shrimp is caught in a directed trawl fishery. The fishery is regulated by TAC and bycatch reduction measures include move-on rules and sorting grids.

Recent catches and TAC ('000 t) were as follows:

	2017	2018	2019	2020	2021	2022	2023	2024	2025
Enacted TAC	5.3	4.3	3.4	4.8	7.0	6.9	6.9	7.9	7.6
SC advised TAC	2.0	2.0	2.0	2.0	3.0	3.0	2.0	2.5	1.0
STACFIS Catch	0.6	0.5	1.6	3.2	3.1	5.5	7.5	7.3	5.3 ¹

¹ To June 30

Effects of the fishery on the ecosystem

Measures to reduce effects of the fishery on the ecosystem include move-on rules to protect sponges and corals.

Source of Information

SCR Docs. 25/041, 25/042, 25/043, NAFO/COM-SC Doc. 24-03

VI. OTHER MATTERS

1. Scheduling of Future Meetings

a) Scientific Council meetings

i) Scientific Council, 15 to 19 September 2025

The Scientific Council September 2025 meeting will be held in Halifax, Canada, 15-19 September 2025.

ii) WG-ESA, 4-12 November 2025

The Working Group on Ecosystem Science and Assessment will be held at Instituto Español de Oceanografía (IEO), Madrid, Spain, 4-12 November 2025.

iii) STACREC May 2026

The Standing Committee STACREC will meet by WebEx in May 2026. Date to be determined.

iv) PA-WG Meeting May 2026

The Precautionary Approach Working Group will meet by WebEx in May 2026. Date to be determined.

v) Scientific Council, June 2026

The Scientific Council June meeting will be held in Halifax, Canada, 29 May-11 June 2026.

vi) Scientific Council Shrimp, 15-17 September 2026

The Scientific Council September Shrimp 2026 meeting will be held in Halifax, Canada, 15-17 September 2026.

vii) Scientific Council, 21-25 September 2026

Scientific Council noted that the Annual Meeting will be held in Lithuania, 21-25 September 2026.

viii) WG-ESA, November 2026

Dates and location to be determined.

b) NAFO/ICES Joint Groups

i) NAFO/ICES Pandalus Assessment Group (NIPAG), 2026

The NIPAG meeting will be held in Copenhagen, Denmark, dates to be determined.

ii) ICES – NAFO Working Group on Deep-water Ecosystem (WG-DEC)

Dates and location to be determined.

iii) ICES/NAFO/NAMMCO Working Group on Harp and Hooded Seals (WG-HARP)

Dates and location to be determined.

c) Commission-Scientific Council Joint Working Groups

i) CESAG

The next meeting of the Catch Estimation Strategy Advisory Group (CESAG) will take place in autumn of 2025.

ii) WG-EAFFM

The joint Commission–Scientific Council Working Group on Ecosystem Approach Framework to Fisheries Management (WG-EAFFM) will take place in August 2026, location to be decided.

iii) WG-RBMS

The joint Commission–Scientific Council Working Group on Risk Based Management Systems (WG-RBMS) will take place in August 2026, locations to be decided.

2. Topics for Future Special Sessions

The Scientific Council agreed to propose an online shrimp aging workshop.

3. Other Business

There was no other business discussed.

VII. ADOPTION OF REPORTS

The STACFIS report was adopted on 11 September 2025. The Chair received approval to leave the report in draft form for about two weeks to allow for minor editing and proof-reading on the usual strict understanding there would be no substantive changes.

VIII. ADJOURNMENT

The Scientific Council meeting was adjourned at 15:14 on 11 September 2025. The Chairs thanked all participants, especially the Designated Experts, for their hard work. The Chairs thanked the NAFO Secretariat for all of their logistical support and for hosting the meeting. The report was adopted at the close of the meeting, subject to a period for editorial revision following this meeting.

APPENDIX I. REPORT OF STANDING COMMITTEE ON FISHERIES SCIENCE (STACFIS)

Chair: Martha Krohn (Canada)

Rapporteur: NAFO Secretariat

I. OPENING

STACFIS met from 9 to 11 September 2025 at the NAFO Secretariat in Halifax, Canada, to review stock assessments of Northern shrimp stocks. Representatives attended from Canada, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Norway, the Russian Federation and Ukraine. A full list of participants is included in Appendix VI.

The Chair, Martha Krohn (Canada), opened the meeting at 09:10 on 09 September and welcomed participants. The provisional agenda was adopted as circulated. The NAFO Secretariat (Andrea Perreault) was appointed as rapporteur.

II. GENERAL REVIEW

1. Review of Research Recommendations in 2024

Recommendations applicable to individual stocks are given under each stock in the “stock assessments” section of this report.

2. Review of Catches

Catches and catch histories were reviewed on a stock-by-stock basis in connection with each stock.

III. STOCK ASSESSMENTS

1. Northern shrimp (*Pandalus borealis*) on the Flemish Cap (NAFO Division 3M)

Interim monitoring report (SCR Doc. 04/77, 16/35, 18/24, 25/044)

a) Introduction

This stock is under effort regulation. The shrimp fishery in Div. 3M began in 1993. Catches peaked at over 60 000 t in 2003 and declined thereafter. A moratorium was imposed from 2011 to 2019. The fishery was reopened in 2020 after nine years under moratorium with an effort allocation of 2 640 fishing days/year. Both effort and catches in 2020 were very low (19 days and 79 t) but increased in 2021 (479 days and 5 703 t; Figure 1.1). A new moratorium was established in 2022 in Div. 3M so there has not been effort directed to the 3M shrimp since then.

Recent catches (tonnes) and effort agreed by the NAFO Commission were as follows (ndf=no directed fishery):

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
STACFIS	0	0	0	0	79	5 703 ³	0	0	0	0
STATLANT 21	0	0	0	0	0	5 905	NA ⁴	NA ⁴	NA ⁴	0 ¹
Effort ² (Agreed Days)	ndf	ndf	ndf	ndf	2 640	2 640	ndf	ndf	ndf	ndf
Effort days used	0	0	0	0	19	479	0	0	0	0

¹ Preliminary catches until June 30

² Effort regulated

³ CESAG method

⁴ NA - In 2022-2024, STATLANT 21 information is incomplete.

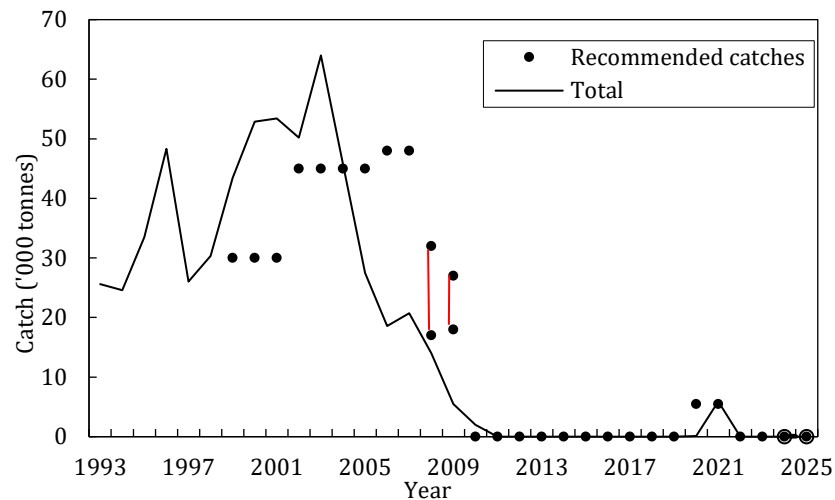


Figure 1.1. Shrimp in Div. 3M: Catches (STACFIS, '000 t) and recommended TAC in the period 1993-2025 (red lines in 2008 and 2009 indicate the catches range recommended by SC and dashed line preliminary catches of 2025).

b) Data overview

i) Fisheries and Catch

Because of the moratorium, catch and effort data were not available from 2011-2019 and for 2022-2025. Standardized CPUE series was not updated for 2020 or 2021.

ii) Research Survey Data

EU Bottom Trawl Research Survey. Stratified-random trawl surveys were conducted on Flemish Cap during the summer from 1988 to 2025. A new vessel was introduced in 2003 which continued to use the same trawl as was employed since 1988. The series prior to 2003 was converted into comparable units with the new vessel using the methods accepted by STACFIS in 2004.

Recruitment: Abundance at age 2 is used as the indicator of recruitment. Recruitment has been low since 2005. From 2021 to 2024, the abundances at age 2 were among the lowest of the historical series and in 2025, although it increased significantly, remains at low level (Figure 1.2).

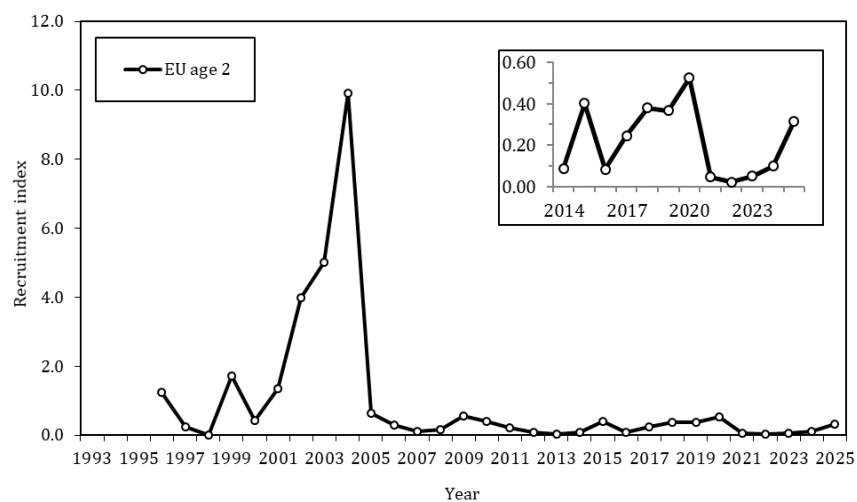


Figure. 1.2. Shrimp in Div. 3M: Abundance indices at age 2 from the EU survey. Each series was standardized to its mean. Inset shows the indices on a different vertical scale for the most recent period.

c) Conclusion

The 3M survey female biomass index was stable at a high level from 1998 to 2007, and subsequently declined until 2014. From 2015 to 2019, the female biomass index increased and was above B_{lim} between 2018 and 2020. Since 2021 the female biomass has been below B_{lim} (Figure 1.3).

The next assessment will take place in 2026.

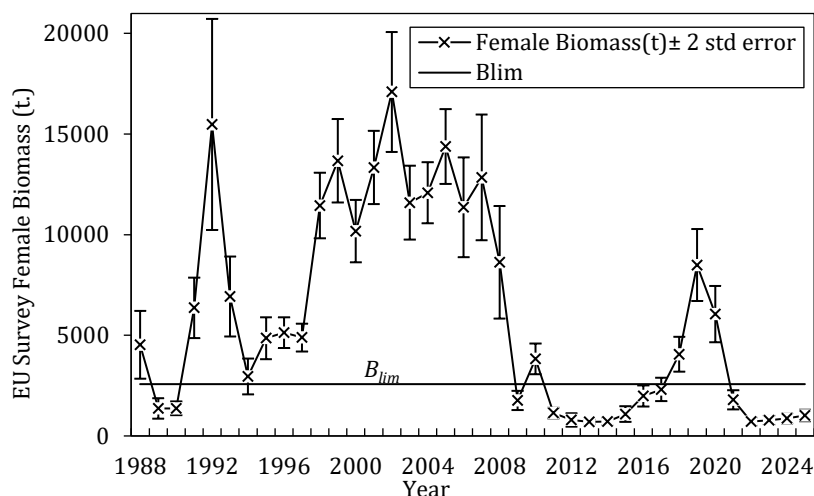


Figure 1.3. Shrimp in Div. 3M: Female biomass index from EU trawl surveys, 1988-2025. Error bars are 2 std. err.

d) Research Recommendations

NIPAG **recommended** in 2016 that *further exploration of the relationship between shrimp, cod and the environment be continued in WG-ESA and NIPAG encourages the shrimp experts to be involved in this work.*

No progress from last year. This recommendation is reiterated.

STACFIS **recommends** *a workshop be scheduled to advance the work being done on aging.*

STACFIS **recommends** *that an estimation of potential reference points be explored.*

STACFIS **recommends** *exploration of a quantitative model for this stock.*

2. Northern shrimp (*Pandalus borealis*) on the Grand Bank (NAFO Divisions 3LNO)

Interim monitoring Report (SCR. 14/048, SCS Doc. 04/12, SCR Doc. 24/037, SCS Doc. 24/18)

a) Introduction

The 3LNO shrimp stock is distributed around the edge of the Grand Bank, mainly in Div. 3L. A new understanding of Northern Shrimp population structure in the Northwest Atlantic, based upon their distribution, dispersal, and life history traits, has revised previous assumptions on the 3LNO stock. The 3LNO stock has been shown to be part of a new South Stock Assessment Region (SSAR) that also includes NAFO Divisions 2J and 3K (DFO 2025).

In 3LNO, the shrimp fishery began in 1993 and came under TAC control in 2000 with a 6 000 t TAC (3L only). Annual TACs were raised several times between 2000 and 2009 reaching a level of 30 000 t for 2009 and 2010. The TAC was then reduced annually until no directed fishing (ndf) was implemented in 2015 to 2025 (Figure 2.1). The TAC entries in the table below include autonomous TACs from Denmark (in respect of the Faroe Islands and Greenland). This fishery has historically been prosecuted mainly by Canada, EU-Estonia and the Faroes. Other counties also have some limited involvement in this fishery

Recent catches and TACs ('000 t) were as follows:

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TAC¹	ndf	ndf	ndf	ndf	ndf	ndf	ndf	ndf	ndf	ndf
STATLANT 21	0	0	0	0	0	0	NA ²	NA ²	NA ²	
STACFIS³	0	0	0	0	0	0	0	0	0	0 ¹

¹NAFO Provisional catches for first half of 2025

² NA - In 2022-2024, STATLANT 21 information is incomplete.

³STACFIS (NIPAG) catch estimates have been updated using various data sources (see p. 13, SCR. 14/048)

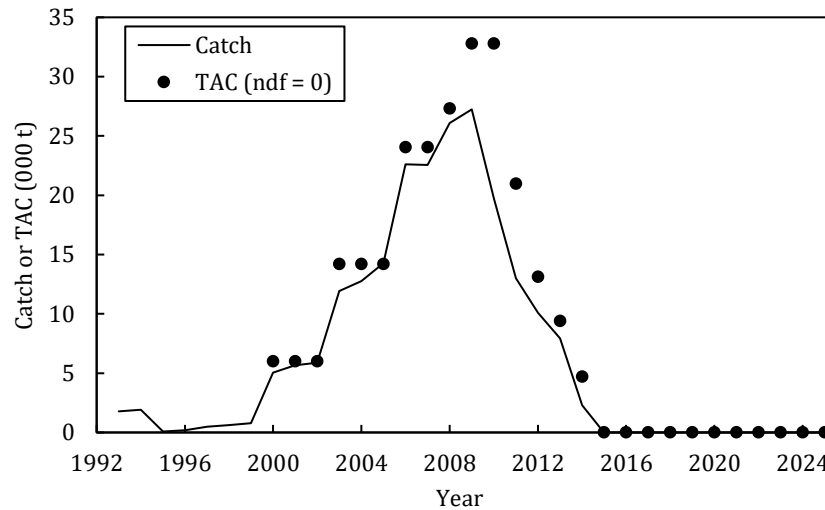


Figure 2.1. Shrimp in Divs. 3LNO: Catches and TAC. The TAC illustrated includes the autonomous quotas set by Denmark (in respect of the Faroe Islands and Greenland). No directed fishing is plotted as zero TAC.

b) Data Overview

i) Fisheries and Catch

Effort and CPUE. Catch and effort data have been available from Canadian vessel logbooks and observer records since 2000; however there was no fishery from 2015 to present.

ii) Research survey data

Canadian bottom trawl surveys. Canada has conducted stratified-random surveys in Divs. 3LNO, using a Campelen 1800 shrimp trawl for spring (1999-2025) and autumn (1996-2024). The autumn surveys in 2004, 2021 and 2022, and the spring surveys in 2015, 2017-2018 and 2020-2022 were incomplete and therefore could not be used to produce biomass indices for Divs. 3LNO. The autumn 2014 survey only surveyed Div. 3L, however since about 95% of the biomass in Divs. 3LNO comes from Div. 3L annually, it was considered useful as a proxy for Divs. 3LNO for 2014.

In September 2024, the application of conversion factors to account for the differences in catchability between outgoing and new survey vessels in the Canadian autumn surveys resulted in a revision of the biomass and exploitation rate indices in Divs. 3LNO (1996-2020), and recalculation of the reference point (B_{lim}). The most recent Canadian spring surveys cannot be directly compared to previous series due to a lack of conversion factors to new survey vessels for this stock.

EU-Spain surveys. EU-Spain has been conducting a stratified-random survey in the NAFO Regulatory Area (NRA) part of Div. 3L since 2003 and in the NRA part of Divs. 3NO since 1995. Prior to 2001, data were collected using a Pedreira trawl, and since 2001 they have been collected with a Campelen 1800 trawl. Pedreira trawl units were converted to Campelen equivalents. There were no EU-Spain Div. 3L surveys in 2005 or 2020-2022 and no Divs. 3NO survey in 2020.

Biomass indices. In Canadian surveys, about 95% of the biomass was found in Div. 3L, distributed mainly along the northeast slope in depths from 185 to 550 m. Total, fishable (shrimp with carapace length > 17mm) and female biomass (SSB) and abundance indices follow the same trend throughout the survey time series. There was an overall increase in both the autumn and spring indices to 2007 after which they decreased by over 95% to the lowest levels in the autumn time-series in 2018 and in the spring time-series in 2016 (Figure 2.2). The 2023 autumn survey indicated that the biomass indices have decreased slightly since 2020 and remain amongst the lowest levels in the autumn time-series. The 2024 spring survey indicated that the biomass indices have decreased slightly since 2023. There are no available 3LNO biomass index estimates from the

Canadian surveys for autumn 2024 and spring 2025 due a change in the index methodology and new understanding of the stock.

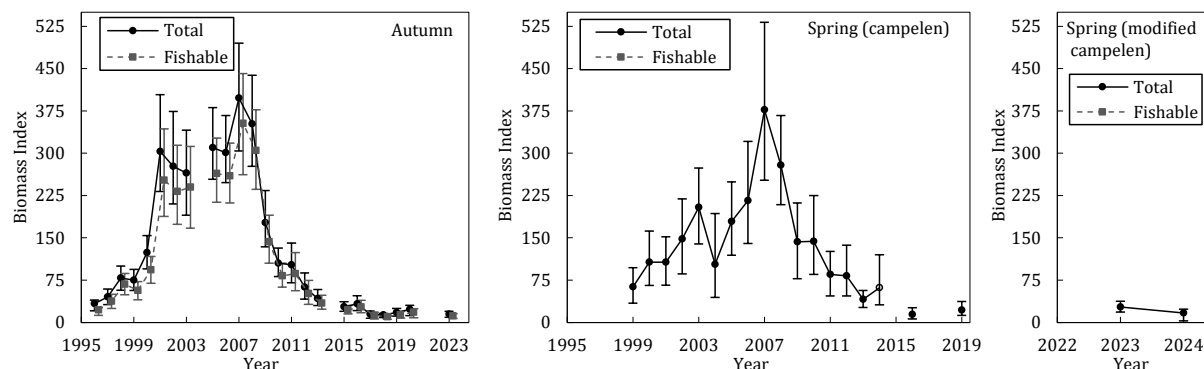


Figure 2.2. Shrimp in Divs. 3LNO: Left plot is total and fishable biomass index estimates from Canadian autumn multi-species surveys 1996-2023 (95% confidence intervals are given; time series corresponds to new vessels with modified Campelen). Middle plot is total and fishable biomass index estimates from Canadian spring multi-species surveys 1996-2019 (Campelen). Right plot is total and fishable biomass index estimates from Canadian spring multi-species surveys 2023-2024 (new vessels with modified Campelen; 2023 and 2024 only). The 2014 autumn index is for Div. 3L only. There are no available biomass index estimates for autumn 2021-2022, 2024 or for spring 2015, 2017-2018, 2020-2022, 2025.

EU-Spain survey biomass indices for Div. 3L and Divs. 3NO, within the NRA only, increased from 2003 to 2008 followed by a 93% decrease by 2012, remaining near that level through 2019 (Figure 2.3). The 2025 survey of Divs. 3NO indicated that the biomass index has increased above the biomass levels of the last 15 years but driven by two large survey sets. The 2025 survey estimate for Div. 3L is the second lowest in the time series. Throughout the survey time-series, more than 97% shrimp biomass has been captured in the 3L survey compared to the Divs. 3NO survey.

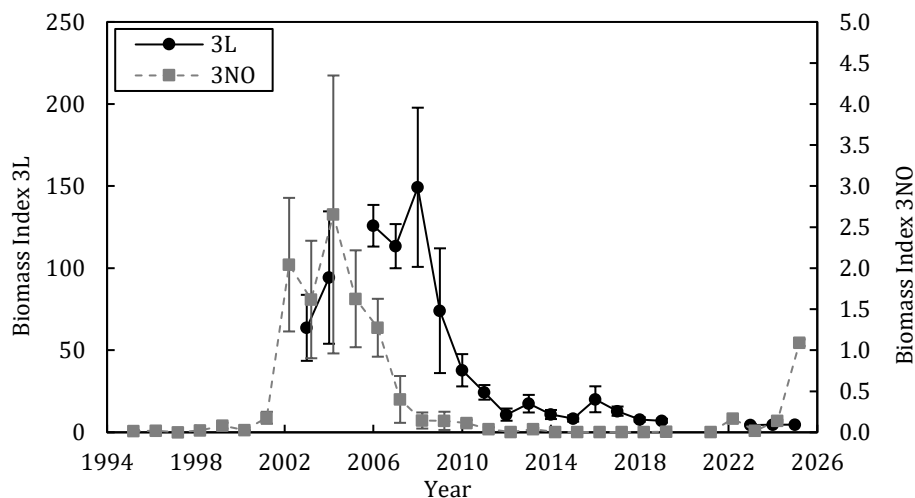


Figure 2.3. Shrimp in Divs. 3LNO: Total biomass index estimates from EU-Spain multi-species surveys (± 1 SE) in the NAFO Regulatory Area (NRA) of Divs. 3LNO. There are no available biomass index estimates for 2020 and only Divs. 3NO were surveyed in 2005 and 2021-2022.

c) Conclusions

Because of a new understanding of Northern Shrimp population structure in the Northwest Atlantic, which indicates that the 3LNO shrimp is part of a broader stock known as the South Stock Assessment Region, the assessment method used for this stock in past years can no longer be applied as it is not consistent with the best available scientific information. It is also not possible at this stage to provide reference points consistent with the new NAFO PA Framework. For these reasons, no full assessment was carried out this year.

d) Research recommendations

NIPAG **recommends in 2018** that *further work on the development of a recruitment index for Divs. 3LNO be completed.*

Status: In December 2024, a new stock assessment model was adopted to provide scientific advice for Canadian domestic stocks (DFO 2025). The new stock assessment model provides recruitment estimates at the regional scale.

STACFIS **recommends** that *an estimation of potential reference points be explored that is consistent with NAFO Precautionary Approach.*

Status: New reference points need to be developed at the scale of the new South Stock Assessment Region in order to apply the NAFO PA Framework.

e) References

DFO. 2025. Northern Shrimp (*Pandalus borealis*) in North and South Stock Assessment Regions in 2024. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2025/042.

3. Northern shrimp (*Pandalus borealis*) off West Greenland (NAFO Subarea 0 and Subarea 1)

Full Assessment (SCR Docs. 04/075, 076, 08/006, 11/053, 058, 12/044, 13/054, 20/053, 054, 058, 25/021, 052, 053, 054, 055)

Environmental Overview

Hydrographic conditions in this region depend on a balance of ice melt, advection of polar and sub-polar waters and atmospheric forcing, including the major winter heat loss to the atmosphere that occurs in the central Labrador Sea. The cold and fresh polar waters carried south by the east Baffin Island Current are counter balanced by warmer waters that are carried northward by the offshore branch of the West Greenland Current (WGC). The water masses constituting the WGC originate from the western Irminger Basin where the East Greenland Current (EGC) meets the Irminger Current (IC). While the EGC transports ice and cold low-salinity Surface Polar Water to the south along the eastern coast of Greenland, the IC is a branch of the North Atlantic current and transports warm and salty Atlantic Waters northwards along the Reykjanes Ridge. After the currents converge, they turn around the southern tip of Greenland, forming a single jet (the WGC) that propagates northward along the western coast of Greenland. The WGC is important for Labrador Sea Water formation, which is an essential element of the Atlantic Meridional Overturning Circulation. At the northern edge of the Labrador Sea, after receiving freshwater input from Greenland and Davis Strait, part of the WGC bifurcates southward along the Canadian shelf edge as the Labrador Current.

a) Introduction

The shrimp stock off West Greenland is distributed mainly in NAFO Subarea 1 (Greenland Exclusive Economic Zone (EEZ)), but a small part of the habitat, and of the stock, extends into the eastern edge of Division 0A (Canadian EEZ). Canada has defined 'Shrimp Fishing Area 1' (Canadian SFA1) to be the part of Division 0A lying east of 60°30'W, i.e., east of the deepest water in this part of Davis Strait.

The stock is assessed as a single population.

i) Commercial Fisheries data

The Greenland fishery exploits the stock in Subarea 1 (Divisions 1A–1F). The Canadian fishery has been limited to Division 0A.

The Canadian and the Greenland offshore fleets have been restricted by areas and quotas since 1977. The Greenland coastal fleet has privileged access to inshore areas (primarily Disko Bay and Vaigat in the north, and Julianehåb Bay in the south). Sorting grids are required in both the Greenland and the Canadian fleets to reduce bycatch of fish. Discarding of shrimp is prohibited.

The TAC for Greenland waters in 2025 was set at 83 125 t and, for Canadian waters, 11 333 t. The total enacted TAC between Greenland and Canada has historically exceeded the TAC recommended by the Scientific Council.

Total Greenlandic catch increased to an average over 150 000 t from 2005 to 2008 and decreased to 72 256 t in 2015 (Figure 3.1). Since 2016, the catch increased in conjunction with increasing TACs to a high of 113 223 t in 2023. However, TAC has been declining over recent years and consequently catches declined to 99 809 t in 2024. The projected catch for 2025 is 85 000 t in Greenlandic EEZ (Subarea 1). Since the early 2000s the Greenlandic fishery has moved north and currently about 80% of the total catch is taken in Division 1A and 1B.

Canadian fishing effort has been sporadic and catches variable. In 2016 fishing increased in the Canadian EEZ with catches reaching a maximum of 3 215 t in 2017 and declining to very low levels since 2021. The projected catch for Canada from Division 0A in 2025 is expected to be low.

Recent catches, projected catch for 2025, and recommended and enacted TACs ('000 t) for Northern shrimp in Subarea 1 and Division 0A (east of 60°30'W) are as follows:

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TAC										
SC Advised	90	90	105	105	110	115	115	110	95	80
Enacted GRL	82.8	87.9	99.9	103.4	108.3	113.7	113.8	109.1	101.7	82.3
*Greenland set aside to Canada	2.2	1	1.3	1.6	1.6	1.2	1.2	0.9	0.8	0.8
Enacted CAN	10.6	12.7	14.9	14.9	15.2	15.9	16.2	15.6	13.5	11.3
Enacted total	4	100.6	114.8	118.3	123.5	129.6	130	124.7	115.2	93.6
Catches (STACFIS)										
SA 1	84.4	89.4	93.2	102	113.1	114.3	118.1	113	99.8	83 ¹
Division 0A	1.2	3.2	1.7	2.5	0.6	0.2	0	0	0 ²	2 ¹
TOTAL	85.5	92.6	94.9	104.4	113.8	114.6	118.1	113.2	99.8	85 ¹
STATLANT 21										
SA 1	82.9	88.9	90.5	98.2	110.1	107.4	117.8	110.2	97.2	-
Division 0A	2.8	1.4	1.3	0.2	0.2	0	0	-	-	-

¹ Projected total catch for the year

² Total catch in Canadian Shrimp Fishing Area 1 in Division 0A was 1.214 tonnes in 2024

* Not included in enacted total

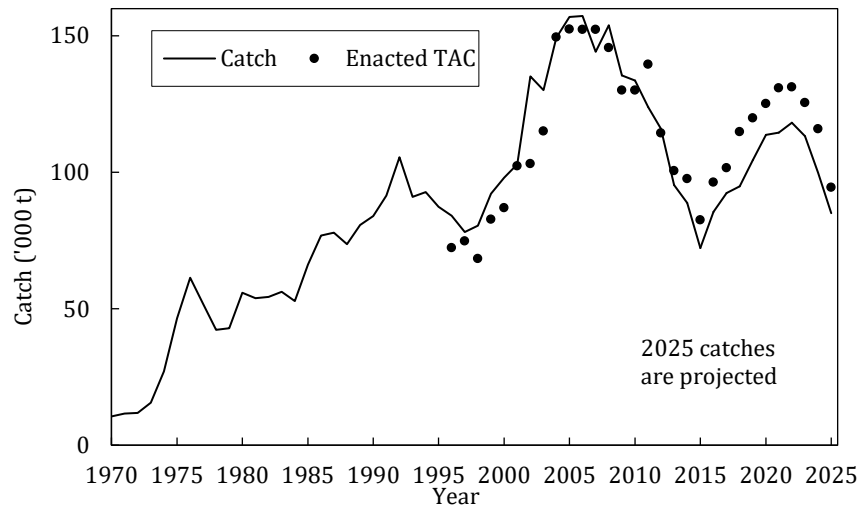


Figure 3.1. Northern shrimp in Subarea 0 and Subarea 1: Total enacted TACs and total catches.

b) Data overview

i) Commercial Fisheries Data

Fishing effort and CPUE. Catch and effort data from the fishery were available from Greenland logbooks for Subarea 1. In recent years both the distribution of the Greenland fishery and fishing power have changed significantly: for example, larger vessels have been allowed in a limited part of coastal areas; the coastal fleet has fished outside Disko Bay; the offshore fleet now commonly uses double trawls or triple trawls. Furthermore, quota transfers between the two fleets are now allowed.

CPUEs were standardized by linearized multiplicative models including terms for vessel, month, gear type, year and statistical area. Standardized CPUE series were done separately for three different fleets (Figure 3.2); the early offshore fleet fishing in Division 1A and part of Division 1B (Royal Greenlandic Trade (KGH)-index, 1976-1990), the present offshore fleet fishing in Subarea 1 (1987-2025) and the coastal fleet fishing in coastal and

inshore areas (1989-2025). In recent years the CPUE of the coastal fleet has remained stable, while the CPUE of the offshore fleet increased to 2017 and then declined until 2024. Partial data from 2025 indicate CPUE for combined fleet components will decline slightly. CPUE for the Canadian fleet fishing in Division 0A is lower than in Greenland.

The three Greenland CPUE series are combined by assuming they all reflect the overall biomass series scaled by a constant fleet factor, and that the errors had a mean of zero and variances that were inversely proportional to the fishing ground of the fleet. The estimation was done in a Bayesian framework.

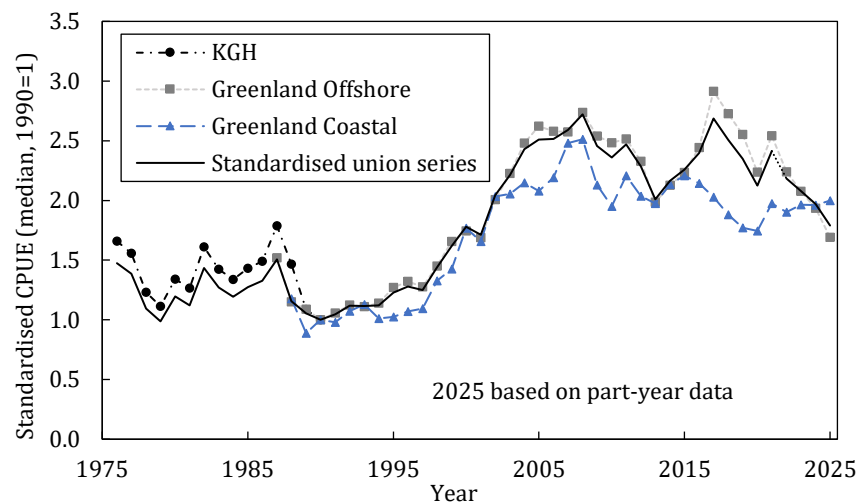


Figure 3.2. Northern shrimp in Subarea 0 and Subarea 1: Standardized Greenland CPUE index series in 1976-2025. The 2025 point is based on data from 1 January to 30 June 2025.

The distribution of catch and effort among statistical areas was summarized using Simpson's diversity index to calculate an 'effective' number of statistical areas being fished as an index of how widely the fishery is distributed (Figure 3.3). The 'effective' number of statistical areas being fished in Subarea 1 reached a plateau in 1992-2003. The range of the fishery has since contracted northwards, and the 'effective' number of statistical areas being fished has decreased.

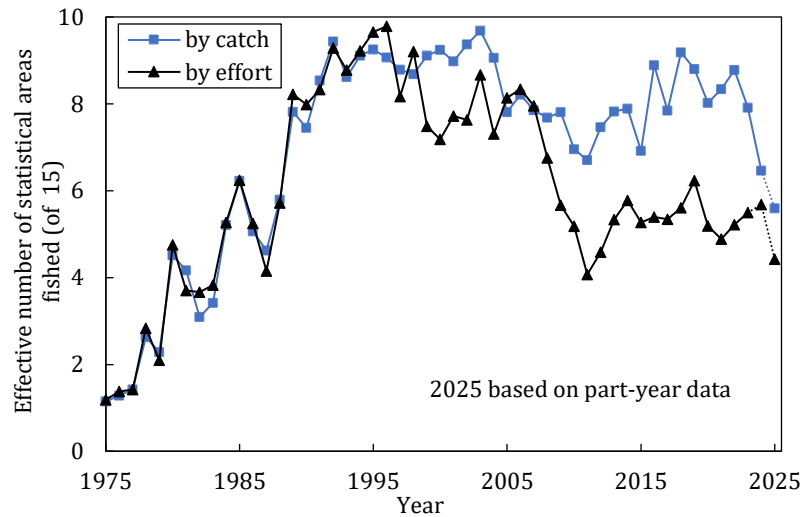


Figure 3.3. Northern shrimp in Subarea 0 and Subarea 1: Indices for the distribution of the Greenland fishery between statistical areas in 1975-2025. The 2025 point is based on data from 1 January to 30 June 2025.

Catch composition. The current data from the commercial samples in Greenlandic EEZ provide valuable information of size compositions of shrimp in the fishery. No information is available from SFA1 in Canadian EEZ.

ii) Research survey data

Greenland trawl survey. Random stratified trawl surveys designed primarily to estimate shrimp stock biomass have been conducted since 1988 in offshore areas and since 1991 also inshore in Subarea 1. From 1993, the survey was extended southwards into Division 1E and 1F. A cod-end liner of 22 mm stretched mesh has been used since 1993. From its inception until 1998 the survey used 60-minute tows, but since 2005 all tows have lasted 15 minutes. In 2005 the *Skjervøy 3000* survey trawl was replaced by a *Cosmos 2000* with rock-hopper ground gear. Calibration trials were conducted, and the earlier data were adjusted.

In 2018 and 2019-2020, the annual trawl survey was conducted with two different chartered vessels during the same time of year as the usual survey, and in 2021 no survey was conducted due to vessel unavailability. Since 2022 the survey has been conducted with the new Greenlandic research vessel *Tarajoq*. All the standard gears were identical to those used on the research vessel *Paamiut* (such as Cosmos trawl, doors, all equipment such as bridles etc., *Marport* sensors on doors and headlines), and all the standard research protocols were followed in an attempt to make the surveys as identical as possible with the previous years' survey with the research vessel *Paamiut*. It is therefore assumed that the 2018, 2019-2020 and 2022-2025 results were directly comparable with the previous surveys, however without comparative fishing there remains some uncertainty.

In 2023, there was heavy ice coverage north of 66°N in the Greenland EEZ, which prevented trawling at many planned stations during the survey. Due to poor survey coverage in the northern survey area, it is uncertain if the 2023 survey results reflect the stock trajectory and status. Hence, it was assumed that the commercially important areas in north were not covered properly. In order to compensate for the un-surveyed area, an average of the past five-year values of biomass and density in the un-surveyed stratum/strata were used to replace missing values for 2023 assessment of the West Greenland shrimp stock.

The survey average bottom temperature increased from about 1.7°C in 1990-1993 to about 3.1°C in 1997-2014 but declined to 2.1°C in 2018. Since 2022 temperature has averaged around 3°C. About 80% of the survey biomass is in water 200-400 m deep throughout the time series. Since 2001 most of the survey biomass has been in water 200-300 m deep. The proportion of survey biomass in Division 1E-F has been low in recent years and the distribution of survey biomass, like that of the fishery, has become more northerly.

Biomass. The survey index of total biomass remained fairly stable from 1988 to 1997. It then increased until 2003. Subsequent values declined, with the second lowest level in the last 22 years occurring in 2014 (Figure 3.4). Since 2017 biomass has remained relatively stable but since 2020 showed a decline.

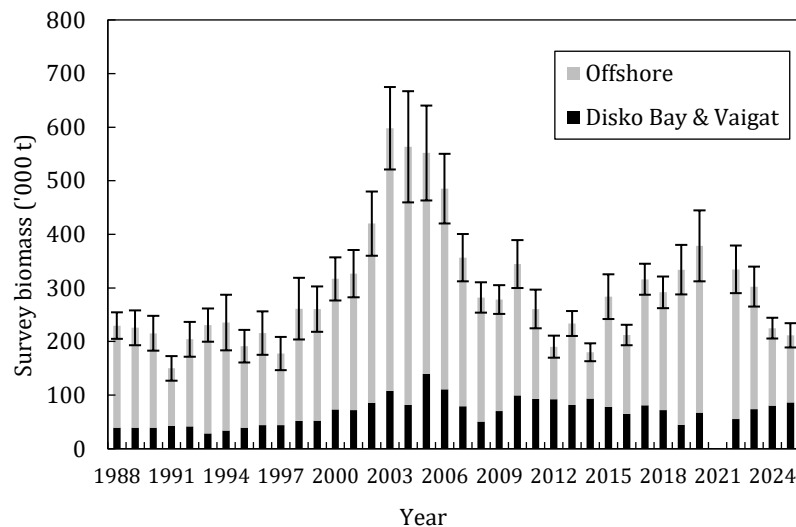


Figure 3.4. Northern shrimp in Subarea 0 and Subarea 1: Biomass index (survey mean catch rates) inshore (Disko Bay and Vaigat) and offshore, 1988-2025 (error bars ± 1 SE).

Length and sex composition. In 2025, in Disko Bay the proportion of fishable males in the survey was in the upper quartile of the 20-year series, whereas the proportion of fishable males in the offshore regions was in the lower quartile. Females comprise a high proportion of fishable biomass indices in both regions. Female biomass index was above the 20-year median offshore, and below the 20-year median in Disko Bay (Figure 3.5).

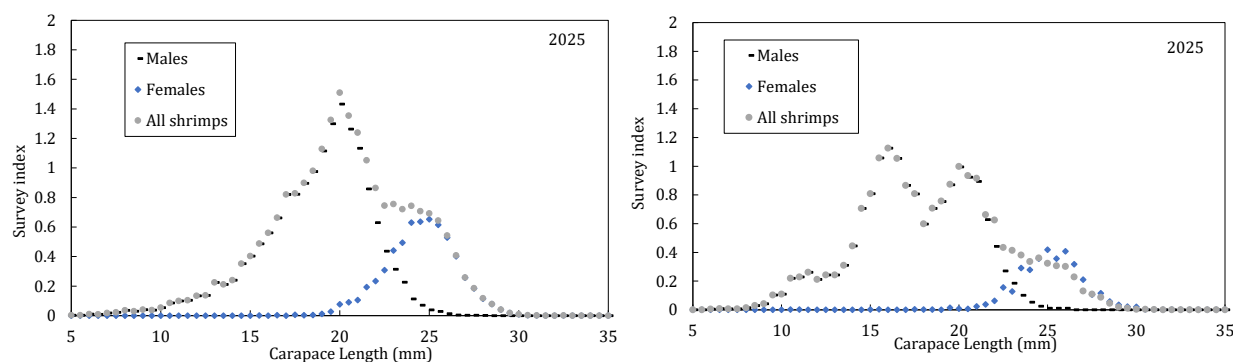


Figure 3.5. Northern shrimp in Subarea 0 and Subarea 1: Survey mean catch composition at length in offshore regions (left) and Disko Bay & Vaigat (right) in the West Greenland trawl survey in 2025.

Recruitment. Throughout the time series, age-2 (10.5 to 13.5 mm carapace length (CL)) recruitment has been variable and has declined from 2022, reaching the lowest in the series in 2025 (Figure 3.6).

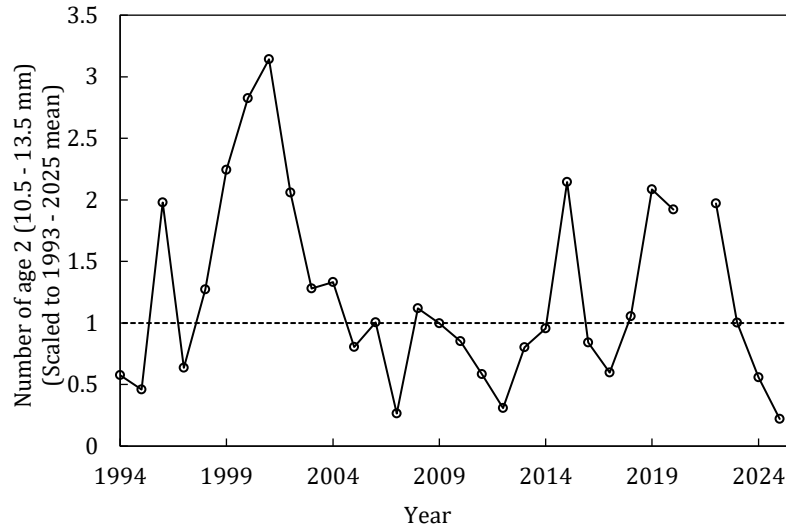


Figure 3.6. Northern shrimp in Subarea 0 and Subarea 1: Survey index of numbers at age 2 (10.5-13.5 mm CL), 1993-2025. Indices are standardized to the series mean (dashed line).

Predation index. Since 2020, the overall Atlantic cod stock biomass index used within the shrimp assessment model has been computed using a state-space assessment model (SAM) based on catch at age in the commercial fishery and the Greenland trawl survey.

Indices of cod biomass are adjusted by a measure of the overlap between the stocks of cod and shrimp to obtain an index of 'effective' cod biomass, which is entered in the assessment model. Currently the cod stock in West Greenland is at a low level compared to the period before the cod collapse in the beginning of the 1990s. The cod stock biomass has been increasing slightly since 2017 and was estimated to be 53 Kt in 2025 and is composed of several year-classes. The index of its overlap with the shrimp stock is still below the time series average. This resulted in a 2025 'effective' cod biomass index of 14 Kt (Figure 3.7).

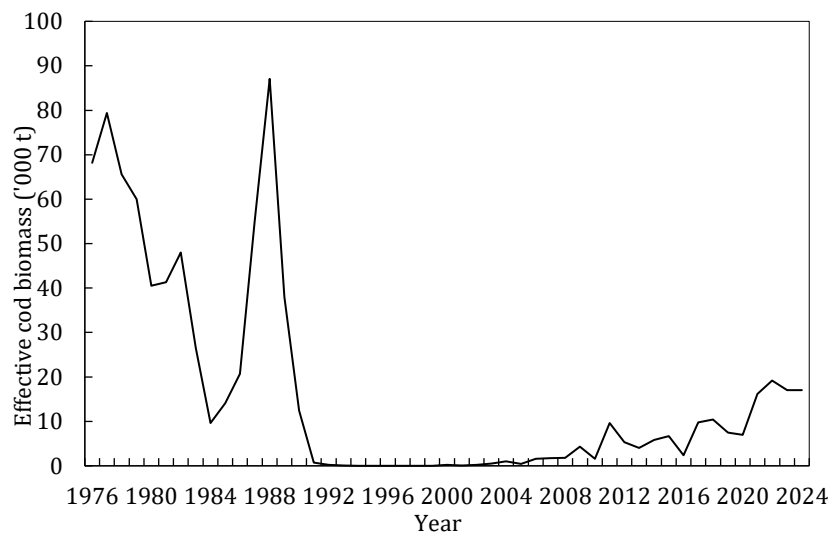


Figure 3.7. Northern shrimp in Subarea 0 and Subarea 1: Indices of the 'effective' cod biomass in Subarea 1 and Division 0A, 1976-2025.

c) Assessment

A Schaefer surplus-production model of population dynamics was fitted to series of CPUE, catch, and survey fishable biomass indices (considered shrimp larger than 17mm CL). The model includes a term for predation by Atlantic cod (Figure 3.7). Total shrimp catches for 2025 are expected to be 85 000 t based on historical fishing patterns.

Estimates of stock-dynamic parameters from fitting a Schaefer stock-production model to 50 years' data are given in Table 3.1. Median values from the 2024 assessment are provided for comparison. The modelled biomass (Figure 3.8) declined steadily from 2004 to 2013, increased slightly until 2017 and has declined since 2022. Biomass at the end of 2025 is projected to be slightly lower than in 2024 and is below B_{msy} . The probability of the biomass at the end of 2025 being below B_{msy} is 55% and the probability of being below B_{lim} is very low (<1%). The probability of being below $B_{trigger}$ is 25%. Mortality has generally been close to or below Z_{msy} during the modelled period (Figure 3.9). Estimates of total mortality have increased in the most recent years. Assuming catches of 85 000 t, total mortality in 2025 is estimated to be close to Z_{msy} with probability of $Z_{2025} > Z_{msy} = 45\%$.

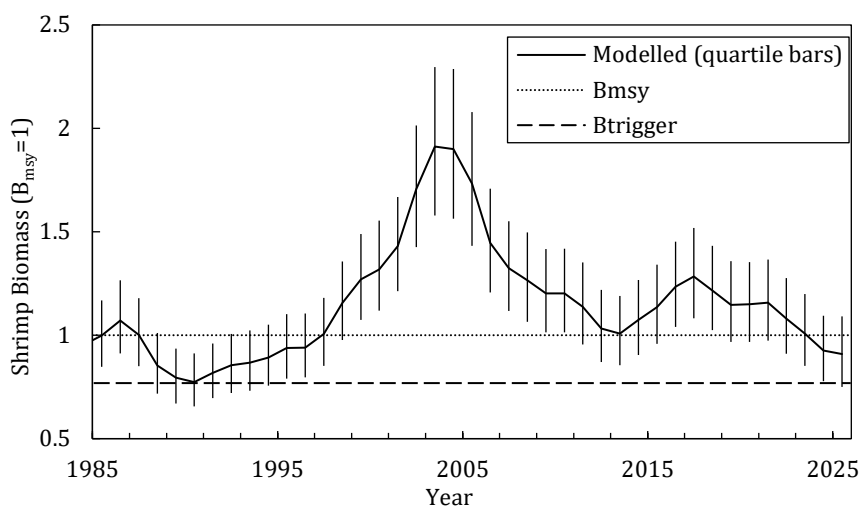


Figure 3.8. Northern shrimp in Subarea 0 and Subarea 1: Relative stock biomass with quartile error bars 1976-2025. Dotted line corresponds to $B = B_{msy}$. Dashed line corresponds to $B = B_{trigger}$.

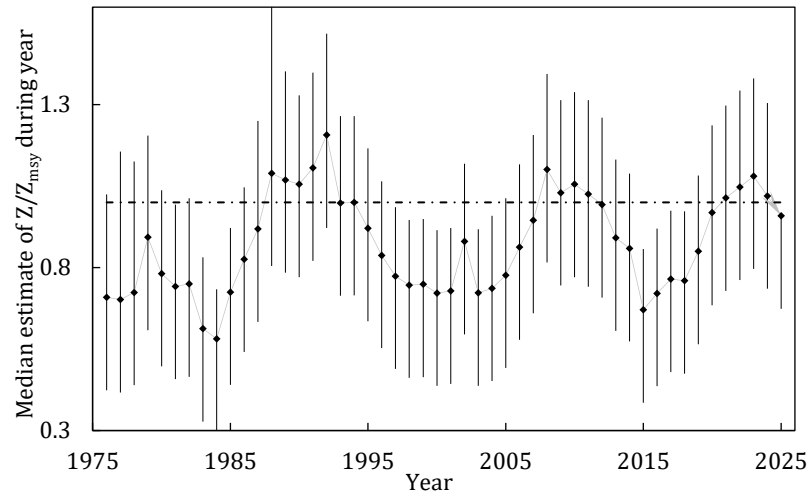


Figure 3.9. Northern shrimp in Subarea 0 and Subarea 1: Trajectory of the median modelled estimate of mortality relative to Z_{msy} (dashed line) during the years 1976-2025 with quartile error bars.

Table 3.1. Northern shrimp in Subarea 0 and Subarea 1: Estimates of stock dynamic and parameters from fitting a Schaefer stock-production model to the West Greenland Northern shrimp stock in 2025. The Median (2024) column shows results from last year's assessment.

	Mean	S.D.	25%	Median	75%	Est. mode	Median (2024)
Max.sustainable yield	120.3	47.5	95.7	113.6	135.0	100.2	118.0
B/B_{msy} , end current year (proj.)(%)	93.3	25.0	75.0	90.8	109.1	85.7	96.6
Biomass risk, end current year(%)	64.3	47.9	-	-	-	-	-
Z/Z_{msy} , current year (proj.)(%)	-	-	70.3	95.9	124.0	-	103.6
Carrying capacity	3204	1880	1836	2646	4059	1530	2940
Max. sustainable yield ratio (%)	9.7	5.2	5.8	9.0	12.8	7.5	8.5
Survey catchability (%)	20.2	12.9	10.4	16.9	26.8	10.4	14.9
CPUE(1) catchability	1.2	0.7	0.6	1.0	1.5	0.6	0.9
CPUE(2) catchability	1.8	1.2	0.9	1.5	2.4	0.9	1.3
Effective cod biomass 2025 (Kt)	17.6	24.4	10.3	13.5	17.4	5.3	16.6
$P_{50\%}$ (prey biomass index with consumption 50% of max.)	3.9	6.8	0.3	1.3	4.5	-3.8	1.3
V_{max} (maximum consumption per cod)	2.1	2.3	0.4	1.1	2.8	-0.9	1.0
CV of process (%)	12.0	2.7	10.2	11.9	13.6	11.6	12.0
CV of survey fit (%)	18.2	2.8	16.2	17.9	19.8	17.3	18.3
CV of CPUE (1) fit (%)	7.0	1.5	5.9	6.7	7.8	6.2	6.7
CV of CPUE (2) fit (%)	6.6	1.6	5.5	6.2	7.3	5.4	6.5

A six-year retrospective analysis was performed (Figure 3.10) and results were found to be relatively stable.

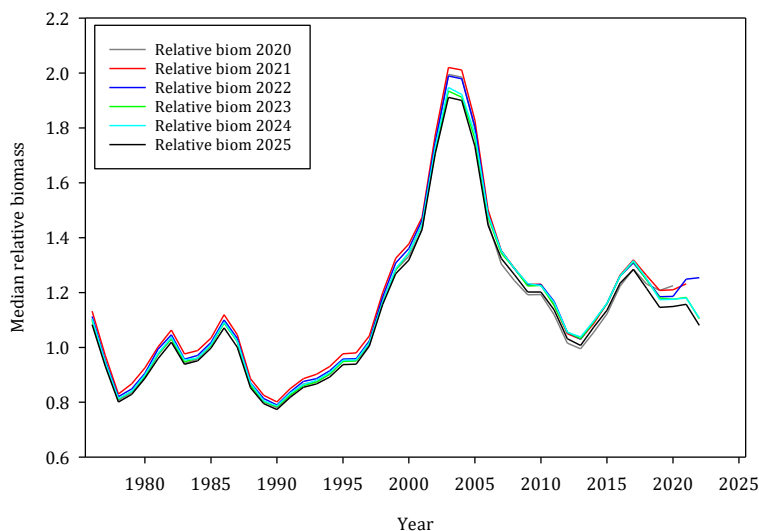


Figure 3.10. Northern shrimp in Subarea 0 and Subarea 1: Retrospective plots of the relative biomass B/B_{msy} 2020 to 2025. Mohn's rho is estimated to 0.08.

d) Reference points

B_{lim} has been established as 30% of B_{msy} , $B_{trigger}$ is defined as 75% of 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 (Figure 3.11).

e) State of the stock

Biomass. Biomass in 2025 is below B_{msy} , above $B_{trigger}$ and the probability of being below B_{lim} is very low (<1%).

Mortality. Assuming catches of 85 000 t in 2025 and an effective cod biomass of 14 000 t, the probability of being above Z_{msy} is 45%.

Recruitment. In 2025 numbers of age-2 were below the time-series average. Prospects for future recruitment are expected to be poor.

State of the Stock. At the end of 2025, we expect the stock to be in the Healthy Zone of the NAFO PA Framework. Biomass is below B_{msy} but above $B_{trigger}$. The probability of being below B_{lim} is very low (<1%). The probability of total mortality (Z) being above Z_{msy} is 45%. Recruitment (number of age-2 shrimp) in 2025 was below the time-series average.

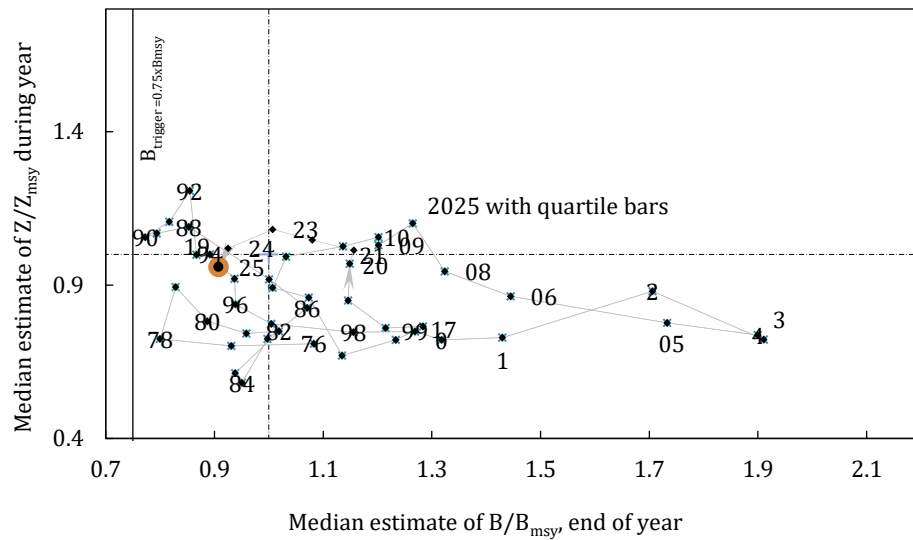


Figure 3.11. Northern shrimp in Subarea 0 and Subarea 1: Trajectory of relative biomass and relative mortality, 1976-2025. The green dot is the current year. $B_{trigger}$ is defined at $0.75B_{msy}$ (solid line), Z_{msy} is the horizontal dashed line and B_{msy} is the vertical dashed line.

f) Projections

Three years projections (2026-2028) under eight catch options are presented. Predation by the cod stock was quantitatively considered using an 'effective' biomass of 14Kt (the estimated value for 2025 was 13.5 Kt).

14 000 t cod	Catch option ('000 tons)							
Risk of:	65	70	75	80	85	90	95	100
falling below B_{msy} end 2026 (%)	58	59	60	61	61	62	62	62
falling below B_{msy} end 2027 (%)	54	55	57	58	58	59	60	62
falling below B_{msy} end 2028 (%)	50	52	53	55	55	58	59	61
falling below B_{msy} end 2026 (%)	0	0	0	0	0	0	0	0
falling below B_{lim} end 2027 (%)	0	0	0	0	0	0	0	0
falling below B_{lim} end 2028 (%)	0	0	0	0	0	0	1	0
exceeding Z_{msy} in 2026 (%)	21	26	33	38	44	49	54	59
exceeding Z_{msy} in 2027 (%)	19	25	31	37	42	48	53	58
exceeding Z_{msy} in 2028 (%)	18	24	30	36	41	47	52	57
falling below B_{msy} 80% end 2026 (%)	30	30	31	32	32	33	34	35
falling below B_{msy} 80% end 2027 (%)	28	30	30	30	32	33	34	36
falling below B_{msy} 80% end 2028 (%)	27	27	30	30	31	35	36	37
falling below $B_{trigger}$ end 2026 (%)	23	24	24	24	25	26	27	27
falling below $B_{trigger}$ end 2027 (%)	21	23	24	25	25	27	28	29
falling below $B_{trigger}$ end 2028 (%)	21	21	24	24	26	28	29	31

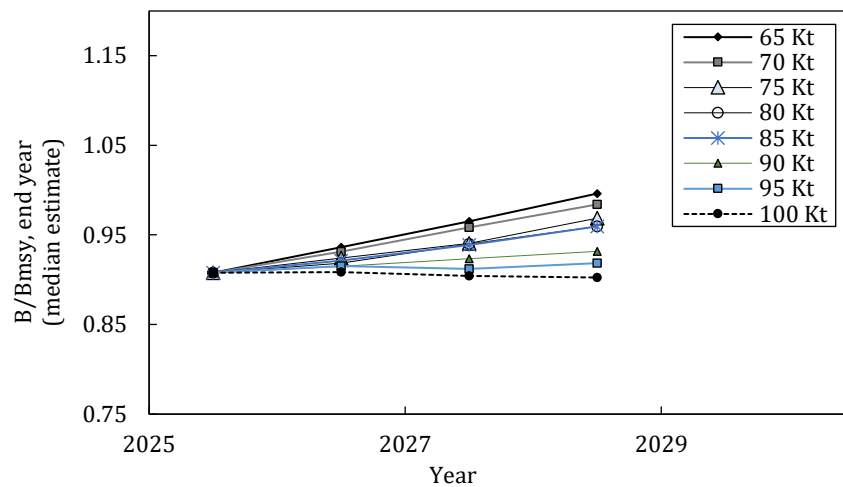


Figure 3.12. Northern shrimp in Subarea 0 and Subarea 1: Median estimates of year-end biomass trajectory for 2026-2028 with annual catches at 65-100 Kt and an 'effective' cod stock assumed at 14 Kt.

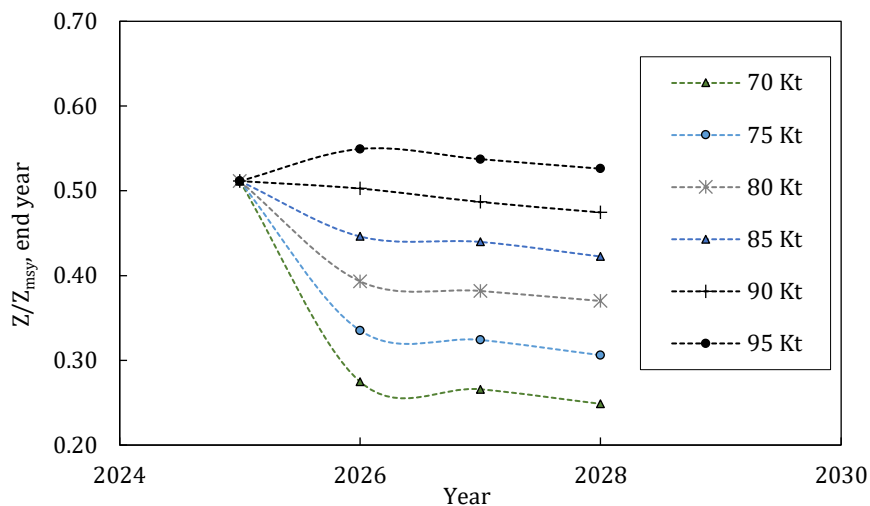


Figure 3.13. Northern shrimp in Subarea 0 and Subarea 1: Risks of exceeding mortality precautionary limits with annual catches at 70-95 Kt projected for 2026-2028 with an 'effective' cod stock assumed at 14 Kt.

g) Research recommendations

STACFIS **recommends** increasing commercial sampling of catch composition to cover both Canadian and Greenlandic fleets.

In progress. Sampling has occurred since 2022 in the Greenlandic fleets and the results were presented at the meeting. Whenever catches in Canadian SFA1 are realized, sampling for size determination is advised.

STACFIS **recommends** developing a joint Canadian and Greenlandic sampling program to determine predation pressure from various fish species.

This has been completed.

STACFIS **recommends** developing a comparative Canadian and Greenlandic analysis to determine predation pressure from various fish species.

In progress.

STACFIS **recommends** exploring the effects of the borrowing and banking system on the sustainability of the stock.

Results from this analysis were presented at the meeting. Even if there is a borrowing and banking system, the Greenlandic TAC is not exceeded.

STACFIS **recommended** that a benchmark be undertaken for this stock in the next few years.

This recommendation is reiterated.

STACFIS **recommends** the continued development of reference points consistent with the NAFO PA Framework.

4. Northern shrimp (*Pandalus borealis*) in the Denmark Strait and off East Greenland (ICES Divisions 14b and 5a)

Full assessment (SCR Docs. 04/012, 25/041, 25/042, 25/043)

Environmental Overview

Oceanography

In the region of East Greenland, South of Denmark Strait, the polar waters are constrained to a narrow coastal region on the shelf, which means that warmer and more saline Atlantic waters, originating from the Subtropical Gyre and transported by the Irminger Current, are more prevalent. The region is dominated by an inflow of multi-year ice from the Central Arctic Ocean, with maximum coverage in March and minimum in September. In the region drift ice is seasonal (early spring), transported from the region further north. Much of the waters in the region are stratified shelf waters, with cold and fresher polar waters overlaying warmer and more saline Atlantic waters.

Ecosystem changes

Sea ice coverage in the area north of the region has been diminishing in the several past decades, including a decrease in winter maximum sea ice extent since the start of satellite records in 1979, and a weak decline in summer minimum ice coverage since 2006.

Surface waters on the narrow south-eastern Greenland shelf and in the area north of Denmark Strait are 1-2°C warmer than the mean conditions for 1981-2010 for much of the year. In contrast, surface waters in the south-eastern reaches of the region have cooled by up to 2°C. Surface salinity has increased in the open waters of the ecoregion but decreased in the East Greenland shelf waters and Irminger Sea surface waters.

a) Introduction

Northern shrimp off East Greenland in ICES Divs. 14b and 5a are assessed as a single stock.

i) Fishery and catches

A multinational fleet exploits the stock. During the most recent ten years, vessels from Greenland, EU, the Faroe Islands and Norway have fished in the Greenlandic EEZ. Only Icelandic vessels are allowed to fish in the Icelandic EEZ. At all times of the year access to these fishing grounds depends strongly on ice conditions in the Greenlandic EEZ.

In the Greenlandic EEZ, the minimum permitted mesh size in the cod-end is 40 mm but most trawlers used 44 mm in the cod-end. The fishery is managed by catch quotas allocated to national fleets. In the Icelandic EEZ, the mesh size is 40 mm and there are no catch limits, however, there have been no catches by Iceland since 2005. In both EEZs, sorting grids with 22-mm bar spacing to reduce by-catch of fish are mandatory. Discarding shrimp is prohibited in both areas.

The fishery started in 1978 and during the period 1985 to 2003 the total catches fluctuated between 9 000 t and 15 000 t. From 2004 to 2016 the total catch decreased to 49 t. Catches increased to 7 466 t in 2023 and

since decreased slightly. Catches in the first half of 2025 were 5 277 (Figure 4.1). Since 2012, little to no fishery has taken place in the southern area.

For 2024 logbooks for one foreign vessel were not available, and for 2025 logbooks for two foreign vessels were not available. Total catches for these vessels have been provided by the Greenlandic Fishery and Hunting Control and are 225 t for 2024 and 408 t for 2025, these are included in the total catches. It has not been possible to include information on CPUE and effort for these vessels, and all further analysis are based solely on available logbooks in both 2024 and 2025.

Since 2014, the fishing effort has been historically low and concentrated in a relatively small area.

Recent catches and TACs ('000 tons) for shrimp in the Denmark Strait and off East Greenland (ICES Divs. 14b and 5a) are as follows:

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 ¹
Recommended TAC, total area	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	2.5	1.0
Enacted TAC, Greenland	5.3	5.3	4.3	3.4	4.8	7.0	6.9	6.9	7.9	7.6
North of 65°N, Greenland EEZ	0.0	0.6	0.5	1.6	3.2	3.1	5.5	7.5	7.3	5.3
North of 65°N, Iceland EEZ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North of 65°N, total	0.0	0.6	0.5	1.6	3.2	3.1	5.5	7.5	7.3	5.3
South of 65°N, Greenland EEZ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL STACFIS	0.0	0.6	0.5	1.6	3.2	3.1	5.5	7.5	7.3	5.3

¹ Catches until July 2025

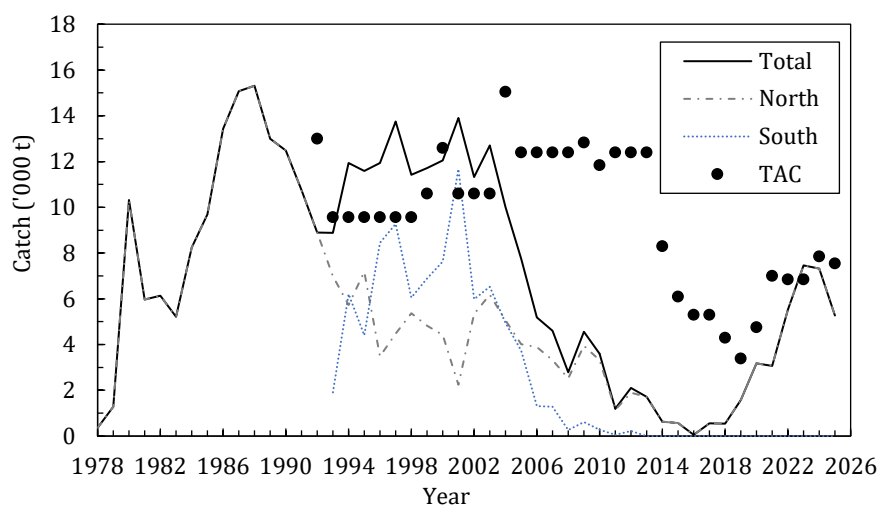


Figure 4.1. Northern shrimp in Denmark Strait and off East Greenland: Catch and enacted TAC (2025 catches until June 30th).

b) Data Overview

ii) Fishery and Catch

Fishing effort and CPUE. Data on catch and effort (hours fished) on a haul-by-haul basis from logbooks from Greenland, Iceland, Faroe Islands and EU since 1980 and from Norway since 2000 are used. Catch-Per-Unit-Effort (CPUE) and total annual effort were calculated. Since 2004, more than 60% of all hauls were performed with double trawl, this is not accounted for in the CPUE index used in the assessment and in the effort timeseries.

The CPUE index for the total areas increased from 1993 to 2009, followed by a continuous decline to a low value in 2015 and increased to record high levels in 2022 and since dropped (Figure 4.2). The drop in CPUE in 2021 is likely related to changes in the fishing pattern. In 2021 the EU fleet in the northern area started fishing in April, which is later than previous years when large portion of the catch was taken in February/March.

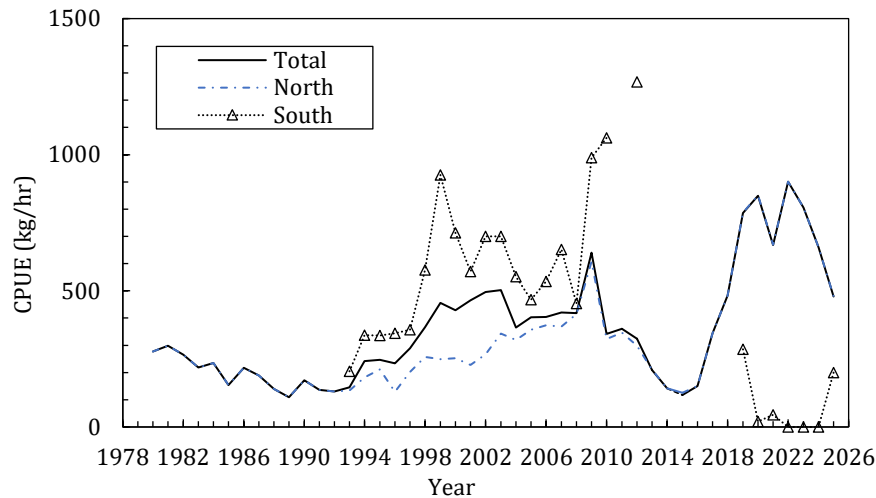


Figure 4.2. Northern shrimp in Denmark Strait and off East Greenland: Annual CPUE index. 2025 includes data until June 30th.

It should be noted that some logbooks from foreign vessels were not available at the time of analysis (from one vessel in 2024 and two vessels in 2025), and are not included in the CPUE and effort values. As most of the fishing has been conducted in the northern area, the overall CPUE index is dominated by the CPUE index for this area.

Fishing effort has been relatively low since 2016, but has been increasing in recent years from 300 fishing hours in 2016 to 10 765 fishing hours in 2024, and the preliminary number for 2025 is 10 154 fishing hours which is concentrated in a relatively small area north of 65°N and west of 30°W (Figure 4.3).

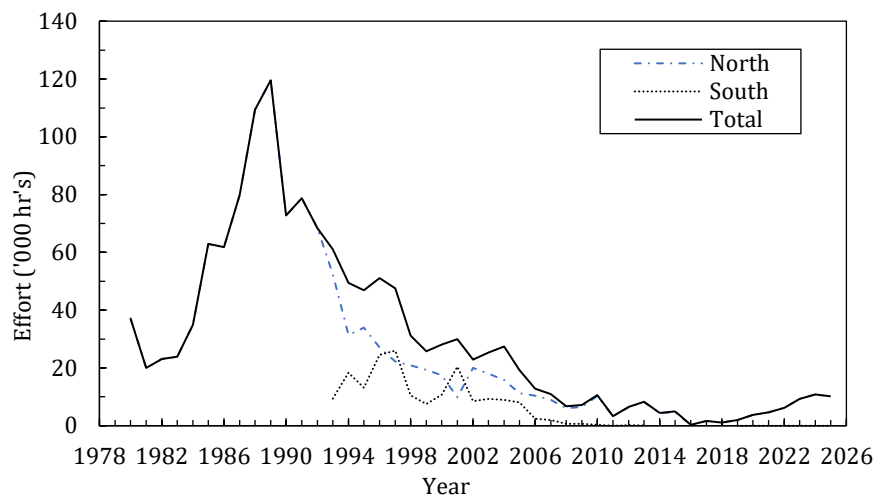


Figure 4.3. Northern shrimp in Denmark Strait and off East Greenland: Annual effort ('000 hrs). 2025 includes data until June 30th.

iii) Research survey data

Trawl surveys have been conducted to assess the stock status of Northern shrimp in the East Greenland area since 2008. Due to the lack of research vessels, no survey was conducted from 2017-2019 or in 2021. The

survey was conducted with the chartered fishing vessel *Helga Maria* in 2020, and in 2022-2025 with the new research vessel *Tarajoq* using the same gear configuration as in previous years. It is therefore assumed that the 2020 and 2022-2025 results were directly comparable with the previous surveys, however without comparative fishing (comparing survey vessels) there remains some uncertainty.

Biomass. The survey biomass index decreased from 2009 to 2012 and then remained at a low level until 2016, there are no estimates for 2017-2019 or for 2021. The 2020 estimate is the highest in the time series (Figure 4.4) but the 2022 biomass index dropped to a level similar to 2010-2011 and increased again in 2023. Due to poor weather during the 2025 survey it was not possible to get full spatial coverage in the northern part of the area. The biomass estimate for 2025 is 8 284 t. Work was carried out to account for the stations skipped in the northern area by using an average catch for these based on previous years data, this resulted in a 2025 estimate of 6 822 t, the confidence intervals of the two estimates are overlapping. The figures in this document are based on the uncorrected survey estimate.

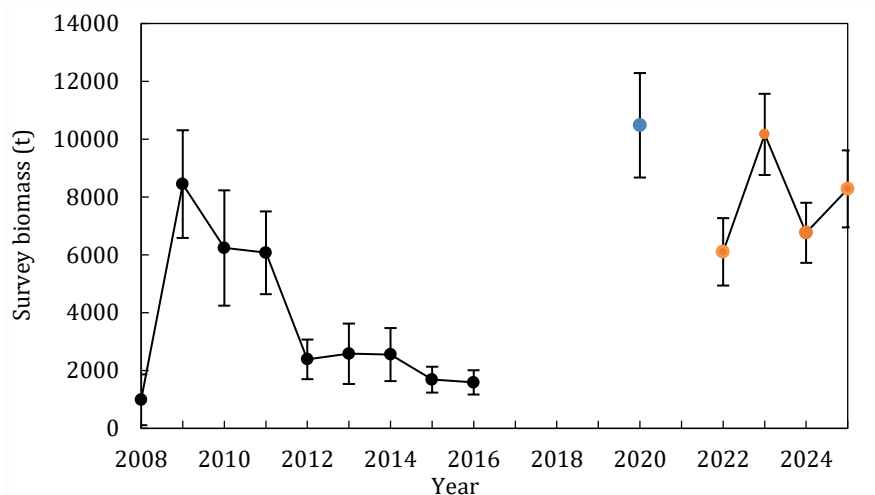


Figure 4.4. Northern shrimp in Denmark Strait and off East Greenland: Survey biomass (tons) from 2008 (± 1 SE). No survey was carried out in the period 2017-2019 or in 2021. Black points represent R/V *Paamiut*, blue is *Helga Maria*, and orange is R/V *Tarajoq*.

The surveys conducted since 2008 indicate that the shrimp stock is concentrated in the area north of 65°N (Figure 4.5).

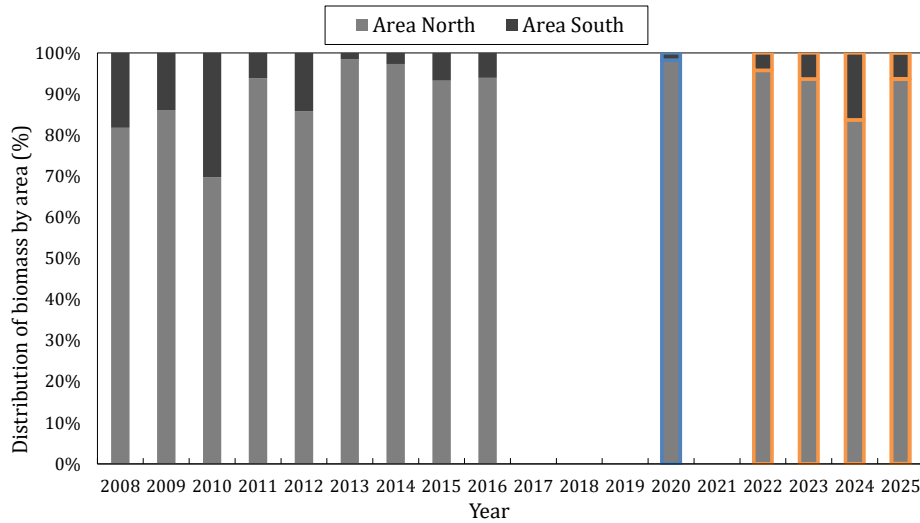


Figure 4.5. Northern shrimp in Denmark Strait and off East Greenland: Distribution of survey biomass north and south of 65°N (in %) from 2008. No survey was carried out in the period 2017-2019 and in 2021. No outline in figure represents R/V *Paamiut*, blue is *Helga Maria*, and orange is R/V *Tarajoq*.

Stock composition. The stock in East Greenland consists of roughly equal proportions of males and females in most years. The proportion of females fluctuates between 40-60% of the biomass in all years except 2009 and 2020. In 2009 and 2020, the biomass of females was 34% and 37%, respectively. In 2025, 49% of the biomass was composed of females.

Very few males smaller than 20 mm carapace length (CL) are caught in the survey, but in 2022 and in 2025 there were small peaks in male shrimps smaller than 20 mm CL (Figure 4.6). Scarcity of smaller shrimp in the survey area suggests that the total area of distribution and recruitment patterns of the stock are still unknown.

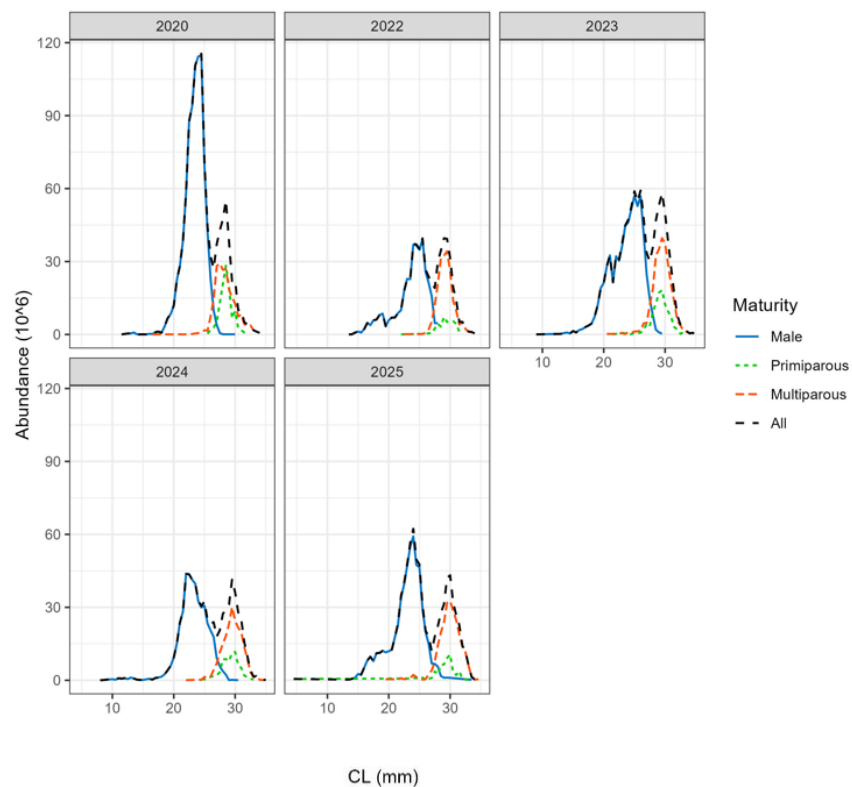


Figure 4.6. Northern shrimp in Denmark Strait and off East Greenland: Numbers of shrimp by length group (CL) in the total survey area in 2020-2025. No survey was carried out in 2021.

c) Assessment results

The surplus production model in continuous time (SPiCT) model was fitted to series of CPUE, catch and survey biomass indices. The time-series were truncated to fit with the survey time-series. The model was run with the assumption that the catch in 2025 was equal to the enacted TAC.

The relative B/B_{msy} projected to the end of 2025 is 0.48, and the relative F/F_{msy} is 2.22 (Figure 4.7).

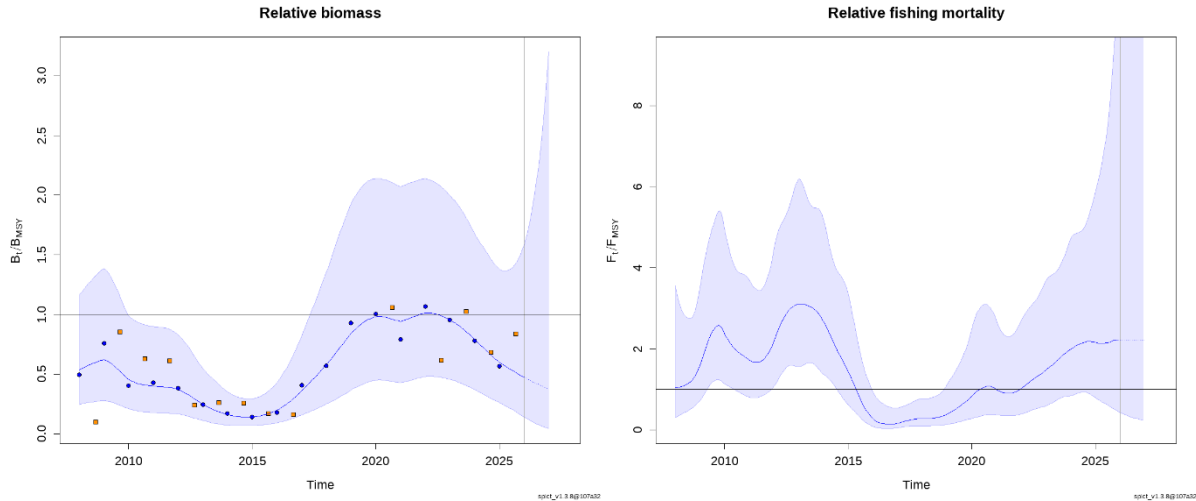


Figure 4.7. Northern shrimp in Denmark Strait and off East Greenland: Relative biomass and fishing mortality. Orange squares are the survey index and the blue circles are the CPUE index (the colour of the symbols denotes the seasonality of the data within the model, orange is July/August and blue in beginning of the year). The grey vertical line corresponds to the time of the last observation. The dotted line is the prediction for the next year given a constant F .

Estimates of stock-dynamic parameters from the SPiCT model are given in Table 4.1. These are in line with parameters estimated in 2024.

Table 4.1. Shrimp in Denmark Strait and off East Greenland: Results from the SPiCT model.

	Estimate	CI lower	CI upper	log.est
α_1 (noise term for CPUE, $\alpha = SD_{Index}/SD_{Biomass}$)	1.37	0.19	10.11	0.31
α_2 (noise term for survey, $\alpha = SD_{Index}/SD_{Biomass}$)	6.45	1.12	37.05	1.86
β ($\beta = SD_{Catch}/SD_F$)	0.61	0.24	1.58	-0.49
r (intrinsic population growth rate)	0.71	0.45	1.12	-0.34
m (SPiCT parameter)	3376.17	2005.21	5684.47	8.12
K (Carrying capacity (tons))	19051.77	7847.55	46252.65	9.85
q_1 (Catchability for CPUE)	0.09	0.06	0.15	-2.41
q_2 (Catchability for survey)	1.05	0.58	1.90	0.05
n (shape of the production curve, set to 2)	2.00	2.00	2.00	0.69
sdb (Standard deviation, biomass)	0.10	0.02	0.53	-2.35
sdf (Standard deviation, fishing mortality)	0.79	0.43	1.45	-0.23
$sdi1$ (Standard deviation, CPUE)	0.13	0.07	0.25	-2.03
$sdi2$ (Standard deviation, Survey)	0.62	0.42	0.90	-0.48
Sdc (Standard deviation, catch)	0.49	0.29	0.82	-0.72
B (Biomass end of 2025)	4540.70	1681.59	12261.00	8.42
F (Fishing mortality end of 2025)	0.78	0.17	3.68	-0.24
Relative reference points				
B/B_{msy} , end current year (proj.) (%)	0.48	0.15	1.54	-0.73
F/F_{msy} , end current year (proj.) (%)	2.22	0.45	10.90	0.80

A five-year retrospective analysis was performed (Figure 4.8) and results were found to be consistent for biomass and fishing mortality with respect to the removal of successive years.

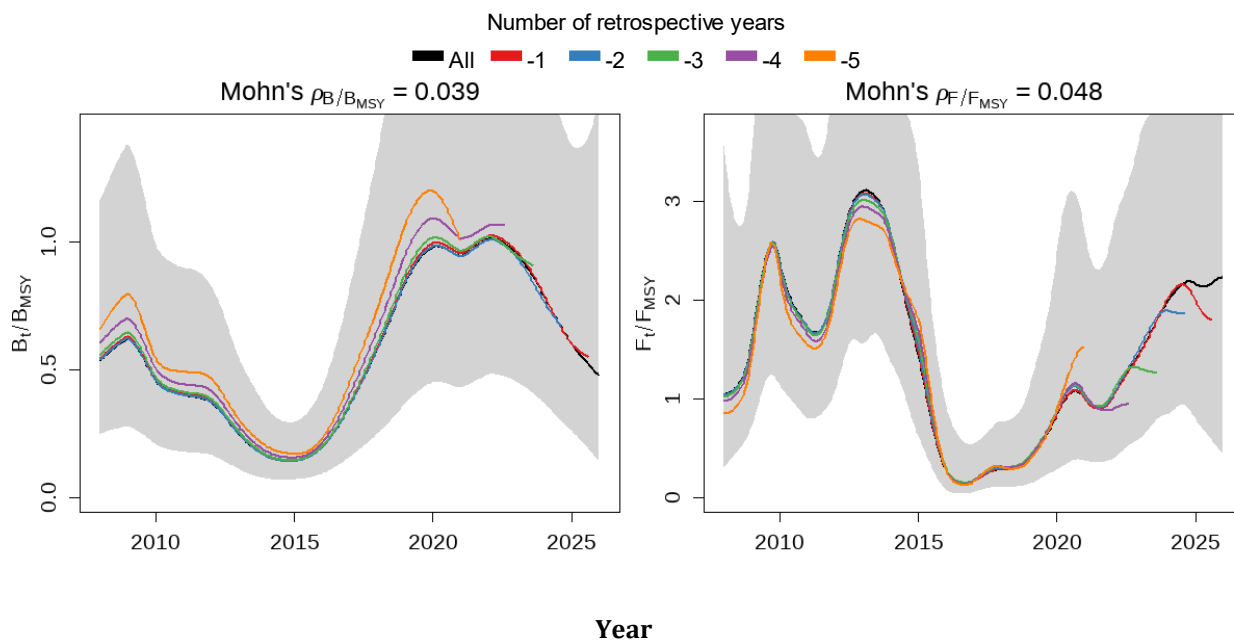


Figure 4.8. Northern shrimp in Denmark Strait and off East Greenland: Five years retrospective plots of fishing mortality and fishable biomass. Confidence intervals are 95%.

d) Reference points

B_{lim} is defined as 30% of B_{msy} . $B_{trigger}$ is defined as 75% of B_{msy} . F_{lim} is defined as F_{msy} . F_{target} is defined as 85% of F_{msy} . The relative reference points B_{msy} and F_{msy} are estimated within the SPiCT model (Figure 4.9).

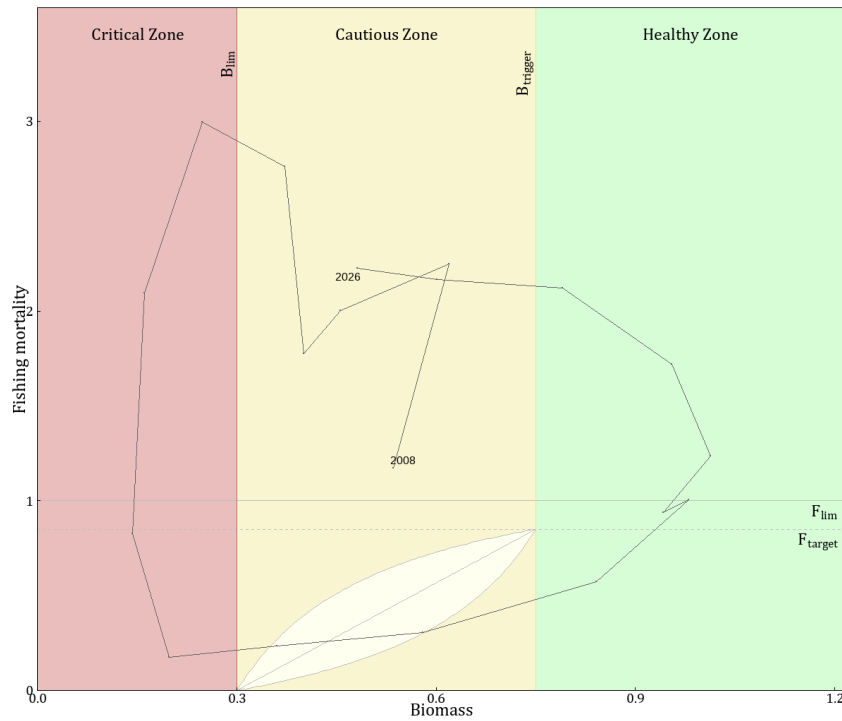


Figure 4.9. Northern shrimp in Denmark Strait and off East Greenland: relative Biomass - relative fishing mortality plot in the NAFO Precautionary Approach Framework. Points plotted are from years 2008-2026 (biomass is estimated on the first day of the year). The reference points F_{msy} and B_{msy} are estimated in the model.

e) State of the stock

Biomass. Median biomass is below B_{msy} and $B_{trigger}$ ($B/B_{msy} = 0.48$). The probability of being below B_{lim} is 23% and the probability of being below $B_{trigger}$ is 77%.

Fishing mortality. Fishing mortality is above F_{target} and F_{lim} ($F/F_{msy} = 2.22$).

Recruitment. No estimates of recruitment are available.

State of the stock. At the end of 2025, the stock is in the Cautious Zone of the NAFO PA Framework. The median biomass is below B_{msy} and $B_{trigger}$ ($B/B_{msy} = 0.48$) and the probability of being below B_{lim} is 23%. Fishing mortality is above F_{target} and F_{lim} ($F/F_{msy} = 2.22$). No estimates of recruitment are available.

f) Projections

One-year projections to the end of 2026 for 3 F levels (from NAFO Precautionary Framework, Cautious Zone) and six catch options were evaluated.

		Catch 2025 = 7550 t									
		Cautious Zone				Catch Options (t)					
		F=0	F lower edge leaf	F midrib leaf	F upper edge leaf						
Yield	2026	0	291	628	1023	500	1000	1500	2000	2500	3000
$P(F > F_{lim})$	2026	0%	5%	17%	30%	12%	30%	45%	56%	66%	74%
$P(B < B_{lim})$	2026	4%	6%	9%	12%	8%	12%	18%	25%	32%	40%
$P(F > F_{target})$	2026	0%	6%	20%	36%	15%	35%	50%	62%	71%	78%
$P(B < B_{trigger})$	2026	48%	51%	55%	59%	53%	58%	63%	67%	70%	73%
$P(B_{end2026} > B_{end2025})$	2026	100%	100%	100%	97%	100%	97%	82%	62%	48%	38%
$(B_{end2026} - B_{end2025}) / B_{2025}$		60%	54%	46%	35%	48%	35%	23%	10%	-4%	-17%

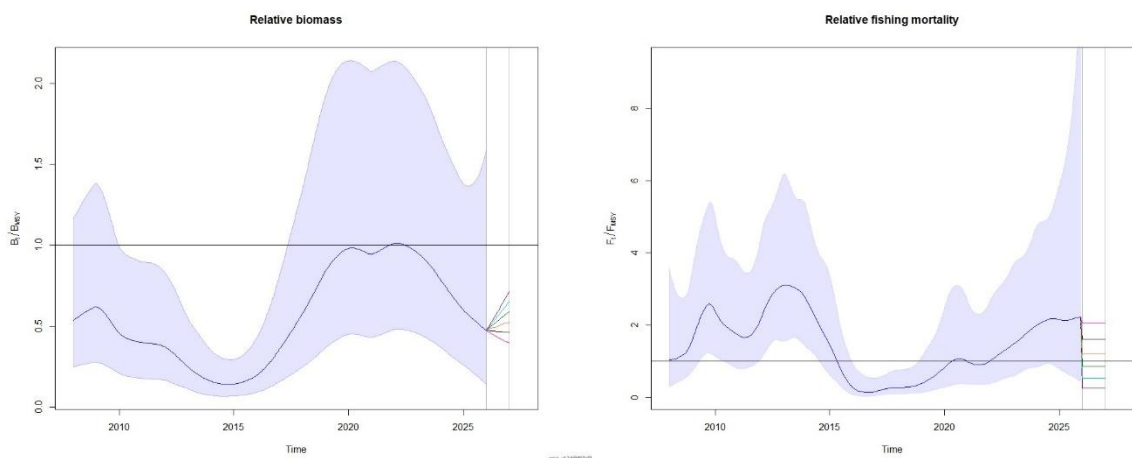


Figure 4.10. Northern shrimp in Denmark Strait and off East Greenland: stochastic projections from 2026-2027 at six catch levels. Top plot shows projected relative biomass ratios (B/B_{msy}), and lower plot is projected relative fishing ratios (F/F_{msy}). Shaded regions indicated 95% confidence intervals.

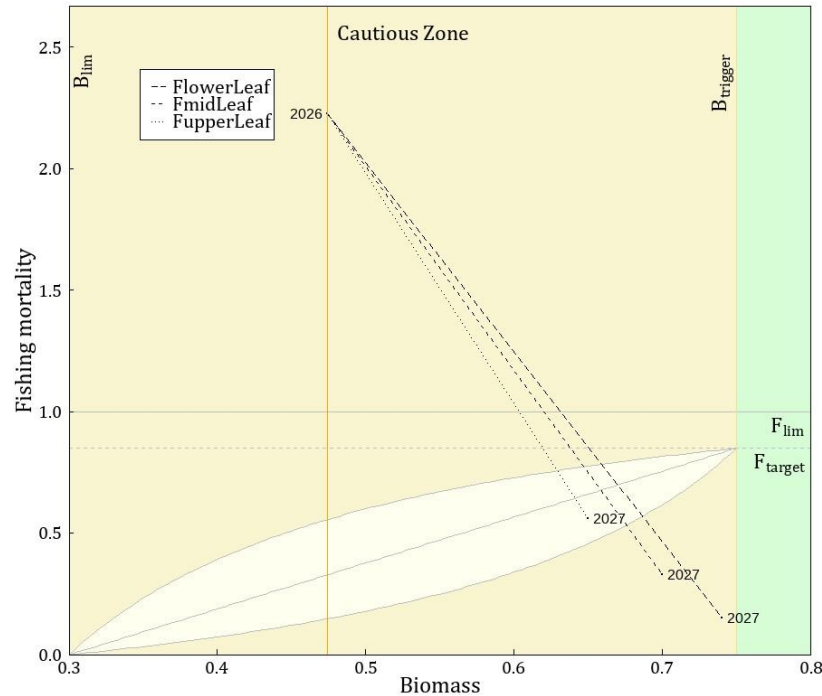


Figure 4.11. Northern shrimp in Denmark Strait and off East Greenland: stochastic projections in the NAFO Precautionary Approach Framework from the first day of 2026 to the first day of 2027 at three levels of F (F lower edge leaf ($F=0.15$), F midrib leaf ($F=0.33$), and F upper edge leaf ($F=0.56$)). Fishing mortality is F/F_{msy} and biomass is B/B_{msy} . The orange line corresponds to the biomass on the first day of 2026 and associated leaf F levels.

g) Research recommendations

STACFIS **recommends** *commercial sampling of catch composition.*

In progress. Sampling has occurred since 2023 from both international and Greenlandic fleets. Results were presented at the meeting.

STACFIS **recommends** *exploration of the use of SPiCT for two and three year projections.*

In progress. Results were presented at the meeting. This recommendation is reiterated.

STACFIS **recommends** *exploration of available historical data from the east Greenland stock.*

This recommendation is reiterated.

STACFIS **recommends** *development of possible harvest control rules for this fishery.*

This recommendation is reiterated.

IV. OTHER MATTERS

a) FIRMS Classification for NAFO Stocks

Scientific Council reiterates that the Stock Classification system is not intended as a means to convey the scientific advice to the Commission, and should not be used as such. Its purpose is to respond to a request by FIRMS to provide such a classification for their purposes. The category choices do not fully describe the status of some stocks. Scientific advice to the Commission is to be found in the Scientific Council report in the summary sheet for each stock.

Stock Size (incl. structure)	Fishing Mortality			
	None-Low	Moderate	High	Unknown
Virgin-Large		3LNO Yellowtail Flounder		
Intermediate		3M Redfish ¹ SA2+3KLMNO Greenland halibut 3M cod SA 0+1 (Offshore) Greenland halibut SA0+1 Northern shrimp	East Greenland Northern shrimp	SA1 American Plaice SA1 Spotted Wolffish
Small	3NOPs White hake 3NO Witch flounder 3LN Redfish			
Depleted	3M American plaice 3LNO American plaice 3NO Cod 3M Northern shrimp ¹ 6G Alfonsino		3O Redfish	SA1 Redfish SA1 Atlantic Wolffish
Unknown	SA2+3 Roughhead grenadier 3NO Capelin	1B-C Greenland halibut Inshore	1D Greenland halibut Inshore 1E-F Greenland halibut Inshore	SA3+4 Northern shortfin squid 3LNOPs Thorny skate Greenland halibut in Uummannaq Greenland halibut in Disko Bay Greenland halibut in Upernavik 3LNO Northern shrimp ²

¹ Fishing mortality may not be the main driver of biomass for this stock.

² Stock designation has changed

APPENDIX II. PROVISIONAL AGENDA – SCIENTIFIC COUNCIL SHRIMP ASSESSEMENT MEETING

NAFO Secretariat

Halifax, Canada

9-11 September 2025

- I. Opening (Chair: Diana González-Troncoso)
 - 1.Appointment of Rapporteur
 - 2.Adoption of Agenda
 - 3.Attendance of Observers
 - 4.Plan of Work
- II. Review of Recommendations in 2024
- III. Fisheries Science (STACFIS Chair: Martha Krohn)
- IV. Reference Points for stocks with full assessment in 2025
- V. Formulation of Advice (see Annexes 1–3)
 - 1. Request for Advice on TACs and Other Management Measures (Item 1, Annex I)
 - a) Northern shrimp in Div. 3M
 - b) Northern shrimp in Divs. 3LNO
 - 2. Requests from Coastal States (Items 5 and 6 of Annex II, item 2 of Annex III)
 - a) Northern shrimp off West Greenland (Subareas 0 and 1)
 - b) Northern shrimp in Denmark Strait and off East Greenland (ICES Divisions XIVb and Va)
- VI. Other Matters
 - 1.Scheduling of Future Meetings
 - 2.Topics for Future Special Sessions
 - 3.Other Business
- VI. Adoption of Scientific Council and STACFIS Reports
- VII. Adjournment

ANNEX 1. COMMISSION'S REQUEST FOR SCIENTIFIC ADVICE ON MANAGEMENT IN 2026 AND BEYOND OF CERTAIN STOCKS IN SUBAREAS 2, 3 AND 4 AND OTHER MATTERS

(From [NAFO SCS Doc. 25/01](#))

Following a request from the Scientific Council, the Commission agreed that items 1, 2, and 3 should be the priority for the June 2025 Scientific Council meeting subject to resources.

1. The Commission requests that the Scientific Council provide advice for the management of the fish stocks below according to the assessment frequency presented below. In line with the Revised NAFO Precautionary Approach Framework (Annex 4 of COM-SC Doc. 24-03) the Commission should be informed by the range of options and associated risks provided by the Scientific Council. The Commission will decide upon the acceptable risk level in the context of the entirety of the Scientific Council advice for each stock guided and as foreseen by the NAFO Precautionary Approach.

Yearly basis	Two-year basis	Three-year basis	Interim Monitoring Only
Cod in Division 3M	Redfish in Division 3M Thorny skate in Divisions 3LNO Witch flounder in Divisions 3NO Redfish in Divisions 3LN Yellowtail flounder in Divisions 3LNO Northern shrimp in Divisions 3LNO Northern shrimp in Division 3M White hake in Divisions 3NO	American plaice in Division 3M Northern shortfin squid in Subareas 3+4 Redfish in Division 3O Cod in Divisions 3NO American plaice in Divisions 3LNO	Subarea 6 Alfonsino Subareas 2-3 Roughhead Grenadier Capelin in Divisions 3NO

Advice should be provided using the guidance provided in **Annex A**, or using the predetermined Management Procedure in the cases where they exist (currently Greenland halibut 2+3KLMNO). For Division 3M shrimp supplementary advice in terms of fishing-days could also be considered as appropriate.

To implement this schedule of assessments, the Scientific Council is requested to conduct a full assessment of these stocks as follows:

- In 2025, advice should be provided for 2026 for: Cod in Division 3M
- In 2025, advice should be provided for 2026 and 2027 for: Yellowtail flounder in Divisions 3LNO, White hake in Divisions 3NO, Northern shrimp in Divisions 3LNO
 - With respect to Northern shrimp in Divisions 3LNO, Scientific Council is requested to provide its advice to the Commission prior to the 2025 Annual Meeting based on the survey data up to and including 2025.
- In 2025, advice should be provided for 2026, 2027 and 2028 for: Redfish in Division 3O, Northern shortfin squid in Subareas 3+4.

The Commission also requests the Scientific Council to continue to monitor the status of all other stocks annually and, should a significant change be observed in stock status (e.g. from surveys) or in bycatch in other fisheries, provide updated advice as appropriate.

2. The Commission requests the Scientific Council to monitor the status of Greenland halibut in Subarea 2 + Divisions 3KLMNO annually to compute the TAC using the agreed Management Procedure and determine whether exceptional circumstances are occurring. If exceptional circumstances are occurring, the exceptional circumstances protocol will provide guidance on what steps should be taken.

3. The Commission requests that Scientific Council continue to advance work on the 3LN redfish MSE processes during 2024-2025.
4. As practicable and taking into account Scientific Council capacity constraints, develop stock summary sheets for NAFO managed stocks that are evaluated using MSE processes.
5. In relation to the Ecosystem Roadmap as a whole, the Commission requests that the Scientific Council develop a reference document detailing the ecosystem roadmap, for completion in the next 1-3 years.
6. In relation to the habitat impact assessment component of the Roadmap (VME and SAI analyses), the Commission requests that Scientific Council:
 - a. Continue the development of a centralized data repository using ArcGIS online to host the data and data-products for scientific advice, in conjunction with the NAFO Secretariat
 - b. Work towards the reassessment of VMEs and impact of bottom fisheries on VMEs for 2027; including potential management options in the reassessment of bottom fisheries.
 - c. Develop materials on the potential of submitting NAFO coral bottom fishing closed areas as OECMs for discussion at the 2025 WG-EAFFM meeting.
7. The Commission requests the Scientific Council to develop reference points to facilitate the implementation of the Revised NAFO Precautionary Approach Framework, for stocks that currently do not have them.
8. In relation to its workload, the Commission requests the Scientific Council to:
 - a. Continue to update the 3-5 year work plan, which reflects requests arising from the 2024 Annual Meeting, other multi-year stock assessments and other scientific inquiries already planned for the near future. The work plan should identify what resources are necessary to successfully address these issues, gaps in current resources to meet those needs and proposed prioritization by the Scientific Council of upcoming work based on those gaps.
 - b. Consider undertaking internal, or support external, assessments to inform the ongoing effort to address the Scientific Council workload. Such assessments could include how to optimize:
 - i. the organization / structure and function of the Scientific Council, its standing committees and working groups,
 - ii. further development and implementation of the Scientific Council's workplan.
9. The Commission requests Scientific Council to conduct ongoing analysis of the Division 3M cod fishery data by 2025 in order to:
 - a. monitor the consequences of the management decisions (including the analysis of the redistribution of the fishing effort along the year and its potential effects on ecosystems, the variation of the cod catch composition in lengths/ages, and the bycatch levels of other fish species, benthos in general, and VME taxa in particular); and
 - b. carry out any additional monitoring that would be required, including Division 3M cod caught as bycatch in other fisheries during the closed period.
10. Noting the voluntary contribution of the United States to support a consultant to provide feedback on NAFO's processes to address climate change impacts, requests the SC to conduct an analysis of progress and/or outcomes of that work.

ANNEX A: Guidance for providing advice on Stocks Assessed

The Commission requests the Scientific Council to consider the following in assessing and projecting future stock levels for those stocks listed above. These evaluations should provide the information necessary for the Commission to consider the balance between risks and yield levels, in determining its management of these stocks:

Stochastic short-term projections (3 years) should be performed with the F levels that are included in the risk table from the Revised PA Framework (Table 1 below), based on the point estimate of biomass. The first year of the projection should assume a catch equal to the agreed TAC for that year. In instances where Scientific Council expects catches to be significantly different from the agreed TAC, an additional projection could be provided based on the best available catch estimation.

In relation to Tier 1 of the Roadmap Scientific Council should provide annually catch information in relation to 2TCI, including recent cumulative catch levels and a scoping of expected cumulative catch levels.

For stocks assessed with a production model, the advice should include updated time series or plots of:

- Catch and TAC of recent years
- Catch to relative biomass
- Relative Biomass
- Relative Fishing mortality
- Stock trajectory against precautionary approach reference points

For stock assessed with an age-structured model, information should be provided on stock size, spawning stock sizes, recruitment prospects, historical fishing mortality. Graphs and/or tables should be provided for all of the following for the longest time-period possible:

- historical yield and fishing mortality;
- spawning stock biomass and recruitment levels;
- Stock trajectory against precautionary approach reference points

For stocks for which only general biological and/or catch data are available, few standard criteria exist on which to base advice. The stock status should be evaluated in the context of management requirements for long-term sustainability and the advice provided should be consistent with the precautionary approach.

The following graphs should be presented for the longest time-period possible:

- catch and TAC of recent years
- length distributions
- time trends of survey abundance estimates
- an age or size range chosen to represent the spawning population
- an age or size-range chosen to represent the exploited population
- recruitment proxy or index for an age or size-range chosen to represent the recruiting population.
- fishing mortality proxy, such as the ratio of reported commercial catches to a measure of the exploited population.
- stock trajectory against precautionary approach reference points

In all cases any additional information the Scientific Council deems appropriate should be provided.

y current year (year in which the assessment is made, data until year y-1)

	Yield			P(F>F _{lim})			P(B<B _{lim})				P(F>F _{target})			P(B<B _{trigger})				P(By+3 > By)	(By+3-By)/By
F in y+1 and following years	Yield y (50%)	Yield y+1 (50%)	Yield y+2 (50%)	y	y+1	y+2	y	y+1	y+2	y+3	y	y+1	y+2	y	y+1	y+2	y+3		
Critical Zone																			
F=0	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F=X% current*	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F current	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Cautious Zone																			
F lower edge leaf	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F midrib leaf	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F upper edge leaf	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Healthy Zone																			
F=0.75F _{msy}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F _{target} =0.85F _{msy}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
F _{lim} =F _{msy}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

*X% may vary stock by stock. In the future, this framework may be modified to include F bycatch.
The number of years in the risk projections table will be the same as the years of advice.

ANNEX 2. DENMARK (ON BEHALF OF GREENLAND) COASTAL STATE REQUEST FOR SCIENTIFIC ADVICE - 2026

(from SCS Doc. 25/03)

Denmark (on behalf of Greenland) Coastal State Request for Scientific Advice – 2026

Denmark (on behalf of Greenland) hereby request scientific advice on management in 2026 of certain stocks in NAFO Subareas 0 and 1. Denmark (on behalf of Greenland) requests the Scientific Council for advice on the following species:

1. Golden Redfish and Demersal Deep-Sea Redfish

Advice on Golden redfish (*Sebastes marinus*) and demersal deep-sea redfish (*Sebastes mentella*) in Subarea 1 was in June 2023 given for 2024-2026. The Scientific Council is requested to continue its monitoring of the above stocks and provide updated advice as appropriate in the event of significant changes in stock levels.

2. Atlantic Wolffish and Spotted Wolffish

Advice on Atlantic Wolffish (*Anarhichas lupus*) and Spotted Wolffish (*Anarhichas minor*) in Subarea 1 was in June 2023 given for 2024-2026. The Scientific Council is requested to continue its monitoring of the above stocks and provide updated advice as appropriate in the event of significant changes in stock levels.

3. Greenland Halibut, Offshore

Advice on Greenland Halibut, Offshore in Subareas 0 and 1 was given in 2024 for 2025 and 2026. Denmark (on behalf of Greenland) request the Scientific Council to provide catch advice according to the NAFO Precautionary Approach Framework (PAF). The advice should also include a range of risk-based catch options for 2026-2027. Specifically, Denmark (on behalf of Greenland) recommends that for each option a clear technical basis is provided and that a table with defined reference points is provided in the advice. Catch options that are in accordance with the NAFO PAF should be highlighted.

The advice shall remain a two-year advice, but Denmark (on behalf of Greenland) recommends the advice cycle to start at even years (starting with the 2026-2027 advice) to follow a request by the Scientific Council with the purpose of better distributing the workload of the Scientific Council.

4. Greenland Halibut, Inshore, West Greenland

Advice on the inshore stocks of Greenland Halibut in Subarea 1 was given in 2024 for 2025-2026. Denmark (on Behalf of Greenland) requests the Scientific Council to continue its monitoring of the above stocks and provide updated advice in the event of significant changes in stock levels.

5. Northern Shrimp, West Greenland

Subject to the concurrence of Canada as regards to Subareas 0 and 1, Denmark (on behalf of Greenland) requests the Scientific Council before December 2025 to provide advice on the scientific basis for management of Northern Shrimp (*Pandalus borealis*) in Subareas 0 and 1 in 2026 in line with Greenland's stated management objective of maintaining a mortality risk of no more than 35% in the first year prediction and to provide a catch option table ranging with 5,000 t increments. Future catch options should be provided for as many years as data allows for.

6. Northern Shrimp, East Greenland

Furthermore, the Scientific Council is in cooperation with ICES requested to provide advice on the scientific basis for management of Northern Shrimp (*Pandalus borealis*) in Denmark Strait and adjacent waters east of southern Greenland in 2026 and for as many years ahead as data allows for.

ANNEX 3. CANADA'S REQUEST FOR COASTAL STATE ADVICE IN 2026

(from SCS Doc. 25/04)

Canada would like to submit its request to the Scientific Council for advice on the following species:

1. **Greenland halibut (Subarea 0 + 1 (offshore))**

The Scientific Council is requested to provide an overall assessment of status and trends in the total stock area throughout its range and to specifically provide risk-based advice on a range of TAC options for 2026 and 2027. The stock status should be evaluated in the context of management requirements for long-term sustainability and the advice provided should be consistent with NAFO's Revised (2024) Precautionary Approach Framework (PAF).

Specifically, Canada requests that, in addition to the risk table inputs provided in Table 2 of NAFO Revised PAF, the following options also be included:

- $F_{\text{status quo}}$
- Current TAC
- the 2019-2022 TAC level (36,370 t)

For each of the projections, please include the probabilities that biomass will increase or remain the same ($P(B_{2027} \geq B_{2025})$); and the probability that biomass will decrease ($P(B_{2027} < B_{2025})$).

Canada also requests that the NAFO Scientific Council define, in a table within the assessment document, stock reference points/indicators such as maximum sustainable yield (MSY), biomass at MSY (B_{MSY}), limit reference point (B_{lim}), and B_{trigger} .

Canada encourages the Scientific Council to continue to advance a model-based approach to bridge survey time series (i.e. data from the RV Paamiut and RV Tarajoq).

2. **Northern shrimp (Subarea 1 and Division 0A)**

Canada requests that the Scientific Council consider the following options in assessing and projecting future stock levels for Northern shrimp (*Pandalus borealis*) in Subarea 1 and Division 0A:

The status of the stock should be determined and risk-based advice provided for catch options corresponding to Z_{msy} in 5,000t increments with forecasts for 2026 to 2028 (inclusive). These options should be evaluated in relation to Canada's Harvest Strategy (2022 revised version attached) and NAFO's Revised Precautionary Approach Framework.

Presentation of the results should include graphs and/or tables related to the following:

- Historical and current yield, biomass relative to B_{msy} , total mortality relative to Z_{msy} , and recruitment (or proxy) levels for the longest time period possible;
- Total mortality (Z) and fishable biomass for a range of projected catch options (as noted above) for the years 2026 to 2028. Projections should include both catch options and a range of effective cod predation biomass levels considered appropriate by the Scientific Council. Results should include risk analyses of falling below: B_{msy} , 80% B_{msy} and B_{lim} (30% B_{msy}), and of being above Z_{msy} based on the 3-year projections, consistent with the Harvest Decision Rules in Canada's Harvest Strategy; and
- Total area fished for the longest time period possible.

Please provide the advice relative to Canada's Harvest Strategy as part of the formal advice (i.e., grey box in the advice summary sheet).

APPENDIX III. PROVISIONAL AGENDA – STACFIS

9-11 September 2025

Halifax, Canada

I. Opening (Martha Krohn)

1. Appointment of Rapporteur
2. Adoption of Agenda
3. Plan of Work

II. General Review

1. Review of Recommendations in 2024
2. Review of Catches

III. Stock Assessments

1. Northern shrimp (*Pandalus borealis*) on the Flemish Cap (NAFO Division 3M) (Monitoring)
2. Northern shrimp (*Pandalus borealis*) on the Grand Bank (NAFO Divisions 3LNO) (Full assessment)
3. Northern shrimp (*Pandalus borealis*) off West Greenland (NAFO Subarea 0 and Subarea 1) (Full assessment)
4. Northern shrimp (*Pandalus borealis*) in the Denmark Strait and off East Greenland (ICES Divisions XIVb and Va) (Full assessment)

IV. Other Business

1. FIRMS Classification for NAFO Shrimp Stocks

V. Adjournment

APPENDIX IV. DESIGNATED EXPERTS FOR PRELIMINARY ASSESSMENT OF CERTAIN NAFO STOCKS

The following is the list of Designated Experts for 2025 assessments:

From the Science Branch, Northwest Atlantic Fisheries Centre, Department of Fisheries and Oceans, P. O. Box 5667, St. John's, NL, Canada A1C 5X1, Canada

Northern shrimp in Divisions 3LNO Nicolas le Corre nicolas.lecorre@dfo-mpo.gc.ca

From the Instituto Español de Oceanografía, Subida a Radio Faro 50, 36390, Vigo (Pontevedra), Spain

Shrimp in Division 3M José Miguel Casas Sánchez mikel.casas@ieo.csic.es

From the Greenland Institute of Natural Resources, P. O. Box 570, DK-3900 Nuuk, Greenland

Northern shrimp in Subarea 0+1 AnnDorte Burmeister anndorte@natur.gl

Northern shrimp in Denmark Strait Tanja B. Buch TaBb@natur.gl

APPENDIX V. LIST OF SCR AND SCS DOCUMENTS**RESEARCH DOCUMENTS (SCR)**

Serial No.	SCR Document	Author(s)	Title
N7668	SCR Doc. 25/037	Burmeister and Buch	The West Greenland trawl survey for <i>Pandalus borealis</i> 2025 with reference to earlier results
N7669	SCR Doc. 25/038	Burmeister	The Fishery for Northern Shrimp (<i>Pandalus borealis</i>) off West Greenland, 1970-2025
N7670	SCR Doc. 25/039	Burmeister	Catch Table Update for the West Greenland Shrimp Fishery
N7671	SCR Doc. 25/040	Burmeister and Buch	A provisional assessment of the shrimp stock off West Greenland in 2024
N7672	SCR Doc. 25/041	Buch and Burmeister	Results of the East Greenland Bottom Trawl Survey for Northern shrimp (<i>Pandalus borealis</i>) Off East Greenland (ICES Subarea XIV.b), 2008-2025.
N7673	SCR Doc. 25/042	Buch and Burmeister	The Fishery for Northern Shrimp (<i>Pandalus borealis</i>) in Denmark Strait/off East Greenland, 1978-2025
N7674	SCR Doc. 25/043	Buch and Burmeister	Applying a stochastic surplus production model (SPiCT) to the East Greenland Stock of Northern Shrimp
N7677	SCR Doc. 25/044	J. M. Casas	Northern Shrimp (<i>Pandalus borealis</i>) on Flemish Cap Surveys 2025

SUMMARY DOCUMENTS (SCS)

Serial No.	SCS Document	Author(s)	Title
N7695	SCS Doc. 25/15	NAFO	Report of the Scientific Council and STACFIS Shrimp Assessment Meeting, 9-11 September 2025

APPENDIX VI. LIST OF PARTICIPANTS, 9-11 SEPTEMBER 2025

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* indicates virtual participation