

PART C: SCIENTIFIC COUNCIL 12-19 SEPTEMBER 2013

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SC-NIPAG Participants 2013



Back Row: Barbara Marshall, Michael Kingsley, Sten Munch-Petersen, Mats Ulmestrand, Bob Mohn, Peter Shelton,
Dennis Zakharov

Middle Row: Miquel Casas, Carsten Hvingel, Don Stansbury, Helle Siegstad, Nannette Hammeken-Arboe

Front Row: Neil Campbell, AnnDorte Burneister, Dave Orr, Goldborg Søvik, Silver Sirp



NIPAG Co-Chairs – Peter Shelton and Carsten Hvingel (also SC Chair) and
SC Coordinator – Neil Campbell



Report of Scientific Council Meeting

12-19 September 2013

Chair: Carsten Hvingel

Rapporteur: Neil Campbell

I. PLENARY SESSIONS

The Scientific Council met at the NAFO Secretariat, Dartmouth, NS, Canada during 12-19 September 2013, to consider the various matters in its Agenda. Representatives attended from Canada, Denmark (Greenland), European Union (Denmark, Estonia, and Spain), Norway and Russia. The Scientific Council Coordinator, Neil Campbell, was in attendance.

The Executive Committee met at 0900 to discuss a plan of work. The opening session of the Council was called to order at 0930 hours on 12 September 2013.

The Chair welcomed representatives, advisers and experts to the opening session of Scientific Council. The Chair noted that the primary reason for this meeting was to provide advice on shrimp stocks based on the assessments provided by the joint NAFO/ICES *Pandalus* Assessment Group (NIPAG). ICES members of NIPAG were granted observer status at the Scientific Council meeting, and the Chair wished all NIPAG members a productive and successful meeting.

The Scientific Council Coordinator, Neil Campbell, was appointed Rapporteur.

This opening session was adjourned at 1000 hours. Several sessions were held throughout the course of the meeting to deal with specific items on the agenda.

The concluding session was convened at 1400 hours on 19 September 2013. The Council then considered and adopted Sections III.1–4 of the “Report of the NAFO/ICES *Pandalus* Assessment Group” (NAFO SCS Doc. 13/19, ICES CM 2013/ACOM:14). The Council, having considered the results of the assessments of the NAFO stocks, provided advice and recommendations and noted the requests of the Fisheries Commission and Coastal States had been addressed. The Council then considered and adopted its own report of the 12-19 September 2013 meeting.

The meeting adjourned at 1500 hours on 19 September 2013.

The revised Agenda, List of Research (SCR) and Summary (SCS) Documents, and the List of Representatives, Advisers and Experts, are given in Appendix I, II and III, respectively.

II. REVIEW OF RECOMMENDATIONS IN 2012

These were reviewed in the appropriate STACFIS sections below.

III. NAFO/ICES *PANDALUS* ASSESSMENT GROUP

NIPAG has assessed four stocks of relevance to NAFO: Northern shrimp in Div. 3M, Northern shrimp in Div. 3LNO, Northern shrimp in Subareas 0 and 1, and Northern shrimp in Denmark Strait and off East Greenland. The Scientific Council summary sheets and conclusions for these stocks are presented in Section IV of this report. The recommendations to Fisheries Commission, with respect to stock advice, appear in the summary sheets. The full NIPAG report is available in NAFO SCS Doc. 13/19 and ICES CM 2013/ACOM:14



IV. FORMULATION OF ADVICE (SEE ANNEXES 1, 2 AND 3)

1. Request from Fisheries Commission

The Fisheries Commission Request for Advice (Annex 1a) for shrimp in Div. 3M and Div. 3LNO regarding stock assessment (Item 1) is given below.



a) Northern Shrimp in Division 3M

Advice September 2013

Recommendation for 2014

No directed fishery.

Management objectives

No explicit management plan or management objectives defined by Fisheries Commission. General convention objectives (GC Doc. 08-03) are applied. Advice is based on qualitative evaluation of biomass indices in relation to historic levels, and provided in the context of the precautionary approach framework (FC Doc. 04/18).

Convention objectives	Status	Comment/consideration
Restore to or maintain at B_{msy}	●	Stock below B_{lim}
Eliminate overfishing	●	No directed fishery
Apply Precautionary Approach	●	B_{lim} defined. No fishing mortality reference point defined
Minimise harmful impacts on living marine resources and ecosystems	●	VME closures in effect, no directed fishing
Preserve marine biodiversity	●	No directed fishery

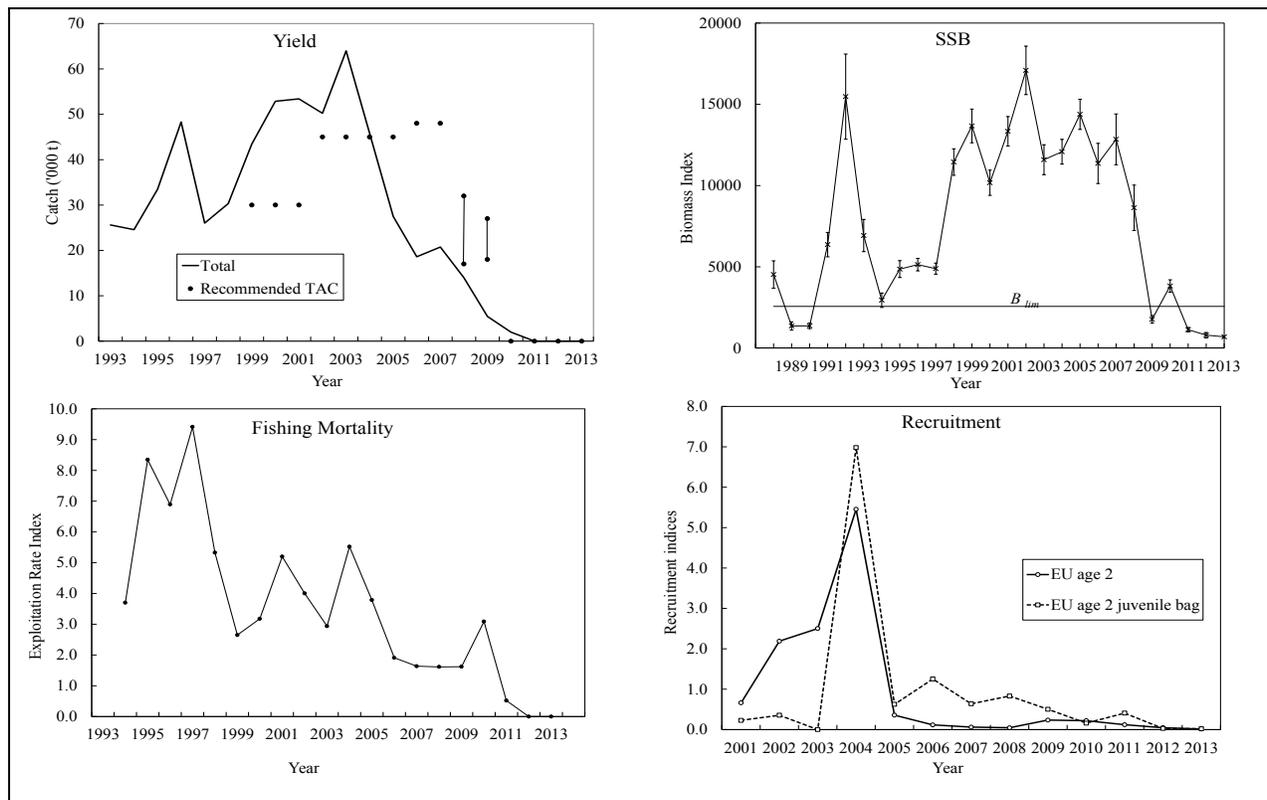
● OK
 ● Intermediate
 ● Not accomplished
 ○ Unknown

Management unit

The Northern Shrimp stock on Flemish Cap is considered to be a separate population.

Stock status

Following several years of low recruitment, the spawning stock has declined, and has remained below B_{lim} since 2011. Due to continued poor recruitment there are concerns that the stock will remain at low levels.



Reference points

Scientific Council considers that a female survey biomass index of 15% of its maximum observed level provides a proxy for B_{lim} . This corresponds to an index value of 2 564 (SCS Doc. 04/12).

Projections

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

Assessment

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

Next full assessment is planned for 2014.

Human impact

Low fishery related mortality due to moratorium and low bycatch in other fisheries. Other sources (e.g. pollution, shipping, oil-industry) are considered minor.

Biological and Environmental Interactions

The drastic decline of shrimp biomass since 2007 correlates with the increase of the cod stock in Div. 3M. It is uncertain whether this represents a causal relationship and/or the result of an environmental factor.

Results of modelling suggest that, in unexploited conditions, cod would be expected to be a highly dominant component of the system, and high shrimp stock sizes, like the ones observed in the 1998 – 2007 period, would not be a stable feature in the Flemish Cap.

Fishery

This fishery is effort-regulated. The effort allocations were reduced by 50% in 2010 and a moratorium was imposed in 2011. Catches are expected to be close to zero in 2013.

Recent catches were as follows:

	2006	2007	2008	2009	2010	2011	2012	2013
NIPAG	18 000	21 000	13 000	5 000	2 000	0	0	0 ¹
STATLANT 21	15191	17642	13431	5374	1976	0	0	
Effort (Agreed Days)	10555	10555	10555	10555	5227	0	0	0

¹ To September 2013

Effects of the fishery on the ecosystem

No fishery.

Special comments

None

Source of Information

SCR Doc. 13/18, 60, 61



b) Northern Shrimp in Divisions 3LNO

Advice September 2013 for 2014

Recommendation for 2014

No directed fishery.

Management objectives

No explicit management plan or objectives defined by Fisheries Commission. General convention objectives (GC Doc. 08/3) are applied. Advice is based on qualitative evaluation of biomass indices in relation to historic levels, and provided in the context of the precautionary approach framework (FC Doc. 04/18).

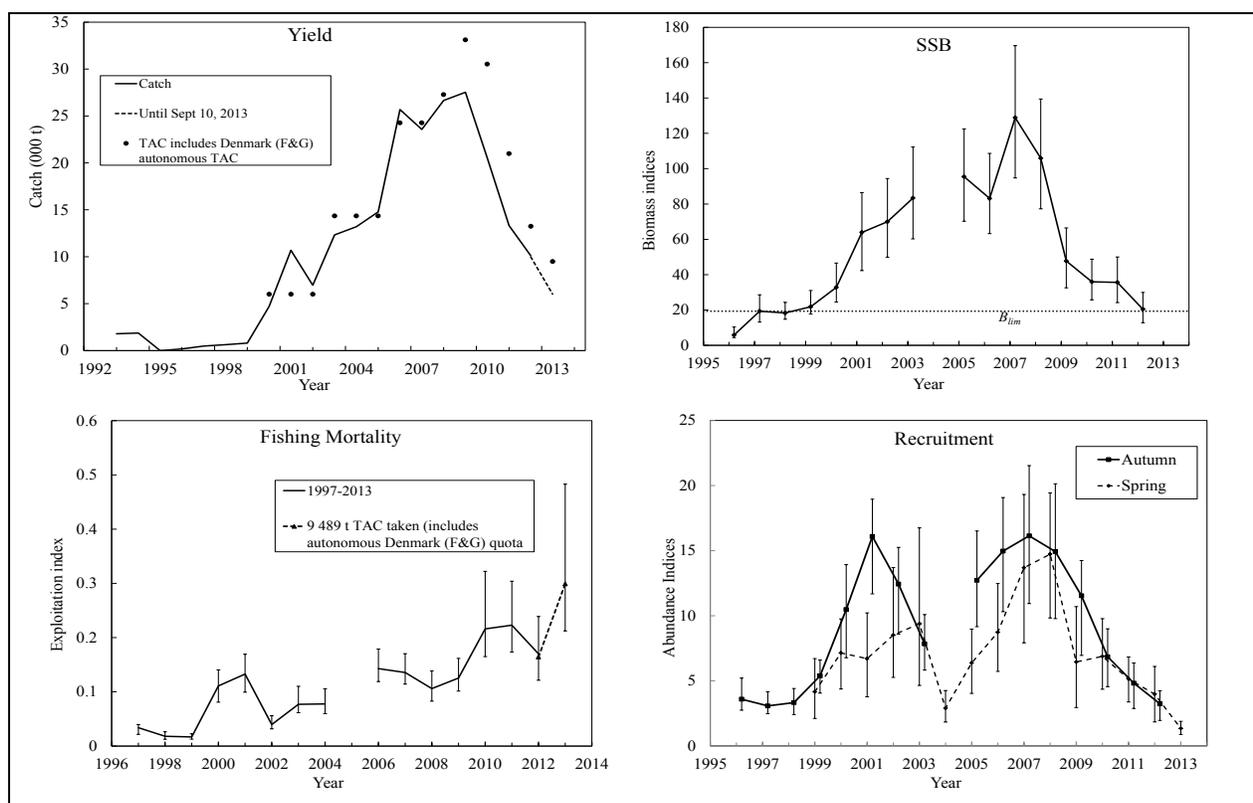
Convention objectives	Status	Comment/consideration	
Restore to or maintain at B_{msy}	●	Stock at B_{lim}	● OK
Eliminate overfishing	●	Current exploitation rate not sustainable	● Intermediate
Apply Precautionary Approach	●	Only B_{lim} is defined	● Not accomplished
Minimise harmful impacts on living marine resources and ecosystems	●	Nordmøre Grate mandatory; bycatch protocols; VME closures in effect	○ Unknown
Preserve marine biodiversity	○	Cannot be evaluated	

Management Unit

The stock in Div. 3LNO is assessed and managed as a discrete population. However, recent analysis shows this stock is part of a wider population spanning NAFO Subarea 2 and at least Div. 3KL.

Stock Status

The stock has declined since 2007 and is now at B_{lim} . The risk of the stock being below B_{lim} in 2012 (43%) exceeds the maximum risk level (10%) specified in NAFO's precautionary approach framework (FC Doc. 04/18). Given expectations of poor recruitment and increased fishing mortality, the stock is expected to decline further.



Reference points

B_{lim} is defined as 15% of the maximum observed female biomass index (SCS Doc. 04/12). This corresponds to an index value of 19 330.

Projections:

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

Assessment

Based upon a qualitative evaluation of trends in stock biomass, fishing mortality proxy and recruitment. Input data are research survey indices and fishery data (NIPAG 2013).

An exploratory quantitative assessment model showed results consistent with that of the accepted qualitative assessment.

Next full assessment is planned for 2014.

Human impact

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

Biological and Environmental Interactions

Both stock development and the rate at which changes might take place can be affected by changes in predation, in particular by cod, which has been estimated to consume large amounts of shrimp. The size of the cod stocks in Div. 2J3KL and Div. 3NO remain at very low levels and therefore the impact of cod predation is considered to be minimal. Other groundfish predators have remained relatively stable at low levels and are not believed to have driven the decline in shrimp stocks seen since 2007.

Temperature in the stock area has been warming over the past decade. Effects of warmer temperatures on shrimp distribution, recruitment, growth and survival are unknown.

Fishery

Northern Shrimp is caught in a directed bottom trawl fishery and there is little or no bycatch in other trawl fisheries. The Northern Shrimp fishery is regulated by quota.

	2005	2006	2007	2008	2009	2010	2011	2012	2013
TAC as set by FC ¹	13 000	22 000	22 000	25 000	30 000	30 000	19 200	12 000	8 600
STATLANT 21	14 281	22 616	22 535	26 004	27 236	19 745	13 014	9 966	
NIPAG ²	14 775	25 689	23 570	26 649	27 527	20 536	13 316	10 108	6 020

¹ Denmark with respect to Faroes and Greenland did not agree to the 2003 – 2013 quotas and have set autonomous TACs since 2003. These increases are not included in the table.

² NIPAG catch estimates have been updated using various data sources (see p. 13, SCR. Doc. 13/64).

Effects of the fishery on the ecosystem

No specific information available. General impacts of fishing gear on the ecosystem should be considered.

Special Comments

Recent genetic analysis shows that this stock is part of a wider population spanning NAFO Subarea 2 and at least Div. 3KL. Migrations of shrimps across the management-area boundaries are not accounted for in the assessment and therefore introduce additional uncertainty. Scientific Council recommends exploration of alternative approaches that take into account the entire stock area.

Sources of information

SCR Doc. 13/063, 064



c) Stock interactions in Div. 3LNO shrimp (Item 14)

The Scientific Council was requested to: *to incorporate as much as possible information on stock interaction between these stocks in the management advice of 3LNO shrimp and to provide sustainable exploitation rates on that basis.*

This was considered by Scientific Council and NIPAG and incorporated into the advice.

d) Reference Points (Item 4)

With respect to Northern shrimp (Pandalus borealis) in Div. 3LNO, noting the NAFO Framework for Precautionary Approach and recognizing the desire to demonstrate NAFO's commitment to applying the precautionary approach, Fisheries Commission requests the Scientific Council to:

- a) *identify F_{msy}*
- b) *identify B_{msy}*
- c) *provide advice on the appropriate selection of an upper reference point for biomass (e.g. B_{buf})*

Scientific Council received a presentation on work to date on a Bayesian assessment model for Northern shrimp in Div. 3LNO (SCR 13/69). Scientific Council considered this model to show promise. It was noted that the model implicitly contains these reference points. Although the model produced outputs in line with the accepted assessment method, its findings were considered qualitative at present. Work to finalise the model is ongoing.

2. Requests from Coastal States

a) Northern Shrimp in Subarea 1 and Div. 0A

Advice September 2013 for 2014

Advice for 2014

Scientific Council advises that catches in 2014 should not exceed 80 000 t. Scientific Council observed no significant changes in the state of the stock. A catch of 80 000 t in 2014 would entail an estimated mortality risk of 32% and would not, in the medium term, entail a high risk of driving the stock below B_{msy} .

Management objectives

Scientific Council is aware of the Greenland management plan for shrimp and of general management objectives specified in the Greenland Fisheries Act; however the contents of these have not been conveyed to the Council. Canada requested Scientific Council to provide advice on this stock within the context of the NAFO Precautionary Approach Framework (SCS Doc. 13/04).

Advice is based on risk analysis coming from a quantitative model, and on qualitative evaluation of biomass and stock-composition indices.

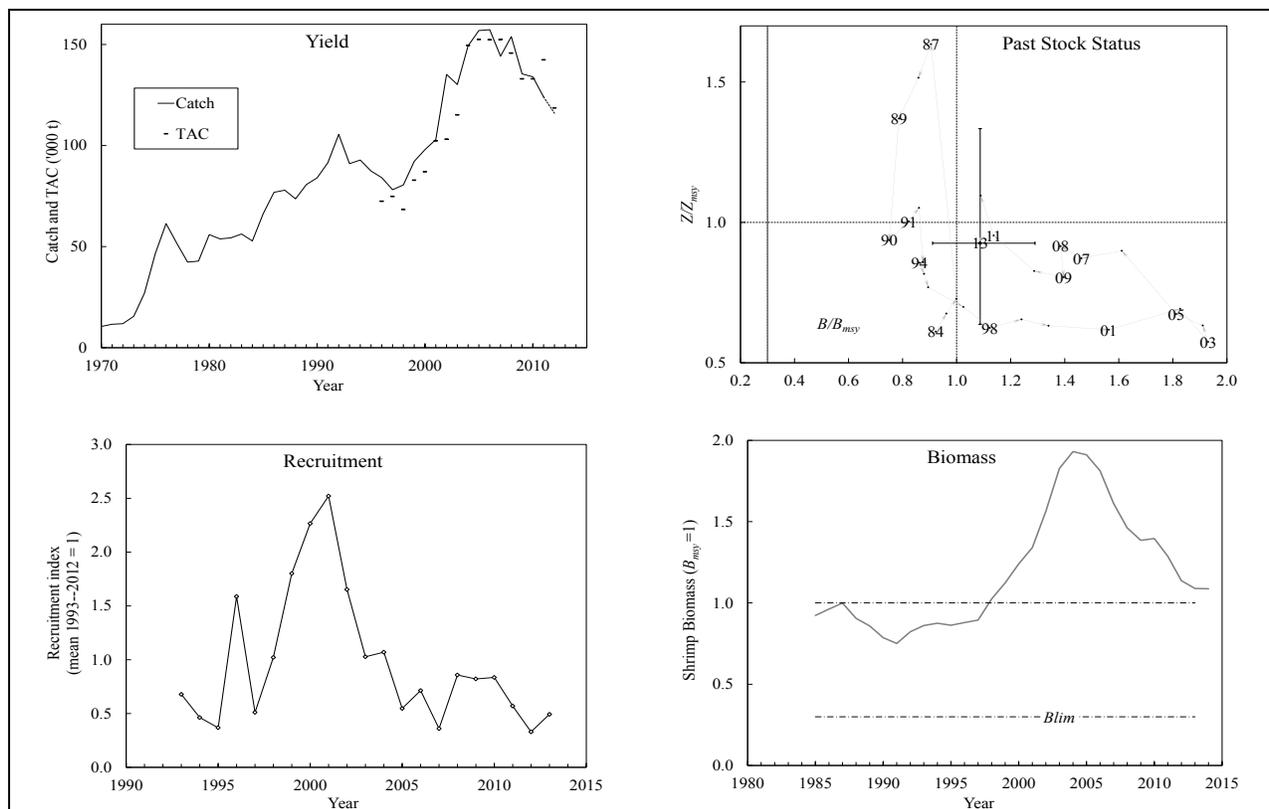
Objective	Status	Comment/consideration
Apply Precautionary Approach	●	Stock status is both estimated and forecast relative to precautionary reference points ● OK

Management unit

The stock, considered distinct from all others, is distributed throughout Subarea 1, extends into Div. 0A east of 60°30'W, and is assessed as a single stock.

Stock status

Biomass is estimated to have been declining since 2004, but at the end of 2013 is projected to be about 10% above B_{msy} . Total mortality in 2013 is not projected to exceed Z_{msy} . But the stock comprises a high proportion of females, so fishing will risk removing much of the spawning-stock biomass, and recruitment to both the fishable and the spawning stocks in both short and medium terms are all expected to remain low.



Reference points

B_{lim} is 30% of B_{MSY} and the limit reference point for mortality is Z_{MSY} (FC Doc. 04/18).

Projections

Projections for 2014 and 2016 were made with catch levels ranging from 50 to 110 Kt/yr and a cod stock biomass at 40 Kt.

2014				2016			
Catch (Kt/yr)	Probability (%) of transgressing:			Catch (Kt/yr)	Probability (%) of transgressing:		
	B_{msy}	B_{lim}	Z_{lim}		B_{msy}	B_{lim}	Z_{lim}
50	34.3	1.8	18.3	50	30.1	3.1	19.3
60	35.2	1.7	21.4	60	31.3	3.1	23.2
70	36.2	1.8	26.5	70	34.4	3.2	28.1
75	36.4	1.7	29.0	75	35.4	3.5	30.9
80	37.5	2.0	32.3	80	37.6	3.6	34.2
85	37.6	1.8	36.3	85	38.6	3.4	37.3
90	38.3	1.9	39.2	90	39.7	3.7	40.7
100	39.3	1.7	45.9	100	42.4	3.6	47.3
110	40.1	1.8	52.1	110	44.5	3.9	54.0

Assessment

The analytical assessment was run with the same methods as in 2011–12 and with updated data series; the cod-stock estimate for 2012 was 2½ times that used in the 2012 assessment. The model converged with no pathologies and most of the error CVs had similar values to those of previous years. The CV of the term for cod predation was larger than in 2012 (SCR Doc. 13/054).

Human impact

Mortality in the directed fishery has been well documented. Other human impacts, including bycatch in other fisheries prosecuted on the same grounds, have not.

Biological and Environmental Interactions

Cod is an important predator on shrimps. This assessment incorporates this interaction.

Fishery

Shrimps are caught in a directed trawl fishery. Bycatch of fish in the shrimp fishery is around 1% by weight. The fishery is regulated by TAC, and bycatch reduction measures include moving rules and Nordmøre grates.

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

	2006	2007	2008	2009	2010	2011	2012	2013
NIPAG	157 315	144 190	152 749	135 458	133 990	123 985	115 975	100 000 ¹
STATLANT 21	156 976	144 123	148 550	133 990	129 179	123 195	115 080	—
Enacted TAC ²	152 380	152 417	145 717	132 987	132 987	142 597	118 596	102 767

¹ provisional—projected to year end; ² sum of TACs autonomously set by Canada and Greenland.

Effects of the fishery on the ecosystem

Measures to reduce effects of the fishery on the ecosystem include area closures and moving rules to protect sponges and cold-water corals, and gear modifications to reduce damage to benthic communities.

Special comments

The future trajectory of the stock is likely to depend on the evolution of the stock of cod, which has recently been erratic and is difficult to predict.

Source of Information

SCR Docs 04/75, 04/76, 08/6, 11/053, 11/057, 11/058, 12/44, 13/54, 13/56, 13/57, 13/58, 13/59, SCS Doc. 04/12.



b) Northern Shrimp in Denmark Strait and off East Greenland

Advice September 2013

Recommendation for 2014

Stock size indicators have declined over the most recent 5 years. Although the exploitation index has been low, average catches for that period appear not to be sustainable. Scientific Council advises that catches should not exceed the current catch level of 2 000 t.

Management objectives

Scientific Council is aware of general management objectives specified in the Greenland Fisheries Act; however the contents of these have not been conveyed to the Council.

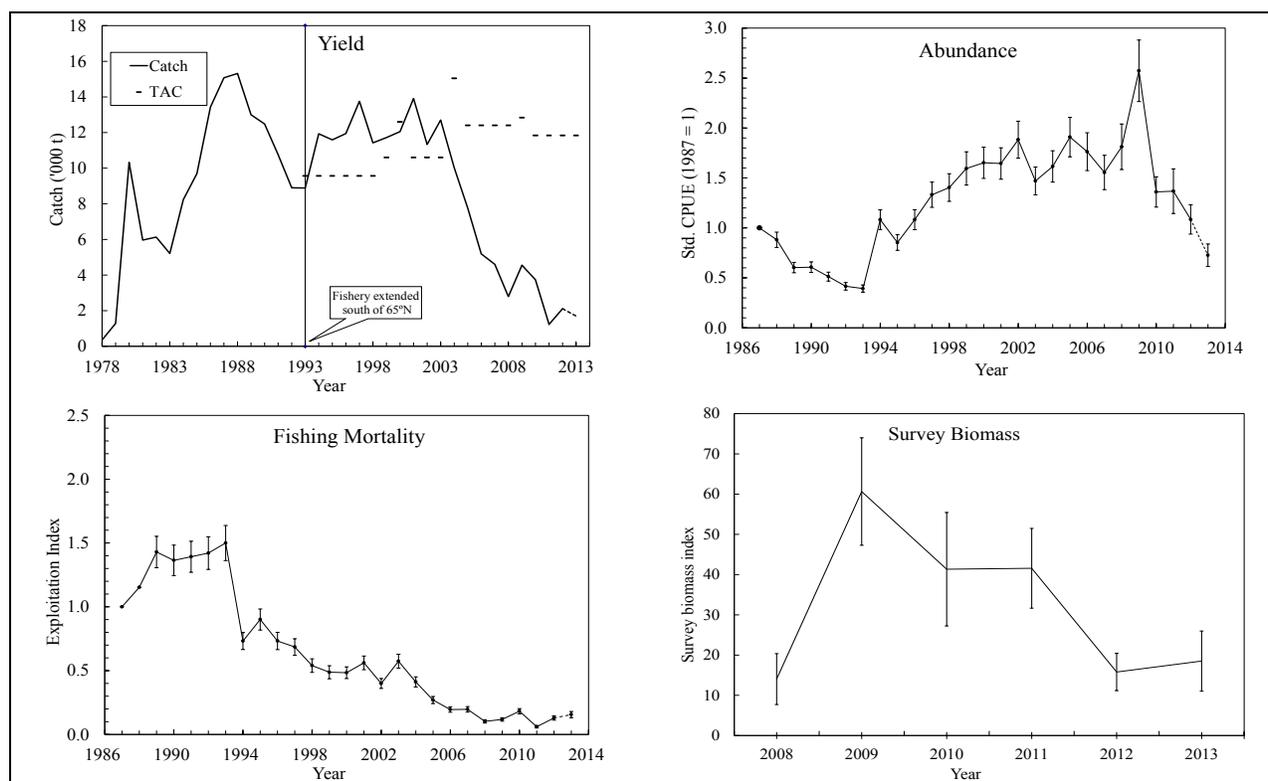
Advice is based on qualitative evaluation of biomass indices in relation to historic levels.

Management unit

The shrimp stock is distributed off East Greenland in ICES Div. XIVb and Va and is assessed as a single population.

Stock status

The decrease in stock size continued in 2013 despite several years of very low exploitation rates.



Reference points

No reference points have been established for this stock

Projections

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

Assessment

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

Human impact

Mortality in the directed fishery has been well documented. Other human impacts, including bycatch in other fisheries prosecuted on the same grounds, have not.

Biological and Environmental Interactions

Cod is an important predator on shrimp. The cod stock has been increasing in East Greenland waters in recent years.

Fishery

Shrimp is caught in a directed trawl fishery. The fishery is regulated by TAC and bycatch reduction measure include move on rules and Nordmøre grates.

Recent catches were as follows:

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 ¹
NIPAG	10016	7753	5189	4600	2794	4555	3735	1235	2109	1702
Enacted TAC	15043	12400	12400	12400	12400	12835	11835	12400	12400	12400
¹ To July 2013										

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 cold-water corals, and gear modifications to reduce damage to benthic communities.

Special comments

The southern area (South of 65°N) is currently lightly fished and the state of the stock in this area is uncertain.

Source of Information

SCR Doc. 13/062, 13/067



c) Harvest Control Rules and B_{msy}

Scientific Council was requested by Denmark on behalf of Greenland and the Faroe Islands to: *report on whether the pending harvest control rules will be able to keep the stock at or above B_{msy} .*

The Scientific Council responded:

Scientific Council has been informed of the harvest control rules (HCR) included in the shrimp management plan promulgated in 2010.

Scientific Council considered a report of a simple simulation that, within its limitations, confirmed Scientific Council's initial evaluation that the mortality-risk limits included in the management plan were conservative and would be highly likely to keep the stock at or above B_{msy} , but would also be likely to entail a high cost in forgone catches. Scientific Council has noted that the biomass-risk criteria that are included in this HCR cannot be met in the short term by catch controls, so in that respect the HCR is difficult to implement.

However, Scientific Council was not clear whether this HCR is the 'pending harvest control rule' referred to in the request or whether alternatives are already being considered, and therefore encourages the Greenland Government to make further progress in refining its proposals with respect to formulating, testing and implementing a possibly revised HCR.

Scientific Council draws attention to its earlier caution that thorough testing of an HCR is likely to be a lengthy and complex task, and to require the participation of all parties concerned in the fishery (SCS Doc. 11/21).

V. OTHER MATTERS

1. Scheduling of Future Meetings

Scientific Council felt that the altered timing of the SC/NIPAG meeting worked well and planned to continue with this schedule.

2. Scientific Council, 23 – 27 Sep 2013

Scientific Council noted the Scientific Council meeting will be held in the Westin Hotel, Halifax, NS, Canada, 23-27 September 2013.

3. Scientific Council, 30 May – 12 June, 2014

Scientific Council agreed that its June meeting will be held on 30 May – 12 June, 2014, in Halifax or Dartmouth. The Secretariat will present some options for venues at the September meeting.

4. Scientific Council, (in conjunction with NIPAG), 10 – 17 Sep 2014

Scientific Council noted the next SC/NIPAG meeting will be held at Greenland Institute of Natural Resources, Nuuk, Greenland, 10 – 17 September 2014.

5. Scientific Council, September 2014

Scientific Council noted that the Annual meeting will be held in September in Halifax, Nova Scotia, Canada, unless an invitation to host the meeting is extended by a Contracting Party.

6. NAFO/ICES Joint Groups

a) NIPAG, 10-17 Sep 2014

Scientific Council noted the next NIPAG meeting will be held at Greenland Institute of Natural Resources, Nuuk, Greenland, 10 – 17 September. 2014.



b) NIPAG, 2015

Scientific Council received an invitation for the 2015 NIPAG meeting to be hosted at DFO St Johns, Newfoundland. Date will be confirmed at the next meeting, but are penciled in for 10 – 17 September 2015.

2. Topics for Future Special Sessions

No special sessions were proposed.

3. Other Business**a) SC/NIPAG Intersessional Workshop on Recruitment Signals**

Scientific Council will hold an intersessional meeting by correspondence to investigate the appropriate recruitment signal which can be used in prediction, taking into account environmental and trophic factors. This was proposed to be hosted by the NAFO Secretariat using Webex, to be held on 3 April 2014.

VI. ADOPTION OF SCIENTIFIC COUNCIL AND NIPAG REPORTS

The Council at its session on 19 September 2014 considered and adopted Sections III.1-4 of the “Report of the NAFO/ICES *Pandalus* Assessment Group” (SCS Doc. 13/19, ICES CM 2013/ACOM:14). The Council then considered and adopted its own report of the 12-19 September 2013 meeting.

VII. ADJOURNMENT

The Chair thanked the participants for their hard work and contribution to the success of this meeting, and welcomed the peer review and constructive comments received in formulating the scientific advice. The Chair thanked the Scientific Council Coordinator, Neil Campbell, and Barbara Marshall, Information Officer for their support during the meeting. The Chair then thanked the ICES and NAFO Secretariats for their support in general. All participants were then wished a safe journey home and the meeting was adjourned at 1600 hours.

