

PART B: SCIENTIFIC COUNCIL MEETING 27 AUGUST - 7 SEPTEMBER 2012

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REPORT OF SCIENTIFIC COUNCIL MEETING

27 August – 7 September 2012

Chair: Carsten Hvingel

Rapporteur: Neil Campbell

I. PLENARY SESSION

The Scientific Council met by correspondence via SharePoint and WebEx video conference during 27 August - 7 September 2012 to address the Fisheries Commission request to update advice on NAFO Div. 3LN and Div. 3M shrimp stocks for 2013, in advance of the 2012 Annual Meeting. Representatives and participants attended from Canada, European Union (Estonia, France and Spain) and Norway. The Scientific Council Coordinator was in attendance. No applications were received from observers to attend this meeting.

The provisional agenda was circulated to Contracting Parties by email on 16 July 2012 and posted on the SharePoint site. The report for this meeting was developed throughout the course of the meeting and was available on the SharePoint report area for comment.

The SharePoint site for this meeting was opened on 31 August 2012. Access to the SharePoint site, and hence participation in the meeting, was given to members of Scientific Council Executive and Members nominated by Contracting Parties. The Chair asked Representatives to post any comments on the agenda by 29 August. Participants were also asked to upload relevant documents to the SharePoint site and to discuss these documents on the discussion area. The opening session of the WebEx meeting of Council was called to order on at 0900 ADT on 7 September 2012. The report was adopted on 10 September 2012

The Chair welcomed all participants to this meeting by correspondence and thanked the Designated Experts for their preparatory work.

The Agenda, List of Research (SCR) and Summary (SCS) Documents, and the List of Representatives, Advisers and Experts, are given in Part E, this volume.

II. FISHERIES SCIENCE

The Council adopted the Report of the Standing Committee on Fisheries Science (STACFIS) as presented by the Chair, Jean-Claude Mahé. The full report of STACFIS is in Appendix I.

III. SPECIAL REQUESTS FROM THE FISHERIES COMMISSION

1. From September 2010

a) Update to 3LNO and 3M shrimp advice

The Fisheries Commission with the concurrence of the Coastal State as regards to the stocks below which occur within its jurisdiction ("Fisheries Commission") requests that the Scientific Council provide advice in advance of the 2012 Annual Meeting, for the management of Northern shrimp in Div. 3M, 3LNO in 2013. The advice should be provided as a range of management options and a risk analysis for each option (rather than a single TAC recommendation).

Noting that Scientific Council will meet in October of 2011 for 2013 TAC advice, Fisheries Commission requests the Scientific Council to update its advice on shrimp stocks in 2012 for 2013 TAC.

Fisheries Commission further requests that SC provide advice in accordance to Annex 1.

Scientific Council responded:

In October 2011 the Scientific Council provided advice for 2013 for shrimp in Div. 3M and 3LNO. The Council reviewed the status of these stocks at this September 2012 meeting, and found no significant change in either to warrant any update of the advice previously provided.

Accordingly, the Council reiterates its advice for 2013 as follows:

Recommendation for Northern Shrimp (*Pandalus borealis*) in Div. 3M:

The 2011 survey biomass index indicates the stock is below the B_{lim} proxy and remains in a state of impaired recruitment. Scientific Council recommended that the fishing mortality for 2013 be set as close to zero as possible.

Recommendation for Northern Shrimp (*Pandalus borealis*) in Div. 3LNO:

Based on the average fishable biomass for the last three surveys and predicted autumn 2011 survey, the following table shows catch levels at various exploitation rates in 2013:

Exploitation Rate	Catch Level
5.0%	3 059 t
10.0%	6 119 t
14.0%	8 566 t
15.3%	9 350 t ¹

¹FC TAC for 2013

Exploitation rates over the period 2006–2009 have been near 14% and were followed by stock decline. Scientific Council considers TAC options involving exploitation rates of 14% or higher to be associated with a relatively high risk of continued stock decline. TACs lower than that will tend to reduce this risk in proportion to the reduction in the exploitation rate. Scientific Council recommended that the TAC for 2013 be less than 8 600 t. Scientific Council is not able to quantify the absolute magnitude of the risk.

b) Update on PA Reference Points for shrimp in Div. 3LNO (Item 3)

*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 responded:

Current scientific advice for the management of Div. 3LNO shrimp is based on the relationship between trends in research vessel survey indices and the commercial landings. There is no accepted assessment model. 15% of the highest survey observation of female biomass (SSB) is currently accepted as a proxy for B_{lim} . There is no current proxy for F_{lim} . Fisheries commission has requested advice on the identification of F_{msy} , B_{msy} and advice on the appropriate selection of an upper reference point for biomass. Such advice is best provided using an accepted assessment model fit to the data. Progress has been made in fitting surplus production models using both maximum likelihood and Bayesian approaches. The Bayesian model will be further refined and presented in 2012 as a potential assessment model for the stock.

IV. ADOPTION OF REPORT

The draft report of this meeting was circulated by email to participants for consideration. The report was adopted in full on 10 September 2012.

V. ADJOURNMENT

The meeting was adjourned by the Chair of Scientific Council after the report was adopted in principle. Participants and the NAFO Secretariat were thanked for their contributions.

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

Chair: Jean-Claude Mahé

Rapporteur: Various

The Committee met by correspondence during 27 August-7 September 2011 via SharePoint and with a WebEx conference to consider the various items on its Agenda on 7 September 2011. Representatives attended from Canada, European Union (Estonia, France and Spain) and Norway. The Scientific Council Coordinator was in attendance.

I. Opening

The Chair, Jean-Claude Mahé, opened the meeting by welcoming participants. The provisional agenda was reviewed and adopted, and a plan of work developed for the meeting.

II. Interim Monitoring Updates

STACFIS was asked to update the assessments of Northern shrimp in Div. 3M and Northern shrimp in Div. 3LNO that had been reviewed at the meeting of NIPAG in October 2011.

1. Northern Shrimp (*Pandalus borealis*) in Div. 3M

(SCR 12/42)

a) Introduction. The shrimp fishery in Div. 3M is now under moratorium. This fishery began in 1993. Initial catch rates were favorable and, shortly thereafter, vessels from several nations joined. Catches peaked at over 60 000 t in 2003 and declined thereafter.

i) Fishery and catches. 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 2012. Recent catches were as follows:

	2006	2007	2008	2009	2010	2011	2012
STACFIS	18 000	21 000	13 000	5 000	2 000	0	0
21A	15 191	17 642	13 431	5 374	1 976	0	0 ¹
Recommended TAC	48 000	48 000	17 000 – 32 000	18 000 – 27 000	ndf	ndf	ndf
Effort (Agreed Days)	10 555	10 555	10 555	10555	5 227	0	0

¹ To September 2012

² Effort regulated

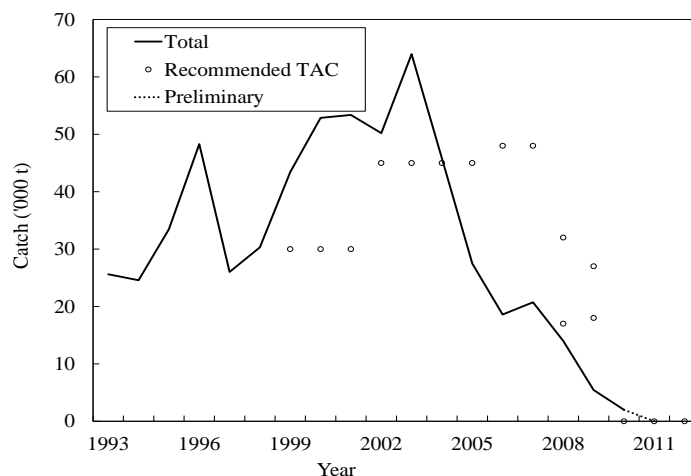


Fig. 1.1 Northern shrimp in Div. 3M: Catches and TACs.

b) Input Data

i) Commercial fishery data

Catch, effort and biological data were available from several Contracting Parties. Time series of size and sex composition data were available mainly from two countries between 1993 and 2005 and survey indices were available from EU research surveys (1988-2011). Catch data were updated for 2012. Because of the moratorium catch and effort data were not available from 2011. Therefore the standardized CPUE series was not updated from 2012.

ii) Research Survey Data

Stratified-random surveys have been conducted on Flemish Cap by the EU in July from 1988 to 2012, using a Lofoten trawl. A new vessel was introduced in 2003 which continued to use the same trawl employed since 1988. In addition, there were differences in cod-end mesh sizes utilized in the 1994 and 1998 surveys that have likely resulted in biased estimates of total survey biomass. Nevertheless, for this assessment, the series prior to 2003 were converted into comparable units with the new vessel based on the methodology accepted by STACFIS in 2004 (NAFO 2004 SC Rep., SCR Doc. 04/77). The index was stable at a high level from 1998 to 2007. Since then the survey biomass index declined and in 2011 was the lowest in the survey series, well below B_{lim} .

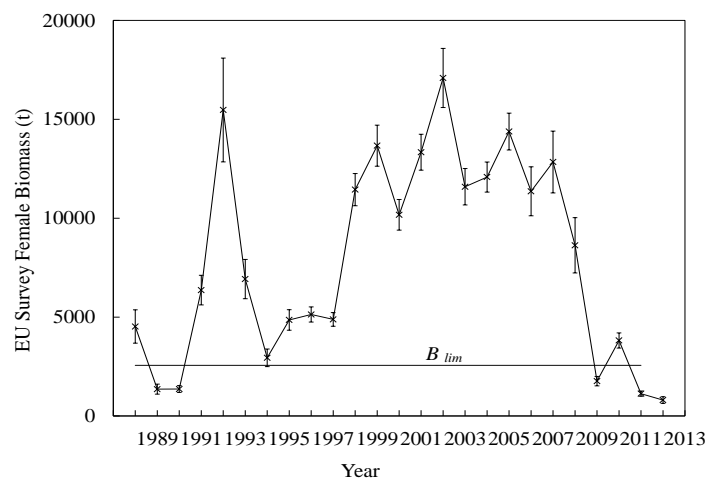


Fig. 1.2. Northern shrimp in Div. 3M: EU survey index of female biomass, 1988-2012

c) Assessment

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

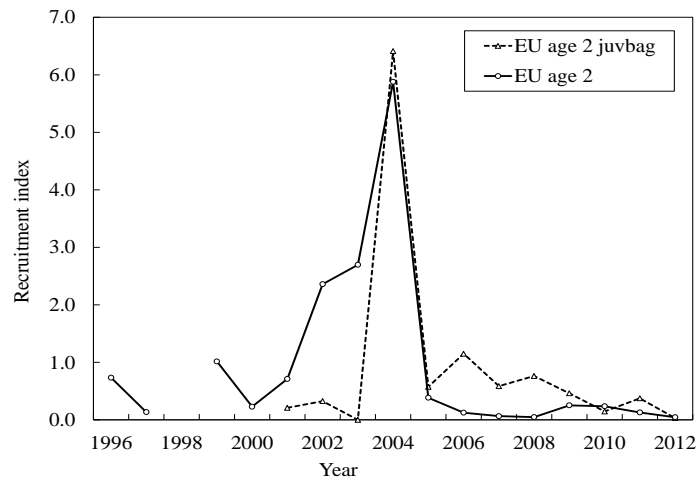


Fig. 1.3. Northern shrimp in Div. 3M: Abundance indexes at age 2 obtained in EU Flemish Cap surveys from Lofoten gear (black line) and juvenile bag (dotted line). Each series was standardized to its mean.

Recruitment: All year-classes after the 2002 cohort (i.e. age 2 in 2004) have been weak.

SSB: The survey female biomass index was at a high level from 1998 to 2007, and has declined to its lowest level in 2012, well below B_{lim} .

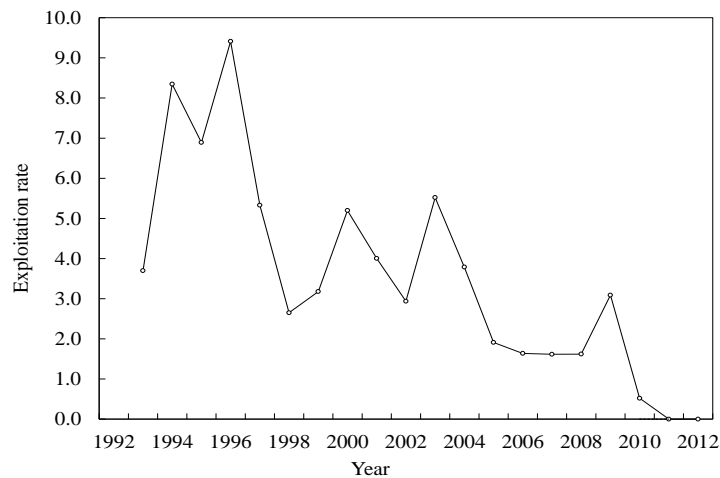


Fig. 1.4. Northern shrimp in Div. 3M: Exploitation rates as nominal catch divided by the EU survey biomass index of the same year.

Exploitation rate: From 2005 to 2008 exploitation rates (nominal catch divided by the EU survey biomass index of the same year) remained stable at relatively low values and increased in 2009. Because catches in 2010 were low, while the female biomass estimate increased slightly, the exploitation rate declined to its lowest observed level. From 2011 no catches were recorded due to the moratorium and the exploitation rate is 0 or very close to 0.

d) State of the Stock. The low values of the Total and Female biomass indexes in 2009 continued in 2010 and well below the B_{lim} proxy in 2011 and 2012, confirming the strong decrease of this stock caused by the weak recruitments in the last eight years and the increase of cod stock, one of their most important predators. STACFIS concluded that there was no change in the status of the stock.

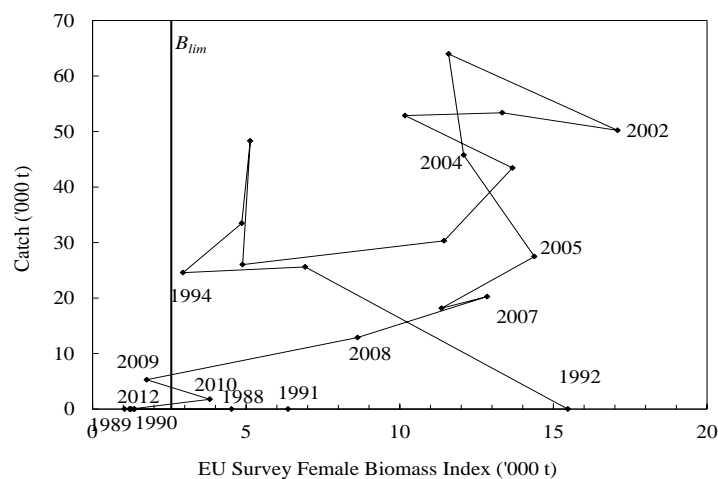


Fig. 1.5. Northern shrimp in Div. 3M: Catch plotted against female biomass index from EU survey. Line denoting B_{lim} is drawn where biomass is 85% lower than the maximum point in 2002. Due to moratorium on shrimp fishery the expected catch in 2011 and 2012 is 0 t.

e) Reference Points. Scientific Council considers that the point at which a valid index of stock size has declined by 85% from its maximum observed level provides a proxy for B_{lim} . This is 2 564 t for northern shrimp in Div. 3M. The index in 2011 and 2012 is below B_{lim} . It is not possible to calculate a limit reference point for fishing mortality.

f) Conclusions. The low values of the Total and Female biomass indexes in 2009 continued in 2010 and well below the B_{lim} proxy in 2011 and 2012, confirming the strong decrease of this stock caused by the weak recruitments in the last eight years and the increase of cod stock, one of their most important predators. STACFIS concludes that there was no change in the status of the stock.

2. Northern Shrimp (*Pandalus borealis*) in Div. 3LNO

(SCR Doc. 12/43)

a) Introduction

This shrimp stock is distributed around the edge of the Grand Bank mainly in Div. 3L. The fishery began in 1993 and came under TAC control in 2000 with a 6 000 t TAC and fishing restricted to Div. 3L. Annual TACs were raised several times between 2000 and 2009 reaching a level of 30 000 t for 2009 and 2010 before decreasing to 12 000 t in 2012 and 9 350 t in 2013. A total catch of 8 233 t was taken up to September 2012 (Fig. 2.1).

Recent catches and TACs (t) for shrimp in Div. 3LNO (total) are as follows:

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TAC as set by FC	13 000 ¹	13 000 ¹	22 000 ¹	22 000 ¹	25 000 ¹	30 000 ¹	30 000 ¹	19 200 ¹	12 000 ¹	9 350
STATLANT 21	11 937	13 533	21 426	21 5431	21 121	24 142 ²	16 310 ²	12 836 ²	8 233 ³	
NIPAG	13 204	14 775	25 696	23 530	26 649	27 914	20 090	13 041		

¹ Denmark with respect to Faroes and Greenland did not agree to the quotas of 144 t (2003–2005), 245 t (2006–2007), 278 t (2008), or 334 t (2009) and set their own TACs of 1 344 t (2003–2005), 2 274 t (2006–2008), 3 106 t (2009), 532 t (2010), 1 985 t (2011) and 1 241 t (2012). The increase is not included in the table.

² Provisional catches.

³ Estimated catches to September 2012.

Since this stock came under TAC regulation, Canada has been allocated 83% of the TAC. This allocation is split between a small-vessel (less than 500 GT and less than 65 ft.) and a large-vessel fleet. By September 2012, the small- and large-vessel fleets had taken 6 206 t and 1 654 t of shrimp respectively in Div. 3L. In all years, most of

the Canadian catch occurred along the northeast slope in Div. 3L. The annual quota within the NAFO Regulatory Area (NRA) is 17% of the total TAC.

The use of a sorting grid to reduce bycatches of fish is mandatory for all fleets in the fishery. The sorting grid cannot have a bar spacing greater than 22 mm.

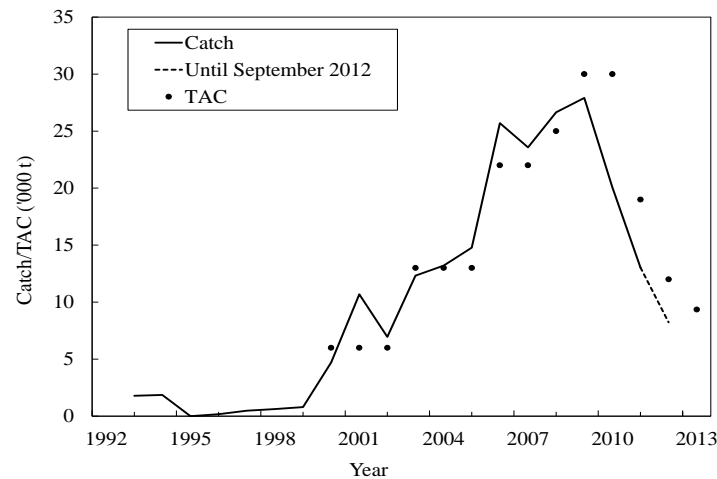


Fig. 2.1. Shrimp in Div. 3LNO: catches (to September 2012) and TAC as set by Fisheries Commission.

b) Input Data

i) Commercial fishery data

Effort and CPUE. No updated information at this time.

Catch composition. No updated information at this time.

ii) Research survey data

Canadian multi-species trawl survey. Canada has conducted stratified-random surveys in Div. 3LNO, using a Campelen 1800 shrimp trawl, from which shrimp data is available for spring (1999–2011) and autumn (1996–2010). The autumn survey in 2004 was incomplete and therefore of limited use for the assessment.

Spanish multi-species trawl survey. No updated information at this time.

Biomass. In Canadian surveys, over 90% of the biomass was found in Div. 3L, distributed mainly along the northeast slope in depths from 185 to 550 m. There was an overall increase in the both spring and autumn indices to 2007 after which they decreased by about 75% to 2012 (Fig. 2.2). Confidence intervals from the spring surveys are usually broader than from the autumn surveys.

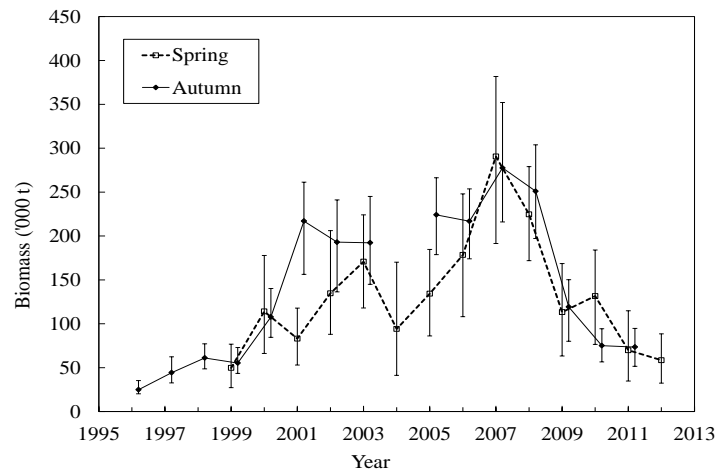


Fig. 2.2. Shrimp in Div. 3LNO: biomass index estimates from Canadian spring and autumn multi-species surveys (with 95% confidence intervals).

Stock composition. No updated information at this time.

Female biomass (SSB) indices. The autumn 3LNO female biomass index showed an increasing trend to 2007 but decreased 72% by 2012. The spring SSB index decreased by 84% between 2007 and 2012 (Fig. 2.3).

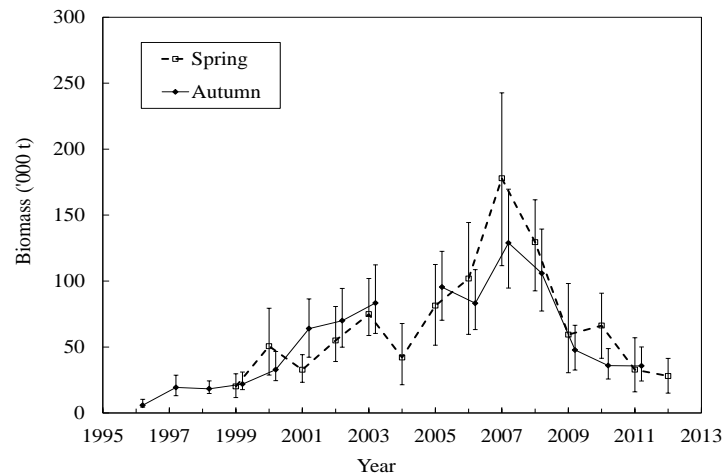


Fig. 2.3. Shrimp in Div. 3LNO: Female biomass indices from Canadian spring and autumn multi-species surveys (with 95% confidence intervals).

Recruitment indices. No updated information at this time.

Fishable biomass and exploitation indices. There had been an increasing trend in Canadian spring and autumn survey fishable biomass indices (shrimp >17 mm carapace length) until 2007. The autumn fishable biomass showed an increasing trend until 2007 then decreased by 76% through to 2010 and remaining near that level in 2011. Similarly, the spring fishable biomass index increased to 2007 but has since decreased by 82% through to 2012 (Fig. 2.4).

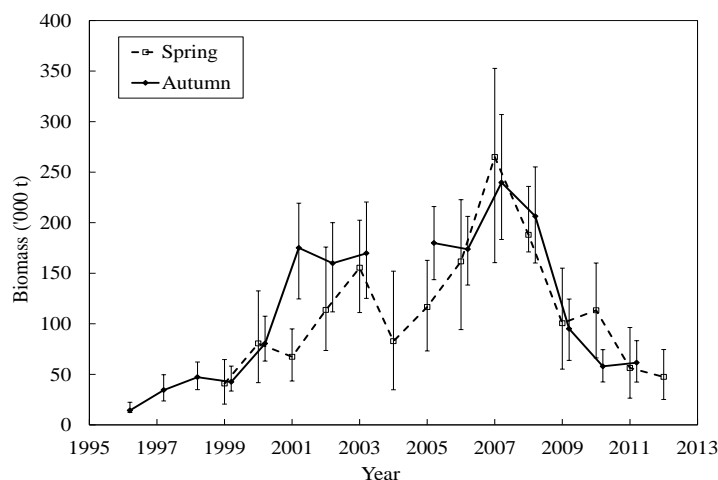


Fig. 2.4. Shrimp in Div. 3LNO: fishable biomass index. Bars indicate 95% confidence limits.

An index of exploitation was derived by dividing the catch in a given year by the fishable biomass index from the previous autumn survey. The catch series was updated in the September 2012. The exploitation index has been below 0.15 until 2010 when it increased to 0.21. By September 2012, the 2012 exploitation rate index was 0.13. Based upon the autumn 2011 fishable biomass of 61 5100 t, if the entire 12 000 t quota was to be taken, the exploitation rate index would increase to 0.20 (Fig. 2.5).

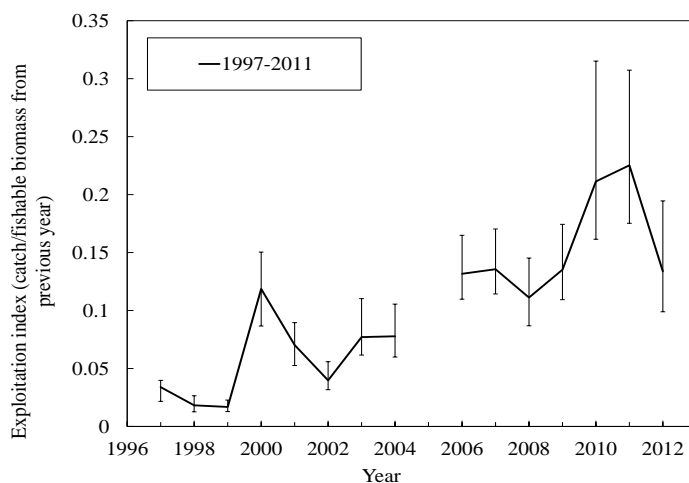


Fig. 2.5. Shrimp in Div. 3LNO: exploitation rates calculated as year's catch divided by the previous year's autumn fishable biomass index. The 2012 exploitation rate index is based upon incomplete catch data. Bars indicate 95% confidence limits.

c) Assessment Results

Recruitment. No updated information at this time.

Biomass. Spring and autumn biomass indices generally increased, to record levels by 2007, but decreased substantially by 2010 and remained near that level in 2011. The spring biomass indices remained at a low level in 2012.

Exploitation. The index of exploitation has remained below 0.15 until 2010 but has since increased.

State of the Stock. The predicted decline in the 2011 autumn survey biomass did not occur. However, the decreased levels of biomass in the Canadian survey series since 2007 are a reason for concern. The biomass is likely to be above B_{lim} .

d) Precautionary Reference Points

Scientific Council considers that the point at which a valid index of stock size has declined by 85% from the maximum observed index level provides a proxy for B_{lim} (approximately 19 000 t) for northern shrimp in Div. 3LNO (SCS Doc. 04/12). Currently, the female biomass index is estimated to be above B_{lim} (Fig. 2.6). It is not possible to calculate a limit reference point for fishing mortality. A safe zone has not been determined in the precautionary approach for this stock.

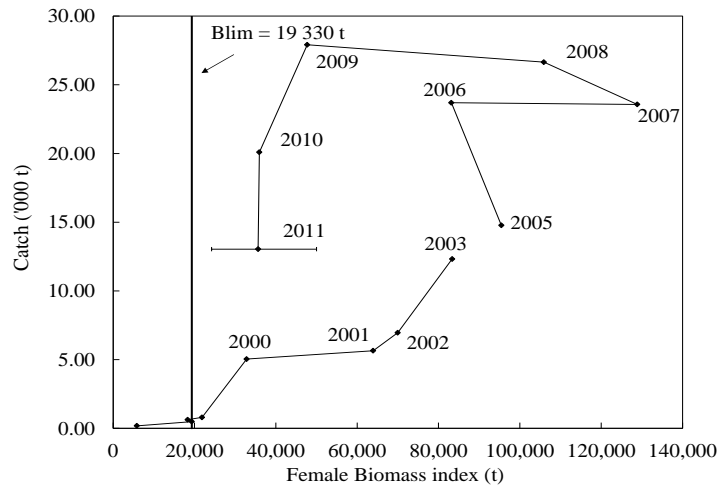


Fig. 2.6. Shrimp in Div. 3LNO: Catch against female biomass index from Canadian autumn survey. Line denoting B_{lim} (approximately 19 000 t) is drawn where female biomass is 85% lower than the maximum point in 2007.

e) Conclusion

The predicted decline in the 2011 autumn survey biomass did not occur. However, the decreased levels of biomass in the Canadian survey series since 2007 are a reason for concern. The biomass is likely to be above B_{lim} . STACFIS concluded that there was no change in the status of the stock.