

**PART D: SCIENTIFIC COUNCIL MEETING, 17-24 OCTOBER 2012**

**CONTENTS**

|   |     |
|---|-----|
| I. Plenary sessions.....  | 229 |
| II. Review of Recommendations in 2011 and in 2012.....            | 229 |
| III. NAFO/ICES <i>Pandalus</i> Assessment Group.....              | 229 |
| IV. Formulation of Advice (see Annexes 1, 2 and 3) .....          | 230 |
| 1. Request from Fisheries Commission .....                        | 230 |
| 2. Requests from Coastal States .....                             | 231 |
| a) Northern shrimp in Subareas 0 and 1 .....                      | 231 |
| b) Northern shrimp in Denmark Strait and off East Greenland ..... | 234 |
| V. Other Matters .....  | 236 |
| 1. Scheduling of Future Meetings.....                             | 236 |
| 2. Topics for Future Special Sessions.....                        | 236 |
| 3. Items arising from the NAFO Performance Assessment .....       | 236 |
| 4. Other Business.....  | 236 |
| VI. Adoption of Scientific Council and NIPAG Reports.....         | 236 |
| VII. Adjournment .....  | 237 |

**SC-NIPAG Participants 2012**



Back Row: Michael Kingsley, Peter Shelton, Miquel Casas, Nannette Hammeken-Arboe, Carsten Hvingel, Don Stansbury, Neil Campbell, Ole Eigaard, Mats Ulmestrand, Dennis Zakharov

Front Row: Anders Nielsen, Jean-Claude Mahé, Helle Siegstad, Dave Or, Silver Sirp, Ole Ritzau Eigaard



NIPAG Co-Chairs – Peter Shelton and Jean-Claude Mahé, SC Chair – Carsten Hvingel and SC Coordinator – Neil Campbell

## REPORT OF SCIENTIFIC COUNCIL MEETING

17-24 October 2012

Chair: Carsten Hvingel

Rapporteur: Neil Campbell

### I. PLENARY SESSIONS

The Scientific Council met at the Institute of Marine Research, Tromsø, Norway during 17-24 October 2012, to consider the various matters in its Agenda. Representatives attended from Canada, Denmark (Greenland), European Union (Denmark, Estonia, France, Spain and Sweden), 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 17 October 2012.

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 0900 hours on 23 October 2012. The Council then considered and adopted Sections III.1–4 of the “Report of the NAFO/ICES *Pandalus* Assessment Group” (NAFO SCS Doc. 12/23, ICES CM 2012/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 17-24 October 2012 meeting.

The meeting adjourned at 1600 hours on 23 October 2012.

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 2011 AND 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 full NIPAG report is available in NAFO SCS Doc. 12/23 and ICES CM 2012/ACOM:14

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

##### **1. Request from Fisheries Commission**

The Fisheries Commission Request for Advice from the September 2010 meeting (Annex 1d) for shrimp in Div. 3M and Div. 3LNO regarding stock assessment (Item 1) is given, respectively, under IV.1.a and IV.1.b below.

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 in September 2012 meeting, and found no significant change in either to warrant any update of the advice previously provided.

Scientific Council noted that due to the change in the timing of future NIPAG meetings these stocks will be fully assessed in September 2013 in advance of the next Annual Meeting.

## 2. Requests from Coastal States

### a) Northern shrimp in Subareas 0 and 1

**Recommendation:** Recent catches are not estimated to be sustainable. Scientific Council therefore recommended that catches in 2013 should be substantially lower.

The risk of exceeding  $Z_{msy}$  in 2013 at a catch level of 80 000 t with an effective cod stock at the 2012 level (22 700 t) is estimated to be around 34%. Model results estimate catches at that level in the medium term to be associated with an increasing stock above  $B_{msy}$ .

Given the level of risk which was accepted in 2012, Scientific Council recommended that catches in 2013 should not exceed 80 000 t.

**Background:** The shrimp stock off West Greenland is distributed in Subarea 1 and Div. 0A east of 60°30'W. A small-scale inshore fishery began in SA 1 in the 1930s. Since 1969 an offshore fishery has developed.

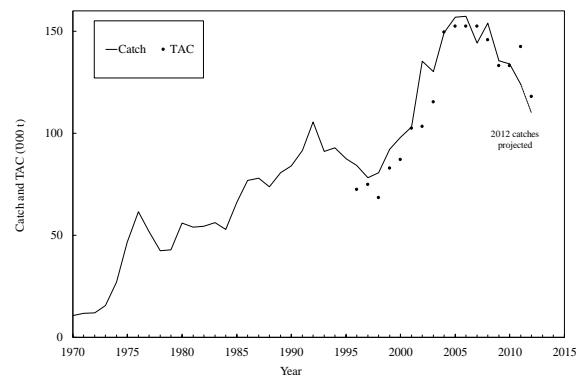
**Fishery and Catches:** The fishery is prosecuted mostly by Greenland in SA 1 and Canada in Div. 0A. Canada did not fish in 2008 and fished little in 2009, but has since resumed fishing. Recent catches are:

| Year | Catch ('000 t)     |                    | TAC ('000 t) |                     |
|------|--------------------|--------------------|--------------|---------------------|
|      | NIPAG              | STATLANT 21        | Advised      | Actual <sup>2</sup> |
| 2009 | 135.5              | 134.0              | 110          | 133.0               |
| 2010 | 134.0              | 129.2 <sup>1</sup> | 110          | 133.0               |
| 2011 | 124.0              | 122.1 <sup>1</sup> | 120          | 142.4               |
| 2012 | 110.0 <sup>3</sup> |                    | 90           | 117.9               |

<sup>1</sup> Provisional.

<sup>2</sup> Total of TACs set independently by Greenland and Canada.

<sup>3</sup> Predicted to year end by industry observers.



**Data:** Catch, effort, and position data were available from all vessels. Indices of how widely the stock and

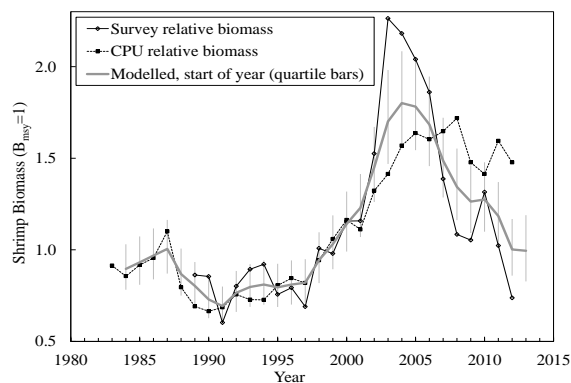
the fishery were distributed were calculated from catch positions in the fishery and the survey.

Series of biomass and recruitment indices and size- and sex-composition data were available from research surveys. Series of cod biomass and cod consumption were also available.

**Assessment:** An analytical assessment framework was used to describe stock dynamics in terms of biomass ( $B$ ) and mortality ( $Z$ ) relative to biological reference points.

The model used was a stochastic version of a surplus production model including an explicit term for predation by Atlantic cod, stated in a state-space framework and fitted by Bayesian methods.  $MSY$  (Maximum Sustainable Yield) defines maximum production, and  $B_{msy}$  is the biomass level giving  $MSY$ .

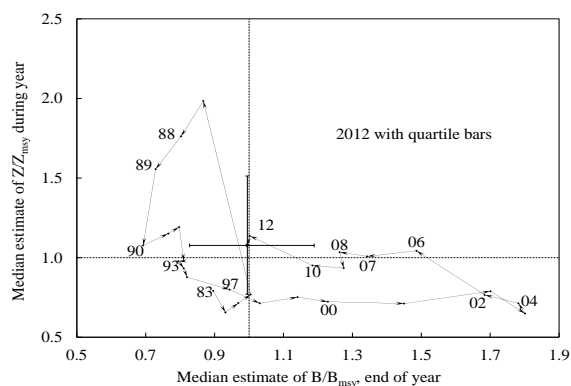
A precautionary limit reference point for stock biomass ( $B_{lim}$ ) is 30% of  $B_{msy}$  and the limit reference point for mortality ( $Z_{lim}$ ) is  $Z_{msy}$ . Recent CPUE values have stayed high, while the area fished has contracted and survey biomass indices have decreased, and CPUE is not now considered a reliable index of biomass. The weight given to it in the model was therefore reduced in 2011. The median estimate of  $MSY$  in 2012 was 132 000 t/yr.



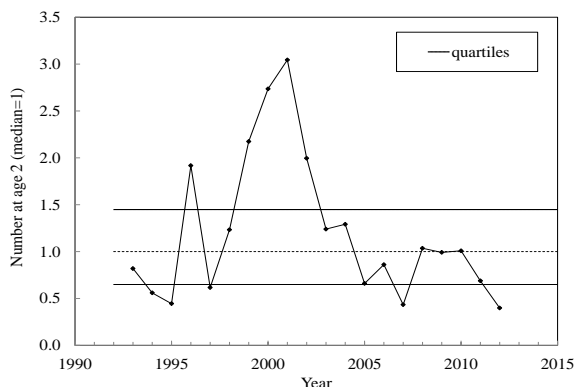
**Biomass.** A stock-dynamic model showed a maximum biomass in 2003 with a continuing decline since; the probability that biomass will be below  $B_{msy}$  in 2012 with projected catches at 110 000 t was estimated at 51%; of its being below  $B_{lim}$  at 1–2%.

**Mortality.** The mortality caused by fishing and cod predation ( $Z$ ) is estimated to have stayed below the

upper limit reference ( $Z_{msy}$ ) from 1996 to 2005, but is estimated to have averaged 2.6% over the limit value in 2006 - 2012. With catches projected at 110 000 t the risk that total mortality in 2012 would exceed  $Z_{msy}$  was estimated at about 56%. Atlantic cod is, in 2012, more concentrated in southerly areas where shrimps are now scarce, and predation is expected to be moderate or low.



**Recruitment.** The stock structure in 20121 is deficient in shrimps of intermediate size 15–22 mm CPL fishable males, presaging poor short-term recruitment to both the fishable and spawning stocks. Shrimps at 14–16.5 mm CPL are abundant relative to survey biomass, promising some short-term recruitment to the fishable biomass. Pre-recruits (CL 14–16.5 mm), expected to enter the fishery in 2013; have been few since 2008 in absolute terms. Numbers at age 2 in 2011 2012 have declined from the level of the 3 foregoing years to 55% of the series mean, their lowest-ever level, so medium-term recruitment is also expected to be poor.



**State of the Stock.** Modelled biomass is estimated to have been declining since 2004. At the end of 2012 biomass is projected to be close to  $B_{msy}$ . Total mortality is projected to exceed  $Z_{msy}$ . Recruitment to

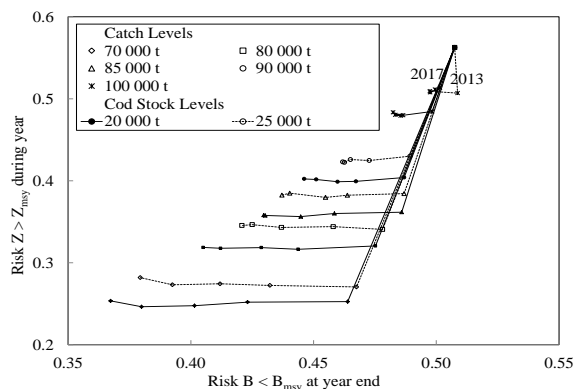
the fishable and spawning stock in the short- and medium-term is expected to remain low.

**Short-term predictions:** Estimated risks for 2013 with an “effective” (the amount of cod biomass overlapping the shrimp biomass) 25 000 t cod stock are:

| 25 000 t cod<br>Risk of<br>transgressing (%): | Catch option ('000 t) |    |    |    |    |    |     |
|---|-----------------------|----|----|----|----|----|-----|
|   | 70                    | 75 | 80 | 85 | 90 | 95 | 100 |
| Bmsy, end 2013                                | 47                    | 48 | 48 | 49 | 49 | 50 | 51  |
| Blim, end 2013                                | 1                     | 1  | 1  | 1  | 1  | 1  | 2   |
| Zmsy, in 2013                                 | 27                    | 31 | 34 | 38 | 43 | 47 | 51  |
| Zmsy, in2014                                  | 27                    | 31 | 34 | 38 | 42 | 47 | 51  |

**Medium-term Predictions:** Projected probabilities of transgressing precautionary reference levels after 3 years in the fishery for Northern Shrimp on the West Greenland shelf with ‘effective’ cod stocks assumed at 20 000 t (20Kt) and 25 000 t (25Kt) were estimated at:

| Catch<br>(Kt/yr.) | Prob. biomass<br>< $B_{MSY}$ (%) |       | Prob. biomass<br>< $B_{lim}$ (%) |       | Prob. mort ><br>$Z_{msy}$ (%) |       |
|-------------------|----------------------------------|-------|----------------------------------|-------|-------------------------------|-------|
|                   | 20 Kt                            | 25 Kt | 20 Kt                            | 25 Kt | 20 Kt                         | 25 Kt |
|                   | 70                               | 40    | 41                               | 2     | 3                             | 25    |
| 75                | 41                               | 43    | 2                                | 3     | 28                            | 31    |
| 80                | 43                               | 44    | 2                                | 3     | 32                            | 34    |
| 85                | 44                               | 45    | 3                                | 3     | 36                            | 38    |
| 90                | 46                               | 47    | 3                                | 3     | 40                            | 43    |
| 95                | 47                               | 49    | 3                                | 3     | 44                            | 46    |
| 100               | 48                               | 50    | 3                                | 3     | 48                            | 51    |



**Special Comments:** Scientific Council notes that the fishable biomass offshore comprises a high proportion of females, so fishing on this stock in this state will disproportionately reduce the spawning

stock biomass. Recruitment in absolute terms is expected to be low in both the short and medium term.

Scientific Council notes that there are indications of factors other than fishery that may be involved in the current decline of the stock.

**Sources of Information:** SCR Docs 04/75, 04/76, 08/62, 12/44, 12/45, 12/46, 12/48, 12/57, SCS Doc. 04/12.

**b) Northern shrimp in Denmark Strait and off East Greenland**

**Recommendation:** Scientific Council finds no basis to change its previous advice at this time and recommended that catches should remain below 12 400 tons in 2012.

Scientific Council notes that stock indicators have declined after 2009. If this trend continues, future catch levels may need to be reduced.

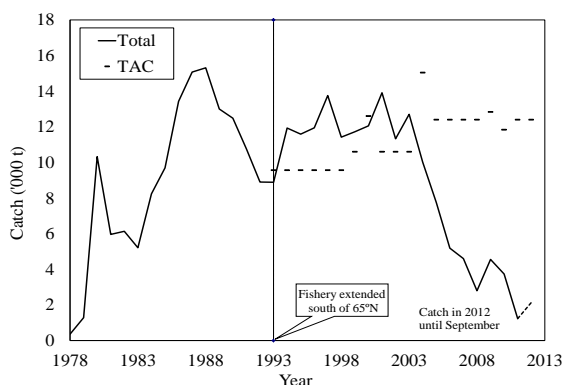
**Background:** The fishery began in 1978 in areas north of 65°N in Denmark Strait, where it occurs on both sides of the midline between Greenland and Iceland. Areas south of 65°N in Greenlandic waters have been exploited since 1993. Until 2005 catches in the area south of 65°N accounted for 50 - 60% of the total catch but since 2006 catches in the southern area has decreased and since 2008 accounted for about 10% of the total catch.

**Fishery and Catches:** Greenland, EU (Denmark) and EU (Estonia) participated in the fishery in 2012. Catches in the Icelandic EEZ decreased from 2002-2005 and since 2006 no catches have been taken. Recent catches and recommended TACs are as follows:

| Year | Catch ('000 t)   |             | TAC ('000 t)  |                          |
|------|------------------|-------------|---------------|--------------------------|
|      | NIPAG            | Recommended | Greenland EEZ | Iceland EEZ <sup>1</sup> |
| 2008 | 2.8              | 12.4        | 12.4          |                          |
| 2009 | 4.6              | 12.4        | 12.8          |                          |
| 2010 | 3.7              | 12.4        | 11.8          |                          |
| 2011 | 1.2              | 12.4        | 12.4          |                          |
| 2012 | 2.1 <sup>2</sup> | 12.4        | 12.4          |                          |

<sup>1</sup> Fishery unregulated in Icelandic EEZ;

<sup>2</sup> Catch till September 2012.

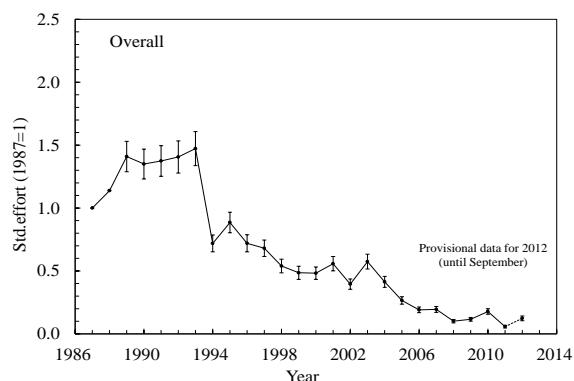


**Data:** Catch and effort data were available from trawlers of several nations. Annual surveys have been conducted since 2008.

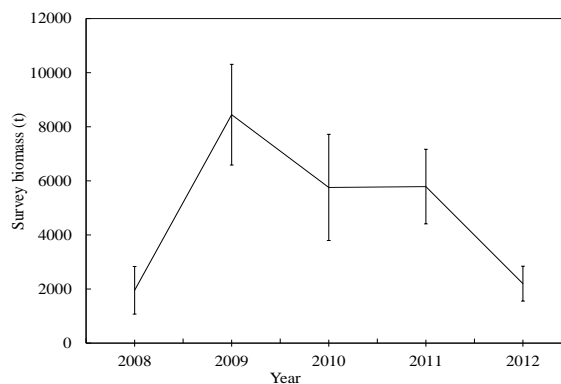
**Assessment:** No analytical assessment is available. Evaluation of the status of the stock is based on analysis of commercial fishery data and survey data.

**Recruitment:** No recruitment estimates were available.

**Exploitation rate:** Since the mid-1990s exploitation rate index (standardized effort) has decreased, reaching the lowest levels seen in the time series from 2008 - 2012.

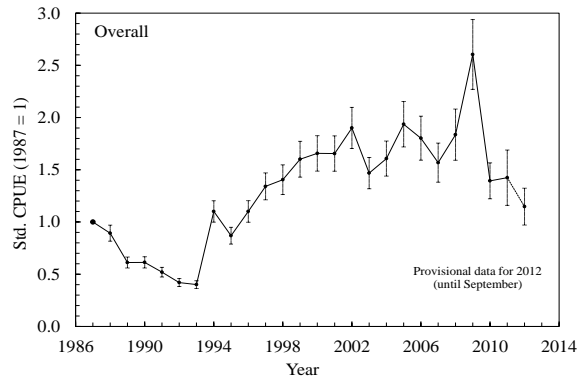


**Biomass:** The survey biomass index has decreased since 2009 and is now at the level seen at the beginning of the short time series in 2008.



**CPUE:** The combined standardized catch rate index for the total area remained at a high level from 2000 to 2009. Since then the combined index has been declining and is now lower than seen during the 2000s.





**State of the Stock:** Indices of stock biomass indicate a decline during the last 3 years. The biomass is now believed to be slightly lower than the relatively high level seen during most of the 2000s.

**Special Comments:** Effort has decreased in recent years. This decrease may be related to the economics of the fishery.

**Sources of Information:** SCR Doc. 12/62, 12/63.

## V. OTHER MATTERS

### 1. Scheduling of Future Meetings

At the 2011 October meeting, Scientific Council noted the proposed change in timing of the Annual Meeting in 2013, the duplication of effort which occurs when updates to advice are produced intersessionally and the time-lag between assessments and the implementation of advice based on them. Scientific Council agreed to reflect upon holding the Scientific Council / NIPAG meeting earlier in the annual cycle in future years.

Having considered the various logistical issues in changing the timing of the meeting, Scientific Council resolved to hold the next NIPAG meeting at the NAFO Secretariat, Dartmouth, Canada, during 12 – 19 September, 2013, in advance of the NAFO Annual Meeting, to produce advice for shrimp stocks in 2014. It is envisaged that the NAFO stocks (*Pandalus borealis* in Div. 3M and 3LNO) will be addressed in the first days of the meeting, allowing the advice to be circulated to Contracting Parties one week in advance of the NAFO Annual Meeting.

### 2. Topics for Future Special Sessions

No special sessions were proposed.

### 3. Items arising from the NAFO Performance Assessment

At its September meeting, Scientific Council developed a plan of action to address the recommendations of the NAFO Performance Assessment. Of relevance to this group was the recommendation that shorter, more concise reports be produced. Scientific Council discussed a suggestion that the NIPAG report be separated into two sections, with one volume covering Barents Sea (ICES Divs. I-II), Skagerrak and Norwegian Deep (ICES Divs. IIIa and IVa East) and Fladen (ICES Div. IVa), and the other addressing West Greenland (NAFO SA 0 + 1), Denmark Strait and East Greenland (ICES Divs. XIVb and Va), Flemish Cap (NAFO Div. 3M) and Grand Bank (NAFO Divs. 3LN). Scientific Council felt that this idea detracted from the intention of this to be a joint NAFO-ICES working group, and expressed a desire to see all stocks reflected in the report. The Executive Committee will work in conjunction with the Secretariat to develop a proposal on streamlining publications to be presented to Scientific Council at the June 2013 meeting.

### 4. Other Business

Scientific Council were informed of results from two research projects focusing on the genetic stock structure of northern shrimp in respectively the whole North Atlantic (POPBOREALIS) and the Skagerrak/North Sea area (Sustainable shrimp fishing in Skagerrak). As the data set from the North Sea/Skagerrak is not yet finalized, and since the statistical analyses are still ongoing, the results are still preliminary. However, the results indicate that shrimp in some areas, especially around Iceland, Jan Mayen and in Gulf of Maine, and possibly also on Flemish Cap, constitute isolated populations, while shrimp in other areas, such as the Barents Sea and the eastern coast of Canada constitute distinct, but large, interbreeding populations. The genetic differences between samples within Skagerrak and the North Sea are small compared with the differences across the North Atlantic as a whole. A finalized data set is expected before the end of 2012 such that conclusions on the stock structure in Skagerrak and the North Sea can be drawn as part of the ICES process for benchmarking stock assessments. Samples from the Gulf of St. Lawrence and east of Greenland would provide a more complete picture of global stock identity.

## VI. ADOPTION OF SCIENTIFIC COUNCIL AND NIPAG REPORTS

The Council at its session on 24 October 2012 considered and adopted Sections III.1-4 of the “Report of the NAFO/ICES *Pandalus* Assessment Group” (SCS Doc. 12/23, ICES CM 2012/ACOM:14). The Council then considered and adopted its own report of the 17-24 October 2012 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 and Institute for Marine Resources for hosting the Scientific Council and NIPAG meetings. All participants were then wished a safe journey home and the meeting was adjourned at 1600 hours.