PART E: SCIENTIFIC COUNCIL MEETING – 23-27 SEPTEMBER 2013

Contents

SCIENTIFIC COUNCIL MEETING PARTICIPANTS SEPTEMBER 2013

Back Row (left to right): Estelle Couture, Herlé Goraguer, Konstantin Fomin, Neil Campbell, Silver Sirp, Carsten Hvingel, Bill Brodie, Ricardo Alpoim Don Stansbury, Jessica Sanders

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REPORT OF SCIENTIFIC COUNCIL MEETING

23-27 September 2012

Chair: Carsten Hvingel Rapporteur: Neil Campbell

I. PLENARY SESSIONS

The Scientific Council met at the Westin Hotel, Halifax, NS, Canada, during 23-27 September 2013, to consider the various matters in its agenda. Representatives attended from Canada, European Union (Estonia, France, Portugal and Spain), France (with respect to St. Pierre et Miquelon), Japan, Norway and the Russian Federation. The Scientific Council Coordinator was in attendance.

The Executive Committee met prior to the opening session of the Council to discuss the provisional agenda and plan of work.

The opening session of the Council was called to order at 0930 hours on 23 September 2013.

The Chair welcomed participants to the 35th Annual Meeting and thanked the NAFO Secretariat for hosting this event.

The provisional agenda was adopted with minor additions. The Council appointed Neil Campbell, the Scientific Council Coordinator, as rapporteur. The Chair welcomed Dalhousie University, Ecology Action Centre, FAO and the WWF as observers to this meeting.

The Council and its Standing Committees met through 23-27 September 2013 to address various items in its agenda. The Council considered and adopted the reports of the STACFIS and STACREC Standing Committees on 27 September 2013. The final session was called to order at 1030 hours on 27 September 2013. The Scientific Council then considered and adopted its report of this meeting. The meeting was adjourned at 1100 hours on 27 September 2013. As the Chair of STACFIS was unable to attend this meeting, the Vice-Chair agreed to chair this session.

The Reports of the Standing Committees as adopted by the Council are appended as follows: Appendix I - Report of Standing Committee on Research Coordination (STACREC), and Appendix II - Report of Standing Committee on Fisheries Science (STACFIS).

The Agenda, List of Research (SCR) and Summary (SCS) Documents, and the List of Representatives, Advisers and Experts, are given in Appendices III, IV, and VI, respectively. The Scientific Council plan of action in response to the NAFO Performance Assessment is given in Annex 1.

II. REVIEW OF SCIENTIFIC COUNCIL RECOMMENDATIONS

From Scientific Council Meeting, 1-14 June 2012

X. MEETING REPORTS

1. Working Group on EAFM, December 2011

Scientific Council **recommended** that *before design of survey sampling schemes are changed, more work be conducted in order to examine the trade-off between scientific sampling needs and potential impact on VMEs.*

STATUS: No progress since 2012.

XII. OTHER MATTERS

6. Other Business

a) Quality of catch information for assessments

Scientific Council noted the concerns expressed by STACFIS regarding the quality of catch data available to perform assessments.

Contracting Parties have the responsibility to report accurate catches to NAFO via STATLANT 21 submissions, and Scientific Council has the responsibility to "compile" these catches for NAFO. Scientific Council considered that it is not its responsibility to provide the best catch figures, nevertheless Scientific Council requests clarification on which NAFO body is responsible for validating the quality of the STATLANT catch figures submitted, to enable the Scientific Council to carry out assessments in a timely manner. If it is the job of Scientific Council, Scientific Council recognizes that the availability of more information will improve the catch quality, for example inspection reports, daily catch reports and VMS data, may be required for this task.

Scientific Council **recommends** that *General Council clarify the responsibilities of NAFO bodies and Contracting Parties with respect to determining the quality of STATLANT 21 data.*

STATUS: An *ad hoc* Technical working group lead by the Chairs of Scientific Council and Fisheries Commission has been proposed to address this issue.

There were no recommendations arising from the 2013 Scientific Council Meetings.

III. RESEARCH COORDINATION

The Council adopted the Report of the Standing Committee on Research Coordination (STACREC) as presented by the Chair, Don Stansbury. The full report of STACREC is at Appendix I.

IV. FISHERIES SCIENCE

The Council adopted the Report of the Standing Committee on Fisheries Science (STACFIS) as presented by the Acting Chair, Don Stansbury. The full report of STACFIS is in Appendix II.

V. REQUESTS FROM THE FISHERIES COMMISSION

1. Requests deferred from the June Meeting

a) Mesh size for Redfish in Div. 3LN

Fisheries Commission requested Scientific Council to provide advice on: to examine the consequences resulting from a decrease in mesh size in the mid-water trawl fishery for redfish in Div. 3LN to 90mm or lower.(item 5)

Scientific Council advises:

Scientific Council concluded that the reduction of mesh size from 130 mm to not less than 90 mm for the pelagic redfish fishery appears not to be harmful to the Div. 3LN redfish stock.

However, measures should be taken to ensure one source of unaccounted mortality i.e. escape mortality at the surface is not replaced by another, i.e. discarding and/or high-grading.

It was observed that beaked redfish escaping from the trawl cod-end during haul-up die as a result of barotrauma as a result of the rapid change in hydrostatic pressure, and the weight of the catch in the cod-end. These escaped fish also suffer increased predation from marine mammals and seabirds.

Previous studies in Div. 3M showed that mid water redfish fishery is a clean fishery: 95% of the hauls do not have bycatch and so its impact on other stocks is minimal. The Scientific Council also notes that the same mesh size (90 mm) for mid-water trawl as already implemented on the pelagic redfish fishery on Div. 3M and Div. 3O.

The results of the research on decreasing the mesh size in pelagic trawls directed to beaked redfish (*Sebastes mentella*) was discussed by Scientific Council.

The research on redfish mesh selectivity during Russian special experiment in 2011 was presented to Scientific Council (SCR Doc. 13/20). Scientific Council recognized that there is considerable escapement at the surface and that this represents a loss of yield to the fishery. It was suggested that a solution to avoid this escapement of dead redfish was to use a smaller mesh in the cod-end. This would have the tendency to shift the size range of the fish lost to a smaller size.

At its September 2010 meeting Scientific Council analyzed the reduction in the mesh in the mid-water trawl fishery for redfish in Div. 3M. At that time Scientific Council concluded for Div. 3M, that the fish bycatch is low when the pelagic trawls are used well above the sea bed. However, it was also noted that some of the reported fish bycatch species were typically demersal species. This indicates that the newer pelagic trawls that are capable of fishing very near bottom could have bycatch concerns. Scientific Council received a response during the September 2010 meeting from the ICES working group on Fish Technology and Fish Behavior (WGFTFB) in response to a request from Scientific Council.

At its 2013 June meeting, Scientific Council considered the work done in ICES WGFTFB during the recent years (2010-2012) and one published paper related to this matter (Herrmann *et al.,* 2012. Understanding the Size Selectivity of Redfish (*Sebastes* spp.) in North Atlantic Trawl Codends. Journal of Northwest Atlantic Fishery Science, 44: 1–13). The main conclusions were that the consequences resulting from a decrease in mesh size in the mid-water trawl fishery for redfish in Div. 3LN to 90mm will be a decrease in L_{50} (length at which 50% of fish entering the cod-end are retained) from 34cm to 25cm, but the selection range (L_{75}-L_{25}) will decrease from 6.6 to 4.4cm.

Scientific Council acknowledges that there is some justification to reduce cod-end mesh size in redfish fisheries. However, measures should be taken to ensure one source of unaccounted mortality i.e. escape mortality at the surface is not replaced by another, i.e. discarding and/or high-grading. Scientific Council expresses its concerns about the definition of the mid-water trawl. Some newer pelagic trawls that are included in this category are capable of fishing very near bottom catching demersal fishes that usual do not happen in a common pelagic fishery and could bring bycatch concerns.

Scientific Council suggests that research efforts should concentrate on improving size selection during the towing process whilst minimizing hauling and surface escapement. In this respect Scientific Council conclude that modified sorting grids provide the best practical solution to improve size selection in redfish fisheries. In designing such grids fish behavior, construction, survival of escapees and handling considerations should be assessed. Scientific Council also recommends that the Russian studies on mesh-size and selectivity should be continued.

b) Sargasso Sea

The Fisheries Commission requests the Scientific Council to comment and advise on whether the Sargasso Sea provides forage area or habitat for living marine resources that could be impacted by different types of fishing; and on whether there is a need for any management measure including a closure to protect this ecosystem. The polygon to be considered is the following:

-46.844711060999884 35.722427393000203,-46.32415425899984 35.369106151000096,- 45.844178761598414 35.0,-62.202511155429988 35.0,-62.632567558331232 35.258234148636177,-63.272355558926961 35.512762148873321,-63.959640559567163 35.669259149019013,-64.673394560231941 35.722388149068536,-65.385178560894815 35.670316149019982,-66.072834561535274 35.514837148875188,-66.875051562282238 35.198759148580848,-67.211147449541443 35.0,-71.448964644661828 35.0,-71.377610283999786 35.483190472000047,-70.697710570999789 35.847831353000117,-69.781329499999856 36.285738255000183,-68.818622663999804 36.688934769000298,-67.810633268999936 37.057011529000135,-66.767771029999835 37.386320105000095,-65.000031260999833 37.838698970000223,-63.160524424999892 38.183166102000087,-61.276399190999882 38.41419272700017,-59.376124598999866 38.528701613000123,-57.575810995999859 38.528867480000258,-55.796226233999846 38.422925564000195,-54.062624079999807 38.211871163000239,-52.399638263999805 37.898770146000288,-50.826090381999791 37.487278854000067,-49.360484950999876 36.981801336000103,-48.028343332999839 36.39115303900013,-46.844711060999884 35.722427393000203

Scientific Council advises:

Within the portion of the Sargasso Sea defined by the polygon provided in the request, the forage areas or habitat for living marine resources that could be impacted by different types of fishing relevant to NAFO management are limited to those associated with the New England and Corner Rise Seamounts.

Therefore the Scientific Council **recommends** that:

1) *The polygons of the closures for both the New England and Corner Rise seamounts be revised to the north, east and west in the NAFO Convention Area to include all the peaks that are shallower than 2000 metres (as shown by green dots in Fig. 3).*

2) *For seamount fisheries in areas where fishing has not historically taken place, the Exploratory Fishing protocol be expanded to include all types of fishing, specifically the current mid-water trawl gears.*

3) *Precautionary regulations of the mid-water trawl fishery on splendid alfonsino be put in place. The regulations can include simple measures such as limiting spatially and temporally (i.e. outside the spawning season which is reported it be in July/August (Vinnchenko,1997)) the activity with a close monitoring (i.e. include 100% scientific observer coverage in order to collect data for these less-known areas) including prior notifications, and effort or catch limitation. These regulations would only apply to areas where fishing has taken place historically as shown in Fig.* 2*, and only using a mid-water trawl (i.e. bottom trawl would remain under the Exploratory Protocol). Outside these areas, the expanded Exploratory fishing protocol would apply.*

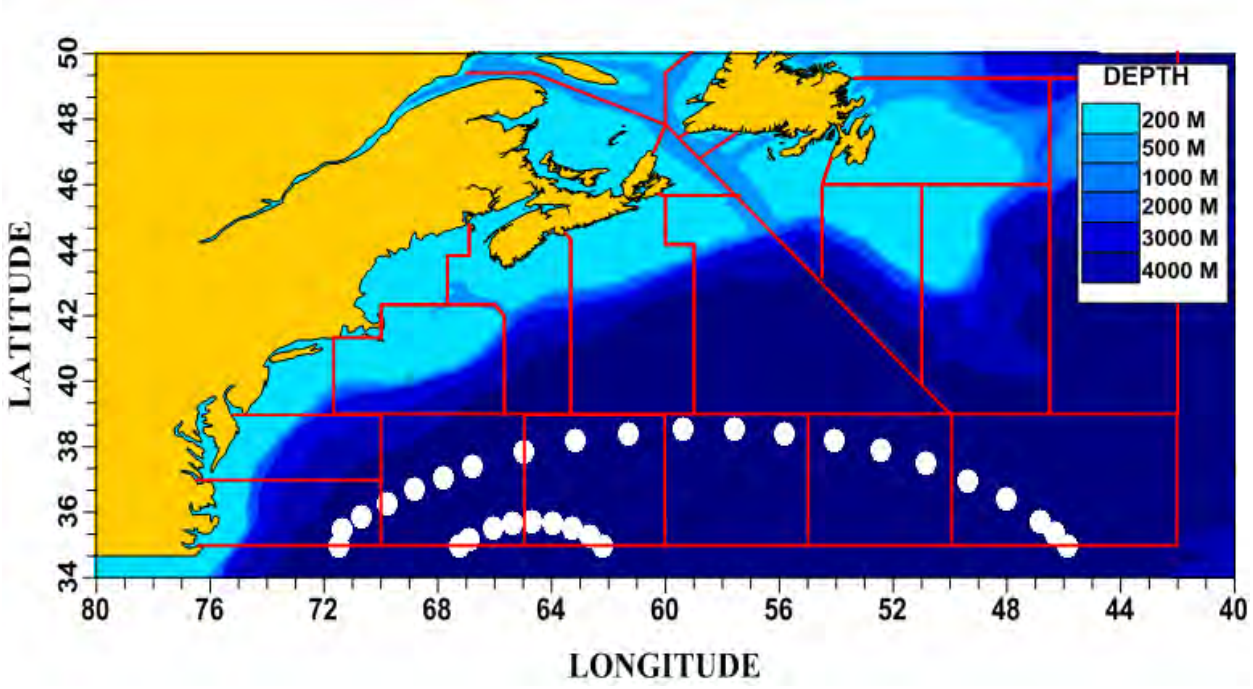

Fig. 1. Map of coordinates provided in Request #15.

Within the portion of the Sargasso Sea defined by the polygon provided in the request, the forage areas or habitat for living marine resources that could be impacted by different types of fishing relevant to NAFO management are limited to those associated with the New England and Corner Rise Seamounts. These seamounts support complex coral and sponge communities, including numerous endemic species, which provide habitat for diverse invertebrate communities that are highly dependent on them (Watling 2007, Watling *et al* 2007, Cho 2008, Simpson and Watling 2011, Pante and Watling 2011, ICES 2011, Shank 2010). These seamounts also host populations of deep-water fish and are important as aggregating and spawning areas for splendid alfonsino (*Beryx splendens).*Generally, deep-sea and seamount fish stocks are particularly vulnerable to exploitation because the fish are long lived, take longer to reach sexual maturity, and have lower fecundities (Norse *et al.,* 2012).

A fishery on splendid alfonsino has taken place on a regular basis from 1976 to 1996 (Vinnichenko, 1997) on the Corner Rise Seamounts followed by a 9-year hiatus and again starting in 2004. Table 3 shows that catches have generally been low except for 1976, 1987 and 1995 where the catches were significantly larger (10 200 t , 2 400 t and 3500 t respectively). The splendid alfonsino is an aggregating moderately productive bathypelagic deep-sea fish that can be caught using either a bottom trawl or a mid-water trawl (Vinnichenko, 1997). It was noted that in most recent years, a directed commercial fishery using mid-water trawl had been conducted since 2005. Catches for this fishery ranged from about 50 to 1200 t and effort ranged from 4 days to 50 days. Although today this fishery is generally small (catches of 302 t in 2012), this mid-water trawl commercial fishery is not covered under Chapter II of the NCEM (i.e. Bottom Fisheries in the NAFO Regulatory Area) or any other chapter. Scientific Council noted that this gap in the NCEM could result in an ongoing fishery that is unregulated. In 1997, Vinnichenko published a study of the alfonsino fisheries on the Corner rise seamounts and concluded: "Limited stocks of deep water fish found in the area by these studies suggest there should be concerns for these resources which are in an area where free enterprise fisheries can develop easily. These concerns demonstrate the **necessity for the development of an international fishery management plan for the area of the Corner Rise** and other seamounts."

Given the long history of the splendid alfonsino fishery on the Corner Rise Seamounts, Scientific Council reviewed FC Doc. 09-02 on the delineation of the fishing footprint and noted that the fished areas of the Corner Rise Seamount (Fig. 2) had met the criteria for inclusion in the footprint but had not been included in the end due to the fact that the seamounts were closed to fishing (SCR Doc. 07/06). Nonetheless, Fig. 2 shows the areas where historical fishing of splendid alfonsino has occurred on the Corner Rise Seamounts.

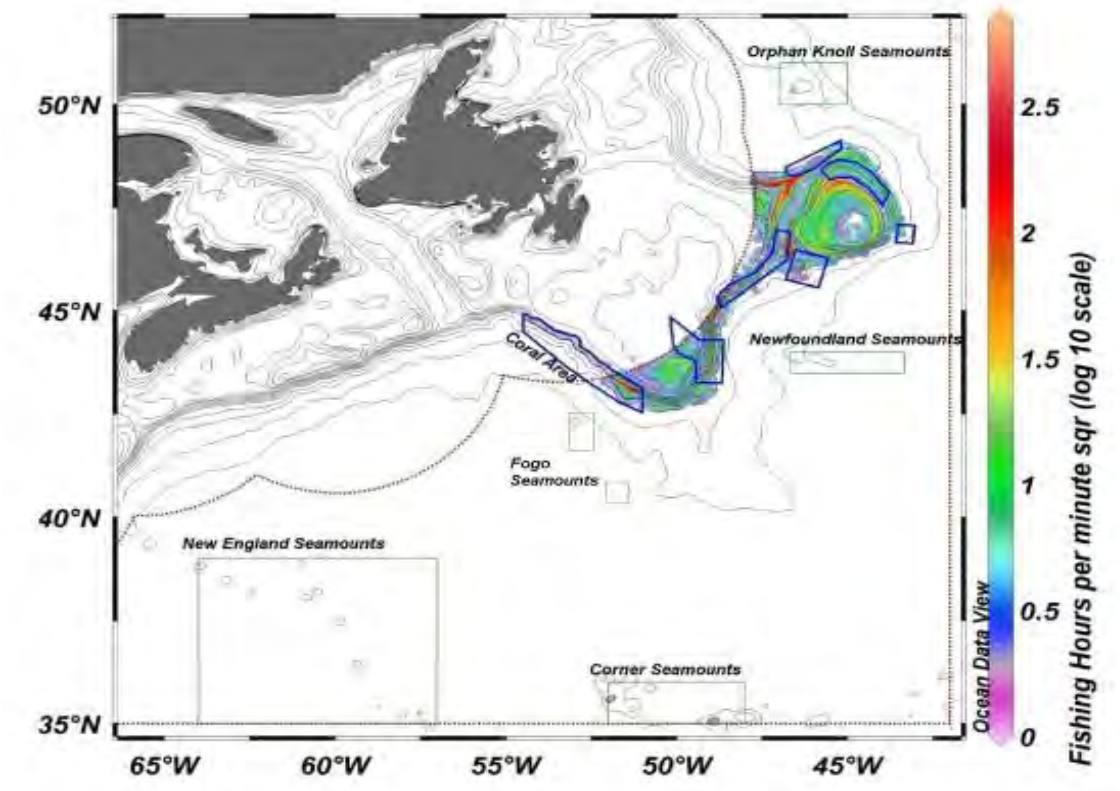

Fig. 2 Distributional map of the intensity of bottom trawl effort by commercial fishing vessels for 2003–2007 in the NRA with an overlay of the candidate VME areas (FC Doc. 09-02). Existing bottom fishing area were defined as areas where VMS data and/or other available geo-reference data indicating bottom fishing activities have been conducted at least in two years within a reference period of 1987 to 2007 (SCS Doc. 09/21).

Scientific Council also reviewed the science advice and management measures in place for alfonsino on seamounts in other areas of the Atlantic. The 2006 ICES advice stated: "Due to their spatial distribution associated with seamounts, their life history and their aggregation behaviour, alfonsinos are easily overexploited by trawl fishing; they can only sustain low rates of exploitation. Fisheries on such species should not be allowed to expand above current levels unless it can be shown that such expansion is sustainable. To prevent wiping out entire subpopulations that have not yet been mapped and assessed the exploitation of new seamounts should not be allowed." (ICES, 2006). Similar advice was also given in the South East Atlantic Fisheries Organisation (SEAFO). A precautionary catch limit of 200 tonnes was implemented for alfonsino in the SEAFO Convention Area until additional information becomes available to identify sustainable fishing levels (SEAFO, 2008).

Historical fishing on seamounts is also known in other areas such as the South Pacific by Australia, New Zealand and other nations (fishing essentially for alfonsino and orange roughy). In the international waters of the South Pacific, before opening new regions or expanding fishing effort or catch beyond existing levels it is necessary to establish conservation and management measures to prevent significant adverse impacts on vulnerable marine ecosystems and assure the long-term sustainability of deep sea fish stocks (SPRFMO, 2007 Interim Management Measures, http://www.southpacificrfmo.org/interim-measures/)

With respect to bottom fisheries on seamounts, Scientific Council reviewed the closures and noted that the boundaries of the polygons around the Corner Rise and New England Seamounts exclude some peaks that are less than 2000m which could therefore be fishable (Fig. 3). Scientific Council notes that exploratory bottom fishing activities are regulated through the exploratory fishery protocol within the closures but that semi-pelagic fisheries (using mid-water trawl) have no measures in place.

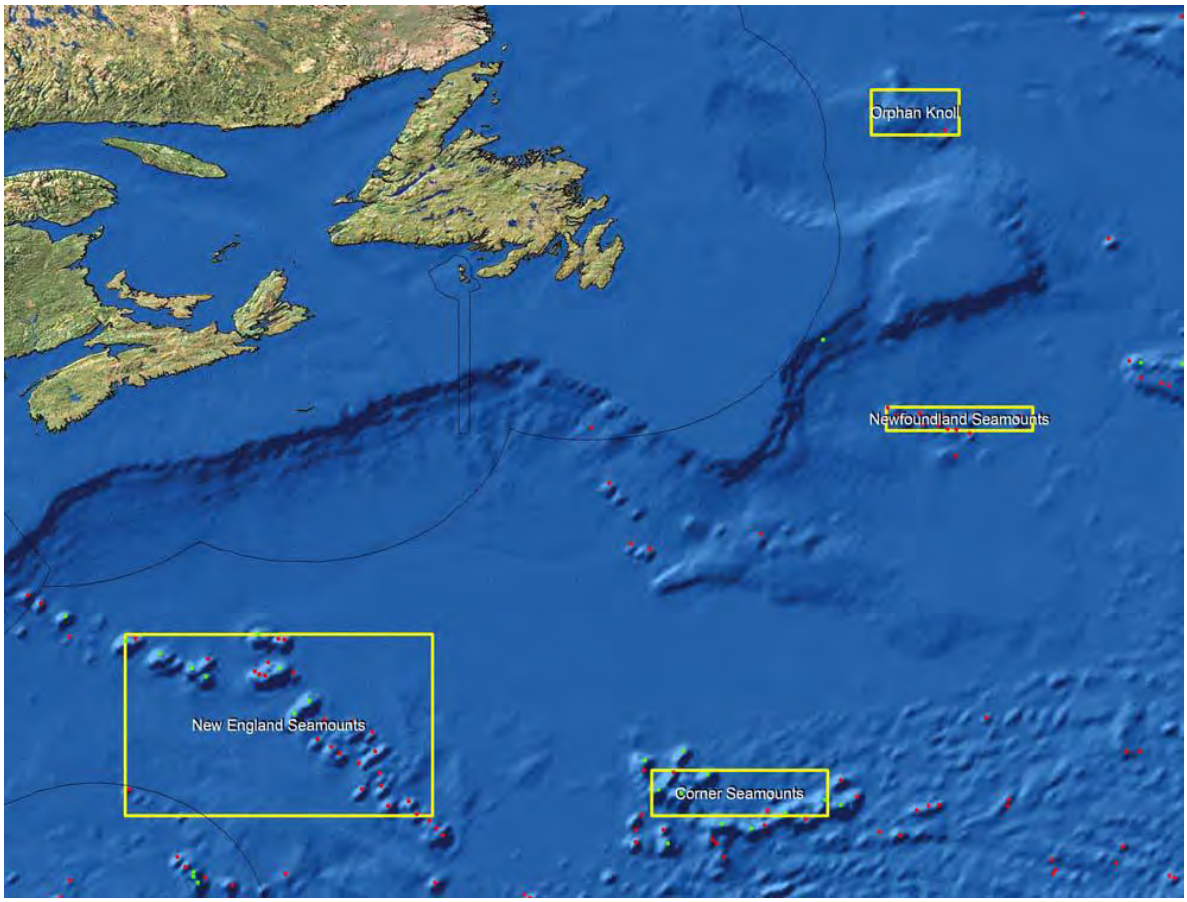

Fig. 3. Area of closure on and around four seamounts in the NAFO Regulatory Area effective 1 January 2007 to 31 December 2010. Seamount peaks marked with green dots rise above 2000 m depth, those marked with red dots have peaks below 2000 m depth. (Map produced by Michael McKee and Peter Auster, National Undersea Research Center at The University of Connecticut, CI USA) (SCR Doc. 07/06)

Table 3. Catches of splendid alfonsino from 1976 to 2012. The shaded area shows the catches and effort of the recent commercial fishery.

Year	Catch (t)	Effort (days)
1976	10200	
1977	800	
1978	130	
1979	530	
1980	200	
1981	390	
1982	10	
1983	360	
1984	240	
1985	10	
1986	110	
1987	2400	
1994	400	
1995	3500	
1996	600	
2004	414	50
2005	1187	29
2006	130	6
2007		
2008		
2009	479	28
2010	52	4
2011	152	9
2012	302	22

2. *Ad hoc* Requests from Current Meeting

The following requests were received during the current meeting (FC WP 13/22). Scientific Council noted that these responses are only for the clarification of the advice and do not in any way alter or change the advice published in the previous reports of the Scientific Council.

a) Sea Pens in Candidate VME Areas 13 and 14

The Fisheries Commission Working Group on Vulnerable Marine Ecosystems (WGFMS-VME) considered the scientific advice available at the time of its last meeting held in April 2013. No consensus was reached between Contracting Parties regarding specific management measures that are best suited in protecting areas 13 and 14 as reflected in Figure 2 of the Working Group report (NAFO/FC Doc. 13/3) and defined by the coordinates indicated in page 10 of that report.

New information from the EU Flemish Cap survey was expected to be available on sea pens later in 2013, which would help to clarify what type of management measures would best suit areas 13 and 14.

The Fisheries Commission requests the Scientific Council to provide the Fisheries Commission with the preliminary results or analysis, regarding occurrence of sea pens in areas towed close to areas 13 and 14 and advise if these reveal significant concentrations of VME indicators.

Scientific Council responded:

The Flemish Cap survey finished in late July 2013 and data from this survey is still preliminary. This will be examined by WGESA in November 2013, as part of their review of VME closures, and presented to Scientific Council at its next meeting. Scientific Council deferred answering this request until this analysis has been carried out.

b) Div. 3LN Redfish Catch Levels for 2014

Regarding Div. 3LN redfish, the Scientific Council recommends for 2013 and 2014 a fishing mortality "around the current level" (corresponding to a TAC of 6 346 t), which is around 1/6 of F_{msy} (TAC of 6 287 t) and a relatively low level when compared to the advice of other NAFO stocks. The Scientific Council also advised that increases should be treated with "caution". In 2012 the Fisheries Commission adopted a TAC of 6 500 t.

The Fisheries Commission requests the Scientific Council to consider the most recent survey trends and advice if an increase in TAC to 7 000 t for 2014 is sustainable.

Scientific Council responded:

A range of catch options for this stock was provided in 2012 for 2013 and 2014. This advice was reviewed in 2013 and Scientific Council concluded that there was no basis to change this advice. As this stock is estimated to be above B_{msy}, the level of acceptable risk should be set by managers. Scientific Council does not have the capacity to fully evaluate stock management advice at the September meeting.

c) Catch Composition of Redfish in Div. 3M

The catch composition of Div. 3M redfish includes three species (Sebastes mentella, S. marinus and S. fasciatus). The assessment is focused on beaked redfish, which is a composition of only two species (S. mentella and S. fasciatus) that dominated catches and stock biomass as estimated by surveys, up to 2005. Since 2005, catches of S. marinus increased and this species is not directly accounted for by the assessment. The Fisheries Commission requests the Scientific Council to clarify how S. marinus is accounted for in the advice and if the recent change in catch composition is reflected in the recommended TAC.

Scientific Council responded:

Div. 3M Redfish advice already incorporates *S. marinus*. Once the advised TAC for beaked redfish is determined, it is raised using the two most recent year average proportion of *S. marinus* found in the redfish catches of the Spanish, Portuguese and Russian fleets.

A separate Div. 3M *S. marinus* assessment may be considered for the future.

d) Reference Points for Div. 3M and Div. 3NO cod

The results of the Div. 3M cod stock assessment and analysis on biological reference points for Div. 3NO cod (SCR Doc. 13/40) show that there is an apparent inconsistency between the two cod stocks regarding fishing mortality reference points. For Div. 3M cod, F_{max} is at the level of natural mortality while for Div. 3NO cod it is $F_{0.1}$ which is at the level of natural mortality. Both stocks are at different conservation status and Div. 3NO cod is under a moratorium. The Fisheries Commission requests the Scientific Council to analyse the apparent inconsistency between reference points of the two cod stocks, considering the selectivity patterns and if fishing mortality reference points for Div. 3M cod could be underestimated.

Scientific Council responded:

In the calculation of the F_{max} for Div. 3M and 3NO cod, two different age ranges are used to estimate average fishing mortality (F_{bar}). Their absolute values can therefore not be directly compared. The use of a different reference age range in the F_{bar} calculation of the Div. 3M cod would change the value of F_{max}, however result in the same yield advice.

e) Scenarios of natural mortality in Div. 3M Redfish

For Div. 3M redfish the Scientific Council recommends not to increase the current TAC of 6 500 t, based on weaker incoming recruitment and uncertainty on current levels of natural mortality. Projections performed assuming current fishing mortality and natural mortality levels of 0.125 and 0.4 estimate median yields of respectively 9 518 t and 5 812 *t for 2014. The Fisheries Commission requests advice on whether it would be reasonable to assume an intermediate scenario of natural mortality, with corresponding yield levels for 2014 and 2015 under the current fishing mortality.*

Scientific Council responded:

Scientific Council reiterates its advice from June 2013. Given the uncertainty about the actual level of current natural mortality (M) (see STACFIS 2013) and its impact on short term model projections, Scientific Council decided not to use model predictions as basis for the recommendation.

f) Productivity of Div. 3NO Cod

Regarding the productivity of Div. 3NO cod and the definition of MSY reference points, the Scientific Council recommended $F_{0.1}$ or $F_{35\%SPR}$ as an interim target for fishing mortality and the level of 180 000-185 000 t of SSB as an interim B_{target}. The Fisheries Commission seeks clarification from the Scientific Council on the derivation of the target reference points and on the possibility to use B_{target} as a proxy for B_{msy}.

Scientific Council responded:

One of the difficulties with estimating reference points for this stock is the poorly defined stock recruit relationship. When there are clear fit problems of the stock recruitment relationship, one of the recommended F_{msy} or F_{lim} proxies is the Yield per Recruit reference point F_{max}.

In 2012 Scientific Council noted that the approach used in estimation of the Div. 3NO cod maximum sustainable yield (MSY) reference points in 2011 may not be advisable due to the high uncertainty in the stock recruit relationship for this stock. Scientific Council recommended the use of proxies based on the yield per recruit (YPR) and spawner per recruit (SPR) to estimate the reference points for cod in Div. 3NO.

Using the NAFO Precautionary Approach Framework, the Scientific Council proposed $F_{0.1}$ (0.19) or $F_{35\%}$ (0.20) as a possible F_{target}. The reason to choose these value is that a small reduction in the yield-per-recruit (YPR) gives a precautionary level of F that has a very low probability to be higher than $F_{lim} = F_{max}$ (less than 5%).

Scientific Council noted that the level of biomass reference points estimated from YPR and spawners-per-recruit (SPR) depends on assumptions about the level of recruitment. Only recruits from spawning stocks larger than B_{lim} were sampled because only recruitment in a fully productive stock should be taken into account when calculating MSY reference points.

The recommended B_{target} and F_{target} values have a very low probability of being above F_{lim} or below B_{lim}. These interim targets are proposed until more stock recruitment and productivity regime information is available to better estimate MSY based reference points.

g) Timetable for evaluation of Div. 2J + 3KLMNO Greenland halibut management strategy

A number of Contracting Parties have expressed willingness to postpone the review of the Greenland Halibut management strategy to 2016. In view of its workload and especially of the foreseen reassessment of the impact of bottom fishing activities in 2016, the Fisheries Commission requests the advice from the Scientific Council on the feasibility to evaluate the Greenland Halibut management strategy by 2016 (or alternatively by 2017).

Scientific Council responded:

Scientific Council considers that a postponement of the review of the Greenland halibut management strategy would be appropriate. Given the current lack of catch data it would not be possible to fully review the MSE in 2014. It is suggested that such a review be carried out in 2017, to allow evaluation against performance statistics (biomass in 2016, relative to 2011) and to avoid excessive workload in light of the reassessment of bottom-fishing activities due in 2016. Scientific Council will continue to monitor primary indicators.

h) Div. 3O Redfish time series

The 2012 TAC seems to be based on average catches over a very long period of time . The Scientific Council has advised on TACs based on catches over a much shorter period of time. In the case of Div. 3NO white hake and Div. 3LNO skates, what is the scientific basis of setting a TAC based on a fifty-year average of catches?

Scientific Council responded:

Scientific Council lacks a quantitative assessment model on which to base predictions of annual yield potential for Div. 3O Redfish. Stock dynamics and recruitment patterns are also poorly understood.

Catches have averaged about 13 000 t since the 1960s and over the long term, catches at this level appear to have been sustainable. Scientific Council is unable to advice on a more specific TAC level.

VI. MEETING REPORTS

1. Fisheries Commission WGFMS-CPRS

This Fisheries Commission Working Group met 9 – 11 July in Saint Pierre, St. Pierre et Miquelon, and was chaired by Jean-Claude Mahé (EU-France). The Scientific Council was advised of progress in this group by the rapporteur in his presentation of the report to Fisheries Commission. Scientific Council thanked the Jean-Claude for his efforts in leading this group.

2. Fisheries Commission WGFMS-VME

This Fisheries Commission Working Group met 23 – 25 April in Halifax, Canada, and was chaired by Bill Brodie (Canada). The Scientific Council was advised of progress in this group by the Chair in his presentation of the report to Fisheries Commission. Scientific Council thanked Bill for his efforts in leading this group.

3. World Conference on Stock Assessment Methods

World Conference on Stock Assessment Methods (WCSAM) was held in Boston, MA, USA during July 15–16 (Workshop); July 17–19 (Conference). Brian Healey and Diana Gonzalez attended as on behalf of NAFO's Scientific Council. NAFO also supported the participation of Sidney Holt as a keynote speaker.

Scientific Council deferred a full presentation on this until the June 2014 meeting.

Brian Healey, Sidney Holt and Diana Gonzalez-Troncoso

VII. REVIEW OF FUTURE MEETING ARRANGEMENTS

1. WG on Reproductive Potential

This WG may meet in conjunction with the ICES/NAFO Symposium during 16-18 October 2013 in St. Andrews, NB, Canada.

2. WGESA (formerly SC WGEAFM), November 2013

The Working Group on Ecosystem Science and Assessment (WGESA) will meet at the NAFO Secretariat, Dartmouth, Canada, during 19-28 November 2013.

3. WGDEC, March 2014

The ICES – NAFO Working Group on Deepwater Ecosystems (WGDEC), chaired by Odd-Aksel Bergstad, Norway, is scheduled to meet at the ICES Headquarters during 24 – 28 March 2014 to address the various items on its agenda.

4. Scientific Council, June 2014

The Scientific Council June meeting will be held on 30 May-12 June 2014. The Secretariat presented an alternative venue for this meeting. It was decided to hold the meeting at Saint Mary's University, Halifax, NS, Canada.

5. SC/NIPAG, September 2014.

An invitation to host this meeting has been extended by the Greenland Institute of Natural Resources. The meeting will be held during 10-17 September 2014.

6. Scientific Council, September 2014

Scientific Council noted that an invitation to host the Annual Meeting had been extended by the European Union on behalf of Spain, and the Annual Meeting will be held in Galicia, Spain 22–26 September 2014.

7. Scientific Council, June 2015

Scientific Council agreed that its June meeting will be held during 29 May - 12 June 2015 with the meeting venue being decided at the 2014 meeting.

VIII. FUTURE SPECIAL SESSIONS

1. ICES/NAFO Gadoid Symposium

NAFO Scientific Council agreed, jointly with ICES, to co-sponsor a symposium on Gadoid fisheries: the ecology and management of rebuilding, to be held in St. Andrews, New Brunswick, during 15-18 October 2013. The organizing committee is being co-convened by Ed Trippel (Canada) and Fritz Köster (Denmark), and is comprised of Jason Link (USA), Olav Kjesbu (Norway), Doug Swain (Canada), and Jonna Tomkiewicz (Denmark). At the June 2013 Scientific Council meeting it was agreed that NAFO would support the attendance of Joanne Morgan (Canada) and Kathy Sosebee (USA). Following the June meeting, the SC Executive Committee agreed to fund the attendance of one of the keynote speakers, and consequently, NAFO will also support the attendance of Peter Wright (UK).

2. ICES/Norway/NAFO Effects of Bottom Fishing Conference, Tromsø, June 2014

At its June meeting, Scientific Council received information on a conference being organized by ICES and the Institute of Marine Research, Norway, entitled "Effects of fishing on benthic fauna, habitat and ecosystem function". This symposium will review the physical and biological effects of fishing activities to sea bottom ecosystems, look at various technical conservation measures designed to mitigate these effects and ultimately try to quantify the overall ecosystem impact. The aim is to develop tools for use in informed ecosystem-based fisheries management. Scientific Council decided to support this important symposium. The conference is being steered by Mariano Koen-Alonso (Canada), Carsten Hvingel (Norway) and Francis Neat (UK–Scotland). Scientific Council agreed to support the conference through funding participation of Mariano Koen-Alonso (Canada) and a keynote speaker.

IX. OTHER MATTERS

1. Election of Officers – STACFEN Chair

The nominating committee met to discuss the next STACFEN Chair. Estelle Couture (Canada) was nominated and approved by Scientific Council. The Council offered its congratulations to Estelle on her appointment and wished her a successful tenure.

2. Matters arising from the NAFO Performance Assessment

Scientific Council reviewed its document from the June meeting (SCS Doc. 13/17) and had no further comments to add at this time.

3. Report of the Joint FC/SC Meeting

A joint meeting of Scientific Council and Fisheries Commission was held at the Annual Meeting. In advance of this, Scientific Council met with Bruce Atkinson, Chair of the Peer Review Expert Panel to discuss the contents of their report. A number of issues were discussed with members of Fisheries Commission, including the terms of reference and chairs of future joint working groups on risk-based management strategies and on the ecosystem approach to fisheries management. Both groups will be co-chaired by a member of Scientific Council and a member of Fisheries Commission. Scientific Council were informed that Kevin Anderson and Robert Day (both Canada) had been nominated by Fisheries Commission as co-chairs of WG-RBMS and WG-EAFM respectively. A nomination committee was formed to consider nominations for the co-chairs to be drawn from Scientific Council. Carsten Hvingel (Norway) was nominated as co-chair of the WG-RBMS and Andrew Kenny (EU) as co-chair of WG-EAFM.

4. Interactions between fishery and oil/gas surveys

The presence of the seismic survey vessel RV *Sanco Spirit* was noted on the first days of the EU bottom-trawl survey of the Flemish Cap on board RV *Vizconde de Eza* in July (Fig. 4). That vessel towed an 8 mile-long cable. The vessel was accompanied by an auxiliary vessel, two miles behind, to prevent other ships from crossing over the cable.

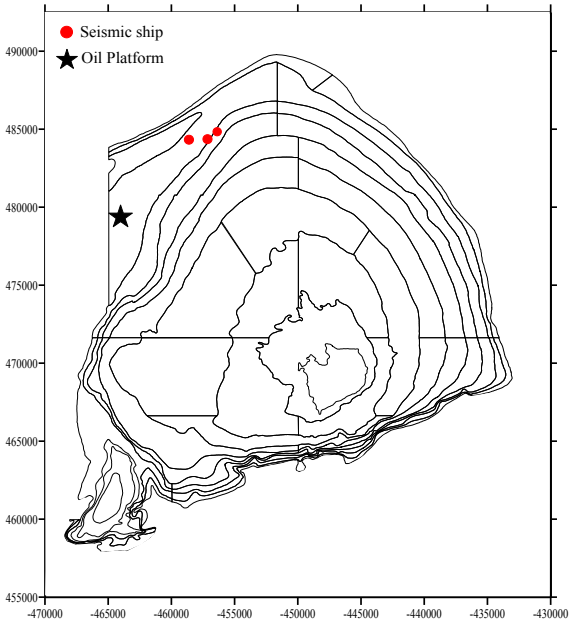

Fig. 4. Map of the observed positions of the seismic survey vessel RV Sanco Spirit during the 2013 Flemish Cap European Union survey.

The *Vizconde de Eza* was warned by the auxiliary ship to maintain a security distance of at least 4 miles to each side of the main ship, and at least 12 miles from its stern; that security area was around 90 squared nautical miles in connection with the seismic vessel. These measures forced modification of the survey plan, including the elimination from the sampling program of one CTD station.

Due to the possible disturbances that seismic survey activity could have on fish behavior and distribution, Scientific Council **requests** *General Council to contact the CNLOPB to request information about past seismic survey activity in the NAFO Regulatory Area, as well as to be informed of plans for future surveys. This would be valuable in evaluation of fishery survey results, and to minimize interactions in the future.*

5. Scientific Merit Awards

At its June meeting, Scientific Council nominated Bill Brodie (Canada) and Jean-Claude Mahé (EU – France) to receive Scientific Merit Awards. Both have provided extensive service to Scientific Council over many years, with involvement in innumerable NAFO meetings. Bill chaired the Standing Committees on Research Coordination (1989 – 91), Fisheries Science (1994 – 96), and Publications (1997 – 99) and Scientific Council (1999 – 2001), while Jean-Claude served as chair of STACFIS between 2011 and 2013. Both have also served the wider NAFO community and helped to improve cooperation between managers and scientists, with Bill chairing the Fisheries Commission Working Group on Vulnerable Marine Ecosystems (2008 – 2013) and Jean-Claude chairing the Fisheries Commission Working Group on Conservation Plans and Rebuilding Strategies (2011 – 2013).

Scientific Council extended its warm thanks to them, and wished them well in their retirements.

6. Awards to outgoing chairs

On behalf of Scientific Council, the Vice-Chair, Don Stansbury (Canada), thanked the Chair, Carsten Hvingel (Norway) for his leadership as chair of STACREC and SC Vice-Chair (2009 – 2011) and Chair of Scientific Council (2011 – 2013).

7. Improved working procedures at the June meeting

Noting the increasing workload of Scientific Council, it was recommended that the chairs investigate ways of streamlining the work of the Council. Specific proposals included simplifying and standardizing interim monitoring reports and producing survey annexes.

8. Terms of reference for joint FC-SC Working Groups

Scientific Council discussed the terms of reference for the new joint working group and made a number of small adjustments. These will be discussed during the first meeting of each group. The Co-Chairs of these working groups coming from Scientific Council will discuss these further with their counterparts from Fisheries Commission. Both groups will be co-chaired by a member of Scientific Council and a member of Fisheries Commission. Scientific Council were informed that Kevin Anderson and Robert Day (both Canada) had been nominated by Fisheries Commission as co-chairs of WG-RBMS and WG-EAFM respectively. A nomination committee was formed to consider nominations for the co-chairs to be drawn from Scientific Council. Carsten Hvingel (Norway) was nominated as co-chair of the WG-RBMS and Andrew Kenny (EU) as co-chair of WG-EAFM.

9. 2nd Central Arctic Oceans Fisheries Meeting, Tromsø, Norway, 28 – 31 October 2013

NAFO was amongst a number of organizations invited to participate in the second scientific meeting on fisheries in the central Arctic. The meeting is organized by coastal states of the Arctic Ocean, and will be held in Tromsø, Norway, 28 – 31 October, 2013. Scientific Council felt that participation in this initiative would be valuable, and nominated Carsten Hvingel to attend on behalf of NAFO Scientific Council.

10. Terms of reference for *ad hoc* Technical Group on Catch Validation

Scientific Council reviewed the proposed terms of reference for a joint *ad hoc* Technical Group on Catch Validation, chaired by the Scientific Council and Fisheries Commission Chairs. In addition to the SC and STACREC Chairs, Scientific Council participants should include Ricardo Alpoim (EU – Portugal), Bill Brodie (Canada) and Fernando Gonzalez (EU – Spain) and by a scientist from the Russian Federation.

11. NEREIDA Funding

Scientific Council noted that the funding for the second phase of this project was still not available and recommended that this was addressed with the utmost urgency.

X. ADOPTION OF REPORTS

1. Committee Reports of STACREC and STACFIS

The Council reviewed and adopted the Reports of the Standing Committees (STACREC and STACFIS).

2. Report of Scientific Council

The Council at its concluding session on 26 September 2013 considered and adopted its own report.

XI. ADJOURNMENT

There being no other business, the meeting was adjourned at 1230 hours on 26 September 2013.

APPENDIX I. REPORT OF STANDING COMMITTEE ON RESEARCH COORDINATION (STACREC)

Chair: Don Stansbury Rapporteur: Barbara Marshall

The Committee met at the Westin Hotel, Halifax, NS, Canada, during 25 September 2013, to consider the various matters in its Agenda. Representatives attended from Canada, European Union (Estonia, France, Portugal and Spain), France (with respect to St. Pierre et Miquelon), Norway, Russian Federation and USA. The Scientific Council Coordinator was in attendance.

1. Opening

The Chair opened the meeting and welcomed everyone. Barbara Marshall was appointed the Rapporteur.

2. Fisheries Statistics

a) Progress Reports on Secretariat Activities

After discussions in June, historic catch date dating back to the 1800 was compiled. This will be presented on the NAFO website.

b) Review of STATLANT 21

i) Submission of data

The following table updates the situation with the submission of STATLANT. There are still a few outstanding submissions but in general the submission rate is acceptable.

TABLE 1. Dates of receipt of STATLANT 21A and 21B reports for 2010-2012 up to 19 September 2013.

Country/Component	STATLANT 21A (deadline, 1 May)			STALANT 21B (deadline 31 August)		
	2010	2011	2012	2010	2011	2012
CAN-CA	31 Mar 11	24 Apr 12	21 May 13	8 Aug 11	21 May 12	
CAN-M						
CAN-SF	28 Apr 11	14 May 12	21 Apr 13	10 June 11	22 Aug 13	22 Aug 13
CAN-G	29 Apr 11	29 Apr 12	9 May 13	27 July 11		21 Aug 13
CAN-N	29 Apr 11	30 Mar 12	30 Apr 13	31 Aug 11	6 Sep 12	30 Aug 13
CAN-Q		19 Jun 12				
CUB		4 May 12	7 May 13			
E/BUL			21 May 13(NF)			21 May 13(NF)
E/EST	27 Apr11	17 May 12	2 May 13 (revised 6 Jun 13)	31 Aug 11	2 Sep 12	29 Aug 13
E/DNK		18 May 12	17 May 13		21 Aug 12	12 Aug 13
E/FRA-M		21 May 12 (NF)	4 Jun 13 (NF)			
E/DEU	28 Apr 11	26 Apr 12	28 May 13	23 Aug 11	7 Jul 12	5 Sep 13
E/LVA	14 Apr 11	17 May 12	22 Apr 13	16 Aug 11	24 Aug 12	22 Aug 13
E/LTU		2 May 12	27 May 13		31 Aug 12	28 Aug 13
E/POL		26 Apr 12 (no fishing)			26 Apr 12 (no fishing)	
E/PRT	27 Apr 11	8 May 12 (revised 29 May 12)	23 Apr 13	31 Aug 11	14 Nov 12	
E/ESP	8 June 11 (revised 20 Mar 13)	30 May 12	28 May 13 (revised 29 May 13)	11 May 11 (revised 20 Mar 13)	3 Sep 12	23 Aug 13
E/GBR	1 Jun 11	26 Apr 12	8 May 13	16 Aug 11		2 Sep 13
FRO	6 May 11	30 Apr 12	2 Jun 13	6 May 11	27 Aug 12	
GRL	27 Apr 11	19 Apr 12	30 Apr 13	29 Apr 11	6 Sep 12	30 Aug 13
ISL	4 May 11	31 May 12	23 May 13 (NF)	1 Sep 11	20 Aug 12	21 Aug 13 (NF)
JPN		25 Apr 12 (no fishing)	26 Apr 13 (NF)		25 Apr 12 (no fishing)	26 Apr 13 (NF)
KOR						
NOR	28 Apr 11	27 Apr 12	30 Apr 13	19 Aug 11	2 Sep 12	21 Aug 13
RUS	27 Apr 11	29 Apr 12	21 May 13	26 Jul 11	6 Sep 12	
USA	16 May 11	21 May 12	21 May 13			
FRA-SP	29 Ap 11	14 May 12	21 May 13	4 Aug 11	24 Aug 12	8 Aug 13
UKR	20 Jan 11 (no fishing)					

ii) Eurostat Meeting

Neil Campbell had been invited to Eurostat fisheries statistics working group meeting. The meeting will be reviewing the deadline for the submission and STACREC noted that the May 1st deadline for 21A data was necessary for the use of the data in the stock assessment process. As well the Committee agreed that the collection of 21B (effort) data was of use to the Scientific Council.

3. Research Activities

a) Surveys Planned for 2013 and Early-2014

Designated Experts were requested to check and update the information contained in SCS Doc. 13/18.

4. Other Matters

a) Review of SCR and SCS Documents

There were no documents presented.

b) Other Business

i) Use of VMS data and daily catch reports

In light of discussions on the improvement of quality and verification of catch data STACREC **recommends** that *the Secretariat continue its exploration of VMS data and daily catch reports.*

ii) NAFOTools package

SCS Doc. 18/22

Using the talents of the NAFO Intern, Thomas Reilly and NAFO Secretariat have produced an R library to assist in plotting maps of the NAFO Regulatory Area, including bathymetric data. The details of functions contained in the library are contained in the SCS document, and the library can be downloaded from the NAFO SC Sharepoint site.

iii) FAO VME database and ABNJ

Jessica Sanders, FAO, provided an overview of the project "Sustainable fisheries management and biodiversity conservation of deep-sea living resources and ecosystems in the ABNJ" which is a project currently being developed by FAO and UNEP. Ms Sanders provided suggestions on areas of the project or activities in which the members of the Scientific Council might be specifically interested. The project includes four components, of which 3 have a fisheries focus. The three components led by FAO include a focus on implementing existing legal and policy frameworks of relevance, reducing impacts on VMEs as well as reviewing work on EBSAs and implementing an Ecosystem Approach to Fisheries in interested regions.

FAO will be seeking comments from partners (which hopefully will include all relevant RFMOs and other stakeholders) over the next month and will then be finalizing the project activities and roles for partners before the end of 2013.

In addition, FAO is currently in the process of developing a database on vulnerable marine ecosystems. The beta version is now developed and the Secretariat from each RFMO will be asked to have a small group of experts discuss the data for each region and provide comments on the content and functionality before the database is made public. FAO will contact the NAFO Secretariat within the following month on this issue.

5. Adjournment

The report was reviewed and the meeting was adjourned at 1045 on 27 September 2013.

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

Chair : Don Stansbury Rapporteur: Various

The Committee met at the Westin Hotel, Halifax, NS, Canada, during 23-27 September 2013, to consider the various matters in its Agenda. The Chair, Jean-Claude Mahé was unable to attend the meeting. Don Stansbury was elected as the Acting Chair for this meeting. Representatives attended from Canada, European Union (Estonia, France, Portugal, Spain), France (with respect to St. Pierre et Miquelon), Japan, Norway, Russian Federation and USA. The Scientific Council Coordinator was in attendance.

1. Opening

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

2. Nomination of Designated Experts

The current list of Designated Experts is given below and will be nominated again, save for Witch Flounder in Div. 3NO and Greenland halibut. The relevant institutes will be contacted to confirm the Designated Experts.

The nominated Designated Experts for 2014 are:

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 (Fax: + 709-772-4188)

Cod in Div. 3NO	Rick Rideout	Tel: +1 709-772-4935	rick.rideout@dfo-mpo.gc.ca
Redfish Div. 3O	Rick Rideout	Tel: +1 709-772-4935	rick.rideout@dfo-mpo.gc.ca
American Plaice in Div. 3LNO	Karen Dwyer	Tel: +1 709-772-6975	karen.dwyer@dfo-mpo.gc.ca
Witch flounder in Div. 3NO	TBC	Tel: +1 709-772-	
Witch flounder in Div. 2J+3KL	Dawn Maddock Parsons	Tel: +1 709-772-2495	dawn.parsons@dfo-mpo.gc.ca
Yellowtail flounder in Div. 3LNO	Dawn Maddock Parsons	Tel: +1 709-772-2495	dawn.parsons@dfo-mpo.gc.ca
Greenland halibut in SA 2+3KLMNO	TBC	Tel: +1 709-772-	
Northern shrimp in Div. 3LNO	David Orr	Tel: +1 709-772-7343	david.orr@dfo-mpo.gc.ca
Thorny skate in Div. 3LNO	Mark Simpson	Tel: +1 709-772-4148	mark.r.simpson@dfo-mpo.gc.ca
White hake in Div. 3NO	Mark Simpson	Tel: +1 709-772-4148	mark.r.simpson@dfo-mpo.gc.ca

From the Instituto Español de Oceanografia, Aptdo 1552, E-36200 Vigo (Pontevedra), Spain (Fax: +34 986 49 2351)

Roughhead grenadier in SA 2+3	Fernando Gonzalez-Costas	Tel: +34 986 49 2111	fernando.gonzalez@vi.ieo.es
Roundnose grenadier in SA 2+3	Fernando Gonzalez-Costas	Tel: +34 986 49 2111	fernando.gonzalez@vi.ieo.es
Cod in Div. 3M	Diana Gonzalez-Troncoso	Tel: +34 986 49 2111	diana.gonzalez@vi.ieo.es
Shrimp in Div. 3M	Jose Miguel Casas Sanchez	Tel: +34 986 49 2111	mikel.casas@vi.ieo.es

From the Instituto Nacional de Recursos Biológicos (INRB/IPIMAR), Av. de Brasilia, 1449-006 Lisbon, Portugal (Fax: +351 21 301 5948)

American plaice in Div. 3M	Ricardo Alpoim	Tel: +351 21 302 7000	ralpoim@ipma.pt
Redfish in Div. 3M	Antonio Avila de Melo	Tel: +351 21 302 7000	amelo@ipma.pt
Redfish in Div. 3LN	Antonio Avila de Melo	Tel: +351 21 302 7000	amelo@ipma.pt

From the Greenland Institute of Natural Resources, P. O. Box 570, DK-3900 Nuuk, Greenland (Fax: +299 36 1212)

Redfish in SA1	Rasmus Nygaard	Tel: +299 36 1200	rany@natur.gl
Other Finfish in SA1	Rasmus Nygaard	Tel: +299 36 1200	rany@natur.gl
Greenland halibut in Div. 1A	Rasmus Nygaard	Tel: +299 36 1200	rany@natur.gl
Northern shrimp in SA 0+1	Michael Kingsley	Tel: +299 36 1200	mcsk@natur.gl
Northern shrimp in Denmark Strait	Nanette Hammeken	Tel: +299 36 1200	nanette@natur.gl

From the Danish Institute for Fisheries Research, Charlottenlund Slot, DK-2920, Charlottenlund, Denmark (Fax: +45 33 96 33 33)

Roundnose grenadier in SA 0+1	Ole Jørgensen	Tel: +45 33 96 33 00	olj@dfu.min.dk
Greenland halibut in SA 0+1	Ole Jørgensen	Tel: +45 33 96 33 00	olj@dfu.min.dk

From Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), 6 Knipovich Street, Murmansk, 183763, Russia (Fax: +7 8152 47 3331)

Capelin in Div. 3NO	Ivan Tretiakov	Tel: +7 8152 450568	tis@pinro.ru

From National Marine Fisheries Service, NEFSC, 166 Water St., Woods Hole, MA 02543

Northern Shortfin Squid in SA 3 & 4	Lisa Hendrickson	Tel: +1 508 495-2285	lisa.hendrickson@noaa.gov

3. Other Matters

a) Review of SCR and SCS Documents

STACFIS reviewed one SCR document during this meeting.

SCR Doc. 13-073. Robustness of the Greenland Halibut MSE to different S/R functions and different Reproductive Potential indices. Fernando González-Costas, Diana González-Troncoso, Joanne Morgan, Hilario Murua and Dorleta García.

The objective of this document is to test whether the current HCR for Greenland halibut under the XSA Current Assessment View OM is robust to different stock recruitment assumptions and to different measures of Reproductive Potential (RP). We tested the HCR using alternative stock recruitment functions (Segmented Regression, Ricker and Ricker) with different RP indices which vary in the level of biological complexity. The RP indices used in increasing order of biological information were: Biomass 10+, SSBcohort, FSBcohort, FSByear and TEP. Understanding the basis of uncertainty in the S/R relationships is generally the most difficult outstanding problem in fisheries assessment and management and it is a key problem in the MSE. A Ricker stock recruitment function fits the Greenland halibut stock recruitment data better than the Segmented Regression for all the RP indices. The results show that the inclusion of more biological information when estimating Reproductive Potential does not improve the stock recruitment fit in either case (Segmented Regression and Ricker). The best fits in both cases were obtained in descending order with: 10+Biomass, SSBcohort, FSBcohort, TEP and FSByear. All the OMs based on the Segmented Regression have very similar results and seem to be robust to assumptions about Reproductive Potential. In the case of the OMs based on the Ricker stock recruitment function, all of them have a very low probability, less than 1%, of achieving the exploitable biomass objective. In the case of the OMs based on the modified Ricker function, all of them have a low probability of achieving the exploitable biomass objective although the total biomass reaches maximum levels in all the OMs. The stock recruitment assumptions seem to have a big impact on the final results while the RP indices appear to have little impact. The majority of the scenarios analyzed in this document present a biomass increase in the short term (until 2016).

The Scientific Council will continue to monitor primary indicators (survey biomass indices and catches) to determine if exceptional circumstances occur, until the revision of the MSE.

b) Other Business

There being no other business Acting STACFIS Chair thanked the Designated Experts for their competence and very hard work and the Secretariat for its great support. The STACFIS Chair also thanked the Chair of Scientific Council, and the Scientific Council Coordinator for their support and help. The meeting was adjourned at 1050 on 27 September, 2013.