

PART A

Scientific Council Meeting, 31 May-14 June 2001

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Participants at Scientific Council Meeting, 31 May-14 June 2001 (Bottom to top – left to right):

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 V. Lisovsky, V. A. Rikhter, S. Mitsuo, D. Parmiter
 O. Jørgensen, V. Babyan, R. Alpoim, L. Hendrickson
 B. Healey, A. Vaskov, T. Dougherty-Poupore, K. A. Sosebee
 D. Power, W. R. Bowering, S. Mehl
 H.-J. Rätz, P. A. Shelton

Missing from picture: D. C. A. Auby, G. Black, N. G. Cadigan, S. Campana, D. Cross, E. G. Dawe, C. L. Kerr,
 B. L. Marshall, R. K. Mayo, G. M. Moulton, A. Okhanov, T. Saat, M. A. Showell, H.
 Siegstad, C. Simonsen, E. Trippel, S. J. Walsh

REPORT OF SCIENTIFIC COUNCIL MEETING

31 May-14 June 2001

Chairman: W. B. Brodie

Rapporteur: T. Amaratunga

I. PLENARY SESSIONS

The Scientific Council met at the Alderney Landing, 2 Ochterloney Street, Dartmouth, Nova Scotia, Canada, during 31 May-14 June 2001, to consider the various matters in its agenda.

Representatives attended from Canada, Cuba, Denmark (in respect of Faroe Islands and Greenland), Estonia, European Union (France, Germany, Portugal, Spain and United Kingdom), Japan, Norway, Russian Federation and United States of America. The Assistant Executive Secretary was in attendance.

The Executive Committee met prior to the opening session of the Council, and the Provisional Agenda, plan of work and other related matters were discussed.

The opening session of the Council was called to order at 1015 hours on 31 May 2001.

The Chairman welcomed everyone to Dartmouth and to this venue for the June Meeting. The Assistant Executive Secretary was appointed rapporteur.

The Assistant Executive Secretary informed Council that prior to the meeting authorization had been received for proxy votes from Estonia, Latvia and Norway to record their abstentions during any voting procedures.

In the review of the Provisional Agenda, the Chairman noted many additional tasks at hand resulting from many requests for advice from the Fisheries Commission. While noting that Standing Committees may include some changes to their individual agendas, the Council **adopted** the agenda as presented (see Agenda I, Part D, this volume).

The Council noted it had no request from observers to attend this meeting.

The Council noted this year's heavy workload for providing advice would require some additional work by the Standing Committees and that some Designated Experts and other experts would be requested to address these as needed.

The Chairman noted elections were needed to the Chair of Scientific Council, Vice Chair of Scientific Council and STACREC, and Chairs of STACFIS, STACPUB and STACFEN, to take office at the end of the NAFO Annual Meeting in September 2001. The Chairman was pleased to announce W. R. Bowering (Canada), M. Stein (EU-Germany) and A. Vazquez (EU-Spain) had agreed to form the nominating committee.

The Council welcomed E. Trippel (Canada) to present the Chairman's update on the progress of the Working Group on Reproduction Potential (see Section X below).

Having reviewed the work plan for each Agenda item, the opening session was adjourned at 1135 hours.

The Council reconvened briefly at 0915 hours on 1 June 2001, and reviewed the extensive list of requests for advice from the Fisheries Commission and Coastal States and nominated certain Designated Experts and experts to address them.

The Council through 9-13 June 2001 addressed various outstanding agenda items as needed. These are given in relevant sections of the report below. The Chairman also called for Executive Committee meetings as needed.

The concluding session was called to order at 0900 hours on 14 June 2001.

The Council first reviewed and **adopted** the reports of the Standing Committees.

The Council then considered and **adopted** the Report of the Scientific Council of this Meeting of 31 May-14 June 2001, noting changes as discussed during the reviews would be made by the Chairman and Assistant Executive Secretary.

The meeting was adjourned at 1215 hours on 14 June 2001.

The Reports of the Standing Committees are appended as follows: Appendix I. STACFEN, Appendix II. STACREC, Appendix III. STACPUB and Appendix IV. STACFIS.

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

The Council's considerations on the Standing Committee Reports, and other matters addressed by the Council follow in Sections II-XVII.

II. REVIEW OF SCIENTIFIC COUNCIL RECOMMENDATIONS IN 2000

The Council noted recommendations made in 2000 pertaining to the work of the Standing Committees were addressed directly by the Standing Committees, while recommendations pertaining specifically to the Council's work were considered under each relevant topic of its Agenda.

III. FISHERIES ENVIRONMENT

The Council **adopted** the Report of the Standing Committee on Fisheries Environment (STACFEN), as presented by the Chairman, M. Stein. The full report of STACFEN is at Appendix I.

IV. RESEARCH COORDINATION

The Council **adopted** the Report of the Standing Committee on Research Coordination (STACREC) as presented by the Chairman, R. K. Mayo. The full report of STACREC is at Appendix II.

The **recommendations** made by STACREC for the work of the Scientific Council as **endorsed** by the Council, are as follows:

1. *Contracting Parties should check to see what interest there is to having their national data included in the Northwest Atlantic Survey Database. Assuming there is interest, Contracting Parties should submit an inventory of applicable data, entailing number of records, data type and formats. Once available, the complete inventory of data will be used to evaluate the complexity and costs of conversion to the database format.*
2. *the Conservation and Enforcement Measures Part VI, Program for Observers and Satellite Tracking, be amended to formally incorporate the Scientific Council protocols as specified in NAFO SCS Doc. 00/23 and as adopted by the Fisheries Commission in September 2000.*
3. STACREC noted that the Conservation and Enforcement Measures Part VI, Program for Observers and Satellite Tracking (Section 3 d), is inconsistent with the Scientific Council protocols adopted by the Fisheries Commission in 2000 and therefore **recommended** that *the Chairman of the Scientific Council contact the Chairman of the Fisheries Commission to develop a means of resolving this inconsistency at the 2001 Fisheries Commission meeting.*
4. *the development of a training and operation manual for the collection of scientific data continue, and that the Scientific Council be represented at the September 2001 STACTIC meeting to further pursue this issue.*

5. *the observer program Access database developed by Canada be adapted by the NAFO Secretariat to capture data collected under the NAFO Program for Observers and Satellite Tracking, with highest priority given to inclusion of current data and secondary priority given to capturing the historic data.*

V. PUBLICATIONS

The Council **adopted** the Report of the Standing Committee on Publications (STACPUB) as presented by the Chairman, O. Jørgensen. The full report of STACPUB is at Appendix III.

The **recommendations** made by STACPUB for the work of the Scientific Council as **endorsed** by the Council are as follows:

1. *each member of the Secretariat be given an individual e-mail address.*
2. *the Secretariat should routinely submit a report in June on the website usage to STACPUB.*
3. *an additional agenda item for future meetings should be introduced to include website use summaries and statistics.*
4. *a Working Group with representatives from General Council, Fisheries Commission and Scientific Council should be established in order to ensure that all relevant material becomes available on the NAFO website.*

The Council noted consultations had taken place between the Chairs of Scientific Council and Fisheries Commission at this matter.

5. *the collection of papers being prepared by the Working Group on Reproductive Potential be edited by the Working Group Chairman, E. A. Trippel (Canada) and compiled into a single issue of the Journal of Northwest Atlantic Fishery Science during 2002. STACPUB further **recommended** that the list of tables designed for the inventory of data on reproductive potential for marine fish stocks be compiled into a single issue of the NAFO Scientific Council Studies in 2002 once it has been reviewed by Scientific Council.*
6. *the co-conveners of Symposia be responsible for nominating qualified editors, maintaining the scientific standard of the Journal, and that once the edited papers were received from the editors further editorial problems, if any, with such Symposia submissions will be addressed by STACPUB, while the NAFO Secretariat will only edit for technical aspects.*

VI. FISHERIES SCIENCE

The Council **adopted** the Report of the Standing Committee on Fisheries Science (STACFIS) as presented by the Chairman, H.-J. Rätz. The full report of STACFIS is at Appendix IV.

The Council endorsed **recommendations** specific to stock considerations and they are highlighted under the relevant stock considerations in the STACFIS Report at Appendix IV.

VII. MANAGEMENT ADVICE AND RESPONSES TO SPECIAL REQUESTS

1. Fisheries Commission

For stocks within or partly within the Regulatory Area, the Fisheries Commission requested scientific advice.

a) **Request for Advice on TACs and Other Management Measures for Year 2002**

The Scientific Council and the Fisheries Commission during the Annual Meeting of September 2000 agreed to consider certain stocks on an alternating year basis. This section presents those stocks for which the Scientific Council provided scientific advice for the year 2002.

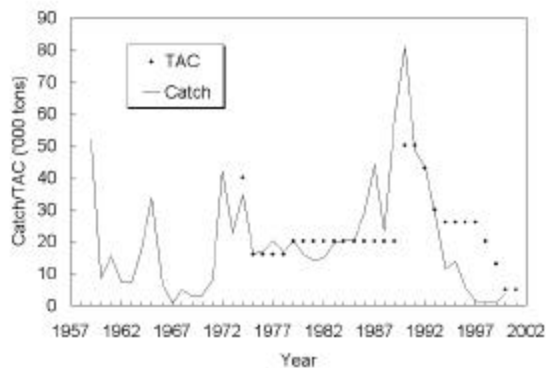
Redfish (*Sebastes spp.*) in Division 3M

Background: There are 3 species of redfish, which are commercially fished on Flemish Cap: deep-water redfish (*Sebastes mentella*), golden redfish (*Sebastes marinus*) and Acadian redfish (*Sebastes fasciatus*). The present assessment evaluates the status of the Div. 3M beaked redfish stock, regarded as a management unit composed of two populations from two very similar species (*Sebastes mentella* and *Sebastes fasciatus*). The reason for this approach is that evidence indicates this is by far the dominant redfish group on Flemish Cap.

Fishery and Catches: The redfish fishery in Div. 3M increased from 20 000 tons in 1985 to 81 000 tons in 1990, falling continuously since then until 1998-99, when a minimum catch around 1 100 tons was recorded mostly as by-catch in the Greenland halibut fishery. Despite low effort by Japanese fleet in 2000 there is an overall increase of the redfish catches to 3 900 tons in 2000. The decline in the Div. 3M redfish catches from 1990 to 1999 was related to the simultaneous quick decline of the stock biomass and fishing effort. The rapid expansion, beginning in 1993, of a shrimp fishery on Flemish Cap led to high levels of redfish by-catch in 1993-94. Despite the fact that since 1995 this by-catch fell to lower levels, it is still accounting for an important portion of the catch in numbers for the most recent years (averaging 42% of the total Div. 3M redfish catch in numbers in 1998-2000).

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Agreed
1998	1.0	20	20
1999	1.1	10	13
2000	3.8	3-5	5
2001		3-5	5

¹ Provisional, excluding redfish by-catch in the shrimp fishery in Div. 3M.



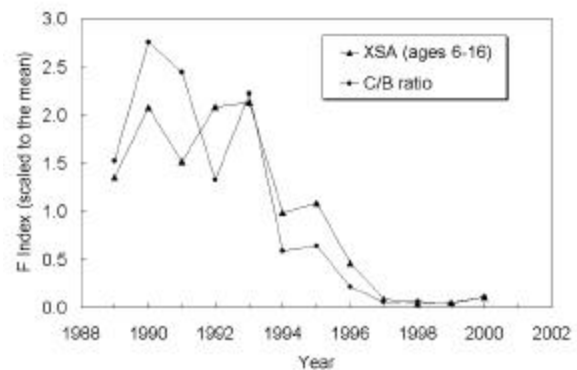
Data: Catch-at-age data were available from 1989-2000, including by-catch information from the shrimp fishery.

Catch rate data for 1959-93 were available from the NAFO database.

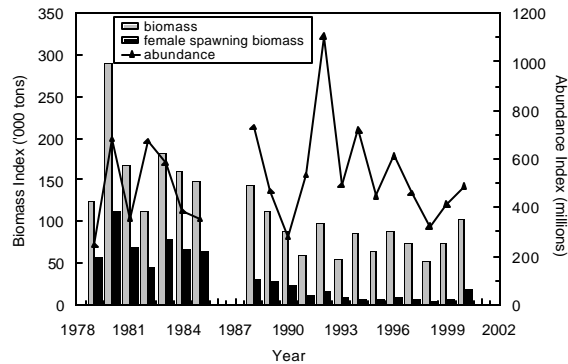
There are three survey series providing bottom biomass indices as well as length and age data for the Flemish Cap redfish stocks; Russia (1983-93 and 1995-96), EU (1988-2000) and Canada (1979-85 and 1996). The Russian survey was complemented with an acoustic estimate of the redfish pelagic component for the 1988-92 period.

Assessment: Survey bottom biomass and female spawning biomass were calculated from 1979-89 Canadian and 1988-2000 EU surveys. A virtual population analysis (XSA) and a surplus production analysis (ASPIC) were carried out for 1989-2000, providing indicators of stock biomass and fishing mortality trends.

Fishing Mortality: Fishing mortality was at very high levels until 1995 and then dropped to relatively very low levels since 1997.



Recruitment: No other pulse of recruitment has occurred since 1990 and abundance at age 4 has been fluctuating over the more recent years at a low level, when compared to the average recruitment of the whole series.

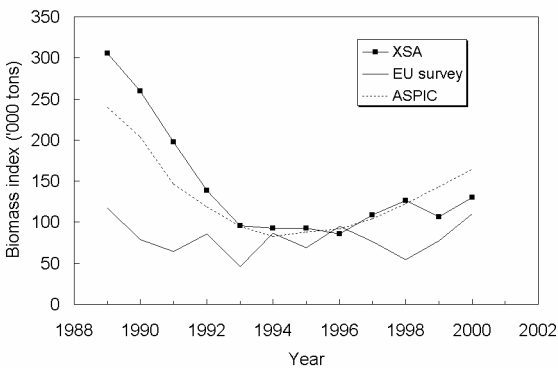


Special Comments: By-catch of juvenile redfish in the shrimp fishery should be kept to the lowest possible level. Redfish by-catches in this shrimp fishery should be closely monitored with information on length distributions and weights and numbers caught being reported on a regular basis to Scientific Council each November during the assessment of shrimp in Div. 3M.

Sources of Information: SCR Doc. 01/19, 22, 45; SCS Doc. 01/09, 11, 18.

Biomass: The stock experienced a steep decline from the late-1980s that continued until 1994, resulting in a decline of the beaked redfish female spawning biomass. Over the second half of the 1990s the decline in stock biomass and female spawning biomass appears to have halted. Despite the recent increases observed in survey biomass it is still unclear as to whether there has been any actual change.

Over the past 5 years, female spawning stock biomass has been about 20% of the total biomass. From 1989 to 1993 that proportion was about 32%.



State of the Stock: Scientific Council concluded that the total stock and spawning stock are currently at a low level compared to the earlier period in the time series. At the current low fishing mortality, and with growth of the relatively strong 1990 year-class, stock and spawning biomass should gradually increase.

Recommendation: The Council was unable to advise on a specific TAC for year 2002, however, in order to maintain relatively low fishing mortalities so as to promote stock recovery, Scientific Council recommends that catch for Div. 3M redfish in year 2002 be in the range of 3 000-5 000 tons.

Reference Points: No updated information on biological reference points was available.

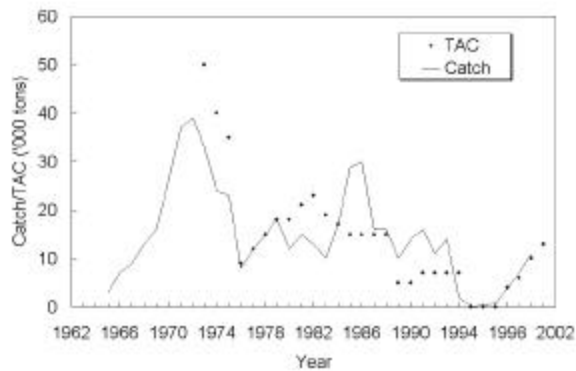
Yellowtail Flounder (*Limanda ferruginea*) in Divisions 3L, 3N and 3O

Background: The stock is mainly concentrated on the southern Grand Bank and is recruited from the Southeast Shoal area nursery ground, where the juvenile and adult components overlap in their distribution.

Fishery and Catches: There has been a moratorium on directed fishing from 1994 to 1997. Small catches were taken as by-catch in other fisheries. Prior to the moratorium, TACs had been exceeded each year from 1985 to 1993. The fishery was re-opened for 1998 and a catch of 4 400 tons was taken. In the 1999 and 2000 fisheries, catches of 6 700 tons and 11 120 tons, respectively were taken.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Agreed
1998	4	4	4
1999	7	6	6
2000	11	10	10
2001		13	13

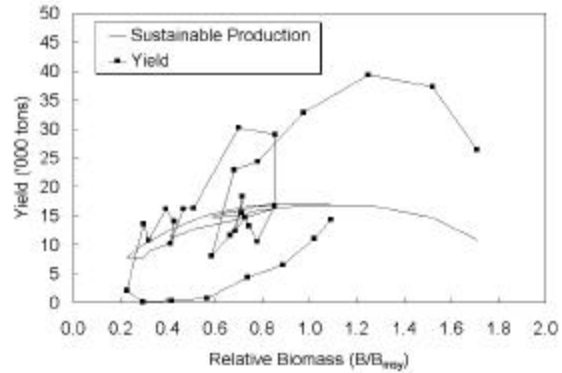
¹ Provisional.



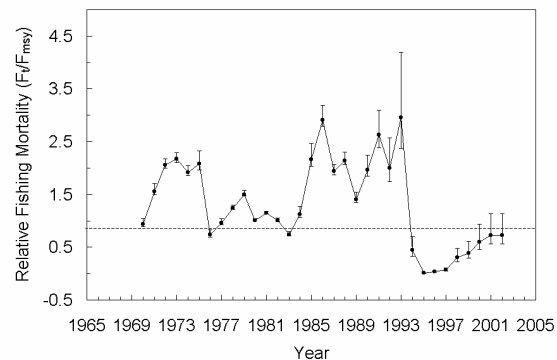
Data: Canadian CPUE data were available from 1965 to 2000. Limited by-catch sampling data from the Russian, Portuguese and Spanish trawler fleets were available. Abundance and biomass indices were available from: annual Canadian spring (1971-82; 1984-2000) and autumn (1990-2000) bottom trawl surveys; annual USSR/Russian spring surveys (1972-91); co-operative Canadian Dept. Fisheries and Oceans/Canadian fishing industry surveys (1996-2000); and Spanish surveys in the NAFO Regulatory Area of Div. 3NO (1995-2000).

Assessment: An analytical assessment using a stock production model was presented to estimate stock

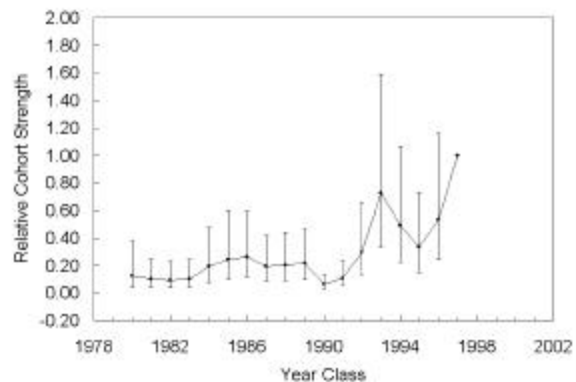
status in 2002. Since 1994, when the moratorium (1994-97) was put in place, the estimated yield has been below sustainable production levels.



Fishing Mortality: Has been below F_{msy} since 1994 and is projected to be 73% F_{msy} in 2001 with an assumed catch of 14 300 tons (TAC + 10% over-run).

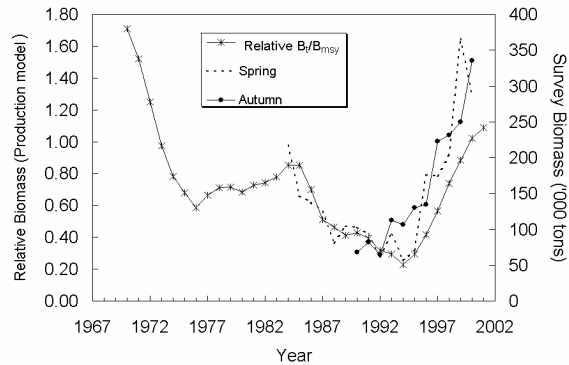


Recruitment: Recruitment has improved since 1990.



Biomass: The average 2000 survey biomass was estimated to be the highest in the time series at 311 000 tons. Relative biomass from the production model has been increasing since 1994 and is estimated to be

above the level of B_{msy} in 2001 and is projected to be above the level of B_{msy} in 2002.



State of the Stock: Based on results of 2 additional surveys since the 2000 assessment, the current view is that the stock size has increased over the past year. The stock biomass is perceived to be at the level well above that of the mid-1980s.

Recommendation: The TAC for yellowtail flounder in Div. 3LNO for the year 2002 should not exceed 13 000 tons, based on the projection of $F = 2/3 F_{msy}$ and an assumed catch of 14 300 tons in the year 2001.

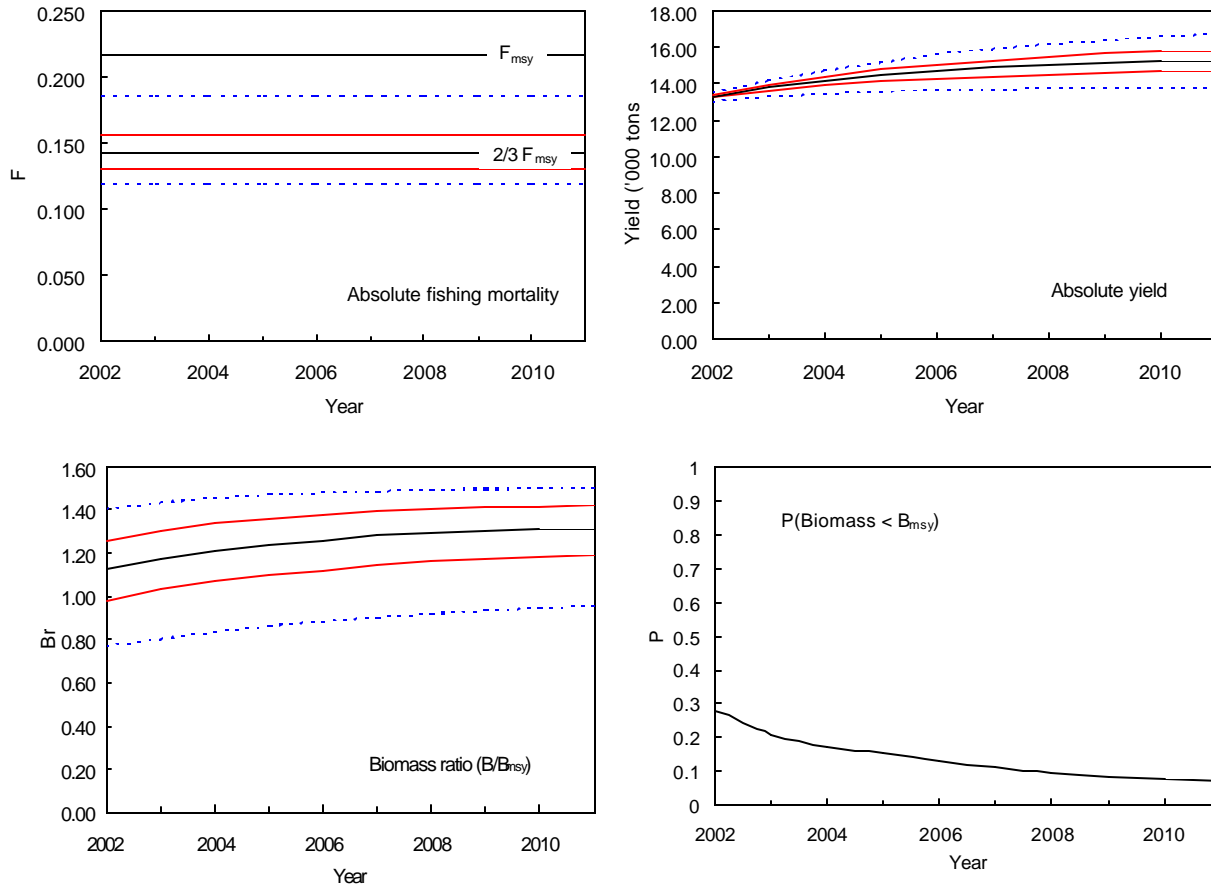
Reference Points: Scientific Council considered $2/3 F_{msy}$ to be a fishing mortality target.

Scientific Council notes it is not in a position to propose reference points from an age based assessment for this stock at this time and recommends that priority be given to restore the Council's ability to do age-structured analyses on this stock.

Medium Term Considerations: Projections (see Figures below) were made to estimate yield for each year from 2002 to 2011 while constraining F at $2/3 F_{msy}$. The results suggest that yield will increase to a maximum of 15 000 tons in the year 2011. The probability of biomass falling below B_{msy} decreases to less than 10% by 2011.

Sources of Information: SCR Doc. 01/50, 69, 70, 71, 74, 76, 78; SCS Doc. 01/9, 11, 18.

Yellowtail flounder in Div. 3LNO: figures show medium-term projections at a constant fishing mortality of $2/3 F_{msy}$. The figures show the 5th, 25th, 50th, 75th and 95th percentiles of fishing mortality, yield, biomass and biomass/ B_{msy} . The probability of biomass being less than B_{msy} is also given. The results are derived from an ASPIC bootstrap run (500 iterations) with a catch constraint of 14 300 tons (TAC + 10% over-run) in 2001.



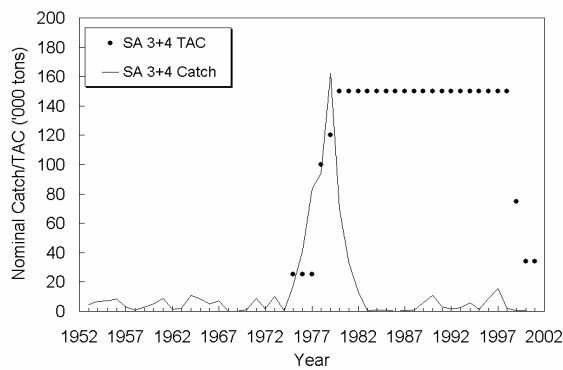
Short-finned Squid (*Illex illecebrosus*) in Sub-areas 3 and 4

Background: The northern short-finned squid is an annual species (1-year life cycle) that is considered to comprise a unit stock throughout its range in the Northwest Atlantic Ocean, from Newfoundland to Florida, including Subareas 3-6.

Fishery and Catches: Catches in Subareas 3+4 increased during the late-1970s, averaging 81 000 tons during 1976-81, and peaking at 162 000 tons in 1979. Catches in Subareas 3+4 declined to 100 tons in 1986, ranged between 600 and 11 000 tons during 1987-95, increased to 16 000 tons in 1997, and declined to 300 tons in 1999 and 2000. A TAC for Subareas 3+4 was first established in 1975 at 25 000 tons but was increased in 1978, 1979 and 1980. The TAC remained at 150 000 tons during 1980-98 and was set at 75 000 tons for 1999 and 34 000 tons for 2000-2001.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Agreed
1998	1.9	na	150
1999	0.3	19-34	75
2000	0.3	19-34	34
2001			34

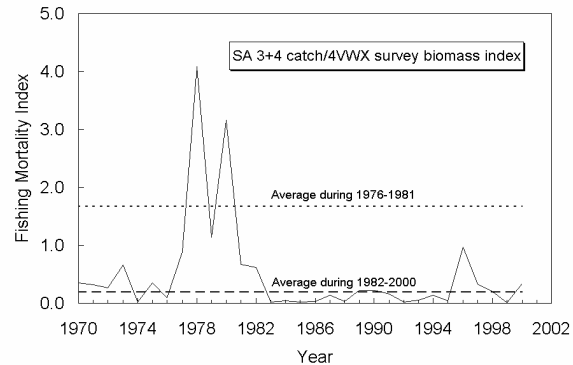
¹ Provisional.
na No advice provided.



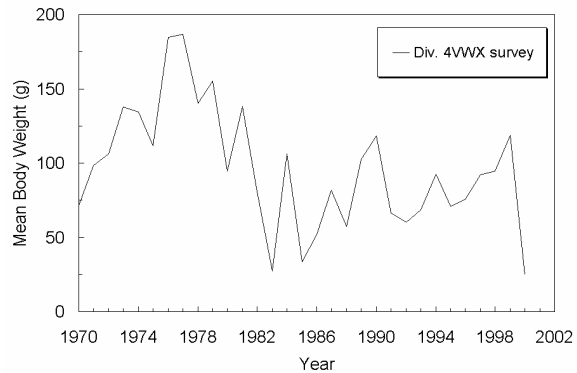
Data: Relative biomass and abundance indices were available from annual Canadian bottom trawl surveys conducted in July on the Scotian Shelf (Div. 4VWX, 1970-2000) and in September in the southern Gulf of St. Lawrence (Div. 4T, 1971-2000). The July survey indices are assumed to reflect relative stock size at the beginning of the fishing season. Size composition data were available from the Div. 4VWX survey and from the commercial inshore jig fishery in Subarea 3.

Assessment: Absolute biomass and recruitment estimates in SA 3+4 were not available.

Fishing Mortality: Fishing mortality indices were highest during 1978-80 and averaged 1.67 during the period of highest catch (1976-81). During 1982-2000, fishing mortality indices were much lower and averaged 0.19.



Mean Size: Annual mean body weights of squid from the Div. 4VWX survey declined markedly during 1982-83, following a period of much higher mean weights during 1976-81. Mean body weight was the lowest on record in 2000, consistent with a very small mean length for squid from the Subarea 3 inshore jig fishery.



Biomass: Survey biomass indices reached peak levels during the late-1970s, indicating that this was a period of high squid productivity. Since 1982, survey biomass indices have been markedly lower, indicative of low squid productivity, and reached their lowest level on record in 2000.

State of the Stock: Based on survey data, the short-finned squid resource in Subareas 3+4 remained at a low level in 2000.

Recommendation: The Scientific Council is unable to advise on a specific level of catch for year 2002.

However, based on available information (including an analysis of the upper range of yields that might be expected under the present low productivity regime), the Council advises that the TAC for year 2002 for short-finned squid in Subareas 3+4 be set between 19 000 tons and 34 000 tons.

The advised TAC range (19 000-34 000 tons) is applicable only during periods of low productivity. In periods of high productivity, higher catches and TAC levels are appropriate.

Reference Points: Scientific Council is not in a position to propose reference points at this time.

Special Comments: It is important to note that short-finned squid in Subareas 36 (and further south to Florida) are considered to comprise a unit stock.

Sources of Information: SCR Doc. 98/75, 01/57, 61; SCS Doc. 01/11, 12, 17.

Response to Fisheries Commission Special Request for Scientific Advice in the Year 2002 Regarding Squid (*Illex*) in Subareas 3+4

The Fisheries Commission stated: *For squid (Illex) in Subareas 3 and 4, the Scientific Council is requested to advise on the level of TAC in high abundance years and on the criteria which could be reliably used to forecast changes in productivity under an annual management regime. Scientists are encouraged to further analyze available data toward developing other possible indicators that could be used under an in-season management regime for squid, recognizing that the practical use of such indicators would require that they be available as early in the season as possible.*

The Scientific Council responded that in 2000, Scientific Council was unable to advise on any modification to the protocol for determining productivity of the short-finned squid resource in NAFO Subareas 3+4 to ensure its applicability in the long term. There are no new data available to address this issue. Furthermore, Scientific Council is not in a position to advise on a specific level of TAC that would be applicable during the high productivity regime.

Greenland Halibut (*Reinhardtius hippoglossoides*) in Subarea 2 and Divisions 3KLMNO

Background: The Greenland halibut stock in Subarea 2 and Div. 3KLMNO is considered to be part of a biological stock complex, which includes Subareas 0 and 1.

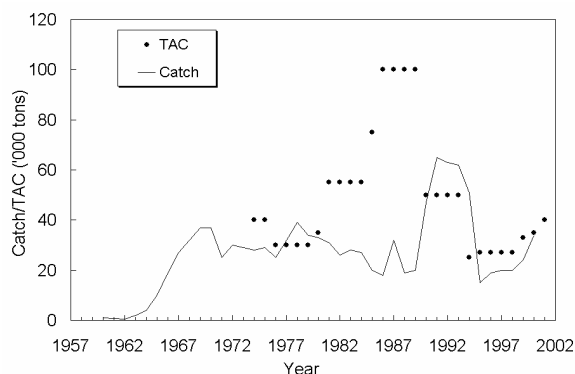
Fishery and Catches: Catches increased sharply in 1990 due to a developing fishery in the Regulatory Area in Div. 3LMN and continued at high levels during 1991-94. The catch was only 15 000 to 20 000 tons per year in 1995 to 1998 as a result of lower TACs under management measures introduced by the Fisheries Commission. The catch has been increasing since 1998 and in 2000 was estimated to be 34 000 tons, the highest since 1994.

Catches in the following table are best estimates.

	Catch ¹ (‘000 tons)	TAC ² (‘000 tons)	
		Recommended	Agreed
1998	20		27
1999	24	~30	33
2000	34	~30	35
2001	-	40	40

¹ Provisional.

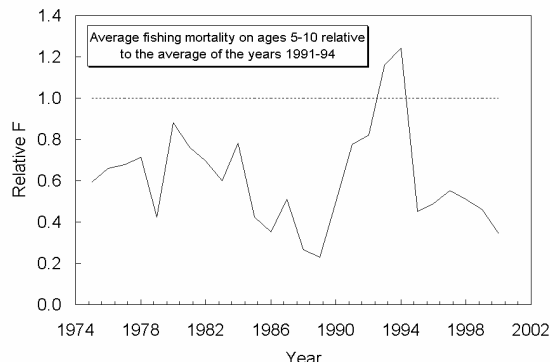
² Established autonomously by Canada prior to 1995 and by the Fisheries Commission in 1995-2001.



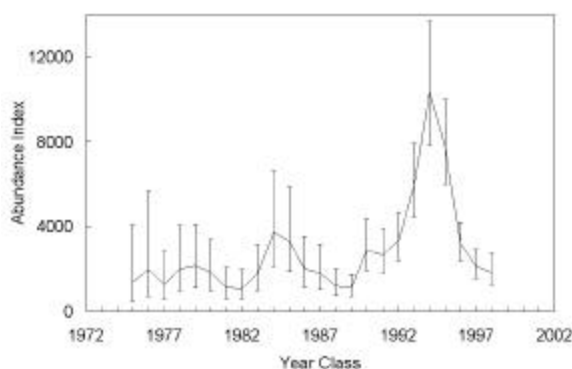
Data: CPUE data were available from international otter trawl fisheries throughout the stock area and the Portuguese otter trawl fishery in the Regulatory Area of Div. 3LMN. Abundance and biomass indices were available from research vessel surveys of Canada (1978-2000) and EU (1988-2000). International commercial catch-at-age data were available from 1975-2000.

Assessment: An analytical assessment using Extended Survivors Analysis (XSA) was reviewed to investigate population numbers in 2001.

Fishing Mortality: While the absolute estimate of fishing mortality implied from the analysis was uncertain, it indicated that the fishing mortality level for 2000 was relatively low in comparison to the early-1990s.

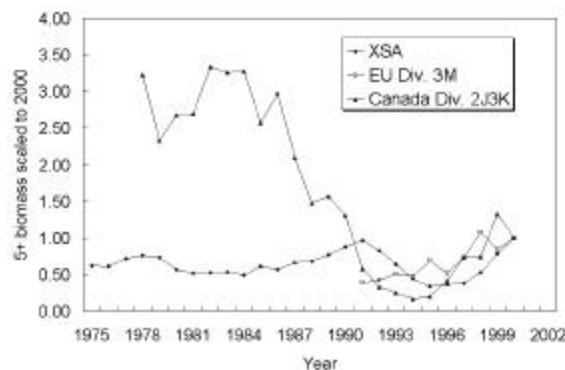


Recruitment: Above average recruitment indicated for the 1993-95 year-classes. The 1996 to 1998 year-classes appear to be average to below average. However, the comparability of the estimates may be significantly influenced by the change in survey gear in 1995.

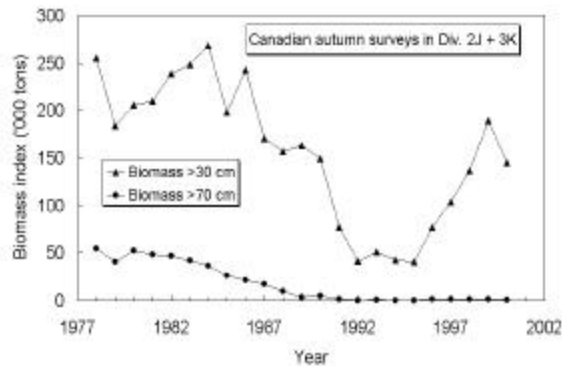


Biomass: As the dynamics of the population remain uncertain, it is not possible to determine an estimate of absolute biomass.

Most survey indices of biomass increased from 1996 to 1999 but declined in 2000.



Indices of fishable biomass since 1995 (30 cm is the minimum landing size) increased until 1999 as good year-classes recruited to the fishable stock but declined somewhat in 2000. The biomass index of fish greater than 70 cm (approximately length at 50% maturity) remains at a very low level.



State of the Stock: The stock appears to be recovering due to good recruitment and low fishing mortality but the biomass of fish over 70 cm is still low. There is concern that the major indices showed a decline in the recent 1-2 years.

Catch Forecast: Short-term projections indicate that there may be scope for catches to increase up to 44 000 tons in 2002 while maintaining the current fishing mortality. See Figure below.

Recommendation: The results of the assessment are considered uncertain. There is a high level of uncertainty associated with the estimates of the 1994 and 1995 year-classes, and these year-classes are expected to contribute significantly to the catches in 2001 and 2002. In addition, the high exploitation of immature fish and the low abundance of adult fish (>70 cm) is indicative of a situation of significant biological risk, although this risk cannot be quantified at present. The Scientific Council therefore recommends that the catch for 2002 should not exceed the 2001 level of 40 000 tons until the contribution of the 1994 and 1995 year-classes to the catches in 2001 can be evaluated during the 2002 assessment.

The Council again recommends that measures be considered to reduce, as much as possible, the exploitation of juvenile Greenland halibut in all fisheries.

Reference Points: Assessment results are not considered sufficiently reliable to allow estimation of formal reference points in quantitative terms. Until such reference points can be provided, Scientific Council advises that:

- Fishing mortality should be maintained, with high probability, below the average level estimated for the period 1991 to 1994.

This approach is advised in order to maintain a low risk that the stock will enter regions of unknown dynamics, which are considered to have unacceptable levels of risk.

Special Comments: The Council reiterates its concern that the catches taken from this stock consist mainly of young, immature fish of ages several years less than that at which sexual maturity is achieved.

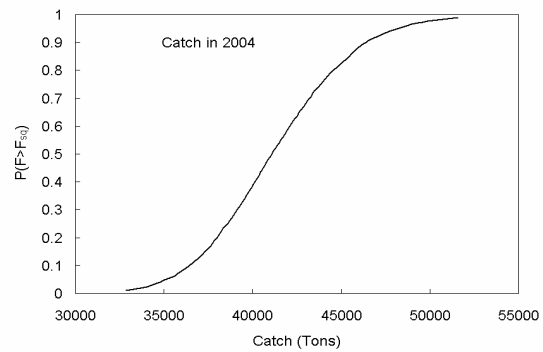
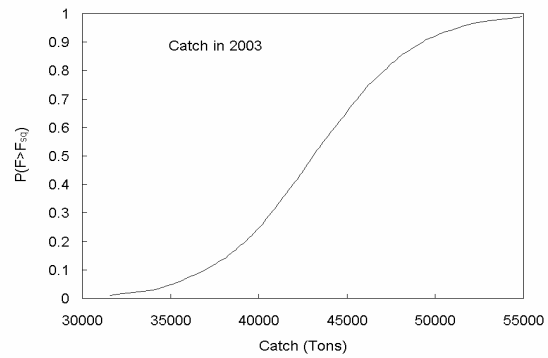
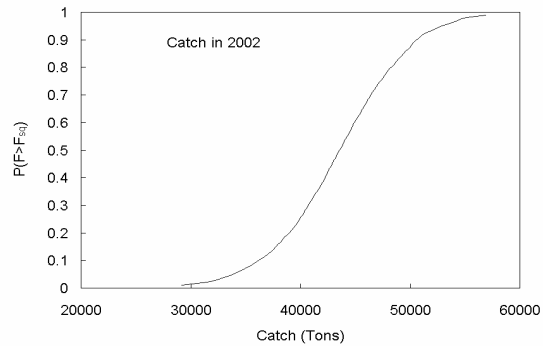
During previous assessments, Scientific Council has noted that fishing effort should be distributed in a similar fashion to biomass distribution in order to ensure sustainability of all spawning components. Application of this approach becomes increasingly important as the overall TAC is increased.

Scientific Council is also concerned that increased catches of Greenland halibut will result in increased catches of other species, some of which are currently under moratoria. It is strongly recommended that Fisheries Commission take steps to ensure that any by-catches of other species during the Greenland halibut fishery are true and unavoidable by-catches.

Sources of Information: SCR Doc. 01/10, 13, 22, 39, 44, 49, 79, 80; SCS Doc. 01/9, 11, 18.

Greenland halibut in Subareas 2+3: short-term catch projection at F_{sq}

Year	2002	2003	2004
Deterministic	43945	43434	41343
P=0.05 X =	33829	35156	35136
P=0.50 X =	43562	43071	41084
P=0.95 X =	52904	51317	48153



Capelin (Mallotus villosus) in Divisions 3N and 3O

Recommendation: No advice possible.

Special Comments: Scientific Council has noted previously that there are data available from multi-species surveys in Div. 3NO that may be useful for evaluating the status of this capelin resource. Despite repeated recommendations that these data be examined and the results of the analyses be brought forward to review by Scientific Council, this has not happened. Scientific Council **recommends** that *data on capelin in Div. 3NO available from Canadian bottom trawl surveys be analyzed and the results be presented at the June 2002 Meeting.*

Scientific Council noted that NAFO has recognized the role that capelin play in the Northwest Atlantic ecosystem as a very important prey species for fish, marine mammals and seabirds. In acknowledgement of this, for many years Scientific Council has maintained the perspective that exploitation should not exceed 10% of the known spawning biomass. Historically, the spawning biomass was determined through the use of hydroacoustics.

Capelin have shown themselves, throughout the North Atlantic, to be amenable to enumeration through application of acoustic techniques. This approach has the added benefit that very little mortality is applied.

Given the unknown status of the resource in Div. 3NO coupled with the acknowledged important role of capelin in the ecosystem, Scientific Council **recommends** that *initial investigations to evaluate the status of Div. 3NO capelin utilize acoustic surveys to allow comparison with the historical time series.*

b) Request for Advice on TACs and Other Management Measures for the Years 2002 and 2003

The Scientific Council and the Fisheries Commission during the Annual Meeting of September 2000 agreed to consider certain stocks on an alternating year basis. This section presents those stocks for which the Scientific Council provided scientific advice for the years 2002 and 2003.

Cod (Gadus morhua) in Divisions 3N and 3O

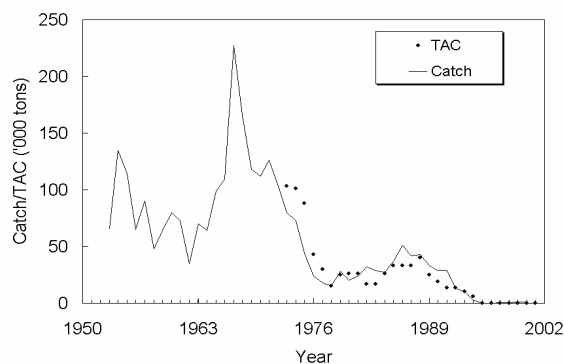
Background: This stock occupies the southern part of the Grand Bank of Newfoundland. Cod are found over the shallower parts of the bank in summer, particularly in the Southeast Shoal area (Div. 3N) and on the slopes of the bank in winter as cooling occurs.

Fishery and Catches: There has been no directed fishery since mid-1994.

	Catch ¹	TAC ('000 tons)	
	('000 tons)	Recommended	Agreed
1998	0.6	ndf	0
1999	0.9	ndf	0
2000	1.0	ndf	0
2001		ndf	0

¹ Provisional.

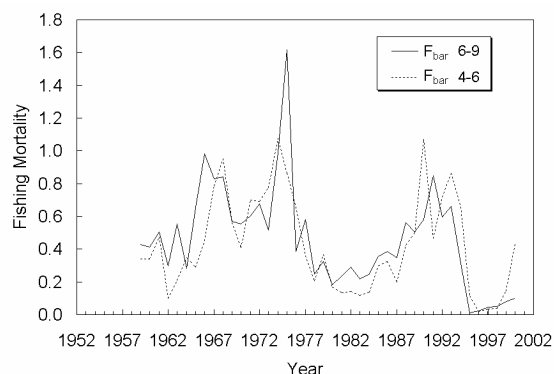
ndf No directed fishery and by-catches of cod in fisheries targeting other species should be kept at the lowest possible level.



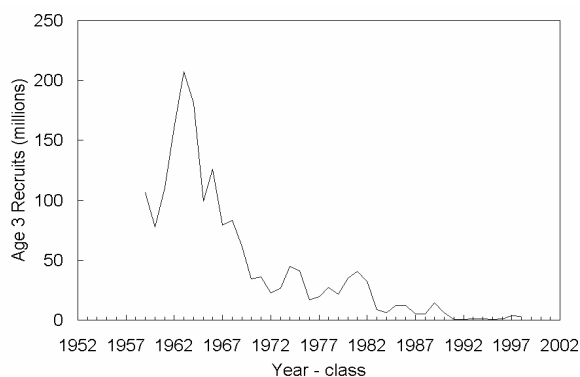
Data: Length and age composition were available from the 1999 and 2000 fisheries to estimate the total removals at age. Canadian spring and autumn survey data provided abundance, biomass and age structure information. Spanish spring survey data provided abundance and biomass information. Canadian juvenile research survey data were available up to 1994.

Assessment: An analytical assessment was presented to estimate population numbers in 2001.

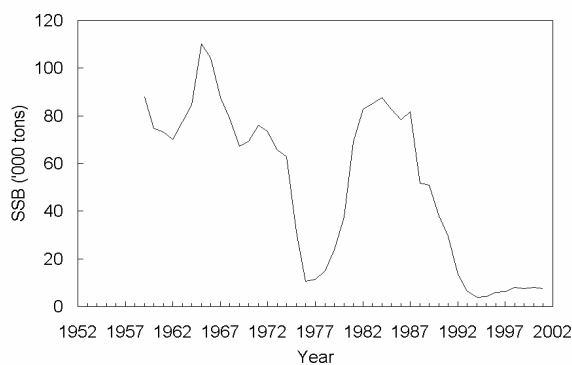
Fishing Mortality: Has increased on young fish in the last two years.



Recruitment: Recent surveys and the VPA suggest that all recent year-classes have been at a low level.



Biomass: The 2001 spawning biomass is estimated to be at an extremely low level.



State of the Stock: The stock remains close to its historical low with weak representation from all year-classes.

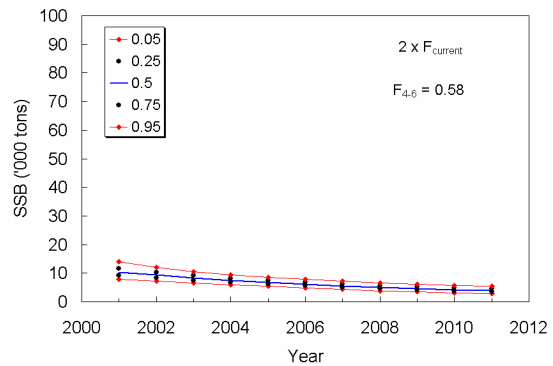
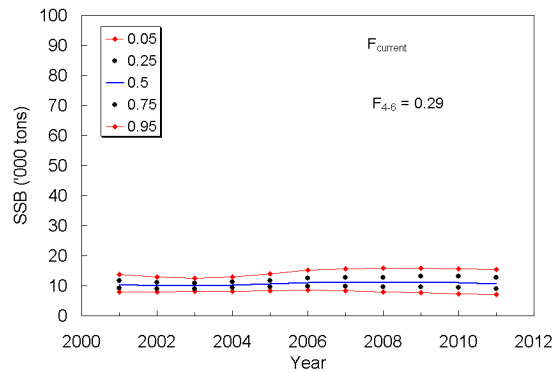
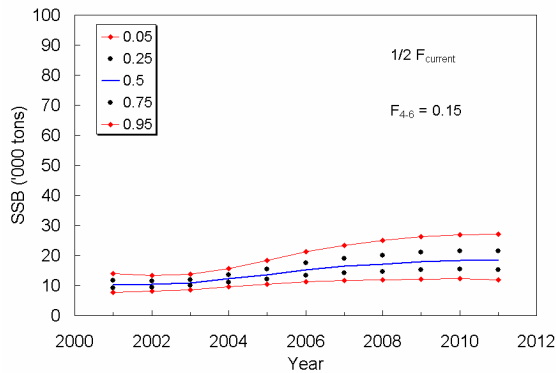
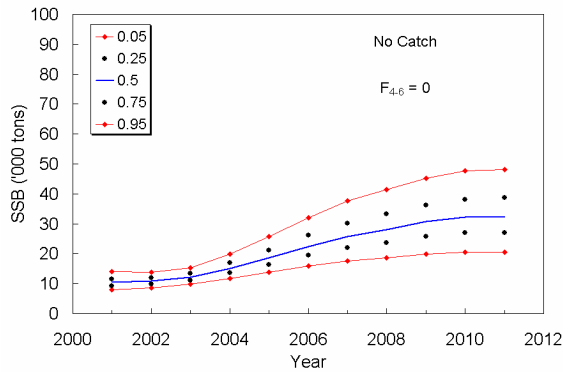
Recommendation: There should be no directed fishing for cod in Div. 3N and 3O in 2002 and 2003. Catches of cod should be kept at the lowest possible level and restricted to unavoidable by-catch in fisheries directing other species.

Reference Points: The current best estimate of B_{lim} is 60 000 tons. It was also concluded that in the recent period of low productivity, there is an indication of even further reduction in recruitment at about half the B_{lim} level. The Scientific Council recommended that it review in detail the biological reference points in the context of the PA framework when the SSB has reached half the current estimate of B_{lim} .

Medium-term considerations: Simulations were carried out to project the SSB for 10 years under various assumptions of spawner recruit regimes and different levels of fishing mortality. These simulations also take into account the precision of the stock size estimates currently available. These results suggest that recovery time will largely depend upon which recruitment regime prevails in the future.

Under the current low recruitment regime observed since 1982, stock increase will be limited even in the absence of fishing mortality. Any level of fishing mortality will further impede stock recovery. Time to recovery will be increased with increased fishing mortality.

Re-sampling from Low Recruitment Regime (1982-2000)



Special Comments: Scientific Council is concerned that catches of cod have increased substantially since 1995 such that fishing mortality is now close to $F_{0.1}$ although the stock is currently under moratorium and at a very low SSB.

Sources of Information: SCR Doc. 01/67, 72, 78, SCS Doc. 01/09, 11, 18.

Redfish (*Sebastes spp.*) in Divisions 3L and 3N

Background: There are two species of redfish, *Sebastes mentella* and *Sebastes fasciatus*, which occur in Div. 3LN and are managed together. These are very similar in appearance and are reported collectively as redfish in statistics. The relationship to adjacent NAFO Divisions, in particular to Div. 3O, is unclear and further investigations are necessary to clarify the integrity of the Div. 3LN management unit.

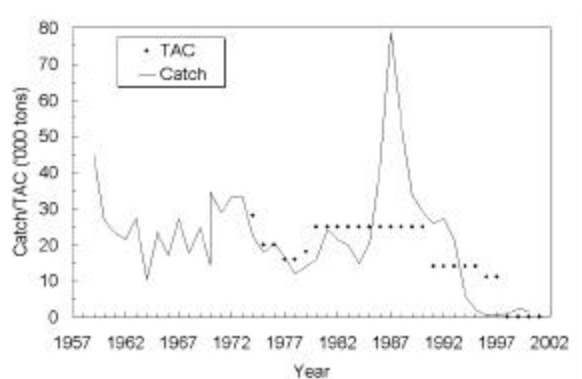
Fishery and Catches: Catches averaged about 22 000 tons from 1959 to 1985, increased sharply to an historical high of 79 000 tons in 1987 then declined steadily to about 500 tons in 1996. Catch increased to 850 tons by 1998 and was about 2 000 tons in 1999 and 2000. A moratorium on directed fishing was implemented in 1998. Catches since 1998 were taken as by-catch primarily in Greenland halibut fisheries by EU-Portugal, EU-Spain and Russia. A portion of the catches, in some years substantial, have been taken by non-Contracting Parties from 1987 to 1994. These countries have not fished in Div. 3LN since 1994.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Agreed
1998	0.9	ndf ²	0
1999	2.3	ndf ³	0
2000	1.7	ndf ³	0
2001		ndf ³	0

¹ Provisional.

² No directed fishing and by-catch kept at current low level.

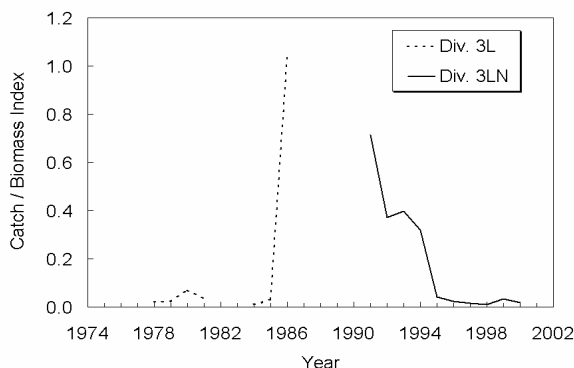
³ No directed fishing and by-catch kept at lowest possible level.



Data: Bottom trawl surveys conducted by USSR/Russia from 1984 to 1994, and by Canada from 1978 to 2000 are the basis for the assessment of stock status.

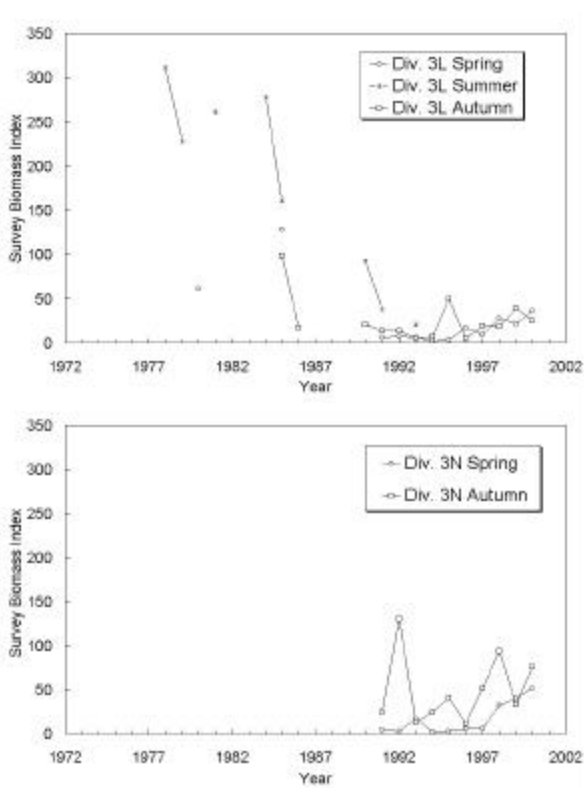
Assessment: No analytical assessment was possible.

Fishing Mortality: Reduced from relatively high levels in 1991-92 and has been relatively low since 1995 in both Div. 3L and Div. 3N.



Recruitment: No sign of good recruitment since the 1986 and 1987 year-classes.

Biomass: Estimates from recent surveys are considerably lower than those from the 1980s indicating a reduced and low stock size.



State of the Stock: Based on the available data, the stock appears to be at a very low level. There are indications of some increases in the stock since 1996 due to growth in weight of the relatively strong 1986-87 year-

classes and possibly through some immigration of fish from Div. 3O to Div. 3N.

Recommendation: No directed fishing for redfish in Div. 3LN, and by-catches of redfish in fisheries targeting other species should be kept at the lowest possible level.

Reference Points: Scientific Council is not in a position to propose reference points at this time.

Special Comments: The most recent relatively good year-classes, those of 1986-87, are recruiting to the SSB. These same year-classes will make up the greatest proportion of the SSB until at least 2010.

The continuing uncertainties regarding the relationship between redfish in Div. 3LN and Div. 3O have important impacts on interpretation of available data.

Assessments of Div. 3LN redfish would be improved by data on the size of the pelagic component of this stock. Appropriate research is needed to eliminate this gap.

Sources of Information: SCR Doc. 01/62; SCS Doc. 01/9, 11, 18.

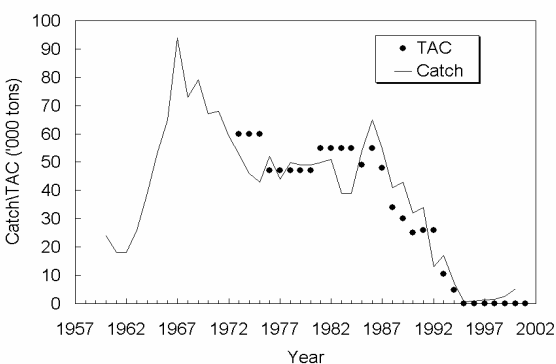
American plaice (Hippoglossoides platessoides) in Divisions 3L, 3N and 3O

Background: Historically, American plaice in Div. 3LNO has comprised the largest flatfish fishery in the Northwest Atlantic.

Fishery and Catches: In most years the majority of the catch has been taken by offshore otter trawlers. There was no directed fishing in 1994 and there has been a moratorium from 1995 to 2001. Even under moratorium catches have increased substantially in recent years.

Year	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Agreed
1998	1.6	nf	0
1999	2.5	nf	0
2000	5.2	nf	0
2001		nf	0

¹ Provisional.
nf No fishing.



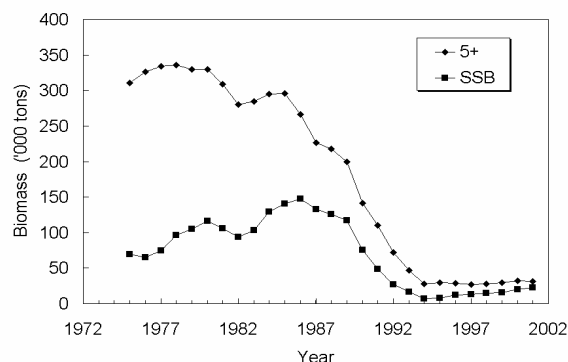
Data: Biomass and abundance data were available from several surveys. Age sampling from Canadian by-catch as well as length sampling from by-catch from Russia, EU-Spain and EU-Portugal were available.

Assessment: An analytical assessment using the ADAPTive framework tuned to the Canadian spring and autumn surveys was used. Natural mortality was assumed to be 0.2 except for all ages from 1989 to 1996 it was assumed to be 0.53.

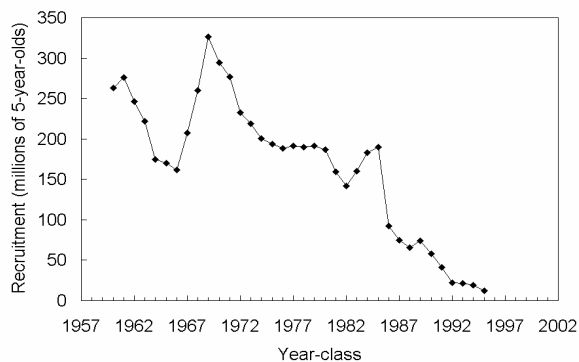
Biomass: Biomass is very low compared to historic levels.

Spawning stock biomass: SSB declined to a very low level in 1994 and 1995. It has increased since then but still remains at a very low level at just over 20 000 tons.

Biomass and SSB from VPA:

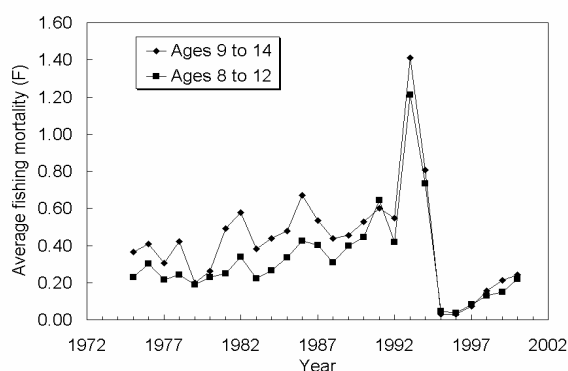


Recruitment from VPA:



Recruitment: There have been no good year-classes since the mid-1980s.

Fishing mortality: Fishing mortality has increased steadily since 1995 and is currently near $F_{0.1}$.



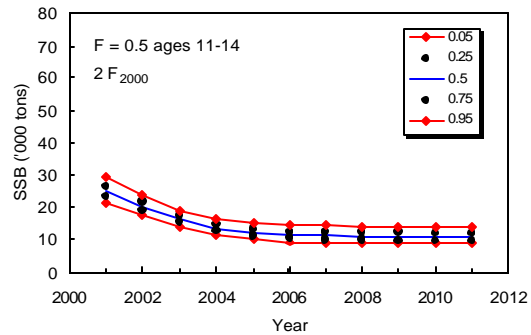
State of the Stock: The stock remains low compared to historic levels.

Recommendation: No directed fishing on American plaice in Div. 3LNO in 2002 and 2003. By-catches kept to the lowest possible level.

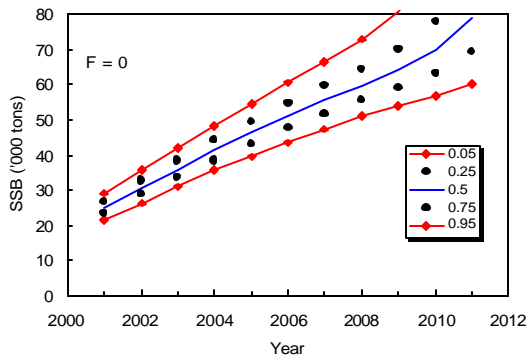
Reference Points: No good recruitment has been estimated for this stock at SSB below 50 000 tons. However, Scientific Council considered it too preliminary to be set as a B_{lim} .

Medium term considerations: Simulations were carried out to compare population trajectories under different levels of by-catch fishing mortality. These simulations take into account the precision of the stock size estimates currently available.

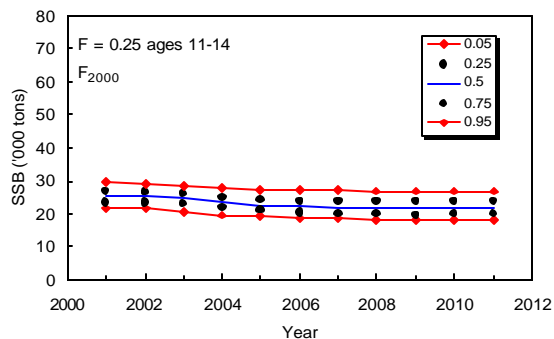
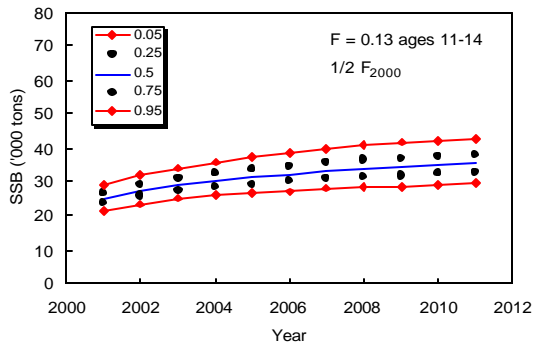
These results show that at or above current levels of catch and fishing mortality, stock size is likely to decline. If fishing mortality decreases to half of current levels, then the stock is estimated to increase only slightly over the medium term.



Special Comments: Scientific Council is concerned that catches of American plaice have increased substantially since 1995 such that fishing mortality is now close to $F_{0.1}$ although the stock is currently under moratorium and at a very low SSB. Most of this increase is reported to be due to by-catches in the unregulated skate fishery in the NAFO Regulatory Area, the Greenland halibut fishery, and the yellowtail flounder fishery. Scientific Council is concerned that much of this catch is not truly 'by-catch' but rather is occurring as a result of directed fishing. Any catches will impede the recovery of this stock. Catches at or above the current level will cause further decline.



Sources of Information: SCR Doc. 01/4, 58, 59, 70; SCS Doc. 01/9, 11, 18.



c) **Special Requests for Management Advice**

i) **Formulation of advice under the precautionary approach**

The Council noted that this matter was considered on a stock-by-stock basis, and addressed and reported where possible with those stocks.

ii) **Witch flounder in Divisions 2J and 3KL**

The Scientific Council considerations were as follows:

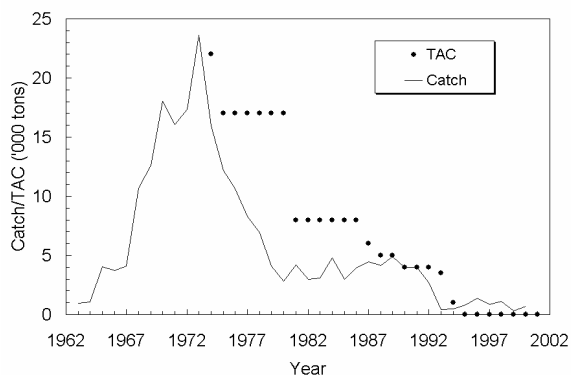
Witch Flounder (*Glyptocephalus cynoglossus*) in Divisions 2J, 3K and 3L

Background: Historically, the stock occurred mainly in Div. 3K although recently the proportion of the stock in Div. 3L has been greater. In recent years, catches have been reported from the Flemish Pass area of Div. 3M. This is likely to represent an extension of the Div. 3L component of the stock. In the past, the stock had been fished mainly in winter and spring on spawning concentrations but is now only a by-catch of other fisheries.

Fishery and Catches: The catches during 1995-99 ranged between 300-1 400 tons including unreported catches. The 2000 catch was 700 tons.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Agreed
1998	1.1	nf	0
1999	0.3	nf	0
2000	0.7	nf	0
2001	-	nf	0

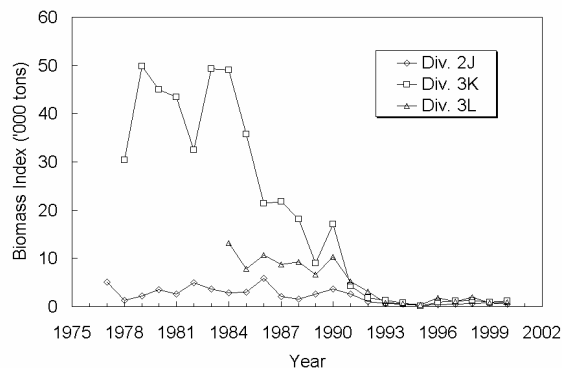
¹ Provisional. Includes estimates from Div. 3M since 1998.
nf No fishing.



Data: Abundance and biomass data were available from Canadian autumn surveys during 1978-2000. Age based data have not been available since 1993 and none are anticipated in the near future.

Assessment: No analytical assessment was possible.

Biomass: Survey biomass indices trended downwards rapidly since the mid-1980s and since 1995 have remained at an extremely low level.



Recruitment: No information was presented.

State of the Stock: Stock remains at a very low level.

Recommendation: No directed fishing on witch flounder in the years 2002 and 2003 in Div. 2J, 3K and 3L to allow for stock rebuilding. By-catches in fisheries targeting other species should be kept at the lowest possible level.

Reference Points: Scientific Council is not in a position to propose reference points at this time.

Special Comments: The relationship between witch flounder in Div. 3M and the Div. 2J, 3K and 3L stock warrants investigation.

The next Scientific Council assessment of this stock will be in 2003.

Sources of Information: SCR Doc. 01/64; SCS Doc. 01/9, 11, 18.

iii) **Information on unregulated species in the Regulatory Area**

Fisheries Commission requested that: *the Scientific Council review all available information from both research vessel surveys and commercial catches on the relative biomass and geographic distribution of the following unregulated species/stocks occurring within the NAFO Regulatory Area: monkfish (Lophius americanus), wolffishes (Anarhichas lupus, A. minor, A. denticulatus), thorny skate (Amblyraja radiata), black dogfish (Centroscyllium fabricii), eelpouts (Lycodes spp.), longfin hake (Urophycis chesteri), and orange roughy (Hoplostethus atlanticus).*

The Council responded that information on monkfish was presented to Scientific Council (SCR Doc. 01/47). Further information on other species will be prepared for the September 2001 Meeting. Accordingly, this item was deferred by the Scientific Council to September 2001.

iv) **Distribution of fishable biomass of main commercial species**

The Council deferred this item to its September 2001 Meeting.

v) **Medium-term development of several stocks under various assumptions**

The Council deferred this item to its September 2001 Meeting.

vi) **Distribution of juvenile American plaice and yellowtail flounder**

The Scientific Council was requested to: *review the distribution of juvenile American plaice and update the distribution of yellowtail flounder based on results from comprehensive research surveys. The Scientific Council is also requested to delineate further the areas of juvenile concentration in the Southeast Shoal area and its surroundings.*

The Council responded that:

The distribution of juvenile yellowtail flounder (0-3 years), and American plaice (0-3 years) on the southern Grand Bank were evaluated using geostatistics and the catch-at-age data from the annual stratified-random juveniles survey in autumn 1985-94 and the annual autumn Canadian surveys during 1995-99 (Fig 1). The surveys were conducted using small mesh shrimp trawls (SCR Doc. 01/78).

The analyses presented corroborates the previous identification of the yellowtail flounder nursery area in Div. 3N as being located on the Southeast Shoal (strata 375 +376) and the area neighboring to the west and south of the shoal (strata 360 + 361) (Fig. 2). An average of 82% of all the juveniles in Div. 3NO on the southern Grand Bank were found in this area during the time series.

Juvenile American plaice has shown a distribution shift in the areal concentration from being predominately in Div. 3N, specifically on the Tail of the Bank, up to 1990 and from 1992 onward to being predominately in Div. 3O. Since 1992, the highest densities, decreasing over time, were found in the Whale Deep-Whale Bank area and along the southwest slope of Div. 3O (see Fig. 1). Coincidental with the disappearance of the high densities of juveniles on the Tail of the Bank, was the disappearance of high densities in the nursery area on the northern slope of the Grand Bank in Div. 3L. By 1995, there were very few of any age-classes anywhere on the Grand Bank. The reasons for low abundance and absence from the traditional nursery areas in the north and the south may be related to the absence of large year-classes. During this time series, the size of Div. 3LNO stock has also declined to a very low level and the remnants are mainly concentrated on the Tail of the Bank in recent years. Should the stock of American plaice rebuild to levels seen in the mid-1980s, then it is expected that the Tail of the Bank and the northern slope of Div. 3L will once again be the major nursery areas on the Grand Bank.

Scientific Council noted that the yellowtail flounder nursery area is the only nursery area for which physical bounds can be defined with some certainty. From the time series analyses, on average 82% of juvenile yellowtail flounder in Div. 3NO, and 24% of juvenile American plaice in Div. 3NO were found in the Southeast Shoal (Strata 375 + 376) and the neighboring area to the west (stratum 361) and south (stratum 360) (Fig. 2 and 3; Table 1). This area would include the shallow (<100 m) portion of the Regulatory Area of Div. 3N.

Table 1. Juvenile American plaice and yellowtail flounder in Div. 3NO: percent abundance of juveniles found in the Southeast Shoal (strata 375 + 376) and neighboring area to the west (stratum 361) and south (stratum 360).

Yellowtail flounder

Stratum	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Mean	SD
375	17.7	14.4	8.5	5.7	6.6	0.4	10.1	17.0	15.5	6.9	10.9	7.7	10.11	5.19
376	37.8	44.5	54.8	65.2	40.2	30.0	57.8	30.0	37.9	55.2	23.7	14.6	40.97	15.16
360	21.9	23.1	24.7	15.4	36.3	43.9	14.9	11.7	15.1	4.0	13.6	6.8	19.29	11.58
361	11.6	9.8	8.9	7.8	7.5	11.2	10.5	12.2	14.4	4.1	22.4	13.5	11.15	4.53
Total	89.0	91.7	97.0	94.0	90.5	85.5	93.3	70.9	82.9	70.1	70.7	42.6	81.5	15.6
Mean	22.2	22.9	24.2	23.5	22.6	21.4	23.3	17.7	20.7	17.5	17.7	10.7		
SD	11.2	15.4	21.7	28.1	18.1	19.4	23.1	8.5	11.5	25.1	6.3	4.0		

American plaice

Stratum	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Mean	SD
375	0.4	0.0	0.1	0.1	0.0	0.6	0.9	0.1	0.1	0.1	0.1	0.2	0.3
376	14.2	0.3	0.5	2.2	3.9	0.5	0.3	0.0	0.1	0.1	0.1	2.0	4.2
360	55.8	52.8	34.5	31.0	8.9	6.1	21.8	7.4	0.6	5.4	3.2	20.7	20.1
361	1.4	0.4	0.4	0.8	0.2	0.4	0.6	1.9	0.6	0.5	0.1	0.7	0.5
Total	71.8	53.4	35.5	34.1	13.0	7.5	23.6	9.4	1.3	6.0	3.5	23.6	22.9
Mean	18.0	13.4	8.9	8.5	3.2	1.9	5.9	2.4	0.3	1.5	0.9		
SD	26.0	26.3	17.1	15.0	4.1	2.8	10.6	3.4	0.3	2.6	1.6		

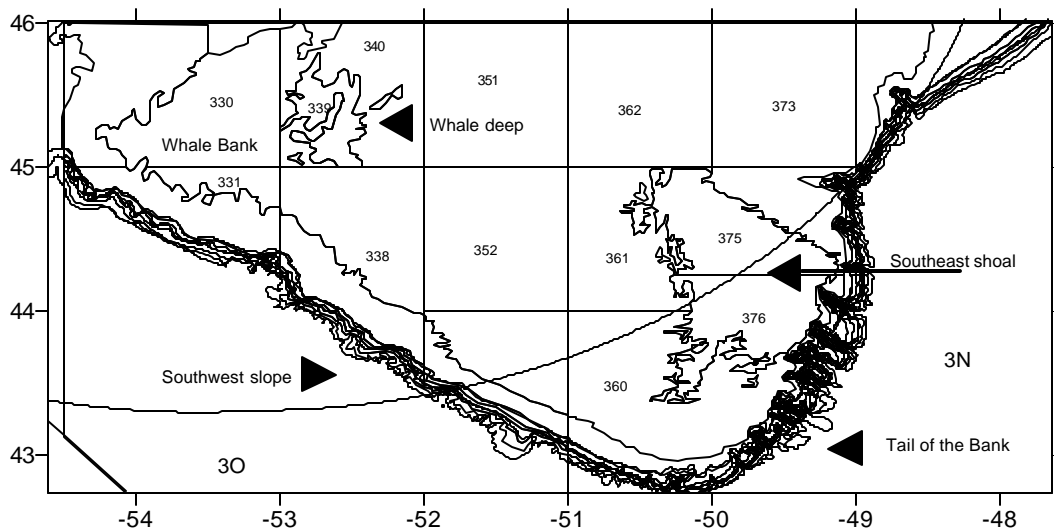


Fig. 1. Juvenile American plaice and yellowtail flounder in Div. 3NO: survey stratification scheme for the southern Grand Bank, Div. 3NO.

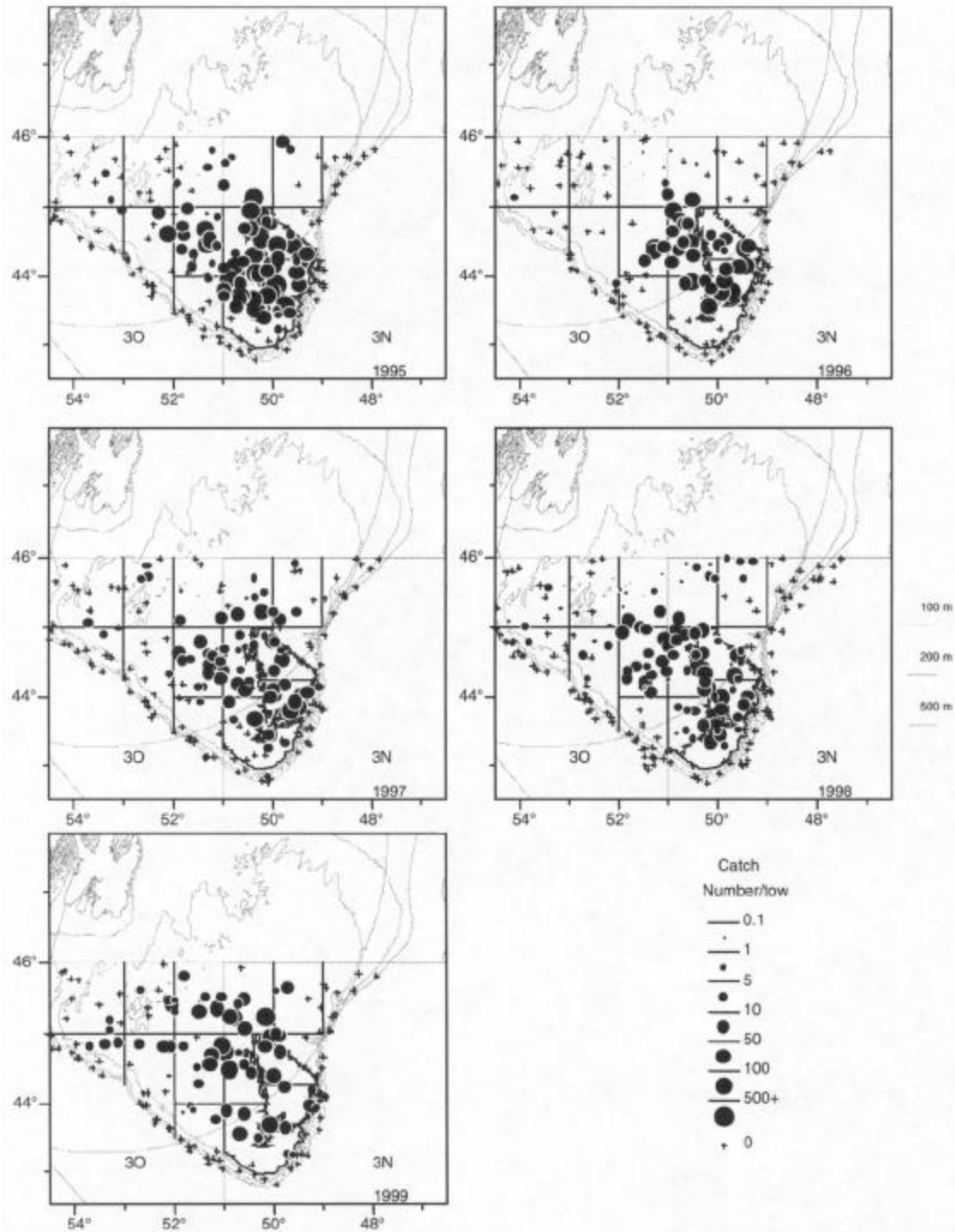


Fig. 2. Juvenile American plaice and yellowtail flounder in Div. 3NO: expanding symbol plots of standardized catches of juvenile yellowtail flounder from the annual autumn surveys on the Grand Bank, 1995-99.

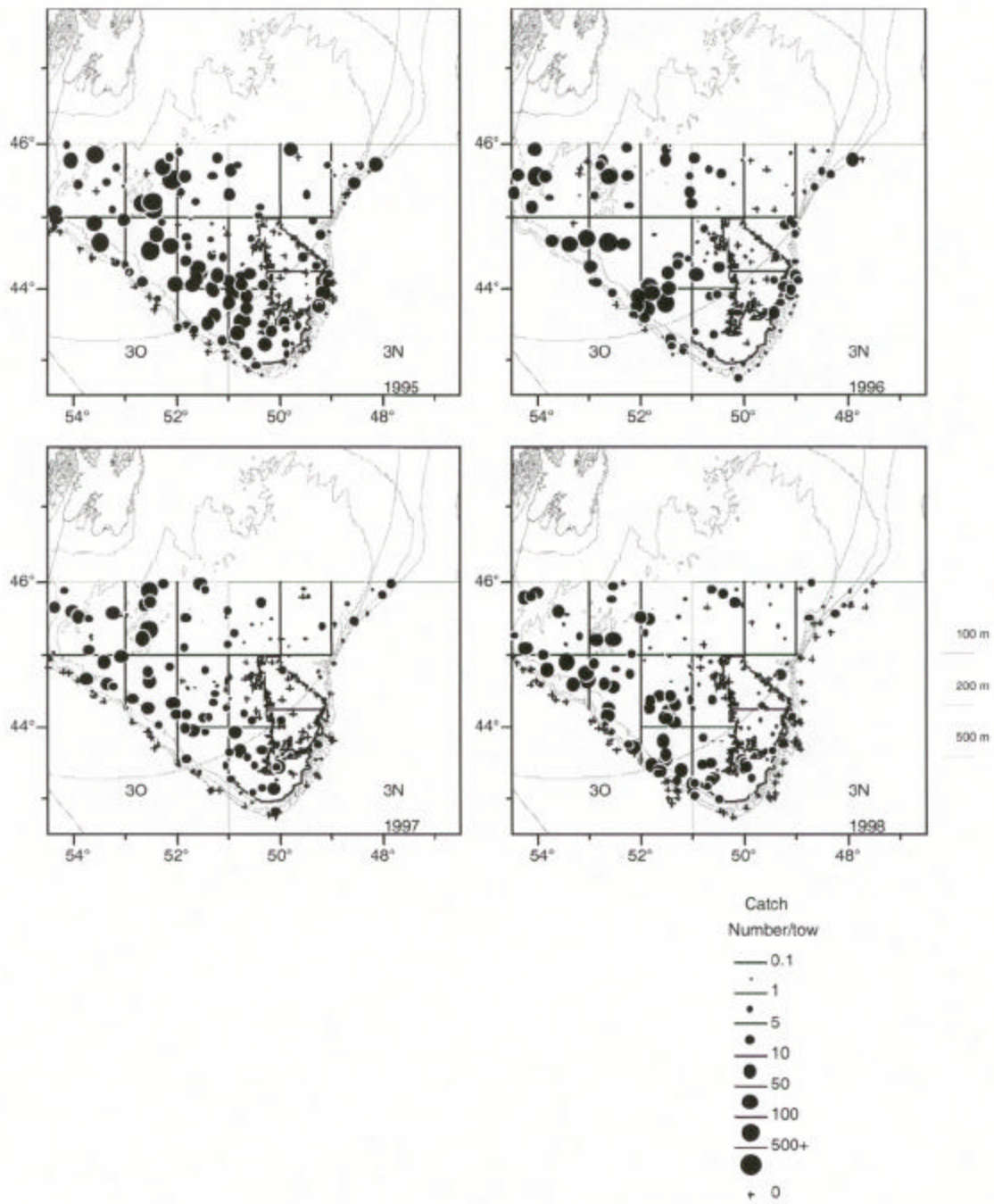


Fig. 3. Juvenile American plaice and yellowtail flounder in Div. 3NO: expanding symbol plots of standardized catches of juvenile American plaice from the annual autumn surveys on the Grand Bank, 1995-98.

vii) **Redfish in Div. 1F and Adjacent ICES Area**

Scientific Council **recommended** that *the pelagic redfish resource in the NAFO Convention Area (NCA) not be referred to as "redfish in Div. 1F" but more specifically as "pelagic S. mentella in the NAFO Convention Area"*.

With regard to redfish in NAFO Division 1F, the Scientific Council was requested by the Fisheries Commission to: *review all available information on the distribution of this resource over time, as well as on the affinity of this stock to the pelagic redfish resource found in ICES Sub-area XII, parts of SA Va and XIV or the redfish found in NAFO Subareas 1-3.*

The Scientific Council responded that information had been provided to Fisheries Commission during the September 2000 Annual Meeting (*NAFO Sci. Coun. Rep.*, 2000, p. 182-183) indicating that since the initiation of systematic surveys in the early-1990s, the stock had been shown to be distributed in the ICES Sub-area XII, parts of SA Va and XIV. During the 1999 international survey, the stock was found distributed to a great extent inside the NAFO Regulatory Area (Div. 1F). Scientific Council also indicated that it considered the pelagic redfish distributed in NAFO Div. 1F as part of the pelagic stock previously distributed in the NEAFC Convention Area.

Scientific Council noted that detailed information addressing this request is contained in the STACFIS report of this meeting (Appendix IV, pages 182-183).

Scientific Council concluded that the redfish found in NAFO Div. 1F do constitute a part of the pelagic redfish in the NEAFC Area, and **recommended** that *the pelagic S. mentella resource should be managed in a compatible manner between NAFO and NEAFC. Scientific Council noted that Fisheries Commission has done this for the 2001 fishing year, but recommends that longer-term arrangements be made.*

Scientific Council was unable to evaluate the possible relationships between the pelagic redfish and the shelf stocks in the NAFO Convention Area and that ICES has also been unable to agree on the relationship of the pelagic redfish with those in the shelf areas of Iceland.

The Council noted another related **request on pelagic redfish was forwarded by the Coastal State Canada:**

With regard to redfish in Division 1F the Scientific Council was requested by Canada:

- a) *to review the available information related to the biology and distribution of oceanic redfish in the north Atlantic and to provide, to the extent possible, commentary on possible links to the various shelf stocks in the northwest Atlantic.*
- b) *to make recommendations on the most appropriate means of interaction with ICES with regards to this resource.*

Scientific Council responded that information pertaining to part (a) of the request is contained in the STACFIS report (at Appendix IV, pages 182-183). With regard to part (b), Scientific Council considered that it is important to have close, ongoing interaction between NAFO Scientific Council and ICES on the issue of pelagic *S. mentella*.

Scientific Council advises against the establishment of a Joint NAFO/ICES Working Group to examine this resource. The resource is assessed annually by the North-Western Working Group of ICES, and members of Scientific Council normally participate in these activities.

Scientific Council **recommended** that *annually, in advance of the meeting of the North-Western Working Group (next meeting tentatively scheduled for April 2002), Scientific Council members who will be participating identify themselves to the NAFO Secretariat who will work with the Chair of Scientific Council and designate formal representation of NAFO to the Working Group. The*

designated person(s) shall then report back on the ICES North-Western Working Group deliberations to the subsequent meeting of Scientific Council.

Additionally, all documentation pertaining to pelagic *S. mentalla* provided to the North-Western Working Group of ICES should be made available to the Scientific Council.

Further, it is **recommended** that *the Chair of Scientific Council will interact with the Chair of the ACFM of ICES as required so that information on approved analyses and recommendations pertaining to the North-Western Working Group is shared and conveyed to NAFO Scientific Council for consideration as necessary.*

viii) **Effect of increasing mesh size in Greenland halibut fishery**

The Fisheries Commission requested the Scientific Council to: *provide information on the long-term effects of increasing mesh size from 130 mm to 145 mm in yield-per-recruit and stock spawning biomass-per recruit for Greenland halibut in Subarea 2 and Divisions 3KLMNO and in reducing by-catch of other species in that fishery. The Scientific Council has also been requested to evaluate the medium term consequences in terms of yield and stock size of any such changes in mesh size.*

The Council commented as follows:

The species that are taken as by-catch within the Subarea 2 and Divisions 3KLMNO Greenland halibut fishery are American plaice, cod, yellowtail flounder, roughhead grenadier, roundnose grenadier, thorny skate, hake, monkfish, spotted wolfish, striped wolfish, redfish and witch flounder. For some of these species, Scientific Council has provided advice on this subject in earlier reports; *NAFO Sci. Coun. Rep.*, 1995, 1997 and 1998.

The effects of a change in mesh selection on the yield- and SSB-per-recruit of Greenland halibut in Subarea 2 and Div. 3KLMNO, American plaice in Div. 3L, 3N and 3O and cod in Div. 3N and 3O were examined. Yield-per-recruit analysis was carried out using 130 mm and 145 mm partial recruitment vectors estimated from selection at length curves. It was assumed that trawlers using 130 mm mesh have landed all of the recent catches. The analyses did not consider the effects on species for which age based assessments were not available.

The results for Greenland halibut and American plaice are consistent with previous advice from Scientific Council. They indicate that there would be only marginal benefits to changing the mesh size from 130 mm to 145 mm, in the Greenland halibut fishery, on yield and SSB of the Greenland halibut and American plaice. For cod there would be large increases in SSB and yield only if effort were constrained.

Scientific Council repeats the conclusions reached in 1995, that it would be difficult to generate an exploitation pattern for trawlers that would be optimal for Greenland halibut in Subarea 2 and Div. 3KLMNO. Substantial improvements in the exploitation pattern could be achieved by adoption of alternative fishing methods such as, long lining and gill netting with 205 mm mesh, or by restricting fishing to waters deeper than 1 200 m (*NAFO Sci. Coun. Rep.*, 1995, p. 41)

ix) **Methodology for scientific research for stocks under moratoria**

The Fisheries Commission requested the Scientific Council to: *provide advice regarding the methodology for scientific research on fish stocks under moratoria.*

The Scientific Council noted the main concerns for collapsed stocks under moratoria are to minimize the risk of the spawner biomass declining further and to maximize the probability of recovery in the medium term. The greatest threat for collapsed stocks may be by-catch in other fisheries leading to higher than desired levels of fishing mortality despite a moratorium on directed fishing. At the present time, there is some evidence that the recovery of several NAFO stocks that are under moratoria may be delayed or even prevented by current levels of by-catch, for example Div. 3LNO American plaice, Div. 3M cod and Div. 3NO cod. To enable Fisheries Commission to take into

account by-catch when setting TACs, Scientific Council must be able to quantify these effects in its advice on by-catch implications on non-target stocks.

The evaluation of the effect of by-catch and discards on stock recovery may be hampered if the data are inaccurate. Observer estimates derived from fisheries which lack 100% observer coverage may not be representative of by-catch levels for the complete fleet. In addition, there are often only limited length and age composition samples of by-catch because of the unpredictable nature of the landings. Accurate catch data and adequate sampling are essential to calculate removals-at-age and carry out population modelling.

Analysis of research vessel data (or data collected from a scientifically designed precautionary approach monitoring program utilizing commercial vessels) for a stock under moratorium may lead to an estimate of relative stock size. Growth, maturity, condition and stomach content data are potentially useful in determining stock productivity. Spatial analysis of research vessel data can indicate the proportion of habitat occupied and degree of aggregation. Stocks reduced to the point where only a small portion of the habitat is utilized, or where the remaining fish are highly aggregated, may have greater vulnerability to environmental conditions or to natural and fishing mortality. These changes in fish distribution and behaviour may also influence survey catchability.

Age-disaggregated data from research vessel surveys can be analyzed in general linear models to determine relative year-class strength and total mortality rates. Low recruitment levels and/or high total mortality rates for stocks under moratoria may indicate a low probability of recovery in the medium term.

If analytical assessments are feasible then medium-term projections at different by-catch levels could provide useful insight into the extent to which recovery may be impeded. The partial recruitment in a by-catch fishery may be quite different to that which occurred in a directed fishery prior to moratorium, and this might require analysis. Medium-term projections for stocks under moratoria require some information on expected recruitment at low stock size. Stock-recruit data collected prior to the moratorium may not be very informative at low stock size and it may be necessary to consider the possibility that dispensation or 'regime shifts' may have occurred. In all cases greater understanding of by-catch effects and stock-recruit relationships will provide useful insight into relative probabilities of recovery for stocks under moratoria.

d) **Monitoring of Stocks for Which Multi-year Advice was Provided in 2000**

Last year (2000), the Scientific Council provided 2-year advice (for 2001 and 2002) for three stocks (cod in Div. 3M; witch flounder in Div. 3NO, and American plaice in Div. 3M). The Scientific Council reviewed the status of these three stocks at its June 2001 Meeting and found no significant change in status for any of the stocks. Therefore, the Scientific Council has not provided updated/revised advice for 2002 for these stocks. The next Scientific Council assessment of these stocks will be in 2002.

2. **Coastal States**

a) **Request by Canada for Advice**

The Scientific Council was requested by the Coastal State Canada to provide advice on stock status for Greenland halibut in Subareas 0-3, cod in Div. 2J+3KL, by-catch of yellowtail flounder in Div. 3LNO, by-catch of American plaice in Div. 3LNO and redfish in Div. 1F. This section provides the Scientific Council responses where possible.

i) **Greenland halibut in Subareas 0-3**

The Scientific Council noted there was no information available at this meeting.

ii) **Cod in Div. 2J and 3KL**

The Council consideration on this stock is reported below:

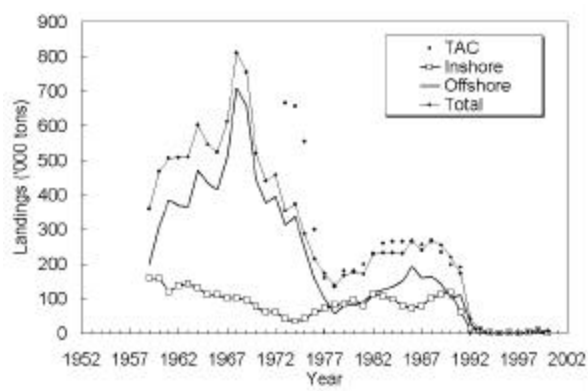
Cod (*Gadus morhua*) in Divisions 2J, 3K and 3L

Background: Considerable uncertainty exists about the structure of the Div. 2J and 3KL stock. The available tagging, genetic, survey and biological data are consistent with the two hypothesis: a) the inshore constitutes a separate inshore subpopulation that is functionally separate from the offshore; and b) inshore and offshore fish together constitute a single functional population. The only over-wintering aggregation known to exist occurs in a deepwater inlet in northern Div. 3L, Smith Sound. Fish from this aggregation migrate seasonally out of the sound in the spring, mainly northward in Div. 3L and southern Div. 3K, supporting most of the commercial fishery which has taken place in the autumn over the last three years. Elsewhere densities are extremely low throughout the stock area, with the exception of the southern portion of Div. 3L where there is a seasonal migration of fish from Subdiv. 3Ps. This migration was much reduced in 2000. Slightly elevated abundances of fish were detected in 1999-2000 in surveys on the shelf near the boundary between southern Div. 3K and northern Div. 3L.

Fishery and Catches: The rapid decline in the resource in the early-1990s led to reduced TACs and eventually to a moratorium on commercial fishing in 1992. A recreational fishery was permitted in 1992-94, 1996, 1998 and 1999 but not in 1995 and 1997. Catches also came from sentinel surveys in 1995-99 and a commercial index fishery 1998. The commercial fishery was reopened in 1999 with a TAC of 9 000 tons for the inshore only. In 2000, a TAC of 7 000 tons was established for sentinel surveys and a commercial index fishery in the inshore for vessels under 65 feet.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended ²	Autonomous
1998	4.5		0
1999	8.5		9
2000	5.4		7

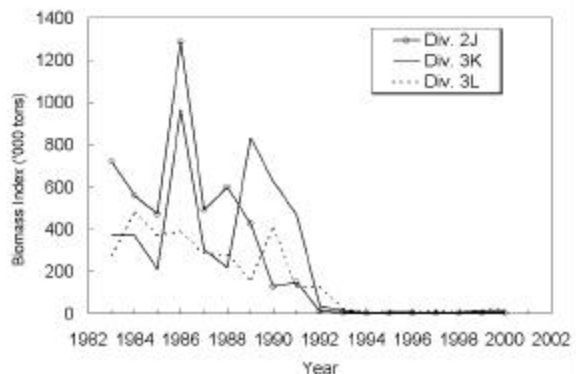
¹ Provisional.
² Advice not requested.



Data: Abundance and biomass indices were available from bottom-trawl surveys in autumn and spring (Div. 3L only). An acoustic survey of the only known over-wintering aggregation resulted in a biomass index and mark-recapture data provided estimates of exploitation rate and exploitable biomass. Removals-at-age in 2000 were constructed for the limited by-catch, the sentinel survey, a recreational fishery and the commercial index fishery.

Assessment: An analytical assessment of the Div. 2J and 3KL cod stock was attempted but changes in the distribution of fish relative to the survey area since the collapse, the change in the survey trawl in 1995, and the unaccounted for fish from the 1986 and 1987 year-classes, precluded obtaining an acceptable calibration of a sequential population analysis model. Stock status was estimated based on research vessel indices, mark-recapture data, an acoustic study in a limited area, and from sentinel and commercial index fishery catch at age data.

Biomass: The biomass index for the offshore area from the autumn research vessel survey in Div. 2J and 3KL declined abruptly in the early-1990s. The biomass index from the autumn survey in 2000 remains extremely low at only 2.5% of the average in the period 1983-88.



The biomass index from the spring research vessel survey in Div. 3L in 2000 is also very low compared to the 1980s.

Analysis of mark-recapture data using a simple migration model resulted in estimates of biomass in the inshore of Div. 3K and northern Div. 3L from 1998 to 2000 that have been relatively stable at about 40 000 tons. A more detailed model, but one which did not include migration (and which therefore will result in positively biased estimates), gave a biomass of no more than 77 000 tons in Div. 3KL in 2000. Fish in southern Div. 3L were found to comprise mostly seasonal migrants for Subdiv. 3Ps. Acoustic surveys in a small inlet in northern Div. 3L, Smith Sound, carried out in January each year provided indices of biomass of about 15 000 tons in 1999, 22 000 tons in 2000 and 31 000 tons in 2001.

Gillnet catch rates for the commercial index fisheries in 1998 and 2000 and the commercial fishery in 1999, showed a significant decline over the three-year period with a progressive shrinkage of the area of highest concentration to a restricted portion of northern Div. 3L. Catch rates in the sentinel gillnet fishery increased from 1995 to 1998 but declined from 1998 to 1999 and decreased further in 2000. Catch rates in the sentinel line trawl catch rates showed relatively little change from 1995 to 1996, increased in 1997, and declined again in 1998, 1999 and 2000.

Mortality: Total mortality estimates increased until 1992, coinciding with the beginning of the moratorium. The rates then declined until 1995, and since then have remained constant at levels similar to those observed in the late-1980s when there was a substantial fishery.

It appears that predation by seals has been an important source of mortality of cod since the start of the moratorium. There is also the possibility that predation by seals is preventing the recovery of the cod stock, not simply because considerable numbers of cod are being consumed but also because some of those cod eaten are mature fish.

Recruitment: The 1998 to 2000 year-classes are higher than earlier year-classes in the time series but are imprecisely estimated and all year-classes are extremely low compared with those that occurred prior to the collapse.

State of the Stock: Indices of exploitable biomass from commercial and sentinel catch rates and the autumn bottom-trawl survey in inshore strata show downward trends over the recent period but are inconsistent with estimates from tagging which

indicate a stable biomass and an acoustic index for Smith Sound which shows an increase. Therefore, it cannot be said whether recent levels of exploitation have been sustainable. The commercial gillnet catch-rate data for the last three years suggests a progressive shrinkage of the area of highest concentration to a restricted portion of northern Div. 3L. The fact that only about 70% of the TAC was taken in the 2000 commercial index fishery is further cause for concern. Overall, there is no doubt that the Div. 2J and 3KL cod spawner biomass remains at an extremely low level and there is no evidence of a recovery. Any fishery on the remnant in the inshore will delay recovery of the stock.

Sources of Information: SCR Doc. 00/33, SCS Doc. 01/9, 11, 15.

iii) **By-catch of yellowtail flounder in Div. 3LNO**

Canada requested Scientific Council: *noting the increase in by-catch of 3LNO yellowtail flounder in other fisheries, in particular the skate fishery the Scientific Council is requested to comment on the potential impacts of these by-catches on the long-term sustainability of the yellowtail flounder resource.*

The Council noted that total catches of yellowtail flounder have been above the TAC in all years since the fishery re-opened: 9% in 1998 and 1999 and 11% in 2000. Scientific Council reiterates its concern that all removals (directed plus by-catch) above the advised catch will result in higher fishing mortality than intended. This will result in an immediate loss in yield available for the next fishing year and, if maintained, could impact the long-term sustainability of the resource.

iv) **By-catch of American plaice in Div. 3LNO**

Canada requested Scientific Council:

Based on information available to date regarding the 2000 fisheries in the NAFO Regulatory Area, there appears to be significant discrepancies regarding by-catches of American plaice between observer reports and the STATLANT 21A information. Scientific Council is requested to review all available information and provide the best estimate of actual by-catch removals of American plaice in the NRA. Further, the Scientific Council is requested to comment on the potential impacts of these by-catches on the recovery of the resource. This will require that national scientists analyze their respective observer reports for the 2000 fishery and bring results to the June Scientific Council meeting for discussion.

Scientific Council noted that estimates of the catch of American plaice in 2000 in Div. 3LNO ranged from about 2 400 tons as reported on STATLANT 21A forms compared to an agreed best estimate of catch used in the assessment of about 5 200 tons. Based on the assessment, this agreed catch translated into a fishing mortality of 0.25; about double that which would have been estimated had the STATLANT 21A data been accepted.

Scientific Council is very concerned about this level of fishing mortality as the spawning stock biomass is predicted to decline in coming years if this high exploitation rate continues. Even with a reduction in fishing mortality by 50%, the stock is projected to increase only at a slow rate.

Based on available information, Scientific Council is also concerned that an increasing portion of the American plaice catch from Div. 3LNO is being taken as a result of directed fishing activities rather than as unavoidable by-catch in fisheries directed for other species. As noted above, the increasing catches are having a negative impact on the recovery of this resource and Scientific Council **recommended** that *Fisheries Commission take all possible steps to ensure that by-catches of American plaice are reduced significantly and restricted to true and unavoidable by-catches in fisheries directed for other species.*

v) **Redfish in Div. 1F**

The Council noted the request from Canada on redfish in Div. 1F and responded to it in conjunction with a related special request from the Fisheries Commission (see above Section VII.1.C.vii on page 33).

b) **Request by Denmark (Greenland) for Advice**

i) **Redfish and other finfish in Subarea 1**

In the Scientific Council Report of 1999, in response to requests from Denmark (Greenland) the Scientific Council provided 2year advice (for 2000 and 2001) for redfish and other finfish in Subarea 1. The following are in response to requests for advice in 2002 and 2003.

The Council noted that the redfish resource in Subarea 1 stated in the Denmark (Greenland) request will be referred to by the Scientific Council in future as **demersal redfish**.

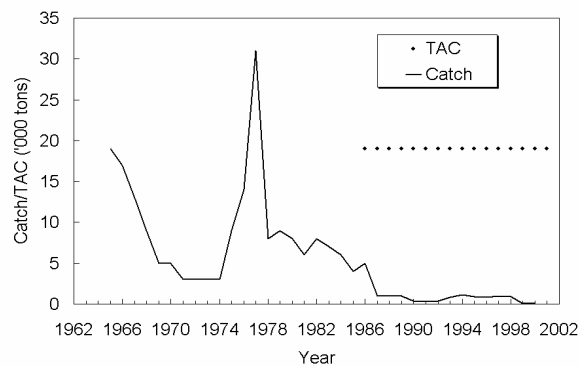
Demersal Redfish (*Sebastes spp.*) in Subarea 1

Background: There are two species of commercial importance in Subarea 1, golden redfish (*Sebastes marinus*) and deep-sea redfish (*Sebastes mentella*). Relationships to other North Atlantic redfish stocks are unclear.

Fishery Development and Catches: During the last decade, redfish were taken mainly as by-catch in the trawl fisheries for cod and shrimp. Both redfish species golden redfish and deep-sea redfish were included in the catch statistics since no species specific data were available. Recent catch figures do not include the weight of substantial numbers of small redfish discarded by the trawl fisheries directed to shrimp.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Autonomous
1998	0.9	ndf	19
1999	0.1	ndf	19
2000	0.2	ndf	19
2001		ndf	19

¹ Provisional.
ndf No directed fishing, by-catch be at the lowest possible level.

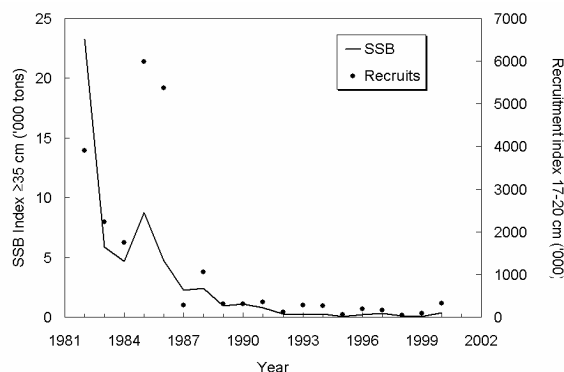


Data: No data on commercial CPUE were available. Spawning stock biomass and recruitment indices were calculated based on EU-Germany groundfish surveys.

Assessment of Golden Redfish: No analytical assessment of *Sebastes marinus* was possible.

Recruitment: Recruitment index has been low during the last decade.

SSB: SSB index has remained at a historical low since 1989.

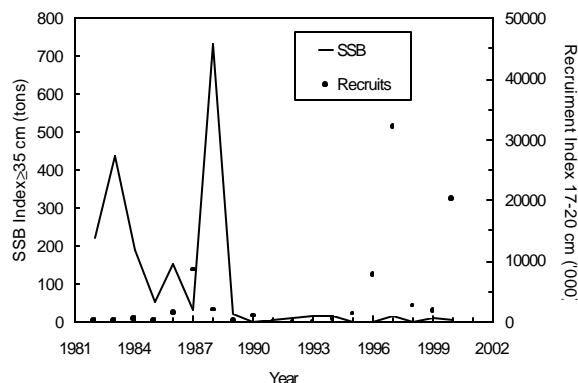


State of the Golden Redfish Stock: The stock of golden redfish in Subarea 1 remains severely depleted. There are indications that the probability of future recruitment is reduced at the current low SSB. Short-term recovery is very unlikely.

Reference Points: Based on available data, there appears to be a very high probability of decreased recruitment below SSB levels of 5 000 tons.

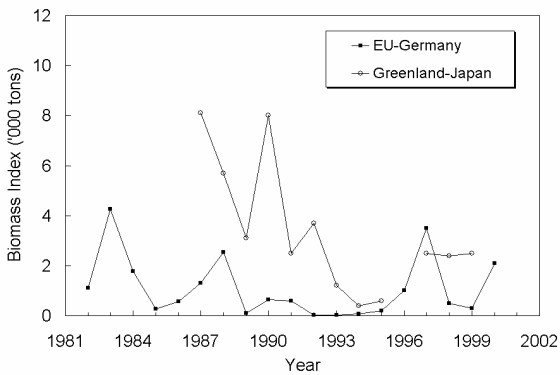
Assessment of Deep-sea Redfish: No analytical assessment of *Sebastes mentella* was possible.

Recruitment: Variation in recruitment indices is high, and the 1997 and 2000 estimates were considerably above average, the former one representing the maximum of the time series.



SSB: SSB index remained at the historical low level since 1989.

Biomass: Total stock biomass indices increased have been at very low level in 1998-99 but increased in 2000. The stock is composed of mostly immature fish.



Reference Points: Scientific Council is not in a position to propose reference points at this time.

State of the Deep-sea Redfish Stock: The spawning stock of deep-sea redfish in Subarea 1 remains severely depleted, and an increase is unlikely in the short term.

Recommendation for Golden and Deep-sea Redfish Stocks: No directed fishery should occur on redfish in Subarea 1 in 2002 and 2003. By-catches in the shrimp fishery should be at the lowest possible level.

Special Comments: The probability of recovery of the redfish stocks in Subarea 1 would be enhanced if the by-catch of demersal redfish taken in the shrimp fishery were significantly reduced. The introduction of mandatory sorting grids on 1 October 2000 will probably reduce this by-catch.

Sources of Information: SCR Doc. 01/15, 23, 35; SCS Doc. 01/13, 21.

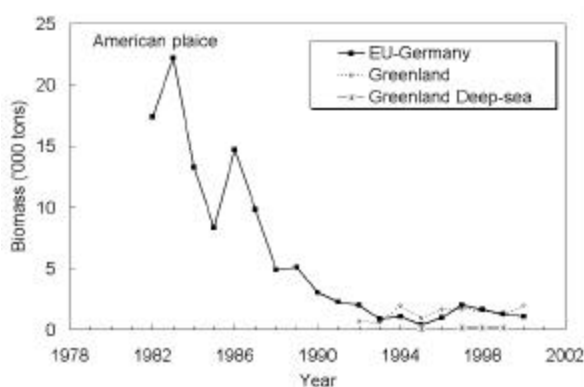
Other Finfish in Subarea 1

Background: The resources of other finfish in Subarea 1 are mainly Greenland cod (*Gadus ogac*), American plaice (*Hippoglossoides platessoides*), Atlantic and spotted wolffishes (*Anarhichas lupus* and *A. minor*), thorny skate (*Raja radiata*), lumpsucker (*Cyclopterus lumpus*), Atlantic halibut (*Hippoglossus hippoglossus*) and sharks. No recommendations can be made for Greenland cod, lumpsucker, Atlantic halibut and sharks.

Fishery Development and Catches: Greenland cod are taken inshore by directed fisheries. Other species are mainly taken as by-catch offshore in trawl fisheries directed to shrimp, cod, redfish and Greenland halibut. In 2000, reported catches of other finfishes amounted to 3046 tons, representing a decrease by about 2 000 tons, compared to the 1999 catch (4 983 tons). This was mainly caused by a lack of catch figures for Greenland cod. The catch figures do not include the weight of fish discarded by the trawl fisheries directed to shrimp.

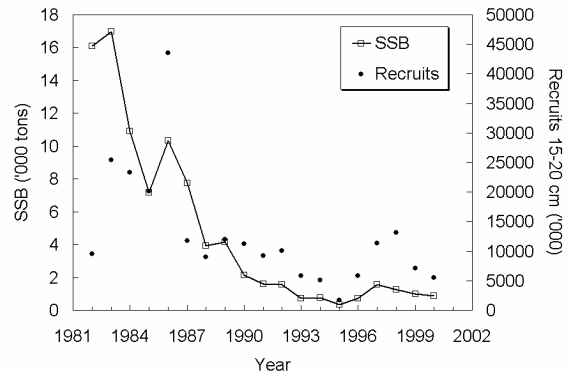
Data: No data on CPUE, length and age composition of the catches were available. Length frequencies were derived from the Greenland bottom trawl surveys. Assessments of recent stock abundance, biomass, and length structure for these stocks were based on annual bottom trawl surveys conducted by EU-Germany and Greenland. Spawning stock biomass and recruitment indices for American plaice and Atlantic wolffish were derived from EU -Germany survey data.

Assessment of American plaice: No analytical assessment was possible.



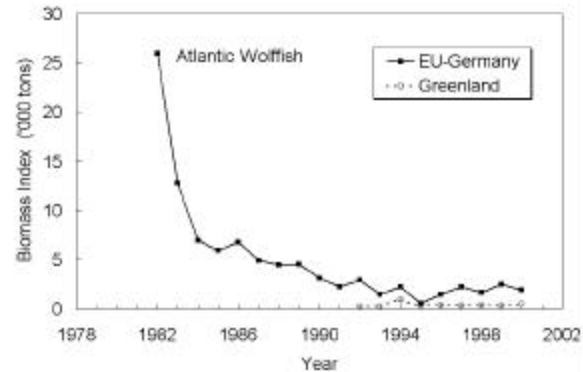
Recruitment: Indices have been low since the late-1980s with an increase to the average level in 1997-98 and values below average in 1999 and 2000.

SSB: During 1982-91, the SSB index decreased drastically to a very low level without a significant increase since then.



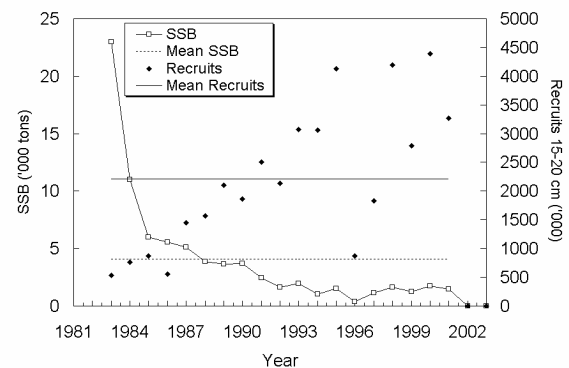
State of the American plaice stock: The stock remains severely depleted.

Assessment of Atlantic wolffish: No analytical assessment was possible.



Recruitment: Index increased steadily since the 1980s but varied considerably since 1995.

SSB: Since 1982, the SSB index decreased drastically and remained severely depleted since the early-1990s.

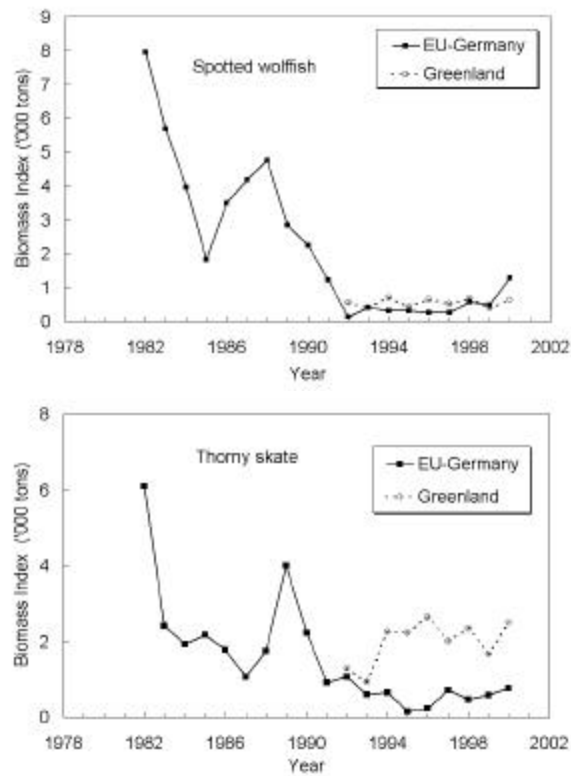


State of the Atlantic wolffish stock: The stock remains severely depleted despite a steady increase in recruitment since the early-1980s.

Assessment of spotted wolffish and thorny skate: No analytical assessment was possible.

Sources of Information: SCR Doc. 01/17, 23, 35; SCS Doc. 01/13, 21.

Biomass Indices: Survey results revealed dramatic declines for spotted wolffish and thorny skate to a very low level.



State of the stocks of spotted wolffish and thorny skate: The stocks of spotted wolffish and thorny skate remain severely depleted.

Recommendation for the stocks of American plaice, Atlantic wolffish, spotted wolffish and thorny skate: No directed fishery in Subarea 1 for American plaice, Atlantic wolffish, spotted wolffish and thorny skate should occur in 2002 and 2003. By-catches of these species in the shrimp fisheries should be at the lowest possible level.

Reference Points: For all these stocks, Scientific Council is not in a position to propose reference points at this time.

Special Comments: The probability of recovery of these stocks would be enhanced if the by-catch taken in the shrimp fishery is significantly reduced. The introduction of mandatory sorting grids on 1 October 2000 will probably reduce this by-catch.

ii) **Roundnose grenadier in Subareas 0 and 1**

The Scientific Council was requested by Denmark (Greenland) to: *continue to monitor the status of roundnose grenadier in Subareas 0 and 1.*

It was noted Scientific Council provided 3-year advice (for 2000-2002) for roundnose grenadier in Subareas 0+1 in 1999. The Scientific Council reviewed the status of this stock at this June 2001 Meeting and found no significant change in status. Therefore, the Scientific Council has not provided updated/revised advice for 2002 for this stock. The next Scientific Council assessment of this stock will be in 2002.

iii) **Distribution of biomass of Greenland halibut between SA 0 and SA 1**

Denmark (Greenland) requested the Scientific Council to: *in its 1993 report, the Scientific Council noted that the offshore component of Greenland halibut was distributed equally between Subareas 0 and 1. The Council is asked to up date the information on the distribution of Greenland halibut and provide advice on allocation of TACs to Subareas 0 and 1 offshore.*

The Council responded:

In 1999 Canada conducted a survey in Div. 0A in which the biomass was estimated at 83 000 tons. There have been no surveys covering Div. 1A. In 2000 Canada conducted a survey in Div. 0B where the biomass was estimated at 56 000 tons. A similar survey in Div. 1CD in 2000 estimated the biomass at 59 000 tons. Based on the surveys in 1987, 1988, and 1990 (*NAFO Sci. Coun. Rep.*, 1993, p. 98) and the recent surveys in Div. 0B and Div. 1CD, the biomass seems to be distributed approximately 50:50 between the two Subareas 0 and 1. There are planned surveys that will cover SA 0 and Div. 1A-1D in 2001.

iv) **Greenland halibut in Div. 1A inshore**

The Scientific Council was requested by Denmark (Greenland) to: *provide advice on allocation of TACs distributed in areas of Ilulissat, Uummamannaq and Upernavik.*

The Council considerations are as given below.

Greenland Halibut (Reinhardtius hippoglossoides) in Division 1A, inshore

Background: The inshore stock is dependent for recruitment on immigration from the offshore nursery grounds in Div. 1A and 1B and the spawning stock in Davis Strait. Only sporadic spawning seems to occur in the fjords, hence the stock is not considered self-sustainable. The fish remain in the fjords, and do not appear to contribute back to the offshore spawning stock. This connection between the offshore and inshore stocks implies that reproductive failure in the offshore spawning stock for any reason will have severe implications for the recruitment to the inshore stocks.

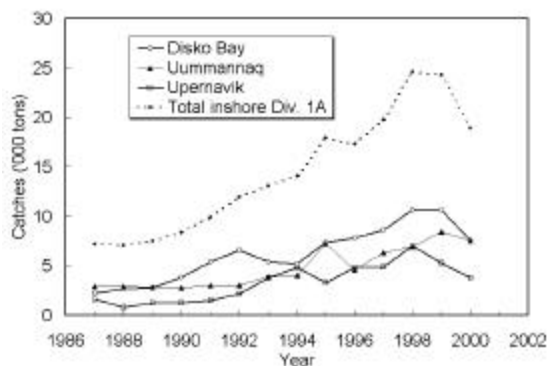
Fishery and Catches: The fishery is mainly conducted with longlines and to a varying degree gillnets. Total catches in all areas have increased from 8 000 tons in the late-1980s increasing to greater than 20 000 since 1998.

		Catches ¹ (‘000 tons)	TAC (‘000 tons) Recommended
Disko Bay	1998	10.7	- ²
	1999	10.6	7.9
	2000 ³	7.6	7.9
	2001		7.9
Uummannaq	1998	6.9	- ²
	1999	8.4	6.0
	2000 ³	7.6	6.0
	2001		6.0
Upernavik	1998	7.0	- ²
	1999	5.3	4.3
	2000 ³	3.8	4.3
	2001		4.3

¹ Provisional.

² No TAC advised before 1999.

³ The total catches are likely to have been underestimated by about 2 000 tons in Div. 1A inshore total.



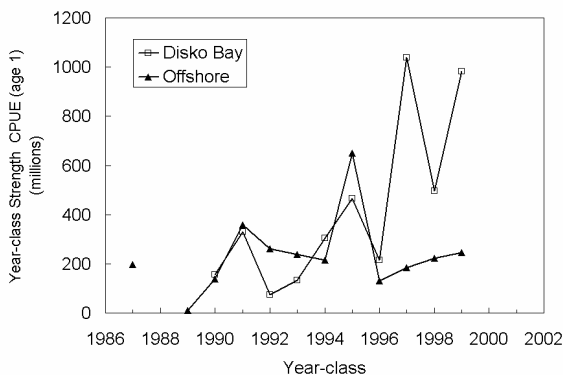
Data: Catch data available at the time of the assessment were very preliminary and are likely to have been underestimated by about 2000 tons. Catch-at-age data were available for years 1988-2000 at Disko Bay, and for most years in this period at Uummannaq and Upernavik. Data on mean length in commercial catches were available. A recruitment index for age 1, 2 and 3+ was available from trawl survey. Catch rates and mean lengths were available from inshore longline surveys.

Assessment: The stock component in Disko Bay is composed of younger and smaller individuals than in the other two areas. Survey results since 1993 do not indicate any major changes in abundance. Mean length composition in the survey has been stable in recent decade. The survey in 2000 did, however, show a decline in mean length in Torssukataq (northern part of Disko Bay). In the commercial fishery the mean length in the summer fishery has been relatively stable while an increase has been observed in the winter fishery.

In Uummannaq survey results since 1993 do not indicate any major changes in abundance. Catch composition in the commercial fishery has changed significantly since the 1980s towards a higher exploitation of younger age groups, but have stabilized during latest years.

In Upernavik survey results for 1993-99 do not indicate any major changes in abundance but the 2000 survey indicated a reduction. Mean length compositions in both commercial and survey catches have decreased, especially in the commercial winter-fishery. New fishing grounds north of 73°45'N have been exploited only recently. Little information exists from these areas, and the stock components are considered virgin.

Fishing mortality: Estimate of fishing mortality in Disko Bay has shown a generally increasing trend from late-1980s to present. In Uummannaq and Upernavik fishing mortality could not be estimated but based on the increase in catches there is indication of an increase in fishing mortality.



Recruitment: Both offshore and in Disko Bay the numbers of one-year-olds from the 1999 year-class were above average. In Disko Bay it was the second highest on record. The 1997 year-class that was very strong inshore was not above average at age 3. A linkage between the recruitment at age 1-3 and the subsequent recruitment to the inshore fishery at age 6-7 have however not yet been established due to the short time series.

State of the Stock: The age compositions in catches in all three areas have been reduced to fewer age groups compared to the early-1990s and the stock has thus become more sensitive to incoming year-classes.

Disko Bay: Indices of abundance have been relatively stable since 1993. Stock structure has also been stable although it consists of relatively few and young age groups compared to before 1990.

Uummannaq: Indices of abundance have been relatively stable since 1993. Stock structure has since the mid-1990s moved towards younger and fewer age groups but have stabilized in recent years.

Upernavik: Stock structure has since the mid-1990s moved towards younger and fewer age groups in the traditional fishing areas around Upernavik and up to 73°45'N (Giesecke Ice fjord). In the northern parts of the district, where new fishing grounds are exploited, data are insufficient to determine the status of the resource.

Recommendation: Scientific Council still considers that separate TACs are appropriate for each of the three areas.

Assessments indicate that there has been no improvement in stock status in any of the three areas. Therefore, Scientific Council concludes that there be no change in the TACs recommended for 2000. The TAC for 2001 for each of the inshore areas are

therefore recommended to be: Disko Bay 7 900 tons, Uummannaq 6 000 tons, and Upernavik 4 300 tons.

Reference Points: Scientific Council is not in a position to propose reference points.

Special Comments: The TAC values above were proposed in the 1998 Scientific Council report to prevent escalating effort and are based on the average catches for 1995-97

The lack of effort data from the commercial fishery impedes the assessment of the stocks.

Because the stock is dependent on recruitment from Davis Strait, exploitation of the spawning stock and by-catches in the shrimp fishery should be taken into account when managing the fishery in the fjords.

Sources of Information: SCR Doc. 01/35, 48, 68; SCS Doc. 01/23.

c) **Request by Canada and Denmark (Greenland) for Advice on TACs and Other Management Measures**

The Scientific Council was requested by the Coastal States Canada and Denmark (Greenland) to: *provide advice for certain stocks*. This section presents the stock for which the Scientific Council provided advice for the year 2002.

Scientific Council noted the request usually makes reference to Greenland halibut in Subareas 0 and 1. The Council noted that the specific stock area to be addressed under this request is Greenland halibut in Subarea 0 offshore, Div. 1A offshore and Div. 1B-1F. The Council considerations are as given below.

Greenland Halibut (*Reinhardtius hippoglossoides*) in Subarea 0 + Division 1A Offshore and Divisions 1B-1F

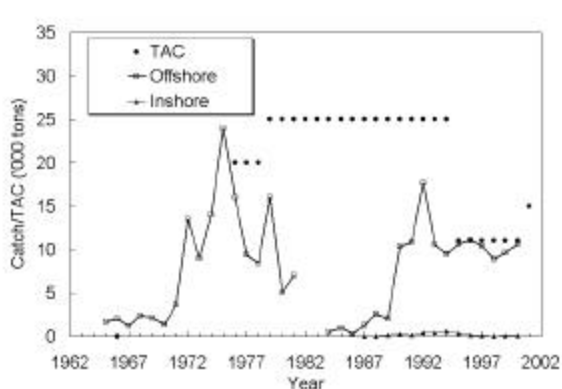
Background: The Greenland halibut stock in Subarea 0 + Div. 1A offshore and Div. 1B-1F is part of a common stock distributed in Davis Strait and south to Subarea 3.

Fishery and Catches: Due to an increase in offshore effort, catches increased from 2 000 tons in 1989 to 18 000 tons in 1992 and have remained at about 10 000 tons annually since.

	Catch ¹ (‘000 tons)	TAC (‘000 tons)	
		Recommended	Autonomous
1998	9	11	11
1999	10	11	11
2000	11	11	11
2001		15 ²	

¹ Provisional.

² Including 4 000 tons allocated specifically to Div. 0A and 1A.

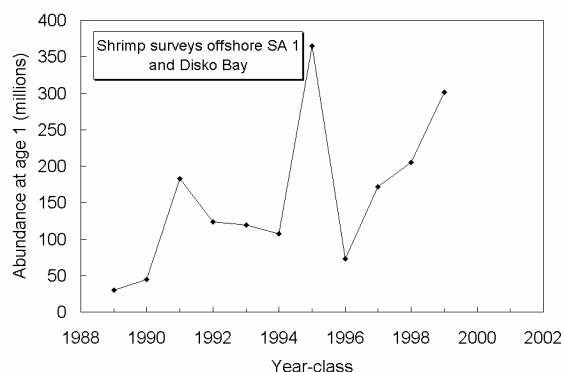


Data: Catch-at-age data were available for assessment from SA 0 and Div. 1CD. Standardized and unstandardized catch rates were available from Div. 1CD. Biomass estimates were available from surveys in Div. 1CD and 0B. Recruitment data were available from surveys in Div. 1A-1F from 1989-2000.

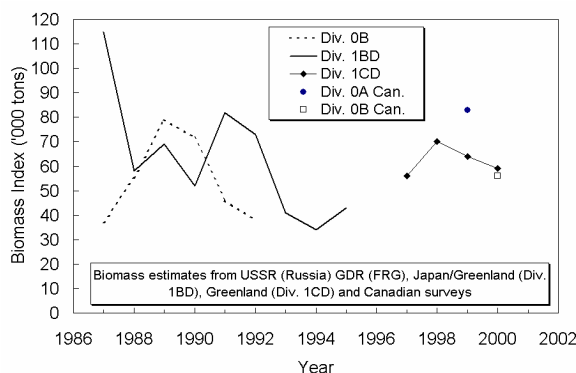
Assessment: No analytical assessment could be performed. Combined standardized catch rates for SA 0 + Div. 1CD have been stable during 1990-2000.

Fishing Mortality: Level not known.

Recruitment: Recruitment of the 1999 year-class at age one was the second largest in the time series.



Biomass: The biomass in Div. 1CD has decreased since 1998 but the 2000 estimate is above the estimate in 1997. A new survey in Div. 0B resulted in a biomass estimate of 56 000 tons.



State of the Stock: The age composition in the catches where most of the fishery takes place has been stable in recent years. Although the survey series from Subarea 1 in 1987-95 is not directly comparable with the series from 1997-2000, the decline in the stock observed in Subarea 1 until 1994 has stopped and the stock seems to be back at the level in the late-1980s and early-1990s.

Recommendation: The TAC for year 2002 should not exceed 11 000 tons for Div. 0B and 1B-1F where the fishery primarily has taken place since it began.

Special Comments. The relationship between Greenland halibut in Div. 0A + 1A (offshore) and the remaining areas needs to be resolved. In June 2000 Scientific Council recommended an additional TAC of 4 000 tons for Div. 0A + 1A offshore based on recent survey results. No new information was available at this meeting to update this advice.

Reference Points: Scientific Council is not in a position to propose reference points at this time.

Sources of Information: SCR Doc. 01/23, 35, 42, 43, 48; SCS Doc. 01/11, 13, 15, 21.

3. **Scientific Advice from Scientific Council on its Own Accord.**

a) **Roughhead Grenadier in Subareas 2 and 3**

The Scientific Council on its own accord considered roughhead grenadier in Subareas 2 and 3.

Based on information available the Council noted that the state of the stock is unknown and is therefore not able to provide advice at this time. The next Scientific Council assessment of this stock should be in 2003.

b) **Elasmobranchs**

The Council agreed to defer this discussion to its September 2001 Meeting.

VIII. FUTURE SCIENTIFIC COUNCIL MEETINGS 2001 AND 2002

1. **Scientific Council Meeting and Special Session, September 2001**

The Council reconfirmed that the Annual Meeting will be held during 17-21 September 2001 in Varadero, Cuba. The Scientific Council Special Session, the Symposium on "Deep-sea Fisheries" will be held during 12-14 September 2001 at the same venue.

2. **Scientific Council Meeting, November 2001**

The Council reconfirmed its meeting on northern shrimp will be held during 7-14 November 2001, at NAFO Headquarters, 2 Morris Drive, Dartmouth, Nova Scotia, Canada.

3. **Scientific Council Meeting, June 2002**

The Council confirmed the Scientific Council Meeting will be held during 6-20 June 2002, at Alderney Landing, 2 Ochterloney Street, Dartmouth, Nova Scotia, Canada

The Council agreed the facilities at this venue were suitable for the meeting, however, it was agreed an audio system was needed to overcome the acoustic difficulties of the meeting room. The Council also agreed that a computer projector hooked onto the server was required. The Secretariat was requested to attend to these requirements for the June 2002 Meeting.

4. **Scientific Council Meeting and Special Session, September 2002**

The Council noted the Annual Meeting will be held during 11-20 September 2002 in Spain, but the meeting site had not been announced yet. The Scientific Council Special Session, the Symposium on "Elasmobranch Fisheries" (the exact title may change), will be held during 11-13 September 2002 at the same venue.

5. **Scientific Council Meeting, November 2002**

The Council confirmed its meeting on northern shrimp will be held in Nuuk, Greenland. The meeting dates and site will be finalized during the Scientific Council Meeting on northern shrimp in November 2001.

IX. ARRANGEMENTS FOR SPECIAL SESSIONS

1. Progress report on Special Session in September 2001: Symposium on "Deep-sea Fisheries"

The co-conveners, J. Moore (NAFO/USA), J. Gordon (ICES/EU-United Kingdom) and T. Koslow (CSIRO/Australia), reported significant progress in the preparations for the Symposium on "Deep-sea Fisheries", to be held during 12-14 September 2001 in conjunction with the 17-21 September 2001 Annual Meeting in Varadero, Cuba.

A total of 55 papers for oral presentations and 63 papers for poster presentations have been accepted for the Symposium. Abstracts for all of these papers, currently being edited for the Abstract Booklet, will be issued at the Symposium.

The sessions are now set up and the entire schedule for the meeting arranged. The schedule will include the following themes:

- Deepwater fisheries, Part I
- Greenland halibut
- Impacts, assessments and management
- Biology of life histories
- Deepwater fisheries, Part II
- Redfish
- Fisheries ecology

Keynote presentations will be made by: R. L. Haedrich (Canada) for deepwater fisheries, T. Koslow for biology and life histories, M. Clark (New Zealand) on assessments and management, and J. D. M. Gordon for fisheries ecology.

The complete schedule with listed papers will be posted on the NAFO Website shortly.

2. Progress report on ICES/NAFO Symposium on Hydrobiological Variability in August 2001

The Council noted STACFEN addressed and reported on this item (see Appendix I, item 10, page 68)

3. Progress report on Special Session in 2002: the Symposium on "Elasmobranch Fisheries"

The Co-conveners reported significant progress in designing this Symposium. The organizer, D. Kulka (Canada) confirmed the participation of co-conveners M. Pawson (replacing Paddy Walker) (ICES), J. Musick, Virginia Institute of Marine Science (VIMS), USA, and T. Walker, Marine and Freshwater Resources Institute (MFRI), Australia. An appropriate title for the Symposium and the formulation of the theme sessions were being discussed. The following tentative themes have been identified: a) stock identity (in relation to assessment and management), or b) stock identity and structuring shark, skate, ray and chimaera populations, c) application of analytical models to assess the status of stocks in relation to sustainable exploitation d) methods for assessment, monitoring, and management of fisheries for sustainable and rational harvest, or methods for rapid assessment of by-catch species and for biodiversity conservation, e) species identification in relation to the collection of catch etc. statistics from fisheries, f) vulnerability of "low reproductive" elasmobranch stocks to exploitation, g) status of elasmobranchs worldwide or description of fisheries worldwide, h) biology of elasmobranchs, and i) status of chondrichthyan fisheries of the world. Further to input from the Scientific Council, these will be finalized shortly. Suggested titles for the Symposium: a) The Foundations of Elasmobranch Stock Recovery Plans, or b) Elasmobranchs - Biology and Exploitation.

The Council noted NAFO Symposia are held in conjunction with the Annual Meetings of NAFO, and are considered as part of the Scientific Council meeting and called Scientific Council Special Sessions. In some years, events such as Scientific Council Workshops (e.g. in 2000) are included. Therefore, they are part of the NAFO Annual meeting budget each year.

The NAFO budget covers the costs of the meeting space and infrastructure including computer and other equipment. This also includes preamble material such as announcements, flyers, and communication with participants and publication of Abstracts. It is noted that Symposium reports are presented to the Scientific Council along with all papers (issued as SCR Documents) during the following week and all these records are archived at NAFO along with the Scientific Council Reports.

Post-symposium expenses relate to publications – usually Journal or Studies. Here too the NAFO budget usually anticipates and accommodates a standard (sized) publication (up to about 300 pages, and around 100 participants). However, more popular symposia (e.g. "Deep-sea Fisheries" in 2001) may warrant additional financial support. In such situations, the Scientific Council proposed that the Journal issue be sold to all participants. The proposed cost per volume could be about \$35.00 for a book of up to about 300 pages and about \$45.00 for larger books, noting that usual NAFO recipients of the book will continue to receive it.

A significant budget item that is not covered by NAFO is the support for "invited", "keynote" or such speakers (usually those from outside the NAFO participant circles). In recent years the Scientific Council has made special requests for such expenses (e.g. \$8 000 for the 2001 Deep-sea Fisheries Symposium). The Scientific Council **recommended** that *a sum of \$8 000 from the budget be requested for the Elasmobranch Symposium*. Additionally, the Scientific Council requested co-convenors to seek financial support from other sources including NGOs and Government Institutes (using the experience of the Shrimp Symposium in 1999).

4. **Topic for Special Session in 2003**

The Council recalled its discussion of 1998 on a proposal for a Symposium on "Managing Marine Ecosystem Variability in the NAFO Area" prepared by a steering committee composed of S. J. Walsh (Canada), O. R. Godø (Norway) and M. Stein (EU-Germany). The Council noted this proposal was postponed then, in consideration of some Canadian initiatives on this theme.

The Council agreed to review the status of the Canadian initiatives and consider the suitability of this symposium topic for 2003, during its meeting in September 2001. The Council requested S. J. Walsh to research and report on this item noting that any proposal for 2003 should be finalized in September 2001 to ensure there would be adequate lead time for preparation.

X. REPORT OF THE WORKING GROUPS

1. **Working Group on Reproductive Potential**

Working Group Chairman, E. A. Trippel (Canada), presented the progress report of the Working Group activities. The Council was informed:

The 1st meeting of the NAFO Scientific Council Working Group on Reproductive Potential was held during 10-13 October 2000 at the Aquarium, San Sebastian, Spain and was hosted by AZTI. There were 14 participants from Canada, Denmark, Germany, Norway, Russia, Spain and the United States of America. Co-leaders of the four Terms of References (ToR) made presentations on the progress made and subsequent plans.

ToR 1: Co-leaders presented a preliminary version of four tables designed for the inventory of data on reproductive potential for marine fish stocks. The four tables comprised (i) available data for a specific stock; (ii) information on data format and quality, (iii) studies on reproductive potential, and (iv) data sources.

ToR 2: Co-leaders updated Working Group members on the necessary procedures used to estimate egg and larval production of fish stocks. Establishment of categories of reproductive biology of the species was made and protocol to estimate fecundity were identified respective to reproductive style (e.g. determinate spawner, batch spawner, etc.). An overview was presented of techniques used to estimate fecundity and egg quality of captive fish.

ToR 3: Co-leaders presented a variety of alternative methods used to measure fecundity to gain annual estimates of a stock's reproductive potential. Several body metrics that showed promise included condition factor and liver index. These could possibly be used to build long time series of reproductive potential, even for years for which no ovary collections were made for fecundity.

ToR 4: Co-leaders provided information on several approaches that could be used to include reproductive data in fisheries management advice. This group recommended that case studies be developed for data rich, data moderate and data poor stocks to reflect the wide variety of data available on reproductive potential. A comparison of the relative merit of using different proxies to estimate reproductive potential was suggested, especially as some data requirements are less tedious yet produce important predictive power.

The Working Group considered publications and next meeting. Participants endorsed the view to prepare material for the primary publication, and proposed a special volume of the *NAFO Journal of Northwest Atlantic Fishery Science*. Co-leaders of ToR 1 also agreed to submit a comprehensive set of tables for the proposed publication in the *NAFO Scientific Council Studies*, as well as prepare a summary manuscript for the *Journal*. The Working Group agreed a compilation of data relevant to ToR 1 would be particularly useful and provide an authoritative assemblage of data for many marine stocks of the North Atlantic and Baltic Sea.

In February 2001, the Working Group agreed that a 2nd Meeting of the Working Group on Reproductive Potential be held from 23-26 October 2001, at the Institute of Hyprorybflot, St. Petersburg, Russia. The focus of the meeting would be on critical review of manuscripts and their integration for a special volume. Working Group Members worked by correspondence with an update forwarded to the Chairman on 1 March 2001.

The Working Group Chairman reported that over the next several months, each manuscript is being completed for the 2nd Working Group Meeting. ToR Co-leaders are to discuss with their participants any problems in the meeting of deadlines. The Chairman requested that the view of the Scientific Council be sought with regard to publication of the suggested material. Editorial duties are proposed to be the responsibility of the Working Group Chairman, with publication year set as 2002.

The Scientific Council was pleased with the progress and the scientific value of the information being compiled as presented on 31 May 2001 by the Working Group Chairman. The Council agreed that the comprehensive Tables of ToR 1 be placed on the NAFO Website, with the eventual possibility of their becoming interactive and updated with new data as they become available for various stocks. The Scientific Council noted the relative importance of male reproductive potential to that of the female and inquired whether this would be accommodated in the report. Paternal relative to maternal reproductive potential is less studied, though the information that exists will be noted and appropriate methodology given.

The Council noted that STACPUB reviewed and agreed to the proposal for two publications and **endorsed** the recommendation that *the collection of papers being prepared by the Working Group on Reproductive Potential be edited by the Working Group Chairman, E. A. Trippel (Canada), and compiled into a single issue of the Journal of Northwest Atlantic Fishery Science during 2002*. The Council also **endorsed** the recommendation that *the list of tables designed for the inventory of data on reproductive potential for marine fish stocks be compiled into a single issue of the NAFO Scientific Council Studies in 2002 once it has been reviewed by Scientific Council*. The Council noted the Working Group Chairman would work with the Assistant Executive Secretary for this publication.

2. **Joint NAFO-ICES Working Group on Harp and Hooded Seals**

This Working Group met in October 2000 and their report, along with the ICES ACFM report dealing with this, was available to Scientific Council. The main focus of this meeting was population assessments of the harp seal stocks in the Greenland Sea, and the White Sea and Barents Sea, as well as a population assessment of the hooded seal stocks in the Greenland Sea. The Working Group is scheduled to work by correspondence in 2001, and to hold a meeting in late summer or early autumn of 2002. The Working Group has also proposed that it sponsor a population modelling workshop, to be held in the winter of 2001-2002. Current terms of reference for the Working Group include review of the recommendations from the modelling workshop, and a review of diet

and consumption studies. Scientific Council did not have any recommendations for the Working Group at this time. The Chair of Scientific Council was requested to follow up with the Chair of the Working Group regarding the workshop, and present a report to Scientific Council in September 2001.

XI. NOMINATION AND ELECTION OF OFFICERS

The Chairman's proposal (31 May 2001) to appoint a Nominating Committee composed of W. R. Bowering (Canada), M. Stein (EU-Germany) and A. Vazquez (EU-Spain) was accepted. On 14 June 2001, the Chairman requested the Nominating Committee's proposals.

The Council noted the appointments were for two-year terms beginning at the end of the September 2001 Annual Meeting and the Chairman called for nominations and elections.

Chairman Scientific Council. For the office of Chairman of Scientific Council, the current Vice-Chairman, R. K. Mayo (USA) was nominated by the Committee. There being no other nominations, the Council elected him by unanimous consent.

Vice-Chairman Scientific Council. For the office of Vice-Chairman of Scientific Council, M. J. Morgan (Canada) was nominated by the Committee. There being no other nominations, the Council elected her by unanimous consent.

Chairman STACPUB. For the office of Chairman of the Standing Committee on Publications (STACPUB), M. Stein (EU-Germany) was nominated by the Committee. There being no further nominations, the Council elected him by unanimous consent.

Chairman STACFIS. For the office of Chairman of the Standing Committee on Fisheries Science (STACFIS), D. E. Stansbury (Canada) was nominated by the Committee. There being no other nominations, the Council elected him by unanimous consent.

Chairman STACREC. The Rules of Procedure determined that the Vice-Chairman would take the office of the Chairman of the Standing Committee on Research Coordination (STACREC). M. J. Morgan (Canada) was accordingly appointed to the office.

Chairman STACFEN. For the office of Chairman of the Standing Committee on Fisheries Environment (STACFEN), E. Colbourne (Canada) was nominated by the Committee. There being no other nominations, the Council elected him by unanimous consent.

XII. REVIEW OF SCIENTIFIC COUNCIL WORKING PROCEDURES/PROTOCOLS

1. Implementation of Precautionary Approach

The Chairman noted that there had been no progress on the implementation of the Precautionary Approach since the Fisheries Commission addressed it in the winter of 2000, after it had adopted the report of the Scientific Council and Fisheries Commission Working Group.

The Fisheries Commission had in September 2000 proposed that a small group meeting in spring 2001 to consider an implementation decision. The Fisheries Commission noted much work still needed to be done, particularly with respect to terminology and the usage of Precautionary Approach at NAFO *versus* NEAFC. The Council noted its framework had not been adopted by the Fisheries Commission yet. However, the proposed spring 2001 Fisheries Commission Meeting on Precautionary Approach had not yet been held.

The Council was informed that the ICES Study Group on the Further Development of the Precautionary Approach to Fishery Management met during 2-5 April 2001 in Copenhagen to:

- a) review the current status of the Precautionary Approach (PA) as implemented by ICES.
- b) develop a framework for formulating advice by defining protocols for the establishment of:
 - i) advice in data poor situations specifically when advising on the exploitation of deepwater species
 - ii) advice in data rich situations
 - iii) recovery plans
- c) investigate the use of MSY (F_{msy} and B_{msy}) as a biological reference point.

The Council was provided with a summary of that meeting by one of the attendees (C. Darby, EU-United Kingdom). It was noted ICES has implemented conservation reference points for 63 stocks. The technical basis for the current reference point values was documented. A range of comments on their use and interpretation was discussed. The study group indicated that the current values need to be further reviewed for consistency, and a policy is required on the frequency and reasons for updating them routinely.

Using the current reference points and advice, in 1999 the ICES ACFM identified 10 stocks that were seriously depleted and had recommendations for rebuilding plans, 9 stocks that were depleted but had no recommended rebuilding plans, and a further 41 stocks that were less seriously depleted and had no recommended rebuilding plan. The study group considered that formulation of the advice could be more consistent if a criterion key was used to diagnose the state of the stocks relative to the reference points, and then used to identify the need and time scale for rebuilding plans. The approach was tested with examples.

The group reviewed historical examples of crisis management of fish stocks in the ICES area, and recent emergency negotiation of recovery plans for seriously depleted stocks in the EU. Observations and suggestions were made about the character of the process, and the need for additional scientific knowledge.

The group had insufficient time to study the problem of data poor situations generally, but looked at the problem for two examples; the deep-water species and *Nephrops* stocks. For deep-water species it was concluded that the priority was not so much to determine reference points, as to make use of existing knowledge and advice, however limited.

The study group reviewed ICES views on the possible use of MSY and $F_{0.1}$ as reference points. The group was not persuaded as to the benefits of utilizing MSY due to the difficulties in its estimation. $F_{0.1}$ was considered to be a robust estimator that could be used as a reference point across a range of species and life history types.

2. NAFO Scientific Council Observership at ICES ACFM Meetings

W. R. Bowering (Canada) represented NAFO Scientific Council as the observer at the ICES, ACFM meeting during October 2000. A significant observation was the disturbing trend in declining groundfish resources in the northern part of the ICES area in the Northeast Atlantic with advice for substantial reductions in catches quotas for many stocks and moratoria advised for a number of cod stocks. There are many similarities now occurring in the ICES area with the events experienced in the NAFO area for about the past 10 years.

With concerns widely expressed throughout the North Atlantic for ecosystem based fisheries management, ICES has created a new advisory committee, Advisory Committee on Ecosystems (ACE), intended to address this issue. The Scientific Council agreed it is worth paying close attention to the progress of this committee as it may provide some insights as to how the Scientific Council may deal with similar issues in the NAFO area.

With respect to future observers from Scientific Council, the Council noted there is usually a problem with anyone attending the ACFM Meetings in May, because of the virtual overlap of those meetings with the NAFO Scientific Council Meeting.

With respect to the October 2001 Meeting of the ACFM, the Council welcomed C. Darby (EU-United Kingdom) to act as the observer and report back to Scientific Council.

3. **Summaries of Standing Committee Reports for NAFO Website**

At the June 2000 Meeting the Scientific Council agreed it should put meeting highlights on the web site after the June Scientific Council Meeting, summarizing the most important results.

The Council noted that an announcement titled "Meeting Highlights" should be put together by the Chairmen of STACFIS, STACFEN, STACREC and STACPUB and adopted by Scientific Council. It should be published on the web site together with the Scientific Council Reports and placed under "What's New/ Recent Events" on the web site.

Basically it should be short and only include information on stocks where the advice has been changed compared to the year before and a short update of the environmental conditions in the Northwest Atlantic. If there is any relevant new information from STACPUB and STACREC it should also be included.

The Scientific Council Chairman was requested to prepare a relevant summary, to be installed by the Secretariat on the website with links to the meeting report.

4. **Website and Technology Issues**

The Chairman reported that he had some discussions with the Fisheries Commission Chair. Scientific Council noted that no Working Group has been established as per its recommendation. They had noted that some Fisheries Commission information was already in the website content, particularly with respect to Annual Report of NAFO, Conservation and Enforcement Measures, etc. However, unlike the practice of the Scientific Council, Fisheries Commission Reports do not get finalized for public issuance for long periods after meetings. Additionally, General Council and Fisheries Commission Committee reports from intersessional meetings need to be adopted by the Constituent Bodies during the Annual Meeting.

The Council considered the possibility of publishing some approved reports and documents on the website, and noted that further discussion by the Chairs of the Constituent Bodies should clarify this.

5. **Facilitating Workload of Scientific Council During Annual Meeting in September**

The Council highlighted its concerns as expressed in its September 2000 Meeting regarding addressing *ad hoc* requests from the Fisheries Commission during the Annual Meetings, when the Scientific Council does not have the full complement of its Designated Experts and all of the data needed.

The Council agreed that the Chair should reiterate these concerns to the Fisheries Commission.

The Council additionally discussed the general issue of re-scheduling the timetable and frequency for assessments of certain stocks.

After considerable discussion, the Council agreed that the issue of re-scheduling for the following should be addressed in September 2001 Meeting:

- Redfish in Div. 3M
- Squid in Subareas 3+4
- American plaice in Div. 3LNO
- Yellowtail flounder in Div. 3LNO

XIII. OTHER MATTERS

1. Report on Second Meeting of FAO and Non-FAO Regional Fishery Bodies, Rome, Italy, 20-21 February 2001

In accordance with the June 2000 recommendations of the Scientific Council, the Assistant Executive Secretary attended this second meeting of the Regional Fisheries Bodies (RFBs). The first one was held in February 1999. The outcome of that meeting was well received by the FAO Committee on Fisheries (COFI), and this meeting was convened based on the COFI recommendation that such meetings be held on a regular basis, preferably prior to the regular COFI Session.

The meeting elected the following:

Chairperson: Mr. Robin Allen, Director, Inter-American Tropical Tuna Commission (IATTC);
Vice-Chairperson: Mr. Estebán de Salas, Executive Secretary, Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR);
Rapporteur: Mr. Tissa Amaratunga, Assistant Executive Secretary, Northwest Atlantic Fisheries Organization (NAFO).

The meeting agreed these officers would hold office till the beginning of the 3rd Meeting of the RFBs.

Noting the meeting would generally deal with initiatives and experiences of RFBs in the implementation of international instruments such as the United Nations Convention on the Law of the Sea (UNCLOS), UN Fishstock Agreement, Compliance Agreement and Code of Conduct for Responsible Fisheries, the discussions focused on the following:

- i) External factors that may impact the work of RFBs and the management of fisheries (the focus was on ecosystem and environmental issues).
- ii) Indicators to assess the performance of RFBs (on criteria with respect to UNCLOS, Code of Conduct, etc.).
- iii) Review of some emerging issues in fisheries of relevance to RFBs .
 - Cooperation in global status and trends (S&T) reporting in fisheries (since the February 1999 Consultation, and subsequent IPOA)
 - Illegal, unreported and unregulated (IUU) Fishing
 - Recent developments on criteria for listing commercially exploited fish in CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna).
- iv) Opportunities and challenges for coordinating the marine RFBs and regional seas conventions:

It was highlighted that the participants of these meetings were representatives of RFB Secretariats who were not mandated for decision making at the meeting. Accordingly, comments were only presented as personal or expert advice, and it was recognized in principle the meeting is for the Secretariats of RFBs. A significant step was taken with the Chairman being requested liaise with RFB Secretariats well in advance of the next meeting in order that the RFBs could provide mandated inputs. FAO would continue to provide the Secretariat for these meetings.

It was agreed to change the title of the meeting to "Meeting of the Regional Fishery Bodies". The third Meeting was proposed for immediately after the next COFI Meeting of 2003.

The meeting was well attended with representatives from 24 RFBs, with 9 of them from FAO and 15 from non-FAO bodies. For NAFO, it was an excellent opportunity to look at global issues in respect of RFBs, to make personal contact with similar status representatives of other RFB Secretariats and learn about other RFBs. NAFO was well recognized as one of the oldest and leading RFBs with a rich history of science and management under ICNAF and NAFO.

2. **Report on Second Technical Consultation on Illegal, Unreported and Unregulated Fishing, Rome, Italy, 22-23 February 2001**

The Assistant Executive Secretary attended, this the Second Technical Consultation on Illegal, Unreported and Unregulated (IUU) Fishing in Rome, Italy, on 22 and 23 February 2001. This was a follow up to the Expert Consultation held in Sydney Australia during 15-19 May 2000, and the First Technical Consultation in Rome during 2-6 October 2000. The meeting was attended by 57 members of FAO and observers from one non-member nation of FAO. Representatives from a specialized agency of the United Nations attended as well as twelve observers from intergovernmental organizations and seven international non-government organizations. The previous Consultation Chair, Mr. A Jackson (United Kingdom) continued to Chair and the Hon. A. V. Fernández-Baca, Vice-Minister for Fisheries of Peru and Mr. M. S. O. Benaouf, Chief of Operations Service, Ministry of Fisheries from Mauritania, served as Vice-Chair of the Consultation and Rapporteur, respectively.

In the context of the Code of Conduct for Responsible Fisheries, the Consultations were to address the need to prevent, deter and eliminate IUU fishing with "a global plan of action to deal with all forms of "flags of convenience" through coordinated efforts by States, FAO, relevant regional fisheries management bodies...". The resulting technical report was due to be presented to FAO Committee on Fisheries (COFI) in 2001.

3. **Participation at FAO Committee on Fisheries (COFI)**

The Council noted that as recommended by the Scientific Council, the Assistant Executive Secretary attended the meeting of FAO and non-FAO Regional Fishery Bodies and the Technical Consultation on Illegal, Unreported and Unregulated Fishing during 20-23 February 2001 (see above). These were preparatory meetings, and held immediately prior to the COFI Meeting. Noting COFI meetings are held every two years and cover many other technical issues with respect to the UN and global fisheries, the Council considered the need to attend the COFI Meetings. The Council **recommended** that *in principal the Scientific Council saw the value of being represented at the COFI Meeting in 2003. The Council requested the Assistant Executive Secretary to keep the Council apprised of the progress and plans of COFI, and agreed that the Council will consider this matter at future meetings.*

4. **Report on NAFO Intersessional Meetings**

The Council noted NAFO intersessional meetings relevant to the work of the Scientific Council were those mainly on Observer Protocol and Conservation of Enforcement Measures addressed by STACTIC (27-29 June 2000 and 1-3 May 2001), and on pelagic redfish in the NAFO/NEAFC area addressed under the aegis of the Fisheries Commission (13-14 February 2001 and 27-29 March 2001). The meeting on the Precautionary Approach as proposed for spring 2001 by the Fisheries Commission in September 2000 has not been held yet.

The Council noted relevant information from these intersessionals were addressed and reported under the appropriate agenda items of this meeting.

5. **Other Business**

a) **STACPUB Sessions at Plenary**

The Council was requested to consider this item by STACPUB.

The Council discussed the desirability of conducting STACPUB business in sessions open to all participants of the Scientific Council. It was particularly noted that in recent years some subjects discussed at STACPUB should be open to views at the plenary.

The Council, while agreeing to open STACPUB sessions, was concerned that the additional workload at plenary may affect the more pressing work of the Scientific Council and the Standing Committees, particularly STACFIS. After further review of the workloads, it was noted that agendas of all Standing Committees should be critically reviewed to eliminate overlap and duplications. The Council therefore agreed to change the format of the next June Meeting of the Scientific Council in 2002, to conduct

STACPUB business in the plenary forum in the same way STACFIS, STACREC and STACFEN conduct business.

The Council noted that the present STACPUB membership needs to be reviewed and agreed to address this issue at its meeting in September 2001.

b) **Sequential Population Analysis for Greenland Halibut**

Scientific Council recognized the substantial advances in developing sequential population models for the assessment of Greenland halibut in 1999 and 2000. However, there is still considerable uncertainty with the results of these models, and at present the results are used by Scientific Council only in an illustrative sense for *status quo* projections. To take advantage of the recent work and progress in this area a workshop should be held sometime prior to the June 2002 Scientific Council Meeting, and should consist of a group of 10-12 people, including the Designated Expert, other NAFO contributors and invited experts from outside Scientific Council. A logical venue might be the Northwest Atlantic Fisheries Centre (NAFC) in St. John's, Canada. Scientific Council **recommended** that *a workshop be held with a focus on sequential population analysis for the Greenland halibut stock in Subarea 2 and Div. 3KLMO. To assist with the cost of conducting this workshop, \$3 000 in funding be sought from the NAFO budget.*

c) **Further Developments on Observer Program**

At the June, 2001 Meeting, STACREC noted the need for further communication between the Scientific Council and the Fisheries Commission to address issues relating to the Program for Observers and Satellite Tracking.

Scientific Council requested the Chair to communicate with the Fisheries Commission Chair to address: 1) Representation of Scientific Council at the September 2001 STACTIC Meeting, 2) Inclusion of Scientific Council issues on the September 2001 STACTIC Meeting agenda regarding: i) resolving the inconsistency between sections 3b) and 3d) of the Conservation and Enforcement Measures Part VI, Program for Observers and Satellite Tracking, and ii) continued discussion of the development of a training and operation manual for the collection of scientific data.

d) **Geostatistics Methodology for Studying Fish Stocks**

The Scientific Council noted that the recent promising developments in geostatistic methods for studying fish distribution and abundance. The Council agreed this matter be further reviewed at its meeting in September 2001, including the possibility of conducting a workshop on this topic.

XIV. ADOPTION OF COMMITTEE REPORTS

The Council, during the course of the meeting, received summary presentations of the Standing Committee Reports, with focus on the recommendations. Having considered each recommendation and also the text of the reports, the Council during the concluding session on 14 June 2001 **adopted** the reports of STACFEN, STACREC, STACPUB and STACFIS. It was noted that some text insertions and modifications as discussed at the Council plenary will be incorporated later by the Chairman and the Assistant Executive Secretary.

XV. SCIENTIFIC COUNCIL RECOMMENDATIONS TO GENERAL COUNCIL AND FISHERIES COMMISSION

The Council Chairman undertook the task of addressing the relevant recommendations from this meeting report to submit them to the General Council and Fisheries Commission, and initiate communications as required.

XVI. ADOPTION OF SCIENTIFIC COUNCIL REPORT

At its concluding session on 14 June 2001, the Council considered the Draft Report of the Meeting, and **adopted** the report with the understanding that the Chairman and the Assistant Executive Secretary will incorporate later the text insertions related to plenary sessions of 31 May-14 June 2001 and other modifications as discussed at plenary.

XVII. ADJOURNMENT

The Chairman expressed his gratitude to the Council members for their work and co-operation during the meeting. He was especially pleased to note the excellent co-operative efforts on a number of stocks, resulting in improved assessments. Special thanks were extended to the Designated Experts and the Standing Committee Chairs for their commitment and for carrying out an extra workload during the meeting.

The Chair thanked the Assistant Executive Secretary for his work as rapporteur. The Secretariat was congratulated for its fine efforts and support during the meeting, and for providing an excellent LAN at the meeting site.

The Chair noted the Chair of STACFIS had a particular heavy workload and congratulated him for leading the Committee through efficient and thorough discussions on all stock assessments.

There being no further business, the Chairman wished everyone a safe trip home and closed the meeting.

The members of the Scientific Council extended a special thank you to the Council Chairman for a well-conducted and productive meeting.