"CONSERVATION MUST BE COMPULSORY, NOT OPTIONAL"

ANNUAL REPORT OF THE FISHERIES RESOURCE CONSERVATION COUNCIL AND CONSERVATION REQUIREMENTS FOR ATLANTIC GROUNDFISH STOCKS FOR 1998

FRCC.98.R.2
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Honourable David Anderson  
Minister of Fisheries and Oceans  
200 Kent St.  
Ottawa, Ontario  
K1A 0E6  

Dear Minister Anderson:

I have the honour to present to you the annual report of the Fisheries Resource Conservation Council (FRCC) for 1997. This report provides a summary of the work the Council has undertaken over the past year including our conservation requirements for Atlantic and Eastern Arctic groundfish stocks for 1998.

We have titled our report Conservation Must be Compulsory, Not an Option. This comes from the Council’s recently released Groundfish Conservation Framework and emphasizes the need to continue to improve the way we prosecute our groundfish fisheries. It speaks to the need to change our attitudes towards the resource including the need to build mutual trust among stakeholders, and between the fishing industry and governments. A conservation minded attitude is a prerequisite to the building of a conservation capacity.

The FRCC had a very productive year in 1997, highlighted by the release of the Council’s Report on Gear Technology in Eastern Canada in March (FRCC.97.R.1) and A Groundfish Conservation Framework for Atlantic Canada in July (FRCC.97.R.3). These reports help to bring together the work the Council has done since 1993 and provide “blueprints” for building sustainable groundfish fisheries in Atlantic Canada. We recognize that “Rome was not built in a day” but the unique opportunity to make real and lasting change provided by the closures of so many groundfish fisheries is coming to a close. Our plea to you and to the Department of Fisheries and Oceans (DFO) is to move forward quickly with the implementation of the recommendations these reports contain.

We thank you for the opportunity you have provided us to make a contribution to betterment of the Atlantic groundfish fishery.

Fred Woodman  
Chairman
CHAPTER 1: CHAIRMAN'S REPORT

The Fisheries Resource Conservation Council (FRCC) was created in 1993 to provide a more effective role in decision making for those with practical experience and knowledge of the fishery. It was established to be a partnership between governments, the scientific community and the direct stakeholders in the fishery. Its mandate is to contribute to the management of the Atlantic fishery on a sustainable basis.

This past year has been a very busy one for the FRCC. We have taken great strides to put into action the words which surround our mandate and to further the role of direct stakeholders in the decision making process. In addition to the Council’s annual work, making recommendations to the Minister of Fisheries and Oceans on conservation requirements for Atlantic groundfish stocks, the Council released two documents which offer a broader perspective on conservation and sustainability in the Atlantic groundfish fishery. Our goal in moving to a broader perspective was to address the failures and abuses which led to the past crisis. We believe that our Groundfish Conservation Framework for Atlantic Canada and our Report on Gear Technology in Eastern Canada will greatly contribute to these goals as set forth in our mandate.

This is the first time the Council has issued an annual report. In the past, our advice on groundfish conservation requirements to the Minister was done in one large report and we used that opportunity to relay some general concerns and themes. This past year we produced a series of reports on groundfish conservation advice which we released throughout the fall of 1997 and winter of 1998. This allowed the Council to better match the latest advice from DFO Science and the results of the sentinel fisheries with the timing of the Council's advice. This was especially important for most cod stocks as DFO Science held a special, one-time, zonal assessment meeting in January 1998 to discuss the latest information on those stocks. Given the smaller and more regionally-based reports the Council produced, we felt it was necessary to offer a more comprehensive package of the Council’s work.

The title of our annual report, Conservation Must be Compulsory, Not Optional, is taken from our Groundfish Conservation Framework for Atlantic Canada. It speaks to our collective tendency over time to ignore conservation when things are good or prices are high and focus on conservation only when stocks plummet and collapse. Conservation should not be considered an inconvenience — it must become an integral and natural part of our sustainable management of fish stocks. For now, we need to continue to change our attitudes towards the resource including the need to build mutual trust among all stakeholders, and between the fishing industry and governments. A conservation minded attitude is a prerequisite to the building of a conservation capacity. This message is the cornerstone of all of the work of the FRCC.

GROUND FISH CONSERVATION FRAMEWORK FOR ATLANTIC CANADA

We have included in Appendix 4 of this report a summary of The Groundfish Conservation Framework for Atlantic Canada. It sets forth a specific definition of groundfish conservation to be followed, the major tasks that have to be accomplished to assure conservation and the responsibilities of each major stakeholder group, and a list of concrete actions to be undertaken. The recommendations contained in this report are the culmination of the views of stakeholders during the consultation process.

When we released the framework in July, we were pleased by the positive reception of this report by the majority of stakeholders and provincial governments. However, we were struck by the attitude of some industry representatives and some provinces that this was "passe". Some commented that the industry had already accomplished much of what was in the framework and we did not need to revisit this. These statements were in stark contrast to what was observed with the limited reopening of the cod fishery in sub-division 3Ps (southern Newfoundland). Our recommendations for 3Ps cod had included tougher and more stringent conservation controls than had ever been in place in the past for this fishery. Although these recommendations were accepted by the Minister of Fisheries and Oceans and implemented by fisheries managers, the appetite for fish was tremendous. Even with strict controls and enforcement the bulk of the quota was caught in less than six days and the mentality was clearly one that focused on a race for fish. Conservation and maximizing the benefits of the resource were not the first, or even the second, thoughts of most of the industry in this area.
If we accept that "actions speak louder than words", then we should use the example of the re-opening in subdivision 3Ps to repeat our message — conservation must be compulsory, not optional and the conservation framework should be accepted as the minimal requirements for a sustainable fishery.

One of the underlying problems discussed in the *Groundfish Conservation Framework for Atlantic Canada* is overcapacity. Overcapacity is an even greater concern now than when moratoria were established and, given the recent advances in technology, we have become even more efficient at killing fish. All of this speaks to the need to control and manage capacity so as to better match it with the available resource. It also speaks loudly for the need to adopt and implement the recommendations contained in the *Groundfish Conservation Framework for Atlantic Canada*. We encourage the Minister of Fisheries and Oceans and his department to move forward with the implementation of a comprehensive strategy for groundfish conservation in Atlantic Canada.

**A Report on Gear Technology in Eastern Canada**

The Council released a special report on gear technology in March 1997. This report focused on improving the conservation aspects of the various fishing gears used in the Atlantic groundfish fishery and reviewed the characteristics of each gear type. The report did not attempt to rate each gear type in terms of its "conservation friendliness" rather it focused on improving optimum manner of usage from a resource conservation perspective.

One of the key elements that emerged from discussion with stakeholders on the drafting of this report was the amount of capacity sitting at the wharf waiting for the reopening of the commercial fishery. Most felt that excessive harvesting power in any gear type is dangerous for the resource. The Council believes that it is impossible to separate this reality from the discussion on gear technology. It is an important consideration for two separate reasons: first, excessive levels of harvesting capacity cause an inherent pressure to achieve the economic returns demanded by the capital investment and, secondly, with an abundance of capacity it is feared that certain gear types such as otter trawlers and gillnets, have the ability to generate heavy harvesting pressure on specific localized resources — in some cases "fishing out" some of the stock subcomponents.

Many of the recommendations from this report were incorporated into the Council’s Groundfish Conservation Framework for Atlantic Canada, however, a full copy of this report can be obtained from the FRCC secretariat or from our website (www.ncr.dfo.ca/frcc).

**Industry Concerns**

Over the past year the FRCC held a number of consultations on groundfish stocks throughout Atlantic Canada and Québec. The Council met with well over a thousand fishermen, scientists, environmentalists and other concerned stakeholders. Many common themes emerged from these meetings and more specific comments can be found as preludes to our stock-by-stock recommendation in Chapter 3 of this report.

**Frustration with the slow rate of recovery**

The FRCC noted that the lack of answers to the many questions concerning the dramatic declines in groundfish stocks has in itself become an impediment to conservation. Fishermen in many areas were especially vocal in their criticism that the DFO Stock Status Reports (SSR) did not accurately reflect the status of the cod biomass. In the case of the southern Gulf of St. Lawrence and northern cod stocks, fishers were convinced that the Science is "looking in the wrong place and at the wrong time" for fish. Almost all participants expressed frustration that the cod stocks have not rebuilt as anticipated. After five years and six fishing seasons boats are still tied to the wharves and the outlook as described by scientists is even more bleak than at the beginning of the moratoria.

The FRCC is concerned with the widening gap between the fishing industry and Science. This is happening despite the success of the sentinel fishery program and a more open and inclusive process for scientific assessment. As the Council stated in its most recent report, it is our observation that the fishing industry has run out of patience with moratoria — they have yet to see a “return on their investment” or an explanation as to why recovery is not taking place. Where causes have been identified, such as seals, they are frustrated by the lack of action despite specific recommendations on what needs to be done.
Seals

During all of our consultations the issue of the expanding seal herd was raised as an impediment to the recovery of fish stocks. This is an emotional issue for fishers throughout Atlantic Canada and Quebec. As in our previous reports, the FRCC has asked the Minister to move forward with measures to control and reduce the seal population. We continue to believe that seals represent a renewable resource which can be harvested sustainably in the context of overall management of the Atlantic marine eco-system. We also believe there is a definite imbalance between predator and prey.

We are disappointed that the effect of seal consumption could not be quantified as part of the SSRs for Atlantic cod stocks. DFO analysis suggests that:

- harp seals may be consuming as much as 140,000t of northern cod;
- grey seals are consuming between 5,400 - 22,000t of Eastern Scotian Shelf cod (on a total biomass estimated to be as low as 32,000t);
- seals in the northern Gulf of St. Lawrence may have consumed as much as 68,000t of cod in 1996; and,
- seals in the southern Gulf of St. Lawrence may be consuming over 10,000t of cod.

These figures speak loudly for a call to action on this issue. The seriousness of this issue is acknowledged by scientists, both within the Department and within the NAFO Scientific Council. Quantification of the effect of seal predation on the various stocks, exploited or not exploited (forage species) must be a very high priority. Many stakeholders believe that unless the seals problem is addressed quickly, stocks will not recover to sustain a commercial fishery.

As part of its groundfish recommendations for 1998, the FRCC recommends that the Minister of Fisheries and Oceans continue to “move forward with developing new markets and products for seals ...and we recommend that immediate ways to significantly increase the harvest of all seals should be pursued.

In addition to this recommendation, the FRCC also recommends that “The effect of predation and of predator prey relationships be analyzed. The impact of seal consumption, especially, remains a major concern and work to quantify its impact must be pursued and funded. The potential effect of exploitation on forage species (e.g. capelin, herring, etc.) must be analyzed and quantified.”

It should not be assumed, as some mistakenly have, that the Council’s recommendation for further research on the quantification of the effects of seal consumption means further study and no action. The Council is adamant in its call for an increase in the harvest of seals. In 4VsW (eastern Scotian Shelf) the grey seal population on Sable Island has doubled in the past few years and is now a major impediment to the recovery of this fish stock. It is time to move to control the seal population in this area and in many other areas.

1998 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in Divisions 2GH, 213KL, 3Ps, 4VsW and Witch Flounder in Sub-Division 3Ps.

Following the release of the FRCC’s latest report on groundfish stocks, 1998 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in Divisions 2GH, 213KL, 3Ps, 4VsW and Witch Flounder in Sub-Division 3Ps, the Council was disappointed with the reaction to its recommendation to continue with the moratorium for both northern cod and the southern Gulf cod stocks. Some stocks have not recovered as anticipated and in the case of northern cod it speaks volumes about our attitude towards the resource that there would be a call for a commercial opening on this stock. Given the extent of the devastation of the past decade it is unrealistic to expect that the northern cod stock could recover this soon. We must continue to expand our knowledge and understanding about these stocks and the causes of their collapse and failure to recover. We realize why, then, there is so much frustration. More practically, we must all continue to be patient and prudent if we are ever to realize the maximum benefits from this resource.
CHAPTER 2: WORK OF THE COMMITTEES

ENVIRONMENT AND ECOCYLOGY COMMITTEE

During the summer of 1997, the revived committee on Environment and Ecology reviewed its mandate and decided that the definition and implementation of an Ecosystem Approach to Fisheries Management, especially as it pertains to the FRCC’s conservation objectives, was the central question facing it. A quick survey of the literature did not suggest any practical approach.

To consult experts and stakeholders and to stimulate interest in the ecosystem approach, a workshop was held in Moncton, 14-15 Dec 1997. The discussion revealed that for most participants, an ecosystem approach to fisheries management is seen as bringing together two components: recognition and respect for the ocean ecosystem and community-based involvement in its management. Ecosystem-based management is only partly about science. It is much more about cultures and society.

The Environment & Ecology committee will now formulate a course of action for the FRCC and work at identifying the kind of initiatives leading towards an ecosystem approach. A report of the Moncton workshop is included in this report as Appendix 6.

STOCK ASSESSMENT COMMITTEE

The Committee, as the other committees, was reorganized in Summer 1997. In agreement with the Committee’s mandate, three major tasks were defined for the incoming year.

1. The reorganization of the schedule of the DFO stock assessment system and of the timing of the FRCC’s recommendations. That activity has begun in 1996 in order to take advantage of the most recent scientific information to make better conservation advice. It takes into consideration the periods of the scientific research surveys as well as the calendar of the fishing seasons. A new schedule was proposed to DFO in fall 1997 for consideration.

2. In agreement with the Council’s mandate, the Committee drafted the recommendations for 1998 on Science Priorities for the DFO. Those recommendations are included in this report as Appendix 5.

3. The Committee defined as its first priority for the incoming year the definition of a practical implementation of the Precautionary Approach to the Canadian Atlantic groundfish fisheries, as recommended in the Groundfish Conservation Framework for Atlantic Canada (FRCC.97.R.3). The Committee is being analyzing the different views expressed around the World (i.e. International Agreement on High Seas Fishing, International Council for the Exploration of the Sea, Northwest Atlantic Fisheries Organization) and how they can be applied to the Canadian context. The Committee is also looking at including other considerations than the single stock assessment data (such as ecosystem, predator-prey relationships, multi-species interactions, or critical habitat protections). The Committee is considering a process by which the stakeholders will be involved in the precautionary approach. Preliminary works have already been discussed within the Council. After a final working document will be drafted, the intent is to submit that document to scientists (DFO and non-DFO) and to the fishing industry for discussion.
The FRCC’s Management and Regulations Committee focuses on two topics, both aiming to help improve FRCC recommendations in particular, and the success of conservation measures in general, from year to year, and over the long term:

1. First, the committee seeks to understand the impact and effectiveness of the various conservation measures that are recommended by the Council and implemented by DFO and the various fishery sectors each year. The committee examines how these conservation measures work out ‘at sea’, both through discussions with government and industry members, and through analysis of fishery information. In this regard, the committee has studied the effectiveness of conservation measures in the Unit 1 Redfish fishery.

   In 1997, the committee’s principal activity involved a detailed examination of the performance of conservation measures in the re-opened 3Ps and 4RS3Pn cod fisheries. Through small group meetings with fishermen and DFO managers, a questionnaire sent to fishery organizations, and examination of a range of fishery statistics, the committee developed a better understanding of the benefits and shortcomings of the conservation measures recommended by the Council for the 1997 year, and implemented by DFO and/or by fishery sectors in their Conservation Harvesting Plans. Highlights of the study were reported to Council, which made use of the major results in developing its recommendations for 1998.

2. Second, taking a longer-term approach, the committee explores the performance of existing conservation measures and the possible usefulness of new approaches. In this regard, the committee has produced two major discussion papers, “Other Conservation Measures” and “Quota Controls and Effort Controls: Conservation Considerations”, exploring a range of direct conservation measures, as well as the indirect conservation impacts of fishery management options.

   Council has incorporated much of the content in the above discussion papers into its new Groundfish Conservation Framework, a 1997 report to the Minister that lays out a comprehensive and integrated strategy for groundfish conservation. In its current and future activities, the committee seeks to assist in implementation of that Framework. For example, the committee will play a role in assessing the conservation measures that arise as components of integrated approaches to fishery management, for example in an ecosystem approach (see page 47 of the Framework). In addition, as a follow-up to its report on “Quota Controls and Effort Controls: Conservation Considerations”, the committee is undertaking ongoing monitoring and assessment of effort control initiatives, in Atlantic Canada and further afield, to examine the positive and negative conservation impacts of developing such approaches as substitutes for or complements to the quota management system that lies at the base of groundfish management.
CHAPTER 3:
STOCK-BY-STOCK RECOMMENDATIONS FOR 1998
3.1. Stocks of Grand Banks, Labrador Shelf and Davis Strait

3.1.1. Introduction to the Stocks of Grand Banks, Labrador Shelf and Davis Strait (Excluding Cod 2GH, 2J3KL and 3Ps, and Witch Flounder 3Ps) (Oct./97)

This report is one of a series that the Fisheries Resource Conservation Council (FRCC) makes to the Minister of Fisheries and Oceans on conservation measures for groundfish stocks in eastern Canada. This report deals with groundfish stocks in the Davis Strait, the Labrador Shelf and the Grand Banks and makes recommendations for the 1998 fishery.

Every year the Fisheries Resource Conservation Council (FRCC) holds public consultations with stakeholders to gather information on all Atlantic groundfish stocks. This information assists us in forming our recommendations to the Minister of Fisheries and Oceans for annual conservation requirements for Atlantic groundfish. For this report we met with fishers and other concerned stakeholders in Deer Lake, Newfoundland on September 12 and in Clarenville, Newfoundland on September 13. We also received a number of written briefs which are noted in appendix 3.

Although this report deals with groundfish stocks in the Davis Strait, the Labrador Shelf and the Grand Banks, it does not include recommendations for cod stocks in divisions 2GH, 2J3KL and 3Ps and witch flounder in 3Ps. Recommendations for those stocks will be included as part of a separate FRCC report to the Minister in March 1998. Also included at that time will be our recommendation for 3Ps witch flounder. Stakeholders have asked that we delay our advice on this stock as they are hoping to organize a science-industry survey for fall 1997.

Special Zonal Assessment

For this year only, the Department of Fisheries and Oceans (DFO) Science will be holding a special zonal assessment for the following cod stocks: 2J3KL, 3Ps, 4RS,3Pn, 4TVn, and 4VsW. This special assessment will be held during the last week in January in order to incorporate all available information into the assessment, including: the upcoming fall and winter surveys, and the results of this years sentinel fishery. Until this special zonal assessment is held the FRCC will not be receiving advice from DFO Science on these cod stocks. It is important for everyone to have the results of the latest assessment before we consult on these stocks.

As a result of this change, the FRCC’s fall groundfish consultations will be staggered through out the fall and into the new year. Our schedule for future consultations includes the following:

- **October 21 - 23:** Scotian Shelf and Bay of Fundy Groundfish Stocks (except 4VsW Cod)
- **October 24:** Redfish Units 1, 2, 3 and 3-0
- **December 1-5:** Gulf Groundfish Stocks
- **February 1998:** Cod Stocks ( 2J3KL, 3Ps, 4RS,3Pn, 4TVn, and 4VsW)

Conservation Issues

During our consultations many concerns were raised about the state and health of groundfish stocks and most of these concerns are dealt with in Chapter 2 of this report in Stock-by-Stock recommendations. However, the Council wishes to highlight some of these concerns and draw particular attention to certain problems.

Greenland Halibut 0B + 1B-F

As part of our recommendations on this stock in Building the Bridge (October 1996), we recommended that “the emerging fishery by gillnets in deep water be carefully monitored as it appears to have serious problems.” We noted again in our Report on Gear Technology in Eastern Canada (March 1997) that many concerns had been expressed by fishers and other stakeholders about the practices associated with this gear type in the deep water turbot fishery. We recommended as part of that report that “...protocols should
be established that limit the amount of gear permitted to that which can be handled in a reasonable time period for the vessel size and area, and that restrict the length of soak time. In areas where there is potential for gear loss, and hence for ghost fishing, this shall be taken into account in developing the protocols on gear amounts, and additional requirements on gear specifications incorporated. Consideration should be given to requiring tagging of nets to facilitate quantification and identification of lost gear.”

This year, during our consultations, the problems associated with the excessive use of gillnets at extreme depths were raised more strongly than ever. Fishers expressed grave concern about the effects of this fishery on the Greenland halibut stocks, especially as it relates to ghost fishing by lost nets, unaccounted mortality as a result of float-outs while the net is being hauled, and discards as a result of deteriorating quality brought on by extended soak times. Participants at consultations also expressed concern with respect to the ghost fishing of gillnets and marine mammals such as narwhal, bowhead and beluga whales which dive to depths of up to 600 fathoms and can become entangled in gillnets.

The FRCC believes that it is necessary to determine the extent to which these problems do exist and as part of our recommendation for this stock in chapter two of this report, we recommend that at-sea observers be deployed in this fishery.

If the concerns which have been raised repeatedly at consultations are proven to be well founded then there will have to be changes made to the way in which this fishery is conducted. As we recommended in the Groundfish Conservation Framework for Atlantic Canada (July 1997), “…if detrimental effects [of this gear] cannot be mitigated, the technology in question should be banned.” Fishers at our consultations made the point that there must be a better way to fish and if changes to this fishery are not forthcoming, a possible change in the type of gear employed may have to be recommended.

**Skates**

In addition to our recommendations in chapter two, it is important to note the frustration of those fishers present at our consultations with respect to the unregulated skate fishery outside of the Canadian 200 mile limit. The effort on skate on the nose and tail of the Grand Banks is far in excess of the amount allowed to be fished by Canadian fishermen and well in excess of the amount that can be sustainably harvested according to the DFO Stock Status Report. The fishery outside 200 miles is prosecuted using 130 mm diamond mesh while that inside the Canadian zone is prosecuted using 300 mm square mesh. This raises concerns with respect to the level and kinds of bycatch that may be caught in this fishery outside of the Canadian zone.

**Cod**

Although our consultations focused on groundfish stocks other than cod, those who attended our meetings wanted to discuss the problems associated with this species. Many noted that they were seeing signs of abundance inshore and picking up clear indications of cod on their sounders. This was especially true of fishers in divisions 3Ps and 3L. They are frustrated with the apparent lack of answers as to why the DFO research vessel surveys are showing little signs of cod abundance offshore. Many fishers expressed their frustration with the lack of progress on “offshore sentinel surveys” for cod and with respect to the lack of progress on cooperative industry-science surveys for other species. The FRCC believes that guidelines should be developed for cooperative surveys and we will expand on this in our next “Science Priorities Letter to the Minister of Fisheries and Oceans”.

**213KL Witch Flounder and 2 + 3K American Plaice**

The Council is concerned about the prospects for the rebuilding of these stocks given recent suggestions that they have moved to deeper waters outside of the Canadian zone. Council is particularly concerned that these species are being captured as by-catch in the Greenland halibut fishery outside of the Canadian zone where 130 mm diamond mesh is used. The Council wishes to emphasize that any amount of by-catch, especially that of juvenile fish, can diminish the chances of recovery for these stocks. Canada should continue to be vigilant in its efforts to keep by-catches to an absolute minimum and to continue to push NAFO to increase the minimum mesh size in the Greenland halibut fishery to 155 mm square mesh as soon as possible.

**BY-CATCH LIMITS**

For a number of stocks for which the Council continues to recommend a moratorium on fishing we have recommended that by-catch protocols be applied. This is somewhat different than our recommendations in previous years where we have recommended that by-catches be limited to a specific number or otherwise be kept to the lowest possible level. We have made this change in light of the obvious difficulty in trying to
determine what is an appropriate level of by-catch that will minimize risks for the stocks which are still under moratoria while allowing for continued commercial fishing on other species which are not under moratoria.

We feel that allowing the Department of Fisheries and Oceans (DFO) in conjunction with the industry to determine the appropriate by-catch levels will achieve a compromise that prevents directed fishing or excessive bycatches on species under moratoria while allowing commercial fisheries to continue. This change in wording should not be interpreted as a relaxing of the FRCC's position that by-catches should be kept to the lowest reasonable level.

3.1.2. INTRODUCTION TO 2GH, 2J3KL AND 3Ps COD STOCKS (MARCH/98)

This report is one in a series of reports the Fisheries Resource Conservation Council (FRCC) has produced to provide advice to the Minister of Fisheries and Oceans on conservation requirements for Atlantic and eastern Arctic groundfish stocks for 1998. This report deals with all groundfish stocks in the Gulf of St. Lawrence, cod stocks in divisions 2GH, 2J3KL, 3Ps and 4VsW, and witch flounder in division 3Ps.

In the past, the FRCC has produced a single report annually which included advice for all groundfish stocks. For its 1998 advice, the FRCC has produced three separate reports: 1998 Conservation Requirements for Grand Banks, Labrador Shelf and Davis Strait Groundfish Stocks (October 1997 - FRCC.97.R.5), 1998 Conservation Requirements for Scotian Shelf and Bay of Fundy Groundfish Stocks (November 1997 - FRCC.97.R.6) and this report Conservation Requirements for Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in Divisions 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in Division 3Ps (March 1998 - FRCC.98.R.1).

The FRCC produced separate reports to allow the most recent information on the state of the groundfish stocks to be used in formulating our recommendations. For this year only, the Department of Fisheries and Oceans (DFO) Science held a special zonal assessment in St. John's, Newfoundland for the following cod stocks: 2J3KL, 3Ps, 4RS,3Pn, 4TVn, and 4VsW. This special assessment was held from January 26 - February 6 in order to incorporate all available information into the assessment including the fall and winter groundfish surveys, and the results of the 1997 sentinel fishery.

The FRCC believed that it was important to have the results of the latest assessment before we consulted on these stocks.

CONSULTATIONS

Before making its recommendations the FRCC conducted a series of public consultations throughout the Maritimes and Newfoundland and Labrador. In the fall of 1997 the FRCC conducted a round of public consultations in Newfoundland on stocks other than cod, and in Nova Scotia on groundfish stocks other than 4VsW cod. In December 1997, the FRCC scheduled consultations in Gaspé, Moncton and Port Hawkesbury to discuss Gulf of St. Lawrence groundfish stocks. However, due to inclement weather only the consultation in Gaspé was completed at that time. In February 1998, the FRCC held an extensive round of consultations in Moncton, Port Hawkesbury, Halifax, Port Hope Simpson, Port-aux-Basques, Port-au-Choix, Grand Falls and Clarenville.

Over 800 fishers, scientists and other stakeholders participated in these consultations and others who could not attend submitted their views in writing. The quality of the briefs presented to the Council and the caliber of discussion was especially high.

The FRCC was struck by the loss of faith many fishers have in the ability of DFO Science to provide answers to the many questions concerning the dramatic declines in groundfish stocks. In the southern Gulf of St. Lawrence fishers were especially vocal in their criticism of the DFO research vessel, the Alfred Needler, in the northern Gulf of St. Lawrence they were adamant in their belief that the Stock Status Report (SSR) did not accurately reflect the status of the cod biomass, and for northern cod, fishers in 3K and 3L were convinced that the Science is "looking in the wrong place and at the wrong time" for fish. Almost all participants expressed frustration that the cod stocks have not rebuilt as anticipated. After five years and six fishing seasons boats are still tied to the wharves and the outlook as described by scientists is even more bleak than at the beginning of the moratorium.

The FRCC is concerned with the polarity that is developing between the fishing industry and Science. This is happening despite the success of the sentinel fishery program and a more open and inclusive process for scientific assessment. It is our observation that the fishing industry has run out of patience with moratoria — they have yet to see a "return on their investment"
or an explanation as to why recovery is not taking place. Where causes have been identified, such as seals, they are frustrated by the lack of action despite specific recommendations on what needs to be done.

Effective communication between Science and the industry has never been more important. However, with the dramatic cuts to Science budgets and to personnel, communications and public relations are often seen as luxuries as Scientists are forced to do the work once done by several people. Unless proper communications are addressed, the unrest will continue to grow, and Science’s credibility within the fishing community will continue to decline. The FRCC addresses this issue, in part, in our stock-by-stock recommendations and more fully in our Science Priorities Letter to the Minister of Fisheries and Oceans (FRCC.98.L.1 - Appendix 5).

GROUNDFISH CONSERVATION FRAMEWORK

In its previous reports, the FRCC highlighted issues that need to be addressed such as over-capacity, effective enforcement, and the need for attitudinal change. Although these are not mentioned in this report, as part of the opening chapter, it does not mean the FRCC is any less concerned about these issues than it was in previous years. In July 1997 the FRCC released its report A Groundfish Conservation Framework for Atlantic Canada (FRCC.97.R.3). That report was designed to provide a comprehensive blueprint for change in the groundfish fishery. That report went beyond the scope of our previous recommendations and provides a foundation for improving the groundfish fishery. That report went beyond the scope of our previous recommendations and provides a foundation for improving the groundfish fishery. It sets forth the basic elements of the groundfish fishery and the issues which need to be addressed. In chapter three of the Groundfish Conservation Framework, the Council provides a specific definition of groundfish conservation and of principles to be followed, major tasks that have to be accomplished to ensure conservation, and, responsibilities for each major stakeholder group (including governments) and a list of concrete actions to be undertaken.

We are encouraging governments and stakeholders to adopt A Groundfish Conservation Framework for Atlantic Canada and to move forward with its recommendations. As we continue with limited, low-level fisheries the challenges for conservation have never been greater and the need to adopt the measures set forth in the report have never been more critical.

INDEX FISHERIES

As part of our recommendations for the cod stocks in 2J3KL and in 4T + 4Vn (N-A), we are recommending that an index program be established to provide further information on the status of these stocks. The longer moratoria continue, two issues become increasingly problematic. The erosion of information from fishing, which is used to justify biomass estimates and, the erosion of confidence in the data provided by DFO Science. Without some fishing, there is a sense in the fishing community that no one knows what’s going on. The index program will begin to address these issues by providing a simulation of commercial activity and correspondingly, restore some level of confidence in the data provided.

This program is in addition to the already established sentinel surveys and moves beyond them. As it is difficult to use data from the sentinel fisheries directly to estimate biomass, this program will offer additional data which can be used to determine abundance. The program is to be established cooperatively between fishers, scientists and managers to maximize the information that can be gained from this exercise while keeping removals at low levels. There should be a reasonable degree of consistency between the programs in the two areas.

The purpose of this initiative in 2J3KL is to move beyond the limits of the sentinel survey and to establish more information about the relationship between the inshore and offshore stocks and to better understand migration patterns the seasonal changes in biomass distribution. In this years SSR, an inshore biomass is established. Understanding what this means in terms of recovery for this stock and how this inshore biomass affects the recovery of the total biomass of northern cod are key questions.

The FRCC is optimistic that this program will cover a broader area and be spread more evenly over the fishing season than the sentinel surveys, including those areas which are further away from shore. In addition, it will provide another index of abundance to augment the research vessel survey. Fishers remain convinced that the biomass is greater than estimated. Gaining a better understanding of the extent of the narrow inshore band of cod and a better perception of the transition zone between the inshore band and the traditional offshore areas are necessary for future conservation and for the management of fisheries in this area. It is our belief that this program can add confidence to the cod population estimates in the SSR.
In 4T + 4Vn (N-A), the program should assist in answering the questions concerning seasonal changes in biomass distribution. It should also provide an index of abundance in addition to the research vessel survey's and reconcile fishers' information regarding spatial distribution to that from the research vessel survey. To this end, we have recommended that questions concerning the survey be a part of the workshop to plan this program. This program should also establish a reliable database which includes information on juvenile abundance and distribution.

**Natural Mortality**

As part of the assessment of groundfish stocks in 1998, DFO Science adopted changes to the assumptions it has made about natural mortality on cod stocks. Natural mortality is any mortality observed outside of reported fishing landings or legal catches. In many cases, the calculated natural mortality has doubled and in some cases it has more than tripled. For certain stocks this means that in the absence of any commercial fishing, the stocks will still continue to decline. Changes in natural mortality are caused by harsh environmental conditions, seal predation (and other predators) and removals from the stock through bycatches, recreational and food fisheries and illegal catches.

Fishers in most parts of Atlantic Canada and Québec had many questions about the change in natural mortality and the repercussions this has for the future of their fisheries. They voiced their concerns that some of the causes of mortality must be addressed. As one stakeholder in Moncton said, “we’ve stopped fishing, you can’t do anything about the environment and this leaves seals, and by God it’s time we did something about seals.” Many fishers noted that the two areas where natural mortality has not increased (3Ps and 4X) are the two areas where there is not currently a significant seal population.

Other fishers expressed concerns about the assumptions made about the amount of fish taken out of the water as part of the recreational fishery and illegal fishing. In the southern Gulf of St. Lawrence, many felt that that removals had been grossly underestimated from these sources.

**Seals**

In all of our previous reports the FRCC has asked the Minister to move forward with measures to control and reduce the seal population. We continue to believe that seals represent a renewable resource which can be harvested sustainably in the context of overall management of the Atlantic marine ecosystem.

During all of our consultations the issue of the expanding seal herd was raised as an impediment to the recovery of fish stocks. This is an emotional issue for fishers throughout Atlantic Canada and Québec and many comments were made concerning seals becoming more important than fishermen. One participant noted that seals were so plentiful and so close to shore that one had eaten part of his lobster catch right out of the crate.

Many participants noted that the range of the seal herd continues to expand. Fishers in 3Ps commented that they were seeing more seals in areas where they have never been in the past. Comments were also received from fishers in southwestern Nova Scotia that the seal herd is moving into their area.

It should be noted that fishers make it clear that seals are NOT solely responsible for the collapse of fish stocks, however, they do believe that they present a significant threat to the recovery of these same stocks.

Some environmentalists and scientists have suggested that if left alone, nature will take its course and the seal population will be gradually reduced resulting in a better balance in the ecosystem. There is some evidence to suggest that the condition of the harp seal is beginning to decline. However, the Council believes that this will be a very long process and, as one member put it, fishermen may well be extinct by the time this happens.

We are disappointed that the effect of seal consumption could not be quantified as part of the SSRs for Atlantic cod stocks. DFO analysis suggests that:

- harp seals may be consuming as much as 140,000t of northern cod;
- grey seals are consuming between 5,400 - 22,000t of Eastern Scotian Shelf cod (on a total biomass estimated to be as low as 32,000t);
- seals in the northern Gulf of St. Lawrence may have consumed as much as 68,000t of cod in 1996; and,
- seals in the southern Gulf of St. Lawrence may be consuming over 10,000t of cod.
This speaks loudly for a call to action on this issue. The seriousness of this issue is acknowledged by scientists, both within the Department and within the NAFO Scientific Council. Quantification of the effect of seal predation on the various stocks, exploited or not exploited (forage species) must be a very high priority.

In our Science Priorities Letter to the Minister of Fisheries and Oceans we recommend that:

The effect of predation and of predator prey relationships be analyzed. The impact of seal consumption, especially, remains a major concern and work to quantify its impact must be pursued and funded. The potential effect of exploitation on forage species (e.g. capelin, herring, etc.) must be analyzed and quantified.

As part of this report, the FRCC recommends that we continue to move forward with developing new markets and products for seals. We are encouraged by progress that has been made at utilizing the full seal and we recommend that immediate ways to significantly increase the harvest of all seals should be pursued.

RECREATIONAL AND FOOD FISHERIES

At almost all of our consultations fishers were empathic in their call for an end to the uncontrolled recreational fishery. In the Gulf of St. Lawrence we heard many accounts of how the limit of ten fish per person per day was abused. One fisher noted that when the boats who had been fishing as part of the gear experiments came into port to sell their catch the processing plants were blocked with fish from the recreational fishery. Fishers thought that the amount of fish taken from this fishery was in the thousands of tonnes, far above the estimate of 300t used in the assessment. It is widely held that the uncontrolled nature of the recreational fishery in this area provides a cover for a significant black market fishery.

During our consultations in Newfoundland it was noted at every stop that there is a significant amount of fish taken out of the water in 2J3KL. Some put this estimate at 5,000t and others put it as high as 10,000t. These very high estimates seem to be supported by the recent raid on processing plants in Trinity Bay and the amount of illegal fish seized by the enforcement branch of the Department of Fisheries and Oceans.

In our previous report, *Building the Bridge*, the FRCC recommended that no recreational or food fisheries take place in areas where moratoria exist. We further recommended that in areas where limited fishing takes place, recreational and food fisheries should be strictly controlled and effort controls be implemented such as number of days, licensing requirements and limiting the number of tags per person per season.

Given the changes in assumptions on natural mortality, the need to more effectively control this fishery is critical. It is not fair to those fishermen who have sacrificed much over the past four and five years to see the chances of recovery diminished by those who continue to abuse the resource under the guise of food fisheries.

The FRCC again recommends that in areas where moratoria exist there be no recreational or food fisheries.

We further recommend that in areas where limited fishing is permitted the recreational or food fishery be limited to a certain “season” such as one day per week for three weeks, or one weekend per year. In the case of tour boat operators, the FRCC recommends that they be licensed by the Department of Fisheries and Oceans and this licensing system must be strictly enforced. This licensing system be vigorous enough to separate legitimate operators from those who wish to use this tourist fishery as a disguise to continue commercial fishing. Operators should have to abide by strict Conservation Harvesting Plans, fill out mandatory logbooks, adopt a system of maximum number of tags per season, and the number of cod per person should be reduced from ten to two. If these measures cannot be adopted for the 1998 fishing season the FRCC recommends that there be no tour boat fishery for 1998 in areas where moratoria exist.
3.1.3. ENVIRONMENTAL OVERVIEW

Near-surface oceanographic conditions off Newfoundland and Labrador are strongly related to the general atmospheric circulation over the North Atlantic. The North Atlantic Oscillation (NAO) index provides a simple measure of the strength of northerly winds along Labrador. High positive values of the index, as observed through the 80's and early 90's, are accompanied by cold water temperatures and heavy ice conditions off Labrador and northern Newfoundland. In 1996, the NAO index became negative, a trend which has continued in 1997 and which brought with it milder ocean conditions.

Ice conditions in 1996 were lighter than normal along the Labrador-Newfoundland coast. Relatively warm air temperatures in the fall of 1996 and normal temperatures in the early winter of 1997 led to abnormally low ice conditions in early 1997; by February, however, below normal air temperatures led to heavy ice conditions in the inshore regions in late winter and early spring. Overall, 1997 was also a relatively light ice year, with the ice edge oscillating around its long term median position and total ice area below normal.

Water temperatures, as measured at Station 27, off St. John's, were slightly above normal in 1996 and early 1997, falling about 0.5 to 1.0°C below normal in the summer of 1997 near the surface, but remaining near normal below 100 m. The Cold Intermediate Layer was about normal on the Grand Bank and slightly colder at the Bonavista transect.

Overall then, oceanographic conditions have been rather moderate over the past year and a half, following on recent negative values of the NAO index.
3.1.4. Stock-By-Stock Recommendations - Newfoundland

3.1.4.1. Cod 2GH

History of FRCC Recommendations:

In November 1993, the Council recommended that the 1994 TAC for 2GH cod be set at 1,000t as a precautionary measure. The consultations held in 1994 confirmed that there had been very few cod in 2GH in recent years and led the FRCC to recommend, in November 1994, that any fishery for cod in 2GH be carried out within the framework of a scientifically coordinated test fishery. The Council recommended that a nominal amount of 200t be provided for this purpose. In 1996 and for 1997 the FRCC recommended no directed fishing take place on this stock and cooperative industry science surveys should be encouraged.

1997/98 Consultations:

There were no comments received from fishermen specifically about 2GH cod.

Analysis:

The 1996 DFO Stock Status Report indicates that:

- the catch has been negligible since 1990.
- the survey conducted in 1991 detected very few fish.
- there are possible links with northern cod.
- the status remains unknown but abundance is assumed low.

There is limited information on this stock and no new information since the last DFO Stock Status Report. There have been no research surveys for the past five years. There are some by-catches reported by observers in the shrimp fishery, although the use of the Nordmore grid is intended to reduce this.

Recommendation #3.1.4.1. Cod 2GH:

The FRCC recommends that:

1. there be no directed fishery on this stock.
Chapter 3: Stock Recommendations

**Council's views on stock status:**

Overall indicator: very low, status unknown

Compared to average

- Spawning biomass: unknown
- Total biomass: unknown
- Recruitment: unknown
- Growth/Condition: unknown
- Age structure: unknown
- Distribution: unknown
- Recent exploitation: none - no fishery
3.1.4.2. Cod 2J3KL

History of FRCC Recommendations:

In 1993, the Council indicated that this stock was at a very low level with poor recruitment prospects, and that a recovery of the spawning biomass was unlikely before the year 2000 at the earliest. The Council recommended that the moratorium on fishing 2J3KL cod be continued for 1994 and that strict limits be placed on food fisheries. In 1995, the Council emphasized the importance of the Sentinel Fishery in monitoring this stock during the moratorium. The Council recommended that the moratorium be continued for 1996 and again in 1997. As part of the recommendations for 1997, the FRCC recommended that the sentinel fishery be expanded to include the offshore.

1997/98 Consultations:

The FRCC held two rounds of consultations in Newfoundland, one in the fall of 1997 and again in February of 1998. Fishers in all sites except Port Hope Simpson do not accept the level of biomass estimated in the SSR. In all locations, except Port Hope Simpson, they reported that catch rates in the inshore sentinel fishery as well as by-catches in other fisheries inshore are exceptionally high. Fisheries in Newfoundland requested a TAC of 15,000t which they estimated as close to F_{0.1}. Fishers in 2J recommended the continuation of the moratorium as stock would rebuild from south to north.

Fishers also expressed their disagreement with the results of the acoustic survey which they believed was inconsistent with the observed catch rates. Fishers in all areas reported an abundance of juvenile cod around the wharves and in Bays. Fishers in Port Hope Simpson reported an improvement in the abundance of juvenile cod in the 2J area.

Recommendation #3.1.4.2. Cod 2J3KL:

The FRCC recommends that:

1. there be no directed commercial fishery for 2J3KL cod in 1998;
2. an index program be established to provide additional information to supplement sentinel programs and to add confidence, inshore and offshore, in cod population estimates;
3. as part of this program:
   a) no more than 4,000 tonnes be caught
   b) catches should be spread over the full range of the stock area and over time,
   c) gear and effort restrictions be applied to ensure catches are kept within 4,000 t; and,
   d) a planning workshop should be held by the Department of Fisheries and Oceans (DFO) and the industry to design this program and its protocols such that this program supplements (and not duplicates) the sentinel survey data.
4. immediate implementation of the offshore sentinel survey;
5. strict controls be established for all shrimp fisheries in this area e.g. Nordmore grate, observer coverage, by-catch protocols;
6. tools be developed to determine inshore biomass; and,
7. additional financial resources be made available to carry out this program.
ANALYSIS:

The 1998 DFO Stock Status Report indicates that:

- Stock has been declining since early 1990's
- Offshore sector shows no significant biomass
- Increase in natural mortality (M) to .77 from .2
- Overall biomass less than 10% of long term average
- No signs of recruitment, 1994 year class best but still below average, 1996 year class is exceptionally weak
- Inshore biomass in the order of 130,000t, based on sentinel fishery
- Minimum trawlable biomass, 21,000t for offshore
- Condition factor improving
- Age at 50% maturity declining since 1991, despite a fair improvement in 1996.

The FRCC is concerned with a number of issues that relate to this stock:

Seal predation is increasing and no quantification of the effect is available. Consumption in 1996 may have been as high as 140,000t of cod in this area.

Inshore biomass derived from the same catch-recapture experiment from Placentia Bay, using the same factor of conversion.

Illegal fishing may be significantly underestimated in the SSR and may represent several thousand tonnes. Recent charges by DFO enforcement in Newfoundland support anecdotal information at consultations concerning illegal fishing. The effects of the recreational fishery are unknown.

The emerging shrimp fishery takes place on critical cod habitat, e.g. Hawke Channel. Given the new entrants to this fishery, there is very high risk of increased by-catch of small cod.

Uncertainties

- Analytical assessment has not been accepted by the scientific community for recent years.
- An acoustic survey in 3KL area gave a total inshore biomass of 18000 t, of which 80% was in 3L.
- No flexibility to allow sentinel fishers to compare commercial catch rates.

Lack of information

- Only one source of information for the offshore.
- Link between inshore and offshore assessments and migration patterns unknown.

Unless the issues which contribute to the increase in natural mortality are addressed e.g. the number of seals, illegal/black market fishery, the chances for recovery for this stock are limited (at best) considering that the mortality factor is now estimated to be 0.77 (M=.77).

SENTINEL FISHERY:

The offshore sentinel survey was not considered as reliable given the timing and the bad weather. This survey has very poor catches. Catch rates in the inshore sentinel survey in 2J remained low in 1997. In 3K and in 3L, the linetrawl catch rates more than doubled between 1995 and 1997; gillnet catch rates increased in 1996 and remained stable in 1997. Many fishers reported that catches and catch rates are higher than they were in the pre-moratorium period.

COUNCIL'S VIEWS ON STOCK STATUS:

<table>
<thead>
<tr>
<th>Overall indicator:</th>
<th>very low; signs of improvement in 3L</th>
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</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning biomass:</td>
<td>very low</td>
</tr>
<tr>
<td>Total biomass:</td>
<td>very low</td>
</tr>
<tr>
<td>Recruitment:</td>
<td>poor</td>
</tr>
<tr>
<td>Growth/Condition:</td>
<td>growth poor, condition good</td>
</tr>
<tr>
<td>Age structure:</td>
<td>poor - no old fish</td>
</tr>
<tr>
<td>Distribution:</td>
<td>improving in south, still abnormal</td>
</tr>
<tr>
<td>Recent exploitation:</td>
<td>low</td>
</tr>
</tbody>
</table>
3.1.4.3. Cod 3Ps

History Of FRCC Recommendations:

In August 1993, the low estimates of biomass for this stock led the Council to recommend that fishing be discontinued, at least until April 30, 1994. The fishery was closed by DFO in September 1993. While the Council indicated in its November 1993 report that recommendations for this stock would be forthcoming following the analysis of the results of the spring survey, such a review was made unnecessary when the fishery was closed by the Minister of Fisheries and Oceans for the whole year.

In November 1994, the Council determined that the results of the 1994 survey confirmed earlier survey results and indicated that the stock abundance was at the lowest level observed since 1978. Consequently, the Council recommended that there be no directed fishing for 3Ps cod in 1995 and that by-catches be kept to the lowest possible level. The Council also recommended that efforts be made to expand surveys into inshore areas, that no recreational/food fishery be permitted and that a broad-based Sentinel Fishery program be implemented.

The Council’s recommendations for 1996 were for a continued moratorium on commercial fishing and a significantly expanded Sentinel Fishery with an upset limit of 3,000t to evaluate the high catch rates found by Sentinel Fishermen. In 1997 the FRCC recommended a limited commercial fishery with a TAC of 10,000t. Included as part of this recommendation were strict measures for the Conservation Harvesting Plans.

1997/98 Consultations:

The FRCC held two rounds of consultations in Newfoundland, one in the fall of 1997 and again in February of 1998. Fishers in Grand Falls and Clarenville noted that the biomass is much higher than calculated as part of the SSR. They all spoke about high densities of cod inshore and their catch rates are much higher than during the pre-moratorium period. Most fishers requested a TAC of 30,000t and felt that this was a very conservative/conservation minded request as the F0.1 level mentioned in the SSR was 40,000t.

Most fishers commented on the good pattern of distribution and of the size of fish. They also mentioned a number of good year classes. Inshore fishers reported good signs of recruitment.

Recommendation #3.1.4.3. Cod 3Ps:

The FRCC recommends that:

1. the 1998 TAC for 3Ps cod be set at 20,000t;
2. measures be taken to reasonably disperse the total catch over the period of the fishing year to minimize impacts on stock sub-components;
3. fishing on spawning concentrations be minimized during the peak spawning season;
4. Conservation Harvesting Plans include:
   a) mandatory monitoring and strict enforcement;
   b) effort be better controlled including limiting the amount of gear used by fishing enterprises so as to better match the available resource and quota.
5. tools be refined to develop inshore biomass estimate.
ANALYSIS:
The 1998 DFO Stock Status Report indicates that:

- Biomass concentrated in a narrow band inshore and estimated at 115,000t.
- Biomass offshore considered as being low however wider spread over the area than in the recent past; estimated to be 100,000t.
- Young fish are scarce in the survey.
- No good signs of fish older than 9 yr., ages 5, 7 and 8 dominate.
- No evidence that the natural mortality has increased. M=0.2 still considered as a valid estimate.
- Age at 50% maturity constantly declining since 1988 (from 7.2 years down to 4.6 years).
- Weight at age 6 still slightly declining. Weight at age 4 stable.
- Year-class 1989 still the highest of the recent past. Year-classes 1993 and 1994 show improvements (however below average).
- TAC of 20,000t would represent a safe level of exploitation.

The FRCC is concerned with a number of issues that relate to this stock:

The inshore/offshore split is used for the first time as part of an analytical assessment. The offshore estimate of abundance is derived from analytical model (large retrospective pattern). The inshore estimates of abundance are derived from a very recently accepted methodology (extrapolation of a catch-recapture experiment with gillnets in Placentia Bay). If we accept the estimates, the stock biomass may be considered as recovered.

It is difficult to reconcile the poor abundance estimate of the RV survey with the biomass derived from the analytical model in the offshore sector.

The truncation of the age distribution is of concern.

Despite major measured increase in biomass, stress indicators (maturity-at-age, weight-at-age) are still on a downward trend.

SENTINEL FISHERY:
After a large increase in catch rates between 1995 and 1996, the catch rates remain stable or slightly decreased in 1997. However, the catch rates remain at a very high level. The highest catch rates were in the Placentia Bay.

The offshore industry/science survey conducted by the Groundfish Enterprise Allocation Council (GEAC) using a mobile gear vessel arrived at biomass estimate of 105,000t for the offshore (with limits of 29,000t – 180,000t).

COUNCIL’S VIEWS ON STOCK STATUS:
Overall indicator: improving; mixed signals

<table>
<thead>
<tr>
<th>Compared to average</th>
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<tbody>
<tr>
<td>Spawning biomass:</td>
</tr>
<tr>
<td>improving with 1989 year class</td>
</tr>
<tr>
<td>Total biomass:</td>
</tr>
<tr>
<td>uncertain</td>
</tr>
<tr>
<td>Recruitment:</td>
</tr>
<tr>
<td>no signs offshore; inshore indications of small fish</td>
</tr>
<tr>
<td>Growth and Condition:</td>
</tr>
<tr>
<td>average growth, good condition</td>
</tr>
<tr>
<td>Age structure:</td>
</tr>
<tr>
<td>1989 year class strong; 1993, 1994 show improvements</td>
</tr>
<tr>
<td>Distribution:</td>
</tr>
<tr>
<td>good inshore; poor offshore</td>
</tr>
<tr>
<td>Recent exploitation:</td>
</tr>
<tr>
<td>low</td>
</tr>
</tbody>
</table>
3.1.4.4. Haddock - 3LNO

In November 1993, the Council noted that the TAC had been reduced to 500t for 1993, from 4,100t in 1992, following recommendations from scientists that removals be limited to a by-catch fishery with a precautionary ceiling of no more than 500t. In order to prevent a repeat of the heavy exploitation that was exerted in the mid-1980s on the 1980 and 1981 year-classes, the Council recommended that there be no directed fishing for the 3LNO haddock stock in 1994 and that by-catches be limited to 500t. In November 1994, the Council reiterated its advice for no directed fishery and recommended reducing the by-catch limit to 100t. In November 1995, the Council noted in 1995 that there had been no signs of improved recruitment and there were no prospects for stock improvement in the near future. It again recommended no directed fishing in 1996 and a by-catch limit of 100t.

In October 1996, the Council recommended that there be no directed fishing for 3LNO haddock in 1997 and by-catches be limited to 100t.

1997 Consultations:

At the FRCC consultation in Clarenville, it was noted that the by-catches of haddock had increased. Fishers didn’t want by-catches of haddock to restrict other fisheries such as redfish. They believed that the by-catch limit should be increased to 500t. It was also noted that the by-catch limit had been exceeded by over 100% this year.

Analysis:

The 1996 DFO Stock Status Report and the 1997 Newfoundland Region Groundfish Overview indicate that:

- high catches in the 1980s were due to the strong 1980 and 1981 year classes.
- there is no evidence of more recent strong year-classes.
- there are no prospects of the stock improving in the near future.

Haddock abundance in 3LNO was low throughout the 1970’s, higher in 1984-1988, and subsequently low. Very few haddock have been found in recent research vessel surveys. The research surveys show that recent year classes are weak and there are no prospects of the stock improving in the near future. Fish that reach spawning age must be protected if recruitment is to improve in the future for this stock.

Recommendation #3.1.4.4. Haddock - 3LNO:

The FRCC recommends that:

1. there be no directed fishing for 3LNO haddock in 1998 and by-catch protocols be applied when prosecuting other fisheries.
Chapter 3: Stock Recommendations

Council’s views on stock status:

Overall Stock Indicator: low

*Compared to average*

Spawning Biomass: low
Total Biomass: low
Recruitment: no signs of good recruitment
Growth and Condition: not available
Age Structure: all recent year classes weak
Distribution: few in 3L
Recent Exploitation Level: unknown; lower than in the past

*1997 catch: as of Sept. 10/97*
3.1.4.5. Haddock - 3Ps

**HISTORY OF FRCC RECOMMENDATIONS:**

In November 1993, the Council noted that the TAC had been reduced to 500t for 1993, from 3,200t in 1992. The by-catch of haddock was significantly reduced because of closures in fisheries for other species. The Council recommended that there be no directed fishing for the 3Ps haddock stock in 1994 and that by-catches be limited to 300t. In November 1994, the Council reiterated its advice for no directed fishery and recommended reducing the by-catch limit to 100t during 1995. This advice was repeated for 1996.

In October 1996, the Council recommended that there be no directed fishing for 3Ps haddock in 1997 and that by-catches be limited to 300t and implemented so as not to impede a limited cod fishery.

**1997 CONSULTATIONS:**

Haddock were observed at various parts of the division but most were observed at 75-80 fathoms. Fishers reported little sign of recruitment and catches were of mature fish.

**ANALYSIS:**

The 1996 DFO Stock Status Report and the 1997 Newfoundland Region Groundfish Overview indicate that:

- this stock increased in mid-1980's due to the 1981 year class, which has been fished out.
- there are no signs of improved recruitment in recent years.
- there are no prospects of the stock improving in the near future.

Haddock in Newfoundland waters are at the northern limit of their range in the NW Atlantic. There are few indications of improved recruitment in this stock and there are no prospects of the stock increasing in the near future. The abundance of large fish appears to have increased inshore; an increase in effort for cod would likely exploit this abundance. As this species is taken as by-catch, it is anticipated that catches will increase when cod fishing is re-opened.

**Recommendation #3.1.4.5. Haddock - 3Ps:**

The FRCC recommends that:

1. there be no directed fishing for 3Ps haddock in 1998 and that by-catch protocols be applied when prosecuting other fisheries.
Chapter 3: Stock Recommendations

**Council's views on stock status:**

Overall Stock Indicator: low  
Compared to average

- Spawning Biomass: low, unknown
- Total Biomass: low, unknown
- Recruitment: poor, no signs of improvement
- Growth and Condition: not available
- Age Structure: not available
- Distribution: increased inshore
- Recent Exploitation Level: low
History of FRCC Recommendations:

In November 1993, the Council noted that there were very few pollock in 3Ps and the TAC was reduced from 5,400t to a 600t by-catch limit. The Council recommended that there be no directed fishing for the 3Ps pollock stock in 1994 and that by-catches be limited to 500t. In November 1994, the Council re-iterated its advice for no directed fishing in 1995 and recommended reducing the by-catch limit to 100t. This recommendation was repeated for 1996.

In October 1996, the Council recommended that there be no directed fishing for 3Ps pollock in 1997 and that by-catches be limited to 1,500t, and implemented so as not to impede a limited cod fishery.

1997 Consultations:

Fishers noted that the 1,500t by-catch limit was not restrictive to other fisheries.

Analysis:

The 1996 DFO Stock Status Report and the 1997 Newfoundland Region Groundfish Overview indicate that:

- this stock is at the extreme north of geographic distribution for pollock.
- recent surveys showed low abundance and biomass.
- schools of small pollock were observed in 1995 in some inshore areas.
- an abundance of large pollock has been reported in some areas.

Pollock in Newfoundland waters are at the northern limit of their range in the NW Atlantic. Recruitment to commercial fisheries has been unpredictable. Commercial catches have varied greatly and have been based on occasional pulses of abundance. Because of the movements of pollock, research vessel estimates of abundance are difficult to interpret and may not be reliable. Recent research surveys indicate poor abundance. However, in 1995, there were many small pollock reported around wharfs by fishermen. Exceptionally large fish in unusual quantities have appeared throughout 3Ps recently and there continues to be good evidence of young fish inshore.

Recommendation #3.1.4.6. Pollock - 3Ps:

The FRCC recommends that:

1. there be no directed fishing for 3Ps pollock in 1998 and that by-catch protocols be applied when prosecuting other fisheries.
Chapter 3: Stock Recommendations

Council's Views on Stock Status:

Overall Stock Indicator: unknown; likely increasing

Compared to average

Spawning Biomass: unknown; large fish present

Total Biomass: unknown

Recruitment: positive signs inshore

Growth and Condition: growth not available; condition good

Age Structure: variety of sizes observed; unknown

Distribution: sporadic at northern limit of range

Recent Exploitation Level: low, by-catch

1997 Catch: as of Sept. 10/97

*1997 Catch: as of Sept. 10/97

![Graph showing catch and TAC from 1985 to 1997](chart.png)
3.1.4.7. REDFISH - 2+3K

HISTORY OF FRCC RECOMMENDATIONS:

In 1993, the Council observed that, given the very low level of this stock, the TAC of 20,000t was too high and recommended, as a precautionary measure, that the 1994 TAC for the 2+3K redfish stock be set at 1,000t. There was practically no fishing during 1994. In November 1994, the Council recommended that any directed fishery, should it be allowed, be carried out within the framework of a scientifically coordinated test fishery and that a nominal amount of 200t be provided for that purpose in 1995. This advice was repeated for 1996.

In October 1996, the Council recommended that there be no directed fishing in 1997 on 2+3K redfish.

1997 CONSULTATIONS:

No specific comments were received on this stock during the 1997 consultations.

ANALYSIS:

The 1996 DFO Stock Status Report and the 1997 Newfoundland Region Groundfish Overview indicate that:

- there has been virtually no recruitment since early 1970s.
- this stock is at a very low level.
- there is no recovery possible until the occurrence of good recruitment.

The survey biomass indices fell to extremely low levels in 1994; declines were of the magnitude of about 95-99%. The most recent survey produced somewhat higher catches of small fish but cannot be directly related to historical estimates because of a change in the survey vessel and gear. These index estimates are still low compared to estimates from the mid-1980s. There are no indications of good recruitment. Recruitment into this stock, when it occurs, would require a minimum of 10 years before it would contribute to any fishery. No fishing on this stock is justified.

RECOMMENDATION #3.1.4.7. REDFISH - 2+3K:

The FRCC recommends that:

1. there be no directed fishing in 1998 on 2+3K redfish and that by-catch protocols be applied when prosecuting other fisheries.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: extremely low

Compared to average

Spawning Biomass: low
Total Biomass: low; unknown
Recruitment: very poor
Growth and Condition: not available
Age Structure: poor
Distribution:
Recent Exploitation Level: low
3.1.4.8. AMERICAN PLAICE - 2+3K

HISTORY OF FRCC RECOMMENDATIONS:

In November 1993, the Council noted that the spawning biomass was far below any previous level and that there were no signs of good recruitment for this stock. The Council recommended that there be no directed fishing for 2+3K American plaice in 1994 and that by-catches be limited to 500t. The Council re-iterated its recommendation in November 1994 for no directed fishing, together with a reduction in the by-catch limit to 100t. This advice was repeated for 1996.

With no new scientific data available, and no evidence of a change in status of this stock, the advice of previous years - no directed fishing and a bycatch TAC of 100 t - was reiterated for 1997. It was also recommended that cooperative science-industry surveys be encouraged in an attempt to increase the data base on the current and ongoing status of this stock.

1997 CONSULTATIONS:

Concern was expressed that the by-catch limits for some closed fisheries could result in premature closures of the few fisheries remaining open. A view was expressed that ongoing fisheries should not be closed because of by-catch limits. An increase in allowable bycatch for this and other species was suggested - for example witch flounder, haddock and skate.

ANALYSIS:

The 1996 DFO Stock Status Report and the 1997 Newfoundland Region Groundfish Overview indicate that:

- abundance and biomass are very low.
- the spawning biomass is only about 2% of peak values.
- reported catches cannot explain the decline.
- in recent years recruitment has been low.
- prospects for rebuilding in foreseeable future are poor.

In recent research surveys, 2+3K plaice have been found in deeper waters. The 1996 research vessel survey indicates that estimates of abundance for this stock continue to be very low, a small percentage of peak values. Abundance has declined in all age groups. It is generally believed that fishing mortality alone cannot be responsible for the observed declines in this stock, since reported

RECOMMENDATION #3.1.4.8. AMERICAN PLAICE - 2+3K:

The FRCC recommends that:

1. there be no directed fishing for 2+3K American plaice during 1998 and that by-catch protocols be applied when prosecuting other fisheries; and

2. co-operative science-industry surveys should be developed to increase the data base for this species.
catches never exceeded about 9% of the survey biomass index. Generally, the low abundance and lack of recruitment in this stock indicate poor prospects for recovery.

**Council's views on stock status:**

<table>
<thead>
<tr>
<th>Overall Stock Indicator:</th>
<th>poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning Biomass:</td>
<td>very low</td>
</tr>
<tr>
<td>Total Biomass:</td>
<td>very low</td>
</tr>
<tr>
<td>Recruitment:</td>
<td>poor</td>
</tr>
<tr>
<td>Growth and Condition:</td>
<td>not available</td>
</tr>
<tr>
<td>Age Structure:</td>
<td>not available</td>
</tr>
<tr>
<td>Distribution:</td>
<td>moved to deeper water</td>
</tr>
<tr>
<td>Recent Exploitation Level:</td>
<td>low; by-catch only</td>
</tr>
</tbody>
</table>
HISTORY OF FRCC
RECOMMENDATIONS:

In November 1993, the Council noted that this stock had declined below any previously-observed level and that there were no signs of good recruitment. The Council recommended that there be no directed fishing and that by-catches be limited to 500t during 1994. The recommended by-catch limit was further reduced in 1995. Closure and minimal by-catch were again recommended for 1996.

With no new scientific data available, and no evidence of a change in status of this stock, the advice of previous years - no directed fishing and a bycatch TAC of 100 t - was reiterated for 1997. It was also recommended that cooperative science-industry surveys be encouraged in an attempt to increase the data base on the current and ongoing status of this stock.

1997 CONSULTATIONS:

Concern was voiced that with no directed fisheries and no survey work done in certain areas, no information leading to reopening of stocks could be gathered. Some discussion on the feasibility of science/industry test fisheries followed, and this highlighted the problem of how to finance or compensate fishermen who carry out test fisheries on closed stocks.

There were reports that American plaice was plentiful in some bays on the south coast, although it was also suggested that distributional shifts had taken place and that on once-good grounds, crab was now the dominant species.

Concern was expressed that the bycatch TAC could result in premature closures of open fisheries. A view was expressed that ongoing fisheries should not be closed because of bycatch TACs, and an increase in allowable bycatch for this and other species (witch flounder, haddock and skate) was suggested.

ANALYSIS:

The 1996 DFO Stock Status Report and the 1997 Newfoundland Region Groundfish Overview indicate that:

- This stock remains at a very low level
- Surveys still show a lack of recruitment
- Surveys conducted in 1995, 1996 and 1997 all give very low biomass estimates for this stock

RECOMMENDATION #3.1.4.9. AMERICAN PLAICE - 3Ps:

The FRCC recommends that:

1. there be no directed fishing for 3Ps American plaice in 1998 and that by-catch protocols be applied when prosecuting other fisheries; and
2. cooperative science-industry surveys should be encouraged.
Catches of 3Ps plaice were highest from 1968-1973 and averaged over 10,000 t. Since 1980, catches have exceeded 5,000t only twice and there have been clear indications that the stock has declined dramatically. Research vessel surveys continue to indicate that the stock is at a very low level. All age groups have declined and recruitment in recent years has been very low. The outlook for this stock is very pessimistic. There are plaice found in low numbers inshore, however, and a slight expansion of by-catch limits may be necessary to permit a limited cod fishery.

Stock rebuilding in the near or medium term is unlikely. Any fishing on this stock in 1998 could be detrimental to stock rebuilding.

**Council's views on stock status:**

- **Overall stock indicator:** poor
- **Spawning biomass:** very low
- **Total biomass:** very low
- **Recruitment:** poor
- **Growth and condition:** not available
- **Age structure:** all years low recently
- **Distribution:** in deeper water than usual
- **Recent exploitation level:** unknown; by-catch only
3.1.4.10. Witch Flounder - 2J3KL

HISTORY OF FRCC RECOMMENDATIONS:

In 1993, the Council noted that the biomass of witch flounder in 2J3KL was far below any previous estimate in the 15-year time series, and consequently recommended that, as a precautionary measure, the 1994 TAC for 2J3KL witch flounder be reduced to 1,000t. In November 1994, the Council recommended that there be no directed fishing for 2J3KL witch flounder in 1995 and that by-catches be limited to 100t in 1996. The Council repeated this recommendation for 1997.

In October 1996, the Council recommended that there be no directed fishing for 2J3KL Witch flounder in 1997 and that by-catches be limited to 100t. The Council also recommended that cooperative science-industry surveys should be encouraged.

1997 CONSULTATIONS:

It was noted that Witch has not been in evidence since 1990. It moved to deeper channels and then outside the 200 mile limit.

ANALYSIS:

The 1997 Report of the NAFO Scientific Council indicate that:

• this stock remains at a very low level.
• there are some indications of movement to deeper waters of 3L.

Witch is a slow-growing species that may live to 30 years. Age groups in the 2J3KL stock have been reduced substantially since the 1970s. There are fewer older fish now. Fishing has generally taken fish from pre-spawning and spawning concentrations. Recently, witch appears to have moved to deeper water (in excess of 900 m). Recent data on this stock indicate that it has dramatically declined since the 1980s; relative biomass in 1994 was estimated to be 4% of the 1986 level. Research surveys in 1996 found that witch was somewhat more abundant in the Flemish Pass area and may have migrated from Canadian waters. Generally, the stock is at the lowest level ever observed and there are no signs of improving recruitment. The shrinking area of distribution of this stock, despite its low biomass, may increase its vulnerability to fishing.

RECOMMENDATION #3.1.4.10. Witch Flounder - 2J3KL:

The FRCC recommends that:

1. there be no directed fishing for 2J3KL witch flounder in 1998 and that by-catch protocols be applied when prosecuting other fisheries; and
2. cooperative science-industry surveys should be encouraged.
Chapter 3: Stock Recommendations

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: very poor

Compared to average

Spawning Biomass: very low
Total Biomass: very low
Recruitment: poor
Growth and Condition: not available
Age Structure: age groups reduced
Distribution: Mainly at depths between 550 - 1,100 m along the deep continental slope area in 3L, both inside and outside the 200 mile limit.

Recent Exploitation Level: low; NAFO catches unregulated

*1997 catch: as of Sept 10/97
**3.1.4.11. Witch Flounder 3Ps**

**1997/98 Consultations:**
During the FRCC consultations in Clarenville and Deer Lake in the fall of 1997, and again in Port-aux-Basques in February 1998, fishermen noted that there is a concentration of witch flounder near shore. They noted that this is in an area which is not surveyed by the Research Vessel Survey. They believe that this stock can be fished with a higher quota and have requested that the FRCC recommend that an Industry/Science survey proceed to determine the extent and size of the inshore stock and 50t be made available for this. They reported having very high catch rates in this fishery and wanted to see the TAC returned to 1,000t.

**Analysis:**
The 1996 DFO Stock Status Report indicates that:
- recent biomass estimates are at the low end of observations.
- the survey does not cover the entire stock range.

Quota for witch were first set in the mid-1970s at 3,000t; these were reduced to 1,000t in the late 1980's. Catches come mainly from St. Pierre Bank in depths of 200-900 m. The research survey relative biomass index has shown substantial variation but no trend between 1976-1994. The research survey does not cover Fortune Bay where 35% of the catch occurs. The survey biomass index was high for 1996 but this may reflect a more efficient survey trawl used for the first time this year.

**Recommendation #3.1.4.11. Witch Flounder 3Ps:**
The FRCC recommends that:
1. the 1998 TAC for 3Ps witch flounder be set at 650t;
2. to meet optimum maturity levels for this stock, the mesh size be set in accordance with selectivity studies; and,
3. given there has been no new assessment of this stock since 1996, a joint DFO/industry study be conducted in the inshore areas to assist in the overall assessment process such as appropriate biological sampling, a tagging/movement component, and identification of stock sub-components.
year. Recruitment levels are at the long-term average. Because the fishery is concentrated on a pre-spawning aggregation in a very small area, catch rates may not be an indicator of a high level of biomass.

**Council's views on stock status:**

- **Overall indicator:** About recent average
- **Spawning biomass:** No trend; unknown and variable, low
- **Overall biomass:** Unknown
- **Recruitment:** About long term average
- **Growth and Condition:** Not available
- **Age structure:** Not available
- **Distribution:** In deep water
- **Recent exploitation:** low
3.1.4.12. **GREENLAND HALIBUT OB+1B-F**

**HISTORY OF FRCC RECOMMENDATIONS:**

In its first reports (November 1993 and June 1994) on Greenland halibut, the Council recommended that the TAC for Subareas OB+1 be set at 25,000t (12,500t for Subarea 0). Further work of the NAFO Scientific Council in June 1994 led to the recommendation that the 1995 TAC be set below 11,000t for Divisions OB and 1B-F, i.e., below the offshore catch levels (11,000-15,000t) seen in recent years.

In November 1994, the Council recommended that the 1995 TAC be set below 11,000t and recommended that the conservation merits and feasibility of closing a spawning area in Davis Strait be evaluated in bilateral discussions with Greenland on appropriate sharing arrangements. The 1995 Canadian quota for Subarea 0 was set at 5,500t.

The Council’s recommendations for 1996 were for a TAC below 11,000t. It was further recommended in view of the international nature of this resource that the feasibility of closing a spawning area in the Davis Strait be given consideration in discussions with Greenland. Once again in 1997 the Council recommended that Canada and Greenland seek consistency in controls on harvesting and that the feasibility of closing spawning and nursery areas be explored with

<table>
<thead>
<tr>
<th>RECOMMENDATION #3.1.4.12. <strong>GREENLAND HALIBUT OB+1B-F:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The FRCC recommends that:</td>
</tr>
<tr>
<td>1. the 1998 TAC for Greenland halibut in OB+1B-F be set below 11,000t;</td>
</tr>
<tr>
<td>2. Canada and Greenland should seek consistency in controls on harvesting Greenland Halibut in area OB+1B-F;</td>
</tr>
<tr>
<td>3. closed spawning areas and closed nursery areas should be implemented in the Davis Strait in 1998; and</td>
</tr>
<tr>
<td>4. if small turbot in the West Greenland nursery area recruit to Canadian fisheries, by-catch in the shrimp fishery may become a problem and should be explored with Greenland.</td>
</tr>
</tbody>
</table>

The FRCC is concerned about the conduct of this fishery, especially with respect to the loss of gillnets, soak time, and the waste associated with ghost fishing and extended soak times, therefore, the FRCC recommends that:

| 5. fishing plans for 1998 should be such that, net limits reflect the number that can be handled in a period of time that will minimize waste due to quality deterioration, and measures be implemented to reduce net loss and the associated ghost fishing; |
| 6. observers should be deployed in this fishery to gather information on soak times, discard levels, adherence to net limits, net loss and any other information that will assist in decision making related to the conservation of this stock; and |
| 7. otter trawlers pursuing this fishery should be required to use a minimum of 155mm square mesh. |
Greenland. In addition the FRCC expressed concern about the emerging fishery by gillnets in this area and concern about potential for juvenile Greenland halibut by-catch in the shrimp fishery in this area.

1997 Consultations:

During the 1997 consultations representatives of the Nunavut Wildlife Management Board (NWMB) and industry representatives from Baffin Island expressed concern over the previous Minister's decision early in 1997 to unilaterally increase Canada's share in this fishery.

Concerns were expressed about the increased use of gillnets in this area, the length of the soak times, the amount of fish lost due to deteriorating quality as a result of lengthy soak times, and the effect of ghost fishing by lost nets. It was also noted that ghost fishing by lost gillnets was a problem for Bowhead, Beluga, and Narwhal as they dive to depths of up to 600 fathoms.

The point was made that there must be a better way to fish this stock. It was recommended that alternatives to gillnetting in this area, such as longlining, be explored. It was noted that one boat had fished this year with longlines and it had reported good catches.

Analysis:

Turbot have a relatively low reproductive rate compared to other deep water fish species. Redirection of effort to deepwater fishing of this species make the impact on stocks difficult to assess.

Since 1987, bottom-trawl surveys have been conducted in subarea 1 jointly by Japan and Greenland. In division 1A, trawlable biomass was slightly higher than that estimated in 1994; other areas were also slightly higher in depths between 400-1,500m. The increase was most pronounced in age group 4, the 1991 year-class. Shrimp trawl surveys off West Greenland in waters from the 3 mile limit to 600m depths increased from 1991-1994, but dropped in 1995. These catches were 1-2 year old fish. Biomass in the nursery area (1As and 1B) is below the level found in 1992-1994 but above the 1990-1991 level. The 1997 NAFO Scientific Council report notes that the 1995 year class appears to be the strongest in the time series.

Changes in the commercial fishery have changed the relative age distributions in catches. Age 7 was still the most dominant year-class in 1996 overall catches, but due to increases in longline and gillnet fishing there is a tendency to larger, older fish in the catches compared to previous years. Catch rate series are incomplete and it is difficult to determine overall trends.

Council's views on stock status:

<table>
<thead>
<tr>
<th>Overall Stock Indicator</th>
<th>average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spawning Biomass</td>
<td>unknown</td>
</tr>
<tr>
<td>Total Biomass</td>
<td>unknown; deep water abundance difficult to assess</td>
</tr>
<tr>
<td>Recruitment</td>
<td>strong 1991 and 1995 year-classes; other year-classes average</td>
</tr>
<tr>
<td>Growth and Condition</td>
<td>unknown</td>
</tr>
<tr>
<td>Age Structure</td>
<td>age 7 dominant in 1996 catches; increases of older fish in recent catches</td>
</tr>
<tr>
<td>Distribution</td>
<td>normal</td>
</tr>
<tr>
<td>Recent Exploitation Level</td>
<td>unknown</td>
</tr>
</tbody>
</table>
3.1.4.13. Greenland Halibut 2 + 3

In June 1994, the Council noted the absence of controls on the foreign fishery outside 200 miles and recommended that all means be taken by Canada to limit the effort on this stock. In November 1994, the Council reiterated that catches in the order of the historical catch level of 25,000t should be a maximum level.

The NAFO Scientific Council concluded in June 1995 that the TAC for Greenland halibut in 2+3KLMMNO should continue to be set at levels well below the catches achieved in previous years until it became clear that the stock was increasing. In addition, the Scientific Council recommended that measures be considered to reduce, as much as possible, the exploitation of juvenile Greenland halibut.

In August 1995, the FRCC re-iterated the need for maintaining reduced TACs. The conclusion of the Scientific Council that the large catches of immature Greenland halibut were a major impediment to stock rebuilding was noted. The Council suggested that Canada’s objective for the near future should be to rebuild the stock to biomass levels of the early 1980s in order to support a sustainable fishery in the long-term. The NAFO Fisheries Commission concluded at the September 1995 meeting that the 1996 TAC would be set at 20,000t for Greenland halibut in 3LMNO, with an additional TAC of 7,000t to be allowed in SA2+3K (Canada only).

**Recommendation #3.1.4.13. Greenland Halibut 2 + 3:**

The FRCC recommends that:

1. the current Canadian quota in 2+3K be maintained at 7,000t for 1998;
2. measures be taken to protect juveniles such as small fish protocols;
3. Canada propose to NAFO that the minimum mesh be increased to 145mm in the NAFO Regulatory Area; and
4. the by-catch of American plaice be kept to the lowest possible level.

Following the September 1997 NAFO Annual meeting, the FRCC further recommends that:

5. efforts by DFO Science to determine distribution and abundance (by management area) throughout the stock area should continue with a view to presenting new information for consideration by the NAFO Scientific Council in June 1998; and
6. otter trawlers pursuing this fishery should be required to use a minimum of 155mm square mesh.
In August 1996, the FRCC was encouraged by the new evidence of good recruitment for Greenland halibut. The Council indicated that the above-average year-classes from the 1990's must be protected to allow the stock to rebuild and that catching large numbers of these fish as juveniles would waste the potential for rebuilding the stock. In September 1996, the NAFO Fisheries Commission concluded that the 1997 TAC would continue to be set at 20,000t for Greenland halibut in 3LMNO. The Canadian quota for 1997 in 2+3K was established at 7,000t in keeping with the FRCC recommendations.

1997 Consultations:

During the 1997 consultations there were again concerns expressed about the effect of the deep water fishery on this stock. There was some suggestions that the catch rates in this fishery are declining and that fishermen are reducing mesh size and moving to shallower water where the reduced mesh size is permitted. It appears however that the recruitment that was seen in the research vessel survey is starting to show up in the commercial fishery. There was concern that if the catch rates are declining in the deep water and that if this is an indication of declining abundance of mature fish then there is a danger that this stock is being overfished.

Analysis:

The June 1997 report of the NAFO Scientific Council makes the following observations:

- Improvements in most indices of abundance in 1996.

The FRCC notes that the additional controls in the NAFO Regulatory Area have likely resulted in a substantial reduction of fishing mortality on the stock in 1995 and 1996. The Council is encouraged by the signs of good recruitment since 1990 and notes that continued conservation measures should allow these year classes to grow and contribute to the spawning biomass in the near future.

Despite these positive signs, we believe it would be premature at this stage to increase catch levels until the stock has benefitted more substantially from this recruitment.

The Council notes that catches from this stock have consisted mainly of immature fish and believes that additional measures such as increased mesh size and small fish protocols should be implemented in the NAFO Regulatory Area so as to be consistent with similar practices inside the Canadian zone.

Council's views on Stock Status:

<table>
<thead>
<tr>
<th>Overall Stock Indicator:</th>
<th>Improving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning Biomass:</td>
<td>Fishable biomass, low</td>
</tr>
<tr>
<td>Total Biomass:</td>
<td>Showing signs of recovery</td>
</tr>
<tr>
<td>Recruitment:</td>
<td>Good year-classes since 1990</td>
</tr>
<tr>
<td>Growth and Condition:</td>
<td>No special observation</td>
</tr>
<tr>
<td>Age Structure:</td>
<td>Older age-groups remain at low levels</td>
</tr>
<tr>
<td>Distribution:</td>
<td>1996 fall survey shows distribution at 17% 2GH, 65% 2J3K, 18% 3LMNO</td>
</tr>
<tr>
<td>Recent Exploitation Level:</td>
<td>Reduced in 1995 and 1996</td>
</tr>
</tbody>
</table>
3.1.4.14. ROUNDNOSE GRENADIER - SUBAREA 0

ANALYSIS:

The 1997 NAFO Scientific Council Report indicates that catches of recent years have occurred principally as by-catch in Greenland halibut fisheries in the regulatory area. There was little new information available in 1997 and it was not possible to provide advice on this stock. Small quantities of roundnose grenadier are also taken in domestic Greenland halibut fisheries in this area.

HISTORY OF FRCC RECOMMENDATIONS:

In its 1993 and 1994 reports, the Council recommended the TAC for 2+3 roundnose grenadier be set at 3,000t. In its 1995 report, Council recommended that should there be directed fishing on this stock, it be done in the context of a scientifically conducted test fishery. In Building the Bridge, Council's November 1996 report, it was recommended that there be no directed fishery on this stock and cooperative industry-science surveys should be encouraged.

1997 CONSULTATIONS:

There were no specific comments on this stock during the 1997 consultations.

RECOMMENDATION #3.1.4.14. ROUNDNOSE GRENADIER - SUBAREA 0:

The FRCC recommends that:

1. there be no directed fishing for roundnose grenadier in subarea 0 in 1998.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: likely low
Compared to average
Spawning Biomass: likely low; unknown
Total Biomass: likely low; unknown
Recruitment: not available
Growth and Condition: not available
Age Structure: not available
Distribution: unknown
Recent Exploitation Level: unknown, low
3.1.4.15. Roundnose Grenadier - 2+3

ANALYSIS:

The 1997 report of the NAFO Scientific Council reveals the stock remains at a very low level despite the absence of directed fisheries since the late 1970’s. The reason for the continued poor performance of the Subarea 0 roundnose grenadier stock is not known. Since 1996 the NAFO Scientific Council has recommended no directed fishing. As there is no information to indicate any improvement in this stock for 1998, the NAFO Scientific Council again recommends no directed fishing and that catches be restricted to by-catches.

HISTORY OF FRCC RECOMMENDATIONS:

In earlier reports, released in the fall of 1993, and 1994, the Council recommended that the TAC for roundnose grenadier be set at 4,000t in 1994 and again for 1995. The TAC was set at 500t for 1995. For 1996 and 1997, the FRCC recommended there be no directed fishing on roundnose grenadier in Subarea 0 and that cooperative industry science surveys would assist in furthering the knowledge on this stock.

1997 CONSULTATIONS:

There were no specific comments on this stock during the 1997 consultations.

RECOMMENDATION #3.1.4.15. Roundnose Grenadier - 2+3:

The FRCC recommends that:

1. there be no directed fishing for roundnose grenadier in 2+3 in 1998.
**COUNCIL’S VIEWS ON STOCK STATUS:**

<table>
<thead>
<tr>
<th>Overall Stock Indicator:</th>
<th>unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average:</td>
<td></td>
</tr>
<tr>
<td>Spawning Biomass:</td>
<td>unknown</td>
</tr>
<tr>
<td>Total Biomass:</td>
<td>unknown</td>
</tr>
<tr>
<td>Recruitment:</td>
<td>unknown</td>
</tr>
<tr>
<td>Growth and Condition:</td>
<td>unknown</td>
</tr>
<tr>
<td>Age Structure:</td>
<td>unknown</td>
</tr>
<tr>
<td>Distribution:</td>
<td>unknown</td>
</tr>
<tr>
<td>Recent Exploitation Level:</td>
<td>unknown</td>
</tr>
</tbody>
</table>
1997 Consultations:

Fishers indicated that while the distribution of fishing effort across 3Ps, 3LN and 3O had remained unchanged for this stock during 1997, there was little difficulty in catching the quota. As in previous years, the bulk of the fishery occurred in Division 3O. One fisher indicated that the redfish fishery in 3O was hampered by the by-catch of skate. While there was no action on Council’s recommendation for the distribution of effort and industry-science cooperative initiatives for 1997, fishers expressed their desire to engage in science-based undertakings and to provide more fisheries data. Fishers did indicate that the conditions attached to the present science-industry initiatives should be consistent with other fisheries. Based on their observations in the directed fishery and by-catches of skate in other fisheries, fishers requested that the skate TAC be raised to 6,000t.

The issue of the directed, unregulated skate fishery outside of the 200 mile limit was raised as a problem for this stock. It was noted that there are many foreign vessels directing for skate between the 200 mile limit and the edge of the shelf in area 3LNO.

Analysis:

Of the 8-10 species of skate found in waters around Newfoundland and Labrador, thorny and smooth skates comprise the bulk of catches by commercial fishery and research vessels. Although thorny skates are widely distributed, tagging studies reveal they exhibit limited movement, with re-captured animals found infrequently beyond 100 kms of the site of initial capture.

Recommendation #3.1.4.16. Skates - 3LNOPs:

The FRCC recommends that:

1. 3LN, 3O, and 3Ps continue to be treated as separate management areas; and
2. the overall TAC be set at 3,000 t for 1998: this should be distributed between management areas, as recommended in the 1996 Stock Status Report.
In comparison to an individual cod which can release millions of eggs a year during a relatively short spawning period, a female skate will lay only 6-40 eggs throughout the year. Special challenges are presented by the limited reproduction potential of this species and insufficient biological information.

The 1996 DFO stock status report reveals there has been a continuing decline of biomass across the entire stock area, and particularly for Divisions 3N and 3O during 1996. Catch and catch rate trends have been declining over this same period. The catch of 1,600t in 1996 marked a low for the Canadian directed fishery but this increased of 2,440t in 1997, with the bulk of removals occurring during May and June. The majority of the catch is still taken from Division 3O but the implementation of Council’s recommendation for three separate management units for 1997 has begun the process of shifting effort across the entire stock area. The serious deficiency of biological and abundance information on this resource has been emphasized and the lack of regulation of the skate fishery outside 200 miles continues to be a problem.

**Council’s views on Stock Status:**

- **Overall Stock Indicator:** unknown, declining
- **Spawning Biomass:** unknown
- **Total Biomass:** declining recently
- **Recruitment:** unknown
- **Growth and Condition:** size declining in RV survey
- **Age Structure:** not available
- **Distribution:** local concentrations
- **Recent Exploitation Level:** unknown
3.1.4.17. LUMPISH

HISTORY OF FRCC RECOMMENDATIONS:
The FRCC first reported on this particular stock in 1995. The Council recommended that management measures, such as shortened season, be used to reduce the effort on this stock. It further recommended that roe content monitoring programs, similar to those employed in the capelin fishery, be established to ensure that fishing takes place at an appropriate time and that closed and protected areas be established for this stock.

In October 1996, the Council recommended that dramatic new management measures be taken to insure conservation of lumpish in 1997 and that these measures include a combination of the following:

- roe content monitoring programs should be established to determine timing of the fishery to maximize yield/fish;
- closed and protected spawning areas must be established throughout the range of the stock;
- more localized management must be established;
- effort must be further reduced;
- gear limits must be decreased and the season shortened.

Unless these measures are effectively implemented, the closure of this fishery is imminent.

1997 CONSULTATIONS:
Many comments were received on this stock at all Newfoundland consultations in 1997. It was noted that the stock appears to be stable at very low levels on the north east coast, but there were signs of increases, including landings on the south coast. It was noted that the lumpish stocks had appeared to increase following the decline of trawling activity. Some noted that there had been no trawling on cod spawning areas in the last few years and this had had a very positive effect on the lumpish.

ANALYSIS:
The 1996 DFO Stock Status Report indicates that:
- there is little scientific information and inadequate biological sampling.
- there has been a 40% decline in roe landings from the recent average.
- inshore fishermen are nearly unanimous in view that this stock is declining, especially in northern areas.

RECOMMENDATION #3.1.4.17. LUMPISH:
The FRCC recommends that:

1. measures taken to control effort in the past few years should be continued; and
2. fishers and science gather more information on this stock through the establishment of an Index Fishermen Program especially with respect to: catch and effort levels, spawning patterns, growth rates, maturation, population structure, temperature preferences and habitat preferences.
Lumpfish males establish breeding territories inshore; these may be used year after year. Data from studies which have monitored these territories indicate exceptional impact from the fishery. Landings of roe averaged 2,000t from 1988-1995. In 1996 they declined to 1,200t. There is nothing known about stock structure and no research planned to study this. Biomass indices have declined by an order of magnitude from 1985 to 1995. The biomass estimate for 1996 is the lowest since the 1980s. Fishermen have expressed concern over effort in the fishery. Catch rates by monitors in 3Ps were the lowest reported since the fishery began in the 1970s.

**COUNCIL'S VIEWS ON STOCK STATUS:**

- **Overall Stock Indicator:** stable at very low levels on Northeast coast/ stable on South coast
- **Spawning Biomass:** declining
- **Total Biomass:** declining
- **Recruitment:** unknown
- **Growth and Condition:** not available
- **Age Structure:** unknown
- **Distribution:** inshore
- **Recent Exploitation Level:** decreasing in some areas, landings up in 3Pn and 3Ps
Dear Minister:

The terms of reference of the Fisheries Resource Conservation Council (FRCC) state, “The Council is also responsible for advising the Minister on Canada’s position with respect to straddling and transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO).” Having received the report of the NAFO Scientific Council (June 1997), the FRCC is providing you with advice for the forthcoming annual meeting of the NAFO General Council and Fisheries Commission in St. John’s, Newfoundland on September 15 - 19, 1997.

As in our previous reports on NAFO stocks, the FRCC wishes to reiterate that the failure of past management practices by NAFO has resulted in devastating over-exploitation of the straddling and transboundary stocks on the once prolific Grand Banks. Despite tremendous effort on the part of Canada, and progress made on key issues, we have yet to succeed at moving NAFO to fully sustainable fishing practices.

The Council remains concerned about the level of by-catch of species under moratorium in divisions 3LNO, e.g. cod, American plaice and witch flounder. Having these stocks recover and reach productive levels is imperative to the Canadian fishery. We are pleased to note that yellowtail flounder, Greenland halibut, and, witch flounder are showing some signs of improvement and we must be careful not to jeopardize this.

We have also noted improvements in the Greenland halibut (turbot) stock in division 2+3 where recruitment has been good throughout the 1990’s. Council is concerned, however, about the large number of juvenile fish that appear to have been taken both inside and outside the Canadian zone. We raised this issue in our 1996 report and, at that time, we recommended Canada push for a 145 mm mesh size for this fishery in the NAFO Regulatory Area. We reiterate this recommendation again this year and we would like to see this as Canada’s official position at NAFO. Further to this, work should begin in 1997 with a view to adopting a mesh size in 1998 which will allow further escapement of juvenile fish, including turbot and other flatfish species. In addition, we think it is very important to continue research in a timely manner with respect to the relative abundance of Greenland halibut throughout the stock range. It is particularly important to confirm whether or not only 18% of the estimated biomass is in 3LMNO. The current TAC for this area may well be excessive if the relative distribution determined by the recent survey is confirmed.

The FRCC fully supports Canada’s position with respect to the pilot project of observer coverage on all vessels in the Regulatory Area and Canada’s position that the observer program should be mandatory after the pilot project. However, we are not at all pleased with the lapses in reporting procedures for this project and we believe that Canada should seek to have this strengthened. This program must be uniform and consistent for all parties, especially with respect to data collection, and reports on catch, discards, etc. This is a required prerequisite for accurate assessments and quota setting.

On July 29, 1997, we released publicly to you our Groundfish Conservation Framework for Atlantic Canada. You will note that we have placed an emphasis on the use of closed areas to protect spawning aggregations and concentrations of juvenile fish. We also call for the adoption of Marine Protected Areas (MPAs). The FRCC encourages Canada to identify such areas or species in the NAFO regulatory zone, and to have NAFO adopt these conservation measures. It is the opinion of the Council that with today’s technology, fish have nowhere to hide and therefore, MPAs have become necessary.
In our four previous reports to the Minister of Fisheries and Oceans on Atlantic Groundfish Stocks, we have raised our concerns about the tremendous increase in the population of seals -- harp, grey, hooded and others. We believe that this is having a negative impact on the recruitment, and consequently the recovery, of groundfish stocks. This year, the NAFO Scientific Council recognized that the number of seals could be having an effect on the rebuilding of groundfish stocks. The FRCC fully supports this position.

We recognize the difficulty in reaching a consensus in an international forum such as NAFO and we commend Canada for the progress that has been made, especially this year at the Scientific Council meeting, having NAFO discuss, and commit to, the precautionary approach. We are pleased to note that a workshop will be held on the framework for implementing such an approach. The FRCC fully supports Canada’s position in this matter and we hope NAFO will adopt the appropriate conservation strategies.

The FRCC believes that Canada must hold fast to its position of no shrimp fishery in division 3LNO until such time as cod, and other groundfish, have recovered in this area and a permanent effective observer program is in place. The Council also wishes to endorse the Canadian position to have the NAFO Fisheries Commission separate discussions of shrimp in divisions 3LNO and 3M from discussions of groundfish in the regulatory zone. The recovery and sustainable utilization of groundfish stocks must continue to be the Canadian priority. In the past, other nations have used the discussion of shrimp on the Flemish Cap to take time away from discussions of concern to Canada about groundfish.

In addition to the six stocks for which we give specific recommendations (see following chapter), the FRCC fully supports the NAFO Scientific Council recommendations for continued moratoria on 3M cod and 3M American plaice. We also believe that the moratorium on 3NO capelin should be continued.

We have noted with interest that the NAFO Scientific Council has recommended a 4,000 t Total Allowable Catch (TAC) for a commercial fishery of 3LNO yellowtail flounder. We also note that the Scientific Council cautions about the by-catch of American plaice in this fishery. As you will note in our stock-by-stock recommendations, the FRCC recommends that 4,000 t be used to determine if this fishery can be conducted cleanly (free of substantial amounts of by-catch of species currently under moratoria). We have also included in our recommendation all other elements of the NAFO Scientific Council’s recommendations including: careful monitoring and sampling, delaying the fishery until after the peak spawning season, and confining the fishery to 3NO. The FRCC also recommends the use of small fish protocols.

If the straddling and transboundary groundfish stocks in the NAFO area are to recover, all participants must adhere to sound conservation principles and practices. Canadian fishermen cannot be expected to pay the price alone. Strong conservation measures which apply inside the 200 mile limit, must also apply outside the 200 mile limit. We have emphasized this point again in our recently released Groundfish Conservation Framework for Atlantic Canada. We must be ever vigilant with our enforcement regime and make sure all players stay committed to conservation.

Best wishes for a successful NAFO meeting in September.

Fred Woodman
Chairman
3.1.5.1. COD 3NO

**History of FRCC Recommendations:**

In the June 1995 report of the NAFO Scientific Council, scientists indicated that this stock was at an all time low in 1994 and was represented mainly by 2 year-classes (those of 1989 and 1990). In particular, the year-classes since 1990 appeared to be weak and the estimates of the 1989 and 1990 year-classes, which were believed to be average, were much lower than previously estimated. Sampling information indicated that commercial fisheries had targeted these year-classes since 1991. In 1994, scientists warned that the spawning stock biomass could not begin to recover unless the 1989 and 1990 year-classes survive to maturity. In particular, they indicated that rebuilding would not happen if fisheries on immature fish continue at current high levels. The NAFO Scientific Council recommended that there be no direct fishing for cod in Div. 3N and 3O in 1996 and that by-catches in fisheries targeting other species should be kept at the lowest possible level.

In its August 1994 and 1995 letters to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended a continuation of the moratorium for cod in division 3NO. The Council was particularly concerned with the low levels of biomass and the lack of recruitment for this stock. The NAFO Fisheries Commission continued the moratorium on 3NO cod.

In August 1996, in a letter to the Minister of Fisheries and Oceans, the FRCC again recommended a continuation of the moratorium on directed fishing for 3NO cod. In September 1996, the NAFO Fisheries Commission agreed to continue the moratorium on fishing 3NO cod in 1997.

**Analysis:**

The June 1997 report of the NAFO Scientific Council makes the following observations:

- Biomass at extremely low level.
- Stock at all time low in 1996.
- Only weak year-classes now in the stock.
- No sequential population analysis possible due to lack of biological sampling.

The 1989 and 1990 cohorts which dominated the 1992-1995 surveys were present in the 1996 spring survey but were practically absent from the 1996 fall survey. The Council is concerned with the low level of biomass and the lack of good year classes since 1991. Under these conditions, the prospects of rebuilding for

**Recommendation #3.1.5.1. COD 3NO:**

The FRCC recommends that:

1. There be no directed fishing in 1998.
2. By-catches be kept at the lowest possible level.
3NO cod are poor and maximum protection must be given to the upcoming year classes. Consequently, the Council considers that no directed fishing should take place on the 3NO cod stock in 1998 and that bycatches of cod should be kept at the lowest possible level.

**COUNCIL'S VIEWS ON STOCK STATUS:**

- Overall Stock Indicator: Very low level
  
  Compared to average

- Spawning Biomass: Likely at very low level

- Total Biomass: At historically low levels

- Recruitment: All year classes at low levels

- Growth and Condition: No special comment

- Age Structure: All year classes weak

- Distribution: No special comment

- Recent Exploitation Level: Under moratorium since 1994
3.1.5.2. **American Plaice 3LNO**

**History of FRCC Recommendations:**

In the June 1995 Report of the NAFO Scientific Council, scientists indicated that the abundance of American plaice in 3LNO was at a record low level. Given the extremely low population size, the concerns with respect to the spawning biomass, and the apparently large mortality on juvenile plaice, the NAFO Scientific Council recommended that there be no fishing for American plaice in Div. 3LNO in 1996 and that by-catches be reduced to the lowest possible level.

In its letters of August 1994 and 1995 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended continuing the moratorium for American plaice in Division 3LNO. The Council also pointed at the need to address the concerns raised by the exploitation of immature fish in directed fisheries by non-contracting parties, as well as the suspected high and increasing by-catches of American plaice in the Greenland halibut fishery.

In August 1996, in a letter to the Minister of Fisheries and Oceans, the FRCC again recommended continuing the moratorium on fishing for 3LNO American plaice. In September 1996, the NAFO Fisheries Commission agreed to continue the moratorium on fishing 3LNO American plaice in 1997.

**Analysis:**

The June 1997 report of the NAFO Scientific Council makes the following observations:

- Stock at a low level
- No good year-classes since 1987.
- Stock composed of fish less than 6 years old.

Although once the largest flatfish fishery in the Northwest Atlantic, and in spite of being under a moratorium since 1995, surveys suggest that this stock has reached a very low level and could still be in decline.

The Council believes that a recovery of this stock is unlikely in the short term as high abundance of juveniles has not translated into a stronger fishable stock in the past, likely due to high by-catch levels in the Greenland halibut fishery.

Since this stock is in such fragile condition, the Council believes that additional protection of nursery grounds be considered with urgency.

**Recommendation #3.1.5.2. American Plaice 3LNO:**

The FRCC recommends that:

1. There be no directed fishing in 1998.
2. Measures be undertaken to minimize the by-catch of American plaice in the Greenland halibut fishery, including an increase in the minimum mesh size to 145 mm.
3. Protection of key juvenile nursery grounds through the establishment of closed areas to all fishing activity be implemented as a priority in 1998.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Very low

Compared to average

Spawning Biomass: Very low
Total Biomass: At low levels
Recruitment: No good recruitment since 1987
Growth and Condition: No apparent change
Age Structure: Less than 5% of biomass age 9 or older, most fish < 6 years of age
Distribution: No special observation
Recent Exploitation Level: Under moratorium
3.1.5.3. **Yellowtail Flounder 3LNO**

**History of FRCC Recommendations:**

In the June 1995 Report of the NAFO Scientific Council, scientists indicated that the potential growth on the stock from the relatively large 1984-86 year-classes had not occurred, likely because of large catches of these cohorts as juveniles by fisheries in the Regulatory Area, and because the TAC had been exceeded each year from 1984 to 1993. The NAFO Scientific Council concluded that this stock was at a low level. The scientists also noted that the geographic distribution of this stock had contracted, making it very vulnerable to over-exploitation. In view of the above, the NAFO Scientific Council recommended that there be no directed fishing on yellowtail flounder in 1996 and that by-catches be reduced to the lowest possible level.

In its letters of August 1994 and 1995 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended the continuation of the moratorium for yellowtail flounder in Division 3LNO. The Council also pointed out the need to address the concerns raised by the exploitation of immature fish in the directed fisheries in the Regulatory Area by non-contracting parties. The Council was particularly concerned with the low levels of biomass and the lack of recruitment for this stock. The NAFO Fisheries Commission continued the moratorium on 3LNO yellowtail flounder.

In its August 1996 letter to the Minister of Fisheries and Oceans, the Council reiterated its recommendation for the continuation of the moratorium on 3LNO yellowtail flounder. The FRCC noted that the potential growth from the 1984-86 year-classes had not occurred, probably because of large catches of juveniles.

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**Recommendation #3.1.5.3. Yellowtail Flounder 3LNO:**

The FRCC recommends that:

1. The total allowable catch be established at 4,000 t to permit a limited directed fishery, provided that the following conditions are met;
2. The yellowtail fishery be restricted to divisions 3NO.
3. By-catches of American plaice, cod and witch flounder be kept at the lowest possible levels, in part through seasonal adjustments to fishing activity.
4. The start of the fishing season be delayed until after peak spawning period in July.
5. The protection of key juvenile nursery grounds through the establishment of closed areas to all fishing activity be implemented as a priority in 1998.
6. Juveniles be further protected through the implementation of strict small fish protocols and avoidance of key juvenile nursing areas.
7. The minimum mesh size in this fishery be established at 145 mm.
8. Monitoring, evaluation and sampling programs be developed prior to the commencement of fishing.
9. There be a mid-season review of fishing activity so as to ensure the effectiveness of the by-catch and small fish protocols.
in the NAFO Regulatory Area. In September 1996, the
NAFO Fisheries Commission agreed to continue the
moratorium on fishing 3LNO yellowtail flounder in
1997.

**ANALYSIS:**

The June 1997 report of the NAFO Scientific Council
makes the following observations:

- Stock size has increased since 1994; still lower
  than in the 1980s.
- Juveniles are concentrated in and around the
  nursery area located in the transboundary area
  of division 3N.
- Recent year-classes below average.
- Stock is capable of sustaining a limited
directed fishery.

Based on the results of several surveys, there appears
to have been a slow but steady increase in biomass
over recent years, although it is still well below levels
recorded in the early 1980's. The NAFO Scientific
Council has recommended using the lowest exploita-

tion rate on record (6%) to establish a TAC (4,000 t)
for 1998. However, the FRCC remains concerned with
the potential impact of a by-catch of American plaice
and cod in such a fishery. The Council is also con-
cerned with the limited geographical distribution of the
yellowtail flounder stock, particularly with low densi-
ties in division 3L. For these reasons, the Council
believes that exploitation rates should be kept at a low
level. For the purpose of the 1998 fishery, the TAC
should be established at 4,000t. A TAC of 4,000t
seems acceptable if proper conservation measures are
effectively implemented.

In addition, the FRCC fully supports the
recommendations of the NAFO Scientific
Council to delay the beginning of the
fishery until after peak spawning has taken
place, to confine the yellowtail fishery to
divisions 3NO, and to ensure that careful
monitoring and sampling take place.
Because by-catches of American plaice
could be substantial in this fishery and
because of the necessity to protect juvenile
flatfish in the known nursery areas, the
FRCC also considers that any fishery on
yellowtail should be carried out under strict
small fish protocols.

**COUNCIL'S VIEWS ON STOCK STATUS:**

- **Overall Stock Indicator:** Gradual improvement
  Compared to average
- **Spawning Biomass:** Undetermined
- **Total Biomass:** Increased since 1994 but likely still below levels of 1980's
- **Recruitment:** Below average
- **Growth and Condition:** Weight at age stable
- **Age Structure:** Stable with several cohorts
- **Distribution:** Expanding compared to early 90's; low densities in 3L
- **Recent Exploitation Level:** Under moratorium since 1995
3.1.5.4. **Witch Flounder 3NO**

**HISTORY OF FRCC RECOMMENDATIONS:**

In the June 1995 Report of the NAFO Scientific Council, scientists indicated that this stock was likely at a very low level. The NAFO Scientific Council recommended that no fishing be permitted on witch flounder in Division 3NO in 1996 in an effort to rebuild this stock to former levels. Scientists also recommended reducing by-catches to the lowest possible level.

In its letters of August 1994 and 1995 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended a continuation of the moratorium for witch flounder in Division 3NO. The moratorium was continued in 1996.

In June 1996, the NAFO Scientific Council recommended that no fishing be allowed on this stock in 1997 to allow for stock rebuilding. It also recommended that by-catches be kept at the lowest possible level. In August 1996, in a letter to the Minister of Fisheries and Oceans, the FRCC again recommended continuing the moratorium on fishing for 3NO witch flounder in 1997. In September 1996, the NAFO Fisheries Commission agreed to continue the moratorium on fishing 3NO witch flounder in 1997.

**ANALYSIS:**

The June 1997 report of the NAFO Scientific Council makes the following observations:

- Stock remains at a low level;

The Council believes that this stock remains at a very low level and that the moratorium in place since 1995 should be continued.

**RECOMMENDATION # 3.1.5.4. Witch Flounder 3NO:**

The FRCC recommends that:

1. There be no directed fishing, to allow stock rebuilding.
2. Witch flounder by-catch be kept at the lowest possible level.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Very low

Compared to average

Spawning Biomass: Likely at low level
Total Biomass: Low; slight improvement in 96/97 survey
Recruitment: No observation
Growth and Condition: No observation
Age Structure: No data
Distribution: No special observation
Recent Exploitation Level: Under moratorium
3.1.5.5. REDFISH 3LN

HISTORY OF FRCC RECOMMENDATIONS:

In the June 1995 report of the NAFO Scientific Council, the scientists concluded that redfish abundance was very low in Division 3L, with no sign of good recruitment. In Division 3N, they observed that the stock has declined from 1984 to 1991 but that "the status since then is uncertain". The Scientific Council of NAFO recommended for 1996 that "total catches of redfish in Division 3LN should not exceed 14,000t". At the September meeting of the NAFO Commission, it was agreed to set the 1995 TAC for 3LN redfish at 14,000t. The Fisheries Resource Conservation Council made no specific recommendation on this stock for 1995.

In its August 1995 letter to the Minister of Fisheries and Oceans, the Council concluded that abundance in 3L appeared to be very low, with no sign of good recruitment, and abundance in 3N had declined to an unknown extent, with no sign of good year-classes since those of 1986/87. The Council noted that for the first time in many years, the TAC was not taken in 1994, due largely to unsuccessful fisheries by several member states. The Council concluded that a cautious approach was crucial for 3LN redfish and that the TAC for 1996 should be substantially reduced from the level of 14,000t, probably to a level below the 1994 catch of 7,000t. At the September meeting of the NAFO Commission, it was agreed to reduce the TAC for 1996 to 11,000t.

In its August 1996 letter to the Minister of Fisheries and Oceans, the FRCC indicated that they could see little evidence to support a 14,000t TAC for 3LN redfish. The Council noted that the Fisheries Commission set the quota at 11,000 t for 1996. The NAFO Scientific Council considered that this stock had declined since the mid 1980's and continued to be at a low level, particularly in Division 3L. There was some indication of recruitment in 3N but no sign of any good year-classes to follow. For these reasons, the FRCC recommended that Canada should propose a substantial reduction in this TAC. In September 1996, the NAFO Fisheries Commission set the TAC for 1997 at 11,000t for 3LN redfish.

The FRCC also cautioned that any further expansion of the shrimp trawl fishery into 3LN should be discouraged. The FRCC noted with concern the high discard rate of small flatfish and redfish in other shrimp fisheries and the effect this could have on recruitment and loss of yield for these stocks, which were at critically low levels. Given these reasons, the FRCC recommended that approach taken by Canada at NAFO in the previous year with respect to an expanded 3LN Shrimp trawl fishery be continued.

RECOMMENDATION #3.1.5.5. REDFISH 3LN:

The FRCC recommends that:

1. There be no directed fishery.
2. By-catch be kept at the lowest possible levels.
3. There be no expansion of the 3M shrimp fishery into 3LN because of potential by-catch of juvenile redfish in the small mesh shrimp gear.
ANALYSIS:

The June 1997 report of the NAFO Scientific Council makes the following observations:

- Biomass low in 3L with no sign of good recruitment.
- Little or no sign of good recruitment since 1986 and 1987 year classes.
- Stock at a very low level.

The Council notes that catches continued to decline in 1996, reaching a historical low (453t) for this fishery. The Council considers that the shortfall of the catch below the total allowable catch in recent years is largely the result of unsuccessful commercial fisheries carried by member states. This is likely an indication of the poor status of the 3LN redfish stock. With no sign of good recruitment since the 1986-87 year classes, the prospects for rebuilding the 3LN redfish stock are poor.

The Council continues to believe that an expansion of the shrimp trawl fishery from 3M to 3LN should be discouraged so that juvenile redfish are given maximum protection. The Council believes that the approach taken by Canada at NAFO with respect to this possible expansion should be continued.

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Very low

Compared to average

- Spawning Biomass: Likely very low level
- Total Biomass: Very low level
- Recruitment: Little sign of good recruitment after 1986-87 year classes
- Growth and Condition: Typically slow growth
- Age Structure: Dominated by 1986-87 year classes
- Distribution: No special comment
- Recent Exploitation Level: Low
3.2. Stocks of the Gulf of St. Lawrence

3.2.1. Introduction to the Gulf of St. Lawrence Stocks

This report is one in a series of reports the Fisheries Resource Conservation Council (FRCC) has produced to provide advice to the Minister of Fisheries and Oceans on conservation requirements for Atlantic and eastern Arctic groundfish stocks for 1998. This report deals with all groundfish stocks in the Gulf of St. Lawrence, cod stocks in divisions 2GH, 2J3KL, 3Ps and 4VsW, and witch flounder in division 3Ps.

In the past, the FRCC has produced a single report annually which included advice for all groundfish stocks. For its 1998 advice, the FRCC has produced three separate reports; 1998 Conservation Requirements for Grand Banks, Labrador Shelf and Davis Strait Groundfish Stocks (October 1997 - FRCC.97.R.5), 1998 Conservation Requirements for Scotian Shelf and Bay of Fundy Groundfish Stocks (November 1997 - FRCC.97.R.6) and this report Conservation Requirements for Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in Divisions 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in Division 3Ps (March 1998 - FRCC.98.R.1).

The FRCC produced separate reports to allow the most recent information on the state of the groundfish stocks to be used in formulating our recommendations. For this year only, the Department of Fisheries and Oceans (DFO) Science held a special zonal assessment in St. John’s, Newfoundland for the following cod stocks: 2J3KL, 3Ps, 4RS, 3Pn, 4TVn, and 4VsW. This special assessment was held from January 26 - February 6 in order to incorporate all available information into the assessment including the fall and winter groundfish surveys, and the results of the 1997 sentinel fishery. The FRCC believed that it was important to have the results of the latest assessment before we consulted on these stocks.

Consultations

Before making its recommendations the FRCC conducted a series of public consultations throughout the Maritimes and Newfoundland and Labrador. In the fall of 1997 the FRCC conducted a round of public consultations in Newfoundland on stocks other than cod, and in Nova Scotia on groundfish stocks other than 4VsW cod. In December 1997, the FRCC scheduled consultations in Gaspé, Moncton and Port Hawkesbury to discuss Gulf of St. Lawrence groundfish stocks. However, due to inclement weather only the consultation in Gaspé was completed at that time. In February 1998, the FRCC held an extensive round of consultations in Moncton, Port Hawkesbury, Halifax, Port Hope Simpson, Port-aux-Basques, Port-au-Choix, Grand Falls and Clarenville.

Over 800 fishers, scientists and other stakeholders participated in these consultations and others who could not attend submitted their views in writing. The quality of the briefs presented to the Council and the caliber of discussion was especially high.

The FRCC was struck by the loss of faith many fishers have in the ability of DFO Science to provide answers to the many questions concerning the dramatic declines in groundfish stocks. In the southern Gulf of St. Lawrence fishers were especially vocal in their criticism of the DFO research vessel, the Alfred Needler, in the northern Gulf of St. Lawrence they were adamant in their belief that the Stock Status Report (SSR) did not accurately reflect the status of the cod biomass, and for northern cod, fishers in 3K and 3L were convinced that the Science is “looking in the wrong place and at the wrong time” for fish. Almost all participants expressed frustration that the cod stocks have not rebuilt as anticipated. After five years and six fishing seasons boats are still tied to the wharves and the outlook as described by scientists is even more bleak than at the beginning of the moratorium.

The FRCC is concerned with the polarity that is developing between the fishing industry and Science. This is happening despite the success of the sentinel fishery program and a more open and inclusive process for scientific assessment. It is our observation that the fishing industry has run out of patience with moratoria — they have yet to see a “return on their investment” or an explanation as to why recovery is not taking place. Where causes have been identified, such as seals, they are frustrated by the lack of action despite specific recommendations on what needs to be done.
Effective communication between Science and the industry has never been more important. However, with the dramatic cuts to Science budgets and to personnel, communications and public relations are often seen as luxuries as Scientists are forced to do the work once done by several people. Unless proper communications are addressed, the unrest will continue to grow, and Science’s credibility within the fishing community will continue to decline. The FRCC addresses this issue, in part, in our stock-by-stock recommendations and more fully in our Science Priorities Letter to the Minister of Fisheries and Oceans (FRCC.98.L.1 - Appendix 6)

GROUNDFISH CONSERVATION FRAMEWORK

In its previous reports, the FRCC highlighted issues that need to be addressed such as over-capacity, effective enforcement, and the need for attitudinal change. Although these are not mentioned in this report as part of the opening chapter, it does not mean the FRCC is any less concerned about these issues than it was in previous years. In July 1997 the FRCC released its report A Groundfish Conservation Framework for Atlantic Canada (FRCC.97.R.3). That report was designed to provide a comprehensive blueprint for change in the groundfish fishery. That report went beyond the scope of our previous recommendations and provides a foundation for improving the groundfish fishery. It sets forth the basic elements of the groundfish fishery and the issues which need to be addressed. In chapter three of the Groundfish Conservation Framework, the Council provides a specific definition of groundfish conservation and of principles to be followed, major tasks that have to be accomplished to ensure conservation, and, responsibilities for each major stakeholder group (including governments) and a list of concrete actions to be undertaken.

We are encouraging governments and stakeholders to adopt A Groundfish Conservation Framework for Atlantic Canada and to move forward with its recommendations. As we continue with limited, low-level fisheries the challenges for conservation have never been greater and the need to adopt the measures set forth in the report have never been more critical.

INDEX FISHERIES

As part of our recommendations for the cod stocks in 2J3KL and in 4T + 4Vn (N-A), we are recommending that a index program be established to provide further information on the state of these stocks. The longer moratoria continue, two issues become increasingly problematic. The erosion of information from fishing, which is used to justify biomass estimates and, the erosion of confidence in the data provided by DFO Science. Without some fishing, there is a sense in the fishing community that no one knows what’s going on. The index program will begin to address these issues by providing a simulation of commercial activity and correspondingly, restore some level of confidence in the data provided.

This program is in addition to the already established sentinel surveys and moves beyond them. As it is difficult to use data from the sentinel fisheries directly to estimate biomass, this program will offer additional data which can be used to determine abundance. The program is to be established cooperatively between fishers, scientists and managers to maximize the information that can be gained from this exercise while keeping removals at low levels. There should be a reasonable degree of consistency between the programs in the two areas.

The purpose of this initiative in 2J3KL is to move beyond the limits of the sentinel survey and to establish more information about the relationship between the inshore and offshore stocks and to better understand migration patterns the seasonal changes in biomass distribution. In this years SSR, an inshore biomass is established. Understanding what this means in terms of recovery for this stock and how this inshore biomass affects the recovery of the total biomass of northern cod are key questions.

The FRCC is optimistic that this program will cover a broader area and be spread more evenly over the fishing season than the sentinel surveys, including those areas which are further away from shore. In addition, it will provide another index of abundance to augment the research vessel survey. Fishers remain convinced that the biomass is greater than estimated. Gaining a better understanding of the extent of the narrow inshore band of cod and a better perception of the transition zone between the inshore band and the traditional offshore areas are necessary for future conservation and for the management of fisheries in this area. It is our belief that this program can add confidence to the cod population estimates in the SSR.

In 4T + 4Vn (N-A), the program should assist in answering the questions concerning seasonal changes in biomass distribution. It should also provide an index of abundance in addition to the research vessel survey’s and reconcile fishers’ information regarding spatial distribution to that from the research vessel survey. To this end, we have recommended that questions concerning the survey be a part of the workshop to plan
this program. This program should also establish a reliable data base which includes information on juvenile abundance and distribution.

**Natural Mortality**

As part of the assessment of groundfish stocks in 1998, DFO Science adopted changes to the assumptions it has made about natural mortality on cod stocks. Natural mortality is any mortality observed outside of reported fishing landings or legal catches. In many cases, the calculated natural mortality has doubled and in some cases it has more than tripled. For certain stocks this means that in the absence of any commercial fishing, the stocks will still continue to decline. Changes in natural mortality are caused by harsh environmental conditions, seal predation (and other predators) and removals from the stock through bycatches, recreational and food fisheries and illegal catches.

Fishers in most parts of Atlantic Canada and Québec had many questions about the change in natural mortality and the repercussions this has for the future of their fisheries. They voiced their concerns that some of the causes of mortality must be addressed. As one stakeholder in Moncton said, "we've stopped fishing, you can't do anything about the environment and this leaves seals, and by God it's time we did something about seals." Many fishers noted that the two areas where natural mortality has not increased (3Ps and 4X) are the two areas where there is not currently a significant seal population.

Other fishers expressed concerns about the assumptions made about the amount of fish taken out of the water as part of the recreational fishery and illegal fishing. In the southern Gulf of St. Lawrence, many felt that that removals had been grossly underestimated from these sources.

**Seals**

In all of our previous reports the FRCC has asked the Minister to move forward with measures to control and reduce the seal population. We continue to believe that seals represent a renewable resource which can be harvested sustainably in the context of overall management of the Atlantic marine eco-system.

During all of our consultations the issue of the expanding seal herd was raised as an impediment to the recovery of fish stocks. This is an emotional issue for fishers throughout Atlantic Canada and Québec and many comments were made concerning seals becoming more important than fishermen. One participant noted that seals were so plentiful and so close to shore that one had eaten part of his lobster catch right out of the crate.

Many participants noted that the range of the seal herd continues to expand. Fishers in 3Ps commented that they were seeing more seals in areas where they have never been in the past. Comments were also received from fishers in southwestern Nova Scotia that the seal herd is moving into their area.

It should be noted that fishers make it clear that seals are NOT solely responsible for the collapse of fish stocks, however, they do believe that they present a significant threat to the recovery of these same stocks. Some environmentalists and scientists have suggested that if left alone, nature will take its course and the seal population will be gradually reduced resulting in a better balance in the ecosystem. There is some evidence to suggest that the condition of the harp seal is beginning to decline. However, the Council believes that this will be a very long process and, as one member put it, fishermen may well be extinct by the time this happens.

We are disappointed that the effect of seal consumption could not be quantified as part of the SSRs for Atlantic cod stocks. DFO analysis suggests that:

- harp seals may be consuming as much as 140,000t of northern cod;
- grey seals are consuming between 5,400 - 22,000t of Eastern Scotian Shelf cod (on a total biomass estimated to be as low as 32,000t);
- seals in the northern Gulf of St. Lawrence may have consumed as much as 68,000t of cod in 1996; and,
- seals in the southern Gulf of St. Lawrence may be consuming over 10,000t of cod.

This speaks loudly for a call to action on this issue. The seriousness of this issue is acknowledged by scientists, both within the Department and within the NAFO Scientific Council. Quantification of the effect of seal predation on the various stocks, exploited or not exploited (forage species) must be a very high priority.

In our Science Priorities Letter to the Minister of Fisheries and Oceans we recommend that:

The effect of predation and of predator prey relationships be analyzed. The impact of seal consumption, especially, remains a major concern and work to quantify its
impact must be pursued and funded. The potential effect of exploitation on forage species (e.g. capelin, herring, etc.) must be analyzed and quantified. As part of this report, the FRCC recommends that we continue to move forward with developing new markets and products for seals. We are encouraged by progress that has been made at utilizing the full seal and we recommend that immediate ways to significantly increase the harvest of all seals should be pursued.

**RECREATIONAL AND FOOD FISHERIES**

At almost all of our consultations fishers were empathic in their call for an end to the uncontrolled recreational fishery. In the Gulf of St. Lawrence we heard many accounts of how the limit of ten fish per person per day was abused. One fisher noted that when the boats who had been fishing as part of the gear experiments came into port to sell their catch the processing plants were blocked with fish from the recreational fishery. Fishers thought that the amount of fish taken from this fishery was in the thousands of tonnes, far above the estimate of 300t used in the assessment. It is widely held that the uncontrolled nature of the recreational fishery in this area provides a cover for a significant black market fishery.

During our consultations in Newfoundland it was noted at every stop that there is a significant amount of fish be taken out of the water in 213KL. Some put this estimate at 5,000t and others put it as high as 10,000t. These very high estimates seem to be supported by the recent raid on processing plants in Trinity Bay and the amount of illegal fish seized by the enforcement branch of the Department of Fisheries and Oceans.

In our previous report, *Building the Bridge*, the FRCC recommended that no recreational or food fisheries take place in areas where moratoria exist. We further recommended that in areas where limited fishing takes place, recreational and food fisheries should be strictly controlled and effort controls be implemented such as number of days, licensing requirements and limiting the number of tags per person per season.

Given the changes in assumptions on natural mortality, the need to more effectively control this fishery is critical. It is not fair to those fishermen who have sacrificed much over the past four and five years to see the chances of recovery diminished by those who continue to abuse the resource under the guise of food fisheries.

The FRCC again recommends that in areas where moratoria exist there be no recreational or food fisheries.

We further recommend that in areas where limited fishing is permitted the recreational or food fishery be limited to a certain “season” such as one day per week for three weeks, or one weekend per year. In the case of tour boat operators, the FRCC recommends that they be licensed by the Department of Fisheries and Oceans and this licensing system must be strictly enforced. This licensing system be vigorous enough to separate legitimate operators from those who wish to use this tourist fishery as a disguise to continue commercial fishing. Operators should have to abide by strict Conservation Harvesting Plans, fill out mandatory logbooks, adopt a system of maximum number of tags per season, and the number of cod per person should be reduced from ten to two. If these measures cannot be adopted for the 1998 fishing season the FRCC recommends that there be no tour boat fishery for 1998 in areas where moratoria exist.
3.2.2. Stock-by-Stock - Gulf of St. Lawrence

3.2.2.1. Cod 3Pn4RS

**History of FRCC Recommendations:**

In August 1993, the Council recommended, as a precautionary conservation measure, that the 1993 TAC for this stock be reduced from 31,000 t to 18,000 t, the revised F0.1 level for 1993. In the fall of 1993 and 1994, the Council recommended that there be no directed fishing for the 3Pn4Rs cod stock in 1994 and that by-catches be kept to the lowest possible level. In addition, the Council recommended for 1995 that there be no recreational/food fishery on this cod stock and that a broad based Sentinel Fisheries program be implemented. In November 1995, the Council reiterated that there was a need to continue the moratorium on commercial fishing, as well as a need to expand the Sentinel Fishery program for this stock.

In October 1996, the FRCC recommended reopening a limited commercial fishery in 1997 with a TAC set at 6,000t. In addition, the Council also recommended that the fishery be closely controlled and monitored.

1997 Consultations:

Fishermen disagreed with the very bleak situation as described in the stock status report. Catch rates in the inshore fleet were good to very good (estimated higher than in the pre-moratorium period). That led to the opinion that the analytical model, driven by the offshore surveys, did not properly estimate the biomass, which should be higher than calculated. They wondered why calculations were not split between inshore and offshore sectors, as done in the 3Ps area, and felt it was an "unfair treatment". Fishers believed that data from inshore sentinel survey and from logbooks could have been used to determine an inshore assessment which would have increased the overall assessment. Fishers are asking for the same fishing pattern as for 1997 with the same TAC, 6000t. In their minds, this will not adversely effect the stock’s growth. Considering the congregation of fish inshore, a fisher suggested that those changes may be cyclic, as he used to have to change his fishing patterns every 10 years. Fishermen

**Recommendation #3.2.2.1. Cod 3Pn4RS:**

The FRCC recommends that:

1. the TAC for 1998 be set at 5,000t to allow for a limited commercial fishery in this area;
2. the same conservation measures imposed as part of the CHP in 1997 apply again in 1998;
3. fishing not be concentrated on 1993 year-class;
4. fishing be minimized during peak spawning periods and on spawning concentrations;
5. tools be developed to accurately incorporate inshore biomass indicators in the assessment process;
6. strict controls be implemented in both the shrimp and turbot fisheries to avoid by-catch of juvenile cod; and
7. the winter fishery on Burgeo Bank should be limited to protect 3Pn4RS stock components.
from the Belle-Isle Strait and from the Quebec Lower North Shore, however, did not see any significant improvement.

**ANALYSIS:**

The 1998 stock status report indicates:

- Mortality other than that induced by fishing catches, has increased in the recent years and is estimated at twice as high as observed in the 1980's.
- The abundance of cod declined sharply in the late 1980s and early 1990s.
- The biomass was 26,000t at the start of 1998, which is only 10% of the average spawning biomass for the period 1974 to 1986.
- The low 4400t catch of 1997 induced a fishing mortality factor of 0.26, which is close to the $F_{0.1}$.
- The growth rate and condition of fish has improved in recent years.
- The 1993 year-class is the highest observed since 1991, but remains below average recruitment.
- Any catch in excess of 6,000t is likely to induce a decline of the stock biomass.
- A catch of 5,000t has an 80% certainty of allowing for stock rebuilding.

The FRCC is concerned with a number of issues that relate to this stock:

Natural mortality is estimated at .4 for this stock and total mortality during the moratorium may have reached .6. This change in mortality is not well understood.

Seal predation is increasing and no quantification of the effect is available. Consumption of cod by seals may have been as high as 68,000t in 1996. The seal population is stable.

Mixing: A large part of this population has expanded to division 3Ps in the winter. This needs to be protected and the extent of the mixing needs further quantification.

Consistency: It is unfortunate that it was not possible to incorporate inshore biomass indices in the total biomass estimate, as was done in 3Ps and 2J3KL areas. It is reasonable to assume that this calculation would have brought the estimated biomass to some higher level.

**SENTINEL FISHERY:**

For the offshore mobile gear survey, the July abundance index doubled between 1995 and 1997, however remains low in absolute terms. The October index rose between 1995 and 1996 but declined in 1997. Inshore surveys are carried on by fixed gears (gillnets and hook-and-lines). Sentinel fishermen are allowed to fish where they want and their activities are monitored more as an Index Fishermen Program. Catch rates for all gears increased in 1996 but declined in 1997.

Gillnet catch rates remain more or less stable in 4R area. Fishermen involved feel that the decline is chiefly caused by the commercial fishery that was taking place, as a great deal of effort was developed in a small region. In general terms, catch rates declined from 3Pn area to the north and this pattern is consistent over the three years of the sentinel fishery. Catch rates remained high, in 1997, for the fishing sites in southern 4R and in 3Pn areas.
**COUNCIL'S VIEWS ON STOCK STATUS:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Stock Indicator</td>
<td>stock rebuilding, however at low level with limited improvement; better geographical distribution</td>
</tr>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Overall biomass</td>
<td>much lower than average</td>
</tr>
<tr>
<td>Spawning biomass</td>
<td>lower than average with light increase</td>
</tr>
<tr>
<td>Recruitment</td>
<td>weak 1991-1992 year-classes, 1993 year-class better</td>
</tr>
<tr>
<td>Growth and condition</td>
<td>condition factor improving about average, growth rate back to normal rate</td>
</tr>
<tr>
<td>Age structure</td>
<td>some improvement</td>
</tr>
<tr>
<td>Recent exploitation level</td>
<td>fishery closed 1994-96, 1997 catch of 4,400t</td>
</tr>
</tbody>
</table>
3.2.2.2. **COD 4T + 4VN (N-A)**

**HISTORY OF FRCC RECOMMENDATIONS:**

In 1993, due to the dramatic decline in all of the indicators for this cod stock and the poor recruitment prospects, the Council recommended that this fishery be closed at least until June 1994. The fishery was then closed by DFO. Taking a cautious approach, the Council recommended in November 1994 that no directed fishing take place on this stock in 1995. In 1995, as prospects for recovery continued to be bleak, the Council recommended for 1996 that the moratorium on commercial fishing be continued. However, the Council estimated that the stock could sustain a 4,000 tonnes catch and that this value could be used as an upset limit for an enlarged Sentinel fishery. In 1996, the calculated spawning biomass (age 5+) was estimated by DFO to be around 110,000 tonnes, improving but still below the values observed in the mid-eighties when at that time the spawning biomass was estimated to be twice as much. The Council recommended for 1997 a limited reopening of the commercial fishery with a TAC of 6,000 tonnes. However, due to disagreements amongst the fishing community as to the partition of such a small quota, commercial fishery did not resume. Instead, the sentinel fishery was expanded and experimental projects were established.

**ANALYSIS:**

The 1998 DFO Stock Status Report indicates that:

- recruitment is very low; although the index of the 1995 year-class shows a modest increase, the value is still well below average;

**RECOMMENDATION #3.2.2.2. COD 4T + 4VN (N-A):**

The FRCC recommends that:

1. there be no directed commercial fishery on this stock for 1998;
2. in order to be able to gather a grounded industry opinion on the state of this resource, where such strong and diverse views have become impediments to conservation and good management, an index program be established, in part, to gather information on seasonal changes in biomass distribution;
3. total removals for this program, the sentinel fishery and bycatches should not exceed 3,000t;
4. as part of this program:
   - the activity should be closely monitored and strictly enforced
   - measures be taken to minimize activities during peak spawning seasons
   - measures be taken and enforced to protect young fish
   - an organized and coordinated system be implemented to gather information on catch and effort, and to build a reliable data base, including information on juvenile abundance and distribution;
5. the planning for this program take place in conjunction with a special zonal session with DFO Science and the fishing industry to identify the concerns associated with the research vessel survey and methodically respond and/or address them in detail; and,
6. additional financial resources be made available to carry out this program.
• the total biomass is near the lowest level ever observed;
• the total biomass is composed mainly of adult fish which are still growing but dying in greater numbers;
• the natural mortality rate for cod in 4T approaches 0.4, which is twice the expected rate. This means that approximately 33% of the adult fish are dying each year. This includes natural deaths, death by predators, sickness, malnutrition and unreported catches. It does not include death by reported catches, whether it is through recreational fishing or by-catches in other fisheries.

The FRCC is concerned that, until recruitment translates into an increase in fishable biomass, any important additional fishing is likely to have a serious impact on the stock biomass and may prevent full recovery when the adverse conditions, whatever they may be, begin to subside.

**Sentinel Fishery**

In the Southern Gulf of St. Lawrence (4T area), sentinel fishery started in the fall of 1994 with two mobile gear vessels. In 1995, more mobile gear was in use and fixed gears were added. In 1996, following FRCC's recommendation, the sentinel fishery was significantly expanded to cover most of the area from July to October, with a wider representation of gear sectors.

In 1997, there were 35 vessels (10 mobile and 25 fixed) involved in the sentinel fishery in the Southern Gulf. The surveys were conducted from early July to late November. In all there were 538 tonnes of cod caught. The coverage was slightly expanded but overall the catch rates of cod remained very low near the Gaspé coast and the coast of N.B. for fixed gears. Mobile gear catch rates near the Gaspé coast did not increase over 1996. Catch rates for longline did increase significantly along the coast of P.E.I. Some increase was also seen near the Cape Breton coast.

The gears that select for large fish (longlines, gillnets and mobile gear without liners) generally showed some increase over 1996. However, the gear that sampled the full size range of the population (mobile gear with liners) all indicated a decline.

**1997/98 Consultations**

During the 1996 consultations, fishermen reported that cod were abundant around Prince Edward Island, on Miscou Banks and on the Southern grounds of Magdalen Islands, where by-catches prevented a full flatfish (American Plaice, Atlantic Halibut) fishery in some areas. Echosounder marks which were believed to be related to cod were also reported. Unusual cod catches in lobster traps were noted around P.E.I. and Magdalen Islands. In several coastal areas of New Brunswick and Quebec, however, inshore fishermen mentioned that cod appeared to be in much lower abundance than in the past history. In the contrary, some fishermen from P.E.I., indicated that the presence of cod nearby was historically high, and in the past N.B. and Quebec fishermen were coming to northern P.E.I. to fish.

In 1997, consultations were held in Gaspé, Moncton and Port Hawkesbury. The Gaspé meeting was very well attended with some 120 people. During the consultation, it became clear that the cod had not come back. In fact, according to professional fishermen, cod was so scarce all along the Gaspé coast that those involved in the recreational fishery had to go as far as the Miscou Banks, north of New Brunswick, to catch a few fish. However, cod seemed to be abundant on Miscou Banks. Blatant abuse of the resource during the recreational fishery was reported. Seals were again mentioned as being abundant. The fishermen recommended that a small fishery could be opened even though there was no fish to be found in their areas.

In Moncton, the meeting was attended by fishermen from N.B. and P.E.I. At the meeting DFO scientists were asked to present their latest evaluations of the state of the stock. The picture was even worse than anticipated. According to the spokesman, the stock spawning biomass is now at its lowest around 80,000 tonnes and there is barely any recruitment. The natural
mortality which up till now had been estimated at 0.2 is now doubled at 0.4. The causes of this increased natural mortality are not clear. The usual culprits: environmental conditions, seals and other predators and unreported catches were mentioned. Some fishermen alluded to the fact that abuse during the recreational fishery was very serious and that the 300 tonnes estimated by DFO was more likely to be 10 times more. This would certainly have an impact on the calculations of the natural mortality. The fishermen recommended that the fishery be reopened. Their recommendations ranged from a small handline fishery of 2000 tonnes to a multigear fishery of 15,000 tonnes.

In Port Hawkesbury the mood of the fishing community was even more sceptical of the scientific survey. Cod seems to be abundant in the area so much so that other fisheries such as for American Plaice, cannot proceed due to high by-catch of cod. Seals were mentioned to be a nuisance in the area but other predators, namely dogfish and cormorants were also to blame. Juvenile cod were reported in shallow waters and many have been seen in lobster traps. The fishermen recommended that the fishery be reopened with a reasonable quota for their area such that they could proceed with other fisheries.

**Council's views on stock status:**

- **Overall indicator:** stock is stable but at a very low level; *Compared to average*
- **Overall biomass:** much lower than average and distributed in inshore areas off P.E.I., south Magdalen, Cape Breton and Shediac Valley, thus in the south-eastern part of the Gulf;
- **Spawning biomass:** stable but extremely fragile to increased natural mortality; stock biomass stable due to growth;
- **Recruitment:** below average;
- **Growth and Condition:** fish improving in weight at age and its physical condition remains stable with respect to 1996;
- **Age Structure:** affected by poor recruitment
- **Distribution:** below average
- **Recent Exploitation Level:** no directed fishing since 1993
3.2.2.3. AMERICAN PLAICE 4T

HISTORY OF RECOMMENDATIONS:

The Council recommended the TAC of 5,000t in each of 1994 and 1995, and measures to protect small fish. For 1996, due to indications that the biomass was at the lowest level observed, the Council recommended a reduction in the TAC to 2,000t. It also recommended continuation of efforts to minimize the capture and discarding of small fish. For 1997, based on fishers' observations of higher catch rates despite the use of larger mesh size off eastern P.E.I., and in consideration that 1996 Fall survey was similar to that undertaken in 1995, the Council recommended an increase in the TAC to 2,500t. The Council reiterated its call to strictly enforce size limits and also recommended that measures be taken to limit the redirection of effort from other fisheries.

1997/98 CONSULTATIONS:

Fishermen in western 4T confirm that abundance is low in this area. Fishermen in western Cape Breton and P.E.I. see evidence of stock abundance with stability in catch rates despite use of larger mesh. They advocate a TAC that is the same or higher than the 1997 level of 2,500t.

ANALYSIS:

The 1998 Stock Status Report states that:
- the stock continues to decline at recent levels of harvest;
- year class strength has been poor for several years and continues to decline;
- the 4T research survey provides a reliable index of plaice abundance;
- chances for conservation would improve if catches were kept well below 2,000t in 1998.

The FRCC notes that it is apparent that the positive signs reported by the fishermen involved in the fishery in eastern 4T over the past two years have not been confirmed by fishermen in other areas, or by the

RECOMMENDATION #3.2.2.3. AMERICAN PLAICE 4T:

The FRCC recommends that:
1. the TAC be set at 1,500;
2. the mandatory hailing system and dockside monitoring be maintained;
3. DFO convene discussions with industry to:
   a) ensure no increased effort in eastern 4T from 1997 levels;
   b) explore an increase in the minimum mesh size to optimal levels for all gears;
   c) establish the use of indexed vessels as controls to project quantities discarded, and to establish proper CPUE indices for future stock evaluation;
   d) launch a joint DFO/Industry research survey using commercial vessel(s).
4. DFO establish measures to ensure that effort is reasonably dispersed and is not concentrated on stock components.
research survey where indicators continue to be alarming. The presence of larger, more productive females continues to decline and is at the lowest recorded level. The abundance of juvenile fish continues to decline and is at the lowest recorded level. The main biomass index continues to decline and is at the lowest recorded level, for both eastern and western sectors of the southern Gulf. The stock range remains concentrated in smaller, localized areas. There is evidence that the length at age (condition) of the fish may be a problem. While we continue to hear contrary beliefs from fishermen in eastern 4T, the balance of evidence, as well as the continuing extreme levels of virtually every indicator measured by DFO research surveys is compelling. It is our view that this stock will not begin to rebuild at current levels of fishing mortality; indeed there is ample evidence that the stock maybe in a dangerous condition.

Council's views on stock status:

Overall Stock Indicator: the balance of evidence points to a stock in continued decline at worst, or in stagnation at very low levels at best; the approach should be to protect against further decline and/or to promote rebuilding.

Compared to average

Overall biomass: less than 1/3 of 26 year mean; about 1/2 of average of the last 10 years; at the lowest level in the time series.

Spawning biomass: cannot be quantified

Recruitment: at the lowest level in the time series.

Growth and condition: generally good fish caught in directed fishery but continued reports of small fish discards arising from other fisheries; poor length at age over the past two year.

Age structure: no particular observation

Recent exploitation level: 15% higher than average of the last 5 years but within TAC levels.
3.2.2.4. Witch Flounder 4RST

1997/98 Consultations

Comments regarding this species were heard from fishers in the eastern Gulf of St. Lawrence and along the west coast of Newfoundland. Gulf fishers reported that catches and catch rates were better in 1997 than in the previous year and that the fish themselves were in good condition. They felt that the quota could be increased from the 1997 level. In western Newfoundland, fishers pointed out that catches were restricted in 1997 due to conflicts with fixed gears set in some fishing grounds. They also related that higher bycatches of American plaice curtailed efforts directed at witch flounder in 4R.

Analysis

The 1998 DFO Stock Status Report indicates that;

- estimates of abundance since 1993 have been stable at a level considerably lower than those in the 1980's.
- these declines have been primarily in the western and northern Gulf (4S, western 4T).
- recruitment remains positive in the 1990's, and is at levels higher than those in the previous decade.

The Council considers that this stock is currently stable, but considerably reduced in abundance from earlier levels, especially in the north-western Gulf, which once supported the bulk of the population. Trawlable biomass estimates were down from 1996 levels. Recruitment seems slightly improved in the 1990's. However, this has not translated into increased harvestable biomass in recent years, even though

Recommendation #3.2.2.4. Witch Flounder 4RST:

The FRCC recommends that:

1. to guard against further declines and enhance prospects of re-building, the TAC be set at 800t for 1998;
2. the information available concerning spawning times and areas for this stock be compiled and assessed, with a view to introducing measures to protect the stock; and,
3. measures be taken to protect juvenile fish, such as increased mesh size.
overall TACs have not been reached and the fishery now selects larger fish with an increased mesh size. Scientists indicate that recently observed levels of recruitment will not promote a re-building of this stock toward historical levels at current rates of harvest.

Council notes that the overall quota has been portioned in recent years into subareas within the management unit. Since abundance in these subareas has behaved differently in the past, prospects for overharvesting one portion would be reduced by continuing to partition the quota between sub-areas in 1998.

**Council's views on stock status:**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Stock Indicator</td>
<td>Stable at a reduced level</td>
</tr>
<tr>
<td>Overall biomass</td>
<td>Below historical averages</td>
</tr>
<tr>
<td>Spawning biomass</td>
<td>Low</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Some improvement over earlier levels</td>
</tr>
<tr>
<td>Growth and condition</td>
<td>No particular observation</td>
</tr>
<tr>
<td>Age structure</td>
<td>No particular observation</td>
</tr>
<tr>
<td>Recent exploitation level</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
History of FRCC Recommendations:

In 1993 and in 1994, the FRCC recommended the TAC to be set at 4000t. In 1995, considering the declining abundance, the Council recommended to decrease the TAC to 2000t, along with measures to allow young fish to mature. The same TAC was set in 1996. In 1997, according to positive indicators regarding the biomass and the recruitment levels, FRCC recommended a raise of the TAC up to 3000t.

1997/98 Consultations

Most of the comments received came from the Gaspé area, where this species is traditionally fished. According to stakeholders, catch rates in 1997 were much better than observed prior to 1995. This is seen as a clear biomass improvement. All indicators show that the stock is rebuilding fast and that stock is healthy. Fishers consider that the proportion of males in catches should reach a normal ratio of 50% in 1998 and 1999 and that any increase in the mesh size would result in targeting mature females. A 1998 TAC of 4500t is perceived as a reasonable level. Other measures regarding the protection of juveniles (namely, small fish protocol, mesh size and the use of the Nordmore grid in the shrimp fisheries) should be maintained. Concerns are raised about winter Greenland halibut fishery in the Cabot Strait area, where the fish is likely to migrate.

Analysis

The 1997 Stock status report indicates that:

- Gulf turbot is a single stock that migrates in the Cabot Strait in winter
- CPUEs of index fishermen in 1996 and 1997 were as twice as those of the period 1991-1995, despite the mesh size increase.
- Two good pulses of recruitment, 1990-92 and 1996-97, while the intermediate recruitment is low
- Research surveys show an upward trend since 1990 and has nearly tripled.

The Council believes that all indices regarding the status of the resource are positive. The biomass is increasing and good sign of recruitment are showing up. Concerns are raised about the poor 1991-1993 recruitment which may induce a declining of the commercial biomass in 1998. The stock is clearly rebuilding and any action taken in 1998 should help the stock to rebuild further. The FRCC believes that 4,000t is a sustainable level for this stock.

Recommendation #3.2.2.5. Greenland Halibut 4RST:

The FRCC recommends that:

1. the 1998 TAC should raised to 4000t;
2. measures regarding the protection of juveniles, such as small fish protocol, mesh-size and Nordmore grate, be maintained; and,
3. further scientific research be pursued in order to develop a more precise view on stock delineation and migration patterns.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Stock still rebuilding

Compared to average

Overall biomass: Increasing since 1990

Spawning biomass:

Recruitment: Young year-classes appearing; 1991-92-93 year-classes are weak.

Growth and condition: Data not available.

Age structure: The size of fish taken in commercial fishery has increased since 1995 due to mesh size increase.

Recent exploitation level: Has increased from 2000 t in 1996 to 3000t in 1997; exploitation rates likely to have decreased.
Chapter 3: Stock Recommendations

3.2.2.6. White Hake 4T

History of FRCC Recommendations

In November 1993, the Council recommended that the TAC be reduced to 2,000 t for 1994 as a precautionary measure. Due to the historically high incidence of small fish in the catch, the Council also recommended that the measures introduced in 1993 to protect small fish be continued. It was also recommended that key areas and times of spawning activity for this stock be delineated and that, if feasible, measures be taken to establish closures during spawning areas/periods.

In November 1994, as there was no change in the abundance estimates (which remained at about half the level of 1992), the Council recommended that there be no directed fishing for 4T white hake and that by-catches be kept to the lowest possible level. In 1995, due to continued concerns over low abundance and with the indications of weak incoming recruitment, the Council recommended a continuation of the moratorium on directed fishing in 1996. For 1997, the Council recommended there be no directed fishing but allowed for a 500 t by-catch.

1997/98 Consultations

No hake, thus no comments outside of Port Hawkesbury

In Port Hawkesbury, fishers explained that sentinel catches in the Georges Bay area remained good in 1997; as good or better than previously. They also felt that there were signs of hake on ground to the north SW Cape Breton, and the west (Northumberland Strait). Several noted there were good signs of small hake in shallower waters. They questioned whether it was reasonable to keep this area closed until the hake returned to other parts of its range, and recommended that a limited directed fishery for hake be opened in their area in 1998. TC proposals ranged from 500 t to 1,000 t.

Analysis

- Sentinel and RV results confirm that hake remain most abundant in the southeast corner of the Gulf and that this species is in very low abundance across the rest of its range. The Channel component appears slightly more abundant than the Strait component.
- With no directed cod fishery, by-catches remained low in 1997, and with sentinel catches, totaled 200 t.

Recommendation #3.2.2.6. White Hake 4T:

The FRCC recommends that:

1. there be no directed fishing for 4T white hake in 1998 and that by-catch protocols be applied when prosecuting other fisheries; and,

2. work be undertaken to determine if this is a resident Gulf stock or if this is a component of the Eastern Scotian Shelf stock.
The RV survey provides the main index, which in 1997 was slightly higher than 1996 but still near the lowest range.

- Landings and RV catches are primarily composed of fish age 4 and younger.
- Age 0 fish in the RV survey declined in 1997.
- Total mortality of older (age 5-8) fish remains relatively high (~1.0), in the absence of any substantial fishery.
- Science feels the current amount harvested, albeit very low, may be excessive and have grave concerns for this stock.

The Council considers that this stock is very low and directed fishing would jeopardize any chances of recovery.

**Council's Views on Stock Status:**

- **Overall Stock Indicator:** Stock at very low level

**Compared to average**

- **Overall biomass:** at lowest level despite local improvement; contraction of geographical distribution, may be improving.
- **Spawning biomass:** very low.
- **Recruitment:** some encouraging signs but limited
- **Growth and condition:** no information
- **Age structure:** abundance of larger hake (larger than 45cm) close to lowest level observed
- **Recent exploitation level:** High prior to moratorium
3.2.2.7. ATLANTIC HALIBUT 4RST

ANALYSIS

The 1996 Stock Status Report indicates that:
- Few biological data available.
- Stock currently stable at low level.
- Exploitation of individuals smaller than 81 cm remains too high.

The Council notes that, historically, a 300t TAC is low compared to the 4000t landings recorded during the first half of the Century. In 1994 and 1995, landings did not reach the TAC. Redirection of effort of fixed gears fleet toward this species occurred in 1996 and even more in 1997, along with the increase of allowed cod and white hake by-catch, even if those by-catches still limit exploitation levels.

Stock seems to remain stable, however at low level. No sign of further decline is appearing, according to research survey and commercial catch rates. Some recruitment may occur as shown by juvenile by-catches. Juvenile catches and landings remain a concern.

RECOMMENDATION #3.2.2.7. ATLANTIC HALIBUT 4RST:

The FRCC recommends that:
1. the 1998 TAC remain at 300t;
2. release of fish smaller than 81 cm and enforced for both commercial and recreational fisheries;
3. landings be properly monitored and small fish protocols be effectively enforced; and
4. measures to protect juvenile halibut and to reduce by-catches should be maintained and strictly enforced.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Stock at very low level.

Compared to average

Overall biomass: Stable at low level.
Spawning biomass: Unknown
Recruitment: Some, as per catch of immature.
Growth and condition: Not available.
Age structure: No reliable indicator.
Recent exploitation level: TAC at 300t since 1991. By-caughters of juveniles remain at concerns.
3.2.2.8. WINTER FLOUNDER 4T

Prior to 1996, when a precautionary quota of 1,000 MT was introduced, no TAC was established for this stock. In its 1993 through 1995 reports, the Council recommended that landings of this species be closely monitored, that the catches of small fish which had been prevalent for this species be rigorously addressed, and that directed fisheries for winter flounder be allowed only if and where by-catches of Atlantic cod could be kept at the lowest possible level.

The Council’s recommendation in 1997 was that overall catches in that year not be allowed to exceed the longer term average of reported landings. Earlier recommendations regarding the need to report landings accurately, minimize juvenile mortality, and control by-catches of other species were reiterated for 1997. Council also requested that the question of stock components be addressed as part of the scientific program for this species.

1997 CONSULTATIONS

Comments vary by area, likely in reflection of the localized abundance and importance of this species. In the western Gulf, few comments were received, fishers stating that the winter flounder was primarily a by-catch in the plaice fishery. In the eastern Gulf, fishers felt the resource was stable and that the TAC could be the same as 1997 or could be increased to 1,200t. There were questions about the by-catches of winter flounder in the expanded yellowtail fishery around the Magdalen Islands, and about the higher catches of larger fish in the fixed gear tangle net fishery and mobile gears suited to fishing rough bottom previously unexploited. Fishers in 4T asked that the subareas be put on separate quotas and that the quotas be segregated by gear type.

Although dockside monitoring or catch verification programs are in place across the Gulf, some fishers express doubts that mis-reporting by species, particularly plaice, has been eliminated.

RECOMMENDATION #3.2.2.8. WINTER FLOUNDER 4T:

The FRCC recommends that:

1. the overall catches in 1998 not be allowed to exceed 1,000 t, through the maintenance of a precautionary TAC;
2. strong measures be maintained to guard against over-fishing of localized concentrations;
3. as added protection for localized concentrations in future, DFO Science and industry address the practicality of establishing sub-area quotas within the 4T stock for 1999;
4. recent and historic trends in changes in landings by gear types be studied in 1998, particularly in relation to gear and area specific size distributions in the catch;
5. by-catch and small fish protocols be effectively applied; and,
6. monitoring programs be applied vigorously to ensure mis-reporting of other commercial species does not take place.
ANALYSIS

The 1997 DFO Stock Status Report (A3-22) indicates that:

- Nominal landings and effort were both up in 1996, but remained below historical averages.
- Overall abundance is decreasing but remains within recent historical levels.
- Several stock sub-components likely exist and abundance varies within the management area for this stock.

The FRCC notes that unlike other commercial groundfish species in the southern Gulf, winter flounder is a more sedentary, year round resident, and the stock is likely made up of a number of localized components. Abundance indices from research surveys must be interpreted carefully as the bulk of this resource occurs along and inside the shore-wise extent of the survey. Separate indices for the Miramichi Bay area are higher than longer averages, those around PEI are intermediate but relatively stable, while recent abundance near the Magdalen Islands appears relatively low. Indices for Chaleur Bay are highly variable, possibly due to survey effects. Overall, this stock is felt to be at an intermediate level of abundance.

Several long standing concerns regarding this stock are beginning to be resolved. Increased mesh sizes and the curtailment of the traditional lobster bait fishery for this species in some areas have likely reduced juvenile mortalities. Widespread dockside monitoring should be improving confidence in reported landings, both by species and amounts, however, concerns for mis-reporting by species persist. While these improvements are welcome, measures introduced to achieve them must be continued to ensure this stock does not suffer due to the restriction of other groundfisheries.

The potential for continued redirection of effort at this species remains a concern. Since 1996, a precautionary TAC of 1,000 MT has been in effect for this species, primarily to aid in controlling prospective increases in localized effort.

The minimum trawlable estimate for commercial-sized fish (greater than 25 cm) in the 1997 research vessel survey was about 60% of the average of the previous ten years, however, these estimates have varied considerably through that period.

Changes in the mix of gears directed toward this species in the 4T area might be increasing exploitation of the resource over previously lightly-exploited rough bottom, and taking larger individuals previously protected from the fishery.

Council feels this stock should continue to support localized fisheries without compromising stock sub-components, but is concerned that reported catches less than 1,000 MT in several recent seasons have not yet resulted in an increasing trend in the biomass estimate. Council re-iterates that measures to manage the potential for re-direction of effort be continued.

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Average overall, some regional depletion

Overall biomass: Average overall, varies by region

Spawning biomass: No information

Recruitment: No information

Growth and condition: Varies by region

Age structure: No information

Recent exploitation level: Overall effort reduced due to moratorium, exploitation rates would vary locally
3.2.2.9. YELLOWTAIL FLOUNDER 4T

ANALYSIS

A first assessment of the 4T yellowtail resource was conducted early in 1997. The DFO Stock Status Report indicates that:

- Yellowtail landings have rarely exceeded 250 t.
- Overall abundance has been quite stable since the mid-1980's, but that abundance in the vicinity of the Magdalen Islands has been higher in the 1990's than in the rest of the unit.

The FRCC notes that until recently, yellowtail flounder have been harvested primarily as a by-catch to other groundfish species in the southern Gulf. It is a smaller flatfish with a coast-wise distribution most prevalent around the Magdalen Islands and across the western sections of the Gulf. To date, it has not been under quota management.

In 1997, a directed fishery for larger yellowtail (25cm and up) developed in and around the Magdalen Islands, which was stopped in late September when landings reached 800 t.

Preliminary results from the September 1997 groundfish survey reveal a noticeable reduction in the relative abundance of larger fish (25cm and up) in strata close to the Magdalen Islands, and a corresponding reduction in the abundance index from the survey. These results were obtained following the bulk of the 800 MT landing. The Council is concerned for the

RECOMMENDATION #3.2.2.9. YELLOWTAIL FLOUNDER 4T:

The FRCC recommends that:

1. until the impact of the harvest levels in 1997 are fully reviewed in the spring 1998 assessment, a catch level not exceeding 300 t be set for the Magdalen Islands directed fishery;
2. the development of directed fisheries in other localized areas be undertaken with similar caution;
3. a small fish protocol be formally established for this fishery; and,
4. measures be established for the collection of biological data to give a better assessment of this stock.
impact of continued landings of the order observed in 1997 in this area might have on the biomass of this species within this relatively small area.

**Council's views on stock status:**

**Overall Stock Indicator:** Stable

<table>
<thead>
<tr>
<th>Overall biomass:</th>
<th>Average</th>
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</thead>
<tbody>
<tr>
<td>Spawning biomass:</td>
<td>Average</td>
</tr>
<tr>
<td>Recruitment:</td>
<td>Average</td>
</tr>
<tr>
<td>Growth and condition:</td>
<td>No information</td>
</tr>
<tr>
<td>Age structure:</td>
<td>Constricted in Madeleine Islands, wide elsewhere</td>
</tr>
<tr>
<td>Recent exploitation level:</td>
<td>May have been high in the Madeleine Islands in 1997, likely light elsewhere</td>
</tr>
</tbody>
</table>
3.3. Stocks of the Scotian Shelf, Bay of Fundy and Georges Bank

3.3.1. Introduction to the Scotian Shelf, Bay of Fundy and Georges Bank Stocks

This report is one of a series that the Fisheries Resource Conservation Council (FRCC) makes to the Minister of Fisheries and Oceans on conservation measures for groundfish stocks in eastern Canada. This report deals with groundfish stocks in the Scotian Shelf and Bay of Fundy and makes recommendations for the 1998 fishery.

Every year the Fisheries Resource Conservation Council (FRCC) holds public consultations with stakeholders to gather information on all Atlantic groundfish stocks. This information assists us in forming our recommendations to the Minister of Fisheries and Oceans for annual conservation requirements for Atlantic groundfish. For this report we met with fishers and other concerned stakeholders in Sydney, Nova Scotia on October 21, Yarmouth, Nova Scotia on October 22 and in Halifax, Nova Scotia on October 23. We also received a number of written briefs which are noted in Appendix 3.

Although this report deals with groundfish stocks in the Scotian Shelf and Bay of Fundy, it does not include recommendations for cod stocks in division 4VsW. Recommendations for those stocks will be included as part of a separate FRCC report to the Minister in March 1998.

Special Zonal Assessment

For this year only, the Department of Fisheries and Oceans (DFO) Science will be holding a special zonal assessment for the following cod stocks: 2J3KL, 3Ps, 4RS,3Pn, 4TVn, and 4VsW. This special assessment will be held during the last week in January in order to incorporate all available information into the assessment including; the upcoming fall and winter surveys, and the results of this year’s sentinel fishery. Until this special zonal assessment is held the FRCC will not be receiving advice from DFO Science on these cod stocks. It is important for everyone to have the results of the latest assessment before we consult on these stocks.

As a result of this change, the FRCC’s fall groundfish consultations will be staggered throughout the fall and into the new year. Our schedule for future consultations includes the following:

Gulf Groundfish Stocks: December 1-3, 1997

Cod Stocks (2J3KL, 3Ps, 4RS,3Pn, 4TVn, and 4VsW): February 16 - 21, 1998

Conservation Issues

During our consultations many concerns were raised about the state and health of groundfish stocks and most of these concerns are dealt with in Chapter 2 of this report in Stock-by-Stock recommendations. However, the Council wishes to highlight some of these concerns and draw particular attention to certain problems.

Concentration of Fishing Effort to the Bay of Fundy

Included in the questions forwarded to stakeholders for discussion, the FRCC asked about the reports from some fishers that fishing effort had concentrated to the mouth of and the inner Bay of Fundy this year. Comments at consultations suggested that this was cause for some concern with one participant suggesting this was a “two-alarm fire” and if we fail to get control of the situation it could develop into a “four-alarm fire”. Although others suggested that this may be caused by restrictive management measures such as closed areas, most expressed some concern over the situation. Council noted with interest the comments from the fixed gear, hook and line fishermen that they have failed to reach their quotas again this year. The Council is very concerned about this situation and many of our members noted that a significant shift in effort has been a serious signal in other fisheries of approaching dangers. For these reasons the Council has made a strong recommendation to the Minister of Fisheries and Oceans that DFO Management and Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. If
the result of this review indicates potential adverse effects on local aggregations or spawning components, measures should be put in place to protect these resources. The Council also recommends that for 4X cod, there be an update on genetic information on the Bay of Fundy and Scotian Shelf components of this stock with a view to determining if a geographic split in the stock between those two areas is appropriate.

Warning Signs

In addition to the redirection of effort to the western portion of division 4X, the Council is also concerned by reports of declining condition factor and weights-at-age, as well as shrinking geographic distribution, for many species. In our stock-by-stock recommendations in Chapter Two of this report we have asked the Department of Fisheries and Oceans to closely monitor this situation.

Seals

As in previous years, we have included in our comments to the Minister our concern and alarm over the size and the effects of the grey seal herd on Sable Island. Recent reports on population put this herd at close to 200,000 animals. The Council believes that their consumption of juvenile cod and other species is a threat to the rebuilding of groundfish stocks, most especially cod in divisions 4Vn and 4VsW. Comments made by those in attendance at our consultation indicate that seals are going further and further in their search for food and there were many reports of seals moving inland after trout and salmon.

The Council, in its previous reports, has advocated use of seal contraceptives as a means to control the population of this herd and we again urge the Department of Fisheries and Oceans to move forward with this initiative.

Species Mix

In previous years, industry participants at our consultations in Southwestern Nova Scotia have advocated a species “mix” for cod and haddock quotas to minimize dumping and discarding. In the past some have suggested a ratio of 2 to 1 with respect to 4X cod and haddock. This year, many participants suggested that the FRCC should not place any undue priority on finding the right mix and instead urged the Council to concentrate on what was right with respect to conservation for each stock. Industry participants noted that the introduction of community quotas has made it easier to “trade” quotas and this management flexibility has allowed the industry to address the issue of a good species mix on their own.

The FRCC remains cautious, as this opinion was not shared by all stakeholders, and will listen carefully for reports of increased levels of dumping, discarding and “shacking off” over the coming year.

Atlantic Halibut

The Council had a difficult time forming its advice on Atlantic halibut to the Minister. We were struck by the consistent industry comments, throughout the range of this stock, that this stock was in better shape than suggested by DFO Science and could well stand a quota increase.

Fishers questioned the difference between the results of the Research Vessel Survey and the observations of the fishing industry. It was mentioned that experienced (halibut-specific) fishermen, on enterprise allocation longliner vessels fishing 3P and 3NO were not experiencing declining catch rates. They have a long history of similar fishing patterns, and there has been no major change in gear technology. Fishers reported a dramatic increase in 4VsW Halibut catches this past year.

The stock status report and the information from fishermen are diametrically opposed for this stock. The former paints a picture of a very depleted stock, while the latter indicates a healthier and growing stock. In the end, the Council used the precautionary approach and recommended that it would not be prudent to increase the commercial TAC at this point. However, the Council emphasized that it is crucial for a scientifically-designed fishermen-operated survey/index fishery to commence, to deal with the great uncertainty in the status of this resource. The Council notes that we have recommended this in the past and hopes that its implementation will help to bridge the gap between Science and the fishing industry on this important resource.
3.3.2. **ENVIRONMENTAL OVERVIEW**

Temperature conditions over the Scotian Shelf, Bay of Fundy and Gulf of Maine are variable due to complex bottom topography, transport of water from upstream sources such as the Gulf of St. Lawrence, intrusion of offshore slope waters, and large seasonal cycles.

Air temperatures over the area were cooler-than-normal in early winter 1996 but rose above average in late winter and through the spring. During summer and autumn, air temperatures varied about the normal.

The amount of sea ice to reach the Scotian Shelf was below normal in 1996, and less than in 1995. The ice arrived later, and departed earlier than average.

Cold water temperatures were observed in 1996 at mid-depths and near bottom on the northeastern Scotian Shelf, in the near surface waters along the Atlantic coast of Nova Scotia, and throughout the water column off southwestern Nova Scotia. In contrast to these cool conditions, the waters in the central Scotian Shelf over Emerald Basin and along the continental slope, were warmer-than-normal; in the Gulf of Maine and in the Bay of Fundy, temperatures were also predominantly warmer-than-normal.

In summary, the northeastern and southwestern parts of the area, under the influence of waters from the Gulf of St. Lawrence and Newfoundland Shelf, were still colder-than-average, but less than last year. The central and southern parts of the area, under the influence of slope waters, were still warmer-than-normal, but also less than last year.
3.3.3. Stock-by-Stock Recommendations - Scotia-Fundy

3.3.3.1. Cod 4Vn (M-O)

History of FRCC Recommendations:

In August 1993, the Council recommended that fishing on this stock be halted immediately. The recommendation was accepted and the fishery was closed in September. In November 1993, the Council recommended that there be no directed fishing for this stock in 1994 and that by-catches be kept to the lowest possible level. This recommendation was repeated in November 1994 for the 1995 fishing year and again in November 1995 for the 1996 fishing season. These recommendations were accepted and the fishery has remained closed. In October 1996, the FRCC again recommended that there be no directed fishery for 4Vn Cod in 1997. Council also recommended that there be an expanded Sentinel Fishery with a strong commercial index component.

1997 Consultations:

DFO Science representatives noted that mortality for the 4Vn cod stock is 40% which is approximately twice as high as would normally be expected. In addition, they noted that recruitment is extremely poor, resulting in a bleak outlook.

Cod by-catch in the halibut fishery was reported by fishermen as very good. These are "good fish", (good size). However, the restrictive nature of the management regime has caused cod by-catch to be dumped.

Concern was expressed about the impact increasing seal populations are having on the recovery of this resource.

Analysis:

The 1997 Stock Status Report indicates that:

- a high level of stock mixing in the area confounds the assessment
- recruitment continues to be poor; the inshore survey indication of a good 1995 year class was not supported by research vessel results
- total mortality rates are still high despite the moratorium, suggesting emigration of fish out of the area, or a lack of survival

Recommendation # 3.3.3.1. Cod 4Vn (M-O):

The FRCC recommends that:

1. there be no directed fishery for 4Vn (M-O) in 1998;
2. bycatches be kept to the lowest possible level;
3. sentinel surveys continue for several years to be of greatest value; and
4. a workshop involving industry be held in 1998 to assess the sentinel survey in 4Vn and in particular to determine if the commercial index can be made viable and continued.
- catch rates in the sentinel survey have declined consistently from 1994 to 1996
- geographical distribution of cod (in sentinel fishery) has not changed over time
- total biomass and adult biomass remain very low; no recovery is possible in the short term

**COUNCIL'S VIEWS ON STOCK STATUS:**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Compared to average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall indicator</td>
<td>very low levels</td>
</tr>
<tr>
<td>Spawning biomass</td>
<td>far below average</td>
</tr>
<tr>
<td>Total biomass</td>
<td>far below average</td>
</tr>
<tr>
<td>Recruitment</td>
<td>very low</td>
</tr>
<tr>
<td>Growth/Condition</td>
<td>Average, improved from low values of 92-94</td>
</tr>
<tr>
<td>Age structure</td>
<td>No good recruitment since 1987, all ages depressed</td>
</tr>
<tr>
<td>Distribution</td>
<td>Steady in recent years, worse than in past</td>
</tr>
<tr>
<td>Recent exploitation</td>
<td>Fishery closed since Sept. 1993; total mortality still high</td>
</tr>
</tbody>
</table>
HISTORY OF FRCC RECOMMENDATIONS:

In August 1993, based on the drastic stock decline, the Council recommended that the 4VsW cod fishery be halted immediately. The fishery was closed in September. In November 1993, the Council recommended that there be no directed fishing for the 4VsW cod stock in 1994 and that by-catches be kept to the lowest possible level. Again in 1994, the Council recommended that there be no directed fishing for 4VsW cod in 1995 and that by-catches be kept to the lowest possible level. This recommendation was repeated in November 1995, and October 1996 for the 1996 and 1997 fishing seasons, consequently; the fishery has remained closed.

1997/98 CONSULTATIONS:

The FRCC conducted two rounds of consultations on Scotian Shelf groundfish stocks, fall 1997 which included a meeting in Sydney and February of 1998 in Halifax. Most fishers agree that this fishery cannot withstand commercial fishing. Those who participated in the sentinel fishery had problems finding fish during the commercial phase of the program. All stakeholders who commented on this stock believed that the seal population on Sable Island represents a major threat to the survival of this fishery.

ANALYSIS:

The 1998 DFO Stock Status Report indicates that:

- Average weight at age has shown some improvement in the last few years from the historic minimum in 1992.
- Surveys indicate that, since the mid-1980s, there has been an increase in the mortality of cod, other than that attributable to fishing, and which has persisted even after the closure of the fishery.
- The scientific evidence indicates that the increase in mortality from sources other than reported landings including discarding, direct and indirect effects of harsh environmental conditions, and predation by seals.

RECOMMENDATION #3.3.3.2. COD 4VsW:

The FRCC recommends that:

1. there be no directed fishery for 4VsW cod in 1998;
2. no recreational or food fisheries take place given the very precarious state of the cod stock in this area; and,
3. the March Research Vessel (RV) survey be re-instated immediately.
The spawning stock biomass is at or near the lowest level seen, between 5% to 16% of the average from 1979-89. Making plausible assumptions about seal consumption and other natural mortality, the biomass is projected to decline 5% to 20%, even in the absence of any fishery.

- There are inconsistent indicators of recent year-class strength, however, the weight of evidence suggests that recruitment has been poor.

- The models of cod consumption by grey seals imply a range from 5,400t to 22,000t of cod being removed by seals. These are relative to estimated biomass of 32,000t to 37,000t respectively. It is not possible with the available data to choose among these models.

The FRCC is particularly concerned with two key issues that relate to this stock:

**Environment**: This area continues to have lower than normal water temperatures. Scientists report an increase in cold water species such as capelin in this area.

Investigations into the cause and significance of low condition in fish have suggested that low temperatures can induce poor condition and that reduced survivorship and reproductive success can result. This is also consistent with the appearance of colder waters on the eastern Scotian shelf since 1986.

**Seals**: The mean percentage of cod in the grey seal diet has remained at about 12%. Given that the grey seal population has apparently continued to increase at the same rate as previously measured, the estimate of consumption of 4VsW cod by grey seal is between 5,400 - 22,000t in 1997.

**Sentinel Fishery**: The distribution of catches in the surveys show most of the cod are found on the 4W banks (Western, Sable, Emerald) throughout the year. The Sentinel survey distribution also indicates that, at least during the fall, there are concentrations of cod in the nearshore areas.

<table>
<thead>
<tr>
<th>Council's views on Stock Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall indicator:</td>
</tr>
<tr>
<td>Spawning biomass:</td>
</tr>
<tr>
<td>Overall biomass:</td>
</tr>
<tr>
<td>Recruitment:</td>
</tr>
<tr>
<td>Growth/Condition:</td>
</tr>
<tr>
<td>Age structure:</td>
</tr>
<tr>
<td>Distribution:</td>
</tr>
<tr>
<td>Recent exploitation:</td>
</tr>
</tbody>
</table>
3.3.3.3. **Cod 4X**

**History of FRCC Recommendations:**

In August 1993, the Council recommended, as a precautionary conservation measure, that the 1993 TAC be reduced from 26,000t to 15,000t. In November 1993, the Council recommended that the 1994 TAC for 4X cod be set at 13,000t. In addition, the Council recommended that other conservation measures, such as (a) improved selectivity of fishing gears (increased hook and mesh sizes), (b) limitations on the quantity and dimensions of fishing gear used, and (c) expanded use of area closures to protect spawning and/or juvenile aggregations, be considered for this fishery. In November 1994, the Council recommended that the 1995 TAC for 4X cod be set at 9,000t. As well, Council recommended that a workshop be organized jointly by the Department of Fisheries and Oceans and industry with the objective of an orderly fishery and the elimination of dumping, discarding and misreporting; and finally the Council recommended that should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved. In the fall of 1995, the Council recommended a TAC of 11,000t for 1996 with mandatory dockside grading for all gear types.

For 1997, the FRCC recommended that the TAC be set at 13,000t, mandatory dockside monitoring be maintained for all gear types, and, the dialogue between DFO and industry concerning dumping, discarding and misreporting continue, to ensure that management measures to avoid these problems remain in place.

**1997 Consultations:**

Industry generally reported that the biomass of 4X cod is still relatively healthy, with a good proportion of spawners. However, some fixed gear inshore fishers observed that the cod biomass is the lowest level they have ever seen. This is the second year in a row some fixed gear quota groups had to leave fish in the water. Many in the industry noted that the comments on the 1997 fishery are based on a four month fishery due to the problems of gaining approval for a CHP. They cautioned that these results should not be compared with the traditional year round fishery once practiced in 4X. They also noted that fish sizes and migratory patterns change with the seasons and their fishing experience, indicates the presence of many small and juvenile cod and haddock.

**Recommendation #3.3.3.3. Cod 4X:**

The FRCC recommends that:

1. the 1998 TAC for 4X cod be set at 9,300t;
2. as an immediate priority, DFO Management and Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. If the result of this review indicates potential adverse effects on local aggregations or spawning components, measures should be put in place to protect these resources; and
3. there be an update on genetic information on the Bay of Fundy and Scotian Shelf components of this stock with a view to determining if a geographic split in the stock between those two areas is appropriate.
There was some discussion of closures due to the abundance of small fish on Roseway Bank this past year. However, it was felt that a permanent closure in this area would be unnecessary and would result in undue hardship to many who fish this area almost exclusively.

Some fishers felt the cod stocks are in better shape now than the landings show, given very cold water in early summer and dogfish keeping boats out of the deep water most of the year.

One fisher wondered how Science could justify a recommendation to lower the TAC on 4X cod. However, some fixed gear fishers were concerned with this stock and supported a reduced TAC for 1998. There are reports of concentrations of fish at the mouth of, and up in, the Bay of Fundy. There was a great deal of concern expressed about the shift in effort from eastern 4X to western 4X for cod, haddock and pollock, and the effect this shift in effort could have on local stock components in western 4X. Concern was expressed about the use of Temporary Vessel Replacement Program (TVRP) vessels and the increased effort this placed on the Bay of Fundy portion of the stock.

Industry recommendations for TACs ranged from 8,000t to 13,000t for 4X cod in 1998. The majority of industry recommendations were in the range of 9,000-9,500t.

Analysis:

The 1997 Stock Status Report indicates that:

- the 1992 year class is strong, but the 1993, 1994 and 1995 year classes are weak
- adult biomass has reached a plateau, slightly above the long term average, but is reliant primarily on one year class
- total biomass is somewhat below the long term average

This stock has grown to average levels from historical low levels. Holding the harvest near $F_{na}$ will allow for expected strong growth in individual fish, and a broadening in the age structure over time.

Industry has noted that the present management regime allows for temporary shifts of allocations between community quotas and between individual quotas within-season. This permits adjustment for specific availability of certain species to certain sectors in certain areas, so that quotas should be set primarily on biological grounds for each stock, with less concern for an 'appropriate mix' in catches between species.

The Council is concerned about the reported shift in effort from the Scotian Shelf portion of 4X to the mouth and inner Bay of Fundy in 1997.

**Council's views on stock status:**

<table>
<thead>
<tr>
<th>Overall Stock Indicator</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning biomass</td>
<td>Slightly above average</td>
</tr>
<tr>
<td>Total biomass</td>
<td>Somewhat below average</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Strong 1992 year class, weak after that</td>
</tr>
<tr>
<td>Growth/Condition</td>
<td>good</td>
</tr>
<tr>
<td>Age structure</td>
<td>average</td>
</tr>
<tr>
<td>Distribution</td>
<td>Indications of declines outside Bay of Fundy</td>
</tr>
<tr>
<td>Recent exploitation</td>
<td>Still above $F_{na}$ but much lower than in past</td>
</tr>
</tbody>
</table>
3.3.3.4. Haddock 4TVW

History of FRCC Recommendations:

In August 1993, the Council expressed concern about the low level of this stock. In November 1993, the Council recommended that there be no directed fishing for the 4TVW haddock stock in 1994 and that the closure of the haddock box to all gears be continued. In 1994, the Council repeated this recommendation for 1995 and again for 1996. In October 1996, the FRCC again recommended that there be no directed fishing for 4TVW haddock in 1997 and the closure of the haddock box to all gears be continued.

1997 Consultations:

Some participants at the consultation noted that fishing alone has not caused the collapse of this stock.

Analysis:

The 1997 Stock Status Report indicates that:

- adult population biomass is low, and likely to decrease further
- recruitment has been below average in every year since the mid-80s (except 1988), but the 1993 and 1994 year classes may be almost up to average
- the rate of natural mortality appears to be high on this stock

This stock shows a high natural mortality in the range of 40%. Fishing alone has not caused the collapse. Harsh environmental conditions and, to a lesser extent, seals were factors contributing to this decline. A reversal of poor ecological conditions is required before stock improvement is expected.

Recommendation #3.3.3.4. Haddock 4TVW:

The FRCC recommends that:

1. there continue to be no directed fishing for 4TVW haddock in 1998;
2. the closure of the haddock box to all gears be continued; and
3. the deterioration in the condition factor of 4TVW haddock be monitored.
COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: very low (collapsed)

Compared to average

- Spawning biomass: far below average (1/3 of long term average)
- Total biomass: far below average (1/3 of long term average)
- Recruitment: below average; possibly two year classes near average
- Growth/Condition: low; fish not growing larger
- Age structure: low biomass but reasonable spread in ages
- Distribution: Steady in recent years
- Recent exploitation: Fishery closed since 1993 (but total mortality still high)

*1997 Catch: as of Oct. 22/97
HISTORY OF FRCC RECOMMENDATIONS:

In its August 1993 report, the Council recommended that every action be taken to ensure that there are no overruns of the 1993 quota. The stock was closed to fishing in September because the quotas had been taken. In November 1993, the Council recommended that the 1994 TAC for 4X haddock be set at 4,500t (by-catch only) and that every action be taken to ensure that there are no overruns of this quota. In November 1994, the Council recommended that the 1995 TAC for 4X haddock be set at 6,000t. The Council recommended that, prior to the 1995 fishing season, a workshop be organized jointly by the Department of Fisheries and Oceans and the industry, with the objective of an orderly fishery, and the elimination of dumping, discarding and misreporting. Finally, the Council recommended that, should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved. In November 1995, the Council recommended that the 1996 TAC for 4X haddock be set at 6,500t, that mandatory dockside grading be implemented for all gear types and that the same closure procedure as recommended in 1995 be implemented for 1996.

In October 1996, the FRCC recommended that the 1997 TAC be set at 6,700t and mandatory dockside monitoring be maintained for all gear types. The Council noted, as part of its recommendation, that should there be sufficient evidence of dumping, discarding and misreporting, the fishery be closed for the gear type involved until such time as fisheries managers can be assured that this activity will not continue; and fisheries managers take appropriate measures to ensure the protection of incoming year-classes, including rigorously enforcing existing small fish protocols.

1997 CONSULTATIONS:

On-the-water experience indicates the presence of many small and juvenile haddock. There were reports of high abundance of haddock although it was noted that some of the longliners did not take their quota. TAC recommendations from stakeholders ranged from 8,000t to 11,000t for 4X haddock in 1998, most recommendations were in the 9,500-9,800t range.

ANALYSIS:

The 1997 Stock Status Report indicates that:
- both the total and the spawning biomass are now above long term averages

RECOMMENDATION #3.3.3.5. HADDOCK 4X:

The FRCC recommends that:

1. the 1998 TAC for 4X haddock be set at 8,100t;
2. as an immediate priority, DFO Management/Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. If the result of this review indicates potential adverse effects on local aggregations or spawning components, measures should be put in place to protect these resources; and
3. the decrease in condition factor be monitored.
recruitment: average year class in 1992, very high in 1993, 1994 (twice the long term average), although there has been a tendency in the past to over-estimate the strength of strong year classes

adjusting for the above tendency, and using a precautionary approach, the appropriate \( F_{0.1} \) level is 9500 tonnes

risk analysis suggests a high probability that the stock will decline if harvested at \( F_{0.1} \) levels

if the 1997 TAC is taken, the resulting exploitation rate will be below \( F_{0.1} \) (for only the second time since 1972)

Council notes that maintaining the catch below the \( F_{0.1} \) level will aid in further building up of the biomass, to better achieve the catch potential of this stock.

The Council is concerned about the reported shift in effort from the Scotian Shelf portion of 4X to the mouth and inner Bay of Fundy in 1997.

\begin{tabular}{|c|c|}
\hline
\textbf{Overall Stock Indicator:} & Medium-High \\
\hline
\textbf{Spawning biomass:} & above average \\
\hline
\textbf{Total biomass:} & above average \\
\hline
\textbf{Recruitment:} & several strong year classes \\
\hline
\textbf{Growth/Condition:} & low \\
\hline
\textbf{Age structure:} & poor: 95% 3-5 year olds, 2% >9 year old \\
\hline
\textbf{Distribution:} & good and expanding \\
\hline
\textbf{Recent exploitation:} & at \( F_{0.1} \) (much lower than in past) \\
\hline
\end{tabular}
HISTORY OF FRCC RECOMMENDATIONS:

In August 1993, the Council recommended, as a precautionary conservation measure, that the 1993 TAC be reduced from 35,000t to 21,000t. The Council also noted that the closure of the 4VsW cod fishery could cause some redirection of effort to the pollock fishery. In November 1993, the Council recommended that the 1994 TAC for pollock be set at 24,000t, the F01 catch level then calculated for 1994. In 1994, the Council recommended that the 1995 TAC for pollock be set at 24,000t, the F01 catch level then calculated for 1994. In 1994, the Council recommended that the 1995 TAC for pollock be set at the revised F01 calculation of 14,500t. The Council also recommended that Fisheries and Oceans scientists work with the industry to determine if, and during what times of the year, it would be appropriate to establish closed areas for pollock to protect the spawning stock. The Council notes that the 2nd Groundfish Work-shop held in early October 1995 provided a forum to discuss possible measures to further improve conservation of groundfish stocks in this area. In November 1995, the Council recommended that the 1996 TAC for pollock be set at 10,000t.

In October 1996, the FRCC recommended that the 1997 TAC be increased to 15,000t. The Council cautioned that DFO scientists continue to work with the industry to determine if, and during what times of the year, it would be appropriate to establish closed areas for pollock to protect the spawning stock. The Council also recommended that DFO scientists look at other abundance indicators.

1997 CONSULTATIONS:

DFO Science noted at the consultation that they use an industry index for this stock which shows an increase in abundance. Concern was expressed about pollock, and the 1,500t made available as in division 3Ps as by-catch in other fisheries. It was noted that this is likely an extension of the Scotian Shelf stock. Concern was expressed about the by-catch limit becoming a target for a directed fishery. It was suggested pollock might follow a pattern of out migration from the Scotian Shelf to 3Ps upon reaching some stage of maturation, not unlike halibut. There were reports that small pollock were common, "all across the board", and in all sectors. Stakeholders reported that the size and abundance of pollock was plentiful in the Bay of Fundy, while to the East it was scarce and small. Fishers from the tip end of Digby Neck reported that pollock seem

RECOMMENDATION #3.3.3.6. POLLOCK 4VWX5Zc:

The FRCC recommends that:

1. the 1998 TAC for pollock be set at 20,000t;
2. as an immediate priority, DFO Management/Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy) for cod, haddock and pollock. If the result of this review indicates potential adverse effects on local aggregations or spawning components, measures should be put in place to protect these resources; and
3. the decline in condition factor be monitored.
to be there, but not cod and/or haddock. Most people commented that pollock stocks are believed to be increasing. Many noted that Dogfish has been reported as a big problem in the pollock fishery.

**ANALYSIS:**

The abundance of this stock is assessed without reference to the RV survey, but relies instead on commercial catch rates. This must be cause for caution, given that reliance on commercial catch rates has had negative conservation consequences in many fisheries around the world. Given that a long RV time series is available, efforts should be made to utilize this in some manner.

In addition to the reliance on commercial catch rates, and the unexplained fluctuations in the RV survey results, there are various other uncertainties in this stock assessment.

While the clear shift in fishing activity to western parts of the stock area may or may not be due to changes in distribution, a precautionary approach is needed to prevent excessive effort on possible sub-stock components.

The Council is concerned about the reported shift in effort from the Scotian Shelf portion of 4X to the mouth and inner Bay of Fundy in 1997.

<table>
<thead>
<tr>
<th>COUNCIL'S VIEWS ON STOCK STATUS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Stock Indicator: Medium (adult stock above long term average)</td>
</tr>
<tr>
<td>Compared to average</td>
</tr>
<tr>
<td>Spawning biomass: 84,000t, above long term average of 70,000-75,000t</td>
</tr>
<tr>
<td>Total biomass: 129,000t, below long term average of 164,000t</td>
</tr>
<tr>
<td>Recruitment: average</td>
</tr>
<tr>
<td>Growth/Condition: slight decline in weights at age</td>
</tr>
<tr>
<td>Age structure: good distribution, few older fish</td>
</tr>
<tr>
<td>Distribution: indications of lower abundance in 4VW</td>
</tr>
<tr>
<td>Recent exploitation: well below F_m in 1996 (less than half of long term average)</td>
</tr>
</tbody>
</table>
**3.3.3.7. Flatfishes 4VW**

November 1993, the Council recommended that the 1996 TAC for 4VW flatfishes be set at 3,500t and that the 1996 TAC for 4X+5 flatfishes be set at 3,375t.

In October 1996, the FRCC recommended that the 1997 TAC for 4VW flatfishes be set at 3,000t and the 1997 TAC for 4X+5 flatfishes be set at 3,000t and that efforts to avoid the capture of small fish be continued for both of these fisheries. The Council also recommended that work be carried out by DFO and the industry, possibly in conjunction with the dockside monitoring program, to address the problem of species identification.

**1997 Consultations:**

Witch (Grey sole):- There were comments that there was still “mixing” of Witch flounder with other flatfish and that this would tend to understate witch landings.

Plaice: There were no detailed discussions on this stock.

**Analysis:**

4VW Flatfish:

No new assessment in 1997, except for witch flounder, which has been assessed this year separately from other flatfish.

The 1997 Stock Status Report indicated that:

- biomass is in decline; resource status deteriorated in the last few years
- rebuilding unlikely unless catches kept below the 1996 level, and effort kept below those of recent years

**Recommendation #3.3.3.7. Flatfishes 4VW:**

The FRCC recommends that:

1. the 1998 TAC for 4VW flatfish be set at 3,000t;
2. the proportionate catch of Witch in 4VW flatfish stocks not exceed current levels;
3. minimum size limits be enforced to protect incoming recruitment and efforts to avoid the capture of small fish be continued; and
4. work continue by DFO and industry to address the problem of species identification.
must avoid capture and discarding of small flatfish
- modest to good recruitment except for yellowtail
- Winter flounder: abundance remains relatively high; not fished commercially in 4VW.
- Plaice: depleted and declining, fewer large fish than in the past, possible incoming recruitment

- Yellowtail: depleted to a very low level, no incoming recruitment

The 1997 Stock Status Report for Witch flounder indicates that:
- fishable population declined from 1980s levels to low of 1992-93, remaining low at present
- pre-recruit (<35 cm) abundance (early-90s year classes) is now highest in 28-year series
- pre-recruits highly localized in Gully and deep holes north of Banquereau Bank in 4VsW
- avoid increased effort on witch, to protect incoming recruitment and allow rebuilding
- likely some linkage with stocks to north and east

### Council's Views on Stock Status (Flatfish except Witch):

<table>
<thead>
<tr>
<th>Stock Indicator</th>
<th>Low (potential for rebuilding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning biomass</td>
<td>Low</td>
</tr>
<tr>
<td>Total biomass</td>
<td>Low</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Signs of recruitment, except Yellowtail</td>
</tr>
<tr>
<td>Growth/Condition</td>
<td>No particular observation</td>
</tr>
<tr>
<td>Age structure</td>
<td>Shift toward smaller fish</td>
</tr>
<tr>
<td>Distribution</td>
<td>Species specific</td>
</tr>
<tr>
<td>Recent exploitation</td>
<td>Too high - must keep catches below 1996 level for rebuilding</td>
</tr>
</tbody>
</table>

### Council's Views on Stock Status (Witch Flounder):

<table>
<thead>
<tr>
<th>Stock Indicator</th>
<th>Low-Medium (rebuilding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning biomass</td>
<td>low</td>
</tr>
<tr>
<td>Total biomass</td>
<td>average</td>
</tr>
<tr>
<td>Recruitment</td>
<td>strong</td>
</tr>
<tr>
<td>Growth/Condition</td>
<td>No particular observation</td>
</tr>
<tr>
<td>Age structure</td>
<td>Good for pre-recruits; older ages lowest observed</td>
</tr>
<tr>
<td>Distribution</td>
<td>average</td>
</tr>
<tr>
<td>Recent exploitation</td>
<td>Too high</td>
</tr>
</tbody>
</table>
3.3.8. FLATFISHES 4X

In October 1996, the FRCC recommended that the 1997 TAC for 4VW flatfishes be set at 3,000t and the 1997 TAC for 4X+5 flatfishes be set at 3,000t and that efforts to avoid the capture of small fish be continued for both of these fisheries. The Council also recommended that work be carried out by DFO and the industry, possibly in conjunction with the dockside monitoring program, to address the problem of species identification.

1997 CONSULTATIONS:

Witch (grey sole):- There were comments that there was still “mixing” of Witch flounder with other flatfish and that this would tend to understate Witch landings.

Plaice: There were no detailed discussions on this stock.

ANALYSIS

Witch flounder has been assessed this year separately from other flatfish.

The 1997 Stock Status Report indicates that:

- given efficiency increases, declines in catch rates may under-estimate stock declines
- the precautionary approach implies immediate action is needed to reduce fishing effort on 4X flatfish (could be done by lowering the TAC so landings in 1998 are less than those in 1996)
- fishing effort should be spread proportionately among species

RECOMMENDATION #3.3.8. FLATFISHES 4X:

The FRCC recommends that:

1. the 1998 TAC for 4X flatfish be set at 2,000t;
2. the proportionate catch of Witch in 4X flatfish stocks not exceed current levels;
3. minimum size limits be enforced to protect incoming recruitment and efforts to avoid the capture of small fish be continued; and
4. work continue by DFO and industry to address the problem of species identification.
Winter flounder:
- some decline in <30cm fish; little change in >30cm fish; decline in >40cm fish
- industry notes decline in abundance, which is consistent with decline in catch rates

Plaice:
- decline in <30cm fish since 1994, little change in >30cm fish, clear decline in >40cm fish
- no significant new recruitment

COUNCIL’S VIEWS ON STOCK STATUS (FLATFISH EXCEPT WITCH):

<table>
<thead>
<tr>
<th>Overall Stock Indicator: Low-Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
</tr>
<tr>
<td>Spawning biomass:</td>
</tr>
<tr>
<td>uncertain: low-average</td>
</tr>
<tr>
<td>Total biomass:</td>
</tr>
<tr>
<td>uncertain: low-average</td>
</tr>
<tr>
<td>Recruitment:</td>
</tr>
<tr>
<td>poor</td>
</tr>
<tr>
<td>Growth/Condition:</td>
</tr>
<tr>
<td>No particular observation</td>
</tr>
<tr>
<td>Age structure:</td>
</tr>
<tr>
<td>Reduced age range for all three species</td>
</tr>
<tr>
<td>Distribution:</td>
</tr>
<tr>
<td>Species specific</td>
</tr>
<tr>
<td>Recent exploitation:</td>
</tr>
<tr>
<td>Effort considered too high</td>
</tr>
</tbody>
</table>

Yellowtail:
- some increase in <30cm fish, possible increase in >30cm fish, decline in >40cm fish
- no significant new recruitment
- industry notes declining abundance in keeping with lower CPUE

Witch flounder:
- fishable population declined from 1980s to low of 1992-93, still near lowest level observed
- pre-recruit (<35 cm) abundance (early-90s year classes) now highest in 28-year series
- small witch (<14 cm, probably 2-year-olds) remain at low abundance (in contrast to 4VW)
- crucial to avoid increased effort on witch, to protect incoming recruitment and allow rebuilding
- likely some linkage with stocks to south and west

COUNCIL’S VIEWS ON STOCK STATUS (WITCH FLOUNDER):

<table>
<thead>
<tr>
<th>Overall Stock Indicator: Low, but rebuilding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
</tr>
<tr>
<td>Spawning biomass:</td>
</tr>
<tr>
<td>low</td>
</tr>
<tr>
<td>Total biomass:</td>
</tr>
<tr>
<td>average</td>
</tr>
<tr>
<td>Recruitment:</td>
</tr>
<tr>
<td>strong</td>
</tr>
<tr>
<td>Growth/Condition:</td>
</tr>
<tr>
<td>No particular observation</td>
</tr>
<tr>
<td>Age structure:</td>
</tr>
<tr>
<td>Good for pre-recruits; older ages lowest observed</td>
</tr>
<tr>
<td>Distribution:</td>
</tr>
<tr>
<td>average</td>
</tr>
<tr>
<td>Recent exploitation:</td>
</tr>
<tr>
<td>Effort considered too high</td>
</tr>
</tbody>
</table>
3.3.3.9. Silver Hake - 4VWX

1997 Consultations:
Questions concerning ages, escapement of younger year classes, and by-catch of Gadoids when directing for silver hake were raised. A member of the silver hake Advisory, stated any Gadoid by-catch was “minuscule”.

Industry have fished this stock for the past three years, and saw better results in 1997 over the previous two years.

Analysis:
The NAFO assessment of this stock indicates that:
- stock size about average relative to 1970-96 period, rebuilding from lows of early 1990s
- catch rates, adjusted for the effect of using of separator grates, have dropped from 1984-89 to low levels in 1992-96
- recruitment: 1995 year class about average, 1996 year class more than twice the geometric mean, based on an early estimate
- commercial mean weights at age have declined sharply since 1992, now stabilized at lower levels

The projection at F_{0.1} is estimated to be +/-55,000 MT. There is no risk analysis but 55,000 is the F_{0.1} for this stock after recruitment was adjusted downward to reflect an expected overestimation of age 1 fish.

Recommendation #3.3.3.9. Silver Hake - 4VWX:
The FRCC recommends that:
1. the 1998 TAC for 4VWX silver hake be set at 55,000t;
2. the by-catch of groundfish should continue to be monitored to ensure there is no adverse impact on these resources; and
3. the decrease in condition factor be monitored.
DFO has conducted analysis subsequent to that found in the NAFO assessment, adjusting for consistent over-estimating of abundances, determining an $F_{0}$ catch level of 55,000 tonnes (rather than the 65,600 tonnes in the NAFO assessment).

**COUNCIL'S VIEWS ON STOCK STATUS:**

- **Overall Stock Indicator:** Medium
- **Compares to average:**
  - Spawning biomass: average, increasing
  - Total biomass: average, increasing
  - Recruitment: 95 year class average, 96 year class above average but uncertain
  - Growth/Condition: lower weights at age than in the past
  - Age structure: Few year-classes but typical for this species
  - Distribution: No particular observation
  - Recent exploitation: below $F_{0.1}$
3.3.3.10. ARGENTINE 4VWX

ANALYSIS:

Since no assessment of this stock was done in 1997, a new stock status report was not produced. Scientific information is from the 1996 Stock Status Report.

The 1996 DFO Stock Status Report indicates that there is too little known about this stock component to generate sufficient data for analytical purposes. Given the by-catch nature of this fishery and the low catches in recent years, the Council believes that the 1997 TAC can continue to be set at 1,000t, as a precautionary measure.

HISTORY OF FRCC RECOMMENDATIONS:

Catches from this stock, which are taken as by-catch in the silver hake fishery, have not exceeded 360t since 1983. In November 1993, the Council recommended that, as a precautionary measure, the 1994 TAC for argentine in 4VWX be set at 1,000t. The TAC was set at that level for 1994. In 1994, the Council recommended that the 1995 TAC for 4VWX argentine be set at 1,000t and this recommendation was repeated for 1996 and 1997.

1997 CONSULTATIONS:

Fishers indicated that they don't fish this species and see very few in their catch except for the vessels conducting the ITQ survey.

RECOMMENDATION #3.3.3.10. ARGENTINE 4VWX:

The FRCC recommends that:

1. the 1998 TAC for 4VWX argentine be set at 1,000t; and
2. if this fishery is pursued in a commercial fashion, there be a requirement for a scientifically based data collection component to improve knowledge about the resource.
Chapter 3: Stock Recommendations

*1997 Catch: as of Oct. 22/97
3.3.3.11. **Atlantic Halibut 3NOPs4VWX5Zc**

In October 1996, the FRCC recommended that the 1997 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 850t, and that the provision for the release of halibut smaller than 81cm be maintained. In addition to this recommendation the Council asked that a joint DFO/industry study be conducted to assist in the overall assessment process, such as appropriate biological sampling, a tagging/movement component, identification of stock sub-components and identification of alternative survey indices.

1997 **Consultations:**

During consultations, DFO Science pointed out that reasonable restrictive measures to permit rebuilding are required. Many industry members noted that misreporting was problem in 1995-96, i.e. halibut landed as other species.

The Atlantic halibut fishery was seen by fishers as an important economic contributor to fishers income and it would be a hardship to curtail effort. Fishers felt there could/should be a slight increase in the current TAC. Today, with modern, nylon “rope” backline, floats, and circle hooks, these fishermen are enjoying the best catch rates ever. There is no historic pattern(s), catch rates, or CUPE data, with which to compare.

Fishers reported that on one vessel, fishing Banquereau Bank, could catch his maximum halibut allocation in 8 hours. The fixed gear sector has been under restrictions since 1993 and a decline in longliner catch rates was noted.

**Recommendation #3.3.3.11. Atlantic Halibut 3NOPs4VWX5Zc:**

The FRCC recommends that:

1. the 1998 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 850t and that the provision for the release of halibut smaller than 81 cm be maintained; and

2. a joint DFO/industry study be conducted to assist in the overall assessment process such as appropriate biological sampling, a tagging/movement component, identification of stock sub-components and identification of alternative survey indices. Tonnages required for this work are to be determined by DFO science and allocated for this purpose only upon approval of a comprehensive plan. An evaluation of the study is to be conducted upon completion of its year of implementation. These catches are to be in addition to TAC.
Fishers questioned the difference between the RV Survey/ DFO Science opinion of this stock and that of the industry. One fisher stated that CHP’s were more the cause of apparent problems than were scientific indicators. Many industry representatives made points concerning the regional aspects of the conduct of the Atlantic halibut fishery. It was mentioned that experienced (halibut specific) fishermen, on enterprise allocation longliner vessels fishing 3Ps and 3NO were not experiencing declining catch rates. They have a long history of similar fishing patterns, and no major change in gear technology. Fishers reported a dramatic increase in 4VsW halibut catches this past year.

In 4X, Atlantic halibut is primarily a by-catch fishery, and 24" to 40" fish are the predominate sizes. There were recommendations from industry to set the Atlantic halibut TAC at 1994 catch levels. One Industry member suggested that the Atlantic halibut TAC in 4VsW should be increased, and it would be in order to let some of the Nova Scotian boats, with their experience and expertise, into 3Ps and 3NO, to conduct a test fishery.

The fishermen are reporting an increased abundance of halibut stock in South West Nova Scotia with sizes ranging from 8 to 75 pounds. Some fishers commented that more undersized halibut has been released this year than in previous years.

Vessels have experienced improved halibut catches along the Scotian Shelf and in 3Ps and 3NO in each of the last two years. Many industry participants noted that halibut is a strongly recovering stock for South West Nova Scotia.

All recommendations suggested either status quo or an increase in the halibut TAC for 1998 with the majority supporting an increase.

**Analysis:**

The 1997 Stock Status Report indicates that:

- abundance is low compared to past years; declines have been more evident for southern Grand Banks than Scotian Shelf
- total mortality (fishing and natural) seems to have increased
- there is a reduced range of sizes in the population
- halibut-directed CPUE down since 1988; some indications of increase in 1996

"present restrictive measures should be continued"

The stock status report and the information from fishermen are diametrically opposed for this stock. The former paints a picture of a very depleted stock, while the latter indicates a healthier and growing stock. Using a precautionary approach, it would not be prudent to increase the commercial TAC at this point, but it is important for a scientifically-designed fishermen-operated survey/index fishery to commence, to deal with the great uncertainty in the status of this resource.

**Council's views on stock status:**

<table>
<thead>
<tr>
<th>Overall Stock Indicator</th>
<th>Compared to average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spawning biomass</td>
<td>low, very uncertain</td>
</tr>
<tr>
<td>Total biomass</td>
<td>low, very uncertain</td>
</tr>
<tr>
<td>Recruitment</td>
<td>Indications of incoming recruitment</td>
</tr>
<tr>
<td>Growth/Condition</td>
<td>No reliable information</td>
</tr>
<tr>
<td>Age structure</td>
<td>Reduced age range in southern area; unknown for northern area</td>
</tr>
<tr>
<td>Distribution</td>
<td>Decline more pronounced for southern Grand Banks</td>
</tr>
<tr>
<td>Recent exploitation</td>
<td>Too high in recent years</td>
</tr>
</tbody>
</table>
3.3.3.12. Skates 4VsW

History of FRCC Recommendations:

This is the second time that the Council has had an opportunity to view information on this fishery and to formulate recommendations for its conservation. In 1994, a combination of closures of traditional groundfish fisheries on the Scotian Shelf and openings in the markets for skate wings resulted in the development of a directed Canadian skate fishery. In 1995, the TAC was lowered to 1,200t, with an additional 20% by-catch allowed in the directed flatfish fishery. In October 1996, the FRCC recommended that the 1997 TAC for 4VsW skates be again set at 1,200t, including by-catch and measures be implemented to diversify size and species of skate in the catch.

1997 Consultations:

It was noted at consultations that discards of skates are far less than in previous years. DFO Science representatives noted that the TAC represents a fairly large part of local biomass and that skate have a low fecundity. Industry participants felt that the current experimental fishery should be continued and many observed that this stock seems to be at a somewhat lower level than in the past for the larger fish, while there seems to be more small skates.

Analysis:

Since no assessment of this stock was done in 1997, a new stock status report was not produced. Scientific information here is from the 1996 Stock Status Report. The biomass index of skates from annual summer surveys has shown a general decline since 1982. In 1995, DFO scientists indicated that the low reproductive rate of skates, combined with declining biomass, and the need to limit by-catch of traditional species in some areas, all indicated the need for a continuation of a conservative approach to harvesting. Given the low reproductive rate common to skate and the current practice of selective removal of large individuals, a reduction in the reproductive potential of the stock is possible.

Measures should be implemented to diversify the size and species of skate to maintain a viable fishery.

Recommendation #3.3.3.12. Skates 4VsW:

The FRCC recommends that:

1. the 1998 TAC for 4VsW skates be set at 1,200t including bycatch;
2. the experimental fishery should continue at a similar level of fishing effort in 1997 to increase our understanding of the resource and to provide the basis for improved assessment and management in the future; and
3. measures be implemented to diversify size and species of skate in the catch.
Chapter 3: Stock Recommendations

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator: Compared to average

- Spawning Biomass: no particular observation
- Total Biomass: below average (Thorny Skates)
- Recruitment: below average
- Growth and Condition: average
- Age Structure: below average
- Distribution: below average
- Recent Exploitation Level: average

*1997 Catch: as of Oct. 22/97
**3.3.3.13. WOLFFISH 4VWX**

**History of FRCC Recommendations:**

This is the second year that the Council has had an opportunity to review information on this fishery and to formulate recommendations for the conservation of this resource. With the limited information available in 1995 on which to base a firm recommendation, the Council recommended a precautionary TAC for 1996 at 600t.

In October 1996, the FRCC recommended that catches should be limited to the historical levels consistent with the truly by-catch nature of this fishery, with sufficient flexibility to avoid closing traditional directed groundfish fisheries.

**1997 Consultations:**

At the FRCC consultation in Yarmouth there was discussion of a possible link between catfish and lobster. Most believe that the stomach contents of catfish indicate they prey on lobster. Anecdotal information reveals that when catfish are high in abundance, lobsters are low.

This stock is rebounding in the 4X area with good catches on the edge of Brown’s Bank. This fish is seen as a predator of more valuable species such as lobster and scallop and many feel that less protection should be exercised for this species.

**Analysis:**

Since no assessment of this stock was done in 1997, a new stock status report was not produced. Scientific information here is from the 1996 Stock Status Report.

It appears that the concentrated fishing effort in 4X on this species, has likely contributed to overall decline. As well, scientists believe that catches in excess of 600t in 1997 would not likely be sustainable.

**Recommendation #3.3.3.13. WOLFFISH 4VWX:**

The FRCC recommends that:

1. catches of 4VWX wolphish should be limited to historical levels consistent with the truly by-catch nature of this fishery, with sufficient flexibility to avoid closing traditional directed groundfish fisheries.
Council's views on stock status:

Overall Stock Indicator: Low

Compared to average

Spawning Biomass: low, declining in 4VWX

Total Biomass: low, declining in 4VWX

Recruitment: near average, small fish in 4X

Growth and Condition: below average

Age Structure: poor

Distribution: average

Recent Exploitation Level: no particular observation

* 1997 Catch: as of Oct. 22/97
**3.3.3.14. White Hake 4VWX5Zc**

**HISTORY OF FRCC RECOMMENDATIONS:**

This is the second time that the Council has had an opportunity to review information on this fishery and to formulate recommendations for its conservation. In November 1995, the Council recommended that the 1996 TAC for 4VWX white hake be set at 2,500t.

In October 1996, the FRCC recommended that the 1997 TAC for 4VWX+5Zc white hake be increased to 3,500t with flexibility to avoid closing traditional directed groundfish fisheries. The Council added that, for assessment purposes, separation of management units 4VW and 4X+5Zc should be implemented and, given the belief that the western stock (4X+5Zc) is transboundary, this stock be included in the bilateral consultations on groundfish with the U.S. with the objective of developing a joint management strategy.

**1997 CONSULTATIONS**

Many commented that there has been a shift of fishing effort up into the inner Bay of Fundy on this stock. Industry TAC recommendations ranged from 2,800t in 4X, to status quo, to establishing a non rigid target for this species.

**ANALYSIS:**

Since no assessment of this stock was done in 1997, a new stock status report was not produced. Scientific information here is from the 1996 Stock Status Report.

The 1996 Stock Status Report indicates that the existing management units used to describe this stock are not consistent with the distribution of this species. Separation of management units to 4VW, and 4X and 5 should be considered. The Council notes that commercial landings of white hake from the Scotian Shelf are largely from 4X (70%) and 4W (10-20%). The biomass of white hake on the Scotian Shelf is estimated to be much lower than the levels reached in the early 1980s and is now approaching the low levels observed in the 1970s. The Council feels that annual catches of the order of 3,500t would be more consistent with the

**RECOMMENDATION #3.3.3.14. WHITE HAKE 4VWX5ZC:**

The FRCC recommends that:

1. the 1998 TAC for 4VWX5Zc white hake be set at 3,500t;
2. for assessment purposes, separation of management units 4VW and 4X+5Zc should be implemented;
3. this stock be included in the bilateral consultations on groundfish with the U.S., given the belief that the western stock (4X+5Zc) is transboundary, with the objective of developing a joint management strategy; and
4. as an immediate priority, DFO Management/Science be tasked to update data on the shift in effort from eastern 4X to western 4X (particularly to the inner Bay of Fundy). If the result of this review indicates potential adverse affect on local aggregations or spawning components, measures should be put in place to protect this resource.
status of the stock based on long term averages. The assessment indicates that the 4VW stock component is declining and this should be taken into consideration in developing and in assessing CHP's.
3.3.3.15. CUSK 4VWX

**Analysis:**

Since no assessment of this stock was done in 1997, a new stock status report was not produced. Scientific information here is from the 1996 Stock Status Report. In the 1995 Stock Status Report, scientists indicated that the cusk biomass in both 4W and 4X has shown a gradual decline since groundfish surveys commenced in 1976. The 1996 Stock Status Report confirms this decline, adding that the 1995 estimate is amongst the lowest observed. The Report states that, given the estimate of low and declining biomass, catches should be restricted to below 2,000t. The 1997 survey indicates historical low abundance for this stock.

**History Of FRCC Recommendations:**

This is the second year that the Council had an opportunity to review information on this fishery and to formulate recommendations for the conservation of this resource. In November 1995, the Council recommended that the 1996 TAC for 4VWX cusk be set at 1500t. In October 1996, the FRCC recommended that the 1997 TAC for 4VWX cusk should not exceed historical catch levels, with sufficient flexibility to avoid closing traditional directed groundfish fisheries.

**1997 Consultations**

Not many comments were received on this species. However, there was an industry recommendation for a non rigid target to be established for cusk in 4VWX.

**Recommendation #3.3.3.15. CusK 4VWX:**

The FRCC recommends that:

1. the 1998 catch for 4VWX cusk should not exceed historical catch levels, with sufficient flexibility to avoid closing traditional directed groundfish fisheries.
COUNCIL’S VIEWS ON STOCK STATUS:

Overall Stock Indicator: low

Compared to average

Spawning Biomass: low
Total Biomass: historical low
Recruitment: no sign
Growth and Condition: poor
Age Structure: below average
Distribution: similar to recent years (average)
Recent Exploitation Level: no particular observation
3.3.3.16. MONKFISH 4VWX

HISTORY OF FRCC RECOMMENDATIONS:

This is the second time that the Council has had an opportunity to review information on this fishery and to formulate recommendations for the conservation of this resource. In November 1995, the Council recommended that the 1996 TAC for 4VWX monkfish be set at 700t.

In October 1996, the FRCC recommended that the 1997 TAC for 4VWX monkfish should not exceed historical levels, with sufficient flexibility to avoid closing traditional direct groundfish fisheries. The Council also recommended that monkfish be treated as a by-catch in all other fisheries and the joint industry/DFO science five year program should be continued.

1997 CONSULTATIONS:

It was noted that from a scientific viewpoint, there is not a lot of data available on this stock. Industry reports less monkfish this year partly due to changes in fishing patterns and partly due to less availability of the species. Industry feels that fishing on this stock should be kept at by-catch levels.

ANALYSIS:

Since no assessment of this stock was done in 1997, a new stock status report was not produced. Scientific information here is from the 1996 Stock Status Report.

Historically, monkfish have been almost exclusively a by-catch fishing of groundfish and scallops ventures. Between 1992 and 1994, the less than 65 ft. mobile fleet has been directing for monkfish in 4X. Consequently landings in this area increased from just over 300t in 1991 to 1,100t in 1994. Abundance is highest in central Scotian Shelf and in the inshore areas of west of 4W. This is a shared resource with the U.S. where the fishery is essentially unregulated. The U.S. survey shows the resource is over exploited. There is no evidence of large scale migration of this stock and there appears to be discrete spawning components in Canadian waters. Consequently, the stock may be managed successfully by Canada with $Zc included in the management area.

There is a joint industry/science five year program to improve knowledge of the resource being conducted by five-mobile gear vessels less than 65 feet. They are conducting a directed fishery in Georges Basin for 200t

RECOMMENDATION #3.3.3.16. MONKFISH 4VWX:

The FRCC recommends that:

1. the 1998 catch for 4VWX monkfish should not exceed historical levels, with sufficient flexibility to avoid closing traditional directed groundfish fisheries;
2. monkfish should be treated as bycatch in all other fisheries; and
3. the joint industry/DFO science five year program be continued.
in co-operation with DFO. There is no biological basis to date for establishing a TAC. DFO Science recommends that catches be maintained at a low level and that the five-year research program be continued.

Scientists suggested that catches be limited to less than 800t, the average landing since 1988. The 1996 Stock Status Report confirms that the biomass remains low and catch level in the order of 800t continue to be suggested.

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<th>Year</th>
<th>Catch (x1000)</th>
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<tbody>
<tr>
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<tr>
<td>1988</td>
<td>0.8</td>
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<tr>
<td>1991</td>
<td>0.8</td>
</tr>
<tr>
<td>1994</td>
<td>1.2</td>
</tr>
<tr>
<td>1997</td>
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* 1997 Catch: as of Oct. 22/97

### Council's Views on Stock Status:

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<th>Category</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Overall Stock Indicator</td>
<td>below average</td>
</tr>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning Biomass</td>
<td>below average</td>
</tr>
<tr>
<td>Total Biomass</td>
<td>below average (declining)</td>
</tr>
<tr>
<td>Recruitment</td>
<td>mixed average in 4X, below average in 4VW</td>
</tr>
<tr>
<td>Growth and Condition</td>
<td>no particular observation</td>
</tr>
<tr>
<td>Age Structure</td>
<td>no particular observation</td>
</tr>
<tr>
<td>Distribution</td>
<td>average</td>
</tr>
<tr>
<td>Recent Exploitation Level</td>
<td>above average</td>
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</tbody>
</table>
3.4. GEORGES BANK

3.4.1. LETTER TO THE MINISTER

May 13, 1997

The Honourable Fred Mifflin, P.C., M. P.
Minister of Fisheries and Oceans
200 Kent St.
Ottawa, Ontario
K1A 0E6

Dear Minister:

The mandate of the Fisheries Resource Conservation Council (FRCC) requires that it advise you on conservation requirements for Atlantic fish stocks. In keeping with this mandate we have conducted consultations with science and industry representatives on the conservation requirements for Georges Bank groundfish stocks.

The FRCC has now concluded consultations on eastern Georges Bank haddock, Georges Bank cod and yellowtail flounder. Our consultations, held in Yarmouth, Nova Scotia on May 7, were characterized by a strong conservation ethic on the part of all stakeholders. Stakeholders were unanimous in asking the FRCC to consider strong conservation measures on all of these stocks. Those who fish on Georges Bank have seen the signs of recovery and they are committed to seeing these stocks rebuild. All who attended our consultations believed that a rebuilding strategy for these stocks should be aggressively pursued and that TACs should continue to be set below the F0.1 level to allow rebuilding to occur. All industry presentations and submissions recommended measures and quota levels that allow for rebuilding.

It was noted in consultations that delaying the opening of this fishery until June has had a positive effect as has the closed area on the US side of the line. Many in the industry pushed for a June 1 opening date as they believe this will allow for a cleaner fishery. It was stated by many of those present that the "hard line" conservation measures and conservative quotas of the past year were "paying off". Many spoke about more responsible fishing practices on the part of the industry. The conservation management measures that have been in place over the past three years such as mesh size, observer coverage, and mandatory dockside monitoring, should be maintained.

The Council wants to take this opportunity to thank the Department for the fine presentation given by scientists from the St. Andrews Biological Station. The high level of debate and discussion at the Yarmouth consultation indicated how healthy the rapport between science and industry is in this area. We believe this is also indicative of the quality of the advice and the presentation, and ultimately, how far we have all come in working together to achieve our conservation goals.

In establishing our recommendations for Georges Bank, Council used the following criteria, which we believe will lead to rebuilding of these stocks:

- setting quotas below \( F_{a,1} \),
- target an increase in biomass by 5 percent or more,
- risk of decline in biomass (from the risk analysis) in the order of 20 percent or less; and
- establishing an appropriate ratio of cod to haddock to minimize dumping and discarding.
Please note that all of the Council’s quota recommendations, when combined with projected catch levels for the US are: below the $F_{0.1}$ level established in the Stock Status Reports, allow for rebuilding of the stocks of more than 5 percent, and the risk of decline in the biomass from quotas at these levels is less than 20 percent. You will note that the risk of decline in the biomass is slightly higher for cod than for the two other species, but Council felt it was important to maintain a better ratio of cod to haddock.

Your Council is pleased to have this opportunity to present you with this advice and we trust you will find this helpful in your deliberations.

Sincerely,

Fred Woodman
Chairman
3.4.2. Stock-by-Stock Recommendations - Georges Bank

3.4.2.1. Cod 5Zj,m

In 1994, the fishery was closed to all sectors from January 1 to May 31 and for an additional month to June 30 to the offshore sector. The U.S. fishery was closed from January 1 to June 30.

In November 1994, the Council recommended that bilateral consultations continue with the objective of undertaking management action appropriate to re-build this stock. In May 1995, the FRCC recommended to the Minister of Fisheries and Oceans that there be no directed fishing for 5Zj,m cod in 1995 and that by-catches be limited to less than 1000t. In November 1995, the Council again recommended that bilateral consultations continue and that the fishery remain closed until June 1996. In May 1996, the Council recommended that the 1996 TAC for 5Zj,m cod be set at 2,000t.

1997 Consultations:

Consultation on 5Z cod were held in Yarmouth in May 1997. Stockholders expressed satisfaction with the initial rebuilding that took place over the past year but were unanimous in recommending further caution. Industry recommendations for TAC’s were all below F_b1. There was also general agreement that observers,

Recommendation #3.4.2.1. Cod 5Zj,m:

The FRCC recommends that:

1. bilateral discussions with the U.S. continue with the objective of undertaking management action appropriate to re-build this stock;
2. the Canadian quota for 1997 be set at 3,000t;
3. the fishery commence June 1, 1997 to allow a better mix of cod and haddock to minimize bycatch problems in the fishery.
mesh size and configuration and dockside monitoring had positive effects and that a closer to 1:1 ratio between cod and haddock quotas would also help in conducting a cleaner fishery.

**ANALYSIS:**

The 1997 DFO Stock Status Report indicates that:

- Exploitation is below $F_{0.1}$
- 1992 and 1995 year classes are moderate; 1994 and 1996 year classes weak
- 49% of 1996 catch comes from the 1992 year class
- Spawning stock biomass improving from low 1994 level, but still below critical level.

This is a transboundary stock. The Council recognizes the improvement made in the recovery of this stock as a result of the conservation measures adopted by industry in recent years and encourages a continuation of these initiatives.

The exploitation rate in 1996 was below $F_{0.1}$. The 1992 year class is moderate; made up 49% of the 1996 catch. The 1995 year class also appears to be moderate. The spawning stock biomass is improving from the low 1994 level but is still below the critical level required for more successful recruitment.

A Canadian quota of 3,000t is recommended because it will permit stock rebuilding, will keep exploitation low and will reduce the risk of decreasing the biomass. There is a 90% probability that the biomass will increase in 1998 under this scenario. The biomass is expected to increase by 19%.
3.4.2.2. HADDOCK 5ZJ,M

In 1994, the Council recommended that bilateral consultations continue with the objective of undertaking management action appropriate to rebuild this stock. In the meantime, the Council recommended that the fishery be closed until June 1995, prior to which time the Council would provide a definite recommendation with respect to the 1995 TAC. In May 1995, the Council recommended that the 1995 TAC for 5Zj,m haddock be set at 2,500t. In May 1996, the Council recommended that the 1996 TAC for 5Z,m haddock be set at 4,500t.

1997 Consultations:
Consultations on 5Z haddock were held in Yarmouth in May 1997. Stockholders expressed satisfaction with the initial rebuilding that took place over the past year but were unanimous in recommending further caution. Industry recommendations for TAC’s were all below F_{1,1}. There was also general agreement that observers and dockside monitoring had had positive effects and that a closer to 1:1 ratio between cod and haddock quotas would also help in conducting a cleaner fishery.

Analysis:
The 1997 DFO Stock Status Report indicates that:
- Exploitation below F_{1,1}
- Moderate year classes in 1992 and 1993 but recruitment from subsequent year classes will be weak

Recommendation #3.4.2.2. HADDOCK 5ZJ,M:
The FRCC recommends that:
1. bilateral discussions with the U.S. continue with the objective of undertaking management action appropriate to re-build this stock;
2. the Canadian quota for 1997 be set at 3,200t;
3. the fishery commence June 1, 1997 to allow a better mix of cod and haddock to minimize bycatch problems in the fishery.
Biomass close to recent average, but less than 1/3 of long term average

• Spawning biomass still below critical level

This is a transboundary stock, the majority of which appears to be in Canadian waters.

The Council recognizes the improvements made in this stock as a result of the conservation measures adopted by industry in recent years and encourages a continuation of these initiatives.

The FRCC is concerned with the apparent poor year classes since 1994. Despite some recovery, the biomass remains low in comparison to the levels of the 1930-1950's. For this reason a cautious approach must continue with the aim of promoting stock rebuilding.

A Canadian quota of 3,200t is recommended because it will permit stock rebuilding, will keep exploitation low and will reduce the risk of decreasing the biomass. There is a 73% probability that the biomass will exceed increase in 1998. The biomass is expected to increase by 7–8% under this scenario.

**COUNCIL'S VIEWS ON STOCK STATUS:**

- **Overall Stock Indicator**: Some signs of recovery
- **Spawning Biomass**: Stabilizing but at low levels
- **Total Biomass**: 1/3 of levels of 1930's to 1950's
- **Recruitment**: Sporadic; 1992 and 1993 year classes moderate
- **Growth and Condition**: Average
- **Age Structure**: Few year classes
- **Distribution**: Limited on US side
- **Recent Exploitation Level**: Below F_{k,1}
3.4.2.3. **YELLOWTAIL FLOUNDER 5ZJ,M**

**HISTORY OF FRCC RECOMMENDATIONS:**

The directed fishery for yellowtail flounder began only recently, with 8 to 10 boats participating in a fishery. It was expanded rapidly in 1994, with about 40 vessels pursuing the fishery. In November 1995, the Council recommended that bilateral consultations continue with the U.S. with the objective of undertaking management action appropriate to rebuild this stock. In the meantime, it was recommended that the fishery remain closed until June 1996, prior to which time the Council would provide a definitive recommendation with respect to the 1996 TAC. In May 1996, the Council recommended that the 1996 TAC for 5Z, in yellowtail flounder be set at 415t.

**1997 CONSULTATIONS:**

Consultations on 5Z yellowtail flounder were held in Yarmouth in May 1997. Stakeholders expressed satisfaction at the moderate rebuilding which has taken place, but asked the FRCC to remain cautious in its recommendations.

**ANALYSIS:**

The 1997 DFO Stock Status Report for this species indicates that:

- This has been a developing Canadian fishery since 1993
- Exploitation below F0.1
- Biomass recovering but still at low level
- Recruitment improving, but no exceptional year classes in the 1990's

This is a transboundary stock, the majority of which appears to be in Canadian waters.

This is a relatively new fishery for the Canadian industry, which started in 1993.

The Council recognizes the improvement made in this stock as a result of a cautious approach taken by industry in this fishery in recent years and encourages a continuation of these initiatives.

The biomass of yellowtail flounder is below the long term average but is showing signs of improvement. Moderate-to-strong year classes in the 1990’s, but 1995 year class appears to be weak. The age structure of the

**RECOMMENDATION #3.4.2.3. YELLOWTAIL FLOUNDER 5ZJ,M:**

The FRCC recommends that:

1. bilateral discussions with the U.S. continue with the objective of undertaking management action appropriate to re-build this stock;
2. the Canadian quota for 1997 be set at 800t.
population is expanding, as evidenced by the size composition in the landings over the past 3 years. Exploitation levels were well below $F_{0.1}$ in 1995 and 1996.

A Canadian quota of 800t is recommended for 1997 because it will permit stock rebuilding, will keep exploitation low and will reduce the risk of decreasing the biomass. There is a 80% probability that the biomass will increase in 1998. The biomass increase under this scenario may be of the order on 10%.

The Council notes that the above figures are calculated based on the method which provides the most conservative levels for $F_{0.1}$. The scientists applied another method in the DFO SSR that provided for a higher estimate of $F_{0.1}$ (or its equivalent). The Council is cautious, and believes that the alternate method may be overly optimistic. For detailed discussion of the two approaches used, please see DFO SSR A3-15, yellowtail flounder on Georges Bank.

**COUNCIL’S VIEWS ON STOCK STATUS:**

<table>
<thead>
<tr>
<th>Overall Stock Indicator:</th>
<th>Rebuilding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compared to average</td>
<td></td>
</tr>
<tr>
<td>Spawning Biomass:</td>
<td>Below long term average but improving</td>
</tr>
<tr>
<td>Total Biomass:</td>
<td>Low</td>
</tr>
<tr>
<td>Recruitment:</td>
<td>Moderate/strong year classes in 1990's; 1995 appears weak.</td>
</tr>
<tr>
<td>Growth and Condition:</td>
<td>Average</td>
</tr>
<tr>
<td>Age Structure:</td>
<td>Expanding</td>
</tr>
<tr>
<td>Distribution:</td>
<td>More concentrated on Canadian side</td>
</tr>
<tr>
<td>Recent Exploitation Level:</td>
<td>Below $F_{0.1}$</td>
</tr>
</tbody>
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3.5. REDFISH UNITS 1, 2, 3 AND 30

3.5.1. INTRODUCTION

This report is one of a series that the Fisheries Resource Conservation Council (FRCC) makes to the Minister of Fisheries and Oceans on conservation measures for groundfish stocks in eastern Canada. This report deals with redfish stocks in Units 1, 2, and 3 and in division 3-0.

Every year the FRCC holds public consultations with stakeholders to gather information on all Atlantic groundfish stocks. This information assists us in forming our recommendations to the Minister of Fisheries and Oceans for annual conservation requirements for Atlantic groundfish. For this report we met with fishers and other concerned stakeholders in Halifax, Nova Scotia on October 24 to discuss redfish. We also received some written briefs which are noted in appendix 2.

CONSERVATION ISSUES

During our consultations many concerns were raised about the state and health of redfish stocks and most of these concerns are dealt with in Chapter 2 of this report in Stock-by-Stock recommendations. However, the Council wishes to highlight some of these concerns and draw particular attention to certain problems.

SCIENCE AND INFORMATION

The Council recognizes the challenge involved in assessing redfish stocks, and the advances made to date by the Department of Fisheries and Oceans (DFO) Science Branch. The FRCC welcomes the adoption of the zonal assessment approach to redfish, the establishment of the multidisciplinary program on redfish, and the greater involvement of the industry through programs such as the sentinel fishery. Nevertheless, everyone — including scientists, industry and the Council — remains frustrated by the difficulty of obtaining abundance indices on redfish stocks. In particular, only one indicator of abundance is currently available for Unit 1 redfish, and there are concerns in the industry that this indicator, from the general groundfish survey, may not accurately reflect redfish stock status. In Unit 2, there is now an accepted indicator of abundance, but no connection has yet been made between this indicator and those used in the past, as well as with commercial catch rate trends, so that it is difficult to assess the relative status of the resource.

In Unit 3, concerns are also present about the reliability of the survey index, and limitations on the sampling locations used. In 3-0, the survey seems to measure the abundance of primarily small redfish, so that there is no reliable indicator of adult biomass. In many cases, the survey index is considered an under-estimate of abundance, and Council recommends that if possible, some clear conclusions be drawn, through additional research if necessary, to quantify this under-estimation, so that historical, current and potential (e.g. F0.1) exploitation rates can be more accurately determined.

The division between Unit 1 and 2 continues to be a problem for Redfish. Catches of Unit 2 fish are taking place close to the division of the two stocks and there are strong industry suspicions that some of this catch is Unit 1 fish. Science has indicated at the consultation that there is little they can do to tell these two stocks apart. Continuing efforts to resolve this problem are crucial.

Council feels that greater participation by scientists, industry and other interested parties in the Regional Advisory Process (RAP) for redfish would be beneficial. An expanded number of scientists (including non-redfish scientists) would broaden the discussion of assessment methodologies and results. Greater participation by industry, by the provinces and by others is also important. To accomplish this, the RAP session must be fully publicized. In addition, the possibility could be explored of having the redfish RAP held together with a regional RAP, such as that of the Scotian Shelf - Bay of Fundy, as a way to facilitate more involvement by other scientists and industry. It should be noted that in making these comments, the FRCC is not advocating moving away from a zonal assessment on redfish.

The FRCC is concerned about the possibility that DFO may move the research vessel redfish survey in Unit 2 from an annual to a bi-annual cycle. It should be noted that, east of Halifax, this fishery is among the few groundfish fisheries that remain open and redfish is very important to the overall value of the groundfish fishery. On the other hand, Council understands the relatively slower-changing nature of redfish. If the redfish survey is to be bi-annual then the Council recommends that it should cover both Units 1 and 2.
using the same vessel, the same gear and the same trawl. At least for the immediate future, the existing RV index for Unit 1 redfish, as derived from the regular summer/fall Gulf groundfish surveys, should also be continued.

**FISHERIES MANAGEMENT AND ENFORCEMENT:**

The FRCC is encouraged by the use of conservation tools such as restricted areas like the "Bowtie" in Unit 3 and the adoption of Small Fish Protocols. However, the FRCC remains concerned about the waste involved in continued fishing on small redfish. If this continues, we will find ourselves in a position where we can not reach the long-term potential of the spawning stocks.

Research and experimental work should be expedited to address this serious problem. In addition, the Council urges that sampling programs, at-sea and in-port, be fully applied to ensure that small fish protocols and discard regulations can be rigorously enforced.

A further concern of the Council about the effectiveness of enforcement in this fishery relates to the adequacy of the Dockside Monitoring Program (DMP). Specifically, the Council recommends that all landings be monitored under the Program.
3.5.2. Stock-by-Stock Recommendations - Redfish

3.5.2.1. Redfish Unit 1 - 4RST + 3PN (Jan-May) + 4VN (Jan-May)

History of FRCC Recommendations:

In November 1993, the Council expressed its concern about this stock and recommended that the 1994 TAC be set at 30,000 t (a 50% reduction) with the view to keeping it at this level for the following two years, if at all possible, to achieve stability.

In its 1994 report, the Council recommended, for Unit 1 redfish, that current scientific work be strengthened and elaborated in co-operation with the industry so as to clarify redfish management units, as well as to better understand migration patterns and stock status and that the 1995 TAC be set at 7,500 t. As well, the Council recommended that a small fish protocol be established to protect juvenile redfish; and that Fisheries and Oceans, in consultation with industry stakeholders, limit the fishery as much as practical during the January to June period. The Minister considered the FRCC TAC recommendation but concluded that no fishery for Unit 1 redfish should occur in 1995. Further to the Council’s recommendation for a joint industry/science initiative for redfish, a multi-disciplinary research program was developed jointly with industry stakeholders and DFO in an attempt to address key questions related to redfish biology, stock definition and migrations, and stock status. For 1996, and again in 1997, the FRCC recommended continuing the moratorium and minimizing the by-catch of redfish in other fisheries. In 1997, the FRCC also recommended that cooperative industry science surveys take place but to date this has not occurred.

1997 Consultations:

The Council held a special consultation on redfish stocks on October 24, 1997. Industry expressed strong concerns about the continuing decline of the biomass in this stock and the lack of available information in the absence of a commercial fishery. Industry again asked for specific sentinel surveys in

Recommendation #3.5.2.1. Redfish Unit 1:

The FRCC recommends that:

1. no directed commercial fishery take place in 1998; and

2. a joint industry science sentinel survey be established, on an ongoing basis, to include both a fully scientific component and a component to re-establish the commercial catch rate index.

a) The level of quota allowed for this should not exceed 1000 t.

b) Participation in this sentinel fishery should emphasize those who have historically fished this stock and whose catches were used to determine the commercial catch rate index. This will allow the new index to be compared with the old.
this fishery and expressed their concerns with using the Needler groundfish surveys as the main indicator of stock status. Comments at consultations and in written briefs noted that no biomass estimate was available in the Stock Status Report (SSR) and added that some minimal catch should be allowed to increase the amount of information available for this stock. As in previous years, the division between Units 1 and 2 was questioned and concerns were expressed about the fishing of Unit 1 redfish in Unit 2.

ANALYSIS:

The 1997 DFO Stock Status Report indicates:

- no sign of incoming recruitment
- biomass at very low levels
- recovery can only occur 7-9 years after significant recruitment has occurred.

The Council remains very concerned about the status of this stock and notes that there is still no apparent improvement in the state of the stock despite the moratorium. Council also feels it is important to gather more information on this stock through joint industry science initiatives, in particular, obtaining a viable and useful substitute for the commercial fishery index. We note that this is the only major fishery currently under moratoria for which there is no sentinel survey.

**COUNCIL'S VIEWS ON STOCK STATUS:**

- Overall Stock Indicator: appears very low
  - Compared to average
- Spawning Biomass: low
- Total Biomass: low
- Recruitment: very low
- Growth and Condition: no particular observation
- Age Structure: poor
- Recent Exploitation Level: moratorium
3.5.2.2. REDFISH UNIT 2 - 3P₄₄Vs₄WFG + 3P₄₄VN (JUN-DEC)

HISTORY OF FRCC RECOMMENDATIONS:

In November 1993, the Council recommended that the TAC for Unit 2 redfish be reduced from 28,000t to 25,000t in 1994. In November 1994, the Council recommended that the TAC be set at 20,000t for 1995 and that a small fish protocol be established to protect juvenile redfish. The Council also recommended that no fishing be permitted in 3Pn and 4Vn during November and December and that scientific work clarify redfish management units and develop a better understanding of migration patterns and stock status. The Council recommended that the fishery be limited as much as practical during the January through June period to avoid taking fish that may, in fact, be fish from Unit 1. The Minister reduced the TAC to 14,000t for 1995 and implemented measures to avoid catching Unit 1 redfish when they could be mixed with redfish from Unit 2.

The Council recommended a TAC reduction to 10,000t for 1996 with: rigid small fish protocols, no fishing in 3Pn and 4Vn during November and December, and limiting, as much as possible, fishing from January to June. In 1997, the FRCC recommended that the TAC remain at 10,000 t, small fish protocols be continued and, DFO and Industry discuss the merits of protecting the 1988 year-class.

1997 CONSULTATIONS:

The Council held a special consultation on redfish stocks on October 24, 1997. Many industry participants questioned the number associated with the F₁₁ level for this stock as indicated in the SSR. Some noted that the F₁₁ level could be as high as 15,000t. All those who participated in consultations felt this stock was in healthy condition and advocated some quota increase. Many indicated that the problems associated with the capture of small redfish can be avoided by staying away from areas such as the Stone Fence. Some noted that gear selectivity is not the answer to the problems with small redfish.

Recommendation #3.5.2.2. REDFISH UNIT 2:

The FRCC recommends that:

1. the TAC for 1998 be set at 11,000 t;
2. seasonal and area closures be continued;
3. the small fish protocol be continued and rigorously enforced and DFO and industry discuss the merits of continuing to protect the 1988 year-class and measures to do this, such as new closed areas or adjustments to the minimum size in the small fish protocol; and
4. DFO Science should seek to determine:
   a) the long term potential for this stock, and
   b) the historical profile of exploitation rates.
**ANALYSIS:**

The 1997 DFO Stock Status Report indicates that:

- The stock size remains stable.
- There are some tentative signs of good recruitment subsequent to the 1988 year-class (1994 year class)
- A catch of 10,000 t in 1998 would generate an exploitation rate of about 10% or less (below the $F_{0.1}$ level).

While the Stock Status Report notes stability in the stock, it does not provide an analysis of how the level of the biomass in this stock relates to the long-term average. The changes in the commercial catch rate index over the past decade, and some current survey results, could be interpreted as suggesting that this stock may not be fully re-built. The Council remains focused on a rebuilding strategy for this stock and remains cautious with any quota recommendations.

The Council notes that the 1988 year class is not fully sexually mature, and the 1994 year class cannot yet be counted on and thus, will need to be carefully monitored to determine its strength. The Council believes that the 1988 year class must continue to be protected. If this is done, and if stock indicators remain positive, the Council is optimistic that the rebuilding potential for this stock can be realized and it will be possible to increase TAC’s over time, toward a long-term level. In the absence of a more precise number from the assessment, the Council believes that a working hypothesis of approximately 15,000 t as a target for sustainable catches in the long term is not unreasonable.

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**COUNCIL’S VIEWS ON STOCK STATUS:**

- **Overall Stock Indicator:** stable
- **Spawning Biomass:** stable
- **Total Biomass:** stable
- **Recruitment:** good: strong 1988 and 1994 year-classes
- **Growth and Condition:** no particular observation
- **Age Structure:** improving
- **Distribution:** no particular observation
- **Recent Exploitation Level:** likely below $F_{0.1}$
3.5.2.3. **Redfish Unit 3 - 4WdehklX**

**HISTORY OF FRCC RECOMMENDATIONS:**

In November 1993 and November 1994, the Council recommended that the 1994 TAC for Unit 3 redfish be set at 10,000t. The Council also recommended in 1994 that the incidence of small fish be monitored in 1995 and that the area be closed to fishing when the incidence of small fish has reached an appropriate predefined level. In November 1995, the Council reiterated that there was a need for maintaining for 1996 the same small fish closure provisions as recommended in 1994, with a 1996 TAC of 10,000t. For 1997, the Council recommended that the TAC for Unit 3 redfish remain at 10,000t. The Council also recommended that the small fish protocol be consistently applied and enforced, and other measures to avoid small fish should be evaluated, including increased mesh size.

**1997 CONSULTATIONS:**

Industry noted that fishing effort has increased on this stock over the past year as larger companies who have not fished their quota in the past few years are now doing so with smaller vessels. Some participants indicated to the Council that there is a need for more enforcement in this fishery.

Others noted that the Bowtie area north of Brown’s Bank is a significant nursery area and must be protected, through continuation and refinement of the closure there.

**ANALYSIS:**

The 1997 DFO Stock Status Report indicates that:

- the abundance of Unit 3 redfish had shown no trend since the late 1980’s.
- there are indications of an improvement in recruitment in recent years.
- Catches of 10,000 t in 1998 would approximate the F_{N}_{s} level.

There is no clear absolute estimate of abundance for this stock. However, the Council notes that since this stock has shown no trend in stock size over the long term, a quota around the F_{N}_{s} level seems appropriate. We also note that there is a good range of year classes and good age structure in this stock. The FRCC is pleased to note that efforts are underway between DFO and the industry to further establish and refine closed areas as a solution to the small fish problems.

**RECOMMENDATION #3.5.2.3. **Redfish Unit 3**:

The FRCC recommends that:

1. the 1998 TAC for Unit 3 redfish be set at 10,000t;
2. the small fish protocol should be consistently applied and rigidly enforced;
3. the closed area known as the Bowtie should be redefined to optimize protection of small fish; in particular consideration should be given to including Western Hole and parts of Brown’s Bank; and
4. DFO Science should seek to determine more precisely the sustainable catch level for this stock.
Chapter 3: Stock Recommendations

**Council's views on stock status:**

- **Overall Stock Indicator:** no trend, near average
- **Compared to average**
- **Spawning Biomass:** no trend, near average
- **Total Biomass:** no trend, near average
- **Recruitment:** improving
- **Growth and Condition:** average
- **Age Structure:** improving
- **Distribution:** no particular observation
- **Recent Exploitation Level:** below $F_{0.1}$

*1997 catch: as of Oct. 22/97*
3.5.2.4. Redfish 30

History of FRCC Recommendations:

In November 1993, the Council recommended reduction of the TAC to 10,000t for 1994. In November 1994, the Council expressed its concern over the uncertainties related to the origin and abundance of small redfish in this Division. The Council recommended that the 1995 TAC be set at 10,000t, that a small fish protocol be established to protect juvenile redfish and that research be accelerated to determine the origin of the small fish found in this Division. The Council recommended a 1996 TAC at 10,000t and continuation of small fish protocols.

For 1997, Council recommended a TAC of 10,000t and further recommended that small fish protocols remain in place and apply to all fleets harvesting the resource throughout the range of the stock. The FRCC also indicated that modifications to gear should be examined to reduce the catch of small fish while minimizing post selection mortality.

1997 Consultations:

The Council held a special consultation on redfish stocks on October 24, 1997. Industry expressed their concern with the fishery in shallow waters in this area. Some participants noted vessels less than 100 feet fishing for 30 redfish captured large amounts of juvenile redfish and significant bycatches of other species. Some suggested that a line be drawn at the 100 fathom mark and no fishing be allowed in waters more shallow than this. Concerns were also expressed with respect to the lack of adequate enforcement in this fishery.

Analysis:

The 1997 DFO Stock Status Report indicates that:

- larger fish found were in deeper waters but generally untrawlable areas.
- it is not possible to describe overall trends in total stock size or to estimate the current size of the fishable portion of the population.
- catches at the 10,000 t level are unlikely to be harmful to the resource.

Recommendation #3.5.2.4. Redfish 30:

The FRCC recommends that:

1. the 1998 TAC for 30 redfish be set at 10,000 t;
2. further scientific effort be applied to determine sustainable levels of harvesting for this stock;
3. small fish protocols remain in place, apply to all fleets harvesting the resource throughout the range of the stock, and be rigorously enforced; and
4. a DFO-industry workshop be established to address the issues associated with the capture of juvenile redfish, including the definition of closed or restrictive areas, with results of this workshop to be included as part of the CHP for all fleets in this fishery for 1998.
The Council is concerned about two consecutive low survey results and other signs of a lack of recruitment and small fish. This situation will need to be carefully monitored.

**Council's views on stock status:**

Overall Stock Indicator: stable

- Compared to average
  - Spawning Biomass: uncertain
  - Total Biomass: likely increasing
  - Recruitment: poor
  - Growth and Condition: no particular observation
  - Age Structure: improving
  - Distribution: no particular observation
  - Recent Exploitation Level: likely below $F_{m!}$
APPENDIX 1:

FRCC MANDATE
APPENDIX 1: FRCC MANDATE

1. INTRODUCTION

The Government of Canada is committed to a more comprehensive approach to the conservation and management of our fisheries resource. This approach demands a better understanding of complex fisheries ecosystems - the interaction of fish with other species, predator-prey relationships, and also changes in the marine environment like ocean currents, water temperatures and salinity.

The Government of Canada is also committed to a more effective role in decision-making for those with practical experience and knowledge in the fishery.

The Minister of Fisheries and Oceans has established the Fisheries Resource Conservation Council (FRCC) as a partnership between government, the scientific community and the direct stakeholders in the fishery. Its mission is to contribute to the management of the Atlantic fisheries on a 'sustainable' basis by ensuring that stock assessments are conducted in a multi-disciplined and integrated fashion and that appropriate methodologies and approaches are employed; by reviewing these assessments together with other relevant information and recommending to the Minister total allowable catches (TACs) and other conservation measures, including some idea of the level of risk and uncertainty associated with these recommendations; and by advising on the appropriate priorities for science.

2. DEFINITION OF CONSERVATION

Fisheries conservation is that aspect of the management of the fisheries resource which ensures that its use is sustainable and which safeguards its ecological processes and genetic diversity for the maintenance of the resource. Fisheries conservation ensures that the fullest sustainable advantage is derived from the resource and that the resource base is maintained.

3. COUNCIL OBJECTIVES

3.1 To help the government achieve its conservation, economic and social objectives for the fishery. The conservation objectives include, but are not restricted to:

3.1.1 rebuilding stocks to their 'optimum' levels and thereafter maintaining them at or near these levels, subject to natural fluctuations, and with 'sufficient' spawning biomass to allow a continuing strong production of young fish; and,

3.1.2 managing the pattern of fishing over the sizes and ages present in fish stocks and catching fish of optimal size.

3.2 To develop a more profound understanding of fish-producing ecosystems including the inter-relationships between species and the effects of changes in the marine environment on stocks.

3.3 To review scientific research, resource assessments and conservation proposals, including, where appropriate, through a process of public hearings.

3.4 To ensure that the operational and economic realities of the fishery, in addition to scientific stock assessments, are taken into account in recommending measures to achieve the conservation objectives.

3.5 To better integrate scientific expertise with the knowledge and experience of all sectors of the industry and thus develop a strong working partnership.

3.6 To provide a mechanism for public and industry advice and review of stock assessment information.

3.7 To make public recommendations to the Minister.
4. MANDATE AND SCOPE

4.1 The Fisheries Resource Conservation Council will address these objectives by bringing together industry, DFO science and fisheries management, and external scientific and economic expertise in one body.

4.2 The Council will:

4.2.1 advise the Minister on research and assessment priorities;
4.2.2 review DFO data and advise on methodologies;
4.2.3 consider conservation measures that may be required to protect fish stocks;
4.2.4 review stock assessment information and conservation proposals, including through public hearings, where appropriate; and,
4.2.5 make written public recommendations to the Minister on TACs and other conservation measures.

4.3 The Council may recommend any measures considered necessary and appropriate for conservation purposes such as TACs, closure of areas to fishing during specific periods, approaches to avoid catching sub-optimal sized fish or unwanted species, and restrictions on the characteristics or use of fishing gears.

4.4 The Council’s scope includes Canadian fish stocks of the Atlantic and Eastern Arctic Oceans. In the first instance, the Council will address groundfish, and then subsequently take on responsibility for pelagic and shellfish species.

4.5 The Council is also responsible for advising the Minister on Canada’s position with respect to straddling and transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO).

5. SIZE, STRUCTURE AND MAKE-UP

5.1 The Council will consist of not more than 14 members with an appropriate balance between ‘science’ and ‘industry’.

5.2 Members are chosen on merit and standing in the community, and not as representatives of organizations, areas or interests.

5.3 ‘Science’ members are drawn from government departments, universities or international posts, and are of an appropriate mix of disciplines, including fisheries management and economics.

5.4 ‘Industry’ members are knowledgeable of fishing and the fishing industry and understand the operational and economic impacts of conservation decisions.

5.5 All members of the Council are appointed by the Minister.

5.6 All members, including the Chairperson, are appointed for a three year term; terms can be renewed.

5.7 Members appointed from DFO serve ‘ex officio’.

5.8 Members have to disclose any interest in the Atlantic or Eastern Arctic fishery and take appropriate measures so as to avoid potential or real conflict of interest situations during the term of appointment.

5.9 The four Atlantic Provinces, Quebec and the Northwest Territories may each nominate one delegate to the Council. These delegates have access to the Council’s information, and may participate fully in meetings, but will not be asked to officially endorse the formal recommendations to the Minister.

5.10 The Council is supported by a small Secretariat, to be located in Ottawa. The Secretariat will:

5.10.1 provide administrative support for the functioning of the Council;
5.10.2 provide a technical science and fisheries management support;
5.10.3 organize Council meetings;
5.10.4 record decisions of the Council;
5.10.5 undertake a professional communications function for the Council, providing a central point for communications to and from the Council; and
5.10.6 undertake such other matters as from time to time might be appropriate.

5.11 The Chairman may appoint an Executive Committee, consisting of the Chairman, Vice-Chairman, and three other Members.

5.12 In addition, the Chairman may, from time to time, strike an ‘ad hoc’ committee to deal with a specific issue.

6. **Activities:**

6.1 Reviews appropriate DFO science research programs and recommends priorities, objectives and resource requirements.

6.2 Considers scientific information - including biology, and physical and chemical oceanography, taking into account fisheries management, fishing practices, economics and enforcement information.

6.3 Conducts public hearings wherein scientific information is presented and/or proposed conservation measures/options are reviewed and discussed.

6.4 Recommends TACs and other conservation measures.

6.5 Prepares a comprehensive, long-term plan and a work plan for the Council which are reviewed annually at a workshop with international scientists and appropriate industry representatives.

6.6 Ensures an open and effective exchange of information with the fishing industry and contributes to a better public understanding of the conservation and management of Canada’s fisheries resource.
APPENDIX 2:
FRCC MEMBERSHIP
APPENDIX 2: FRCC MEMBERSHIP

CHAIRMAN: FRED WOODMAN, NEW HARBOUR, NEWFOUNDLAND

Mr. Woodman has worked for more than 40 years in the fishery, first in the family fresh fish and saltfish business founded by his father and grandfather, F. Woodman and Son, and more recently as founder and president of Woodman Fish Products, New Harbour, Newfoundland. The Woodman name has been linked with the fishery in Newfoundland for more than 100 years.

Throughout his career, Mr. Woodman has held a number of prestigious positions including chairman of the Fisheries Council of Canada, and chairman of the Fisheries Association of Newfoundland and Labrador. He was also chairman of Newfound Resources Ltd., a consortium of inshore fish plant operators. Mr. Woodman has been a member of the FRCC since May 1993, participating actively in the work of several subcommittees. Mr. Woodman resides in New Harbour.

VICE-CHAIRMAN: DR. JEAN-CLAUDE BRÈTHES, RIMOUSKI, QUÉBEC

A Professor of Oceanography at the Université du Québec à Rimouski since 1978, Dr. Brèthes' research interests lie in fisheries development, population dynamics and ecology, and coastal oceanographic processes. Dr. Brèthes has worked abroad on several projects, especially in Africa. Dr. Brèthes has conducted extensive research on various Atlantic fish stocks, and was one of four external members of the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC).

MEMBERS

MICHAEL BELLIVEAU, SHEDIAC, NEW BRUNSWICK

Mr. Belliveau is the Executive Secretary of the Maritime Fishermen's Union, a position he has occupied since 1987. Mr. Belliveau has been with the MFU since 1981. Since 1986, Mr. Belliveau has been a member of the International Collective in Support of Fishworkers, a unique international non-governmental organization based in India, with a liaison office in Brussels. In addition, he has been active in several non-governmental organizations relating to fisheries, unions and international aid and development. Mr. Belliveau holds an M.A. in Political Science from York University.

BRUCE CHAPMAN, ST. JOHN'S, NEWFOUNDLAND

Bruce Chapman is the Executive Director of the Groundfish Enterprise Allocation Council, an association of offshore groundfish operators. Until recently, since 1984, Mr. Chapman was President of the Fisheries Association of Newfoundland and Labrador (FANL), an organization of fish and seafood processors. He was also President of Newfound Resources Limited, and Vice-President of the Fisheries Council of Canada, and has held senior positions at the Canadian Association of Fish Exporters (CAFE) and the Seafood Producers Association of Nova Scotia (SPANS).

Mr. Chapman has participated on several boards, including the Federal Task Force on Incomes and Adjustment in the Atlantic Fishery, the Advisory Committee of the Fisheries and Marine Institute of Memorial University of Newfoundland, the Northwest Atlantic Fisheries Organization (NAFO) and the St. John's Board of Trade. Mr. Chapman has a Bachelor of Arts and a Bachelor of Education from Memorial University.

DR. ANTHONY T. CHARLES, HALIFAX, NOVA SCOTIA

As a Professor in the Faculty of Commerce at Saint Mary's University, Dr. Charles specializes in teaching and research on the fishery, particularly economics, management, and policy. He has written extensively on strategies for sustainable fisheries in Atlantic Canada and internationally.
Dr. Charles is a Director of the Oceans Institute of Canada, a member of the Fishermen and Scientists research Society, and coordinator of the Fisheries Seminar Series at Saint Mary's.

**Samuel G. Elsworth, Bridgewater, Nova Scotia**

Mr. Elsworth is the President of Sambro Fisheries Limited, an inshore groundfish processing company which is also involved in fisheries for halibut, swordfish, lobster and underutilized species. He is President of the Halifax West Commercial Fishermen's Association, a Director of the Eastern Fishermen's Federation and the Co-Chairman of the Eastern Nova Scotia Fish Packers Association.

An active member of several industry-government committees, Mr. Elsworth has represented various aspects of the Canadian Atlantic inshore fishery in Canada, the United States, Norway, Iceland and Spain.

**Dr. Sally Goddard, St. John's, Newfoundland**

Dr. Goddard holds a Doctorate in Fish Physiology and a joint Bachelor of Science in Marine Biology/Zoology from University College of North Wales in Bangor, United Kingdom.

Dr. Goddard has been a Research Associate at Memorial's Ocean Sciences Centre since 1990 where her work has focused on the role of antifreeze proteins in the survival and distribution of Atlantic cod in the Northwest Atlantic. She is currently on leave to work in the private sector with A/F Protein Canada Inc.

**Jean-Claude Grégoire, Grande-Rivière, Quebec**

Mr. Grégoire has a Master's in Political Science from the University of Ottawa and a Bachelor in social sciences from Université Laval. He has been a professional inshore groundfisherman since 1986 and has owned a vessel since 1987.

He has held administrative positions including Regional Director of the QPDB for Gaspé and the Magdalen Islands, as well as other QPDB positions in Quebec City, Rimouski and Gaspé, and was a member of the Syndicat des professionnels du gouvernement du Québec.

**Thomas A. Hallett, St. John's, Newfoundland**

Mr. Thomas A. Hallett, B.A., B.Comm, is President of T. Hallett Limited and Vice-President of Beothic Fish Processors Limited. Mr. Hallett has been involved in fish processing and exporting since his graduation from Memorial University of Newfoundland in 1962. Currently a member of the St. John's Board of Trade, Mr. Hallett is former Chairman of both the Fisheries Association of Newfoundland and Labrador and the Fisheries Council of Canada. He served as President of the Navy League of Canada and the Rotary Club of St. John's.

**Frank Hennessey, Souris, P.E.I.**

A full-time fisherman in the Gulf of St. Lawrence, Mr. Hennessey has worked in the fishery since 1967. In these 26 years, he has fished both inshore and offshore, and is now the owner and master of a 55' mid-shore trawler.

Mr. Hennessey has a long history of involvement in fishermen's organizations and advisory committees to governments, and has participated in workshops and international technical visits. Since 1988, Mr. Hennessey has been President of the P.E.I. Groundfish Association.

**Dr. Paul LeBlond, Vancouver, British Columbia**

Professor of Oceanography at the University of British Columbia since 1965, Dr. LeBlond has been active in many Canadian collaborative marine science programs, including the World Ocean Circulation Experiment, the Ocean Production Enhancement Network, and the North Pacific Marine Science Organization. A world-renowned oceanographer, Dr. LeBlond is interested in the study of oceanic waves, coastal oceanography and fish migrations. He was elected a Fellow of the Royal Society of Canada in 1982.
DR. VICTORIN MALLET, MONCTON, NEW BRUNSWICK

Dean of Science at l'Université de Moncton, Dr. Mallet has taken a leading role in increasing university-industry interaction on environmental issues. Dr. Mallet began teaching in Moncton in 1971, and was promoted to Dean in 1990. A well-known analytical chemist, Dr. Mallet has published extensively on the presence of chemical contaminants in the environment. From 1991 to 1993, Dr. Mallet was one of the four external members of the Canadian Atlantic Fisheries Scientific Advisory Committee.

TREVOR TAYLOR, CORNER BROOK, NEWFOUNDLAND

Trevor Taylor was raised in Gunner's Cove, a small community on the Northern Peninsula of Newfoundland. He attended Memorial University and completed a number of fishery-related courses at the Marine Institute in St. John's.

Mr. Taylor spent a number of years as a full-time inshore fisherman, fishing a variety of species, including cod, turbot and crab, using various gear types, including cod traps, gillnets and otter trawls. He has been an elected member of the Fishermen, Food and Allied Workers Union's Executive Board and of the Inshore Fishermen's Council since 1991. In the off-season, he has been actively involved in fisheries-related training for the FFAW and the Marine Institute. In 1993, Mr. Taylor was appointed coordinator of the Newfoundland Fishermen's Resource Centre in Corner Brook.

MAUREEN YEADON, HALIFAX, NOVA SCOTIA

Maureen Yeadon was most recently Vice President, Government Relations, of National Sea Products Limited. From 1982 to 1993, Mrs. Yeadon held various positions with NSP, including management of company's fleet operations and responsibility for the company's communications and public relations.

EX OFFICIO MEMBERS

From the Department of Fisheries and Oceans:

DR. W. DOUBLEDAY, DIRECTOR GENERAL, BIOLOGICAL SCIENCES

Dr. Doubleday was born in Midland, Ontario. He attended Queen's University in Kingston where in 1969 he received a B.Sc (Hon) in Mathematics and Chemistry, and from the University of Sheffield, he completed a M.Sc. in 1971 and a Ph.D. in 1973 in Probability and Statistics. Upon graduation, he joined the Public Service as a research scientist at St. Andrews.

Serving as Director of the Fisheries Research Branch, and Director, Policy and Program Coordination for Science, Dr. Doubleday was promoted to Director General, Policy and Strategy Directorate for Science, and acted as Assistant Deputy Minister, Science from May 1988 to February 1990, and from January 1992 to June 1994.

Dr. Doubleday is a member of the FRCC, former Chairman of the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC), and is currently Director General, Fisheries and Oceans Science Directorate.

BARRY RASHOTTE, DIRECTOR, RESOURCE ALLOCATION MANAGEMENT, ATLANTIC

Born in Kingston, Ontario in 1952, Mr. Rashotte obtained a BSc (Honours) in Biology from Queen's University in Kingston in 1974.

In 1977 he was hired by the Department of Fisheries and Oceans as a fisheries officer in Yarmouth, Nova Scotia. After three years as a field officer, Mr. Rashotte moved to Regional Headquarters in Halifax to deal with licensing policy and regulations. He later moved to Ottawa, progressing to his current position of Director, Resource Allocation Management, Atlantic.
FROM THE PROVINCIAL GOVERNMENTS:

STEPHEN ATKINSON, NORTHWEST TERRITORIES

Stephen Atkinson has been appointed to the Council as the Northwest Territories Provincial Delegate.

ROB COOMBS, PROVINCE OF NEWFOUNDLAND AND LABRADOR

Born at Cartwright, Labrador where his family fished groundfish and pelagics for generations. Left the fishery in 1982 to attend Memorial University where he received a B. Sc. in 1987 and is now enrolled in studies toward a Master’s of Fisheries Management. Presently holds the position of Fisheries Resource Planning Supervisor with the Department of Fisheries and Aquaculture in St. John’s Newfoundland, which involves resource analysis and development of resource policy. He has also held positions with the Department of Fisheries and Oceans and the provincial government in the areas of resource policy, fisheries development, and habitat protection.

YVON CHIASSON, PROVINCE OF NEW BRUNSWICK

Yvon Chiasson is a graduate in Biology at the Université de Moncton. He worked at the Department of Fisheries and Oceans for thirteen years in the field of invertebrate science. Yvon is now employed by the New Brunswick Department of Fisheries and Aquaculture as a coordinator in resource management.

DAVID GILLIS, PROVINCE OF PRINCE EDWARD ISLAND

Mr. Gillis is a marine fisheries biologist for the Prince Edward Island Department of Agriculture, Fisheries and Forestry. In addition to his work with the Council, he represents the province in fisheries management issues for a number of species, including lobster, scallops and groundfish. He also acts as a liaison with DFO Science on resource issues and supervises marine resource sampling and harvest efforts undertaken by the Province. Prior to 1989, Mr. Gillis worked on a range of fisheries development and management issues in the eastern Arctic for Makivik Corporation of Quebec and has worked for several offshore commercial fishing companies operated by the Inuit of that region. A native Islander, Mr. Gillis resides and works in Charlottetown.

DARIO LEMELIN, PROVINCE OF QUEBEC

Mr. Lemelin works in Stratégies et politiques au Ministère de l’agriculture, des pêcheries et de l’alimentation in Quebec City. He has a degree in Biology from the Université Laval. He has worked for the past thirteen years in Fish Inspection as an inspector and as a coordinator.

CLARRIE MACKINNON, PROVINCE OF NOVA SCOTIA

Mr. MacKinnon is Marine Advisor, Grounfish and Seaplants, with the Nova Scotia Department of Fisheries. Before joining the Department, he worked for several years in the media and in public relations. Other positions he has held at Fisheries include Manager of field Services and Aquaculture Administrator. Mr. MacKinnon is a graduate of Mount Saint Vincent University in political science and has a Master of Marine Management from Dalhousie University. He has been a community activist for many years and has spent over a decade in municipal politics. The future of small and independent fishers and coastal communities are concerns he advances at every opportunity.

SECRETARIAT

Catrina Tapley, Executive Director
Renée Brisson
Denis Rivard
Linda Brisebois
Debra Côté
Lisa Tenace
APPENDIX 3:

GROUND FISH CONSULTATIONS
APPENDIX 3: GROUNDFISH CONSULTATIONS

3.1 GEORGES BANK

3.1.1. LETTER TO STAKEHOLDERS & QUESTIONS FOR DISCUSSION AT CONSULTATIONS

April 28, 1997

Dear Stakeholder:

On May 7, 1997, the Fisheries Resource Conservation Council (FRCC) will hold a public consultation at 9:30 A.M. in the Yarmouth Room of the RODD GRAND HOTEL in Yarmouth, Nova Scotia to gather information on Georges Bank groundfish stocks.

Stakeholders’ views will assist the FRCC in providing advice to the Minister of Fisheries and Oceans regarding conservation requirements for Georges Bank haddock, cod and Yellowtail Flounder, Subarea 5Zjm.

The FRCC is committed to the continued rebuilding of Georges Bank groundfish stocks in order to attain a sustainable yield, closer to the term average. We are optimistic about these stocks, given the favourable environmental conditions which exist there, along with strong conservation measures which exist in the management of the Georges Bank fishery such as mandatory hauling, use of square mesh gear for otter trawls, small fish protocol, observers, and the continued use of mandatory dockside monitoring.

Our recommendations for 1996 reflected the strong conservation ethic expressed by industry representatives at consultations on these stocks. The Council commends the participation of all stakeholders at last year’s meeting.

The FRCC gave the following advice to the Minister for the 1996: the Council recommended that the Canadian quota for haddock on Georges Bank (5Zjm) be set at 4500t, which was expected to allow for a 10 percent increase in the biomass for ages 3+.

For yellowtail flounder (5Zhjmn), the FRCC recommended that the quota be set at 415t, which was expected to allow for an increase of approximately 32 percent in the biomass for ages four and older.

The Council recommended that the quota for Georges Bank cod (5Zjm) be set at 2000t, to allow for a 7 percent in the biomass for age 3+.

To help focus the discussion at the Yarmouth consultation, the FRCC has produced the following questions:

1. Based on your knowledge of Georges Bank, are we at a comfortable level of biomass? What rebuilding threshold should we be seeking to reach?
2. How can we best enhance rebuilding of the stocks, e.g., fish at F_{0.1} or less, ensuring more spawners and larger fish are left to produce adequate recruitment?
3. Were last year’s FRCC recommendations appropriate to allow a clean fishery without dumping and discards? What should this year’s recommendation be with respect to the proper mix between cod and haddock?
4. Given the complex ecosystem on Georges Bank, what effect do you think the proposed US herring bait fishery will have on Canadian groundfish stocks?

Stakeholders are invited to make public presentations by way of oral presentation or by providing us with a written brief. The Council has also asked the Department of Fisheries and Oceans to present new data from its 1997 Stock Status report at the meeting.
For further information, or if you are unable to attend and wish to submit a brief, please contact the FRCC:
Fisheries Resource Conservation Council
P.O. Box 2001 Station D
Ottawa, ON, K1P 5W3
(613) 998-0433 voice
(613) 998-1146 fax

Your views are important to the Council, and we hope you will participate fully.

Sincerely,

Fred Woodman
Chairman
3.1.2. Briefs Received

FRCC.97.5Z-1 Bee d’Entremont, Acadian Fish Processors Ltd., Yarmouth Co., N.S.
FRCC.97.5Z-2 Claude d’Entremont, Inshore Fisheries Ltd., Yarmouth Co. N.S.
FRCC.97.5Z-3 Brian Giroux, Scotia Fundy Mobile Gear Fishermen’s Association, Yarmouth, N.S.
FRCC.97.5Z-4 Evan L. Walters, Shelburne County Competitive Fishermen’s Association, Shelburne, N.S.
3.2. **NEWFOUNDLAND GROUNDFISH STOCKS OTHER THAN COD**

3.2.1. **LETTER TO STAKEHOLDERS**

August 15, 1997

To Stakeholders:

The Fisheries Resource Conservation Council (FRCC) will hold public consultations to gather information on Newfoundland groundfish stocks other than cod. This will assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for 1998 conservation requirements for Atlantic groundfish. We will also hold a second round of public consultations in February 1998 to discuss Newfoundland cod stocks.

The consultations will begin at 10:00 AM on September 12 at the Deer Lake Motel, Gate House Room and September 13 at the Lion’s Club in Clarenville to discuss and provide advice to the Minister on the following stocks:

- **AMERICAN PLAICE** (2 + 3K, 3Ps)
- **WITCH FLOUNDER** (2J3KL, 3Ps, 4RST)
- **GREENLAND HALIBUT** (TURBOT) (0B+1B-F, 2+3, 4RST)
- **ATLANTIC HALIBUT** (4RST)
- **SKATE** (3LNOPs)
- **REDFISH** (2 + 3K)
- **ROUNDNOSE GRENADEIR** (0, 2+3)
- **LUMPISH**

Please note that the FRCC will provide advice to the Minister on cod stocks in early 1998. DFO Science will be conducting a full zonal assessment of cod stocks in January 1998. This assessment will include the results of sentinel fisheries and fall and winter research surveys. Once we have received the scientific assessments, the FRCC will hold a more extensive round of consultations to hear your views on cod stocks.

The challenge for groundfish conservation and sustainability is great for all species. The Council bases its advice on sound conservation principles, and advocates a precautionary approach: when we proceed, we must do so with caution. What we have learned from stakeholders is invaluable in helping us form recommendations.

Stakeholders are invited to make public presentations by way of oral presentation or by providing us with a written brief: FRCC, P.O. Box 2001, Station D, Ottawa,ON K1P 5W3, phone (613) 998-0433, fax (613) 998-1146, Internet www.ncr.dfo.ca/frcc.

The success of these consultations is of interest to all Newfoundland stakeholders. Your views are important and we hope you will participate fully.

Fred Woodman
Chairman
3.2.2. Questions For Discussion At Consultations

**Greenland Halibut - OB + IB-F**

There has been increased effort in the deep water turbot fishery. Has catch rate per net increased or decreased? Is gear loss a problem, if so how can it be avoided e.g. transponders, and should these devices be mandatory? Float out and soak time on nets is a problem. Does establishing a limit on soak time address the problem, and if so, what is an appropriate limit on soak time? Should the limit on the number of nets be reduced from 500 in order to reduce soak times? Should a minimum mesh size be increased from 7 inches? What other conservation problems do you see in the deep water gill net fishery?

**Greenland Halibut - 2 + 3K**

Throughout the late eighties and early nineties the turbot fishery in this area declined dramatically, with the bulk of the fishery concentrating in water depths greater than 400 fathoms. In 1996 and again in 1997 there were signs of some rebuilding in shallower depths as a result of incoming recruitment in the stock. Do you think the 7,000 t quota currently in place in 2 + 3K will allow continued rebuilding in this area? What effect do you think the deep water fishery is having on the turbot stock overall? Is gear loss in this fishery a conservation concern? If so, what measures do you recommend to minimize the problem e.g. gear detection devices? Should net limits and soak time be established? Should mesh size be increased beyond 6 inches?

**Greenland Halibut - 4RST**

In your experience what is the status of this stock in comparison to the fishery in the past ten years? How do catch rates per net compare in 1997 to past years when the fishery was conducted with 5.5 inch mesh as opposed to the current 6 inch mesh size? Should the mesh size be increased beyond 6 inches?

**Lumpfish**

Over the past few years there have been significant changes made to reduce effort and thereby improve the health of this stock. In 1997 there appears to have been an increase in the landings along the south, southwest and some parts of the west coast. Has this increase been as a result of improved catch per unit of effort or is it due to increasing effort in this fishery? Do you think that the effort control measures introduced in this fishery are adequate to rebuild and maintain a sustainable fishery?

**Skates - 3LNOPs**

The FRCC in its 1996 report recommended that this stock be treated as separate management areas 3LN, 30 and 3Ps - have you found concentrations of skate in all areas? Have you found concentrations of skate in other areas? Has your effort increased or decreased in 1997?

**Flatfish and Flounders**

Should a minimum mesh size be established for all deep water flounder fisheries?
3.2.3. BRIEFS RECEIVED FOR THE NEWFOUNDLAND CONSULTATIONS

FRCC.97.GR-NF.1 Lloyd Phillips - Secretary/Treasurer, Inshore Fishermen’s Improvement Committee, Clarenville, NF
FRCC.97.GR-NF.2 Attila J. Potter - MMM, Clarenville, NF
FRCC.97.GR-NF.3 Maxwell Seaward - Seaward Seafoods Co., Ltd., Port aux Basques, NF
FRCC.97.GR-NF.4 Ronald Skinner - Chairman, Fishermen’s Committee of McCallum, McCallum, NF
3.3. SCOTIAN SHELF AND BAY OF FUNDY GROUNDFISH STOCKS

3.3.1. LETTER TO STAKEHOLDERS

October 2, 1997

To Stakeholders:

The Fisheries Resource Conservation Council (FRCC) will hold public consultations to gather information on Scotian Shelf and Bay of Fundy groundfish stocks to assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for 1998 conservation requirements for these groundfish stocks.

Consultations will take place at 1PM Tuesday, October 21, Mira Road Fire Hall in Sydney, and 10AM Wednesday, October 22, Rodd Grand Hotel, Shelburne Room in Yarmouth and Thursday, October 23 at the Holiday Inn Express in Bedford. Discussion will center around the following stocks:

- COD (4Vn,4X)
- ATLANTIC HALIBUT (3NOPs,4VWX,5Zc)
- HADDOCK (4TVW,4X)
- POLLOCK (4VWX,5Zc)
- SKATE (4VsW)
- ARGENTINE (4VWX)
- WOLFFISH (4VWX)
- FLATFISHES (4VWX)
- WHITE HAKE (4VWX)
- SILVER HAKE (4VWX)
- CUSK (4VWX)
- MONKFISH (4VWX)

Stakeholders with an interest in Redfish are invited to a separate FRCC consultation on Redfish in Units 1,2,3 & 3-0 at 10AM on Friday, October 24 at the Holiday Inn Express in Bedford.

Please note that the FRCC will provide separate advice to the Minister on cod stocks in 213KL, 3Ps, 4TVn, 4RS,3Pn, and 4VsW in March 1998. DFO Science will be conducting a full zonal assessment of these cod stocks in January 1998. This assessment will include the results of sentinel fisheries and fall and winter research surveys. The FRCC will give stakeholders an opportunity to comment on 4VsW cod prior to the Council forming its advice.

Stakeholders are invited to make public presentations by way of oral presentation or by providing a written brief: FRCC, P.O. Box 2001, Station D, Ottawa, ON K1P 5W3, phone (613) 998-0433, fax (613) 998-1146, internet www.ncr.dfo.ca/frcc.

The challenge for groundfish conservation and sustainability is great for all species. The Council bases its advice on sound conservation principles, and advocates a precautionary approach. The success of these consultations is of interest to all stakeholders. Your views are important and we hope you will participate fully.

Fred Woodman
Chairman
3.3.2. **Questions for Discussion at Consultations**

Based on your traditional knowledge of groundfish, are we at a comfortable level of biomass for key stocks and what rebuilding threshold should we be seeking to reach?

How can we best enhance rebuilding of the stocks, e.g. fish at $(F_{0.1})$ or less, ensuring more spawners and larger fish are left to produce adequate recruitment, etc.?

With respect to the proper mix between cod and haddock, were last year’s FRCC recommendations appropriate to allow a clean fishery without discards and dumping, and what should “the mix” be this year?

Has there been a concentration of fishing effort to the Bay of Fundy in 4X, if so, what effect has this had on fishing grounds and what could this shift mean in relation to stock abundance?

What has your fishing experience been for pollock in the last year? Where is most of the effort concentrated? Have you any comments to make with respect to geographical distribution of the resource and fish size?

Recruitment is a problem in most Atlantic groundfish fisheries. Have you seen an increase with respect to juvenile fish?

In your opinion, are the flatfish stocks in decline?

There have been reports that Atlantic halibut abundance is increasing. Have you seen this in your area? What size of Atlantic halibut have you been catching?
3.3.3. BRIEFS RECEIVED FOR THE SCOTIAN SHELF AND BAY OF FUNDY CONSULTATIONS

A. OCT. 21, 1997 - Mira Road Fire Hall, Sydney, N.S.

B. OCT. 22, 1997 - Rodd’s Grand Hotel, Yarmouth, N.S.

FRCC. 97.GR-N.S.1 Inshore Fisheries Ltd, Middle West Pubnico Yar. Co., N.S.
FRCC.97.GR-N.S.2 Evan Walters, Scotian Fundy Inshore Fishermans Assoc., Barrington, N.S.
FRCC. 97.GR-N.S.3 Gary Dedrick, Shelbourne County Fixed Gear Quota Group, Shelbourne Co., N.S.
FRCC. 97.GR-N.S.4 G. Wendy Bellineau, Professional Fisherman’s Cons. Assoc., Wood’s Harbour, Shelbourne County, N.S.
FRCC.97.GR-N.S.5 Pamela R. Decker Shelbourne County Competitive Fisherman’s Assoc., Lockeport, N.S., and, Ronnie A. Newell, South West Fisherman’s Assoc., Clarks Harbour, N.S.
FRCC.97.GR-RF.6 Brian Giroux, Scotia Fundy Mobile Gear Fisherman’s Assoc., Yarmouth, N.S.

C. OCT.22, 1997 - Holiday Inn, Halifax, N.S.

FRCC. 97.GR-N.S.7 Mark Buttler, Ecology Action Centre, Halifax N.S.
FRCC. 97.GR-N.S.8 Sarah A. Huskilson, Eastern Shelbourne Fisherman’s Association, Shelburne, N.S.

D. Briefs Received by Mail

FRCC.97.GR-N.S.9 SWNB Fixed Gear Groundfish Management Board, St. George, N.B.
FRCC.97.GR-N.S.10 Capt. Hubert E. Saulnier, Digby Co., N.S.
FRCC.97.GR-N.S.11 Herbert F. Nash, Glace Bay, N.S.
FRCC.97.GR-N.S.12 W.A. Williams, SW Nova Fixed Gear Assoc., Lockeport, N.S.
FRCC.97.GR-RF.13 Groundfish Enterprise Allocation Council, Gloucester, ON
FRCC.97.GR-N.S.14 Fred Horner, Bay of Fundy Inshore Fishermen’s Association, Sandy Cove, N.S.
FRCC.97.GR-N.S.15 Laurence Outhouse, Island’s Inshore Fishermen’s Association, Tiverton, N.S.
3.4. **Redfish in Units 1, 2, 3 & 3-0**

3.4.1. Letter to Stakeholders

October 10, 1997

To Redfish Stakeholders:

The Fisheries Resource Conservation Council (FRCC) will hold a public consultation at 10AM on **Friday, October 24** at the **Bedford Holiday Inn Express in Halifax, NS** to gather information on Redfish in Units 1, 2, 3 & 3-0. This will assist the Council in making recommendations to the Minister of Fisheries and Oceans for **1998 conservation requirements for these groundfish stocks**.

Stakeholders are invited to make public presentations or to provide a written brief: FRCC, P.O. Box 2001, Station D, Ottawa, ON K1P 5W3, phone (613) 998-0433, fax (613) 998-1146, internet www.ncr.dfo.ca/frcc.

The challenge for groundfish conservation and sustainability is great for all species. The Council bases its advice on sound conservation principles, and advocates a precautionary approach. The success of these consultations is of interest to all stakeholders. Your views are important and we hope you will participate fully.

Fred Woodman
Chairman
3.4.2. **Questions for Discussion at FRCC Consultation**

1. In keeping with the Fisheries Resource Conservation Council (FRCC) mandate to re-build stocks the FRCC has recommended reduced quotas, closures, increased mesh size and small fish protocols over the past four years. Keeping in mind the Council's mandate, have these measures been adequate/effective in re-building stocks?

2. The FRCC in its letter to the Minister of Fisheries and Oceans on science priorities called for better cooperation between the regions on redfish research. Are there specific issues you feel that need to be addressed, as research priorities, for redfish?

3. Last year the FRCC requested that initiatives (e.g. sentinel fishery, tows for science) be undertaken to improve and expand the information on redfish stocks, particularly in Unit 1 where there has been moratorium in place since 1995. Has this been adequate to address the concerns? Should more be done in future?

4. Does the scientific information provided for Units 2 and 3 and NAFO Division 3 O compare with your experience in fishing these stocks over the past few years? If not, how does it differ?

5. This year, it has been reported that fishing for redfish had improved in Unit 2. Is this consistent with your observations? Is a 10,000 t TAC offering stability in this fishery, is it allowing for rebuilding, or are stocks still continuing to decline? Are other measures needed to protect the 1988 year class?

6. There have been reports of significant catches of small redfish in Unit 3. Has the small fish protocol been effective and have landings of small redfish been adequately monitored? Should we expand the size of the closed area for juvenile redfish to include other areas such as Western Hole?

7. Last year the FRCC recommended gear modifications to reduce the capture of small redfish in 3 O. Has this happened? What are the results you have observed from gear modifications?

8. There have been reports of increased fishing effort on 3 O redfish. This area has always been noted for small redfish, especially in shallow waters. What measures do you recommend to eliminate the capture of small redfish? Is increased mesh size the answer, should there be water depth restrictions or the establishment of a closed area?
3.4.3. Briefs Received for the Redfish Consultations

FRCC.97.GR-RF.1  Brian Giroux, Scotia Fundy Mobile Gear Fisherman’s Assoc., Yarmouth, N.S.
FRCC.97.GR-RF.2  Groundfish Enterprise Allocation Council, Gloucester, ON
3.5. **Gulf of St. Lawrence Groundfish Stocks**

3.5.1. **Letter to Stakeholders - Gulf of St. Lawrence Groundfish Consultations**

November 7, 1997

To Stakeholders:

The Fisheries Resource Conservation Council (FRCC) will hold public consultations to gather information on Gulf of St. Lawrence groundfish stocks to assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for 1998 conservation requirements for these groundfish stocks.

Consultations will take place at 1PM Monday, December 1 at the Quality Inn in Gaspe, 9:30AM Tuesday, December 2 at the Hotel Beauséjour in Moncton and 9:30AM Wednesday, December 3 at the Nautical Institute in Port Hawkesbury. Discussion will center around the following stocks:

- COD (4T, 4Vn, 3Pn4RS)
- American Plaice (4T)
- Witch Flounder (4RST)
- Greenland Halibut (4RST)
- White Hake (4T)
- Atlantic Halibut (4RST)
- Winter Flounder (4T)

Although new stock status reports for Gulf cod stocks have not yet been produced, DFO has made available the results of the fall survey in the southern Gulf and the FRCC is eager to hear your views on all Gulf of St. Lawrence groundfish fisheries, including cod.

DFO Science will conduct a full zonal assessment of 2J3KL, 3Ps, 4TVn, 4RS, 3Pn, and 4VsW cod stocks in January 1998 which will include the results of sentinel fisheries and fall and winter research surveys. Following this, the FRCC will hold a full round of public consultations in Newfoundland, and the Council will give stakeholders in Québec and the Maritimes an additional opportunity to comment on these stocks prior to forming its advice to the Minister.

Stakeholders are invited to make public presentations by way of oral presentation or by providing a written brief: FRCC, P.O. Box 2001, Station D, Ottawa, ON K1P 5W3, phone (613) 998-0433, fax (613) 998-1146, internet www.ncr.dfo.ca/frcc.

The challenge for groundfish conservation and sustainability is great for all species. The Council bases its advice on sound conservation principles, and advocates a precautionary approach. The success of these consultations is of interest to all stakeholders. Your views are important and we hope you will participate fully.

Fred Woodman
Chairman
3.5.2. Questions For Discussion At Gulf Of St. Lawrence Groundfish Consultations

**4T, 4Vn Cod**

1. There are numerous reports that cod have been abundant in 1997 in many inshore ground, especially in the southeastern Gulf. What was observed in 1997 in midshore and offshore waters?

2. What indications are there regarding the presence of small (juvenile) cod in the Gulf in 1997? Are you seeing incoming recruitment? Should there be areas/times set aside in the Gulf for spawning or nursery areas?

3. How did the size and fitness of the cod observed in 1997 compare with normal expectations?

4. Do you believe there is sufficient spawning stock biomass to warrant a limited commercial fishery for 1998?

**4RS, 3PN Cod**

5. Fishermen and Scientists have observed that northern Gulf cod has been concentrated off western Newfoundland with very few signs of cod in 4S (Québec North Shore). What have you observed in 1997 from the limited commercial fishery in this area? Size, condition, abundance?

**4T Hake**

6. In recent years, the distribution of the hake resource has shrunk into an area between Eastern PEI and St. Georges Bay. Are the Hake still present in this area? In other areas?

7. What indications are there regarding the presence of small (juvenile) hake in the Gulf in 1997?

**4T American Plaice**

8. Fishery and survey information from recent seasons indicate that the abundance of plaice has dropped sharply on grounds in the western Gulf but there is little or no decrease in the east. What observations were made in 1997?

**4T Winter Flounder**

9. Efforts directed at Winter flounder have increased in some areas since the closure of the cod and hake fisheries and the lowering of the plaice quota. Blackback stocks are very localized and do not migrate far. What is your impression of the state of the blackback resource in your fishing grounds?

**4RST Greenland Halibut (Turbolt)**

10. In your experience what is the status of this stock in comparison to the fishery in the past ten years? How do catch rates per net compare in 1997 to past years when the fishery was conducted with 5.5 inch mesh as opposed to the current 6 inch mesh size? Should the mesh size be increased beyond 6 inches?

**4RST Witch Flounder**

11. What are your observations in this fishery in 1997 with respect to fish size, abundance and geographical distribution? Are additional measures needed, if any, to allow for the rebuilding of this stock?

**Recreational Fishery**

12. What have you observed with respect to the abundance of cod and what have you seen with respect to landings of juvenile cod in the recreational fishery? Are you seeing more or less cod than previous years and have you noticed any changes in size and condition? Are you catching more or less cod than in previous years? Are there sufficient controls on this fishery to limit abuses?
SCIENCE PRIORITIES

13. The FRCC is mandated to provide the Minister of Fisheries and Oceans with recommendations on DFO science priorities. Are there specific issues you feel that need to be addressed, as research priorities, for groundfish in the Gulf of St. Lawrence?
3.5.3. Briefs Received for the Gulf of St. Lawrence Consultations

A. DEC. 1, 1997 - Gaspé, Québec
FRCC.97.GR-QUE.30 1998 Turbot Management Prospects, Jean-Marc Ouellet, President, Regroupement des pêcheurs Professionnels du Nord de la Gaspésie, Les Méchins, Québec

A. FEB. 18 - Moncton, N.B.:
FRCC.98.GR-NB.2 P.E.I.F.A. Groundfish Committee, P.E.I.
FRCC.98.GR-NB.3 Association des Crevettiers Acadiens du Golfe Inc., Shippagan, N.B.

B. FEB. 19 - Port Hawkesbury, N.S.:
FRCC.98.GR-NS.4 Osborne Burke, Federation of Gulf NS Groundfishermen (Fixed/Mobile <45ft Competitive), Ingonish, N.S.
FRCC.98.GR-NS.5 Osborne Burke, Gulf NS Fixed Gear Sentinel (1997), Federation of Gulf NS Groundfishermen (Fixed/Mobile <45ft Competitive), Ingonish, N.S.
FRCC.98.GR-NS.9 Reginald E. Grand, President, Gulf Nova Scotia Bonafide Fishermen’s Organization, Antigonish Co., N.S.

D. Briefs Received by Mail
FRCC.98.GR-NB.10 Ghislain Chouinard, Department of Fisheries and Oceans, Science Branch, Moncton, N.B.
FRCC.98.GR-NB.11 Daniel Gionet, Association des Crevettiers Acadiens du Golfe Inc., Shippagan, N.B.
FRCC.98.GR-QUE.31 Regroupement des pêcheurs Professionnels des îles, Québec
FRCC.98.GR-PEI.32 James A. MacDonald, P.E.I.F.A. Groundfish Advisory Committee, PEI
FRCC.98.GR-QUE.33 Jean-Marc Ouellet, President, Regroupement des pêcheurs Professionnels du Nord de la Gaspésie, Les Méchins, Québec
FRCC.98.GR-NB.34 Alyre Gauvin, Président, A.P.P.F.A., Acadian Groundfish Fisherman’s Association Inc., Lamèque, N.B.
FRCC.98.GR-QUE.35 Achieving a viable and sustainable turbot fishery in the Gulf of St. Lawrence for the Quebec Industry, L’Alliance des pêcheurs professionnels du Québec - La fédération des pêcheurs semi-hauturiers du Québec - Le groupe Forillon, Moncton, N.B.
3.6. **Cod Stocks in Divisions 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in Division 3Ps**

3.6.1. **Letter to Stakeholders**

January 19, 1998

To Stakeholders:

In February 1998, the Fisheries Resource Conservation Council (FRCC) will gather information from stakeholders on Atlantic groundfish stocks. This will assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for 1998 groundfish conservation requirements for Gulf of St. Lawrence groundfish stocks, and cod stocks in Divisions 2GH, 2J3KL, 3Ps, 4Rs, 3Pn and 4TvN.

The FRCC will review DFO's January zonal assessments of cod stocks, the results of sentinel fisheries, and fall and winter research vessel surveys. The Council will then consult with interested stakeholders in the following areas:

a) full round of Newfoundland consultations to discuss Newfoundland cod stocks  
b) two meetings to discuss all Gulf of St. Lawrence groundfish stocks, including cod  
c) Atlantic-wide consultation to discuss all Atlantic cod stocks, prior to forming advice to the Minister.

- **February 18 9:00AM - Hotel Beauséjour (ballroom B) Moncton, NB**  
- **February 19 9:00AM - Nautical College (auditorium) Port Hawkesbury, NS**  
- **February 20 9:00AM - Holiday Inn Select, 1980 Robie Street, Halifax, NS**  
- **February 23 9:00AM - Alexis Hotel, Port Hope Simpson, Labrador - 2GH, 2J3KL**  
- **February 24 9:00AM - Hotel Port-aux-Basques, Port-aux-Basques, NF**  
- **February 25 10:00AM - Town Council Office, Port-aux-Choix, NF**  
- **February 26 10:00AM - Mount Peyton Motel, Grand Falls, NF - 2J3KL, 3Ps**  
- **February 27 9:00AM - Lion's Club, Clarenville, NF - 2J3KL, 3Ps**

Although discussion will focus on the above stocks, the FRCC welcomes all stakeholders' comments and questions and is interested in your views on all groundfish stocks.

Stakeholders are invited to make public presentations by way of oral presentation or by providing a written brief: FRCC, P.O. Box 2001, Station D, Ottawa, ON, K1P 5W3, phone (613) 998-0433, fax (613) 998-1146, internet www.ncr.dfo.ca/frcc.

The success of these consultations is of interest to all stakeholders in the fishery. Your views are important and we hope you will participate fully.

Fred Woodman  
Chairman
3.6.2. **BRIEFS RECEIVED FOR THE CONSULTATIONS ON COD STOCKS IN DIVISIONS 2GH, 2J3KL, 3Ps, 4VsW AND WITCH FLounder IN DIVISION 3Ps**

A. **FEB. 20 - Halifax, N.S. - ATLANTIC WIDE CONSULTATION:**

- FRCC.98.GR-NS.1  *The Recovery of Overexploited Fish Stocks*, Ransom A. Myers and Jill Casey, Dalhousie University, Halifax, N.S.
- FRCC.98.GR-NS.6  *A Stochastic, Age-Structured Life History Model of Atlantic Cod, Gadus Morhua, Population Growth*, Jeffrey A. Hutchings, Dalhousie University, Halifax, N.S.
- FRCC.98.GR-NS.7  *Mate Competition and Mate Choice in Atlantic Cod, Gadus morhua, and Possible Demographic Consequences of their Mating System*, Jeffrey A. Hutchings, Dalhousie University, Halifax, N.S.
- FRCC.98.GR-NS.8  E.L. Walters, Executive Director, Scotia Fundy Inshore Fishermen’s Association, Barrington, N.S.

B. **FEB. 23, 1998 - Port Hope Simpson, Labrador**

- No briefs received

C. **FEB. 24, 1998 - Port-aux-Basques, Nfld**

- No briefs received

D. **FEB. 25, 1998 - Port-au-Choix, Nfld**

- No briefs received

E. **FEB. 26, 1998 - Grand Falls, Nfld**

- FRCC.98.GR-NF.13  Captain Wilfred Bartlett, Brighton, Notre Dame Bay, Newfoundland

F. **FEB. 27, 1998 - Clarenville, Nfld**

- FRCC.98.GR-NF.12  *Inshore Fishery Survival*, Earl Johnson, Chairman, Inshore Fishermen’s Improvement Committee, Clarenville, Nfld
- FRCC.98.GR-NF.15  Bill Broderick, Inshore Fishermen, Bonavista Bay, Newfoundland
- FRCC.98.GR-NF.17  FFAW, St. John’s, Newfoundland
- FRCC.98.GR-NF.18  *3Ps Cod Assessments*, Earl Johnson, Placentia Bay, Newfoundland
- FRCC.98.GR-NF.19  *The Newfoundland Cod Stocks*, Atlantic Harvesting Group Inc., St. John’s, NF
- FRCC.98.GR-NF.20  Jerome Kerrivan, Placentia Bay Action Committee, Placentia Bay, Newfoundland
- FRCC.98.GR-NF.21  Alliance for the Survival of Coastal Fishing Communities, Petty Harbour, NF
- FRCC.98.GR-NF.23  *Comparative Analysis of 1995, 1996 and 1997 Sentinel Data with Interpretive Information From Fish Harvesters - 2J3KL*, Harvey Jarvis, FFAW, presented by Earl McCurdy, St. John’s, Newfoundland
FRCC.98.GR-NF.24  Comparative Analysis of 1995, 1996 and 1997 Sentinel Data with Interpretive Information From Fish Harvesters - 3Ps, Harvey Jarvis, FFAW, presented by Earl McCurdy, St. John’s, Newfoundland

G. Briefs Received by Mail
FRCC.98.GR-NF.1  Jon Lien, Memorial University, St. John’s, Newfoundland
FRCC.98.GR-NF.2  Kenneth Sheppard, Fisherman’s Committee, Rencontre East, Newfoundland
FRCC.98.GR-NF.3  Dr. Fred Winsor, Vancouver, B.C.
FRCC.98.GR-NF.4  Sidney Poole, Belleoram, Newfoundland
FRCC.98.GR-NF.5  David Hiscock, Town Clerk, Town of Bonavista, Bonavista, Newfoundland
FRCC.98.GR-NF.6  Eric King Fisheries Ltd., Burnt Islands, Newfoundland
FRCC.98.GR-NF.7  Groundfish Enterprise Allocation Council, Gloucester, Ontario
FRCC.98.GR-NF.9  Will Reid, FFAW, Grand Falls-Windsor, Newfoundland
FRCC.98.GR-NF.10 Evan Walters, Executive Director, Scotia Fundy Inshore Fishermen’s Association, Barrington, N.S.
FRCC.98.GR-NF.11 Alfie MacLeod, MLA, Cape Breton West, House of Assembly, Nova Scotia, Halifax, N.S.
FRCC.98.GR-NF.25 Wayne Squires, Trinity Bay, Newfoundland
FRCC.98.GR-NF.26 Lloyd Sullivan, Calvert Southern Shore, Newfoundland
FRCC.98.GR-NF.28 Alastair O’Reilly, President, Fisheries Association of Newfoundland and Labrador Ltd., St. John’s, Nfld.
FRCC.98.GR-NF.29 A Critique of the 3Ps Cod Assessment, Ransom A. Myers, Dalhousie University, Halifax, N.S.
APPENDIX 4:

SUMMARY OF THE GROUNDFISH CONSERVATION FRAMEWORK FOR ATLANTIC CANADA
APPENDIX 4: SUMMARY OF THE GROUNDFISH CONSERVATION FRAMEWORK FOR ATLANTIC CANADA

WHY A GROUNDFISH CONSERVATION STRATEGY?

Recent history demonstrates that, collectively, we failed at managing and preserving the resource and the associated economic activities. We have to learn lessons from past errors and, gradually, by cautious reopenings of closed fisheries, to start a new conservation-based fishery.

FRCC reports have all emphasized certain elements of a conservation strategy. The Minister of the Fisheries and Oceans challenged the Council to develop a comprehensive groundfish conservation strategy, the new conservation framework for groundfish fisheries.

HOW DO WE ADOPT A CONSERVATION-MINDED ATTITUDE?

Conservation must be an ongoing concern reflected in every fishery; a conservation-minded attitude is a prerequisite to the building of conservation capacity. Resource conservation may be seen as a joint venture where everyone has a role to play, adopting a conservation attitude, and accepting a moral obligation toward resources and those who depend on them. Each must ensure conservation practices in their field and accept responsibility for their behaviour and its effect on the resource.

There was a window of opportunity, after the extension of the 200 mile limit, to plan a fishery for the future. We missed that window of opportunity. While several fisheries are now under moratorium, a window remains open, however narrow. If we miss this last window of opportunity, the failures of the past will be repeated again and again. This is the reason for a Groundfish Conservation Strategy — to seize this opportunity, to make real and lasting change.

WHAT'S IN THE REPORT?

The report sets out a course of action consisting of goals, principles, conservation measures and a practical set of actions for all stakeholders in the fishery.

Conservation is everybody's concern, and the proposed strategy is written for all those involved, at all levels, in groundfish fisheries:

- Ministers
- Fisheries Resource Conservation Council
- Harvesters and Processors
- Scientists
- Managers
- Other Stakeholders eg., Nongovernmental Organizations, General Public

HOW DO WE KEEP FROM REPEATING PAST MISTAKES?

GOALS

The strategy sets four goals to achieve a sustainable fishery.

- rebuilding of depleted stocks
- sustainable utilization
- conservationist practices
- optimum benefits

A 37
**PRINCIPLES**

Achieving conservation goals requires a comprehensive program of actions which must be guided by clear principles. These principles embody the fundamental rules of conservation.

**Understanding the resource:**
- **adequate information on the resource and the consequences of harvesting**
  - e.g. research on stock structure and reproductive capacity
  - joint science/industry programs

**Protecting resource renewability:**
- all activities must be concerned with ensuring continuity of fish stocks
  - e.g. small fish protocols, minimum sizes, area and seasonal closures

**Precautionary approach:**
- it should not be necessary to await scientific analysis before taking conservation measures; it should be enough that, on the balance of evidence, it makes sense to take action
  - e.g. closing fisheries that fall below critical levels

**Systems approach:**
- understanding of the interaction between the resource, natural environment, fishing activities, technology, human behaviour, and social and economic factors
  - e.g. interregional laboratory research programs

**Consistency:**
- all fishing activities should abide by the same principles which should be consistent between areas and species
  - e.g. introduction and use of Conservation Harvesting Plans for all fleet sectors and species

**Accountability:**
- all involved in the fishery must recognize their role and their actions and accept the consequences of their activities -- conservation is compulsory, not an option
  - e.g. development of a code of responsible harvesting practices
  - implementation of Regional Advisory Process to discuss/interpret scientific advice and harvesting patterns of the previous year
  - implementation of a Regional Sanction Board

**Flexibility and responsiveness:**
- management systems must be able to modify measures as new information becomes available
  - e.g. temporary closures of high by-catch fishing areas

**HOW DO WE BUILD A CONSERVATION CAPACITY?**

**CONSERVATION MEASURES**

The FRCC presents a checklist of seven tasks to achieve conservation principles:

**Establish conservationist harvest rates**
- Applying the Precautionary Approach
- Setting quotas (TACs)
- Controlling fishing effort
- Managing fishing capacity
- Closing seasons and areas

**Maintain adequate spawning potential**
- Apply the Precautionary Approach
- Limit harvest rates
- Protect spawning concentrations
- Implement selective harvesting
Establish a diverse age structure in the stocks
   a. Implement selective harvesting
   b. Limit harvest rates
   c. Closing seasons and areas

Protect genetic diversity within fish populations
   a. Maintain the number of spawning components of fish stocks
   b. Maintain the geographical distribution of stocks
   c. Implement Marine Protected Areas

Protect the ecosystem
   a. Implement Marine Protected Areas
   b. Implement Ecosystem-Based Management

Protect critical habitats
   a. Limit activities that could be detrimental to habitats
   b. Apply technology toward reducing negative impacts of harvesting on fishing grounds and habitats
   c. Implement Marine Protected Areas

Minimize resource waste
   a. Target fish at a proper size
   b. Target fish at proper time
   c. Minimize incidental harvests
   d. Implement proper handling procedures
   e. Maximize utilization of the fish

The conservation regime of the 1980's failed to maintain groundfish stocks at productive levels. This failure was not because of a lack of suitable goals and principles but rather a failure in execution, in a context of difficult environmental conditions. If conservation is to be achieved, all components of the system must work together effectively: goals and principles must be appropriate, policies and regulations must be adapted to achieve the goals, government programs must be effective, and the practice of fishers must be consistent with the conservation regime. All these elements must be present and adequate for the conservation regime to be effective.

WHAT IS THE BEST COURSE OF ACTION?

8 STEPS TO BUILDING A CONSERVATION PLAN:

Step 1 Determine appropriate level of action
Step 2 Identify objectives
Step 3 Choose indicators
Step 4 Set target levels and operational constraints
Step 5 Decide on conservation measures
Step 6 Evaluate the feasibility and efficacy of conservation measures
Step 7 Implement the conservation plan
Step 8 Monitor and evaluate the conservation plan

WHO DOES WHAT?

Everyone has a role in conserving fishing resources and ensuring that conservation plans are effectively made and implemented.
**Fishermen and Their Organizations**

Ultimately fishers on the water make the final practical decisions about conservation. Fishers must play a major role in the building of a conservation capacity and in increasing conservation awareness through active participation in education and training. The role of fishers becomes even greater with any delegation of management powers, especially through the definition and implementation of CHPs, which should be in agreement with the overall conservation objectives for the resource, such as: sets of measures related to gear use, impact on habitat and environment, effort control, size range of fish to be caught, and permanent/seasonal area closures. Industry is responsible for addressing the issue of fishing capacity.

**Managers**

As a first priority, the management sector in conjunction with the fishing industry must address the reduction of fishing capacity. Managers must implement measures to strictly control fishing effort. Seasonal closures of fisheries should be considered. Though some management responsibilities may be delegated to boards, local authorities or fisher’s groups, the Department of Fisheries and Oceans remains responsible for ensuring the long-term conservation of the resource.

**Science**

Stock assessments are a crucial step to determining conservationist harvest rates. Stock assessments must be expanded to include a fuller appreciation of the state of the marine ecosystem. Information collection must be directed to assist in the protection of the resource, its genetic diversity, and its renewal capacity, and to understand and forecast the effect of human actions, and to understand predator-prey relationships, as well as the effect of environmental conditions on the resource. The study of the fisheries ecosystem, as a whole, appears critical. Scientists should work closely with fishers to involve them in the scientific process through data gathering and interpretation. Traditional knowledge must be considered as a full part of information gathering systems.

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*We must understand the rationale behind the decisions which are being made. If we can build a transparent and truly inclusive decision-making process, we can be confident in a system that will work toward an improved and sustainable fisheries resource for all.*
APPENDIX 5:

SCIENCE PRIORITIES 1998
Honourable David Anderson  
Minister of Fisheries and Oceans  
200 Kent St.  
Ottawa, Ontario  
K1A 0E6

Dear Minister:

One component of the mandate of the Fisheries Resource Conservation council (FRCC) is to advise the Minister on research and assessment priorities. Recommendations were presented in our last Science Priorities letters to the Minister (January 1994, December 1996) as well as in our report *Building the Bridge* (FRCC.96.R.2, October 1996). At the Minister's request, the FRCC produced an important report called *A Groundfish Conservation Framework for Atlantic Canada* (FRCC.97.R.3, July 1997). While analyzing the main issues that face our Atlantic groundfish fisheries, that report emphasized scientific issues that should be addressed as a priority. The FRCC emphasizes that the research recommendations expressed in the *Groundfish Conservation Framework for Atlantic Canada* remain relevant. Although there has been noticeable improvements, some issues already raised have to be expressed again.

*Fisheries should be looked at as a system with research seeking to how such a system works, including studies on: fishing effort, the effects of gear on habitat and fish populations, and the various interactions within the ecosystem. Our reports raised the necessity of building interdisciplinary research, involving scientists from different regions, as well as scientists from social and economic sciences, inside and outside the Department of Fisheries and Oceans.*

*To get the best view possible on the stocks' status, the FRCC believes that it is necessary to use multiple sources of information, to complement scientific research vessel surveys, such as sentinel fisheries surveys and cooperative-operative science-industry surveys and projects. Including fishermen's knowledge and experience in the scientific process is a major challenge for DFO scientists.*

*The seal issue continues to be a major concern. This concern has been continually expressed by fishermen, and this seriousness of this issue is now considered by scientists, both within the Department and within the NAFO Scientific Council. Quantification of the effect of seal predation on the various species, exploited or not exploited (forage species) was expressed as a very high priority.*

We have to note that research groups still have a tendency to work in isolation and do not take full advantage of the expertise existing in other disciplines and/or in other regions, and that the integration of social sciences remain marginal. In a time of limited financial resources, maximizing the use of all resources through zonal approaches and cross-regional teams is critical. The recent Zonal Advisory Process dealing with the Atlantic Cod stocks, which appeared as a very valuable achievement, was however, unable to show common views and approaches in stocks assessment among Regions.

The FRCC is pleased to note that considerable progress has been made with respect to many of our previous recommendations on Science Priorities:

- The Science Sector considers new approaches in the scientific process.
- Sentinel fisheries data are now routinely considered in stock assessment.
- Joint science-industry initiatives are in place (e.g. the Fishermen and Scientists Research Society, the inshore Mobile Gear survey in southwestern Nova-Scotia, and the industry funded offshore survey in the division 3Ps).
- The Regional Advisory Process (RAP) involves not only DFO scientists, but also industry representatives and other interested scientists. This appears to be an open, transparent and effective table for discussion.
- The implementation of multi-disciplinary teams and "Zonal" approaches are now more common to address several science issues.
- Risk analyses are systematically carried out, when feasible, and scientists are already trying to suggest multiple reference points and scenarios of the potential effects of the decisions. Those elements appear to be important and valuable improvements.
- Ecosystem considerations are becoming an integral part of the RAP sessions and of the groundfish stock status reports.

The FRCC regrets, however, that many of these initiatives and accomplishments are poorly publicized, and that the Council, and the public, may not be aware of them. The communication system has to be improved. For example, DFO could provide the FRCC and key industry organizations with a list of ongoing projects with a brief statement on the achievements of each: this would certainly help the Council to appreciate the work being done and to allow the FRCC to more strategically focus its recommendations.

This present letter builds from previous recommendations and underlines issues that are perceived as current priorities in the context of the current situation of our groundfish fisheries. The Council's recommendations in this letter are grouped under a few headings. The elements presented under each heading should be seen as a whole and should be considered as part of a global strategy, and not in isolation from each other.

1. The Recruitment Dilemma

The various closures in place with respect to directed groundfish fisheries were adopted with the principal objectives of stopping the downward plunge in biomass abundance, and promoting stock recovery. There was a clear expectation that the absence of directed fishing mortality would lead to a significant turnaround in the health of the stocks within a reasonable time-frame. It is apparent, after 4-5 years, that the health of most of these stocks has not turned around; some continue to decline even without directed fishing pressure. In light of the protracted closures and/or continuing declines, there is a heightening frustration among all concerned parties who are demanding answers to the question "why are the stocks not recovering"? The fishing industry has done its part—enduring painful fishing closures. We have to look at other aspects of the fisheries system that could help stock recovery.

We recommend that a focused initiative, based on a coordinated "Zonal" approach, be undertaken by DFO Science Sector to address the recruitment issue, to articulate a reasoned and reasonable response to the above questions, and, to determine whether or not additional action can be taken to address the problem. The FRCC appreciates that much of this information already exists, however it is very disperse. The Council recommends that existing information be consolidated and presented as a formal report, in language accessible to fishers, underlining what is considered as scientifically acceptable, the current hypotheses and the knowledge gaps, and research to be undertaken. That report should be communicated before the end of the year 1998. As part of this report, the FRCC recommends the preparation of a "Zonal Strategy" to address the recovery issue. This strategy should be built from the conclusions of the report. The Council views the following points as particularly interesting and important.

Possible changes in natural mortality have raised concerns, as emphasized by recent scientific work. The effects of starvation, predation, stress, toxicity, etc., should be scrutinized, with particular focus on juveniles.

The effect of predation and of predator prey relationships have to be analyzed. The impact of seal consumption, especially, remains a major concern and work to quantify its impact must be pursued and funded. The potential effect of exploitation on forage species (e.g. capelin, herring, etc.) should be analyzed and quantified.

DFO scientists have shown that the calculation of spawning biomass alone is not sufficient to assess the reproductive potential of fish populations. More work is needed to clarify the nature of spawning potential. Studies have to be carried out as well to examine the reproduction rates, as well as egg and larval survival.

Conservation measures to aid in the recovery of stocks must also be considered:
- identification of spawning grounds and nursery grounds should become a priority;
- identification of critical habitats subject to special protection should be undertaken;
- the effect of spatial and temporal closures must be assessed (e.g. the “Haddock Box” in Nova Scotia, as recommended in the FRCC Science Priorities letter of December 1996).

2. IDENTIFICATION AND VERIFICATION OF STOCK MANAGEMENT UNITS

The effectiveness of management tools and resource conservation measures are improved in those cases where the management units utilized for a stock correspond closely to the biological stock boundaries. In many cases, existing stock boundaries were established prior to the availability of improved knowledge of actual stock limits. In others, stock management units developed for one species, often cod, were then applied to other species in the same general area without full analysis of their applicability. In recent years, new analytical tools for delineating distinct populations have been introduced. These tools are now illuminating certain discrepancies in areas such as the Laurentian Channel, where a number of species and stocks mix and share grounds. These new tools offer an opportunity to study these important issues in more detail and more cost-effectively than previously possible. Their development and application in known or suspected cases where stock boundaries may affect conservation should be supported. In its consideration of the stocks over the last number of years, the FRCC feels such investigations should be considered in the following cases:

3Ps cod: Fish from 3Pn4RS on the west and from 3L on the east appear to utilize grounds within the 3Ps stock management area.

2J3KL cod: This stock has been suspected to be composed of various sub-stocks.

4X cod Fishers and geneticists all understand this stock to be composed of several sub-stocks.

4T white hake, 4T Greenland halibut and 4T American plaice: These stocks are now known to winter in the Laurentian Channel, though the extent and consequences are not yet clear.

Redfish: The delineation of stocks was changed in 1993 with the introduction of Units 1 and 2, but part of the industry continues to feel the current boundaries do not adequately describe these stocks.

The FRCC appreciates that the most modern scientific tools (e.g. otolith fingerprints, DNA probes) are currently being used to address these issues. While these studies must continue, they should be complemented by other sources of data. The FRCC strongly recommends that a major tagging program, using the most appropriate mix of technologies, be implemented on cod stocks as soon as the summer of 1998 to help clarifying exchanges between stock management units: 1998 should become known as “The Year of Tagging Programs”.

More accurate delineation of stock boundaries is important in order that the industry, DFO scientists and managers, and the Council itself, have the clearest possible view of stocks in formulating advise and conservation measures, especially as considerations focus on the issue of reopening of fisheries.

3. THE SCIENTIFIC PROCESS

3.1. SCIENTIFIC SURVEYS

The FRCC recognizes the importance of research surveys as one of the major tools in stock assessment. In a context of very limited commercial fishing activity due to fisheries closures, we view these surveys as an even more critical source of information about the status of groundfish stocks.

The FRCC is aware that decisions are being taken to eliminate groundfish surveys in an effort to address budgetary constraints. For instance, we have been informed that the March 4VsW survey is scheduled to be eliminated from the Maritime region 1997/1998 budget. The juvenile survey in 2J3KL cod, may also come to end. As far as we know, there have been no consultation about this with industry or with the FRCC.
Surveys are an essential element of the stock assessment process, additionally, they gather basic information on oceanographic data and fundamental biological data (e.g. spawning success, survival of early life history). Therefore, the FRCC recommends that they should not be cut from the Department's activities without a full assessment of the potential impact on the reliability of scientific data. While we realize the need for fiscal restraint, we want to be certain that cuts to fundamental elements of the science program are not made only for financial reasons. Those cuts should not be made on an ad hoc regional basis but should be included in an overall assessment of the direction of Science Sector. These decisions must be made in a broader context of a global strategy of Science Sector.

Acoustic surveys appear to become more and more important to assess the inshore components of stocks. The FRCC encourages all scientific endeavors, both inside and outside the Department, with acoustic surveys, which also appear to be less expensive than the trawl surveys.

3.2. SCIENCE-INDUSTRY INITIATIVES

The FRCC would like to congratulate the Department on its efforts to involve the industry both in the Sentinel Fisheries Program and in other DFO-Industry science initiatives. In the context of both fiscal constraints and fisheries closures, the need to find alternative sources of information about stock status becomes even more crucial. It is the FRCC's view that these activities not only provide important information but also improve the relationship between the parties.

Sentinel Fisheries have proven to produce highly valuable data and are now an integral part of the stock assessment process. The present programs mainly address the inshore components of stocks, which is a sensible starting point since such components were not well covered by research vessel surveys. However, it is also important to have industry involved in offshore surveys. The FRCC understands that some offshore sentinel surveys are already in place while others have had difficulties being implemented. The Department should develop a flexible administrative system that would facilitate and accelerate the implementation of science-industry initiatives in those areas. The FRCC considers that independent indices, complementary to ongoing research vessel surveys, will be an ongoing priority. In addition to the sentinel fisheries, the Department should work with industry to develop "indexed" commercial catch rate indices.

Sentinel surveys and other science industry surveys are, however, variable in nature and design among regions and thus provide different type of data which may be difficult to understand and compare. The FRCC recommends the appointment of an Atlantic coordinator whose mandate would be to: (a) coordinate and harmonize the various science-industry initiatives, seeking to ensure the most useful results, while allowing local autonomy in each initiative; (b) promote such initiatives within the Department and help in their implementation, and (c) promote such activities with stakeholders and communicate their results. The FRCC also recommends that a workshop be organized to discuss and compare the various sentinel fisheries surveys.

3.3. FISHING EFFORT

The FRCC re-emphasizes the necessity to get accurate data on fishing effort. Effort distribution in space and time must be monitored and the impact of technological changes must be assessed. As but one example of the need for such studies, the Council is especially concerned about the possible effort shift in the 4X area, which would lead to a greater concentration of effort at the entrance of the Bay of Fundy.

4. PRECAUTIONARY APPROACH

The FRCC noted in the Groundfish Conservation Framework for Atlantic Canada the need to follow the Precautionary Approach in managing groundfish fisheries. The Science Branch must be prepared to provide the data necessary for the implementation of the precautionary approach. The following elements are of major importance to the FRCC:

Stock-recruitment analyses are crucial. They must be presented routinely as part of stock assessments, with analysis of the impact on the assessment of stock trends along with potential effect on decisions.
Risk analyses represent a major improvement in stock assessments. They rely largely, however, on the reliability of analytical models, and are based on only a small sub-set of uncertainties involved. Further efforts are needed to implement other available approaches to risk assessment, to complement current methods.

The precautionary approach implies the definition of critical limits and buffer zones that would be incorporated in the "report card" proposed by the FRCC as a tool to guide its decisions. Limit values (spawning biomass, recruitment level, mortality,...) have to be calculated for each stock, based on available information. Knowledge gaps have to be recognized and measures need to be implemented to increase the knowledge base. The FRCC notes that scientists are expanding work on reference points and scenario analysis; those efforts are to be commended.

The FRCC is still concerned by the lack of information on several stocks, being either newly exploited or considered as "marginal". The Council recommends that DFO intensify the process of collecting data on these resources.

The precautionary approach also requires "ecosystem thinking" at every step of the decision making process. While the stock assessment process remains important, it is necessary that the basic biology is not missed. This requires a proper balance between stock assessment and basic research in biology, oceanography and ecology. The management system should also be involved and new innovative management approaches developed to implement "ecosystem thinking" in management practices.

The FRCC takes this opportunity to thank the Department for the excellent support the Council has received over the past years and reiterates its confidence in the work of DFO scientists. The support received has enabled the Council to make diligent recommendations towards the rebuilding and conservation of fish stocks.

Sincerely,

Fred Woodman
Chairman
APPENDIX 6:

"TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT"

REPORT OF THE ENVIRONMENT & ECOLOGY WORKSHOP
APPENDIX 6: REPORT OF THE ENVIRONMENT AND ECOLOGY WORKSHOP

“TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT”

1. OVERVIEW

As part of its mandate, the FRCC is to foster the development of an ecosystem approach to the management of Canadian Atlantic groundfish resources. Responsibility for initiating discussion on this theme falls upon the Council’s Environment & Ecology (E&E) Committee.

Considering the variety of definitions of just what is meant by “ecosystem approach”, and the range of reactions to the expression, the E&E committee recommended that to clarify how the FRCC could be most effective in fostering this approach, a consultative workshop should be held to debate the question.

The workshop was held on Dec 15-16, 1997, and was hosted by the Université de Moncton, at the invitation of Dean of Science (and FRCC member) Dr. Victorin Mallet. Participation was by invitation, from a list compiled by members of the E&E committee, after consultation with the full Council, to include wide representation in area and interests while keeping numbers small enough to involve all participants in the discussion.

Invitees having responded positively to the initial invitation were faxed briefing notes on Dec. 1, 1997. These notes were also made available upon registration at the workshop.

The report introduces the reader to the workshop with the material sent to participants: the letter of invitation and the briefing notes. The conduct of the meeting is reviewed and the final agenda included. Summaries of the invited talks are then presented, followed by a synopsis of points raised in discussion. The report ends with recommendations and action items for the FRCC. A list of participants and a short bibliography of useful references are attached in appendix; so are written briefs received from participants.
2. LETTER OF INVITATION

November 4, 1997

Dear Workshop Participant:

The conservation objectives which define the mandate of the Fisheries Resource Conservation Council (the FRCC) include the development of “a more profound understanding of fish-producing ecosystems” and an “ecosystem approach to fisheries management.”

There has been much discussion about what is meant by ecosystem approach to fisheries management. It is generally agreed that it does not mean management of the ecosystem, but rather an integrated management of human interventions which takes into account the response and variability of the natural ecosystem.

The Environment and Ecology Committee of the FRCC has been tasked with exploring these issues and bringing forth practical suggestions to strengthen the conservation objectives for the groundfish fishery in Atlantic Canada.

To gather opinions on what measures might be considered for detailed consideration and further debate, the Committee will hold a short workshop, by invitation only, on December 15-16 at the Université de Moncton. Participants will be provided with briefing material on the ecosystem approach and examples of initiatives in other areas which follow this approach. The workshop’s report is expected to include a list of policy, scientific, administrative, management and educational activities towards an ecosystem approach to the management of Atlantic groundfish fisheries.

It is my pleasure to invite you to this workshop. As you will see from the preliminary agenda, the exercise will be quite focused and, to gather a wide range of opinions, the FRCC has invited people representing a broad variety of backgrounds. A block of rooms has been set aside for the FRCC at the Hotel Beauséjour, 750 Main Street in Moncton at $68/night. Participants are to make their own reservations with the hotel at (506) 854-4344.

Although the workshop’s duration has been reduced to minimize costs, we regret that funds will not available to cover participants’ expenses. Participants are requested to confirm before November 14 by contacting the FRCC at (613) 998-0433 phone, (613) 998-1146 fax or e-mail at catrina.tapley@frcc.x400.gc.ca) whether you will be able to come. Further details will be forwarded to participants.

Your participation at this workshop will assist the FRCC’s Environment and Ecology Committee in defining what an ecosystem approach means, in practice. I hope we can count on your presence and look forward to meeting with you in Moncton.

With best wishes,

[Signature]

Paul H. LeBlond
Chair, Environment and Ecology Committee
3. BRIEFING NOTES

"TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT"

An “ecosystem approach” is currently advocated (for example in DFO’s Sustainable Development Strategy Discussion paper) as a framework for conservation-based management of natural resources. There is a variety of views as to what this expression actually means and considerable uncertainty on how to implement such an approach.

The Fisheries Resource Conservation Council (FRCC) wishes to consider practical measures towards an ecosystem approach which will strengthen its conservation objectives for Canada’s Atlantic groundfish resources. Participants of this workshop will help identify and prioritize such measures.

These briefing notes are circulated to all participants to provide adequate background for the workshop. Please read them carefully.

A. WHAT IS AN “ECOSYSTEM APPROACH”? 

A variety of definitions have been proposed. In its Dec 1995 Strategic Planning Workshop, the FRCC viewed it as “an approach which seeks to understand the impact of human intervention on target species as well as on their food and on their preys.”

A panel of the American Fisheries Society refers to “a management philosophy that focuses on local and large geographic scales, considers long-term temporal scales, and preserves biotic and abiotic components of ecosystems when making natural resource management decisions.”

Canadian biologist J.R. Vallentyne sees the ecosystem approach as “explicitly recognizing that human populations, together with their various inputs, and by-products, formed an important part of the ecosystem.”

The Ecological Society of America offers the following definition: “...management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure and function.”

These various definitions attempt to condense in a short paragraph the idea that an “ecosystem approach” to renewable natural resource management must consider the complexity and variability of natural ecosystems and try to understand the integrated impact of all human activities affecting it. In the phrase coined by U.S. pioneer conservationist Aldo Leopold, one should “Think like a Mountain.” In our case, “Think like an Ocean”.

It is important to note that all the definitions:

i. include the idea of sustainability: measures taken today must not ruin tomorrow’s prospects;

ii. recognize that in order to achieve this goal, sufficient knowledge of the system is necessary;

iii. recognize the complexity and variability of the natural environment; iv - and thus advocate a precautionary approach;

v. include humans and their activities as part of the system;

vi. insist on the need to integrate knowledge and management perspectives: for example, fisheries cannot be managed independently from water quality, social assistance programs and parallel ocean development initiatives;

vi. require collaboration among all human participants - different gear sectors, social groups, government departments and agencies, etc...to the international level.
An ecosystem approach to the management of fisheries resources would then require an intimate knowledge of the ocean ecosystem and of its variability, agreement among fishers and managers on goals and methods of fishing which do not endanger ecosystem integrity, and a social situation where there was no pressure to go beyond such goals. Some would describe this as an unreachable utopia; others will argue that it is the only path to sustainability. Most, however, will agree that some of this makes sense and that fisheries management and conservation would be well served by taking steps towards an approach which fosters ecosystem health.

What practical steps can be taken now or in the near future? Are there any initiatives elsewhere to inspire us? In this workshop, we will draw from these initiatives and from the general principles behind the ecosystem approach to arrive at practical suggestions.

B. PRACTICAL STEPS TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT.

When thinking of implementing an ecosystem approach, things become vague. Examples provide the best inspiration. Our invited speakers will describe practices and initiatives introduced elsewhere as well as in Atlantic Canada, in the marine domain as well as on land.

Two perspectives may guide our steps. First, the “ecosystem” part of “ecosystem approach” suggests that the more we know about the natural ecosystem and its workings, the closer we can get to the right approach. A deeper knowledge of the interactions between fish, their predators, their food and their environment is required. Scientists need to develop that knowledge and make it accessible to others through a variety of efforts: multi-species studies, ecosystem models, holistic indicators, key species... Most biologists are well aware of this; they need encouragement and support. Participation of fishers and of the general public in information gathering and analysis is desirable within an ecosystem approach. How is this to be achieved? More funding? Wider scientific efforts? Public education? Since entire communities are concerned, perhaps entire communities, not just specialists need to address these issues.

The second part is of course the “approach”: the human behaviour which creates management - and recognizes that man is indeed also part of the ecosystem. Promoters of the ecosystem approach insist that it should take into account all human interventions: transportation, recreation, sport and commercial fishing, waste disposal, resource extraction, etc... must all be considered as affecting the marine ecosystem. Science, management and policy-making must be coordinated. Human motives - socio-economic factors affecting the drives of the higher predator-must be reckoned as part of the ecosystem.

Basin-wide integration, as in the Great Lakes, or over a watershed, as is now becoming the practice in fresh-water management, are examples to guide us. Habitat protection for enhancing availability of the resource - as practiced, for example, by Ducks Unlimited - and as suggested in Marine Protected Area discussion papers, offers another avenue. Sustainability is not to be measured in terms of output (so many tons of fish, so many board-feet of lumber), but in terms of ecosystem integrity. For example, a selectively logged forest continues to be a forest as logs are removed from it (the Merv Wilkinson example) - is this example a lesson for fisheries?

The ecosystem approach emphasizes long-term, large-scale benefits over short term, local advantages. Will likely approaches be disruptive of current practices? How can this be avoided? How can an ecosystem approach be introduced without causing economic havoc? If there is a price to pay, how can it be demonstrated to be worth it?

These are not easy questions. We ask you to use your imagination, to think up ideas. This workshop is basically a brain-storming session and you should not to limit yourself to what has already been done or be deterred by apparent obstacles.

While everyone will have a chance to speak their piece briefly, only a few formal presentations will be made. If you are concerned that your ideas may not receive the time which you think they need for full exposure, please write them down and bring a written brief with you (or send it after the meeting). Briefs will be included in the workshop report and will receive the direct attention of the full Council when it considers the recommendations of its Environment & Ecology Committee.

Please direct any questions regarding the workshop topic and/or its organisation to the FRCC Secretariat.

Paul H. LeBlond
Chair, Environment & Ecology Committee of the FRCC
4. **Conduct of the Meeting**

The meeting followed the preliminary agenda circulated with the briefing notes, except for the replacement of the presentation by B. Kovic (who could not attend because of weather) by a talk on a similar topic, but from a different perspective, by R. Haedrich, of Memorial University. The organisers wish to express their thanks to Prof. Haedrich for his willingness to step into the breach on very short notice.

All confirmed invitees, except for Mr. Kovic, were present at the workshop.

Just before lunch, break-out groups were formed to focus discussion on various aspects of fisheries management and how they could be adapted to an ecological approach. Group leaders were asked to present a one-page report of their lunch-time discussions. Each presentation generated a lively exchange of views.

The organisers wish to express their gratitude to Dr. Victorin Mallet, who hosted the meeting and to his secretary, Ms. Monette Saulnier, who assisted with registration and meeting logistics.

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**AGENDA**

**FRCC WORKSHOP - DECEMBER 15-16, 1997**

"TOWARDS AN ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT"

**Monday 15 December: Taillon Building**

- 16:30 Registration
- 17:00 Reception
  - Welcome to Université de Moncton: Victorin Mallet, Dean of Science
  - The FRCC’s mandate: Fred Woodman, Chairman
  - Goals of the Workshop: Paul LeBlond, Chairman of the Workshop
- 18:00 Dinner
  - “Ecosystem Approach in Resource Management: Model Forests.”
  - Speaker: Louis Lapierre, Univ. de Moncton

**Tuesday 16 December Taillon Building**

- 08:45 Steps towards Ecosystem Approach: Three 20 min talks + 10 min. questions/discussion
  * François Poulin / Marc-André Bédard: “Gaspé-Sud / Hortus Projects”
- 10:00 Break
- 10:30 * Richard Haedrich, Memorial University: “Scientific and Traditional Knowledge”
- 11:00 General Discussion
- 12:15 Lunch - breakout groups
- 13:15 Breakout group reports/discussion
- 16:30 End of meeting.

**Breakout Groups**

Topics, discussion leaders.

1. Community Participation: Brian Giroux, Roy Drake
2. Agency Coordination: John Kearney, Mike O’Connor
3. Conservation initiatives: David Coon, Ted Potter
4. Science and Traditional Knowledge: John Anderson, Omer Chouinard
5. Education: Martin Willison, Ilke Milewski
7. Management: Jim Baird, Dan Lane
5. SUMMARY OF PRESENTATIONS

Speakers were invited to present examples of application of the ecosystem approach, as they understood it, or of initiatives leading towards such an approach. The first two presentations, by Louis Lapierre and Tracy Mehan, on The Fundy Model Forest, in New Brunswick, and on The Great Lakes Ecosystem respectively, introduced workshop participants to the practice of an ecosystem approach in fields or geographical areas remote from their daily concerns. In this way, ideas and practices could be considered without the immediate surge of objections which usually accompanies a new proposal in familiar terrain. The other two presentations addressed issues central to the ecosystem approach: local community initiatives linked to integrated regional management (in the Gaspé-Sud/Hortus project) and the harmonisation of systematic scientific knowledge with traditional knowledge.

5.1 Louis Lapierre: Sustainable Resource Management into the 21st Century

Dr. Louis Lapierre is Professor of Ecology and holder of the K.C. Irving Chair on Sustainable Development at the Université de Moncton.

In his talk, Prof. Lapierre described the New Brunswick Fundy Model Forest project, one of ten model forests in Canada. Model forests have social, economic and environmental goals. One of the big steps is to bring people to the table to manage sustainably. Public participation is seen as an essential component of sustainable forest management, helping to set goals on how much is to be taken from the forest. Implementation of these goals, rather than some harvest objective, determine exploitation rates and methods.

The first element of the Model Forest project consists of organisation and development: bringing stakeholders to the table and designing a process which allows understanding of issues, expression of preferences, resolution of concerns and reaching of satisfactory compromises. Model Forest projects also include elements of education and cultural participation; economic diversification and consideration of biodiversity.

A management plan for a Model Forest would include efforts to optimize forest exploitation, biodiversity, economic and social conditions in a mutually reinforcing way.

Dr. Lapierre reflected on his earlier attempt to extend the Model Forest concept to a Model Ocean area in the Gulf of St. Lawrence. In his view, the multiplicity of fishing groups and interests would make it much more difficult (but not necessarily impossible) to reach the consensus required to set up an equivalent system in the ocean.

Extension of the Model Forest concept and experience to the ocean domain would require starting small, in coastal communities where inhabitants identify with the oceanic area (e.g. an estuarine area, such as the Richibucto (N.B.) Environment and Resource Enhancement Project), and proceeding gradually to wider spatial scales. As on land, where forests are recognized to consist of more than just trees, the ocean must be recognized to be more than just a source of fish. Sustainable management of fisheries must include considerations of biodiversity, habitat, social and economic conditions.

5.2 Tracy Mehan: The Great Lakes Ecosystem

G. Tracy Mehan, III, is director of the Michigan Office of the Great Lakes and a member of Governor John Engler’s Cabinet.

Human impact on the Great Lakes Basin, where 35 million people live, has been very heavy. As Mr. Mehan pointed out, “the environmental history of this region is a story of extreme degradation and remarkable restoration, still underway.” Much of the impact has been associated with chemical pollution; restoration has required extensive international, inter-state and regional coordination. The Great Lakes Water Quality Agreement between Canada and the United States undertook “to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lake Basin ecosystem”, defined as “...the interacting components of air, land, water and living organisms, including humans, within the drainage basin...” Coordinated control of chemical impacts had notable success, as evidenced by recovery of bald eagle populations nesting around the lakes.
Another significant anthropogenic impact in the Great Lakes is the introduction of more than 140 exotic species, which were not present in the 1800's. Some of these, such as lampreys and zebra mussels, have had a devastating impact on native fish stocks. Dr Cooper, of Michigan State University, was quoted as stating that introduced exotic species had an even worse impact than chemical pollution on the integrity of the ecosystem. "Environmental and resource managers throughout the region are now taking a broader ecosystem approach," said Mr. Mehan, going beyond (without abandoning them) traditional chemical controls to include concerns for habitat, overfishing and the role of exotic species.

For example, the Great Lakes Fisheries Commission, a bi-national body which includes the three Great Lake states, the province of Ontario, and various tribal authorities, has introduced a program which, by combining water quality standards, lamprey controls, sport and commercial fishing, and stock enhancement, has allowed lake-trout to become self-sustaining again in some areas of Lake Superior.

Application of the ecosystem approach to fisheries management in the Great Lakes has thus consisted of integrated interventions of all agencies and groups concerned to maintain or restore the environmental conditions (chemical, physical and biological) favourable to fish stock sustainability. In concluding, Mr Mehan noted that: "The Great Lakes ecosystem is a dynamic one which, over time, responds to its own internal processes and external influences. Human beings, as active agents, need to adopt thought and actions consistent with the actual state of the resources." He also noted that an "ecosystem approach" was neither purely scientific nor purely political, and there was a need to define its practice through case studies well anchored in place and time.

Mr. Mehan mentioned that, in his opinion, it would not be possible to revert to original environmental conditions in the Great Lakes. Perhaps this is an omen for what might happen to the Atlantic marine environment if steps are not taken soon to counter the effects of pollution, overfishing and habitat degradation.

5.3 François Poulin: The Gaspé Sud Project
Marc-André Bernard: Le Projet Hortus

François Poulin is the Director General of the Alliance des Pêcheurs Professionnels du Québec. Marc-André Bernard is the biologist in charge of Project Hortus.

The Projet Gaspé Sud is a pilot project to create a new fisheries management regime within an integrated inshore fishing zone in the Bay des Chaleurs and the South Shore of the Gaspé coast. Mr. Poulin reviewed the project, submitted in March 1997 to the Minister of Fisheries and Oceans by the "Regroupement des pêcheurs professionnels du Sud de la Gaspésie. An overview of the project, distributed to participants, is attached to this report.

The fundamental goal of this 5-year pilot project is "the search for a durable and viable equilibrium between the number of inshore fishermen harvesting the proposed integrated inshore fishing zone and the long term fishing potential of the same zone". The project is focused on the development of a multi-species inshore fishery, and the search for an equitable sharing of the resources.

The project is inspired by the FAO's position on coastal fisheries and advocates control of adjacent marine resources by coastal communities. It welcomes participation by First Nation fishers and combines social, economic and ecosystem considerations.

Projet Hortus is a local, focused initiative coordinated with and integrated within the broader-scale Gaspé-Sud project. Bringing together 18 community organisations over a dozen meetings to create a "garden" project in Cascapedia Bay, where diverse uses of the sea will co-exist.

5.4 Richard Haedrich: Science and Traditional Knowledge

Dr. Haedrich is a professor of Ocean Sciences at Memorial University of Newfoundland and an expert in deep-sea fishes.
Dr Haedrich presented some thoughts on the relative use and meaning of traditional and scientific information, the former defined as gathered by fishermen at sea and passed on to their children and others by anecdotal means, the latter obtained systematically through scientific methodology. Traditional knowledge is relevant to local conditions and their variations over long-time scales, while scientific knowledge, as available today, applies to large spatial scales but only to short time scales (e.g. this year's survey). The two approaches represent isolated bubbles of information on a Stommel diagram of space and time scales.

**Figure #1**

Because of this disparity in scales, it appears that currently fishers' knowledge is more useful for long-term policy setting which applies to whole ecosystems, whereas scientific knowledge deals with fish populations is more useful for the actual management of fisheries. If management is to follow policy and be matched to ecological time and space scales both approaches must be drawn upon.

**Figure #2**

How to bring the two approaches closer together? Perhaps through the common language of charts, suggested Haedrich, who showed a 1900's chart of the Gulf of Maine which had spawning areas and other traditional fisheries information on it. Through letting fishermen indicate on charts “This is where I saw it” or “This is where we used to fish”, the information could be put in a format useful for scientific analysis and scales of common interest can be identified.
6. SYNOPSIS OF DISCUSSIONS

Each formal presentation was followed by wide-ranging questioning and discussion. Comments have been grouped by topic, most of them coinciding with the themes considered by the break-out groups, other arising spontaneously from the floor. Only an edited synopsis is presented: there has been no attempt at verbatim reporting and specific comments have not been attributed to individual speakers.

6.1. COMMUNITY PARTICIPATION

Community participation is widely recognized as an essential element of any sustainable or ecological management scheme. People living with the environment and drawing directly from its resources must play an important role in decisions about its management. The first question is to define the relevant community: by geography? interests? How wide and all-encompassing is a community? Can, or should, the approx. 1,600 coastal communities in Atlantic Canada be brought together within a broader meta-community? If one is to speak of ecosystem management associated with community involvement, it is important to match the scale of one with that of the other. A small community alone cannot effectively manage an ecosystem which extends over a much larger spatial scale: decisions taken in other communities will impact the ecosystem. Creating a large-scale functional community by speaking with individuals in order to reach common objectives was seen as impractical: a more workable method is to proceed hierarchically, by encouraging local groups with specific interests to define their preferences and objectives; these groups in turn associating within a regional, broader-based organisation, and so on. An example of this process was presented from the Bay of Fundy, where Bay-wide groupings support and extend local initiatives. It was also suggested that one might learn from the biological definition: “a community is made of linked species sharing the resources of the ecosystem.” Also, from a different perspective, that management should be linked to habitat types rather to single species. A warning about community involvement and community control however: in our system where opportunities must be available to all (or at least to all within a licensed group) it is impossible to extend community-based privileges to one community without making them available to all communities. The importance of the process for arriving at consensus, or more appropriately compromise, positions was stressed, inspired in part by Dr. Lapierre’s Model Forest example. Techniques of “interest-based” negotiation were advocated, in which positions are attacked, not people.

6.2. AGENCY COORDINATION

The first reaction of participants to this topic was frustration at the lack of coordination. The Great Lakes history clearly shows the need for coordinated efforts in protecting and restoring the environment and its resources. Some concern was expressed however about potentially increasing bureaucratic complexity or weakening DFO’s focus on the fishing industry. Suggestions to move towards closer integration of various human rules and activities included an inventory of existing environmental and resource use legislation, the creation of a (DFO?) website for ecological fisheries management projects, discussion papers, etc... Finally, interagency coordination in an ecological approach can only take place if the various agencies, - international, federal, provincial, municipal, etc... - are aware of the need for such coordination and come to the table to plan for it: coordination itself occurs in a step-wise fashion. Transparency was claimed by all to be of crucial importance to all coordination and interagency communication processes. There was a call for a broadening of perspective in dealing with ocean issues - general ocean ecosystem policy should integrate downstream effects of land-based development as well as shore-based activities. It is not sufficient to coordinate agencies concerned with the ocean: actions taken on land have an impact at sea.

6.3. CONSERVATION INITIATIVES

What conservation initiatives, within and beyond the FRCC’s Groundfish Conservation Framework, might contribute to an ecological approach to fisheries management? It was first suggested that the FRCC should define a mechanism for supporting and encouraging current initiatives - by providing information about them and rallying DFO, industry and public support in their favour. To be deserving of support, existing as well as future initiatives should satisfy agreed-upon criteria, documenting, for example, their conservation effectiveness, and their economic and social impacts. Such criteria should be based on solid scientific, legal and economic bases. There is
also a need for a clear articulation of a vision to guide a transition towards an ecological approach, inspired in part by the FRCC's Groundfish Conservation Framework and by the work of Model Forests. Many of the topics discussed at the workshop provide the seeds of such a vision and suggest practical steps towards it: Marine Protected Areas, public education, community consultation, blending of scientific and traditional knowledge.

6.4. SCIENCE AND TRADITIONAL KNOWLEDGE

Science and traditional knowledge represent equivalent forms of excellence in the expression of knowledge; together they create a broader basis of knowledge to assist decision making. Science is quantitative and usually, broad in scale; traditional knowledge is qualitative and local in scale. Nevertheless, both contribute to information about the environment and should be brought together rather than considered as fundamentally different. Science, after all, evolved from less systematic, more traditional ways of observing nature.

There was not universal agreement with Dr. Haedrich’s division or pertinence of traditional knowledge as local and long-time scale versus science as broadly based over short time scales: after all, there are scientific measurements of some fish stocks dating back to the turn of the century. Another argument for the complementarity of both approaches!

If traditional knowledge is to contribute to fisheries management and supplement scientific information, it must be treated using its own appropriate methodology. Beyond the use of maps as a common language, the cultural element of traditional knowledge must be taken into account. Whether science and traditional knowledge should treat their separate windows in space and time scales remains a matter of debate. There is a need for clarification, especially for the fishing industry, of the relative roles of these sources of information and how they are to be blended together. It was suggested that where science and traditional knowledge differ, a precautionary approach be adopted, erring on the side of caution in favour of conservation objectives.

What science wants from traditional knowledge is the development of methods to assure scientists of the generality and consistency of traditional observations and results in an open and transparent way. In turn, what traditional knowledge experts (fishers, sociologists...) want from scientists is means of incorporating traditional knowledge into surveys and ecological studies in an open and transparent way.

What we are left with is a call for a process which brings science and traditional knowledge into a common framework. This process should include the development of methods which ensure quality control of qualitative knowledge as well as of methods which incorporate traditional knowledge in the design of surveys and the interpretation of their results.

6.5. ECOLOGY

It is impossible to speak of an ecological approach to fisheries management without considering the biological basis of natural marine ecosystems. In the words of one participant: "The marine environment is too complex, fluid and dynamic to impose on it narrow, arbitrary boundaries". The non-linearity and variability of natural ecosystems makes them difficult (some would say impossible) to manage. An ecosystem approach must recognize and adapt itself to these features of natural ecosystems. Fisheries scientists have made serious efforts to consider multi-species fisheries management. As biologists, they are also generally keen to take a broader ecosystemic approach to fisheries science; however, some also feel trapped by the requirements of the current single-species management schemes and the demands made for accuracy of stock estimates. The necessity of federal involvement, with DFO as the lead federal agency, in large-scale ecological concerns was widely acknowledged, and it was agreed that it is important to continue to ensure that scientific discussions include all relevant perspectives, including fishers, academica and NGO's. The dissemination of ecological information through maps, atlases and other means was seen as an important step in educating stakeholders and the public, in harmonizing traditional and scientific knowledge, in establishing the basis for ecosystem thinking in ocean management, and in providing the information necessary to consider Marine Protected Areas under the Oceans Act. Examples of current efforts at developing an "Ecosystem Description" of Atlantic waters were mentioned (Geomatics International and Nova Scotia Museum). One should remember however that it is essential to have some clear goals (e.g. protecting spawning areas, characterization of habitat types, etc...) in mind when using geographical ecosystem information.
for management purposes. Finally, a periodic ecosystem assessment of fisheries status and impact was suggested as a tool to assist in developing an ecological approach. It was suggested that the FRCC could play a role in stimulating interactions between DFO, academic and industry spokespersons in the development of such an assessment process.

6.6. Education

Within the perspective of an ecological approach, one should recall that education is: 1 - a continuous living process, evolving as knowledge evolves; and that 2- it has formal and informal aspects. Teachers and journalists are both involved in education, for example. The breakout group recommended that the FRCC should teach by example and show the way towards an ecological approach by recommending to the Minister that future appointments to the Council reflect the issues discussed at the workshop, as pertinent to an ecological approach.

6.7. Economics

Commentators offered a variety of relevant opinions, pointing out:

- the need for a buy-out program to address over-capacity issues in the fishery;
- that economic pressures (markets, employment, capital needs) should not be allowed to undermine ecological requirements (spawning areas, protection of juveniles...)
- economics is part of ecological planning:
- ecology must be part of economic planning - a significantly different emphasis;
- an ecosystem approach would best be tried on smaller "bubble" projects; smaller scale would allow local management control, more intimate appreciation of the ecosystem;
- having, in the same area, competitive fisheries together with rights-based fisheries causes problems in management and the application of conservation measures;
- there is a need for a transitional strategy to get to the ideal future from the present situation;
- many fishers are nearing retirement age - their replacement (or not) is part of the transition.

One should remember that economics and ecology are etymologically closely related. After a period of divergence, during which environmental costs were completely externalized, ecological considerations are beginning to be incorporated into economic thinking. Ecological economics, as this new approach is called, specifically includes environmental costs and benefits within the total balance sheet (Costanza, 1991). We recognize various elements of ecological economics in the comments offered at the workshop and particularly in the integrated management paradigm adopted by the Model Forest. A systematic application of ecological economic thinking to fisheries is clearly to be encouraged.

6.8. Management

In an ecological approach, management should mimic nature and be on the scale of an ecosystem. Agencies with broader scope (e.g. DFO) should be concerned with large scale management; local organisations with local issues. Given the current single-species focus of fisheries management, progress towards a more ecological approach may require a modified decision-making system, centred less on TAC's and more on the sustainability of the ecosystem as a whole, somewhat following the process outlined in the Model Forest presentation of Dr. Lapierre. In such a system, conflicts between community or user groups are resolved at the table rather than on the back of the resource, a clear advantage to conservation. Management by consensus was thought to be easy: what's difficult is arriving at a consensus. Matching fisheries management to ecological scales, the latter being defined in terms of harvested populations as well as of fishing communities, is seen as desirable. Bottom-up management is of course easier for smaller biological communities, where such efforts should begin. Difficulties were recognized regarding the definition of access to local resources by local communities, in keeping with the adjacency principle. Never-
theless, the principle of making decisions at the lowest level of management possible was strongly argued. Small scales are easier to understand; people also find them easier to relate to. For guidance in dealing with migratory species, one might be inspired by conservation measures applied to migratory birds - although it was pointed out that the comparison is not quite appropriate, since they do not sustain a commercial harvest.

6.9. Aboriginal Fisheries

The workshop was forcefully reminded of the expanding role of First Nations in Atlantic fisheries. It is clear that the broader “community” will have to include native communities as full participants whose access is guaranteed under the Constitution. All conservation issues are likely to be impacted. First Nations councils will have to be consulted and will be an important source of experience and wisdom in moving towards an ecosystem approach. As their perspective on many issues is likely to be quite different from that of other stakeholders, it is important that a deep dialogue be initiated as soon as possible.

6.10. Expectations

As a prominent official standard bearer for conservation, the FRCC has earned wide respect within the fishing industry and conservation-minded NGO’s. Expectations of what the FRCC can actually do however greatly exceed its power as an advisory body. The FRCC only makes recommendations. Nevertheless, these recommendations can be very influential and can stimulate action by others, in government, industry and the public. Comments were made on the mandate of the FRCC: too specifically focused on groundfish. How can the FRCC foster an ecological approach while focusing on single species management of only some of the fisheries resources? Some participants wanted the FRCC’s mandate to be expanded to an Ecosystem Approach to Fisheries Management.

7. Conclusions

The Moncton workshop led to focused and active discussion. Valuable contributions were made by all participants, resulting in suggestions for immediate action and longer-term partnerships. A general recognition of a need to go beyond current fisheries management practices pervaded the meeting, tempered by puzzlement at how to proceed and how to deal with a variety of practical issues. “I’m sure we are a long way from an ecosystem approach”, someone remarked, while adding that he was “more convinced than ever that we need to introduce” that approach. While some participants thought of an ecosystem approach as equivalent to a multi-species management scheme, another view - perhaps more realistic as an intermediate step - defines it as a “transparent definable process that assesses the status of one species, taking into account its interactions with other species.”

For most participants, an ecosystem approach to fisheries management was seen as bringing together two essential components: recognition and respect for the ocean ecosystem and community-based involvement in its management. It may be argued that the link between the two is not entirely necessary - one might exist without the other - but they are closely related in the mind of most intervenors. Perhaps the perceived need for both brings them together. In any case, human intervention is certainly a major element of the ecosystem approach. To quote Edward Maltby (1997): “The earlier separation of ecology and economics and of ‘nature’ and human society (at least in western cultures) favoured still by some conservationists is not helpful.” Further: “...ecosystem based management is only partly about science. It is much more about cultures and society.

It is very clear that there is a great conceptual distance between a functioning ecosystem approach, as sketched by the participants, and present-day fisheries management. In contrast to today’s single species or single stock management regime, where the fishery is pursued by competing gear sectors and regional groups, restrained by a variety of regulations, an ideal ecosystem approach is characterized by a concern for the integrity of the natural ecosystem, and a bottom-based, community-oriented management regime.

The ideal of communities at peace with nature and each other, happy to draw from the environment only what it can provide without damaging its ecosystemic stability, will appear utopic to some, who may imagine it as an attempt to re-create an idyllic and imaginary past. There are however significant differences between yesterday’s and today’s conditions. Fishing capacities and catches are now at a level which threaten the very core of the marine ecosystem. Respect for nature is no longer a philosophical option; it is a necessity. Fisheries are operating...
at the limits, and beyond, of what can be taken from the ocean. There remain a number of important questions regarding the definitions of ecosystems and of communities and how they are to be matched, in space and time, but the course towards sustainability seems to be set along the two guiding axes of the ecological approach and must be guided by sound scientific research.

Moving towards a management regime inspired by the ecological ideal will be possible only through a series of small steps. First, enough people have to be convinced of the need to move in that new direction. Initiatives in the desired direction have to be encouraged and used as guideposts, defining the path and strengthening the resolve. Broad-based participation and support of the public and the fishing industry will be required.

Having started the workshop with a presentation on the Fundy Model Forest, it is appropriate to end on a similar note, drawing again from a forestry analogy. As Clarence Pautzke, Executive Director of the North Pacific Fishery Management Council put it at the Global Trends in Fisheries Management Conference: “If the practice of not seeing the forest for the trees has brought us to our present state of affairs in the Northwest logging industry, then our inability to see the ocean for the fish, because we see fish as a product, I would suggest has brought us to the present state of affairs in our global fisheries management.” (Pikitch et al., 1997). The urgent need for a new approach was recognized by McGinn in her essay in the 1998 State of the World: “With timely action, fisheries can continue to provide food, jobs and enjoyment for millions of people worldwide. But ultimately this means changing our focus from what is done to a fish to what can be done for the fish. An the time for that change is now.”

8. Recommendations

These recommendations are presented by the Environment and Ecology Committee to the FRCC for discussion. From this discussion will emerge a selection of priority lines of action to enhance the Council’s continuing conservation work.

R-1 Using the advice received at the Moncton workshop as well as information from current literature, the FRCC should determine, through the following action items, how it will move towards an ecosystem approach within its existing mandate.

A-1 The E&E Committee will prepare a position paper to be completed in the fall of 1998.

A-2 This same committee, with the help of the Secretariate, will collect information on the ecosystem approach in resource management in general and fisheries in particular.

R-2 The FRCC should recognize initiatives by regional and industry groups towards community and industry-based ecosystem approaches in fisheries management as follows:

A-3 The E&E Committee will compile, for the FRCC’s information, a list of on-going initiatives which it considers pertinent to an ecological approach to fisheries management in Atlantic Canadian waters.

R-3 As part of its conservation strategy, the FRCC should develop closer links with all stakeholders, including First Nations, on the formulation and development of an ecosystem approach as follows:

A-4 The FRCC will seek information, within the framework of regular as well as special consultations, on initiatives leading towards an ecosystem approach.

R-4 Information on ocean ecosystems must be made more broadly understandable and available as a tool for public education and fisheries management.

A-5 The FRCC will encourage DFO to develop partnerships towards the development of information material integrating traditional and scientific sources of ecosystem knowledge.

A-6 The FRCC will request that DFO develop partnerships towards the dissemination (publications, atlases, web site...) of ecosystem knowledge.
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1. **Pilot Project to Create an Integrated Fisheries Resources Harvesting Area**

*TRANSLATED*

This document constitutes a pilot project designed to define, over the coming years, a new approach to the inshore fishery in Chaleur Bay and along the south coast of the Gaspé and the east coast of New Brunswick.

This new approach has become essential if we are to avoid repeating the mistakes of the past which led to the widely publicized tragedy of the closure of the cod fishery in 1993, a tragedy which in five years has cost Canadian taxpayers over $2.0 billion and for which no real sustainable solution has as yet been proposed for the future.

Project submitted jointly by the Regroupement des pêcheurs professionnels du Sud de la Gaspésie (member of the Alliance) (Appendix VI) and the Maritime Fishermen’s Union (Appendix VII) to Fisheries and Oceans Canada February 1998

**PILOT PROJECT (summary sheet)**

**Project title:** Creation of an experimental integrated inshore fisheries resources harvesting area.

**Geographic borders:** Integrated area comprised of four subareas, i.e. one joint Quebec/New Brunswick area in Chaleur Bay, one Gaspé South area northeast of Chaleur Bay, and two areas in New Brunswick, namely the Northeast and Northumberland Strait (see map in Appendix 1 and justification of area boundaries in Appendix II).

**Nature of project:** Pilot experiment to develop a new sustainable model for the co-management (status/environment), harvesting, conservation and development of inshore fisheries resources by fishers adjacent to the integrated area (Appendix III).

**Objectives:** Seek a sustainable balance between the exploitable potential of fisheries resources in a maritime area and the maximum number of adjacent inshore fishers (traditional or Aboriginal) who can make a decent living from them.

This approach is based on the professionalization and accountability of inshore fishers for the marine environment on which they depend, and recognizes the need to make fishers more versatile in seeking greater security, professional stability and profitability.

(For secondary objectives, see Appendix IV.)

**Target clientele:** The target clientele includes fixed-gear fishers operating vessels under 50 feet who are adjacent to the integrated area, as well as a number of new entrants (still to be determined) to satisfy the unquestionable and entirely legitimate historic rights of the Aboriginal communities adjacent to this area.

Agreements might be possible to permit and regulate the use of mobile gear by inshore vessels under 50 feet LOA for species which can only be harvested using such gear.

At the outset, the number of harvesters could be around 1500 inshore fishers, including Aboriginal people. The five-year term of the pilot project will serve to determine the appropriateness of creating an integrated area and the number of active fishers who could make a decent living from it on a sustainable basis; at the
same time, it could serve to define any necessary programs which might offer surplus fishers worthwhile alternatives that can realize the objective of a balance between harvesters and resources, which is the foundation of the pilot project - in particular, a rationalization program.

**Project schedule:** The pilot project would last five years, starting January 1, 1999 and ending December 31, 2003.

However, essential management of this pilot project requires a preparatory phase which must extend from April 1, 1998 to December 31, 1998, a phase which must conclude with the signing of a five-year pilot partnership agreement on status/environment co-management.

Start-up of this pilot project therefore requires that it be immediately approved by the competent government authorities.

**Project funding:** Each of the participants involved in the preparatory phase will assume the inherent costs of its participation. During this phase, costs of a community nature could be defrayed by a budget shared by the participants.

Costs for the five years of pilot project delivery will be divided equitably among the stakeholders under a co-management partnership agreement to be signed by the parties at the conclusion of the preparatory phase; these costs together with the inherent costs of a rationalization program will be financed jointly by DFO and by a levy on landings.

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**APPENDIX I**

![Map of Québec and surrounding areas](image-url)
APPENDIX II

PILOT PROJECT TO CREATE AN INTEGRATED FISHERIES RESOURCES HARVESTING AREA

JUSTIFICATION OF THE BOUNDARIES OF THE INTEGRATED AREA

The boundaries proposed are those of the traditional fishing territory of Gaspé and Acadian inshore fishers, a territory where they have fished in an environmentally friendly manner for more than 300 years, never endangering the various fisheries resources. For more than 3,000 years of history, it has also been the ancestral fishing territory of Aboriginal people, who also want to retain their access to it.

It is urgent that this territory be restored to the traditional inshore fishers, who have been literally expelled from it over the past 30 years by unbridled industrial fishing, conceived without judgment or qualification by technocrats eager for the big industrial push which over the years has translated into a series of stock collapses, the last one being that of cod, which has cost the Canadian population over $2 billion.

Unfortunately, a good many senior technocrats are still involved in the fisheries, and they defend this industrial model despite the fact that it has been synonymous with ruin and desolation, not only in Eastern Canada but throughout the world.

Time is pressing: it is legitimate for the inshore fishers to hope to one day be able to make a decent living and to leave something to their descendants.

In this regard, the inshore fishers share the concerns of the FAO (UN) with respect to small-scale fishing (see Appendix V).

They also consider themselves the victims of an unspeakable injustice in being the only ones not to have obtained renewed access to the inshore resources along the Gaspé and Acadian coasts, access of which they have literally been stripped by industrial fishing and its supporters. For snow crab, for example, all the other regions of the Gulf have obtained this inshore access, the last two being Gaspé North (1994) and the west coast of Newfoundland (1994).

APPENDIX III

PILOT PROJECT TO CREATE AN INTEGRATED FISHERIES RESOURCES HARVESTING AREA

NATURE OF THE PROJECT

This pilot project involves the development, within the framework of a five-year partnership (co-management) agreement starting January 1, 1999, of a new sustainable model for the management, harvesting, conservation and development of all fisheries resources available and accessible to inshore fishers and Aboriginal people adjacent to the integrated management area proposed in Appendix I.

A multi-species approach to inshore fisheries is to be developed, based on the professionalization and accountability of inshore fishers and Natives for their ancestral fishing grounds.

In the proposed territory, this means a return to a versatile model of inshore fishing that is sustainable (ecological) and cost-effective (economical), a model which on the one hand offers several centuries of solid guarantees that the environment and resources will be respected, and which on the other has been sufficiently modernized over the last three decades to offer legitimate guarantees of supply for the processing sector.

The balance sheet on 30 years of industrialized and specialized fishing speaks volumes about the lamentable failure of this formula, which over the years has been characterized by the successive collapse of most of the Gulf of St. Lawrence stocks, closure of a series of processing plants, and the massive complementary mobilization of government social programs funded by Canadian taxpayers: one need only mention, for example, the collapse since 1970 of our stocks of herring, redfish, crab, turbot, cod, hake, etc.
In the present difficult socio-economic context in Canada, there is no longer any place for a fishing industry which, using resources that belong to all Canadians, creates rich industrial fishers (crabbers and shrimpers) on the one hand, and on the other poor fishers who are supported by social programs.

Neither is there any place for an excessively specialized fishing industry that creates short-term fishery activities such as crab (about 7 weeks), lobster (10 weeks), groundfish (10 weeks) and pelagics (5 weeks), specialty fisheries that are able to survive only because of massive backing from social programs, notably employment insurance.

It is becoming urgent to make the necessary change in direction and to allow access to versatility, in both harvesting and processing; this alone can stabilize the fishing industry and make it cost-effective by letting it operate throughout the annual period when the Gulf is ice-free.

APPENDIX IV

PILOT PROJECT TO CREATE AN INTEGRATED FISHERIES RESOURCES HARVESTING AREA

OBJECTIVES

The basic objective of the pilot project is to aim for a sustainable, viable and profitable balance between the number of inshore fishers working the proposed integrated area and the sustainable fisheries potential of that area.

The secondary objectives which seem to us essential in pursuing the primary objective are to strive for the following:

• **Versatility**, to allow inshore fishers access to a range of resources (shellfish, groundfish and pelagics) sufficiently diversified so that they can practice their profession for the longest possible yearly period in a context of security, stability and profitability much more effective than now possible under the industrial model based on specialization. Only the versatility proposed by the pilot project can offer inshore fishers legitimate alternatives in the event of a collapse in market prices or in a resource, for example. In the recent past, the current industrial model has had no options to offer apart from massive recourse to government protectionism financed by Canadian taxpayers.

• **Equitable sharing of available, accessible resources**, which will allow, always on the basis of long-term equilibrium, the greatest possible number of fishers, crewmen and plant workers to earn a decent living from the rational harvesting of fisheries resources belonging to the Canadian people, in coastal areas where there is often no other industry to offer a worthwhile alternative to workers and fishers who are deemed surplus. The resources presently available can be augmented by underutilized species and species with farming potential.

This objective of maintaining the highest possible number of viable jobs is precisely that of the pilot project, contrary to the present industrial model which is characterized by a concentration in the hands of a few big overspecialized industrial fishers of enormous capital and highly advanced technology which afford little room for harvesting labour and cause considerable damage to the marine environment and marine species.

For all practical purposes, if DFO wants to make the 500-odd industrial fishing vessels now cruising the Gulf cost-effective so as to maintain and stabilize the technocratic industrial model that has been imposed for 30 years, it will have to concentrate all resources in their hands and wipe out about 7,000 inshore fishing units and some 18,000 related jobs. Such an attitude on the part of DFO is no longer justifiable.

• **Social peace** between inshore fishers and industrial fishers, by assigning each fleet its own grounds, thereby avoiding the confrontations that have been ongoing for more than 30 years and are intensifying as resources become scarcer due to industrial overfishing.
The tension in the Gulf has reached fever pitch with the announcement of the signing of the snow crab co­management agreement in July 1997. The inshore fishers fear that the government is capitulating to the lobbying of the rich and powerful crabbers and shrimpers, the grave and immediate consequence of which will be the death-knell of the inshore fishery and a match to the powder keg.

Only the acceptance of this pilot project will maintain a light at the end of the tunnel, and avoid a veritable social explosion in the communities concerned.

APPENDIX V

PILOT PROJECT TO CREATE AN INTEGRATED FISHERIES RESOURCES HARVESTING AREA

SMALL-SCALE FISHERIES

Almost 50 percent of total world landings are estimated to come from small-scale capture fisheries, and most of this production is used for direct human consumption. The small-scale sector employs many more people than the other fisheries sectors (although the catch per person employed is much less than for those employed in other fisheries) and many communities rely solely on fisheries for their existence. Against this background is the fact that coastal fisheries, most commonly exploited by the small-scale sector, are generally overfished in most parts of the world. The reasons for this include the lack of assured access to stocks, the inability to fish further offshore, and the interaction with industrial fishing fleets operating illegally too close to the shore. Small-scale fisheries are also under threat from other users in the coastal zones and they are perhaps the first to be affected by land-based pollution and other changes in the coastal area.

More recently the small-scale sector has come under threat through legislation enacted in favour of recreational users of the aquatic environment and this has had an adverse effect on small-scale fisheries in some small island developing states (SIDS).

FAO has advocated an integrated approach to small-scale fisheries conservation and management, not only within the fisheries sector itself, but also within coastal area management schemes. Better and safer craft for more advanced artisanal fisheries have been developed, appropriate fishing gear has been introduced and, in order to acquire new tools as well as to assist in marketing, institutional credit programmes have been promoted (with promising results in some parts of Africa and Asia).

Notwithstanding the progress made in enhancing fisheries conservation and management in coastal areas, competition for fisheries resources with industrial fleets and the lack of effective MCS mean that inshore fisheries will remain under threat. The situation is a matter of primary concern because of the impact that this unsustainable use of coastal fisheries resources has had on food security among highly vulnerable and very often impoverished communities.

Small-scale fisheries require the support of fishery managers, and they need assured access to areas that should be out-of-bounds to all other users. This requires strengthened MCS systems. Furthermore, in cases of coastal navigation practices and, where they exist, vessel traffic separations, as well as the avoidance of sensitive areas, there is an urgent need for close cooperation with other international agencies to ensure that the priorities for small-scale fisheries are given proper consideration.

Traditional approaches to fisheries conservation and management

The difficulties associated with transplanting current fisheries conservation and management concepts and systems to developing states have encouraged renewed interest in some of these states to build on traditional (or community) fisheries conservation and management practices. Among many indigenous communities communal control over access to fisheries resources, as well as the use of a range of conservation-oriented measures in coastal fisheries, operate to ensure sustainability.
With the advent of rapid social change, population increases, urbanization, the rise of commercial opportunities for sales of fish and fisheries products, and the introduction of more effective mobile gears, these traditional management systems have come under extreme pressure and have, in some cases, started to disintegrate. However, the merits of fostering community control over vulnerable coastal fisheries are apparent and, given the mixed results that have been achieved with other conservation and management approaches, traditional management practices provide a viable alternative, in some cases, for regulating the use of coastal fisheries resources.

In some industrialized states community-based systems of fisheries conservation and management are institutionalized and effectively applied (e.g., Japan). Within these systems fishermen, often together with their cooperatives, play a central role in conservation and management decisions for fisheries resources. In general, fisheries managed in this manner tend to be both resource-sustainable and economically efficient.

Excerpt from an FAO document published by the UN in 1995, entitled The State of World Fisheries and Aquaculture (pages 22 and 23).
2. Ecosystem Management of Fisheries by Mark Butler and Martin Willison

Ecosystem Management of Fisheries
by Martin Willison and Mark Butler; Ecology Action Centre, Halifax, Nova Scotia

The term “ecosystem management” can be taken to mean that we manage our activities as if ecology is a meaningful science. Unfortunately, this is not the way modern enterprises are usually conducted. Instead, it is usually assumed that engineering, political and short-term economic factors must be considered first, and ecological considerations are then required to be compromised in order to obtain a desired managerial outcome. Ecologists know that this is impossible to achieve, and consequently tend to be sceptics who throw up their hands when asked to struggle with the complex problems of applied marine ecology, including fisheries ecology.

In using the concept “ecosystem”, the scientist takes a systems analytical approach to understanding the marine environment. In practical terms, the observer defines the system under consideration (whether it be a bucket of seawater in a laboratory or the entire global oceans system) and then tries to understand the relationships among the living and non-living components of the natural system.

Ecosystems, however, are immensely complex, and our knowledge is very limited. Indeed, as the ecologist Daniel Botkin has pointed out recently, it is hard to model reliably anything more complex than the interaction between one living species and its abiotic environment. More complex living systems behave roughly like their notional (computer-generated) models for a short period, but always end up behaving unpredictably after a few cycles.

Although the science of ecology is far from perfect, this does not mean that we should ignore it. (Political science and economics, after all, are even less perfect!). Rather, we should make the best use of the generalizations that ecology can provide, while at the same time drawing on the observations made by marine naturalists, whether they be professionals (marine scientists) or amateurs (commonly fishermen).

Since ecology deals with the relationships among all the components of a living system, and management requires that we examine a system which is defined in space and time, the ecosystem concept is very useful. If, for example, we wish to consider the management of a fishery for Atlantic cod in the management zone 4X (southwest Nova Scotia) over a period of one year, we need to consider all the factors that might affect that population: the cod’s prey, the cod’s predators, the primary production, the state of the physical environment, and so on. If we do this, we quickly come to realize that there are connections among all the components of the “system”, including the actions of the most aggressive predator of all - ourselves. Furthermore, some actions on land, apparently separate from the marine environment, can also influence the behaviour of the system.

We have seen only too well how fisheries management can go wrong when management is considered on a species-by-species basis. Look at the pattern in many of the recent fishery collapses. When stocks were high relative to the fishing effort, a single species approach to management was relatively successful. In essence, management focused on access to a boundless resource (falsely described as “resilient” by some scientists). But once that resource became limited, the approach failed because a host of complicating cross-acting factors were overlooked, a phenomenon well illustrated by the ongoing debate among scientists and others over the causes of the collapse of Atlantic groundfisheries.

The roles played in the collapse by water temperature, fishing effort, changes in fishing methods, changes in breeding and feeding habitat, fish population biology, seals, availability of prey and competing fisheries tend to have different champions. Yet the ecologist immediately recognizes that all of these factors (as well as many unmentioned) interact - that all are important and none is constant. It makes little sense to focus intensely on one factor when all vary. It makes lots of sense to consider the system as a whole.

When fishing patterns are changed, the change is almost never introduced in the context of considering the whole system. For example, the shark fishery in Atlantic Canada (both directed and as a bycatch) was initiated without considering the impact on other species. Sharks have been heavily fished in the North Atlantic without adequate consideration of their role as predators of seals and other fish-eating marine mammals. Now, as the seal population rises, we blame the seals for eating too many ground fish while ignoring our role as an exploiter of one of the major predators of one of our competitors. It can be argued that the reason for this lack of vision is that fisheries management is conducted stock-by-stock.
Future Directions

Moving away from the present management structure will not be easy, even for those who clearly see its failings. At the present time, the system is structured to provide an estimate of total allowable catch (TAC) for any particular species in a defined area. The TAC is then divided among fishermen according to socio-economic and political considerations. If we try to insert an “ecosystem approach” into the present arrangement, the outcome is unlikely to be successful. Instead, we need to examine the failings of the management system itself, then make radical reforms to its structure. For example, James Wilson and a group of American resource economists have suggested that the quota system itself is fundamentally flawed and that there is need for a “parametric approach” to management that provides much greater local autonomy and control. This concept is compatible with the emerging discipline of ecological economics, which utilizes our growing understanding of the dynamism and local variation of natural systems.

Since it will take a long time to redevise the fisheries management system to a model geared to sustainability, it would be wise to introduce interim measures such as restrictions on damaging gears, marine protected areas, seasonal closures, and inclusion of fishermen and their knowledge in the management process. Such interim approaches must be seen as experimental; as part of an adaptive process. Most important is the need for recognition of the worldwide pattern of over-exploited fish stocks, and for a global limit on the capture fisheries. Only within the context of a new conservation paradigm can fisheries management be adapted to this new reality.

Habitat

Among the most fundamental of ecological conceptions missing from Canadian ocean fisheries management has been adequate attention to habitat. Consideration of habitat within the context of an ecosystem approach to fisheries management can be used to illustrate the general changes that might occur.

Habitat can be defined simply as an animal’s home. In the ocean, we talk about the pelagic (upper layers) and benthic (ocean bottom) realms, though this division is partly a convenience and that tends to be over-used when considering real marine systems.

Fisheries science has tended to disregard the role of benthic habitat in the life histories of groundfish, yet the structure of the bottom of the ocean is important for the feeding and reproduction of cod, and the survival of juveniles. Despite this, we behave as if the structure of the benthic component of habitat is irrelevant to the health of cod and similar bottom-feeding fish.

Little is known about the structure of benthic habitat in Atlantic Canadian waters, the relationships among its living components, and the impacts on it of fishing activities. To the ecologist taking an ecosystem approach to fisheries management, it is just common sense that before introducing otter trawling (“dragging”), there would have been thorough research on what it does to local benthic habitat. It is over forty years since this benthic-plowing activity began, and yet the first research has been conducted only recently, after systemic changes have already occurred.

The issue of otter trawling is obviously a contentious one. There has been massive investment in the technology, and many people have invested their lives in its use and management. Yet the precautionary principle embedded in Canada’s new Oceans Act legally requires us not just to be cautious in taking new actions but also to review past assumptions about what does, and does not, cause irreparable damage to the health of the ocean systems within our jurisdiction. To quote an American scientist, Peter Auster, “I am not advocating that mobile fishing gear not be used anywhere, but suggesting that perhaps we should not use it everywhere.”

If the Oceans Act is to be interpreted broadly, we must begin an open, objective, fair, and effective process to evaluate fishing gear impacts on habitat. This examination should include all fishing technologies about which there is reason for concern, such as monofilament gill nets, bottom dragging and dredging, and many other fishing gears. In some respects we are lucky in that we need not do this in a political or historical vacuum - we can examine how other leading countries with longer histories of intense impacts on the ocean, such as Norway, have dealt with this issue. Learning from each other is, after all, a successful behavioural trait well known to ecologists!

Mark Butler, Chair, Marine Issues Committee, Ecology Action Centre, Halifax
Martin Willison, Professor, Dalhousie University, Halifax
December 17, 1997

Paul LeBlond  
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Dear Paul:

Thank you for inviting us to your workshop "Towards and Ecosystem Approach to Fisheries Management." The decision by the FRCC and your committee to examine this issue certainly was timely. I would like to pass on a couple of comments for your consideration.

Taking an ecosystem approach to management must mean that fishing and other human activities do not change or degrade the structure, function or composition of the ecosystem. This means writing fishing rules that place the emphasis on controlling effort in terms of how, when and where to fish according to ecological principles, rather than on how much to fish. This necessarily means restricting technology, both in terms of when and where different kinds of gear can be used, and with respect the design of the gear itself.

Will an ecological approach be disruptive to current practices? Of course, some current practices have decimated fishery after fishery. How can a new approach be introduced without causing economic havoc? The old approach caused economic havoc for 40,000 people. How do we begin? How do we phase in a new approach?

Clearly, the priority should be placed on helping, and certainly not hindering, those initiatives that have arisen from fishermen’s organizations and coastal communities to pursue an ecosystem approach. The Bay of Fundy Fisheries Council is one example.

DFO must be willing to relinquish some control, to take some risks, to have some trust if the new approaches being developed by fishermen’s organizations are going to have a chance of working. We hope the FRCC will impress this imperative on the Minister.

The other matter I would raise with you is the necessity for your report to clearly and explicitly articulate the purpose and goals of an ecosystem approach to management. It cannot be all things to all participants in the fishery.

I trust these comments will be helpful to you in preparation of your report.

Yours truly

David Coon  
Policy Director

International Year of the Ocean  1998  Année internationale de l'océan
4. **Brief Presented to the Parliamentary Standing Committee on Fisheries**

**By Inka Milewski, President, Conservation Council of New Brunswick**

The Conservation Council of New Brunswick has spent the last three years examining the history of the current fisheries crisis in Atlantic Canada and working towards defining an alternative approach to fisheries management: one that respects fish and the communities that have been built upon these resources.

We are participating in these hearings because we believe the current analysis of what went wrong in fisheries management and what to do about it is deeply flawed. As your Committee has no doubt heard from various sectors, there are too many fishermen chasing too few fish and the solution is to impose individual transferable quotas (ITQs) on fisheries management and TAGs. One rationale for advancing this system of management is that it will help reduce the number of fishermen. ITQs are supposed to provide fishermen the means to retire from the fishery because it gives them a tradeable commodity. Under a privatized fishery, fishermen will be able to sell their right or license to fish to the highest bidder. The assumed outcome is there will be fewer people catching fish and those left in the fishery will be better guardians of the resource because they own the fish. This simplistic solution demonstrates a fundamental lack of understanding of fish and fishing.

Privatization does not and will not require quota owners to care for spawning fish, protect spawning habitat or juvenile nursery areas - the cornerstones of any fishery. Nor will it require them to change their fishing practices to avoid by-catch, high grading, or habitat destruction.

We believe there are two key reasons why just about every commercial fish stocks has been brought to its knees: 1) the current quota-based system of management, where it is assumed that fish can be counted and then managed, has failed to protect fish stock from collapse coupled with; 2) unregulated technology.

In the first instance, if fisheries management is just a matter of counting fish and adjusting fishing effort from year to year, why then have the various groundfish stocks under moratorium failed to recovery despite a cessation of fishing effort? There is a need to shift science and management effort from single-species, quota-based management to multi-species, ecosystem-based management. The inadequacy of science is directly related to the questions it is trying to answer. Management must ask new and different questions and science needs to respond. We need to see a shift from calculating how many fish can be caught to determining where, when and how fish are caught. This form of management is called parametric or ecological management. It has been argued the amount and type of information required to manage fish under a parametric system is too great and not dependable. I might just say at this point that while numerous fisheries are under moratoria, legions of scientists and technicians continue to collect large amounts of information which are used to computer models that still cannot explain why stocks are not recovering.
Fisheries Resource Conservation Council

We believe the type of information collected should be on the scale at which populations function (e.g., spawning activity, the structure of local populations, habitat). This means breaking down fish stocks from one management unit, like 4T cod or 4X haddock, to smaller units. We now know that a fish stock can be made up of many discrete populations, each with a definable set of characteristics. By identifying and monitoring these sub- or meta-populations over the long-term, we are more likely to see important trends and patterns that tell us more about the state of the ecosystem and fishery than knowing how many fish are out there. This also means that data gathering, analysis, enforcement, and management will need to be decentralized to correspond to the scale of ecological information gathered.

Second, the federal government has failed to address the role of technology in the fisheries crisis. We reject the notion of "too many fishermen". We believe there is too much technology and until technology and gear are reined in fisheries management of any sort will likely fail. Currently, the industry has the capacity to find, access, and catch every fish in the sea. A little more than a year ago the Fisheries Resource Conservation Council (FRCC) released a discussion paper and held consultations on gear technology. Instead of identifying the ecological or conservation needs of fish and developing a set of criteria for the usage, design, and relative desirability of groundfish gear that respects these needs, the FRCC placed the interests of the technology ahead of the conservation needs of the resource.

For example, the Consultation Paper on Gear Technology did not address how gear is used (i.e., the impact of groundfish gear on habitat requirements of other species), when it is used (i.e., fishing during spawning or roe fishing), and the scale of the technology. Gear should be evaluated against the ecological and biological requirements of fish. Ecological criteria means protecting energy flows in the food web which can be altered when fishing causes a species shift or shift in fish size. In this case, gear must be designed to minimize the catch of unwanted species and sizes and to limit the overall catch per trip. Biological criteria means protecting habitat for various life stages and avoiding the harvest of eggs and spawners and it requires both specialization in gear and its manner of usage. This means gear must be designed to minimize disruption of spawning areas and juvenile habitat for all commercial species not just groundfish.

As for the scale of technology, the FRCC has completely ducked the issue demonstrating the continuing policy dissonance between conservation (FRCC) and development (DFO). While the Gear Technology Subcommittee indicated it is not the FRCC's intention to recommend the banning of any particular gear type, DFO's fisheries policy has contemplated banning the least damaging most conservation-friendly groundfish gear - the hook and line used by handliners - through their current efforts to restructure the Atlantic fishery. DFO has determined that groundfish handling is not a key licence and therefore suggested its elimination. Two other conservation-oriented fisheries, herring weirs and shut-offs, have also been considered for elimination under this new restructuring.

As a result of our analysis, the Conservation Council is advocating a complete re-orientation and re-structuring of fishing management. In developing this new management structure for fisheries we have been guided by two principles: 1) Proprietary rights to the common fishery resource should be allocated to those geographic communities most dependent on it for their economic, social and cultural well-being; and 2) management of fisheries should be placed in public hands at the community level, and not privatized to individual and corporate interests. The re-structuring process begins by placing trusteeship of and responsibility for fish resources at the community level. We believe this level of management mimics or parallels the level at which ecological events/changes are more readily observed. It also allows the community to carry out
integrated management of both the resource and its environment, a necessary element which has eluded fisheries management to date. This will require the formation of new community and regional institutions.

We propose three levels of institutions to oversee fishing, conservation and habitat protection. At the community level (defined by geography and ecology) there would be an elected Community Fisheries Board with a fisheries management council comprised of fishing industry representatives as a subset; at the larger ecosystem level there would be a Bioregional Fisheries Board comprised of representatives from Community Fisheries Boards. Offshore Fisheries Boards would govern the offshore, with representation from Bioregional Boards. With a shift to community-based management, much of DFO's budget allocation for management and administration would be transferred to the new community and regional institutions.

It is difficult to fully elaborate our approach in the time allocated. We urge you to read our publication, Beyond Crisis in the Fisheries: A Proposal for Community-based Ecological Fisheries Management which outlines in more detail the role and function of each of these Boards, as well as the analysis which brought us to these conclusions.

You are no doubt thinking that re-structuring the current traditional management approach will be a lot of work and difficult. It will be. However, we believe there is no choice but to deal with these issues. Yet without this kind and scale of restructuring, we will lose more fish stocks and the communities that depend on them.
APPENDIX 7:

FRCC PUBLICATIONS
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FRCC.98.R.1 1998 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in Division 3Ps and Science Priorities Letter to Minister (March/1998)

FRCC.97.R.7 1998 Conservation Requirements for Redfish Units 1, 2, 3 and Division 3-O (Nov/97)

FRCC.97.R.6 1998 Conservation Requirements for the Scotian Shelf and Bay of Fundy Groundfish Stocks (Nov/97)

FRCC.97.R.5 1998 Conservation Requirements for Grand Banks, Labrador Shelf and Davis Strait Groundfish Stocks (Oct/97)

FRCC.97.R.3 A Groundfish Conservation Framework for Atlantic Canada (July/97)

FRCC.97.R.2 Georges Bank - 1997 Conservation Requirements for Georges Bank Groundfish Stocks (May/97)

FRCC.97.R.1 A Report on Gear Technology in Eastern Canada, Prepared by the Gear Technologies Subcommittee (March/97)

FRCC.96.TD.3 Quota Controls and Effort Controls, Conservation Considerations - A Discussion Paper Prepared by the Management and Regulations Subcommittee (Dec/96)

FRCC.96.L.2 Science Priorities Letter to Minister (Dec/96)

FRCC.96.R.2 Building the Bridge - 1997 Conservation Requirements for Atlantic Groundfish (Oct/96)

FRCC.96.R.1 Learning from History, Prepared by the Historical Perspective Subcommittee (July/96)

FRCC.96.TD.2 From Moratorium to Sustainability: Criteria for Re-Opening and Sustainable Harvesting, with Reference to Cod Stocks in Areas 3Ps, 4TVn and 3Pn4RS, Prepared by the Stock Assessment Subcommittee (June/96)

FRCC.96.L.1 Letter to the Minister; Georges Bank Haddock, Cod and Yellowtail Flounder Subarea 5Zjm (May 14/96)

FRCC.96.TD.1 Consultation Paper on Gear Technology, Prepared by the Gear Technologies Subcommittee (Jan/96)

FRCC.95.R.2 Conservation Come Aboard - 1996 Conservation Requirements for Atlantic Groundfish (Nov/95)

FRCC.95.R.1 A Conservation Framework for Atlantic Lobster (Nov/95)

FRCC.95.L.1 Letter to the Minister; Georges Bank Haddock and Cod, Subarea 5Zjm (May 19/95)

FRCC.94.TD.4 Conservation Aspects of Groundfish Gear Technologies in Eastern Canada, Prepared by the Gear Technologies Subcommittee (Dec/94)

FRCC.94.R.4 Conservation Stay the Course - 1995 Conservation Requirements for Atlantic Groundfish (Nov/94)
FRCC.94.TD.3 Some Issues Related to Seal-Fisheries Interactions in Eastern Canada, *Prepared by the Environmental and Ecology Subcommittee* (Sept/94)

FRCC.94.TD.2 Report to the Minister on Other Conservation Measures (Sept/94)


FRCC.94.R.3 Report to the Minister of Fisheries and Oceans on Greenland Halibut (Turbot) in NAFO Subareas 0, 1, 2 and 3 (June 20/94)

FRCC.94.L.1 Letter to Minister regarding Science Priorities (Jan/94)

FRCC.93.R.2 Partners in Re-building Fish Stocks for our Future - 1994 Conservation Requirements for Atlantic Groundfish (Nov. 29/93)

FRCC.93.R.1 We Must Stop Chasing Quotas Down to the Last Fish - 1993 Conservation Requirements for Atlantic Groundfish (Aug/93)

FRCC.93.L.1 Letter to Minister regarding Silver Hake (August 23/93)


The above reports can be found on our Web Page, [www.ncr.dfo.ca/frcc](http://www.ncr.dfo.ca/frcc)
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