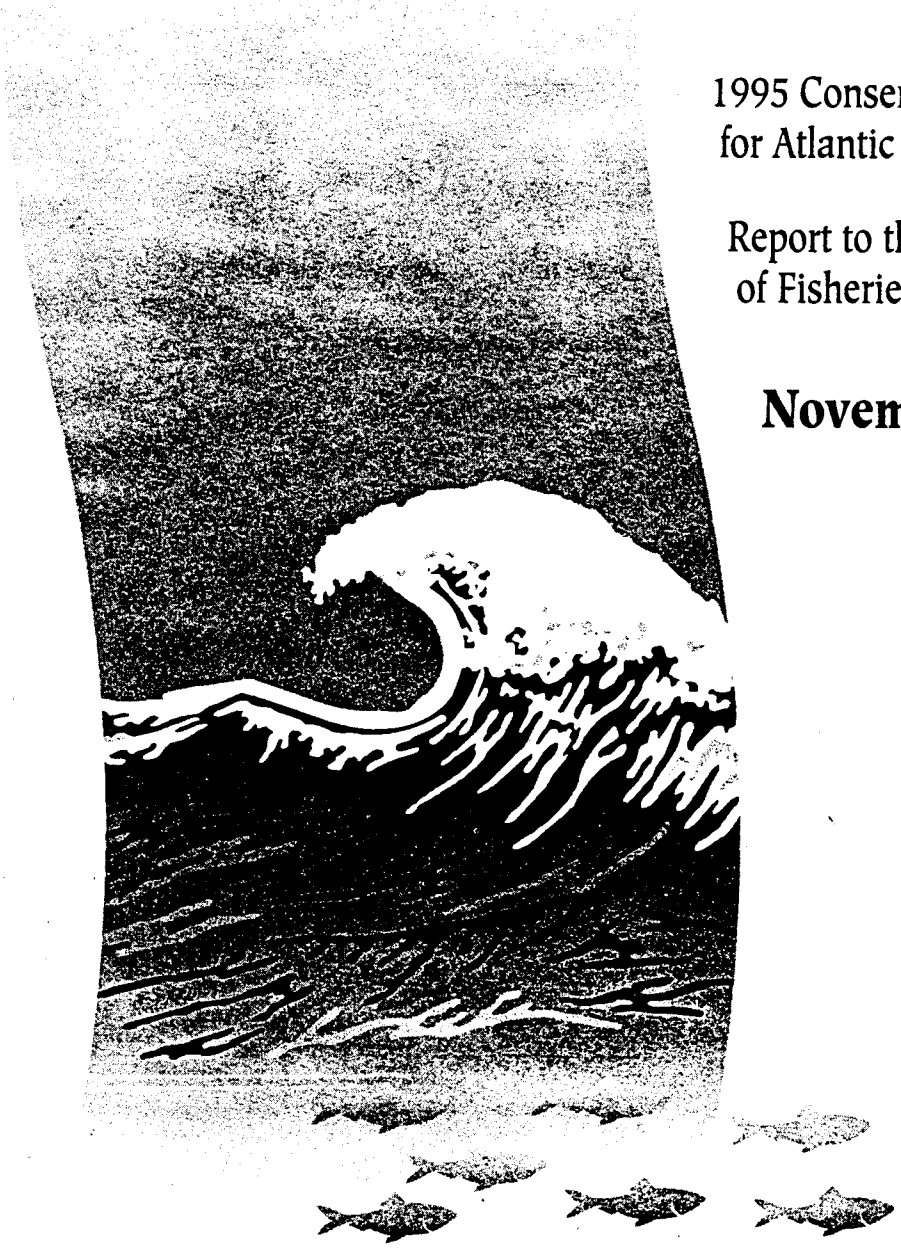
Fisheries Resource Conservation Council
Ottawa, Canada K1A 0E6

CONSERVATION
Stay the Course

1995 Conservation Requirements
for Atlantic Groundfish

Report to the Minister
of Fisheries and Oceans

November 1994



Canada

CONSERVATION - STAY THE COURSE

FISHERIES RESOURCE CONSERVATION COUNCIL

REPORT TO THE MINISTER OF FISHERIES AND OCEANS

1995 CONSERVATION MEASURES FOR ATLANTIC GROUNDFISH

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Published by:

Fisheries Resource Conservation Council
200 Kent Street
Ottawa, Ontario
K1A **OE6**

FRCC 94.R4E

Cat. No. Fs 1-61/1995E
ISBN o-662-22750-6

Aussi Disponible en Français

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1 .O Chairman's Report

The Honourable Brian Tobin
Minister of Fisheries and Oceans
House of Commons
Ottawa

Dear Minister:

I am pleased to provide you with this report of the Fisheries Resource Conservation Council (FRCC) on its 1994 activities and conservation recommendations for the 1995 groundfish season. This is the Council's third comprehensive report on conservation measures for Atlantic groundfish stocks. In its August 1993 report, We Must Stoo Chasina Quotas Down To The Last Fish, the Council documented the "critical" or precarious condition of a significant number of stocks where key biological indicators were showing a continuing and rapid decline. Given that situation and the Council's mandate for making conservation recommendations aimed at "stock rebuilding," we took the view that the first step must be to **"attempt to halt and reverse these disastrous trends."**

However, it was quite clearly pointed out there was no guarantee this could be done - even in the absence of fishing. The November 1993 report, Partners In Rebuildina Fish Stocks For Our Future, confirmed that many groundfish stocks were at their lowest levels ever recorded, outlined some new approaches to conservation and identified constraints to stock rebuilding. Both reports reflected a philosophy of "erring on the side of caution" and recommended drastic actions including the closure of many fisheries and unprecedented quota cuts in others. These recommendations were accepted by the Minister of Fisheries and Oceans and implemented by the Department.

While the diversity of Atlantic groundfish makes it difficult to speak in general terms, regretfully, we have to report that a number of stocks have continued to decline in 1994, others have stabilized, and in only a few cases, improvements over 1993 levels have been indicated. There are, however, some encouraging signals that the physical environment is becomming more favourable.

For fisheries that are closed we recommend a continuation of these closures in 1995 and, as well, we recommend closing 2J3KL witch and 4T white hake in the Gulf. We reiterate the need to continue efforts to keep by-catches in these closed fisheries to a minimum. On the Scotian Shelf we recommend reduction in the quotas of Atlantic halibut, pollock, flatfishes and 4X cod, and, an increase in 4X haddock and silver hake. Particular attention and concern is directed at the various redfish stocks, especially in the Gulf and Laurentian Channel areas (Unit 1 and Unit 2). We make recommendations to increase the scientific attention to redfish, to protect small fish and to implement seasonal restrictions on catching. In addition, we recommend a 75% reduction in the Unit 1 TAC and a 20% reduction in the Unit 2 TAC. We also recommend that research be accelerated on an urgent basis to determine the origin of the small redfish found in

Division 30 and whether or not this is an important nursery area for other management units.

We need better scientific information. The Department of Fisheries and Oceans needs to improve the reliability of trawl surveys, needs to further develop sentinel fisheries and use the resulting data and, needs to factor traditional knowledge into stock assessments. There is a growing lack of confidence in the Stock Status Report and the Department must act now to improve the knowledge base of this critically important document.

A continuing focus for the Council in 1994 was to develop, promote and follow a more comprehensive or "ecological" approach to fisheries conservation. Such an approach was recommended to you in our January document on science priorities and it has been generally well supported in the many representations made to the Council. We reaffirm our conviction of the appropriateness of this approach and our belief that good decisions can be made using common sense, coupled with available industry and science knowledge, even though we do not formally understand all the intricate details of the complex processes at work.

An ecological approach is necessary when addressing predator/prey relationships. Clearly, from the past year's experience, ensuring that groundfish resources are protected from humans is not enough. From an ecological perspective, we believe recovery of groundfish stocks will only occur when there is an abundance of food and a balance in the predator/prey relationship. The Council is seriously concerned that fishing pressure on capelin is a constraint to groundfish rebuilding. As well, the Council has concluded that early action should be taken to significantly reduce the populations of grey, hooded and harp seals to help the recovery of groundfish stocks.

The Council has endeavoured to provide an open and transparent consultative process whereby those with a stake in the fishery can have direct input into the decisions that affect them. In our consultations, we have heard varied opinions on how to resolve conservation problems for the longer term and quite frankly, the Council has been moved by the sincere and professional approach taken by many in the Atlantic fishing industry to finding long-term solutions to chronic conservation problems.

Major problems persist, however. The Council was distressed to hear about fishermen dumping their catches of certain species in order to maintain their quotas in mixed stock fisheries. This practice was acknowledged by fisheries managers who appear unable to find satisfactory long-term solutions. The Council itself could not come to grips with the serious conservation conflicts that issues such as this are causing throughout the whole area. Fostering positive conservation attitudes in all stakeholders is central to establishing sustainable fisheries. These attitudes, must be reinforced by clear, conservation oriented policies of governments which are responded to positively by industry. In this respect the Council was very concerned over a message repeated at nearly every consultation • some management policies and programs have elements which are undermining the conservation process. We have therefore reported on a

number of illustrative examples in Chapter 2 of our report and have recommended that they be reviewed by the Department in consultation with industry.

Specific mention should be made of the recreational/food fishery. Quite frankly Minister, we were wrong in our analysis of the situation in our 1993 report. While we agree that we have information we would not otherwise have had, the opening of these fisheries conveyed a message to many that conservaton was not a serious concern. For 1995 the Council believes that there should not be a recreational/food fishery on fisheries that have been closed.

For the future, a significant question which faces the Council is when and at what levels to recommend re-opening a closed fishery or when to expand the levels in an existing fishery? In September, we released a brief discussion paper, Considerations on How to Re-ooen a Closed Fishery, which outlines the draft criteria and a process for determining a "healthy" stock or an index of health. A more detailed paper will be released this fall and the Council will hold public hearings in the winter of 1995 to further consider this important issue. As a specific case study we intend to focus on the situation of the Southern Gulf, 4T+4Vn(N-A) cod stock.

Another issue has to deal with the tool-kit of conservation measures other than TACs. In September the Council released a discussion paper on this topic and is taking a serious look at a number of these potential measures including better monitoring and control of catches, appropriate level of TACs in mixed stock fisheries, effort control, fish maturity target, closed areas, and harvesting fish at optimal time of season.

I believe that the Council must be responsive, innovative and flexible in its relations with stakeholders but always cognizant of the fact that we are an advisory body • not an operational body for Atlantic fisheries, as is sometimes perceived by the industry. For certain issues, longer term solutions will likely not be possible without difficult and I expect fractious debate. We want to continually improve our process in order to foster a full dialogue with stakeholders. The use of symposia/workshops and other such fora specifically for affected fishermen and industry should help to engender appropriate discussion and consultation on sensitive issues. The consultative process to date has been invaluable to the Council and will continue to be the mainstay of its deliberations.

All parties have an important responsibility in ensuring that the new conservation ethic you speak of becomes an integral part of all policies and decisions affecting fisheries. Our objective is to rebuild stocks for a fishery of the future which is sustainable. I am optimistic that this objective can be achieved, but, to do it, we must **Stay The Course.**

Sincerely,

H.M. Clarke
Chairman,
Fisheries Resource Conservation Council

2. CONSERVATION RECOMMENDATIONS FOR 1995: ISSUES

2.1 Science. Priorities

One of the founding principles of the FRCC was a commitment by the Government of Canada to ". ..a more comprehensive approach to the conservation and management of our fisheries resources through a better understanding of fisheries ecosystems • the interaction of fish with other species, predator-prey relationships, and also changes in the marine environment, like ocean currents, water temperature and salinity."

The FRCC's 1993 reports developed this concept further and the Subcommittee on Environment and Ecology was formed to specifically focus our efforts towards that objective. In January 1994 the Council's Report to the Minister of Fisheries and Oceans on Science Priorities (see Appendix I) recommended a new approach to fisheries science consisting of the following essential elements:

- a real move be made towards an ecosystem approach to fisheries management;
- a multidisciplinary team approach be implemented in addressing fishery research questions • both in the laboratory and in the field;
- scientists study "fishing" scientifically as a system and strive to better understand the relationship between fish (resource) and fishing (fishing practices, gear technology, capacity analysis, etc.);
- a more effective role in fishery science for those with practical experience and knowledge in the fishery, and the role must be rigorous and transparent; and,
- better co-ordination in DFO between regions, between sectors and with the fishing industry generally.

The Department of Fisheries and Oceans has accepted this new approach generally and is working towards implementing it as the basis for Departmental scientific priorities.

The Council remains convinced of the appropriateness of the direction recommended in its Report on Science Priorities and of the benefits to be derived from achieving it.

2.1 .1. An Ecological Approach

The primary conservation objective of the Council is "rebuilding stocks to their 'optimum' levels and thereafter maintaining them at or near these levels, subject to 'natural fluctuations [...]". The FRCC is thus committed to recommending measures which will ensure the long-term sustainability of Atlantic fisheries.

In this perspective, fishing activity is but one element of a complex natural system which encompasses fishermens' behaviour (including technology development); the population dynamics of targeted species, as well as of their prey and predators; and the response of these species to the physical environment (temperature and salinity variations, and ocean circulation patterns).

It has become clear by now that the classical management approach, based on calculated abundances of a single species of fish by age group, is not sufficient to manage fisheries effectively. When considering long-term sustainability of the fisheries, variable factors, natural and human, must be considered if we are to progress towards an "ecosystem approach" as an alternative to the existing management approach.

However, it must be recognized that an ecosystem approach is not simple to implement. It requires building a general framework to analyze the system as a whole. More specifically, the dynamics of a group of related marine species, of which one or more may be commercially harvested, must be considered as must their relation to the overall environment and their response to natural and fishing pressures. The 'classical fishery model', with its assumptions of steady recruitment, constant natural mortality (M), constant growth, and predictable fishermen is no longer representative - if it ever was. The FRCC's Ecology and Environment Subcommittee has been exploring the issues leading to an ecosystem perspective, particularly inter-species interactions and environmental responses. Some of the more pressing challenges associated with this, especially during a period when many fisheries are closed, are discussed below. We have also singled out for special attention some inter-species interactions, namely between capelin, commercial species of groundfish and seals.

With respect to an "ecological approach", until we develop more of an empirical understanding of this complex process, we have to characterize many of the interactions in the ocean intuitively. in the face of uncertainty - good decisions can be made using common sense. We must be cognizant however, of the risks involved, but we must not be unduly fearful of proceeding down this road.

2.1.2. The Need for Better information

An ecosystem perspective will require information about an exploited fish stock, about its principal competitors, prey and predators, and about relevant environmental variables. Setting up adequate information systems will require careful thought. At this stage, however, we can already identify some areas which require attention.

The first is the reliability of scientific surveys. Both the catchability of trawls and the coverage of trawl surveys are questioned. Given the depleted fish population levels, these surveys often yield only very small samples, too small in the eyes of many to provide usable statistics on which to base stock status. In some areas, trawl surveys cannot be conducted over the whole area occupied by fish and results are therefore widely held as gross underestimates. For closed fisheries, there are no commercial catch

data to provide additional information about the stock. Lack of confidence in the results of scientific surveys has been repeatedly expressed at all of our meetings.

The current lack of sufficient scientific information on which to base detailed assessments, evident in the repeated statements of a lack of knowledge about the status and prospects of many stocks in the 1994 Stock Status Report, as well as the growing lack of confidence among stakeholders in the information presented in that report, are seen by the Council as matters of very serious concern. A combination of measures may be needed to improve the situation - but it must be improved.

Better quantitative fish counting technology, which allows rapid, broad area coverage is a continuing need in fisheries science. While such tools, of which acoustics is one, will not be developed overnight, their necessity is growing more apparent daily, in many Canadian fisheries.

Existing expertise in ocean acoustics within the Department of Fisheries and Oceans and within other government departments should be brought to focus on this problem of quantitative fish counting technology as a matter of priority.

2.1.3. Sentinel Fisheries

Sentinel fisheries were proposed in the Council's 1993 report as a means to supplement scientific surveys in the absence of commercial catches during a fishery closure. For various reasons, progress has 'been frustratingly slow on setting up these sentinel fisheries. Perhaps because of the novelty of the idea, there has been some confusion about the nature of the endeavour. We reiterate the Council's view that sentinel fisheries are not a limited opening of a closed fishery by another name. Given the economic situation, there has also been a temptation by some to view sentinel fisheries as an income supplement, which is also not their purpose. Rather, they are to be conducted with scientific aims in mind, under careful scientific control, towards providing supplementary information on stock abundance and distribution, on fish condition and food intake. Sentinel fisheries programs have to be comprehensive in nature with respect to gear types, geographical areas of coverage and season. It is important that the scientific community and the industry have confidence in the quality of information coming from this source. Further, sentinel fisheries have an important secondary benefit of involving the fishing industry directly in the scientific data-gathering process.

We reiterate the importance of sentinel fisheries; the need for a simplified procedure to implement them; the need for a sufficiently long commitment and sufficiently comprehensive coverage to ensure quality and continuity of the data obtained; and the need to develop a close rapport between sentinel fishermen, DFO scientists and managers, and the industry generally.

2.1.4. Traditional Knowledge

The FRCC has been advised, in consultations, that traditional knowledge should be taken into account in stock assessment. We have listened to many expressions of traditional knowledge, sometimes in agreement, sometimes in disaccord with the results of scientific surveys. This kind of knowledge has rarely been formally used, since there is no established framework to transform it into the stock assessment process. However, it is important, both for the sake of gathering information about the fishery, as well as for strengthening the collaboration between scientists and harvesters, to find systematic ways of using traditional knowledge. Natural scientists are not trained to handle that kind of information and are often reluctant to acknowledge its relevance.

The Council reiterates its 1994 recommendation that DFO Science develop and implement effective mechanisms to systematically collect and use information from fishermen and the commercial fishery in stock assessment. The Council repeats the need to develop closer ties between Department scientists and fishermen and suggests that if the results of scientific surveys are not accepted in parts of the community, scientists should engage in a dialogue with fishermen on the issues. We welcome in this respect a number of initiatives, including the recently formed Fishermen's and Scientists Research Society in Nova Scotia, as positive steps in that direction and urge the Department to encourage participation.

2.1.5. Focused Research

We are beginning to recognize, if not fully understand, the importance of interactions with the environment at various stages of the life history of many fish. We have learned something over the past few years about temperature preferences and oxygen tolerance in cod. We still know little on how changes in the environment influence fertility, spawning success, early survival, predator-prey interactions or adult mortality, or any other life characteristics of most stocks.

After more than two years of moratorium in large areas (eg. 2J3KL cod), scientific'surveys still do not show signs of stock recovery. Are the drastic conservation measures adopted so far insufficient? Are predators preventing recovery of the stocks? Is the environment affecting recruitment? We seem little closer today to answers from scientists to these questions which we are more than ever in need of.

We recommend focused research on the causes of the continuing low levels of fish stocks and the wide-spread lack of recruitment.

2.2. Predator-Prey Relationships

As stated earlier, the primary conservation objective of the FRCC is to recommend measures designed to "rebuild" the resource base of the Canadian Atlantic groundfish industry. It was in this context that the Council made dramatic and unprecedented recommendations to close the majority of groundfish fisheries in Atlantic Canada during late 1993 and at the beginning of 1994. These actions helped to halt the decline in many stocks and to stabilize them at low levels. Now the Council must address issues which many in the scientific community, the fishing industry and the public see as impediments to rebuilding. Ensuring that groundfish resources are protected from man is not enough. From an ecological perspective we believe the stocks can only recover if the food supply upon which they depend is abundantly available and if predators are in balance with the groundfish resources and the other species upon which they feed.

As managers, humans have not taken responsible action in the recent past; they have fished groundfish stocks to the lowest level ever observed, increased efforts to harvest "underutilized species" such as capelin and shrimp which are near the base of the food chain and, at the same time, allowed populations of grey, hooded and harp seals to grow virtually unchecked. During the Council's public consultations, the main theme of discussion was the need to "restore the balance" if any rebuilding is to occur. The focus was two-fold, firstly the species which are the primary source of food for groundfisti stocks must be protected and rebuilt and, secondly, the seal herds which have increased in abundance and are now spending longer in Atlantic Canadian waters must be reduced in number. To quote from a written presentation to the FRCC at our Plum Point meeting "[...] with the cod moratorium in effect, fishermen are no longer a primary predator of cod and in the absence of a capelin fishery this year, fishermen are not a primary predator for capelin. In this process, seals become the primary predator for both cod and capelin".

The FRCC recognizes it has to address predator-prey relationships within the larger context of an "ecosystem approach" to conservation and management. It recognizes also that the desired level of scientific advice is not available. Nevertheless, the Council is mandated to integrate the available scientific information with the practical knowledge of fishermen and, in line with its general philosophy of "erring on the side of caution", recommend actions as it considers appropriate.

2.2.1. Prey Species

The entire marine ecosystem is based upon the production of microscopic plant life in the surface layers of the ocean. This production is referred to as phytoplankton and is the base of the entire food chain. The transfer of energy from plant life to species such as cod is complex and differs among the various ecosystems.

For example, in the Newfoundland coastal zone the plant life is consumed by small shrimp like creatures called zooplankton which in turn are fed upon by various marine animals including capelin. The "redfeed" problem associated with the capelin fishery is in fact a small copepod which capelin feed heavily upon in the offshore area. Capelin are

in turn a primary food source of seals, sea birds, cod and many other groundfish species. In other words, in the Newfoundland ecosystem, capelin is near the base of the food chain and the survival and growth of the capelin resource is a very important part of the entire ecosystem.

Elsewhere, such species as herring, hake, shrimp and sand lance play a similar role. Thus, these species are the subject of great concern to the fishing industry (e.g. declining herring stocks on the Scotian Shelf) and to the FRCC in a period when many groundfish stocks are at the lowest level observed and when the observed average weight-at-age of fish is decreasing. In this environment, heavy fishing pressure on prey species is, as a 'common sense' perception, a constraint to groundfish recovery. During its public consultations in Newfoundland in the fall of 1994, the FRCC was consistently advised that the commercial capelin fishery should be closed.

Given its place in the food chain, the current low level of the capelin resource, and the concerns expressed at the public meetings it is essential that a very conservative approach be taken to capelin management. Thus, the Council's first reaction is that the commercial fishery for capelin should be prohibited until there is clear evidence of significant stock recovery.

However, prior to taking a definitive decision to **close the capelin fishery, it is recommended that DFO conduct a full consultation with the industry (groundfish as well as capelin industry) and take into account both the then most current scientific advice on capelin and the serious concern expressed by the Council that fishing pressure on this prey species is a constraint to groundfish recovery.**

Likewise, fisheries for other species which are at or near the base of the food chain such as herring and'shrimp should be evaluated in the context of their dual role; these stocks are the base of fisheries in their own right but are also at the base of a food chain upon which the majority of commercially-fished groundfish stocks are precariously perched.

2.2.2. Predators of Groundfish - Seals

Fishermen generally believe that consumption of fish by seals is one of the causes for the decline of groundfish populations in the Northwest Atlantic. Considering, on one hand, the increases in seal populations and, on the other hand, the reduction in TACs and moratoria on several groundfish fisheries, an imbalance is perceived between the amount of fish eaten by seals and the amount that may be taken by fishermen. **The FRCC has previously identified predation by seals as one of the major constraints to stock rebuilding and remains convinced that this continues to be the case.**

Clearly, the issue has to be addressed and those appearing at our public consultations unanimously urged the FRCC, in the absence of scientific certainty, to use "common sense in returning a balance to the ecosystem".

In September the FRCC released a discussion paper entitled "Some Issues Related to Seal-Fisheries in Eastern Canada" (FRCC.94.TD.1). That paper provided a review of available scientific knowledge on three main species - grey seals, hooded seals, and harp seals. Based upon available information the abundance of seals is increasing, they stay for longer periods in our waters, and they eat large amounts of fish (see Appendix II.) However, they are part of a very complex multi-species, predator-prey interaction and thus, the "impact" of seal predation on a particular prey population is not easy to quantify or predict.

A seal's diet is composed of a variety of fishes: arctic cod, herring, redfish, capelin, atlantic cod, hakes, invertebrates, for the harp seal; Greenland halibut, redfish, herring, arctic cod, atlantic cod, for hooded seals; sand lance, atlantic cod, flatfishes, herring mackerel, silver hake, squid, for the grey seal. This diet also varies seasonally.

The amount of fish consumed by seals is based primarily on estimates derived from stomach contents analyses. It appears, however, that this consumption is far from negligible: an adult grey seal or hooded seal would eat around 9 kg per day of a mixed diet; an adult harp seal would eat 5 kg per day of a mixed diet. Further, considering that the fish consumed are mainly young and small, the total number that disappear due to predation is probably well above what is allowed to be caught in commercial fisheries. This reduces recruitment potential. For grey seals alone, a recent scientific report estimated the consumption of Atlantic cod to be in the order of 40,000t in 1993 of which 17,000t was 4VsW cod. Based on the average weight of cod eaten, the 1993 consumption of 4VsW cod represents about 48 million fish or 20% of the estimated number of cod in the population. The remaining 23,000t of cod was primarily from the Gulf. Due to their larger populations, it is logical to assume that consumption of certain groundfish stocks by hooded seals and harp seals is far more important.

In addition, the 1994 Stock Status Report mentions the disappearance of a number of pre-recruited year classes that had been previously observed. Recruitment is also reported as very low for most groundfish stocks. The continuous decline of some stocks under moratorium, such as 2J3KL cod, and the decline of certain non-fished species cannot be explained by fisheries alone. Natural mortalities are likely to have increased in recent years. The precise relationship between these observations and seal abundance as compared to environmental and other factors, remains speculative. The questions, however, cannot be ignored.

What to Do

While the food requirements and feeding habits of seals is still hotly disputed, it is clear that "something" has to be done. to address this issue. At our public meetings fishermen presented a number of suggestions to the FRCC, including:

1. a major cull;

2. reducing the seal population by 15% per year until we arrive at a *balance';

4. changing DFO regulations immediately to allow:
   - an incidental harvest of seals (no season);
   - bounty for jaw bones;

The FRCC has concluded that early action should be taken to significantly reduce the populations of all three species of seals to help the recovery of groundfish stocks.

There are a number of alternate approaches to achieve this, probably varying by species. To find the most appropriate one requires more discussion and, as much as possible, consensus. The Council therefore recommends that the Minister of Fisheries and Oceans, on a priority basis, convene a special forum on this issue, with all Interested parties; that the forum consider the alternate approaches with all their implications, and develop for early implementation an action plan to achieve a meaningful reduction in the seal populations.

2.3. Foreign Overfishing

The Council understands the difficulties faced in dealing with the over-exploitation of straddling stocks on the Grand Banks by foreign 'nations and believes that significant progress is being made by the Government of Canada at the United Nations and at NAFO.

However, the ongoing effort by 40-60 vessels to harvest stocks which are at very low levels and the continuing catch of juvenile fish will continue to undermine Canada's efforts to rebuild these stocks which have traditionally supplied in excess of 100,000t of resource annually to the Canadian fishing industry.

The arrest of the "Kristina Logos" in the spring of 1994 dramatically demonstrated why Canada needed to take strong action against non-NAFO members. That vessel's catch of nearly 200t of juvenile fish included 197,000 individual cod and nearly 350,000 redfish which were sexually immature and in the 6-8 inch size range. Unfortunately, these types of activities are currently still going on- albeit at lower rates.

The Council is convinced it is essential to avoid the catch of juveniles if straddllng stocks are to recover from their precariously low levels.

2.4. Fisheries Management ▪ Conservation Concerns

Many presenters to the Council emphasized the need for a new 'conservation ethic' where stakeholders take a more responsible approach in their fishing activities and where new conservation approaches are reflected in fishery science and management.

Establishing conservation attitudes in all stakeholders is critical to establishing sustainable fisheries. These attitudes can only be fostered by clear conservation oriented policies of governments which are responded to responsibly by industry. In this respect, the Council is very concerned over **a** message repeated at nearly every consultation ▪ **some management policies and programs result in activities that are contrary to the conservation process!**

- Low trip limits in a fishery where it is common knowledge that such limits cause highgrading and/or dumping of fish. Such measures are usually put in place in an effort to extend fishing seasons.

- The 'land it all' policy in fisheries where survival of released fish is high enough to justify release. The policy has also resulted in deliberate targetting of by-catch species on the grounds that the catch could not be released.

- Many fishermen continue to act as if there is a "use it or lose it" policy in place. They are anxious about future access to many fisheries and are consequently expending funds to purchase unneeded licenses and expending effort at sea to capture fish. These activities are often uneconomical and damaging to the species in question yet they are persued in the belief that this activity is necessary in order to preserve future fishing rights.

Other management measures are clearly counter-conservation in nature and design. Some illustrative examples follow:

- The extra cod-end allowed in the gulf shrimp fishery to capture cod and halibut which would have otherwise escaped because of use of the Nordmore grate. The cod fishery is closed and the halibut stock is in trouble. These bycatches would not meet the test of being truly "incidental".

- Until recent time the lumpfish fishery has required very little management control. However, with the redirection of effort, management measures have been seen as necessary. The 100 lump-fish net maximum, designed to limit re-direction of effort, in fact, resulted in many fishermen increasing the number of nets they fished and the Council is of the view that a reduction in effort is now necessary as the stock is declining and appears to be significantly over exploited. .

- Groundfish food and recreational fisheries, where cod fisheries had been closed, were, for the first time in 1994, conducted under regulations (quite strict

ones in Newfoundland). This was in line with suggestions in the Council's 1993 report. In retrospect, quite frankly, we were wrong. These fisheries convey the wrong message in terms of conservation, particularly when juvenile fish. are taken and particularly to fishermen who are on-shore because the fishery is closed. This was most dramatically brought home to the Council at its meeting in Harbour Breton where one presenter very articulately likened tourists catching northern cod in 1994 to inviting tourists to the Arctic to kill polar-bears or to the rain-forest to cut trees. To him, it just did not make any sense.

- There has been tremendous pressure from groundfish fishermen to access new fisheries - new -licenses for lucrative fisheries such as snow crab, lobster, shrimp and scallops - exploratory permits and the like for sea urchins, skate, monk-fish, rock crab and lumpfish. We have no formal knowledge of the stock status of these latter species but the general perception is that they are, or soon will be, over exploited! What is particularly at cross purposes to conservation is that some of this pressure is motivated or generated by incentives in financial assistance programs for fishermen to increase revenue from the sea.

- Sometimes the transfer of licenses rejuvenates latent effort and, in the view of many fishermen, is an affront to conservation.

The Council recognizes the tensions and sensitivities within the current environment. Nevertheless the Council recommends that the Department systematically review these management initiatives, and any new ones contemplated, with industry to ensure that, working together, the conservation effects are maximized

2.5. Other Conservation Measures

In September 1994, the FRCC released a discussion paper entitled "Other Conservation Measures" (FRCC.94.TD.3). That document outlined six possible Conservation Measures:

- Better Monitoring and Control of Catches;
- Appropriate Level of TAC's in Mixed Stock Fisheries;
- Effort Control;
- Fish Maturity Target;
- Closed Areas; and,
- Harvest Fish at Optimal Time of Season.

These measures were put forward for consideration and, in particular, for evaluation in terms of effectiveness from a conservation point of view as well as in terms of practicality of "implementation" and "enforcement" from a fishery management point of view.

During our fall consultations the Council was impressed with the number and quality of detailed analysis and commentary on these measures in relation to specific stocks or areas. In other cases we were informed, that because of the potential significant implications of some measures, there was a need for more time and perhaps focussed consultations and/or workshops.

The FRCC will be pursuing its evaluation of these other conservation measures over the coming months. In the meantime, the Council urges the Department of Fisheries and Oceans officials, together with industry groups, to continue to evaluate the feasibility of these measures as conservation tools to be used in conjunction with TACs and to develop suitable implementation plans for specific fisheries.

A specific case in point is the use of a 'closed area' as a conservation tool. Where used to date, closed areas have been established principally to protect spawning or juvenile fish of a particular species - rather than being based on conservation of the ecosystem. However, numerous presentations to the Council have recommended the use of "Marine Protected Areas", MPAs, or "Marine Conservation Areas", MCAs, in the broader sense in line with the Council's mandate and ecosystem approach to fisheries conservation.

The term "Marine Conservation Area" refers to any region of the ocean in which fishing and other human activities are prohibited or restricted. Such measures are implemented to accomplish one or more of: (a) protecting spawning grounds, (b) protecting areas in which. juvenile fish congregate or, (c) providing a sanctuary -- an untouched part of the marine habitat and ecosystem -- in which juvenile and adult fish, together with other forms of ocean life, exist in an unexploited environment. While in any given situation,. the success of Marine Conservation Areas is difficult to either "prove" or "disprove", there is growing evidence of acceptance in many parts of the world.

The FRCC believes that there is a need to protect special areas as part of future management and therefore, the use of Marine Conservation Areas is a tool to be considered.

3. CONSERVATION RECOMMENDATIONS FOR 1995: STOCK-BY-STOCK

3.1 General

Minimizing By-catches

In its November 1993 report to the Minister, the FRCC reiterated that "management measures must be taken to ensure that by-catches are truly incidental and kept to an absolute minimum and that conservation must take top priority in setting allowable by-catch levels."

For some stocks where the Council recommended that "there be no directed fishery", it also recommended that "by-catches be limited to 500t," e.g. haddock, pollock and American plaice in 3Ps. For others, it recommended that "by-catches be kept to the lowest possible level," e.g. cod in 4Vn(M-N), 4VsW and 3Pn4RS. The 500t by-catch limits recommended for 1994 were intended as "maximums" or "upset limits" but were interpreted by some in industry as being by-catch allocations and, in practice, as by-catch targets.

For 1995 the FRCC is recommending for certain stocks that these by catch limits be lowered to 1 00t to better reflect the realities of the local fisheries and to further assure the protection of species under stress.

RECOMMENDATION: The FRCC continues to be concerned about by-catch controls and recommends that:

1. **by-catches be truly incidental and kept to an absolute minimum;**

2. **all target fisheries be closed when the recommended "upset limit" for by-catch is reached.**

TACs and Catches

It should be noted that the catches outlined in the various tables on TACs and catches are "preliminary" for the more recent years(1992-1993). These were updated since last year and this explains any differences between the figures in the FRCC November 1993 report and this report.

The catch information provided for 1994 is based on an estimate of catches as of October 26, 1994.

3.2 Stocks of Labrador, Northeast Newfoundland Shelf, Grand Banks and Southern Newfoundland

3.2.1 Ecosystem Overview

General features

Generally, water masses in this area move southward as the Labrador Current, one of the largest movements of cold water in the North Atlantic. One branch of this current hugs the coastline, while another moves along the edge of the continental shelf. Freshwater runoff originating from Hudson Bay and the rivers of Labrador greatly influences the general characteristics of the water in the Labrador Current.

The Labrador Current consists of three layers. A surface layer, to a depth of 40m, varies greatly in temperature and salinity with the seasons. The extent and the duration of ice coverage in winter may change both the salinity and the temperature of this layer from year to year. The Cold Intermediate Layer (CIL) ranges to a depth of 150 - 200 m. Its temperature may vary several degrees, due to movement of the water masses and mixing with the surface layer in winter. This means that a cold winter may reduce the temperature of the CIL. The bottom layer is warmer and more saline than the upper layers and is preferred by the cod.

It has been suggested that the water in the CIL of the Labrador Current may create a thermal barrier preventing fish movement, especially by cod, when its temperature is too low. The position and the extent of the CIL may fluctuate quite extensively from year to year.

The southern area of the Grand Banks is also influenced by the relatively warm offshore slope waters to the south and occasionally by the Gulf Stream, which brings warmer waters from the south. For this reason, cod in this area grow faster than cod from northern areas. The St. Pierre Bank area is influenced by incursions of cold water from the Labrador Current, water coming out of the Gulf of St. Lawrence, and by warmer water from the offshore slope waters.

Recent trends

In many ways, ocean climate conditions in 1993 resembled those in 1992, with near record cold air temperatures persisting in the coastal region of the Labrador Sea. Ice coverage was near the long term maximum during the first three months and persisted longer than normal during the spring. The areal extent of the Cold Intermediate Layer remained above normal: during summer, it increased compared to 1992 and, in the fall, there has been a steady increase since 1991. In 1993, the CIL area over Hamilton Bank was still above normal but had decreased from the 1990 peak value. Air temperatures were below normal throughout the year except in late summer. Off St. John's (Station 27), the ocean temperature was, in 1993, again below normal throughout

3.2.1 Ecosystem Overview (continued)

the water column, continuing the trend observed in 1992. However, in the fall of 1993, the temperatures of upper layers were near normal in inshore areas of Newfoundland, which is an improvement from previous cold years.

In 1994, cold air temperatures experienced in Atlantic Canada during the winter had moderated to near normal conditions in late spring. The rate of ice retreat in the spring was much more rapid than in the previous three years. At Station 27, positive temperature anomalies were observed at the surface (0-30m), although deeper waters were still marked by negative temperature anomalies. **In general, the surface temperature in July over most of the Grand Bank, northeast Newfoundland Shelf and southern Labrador Shelf were near the long term average. In 1994, the CIL area was about 7% above normal, compared to 28% in 1993 and 88% in 1991. In 1994, the moderation of cold water temperatures experienced coincided with a modest but nonetheless noticeable return of squid off Newfoundland (first significant landings since 1983).**

Harp and hooded seals are important predators of fish. The production of harp seals on the Front, off Labrador and northeast Newfoundland, was estimated at 470,000 pups in 1990. The total population of harp seals in the northwest Atlantic (Front and Gulf of St. Lawrence) was estimated to be about 3 million animals in 1990 and it has likely been increasing. The results of an aerial survey of both harp and hooded seal pup production made in 1994 are being analyzed and new estimates will be available early in 1995.

General stock trends

The groundfish fisheries along the Labrador and east coasts of Newfoundland exploit three main species groups: the gadoids (essentially cod in this area), the flatfishes (American plaice, yellowtail flounder, witch flounder, Greenland and Atlantic halibuts) and the others consisting of species such as grenadier and redfish.

Most of the groundfish stocks are in a very critical situation, perhaps even collapsed. For the Northern Cod stock, which was the largest cod stock of the Northwest Atlantic and where the fishery has been closed since July 1992, the biomass continued to decline in 1993 and was estimated to be only 3% of that of 1990. It seems, however, that the whole ecosystem is following the same trends, as massive downturns have been noted for both fished and non fished populations. Fishing pressure alone cannot account for this and other factors such as predation and ocean climate are considered to be involved. The distribution of remaining fish has changed and fish are found at greater depths than observed in the past. Stocks of American plaice, witch flounder and cod present the lowest abundance ever recorded, too low to allow directed fisheries to occur. Redfish stocks remain in a precarious situation. As recruitment does not yet show any sign of improvement, a strong recovery of these fisheries cannot be anticipated in the foreseeable future, although there are some signs that environmental conditions are getting more favourable. Greenland halibut (turbot) is declining.

2.0 Ecosystem Overview (continued)

Since 1990, there has been a major disruption of the capelin biological cycle, as evidenced by the small size and the late arrival of capelin on the spawning beaches. Herring stocks have been characterized by relatively low recruitment with a few years of occasional good recruitment. Since the 1960s, the strongest year-classes for herring have been those of 1968 and 1982.

Lobster landings have shown the same upward trend in the past decade as in other Atlantic regions, although the increase has not been so pronounced. Landings peaked in 1992. Data are not available for 1993 and 1994 but preliminary information suggests a decline in most areas. Shrimp landings from Newfoundland and Labrador stocks have increased steadily over the past 15 years and fishable concentrations of shrimp have been found over a much wider area than previously. Landings of snow crab in recent years have been much higher than the long term average over all areas where this species is found, but it appears that landings may decline over the next several years as recruitment decreases.

3.2.2 Stock-by-Stock Recommendations

3.2.2.1 Cod - 2GH

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000.	1,000	1,000
Catch	1,500	500	500	100	500	400	400	0	0	3	0'

*As of October 28, 1994.

The TAC for this stock was reduced in 1993 to 1,000t from 20,000t in 1992. A survey in the autumn of 1991 provided a very low estimate of biomass. Any recovery of this stock may be linked with events in neighbouring cod stocks (Divisions 2J3KL and West Greenland), both of which are at very low levels at present.

All indications from fishermen indicate that there have been very few cod in 2GH in recent years; The shrimp and turbot fisheries in 'this area have reported no significant cod by-catch..

In November 1993, the Council recommended that, as a precautionary measure, the 1994 TAC for 2GH cod be set at 1,000t. There is no scientific or fisheries data to support a commercial fishery on this stock.

RECOMMENDATION: The Council recommends that should any directed fishery be contemplated for 2GH cod, it be carried out within the framework of a scientifically coordinated test fishery and a nominal amount of 200t be provided for these purposes.

3.2.2.2 Cod - 2J3KL

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	266,000	266,000	266,000	256,000	266,000	235,000	199,262	190,000	Mora-torium	Mora-torium	Mora-torium
Catch	232,500	231,300	251,500	235,000	268,700	253,400	218,700	170,900	43,700	11,400	955

*As of October 26, 1994 (includes estimate for commercial by-catches and recreational fishery).

Recent assessments show that this stock continues to be at a very low level, probably the lowest level of abundance ever experienced. The research survey data available suggest that there has been a further decline in 1993: survey biomass estimates were extremely low and no cod were caught older than age 9, an indication that the spawning biomass is extremely low. The survey age structure has changed in recent years with younger cod (age 4) predominating, as opposed to ages 5 and 6 in the 1980s. Adverse environmental conditions and increased predation are having an adverse impact on recruitment and the growth of young fish. Year-classes of the late 1980s and early 1990s have all been estimated to be weak. Stock recovery in terms of total and spawning stock biomass is not possible in the next 5-7 years and cannot begin until there is production and survival of large numbers of new recruits.

In a survey conducted in 1994, the index of abundance of cod born in 1994 was much higher than in previous years. While this is a positive sign, the survival of young fish in their first year is **a** key factor in determining the strength of a year class. If these fish survive, they will be recruited to the groundfish surveys within a few years and scientists will then be able to use these surveys to provide estimates of abundance for that year class.

In November 1993, the Council recommended that the moratorium on fishing for **2J3KL** cod be continued in 1994. The Council also recommended that strict limits be placed on "food fisheries" to ensure that they were truly for personal consumption. Such a restricted fishery was implemented for four **2-day** periods for a total of eight days fishing. During these eight days the total amount of cod taken was in the range of 300t. By-catches from other fisheries are estimated to be less than **100t.**

Based on this, fishermen reported that fish are scarce, small and in poor condition. Fishermen and other industry stakeholders appearing before the Council said that they believe seals are decimating the remaining cod stock and that the large and ever increasing population of seals represent the single most important impediment to stock rebuilding. Concern was expressed regarding foreign fishing. Further, there was overwhelming support for the establishment of sentinel fisheries to provide needed information to complement research surveys and for the integration of traditional ecological knowledge in stock assessments; there was an overall consensus for terminating the recreational food fishery for the moratorium period and to have no capelin fishery until the cod stock recovers.From a conservation perspective, it is clear that given the continuing decline and continuing poor recruitment, there should be no fishing on the northern cod stock. Furthermore, the biomass is at such a critically low level that we

3.2.2.2 Cod - 2J3KL (continued)

must recognize that seal predation is having a negative impact on stock recovery. We must also continue to be vigilant in protecting this stock outside 200 miles on the Nose of the Grand Bank from foreign fishing. Issues regarding recreational/food fisheries, seals, capelin, foreign fishing and sentinel fisheries are addressed elsewhere in the main body of the report.

RECOMMENDATION: The Council recommends for 2J3KL cod that the moratorium on fishing be continued in 1995; that, no recreational/food fishery be permitted; and, that a broad based sentinel fisheries program be implemented.

3.2.2.3 Cod - 3Ps

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	33,000	41,000	41,000	41,000	41,000	35,400	35,400	35,400	35,400	20,000	Mora-torium
Catch	37,000	51.400	57,300	57,300	43.400	39,500	41,300	43,100	31,500	14,900"	500'

*As of October 26, 1994 (includes estimate for commercial by-catches and recreational fishery).
"Closed in September 1993.

The 1994 Stock Status Report indicated that the stock abundance continued to be at its lowest since 1978.' The 1987 year class has declined and although the 1989 year-class is still relatively strong, there is no indication of strong year-classes since that time. Research surveys have shown a marked decline in stock size since 1988, with estimates in 1992, 1993, and 1994 approaching the lowest level seen. The numbers of older fish (ages 6+) found during the surveys have declined, lengths at age are decreasing, particularly for older ages, and both males and females are becoming mature at a younger age. The relatively strong 1989 year-class will begin to contribute to the spawning stock in 1995. However, as there are no indications of good recruitment thereafter, additional good year-classes will be required to promote stock rebuilding.

Based on the Council's recommendation, the fishery was closed in September 1993 despite protests and different views expressed by some fishermen. The survey area was expanded into parts of Placentia Bay to address reports from inshore fishermen suggesting an increase in abundance of fish in the bay. As well, changing the timing of the regular surveys from February to April in 1993 and 1994 appears to have reduced the possible effects of mixing with adjacent stocks. Nevertheless, the 1994 survey results confirm the results of the 1993 survey, indicating that the stock abundance is at the lowest level since 1978.

Originally, the Council had stated its intent to review the results of the April survey and to make further recommendations for 1994. However, such a review was made unnecessary when the fishery was closed by the Minister of Fisheries and Oceans for the whole year.

The recreational food fishery was closed in September after four 2-day periods. Estimated catches were in the order of 100t-200t and fish were larger than in other areas. By-catches from other fisheries (primarily redfish) are estimated to be less than 300t. Although there is general agreement on the low level of the stocks, suggestions from fishermen varied from continuation of the closure to a limited hook and line fishery with a very low TAC to allow for stock rebuilding. As well, the Council received recommendations that traditional ecological knowledge be integrated in stock assessments, that DFO establish sentinel fisheries and that no recreational food fishery be permitted until stocks rebuild.

3.2.2.3 Cod - 3Ps (continued)

RECOMMENDATION: The Council recommends 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 recommends that efforts be made to expand surveys into inshore areas; that no recreational/food fishery be permitted; and, that a broad-based sentinel fisheries program be implemented.

3.2.2.5 Haddock - 3Ps

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	....	....	....	150	2.200	3,200	3,200	3,200	3,200	500	500"
Catch	2,800	7,500	5,400	2,700	2,400	2,900	1,500	500	500	100	10'

'As of October 26, 1994.
**By-catch limit.

The TAC was reduced to 500t for 1993 following recommendations from scientists that the TAC of 3,200t was too high and that the fishery should be limited to a by-catch fishery with a precautionary ceiling of no more than 500t. The 1994 Stock Status Report gives no indications of any stock increase for 1995.

In November 1993, the Council recommended that there be no directed fishing for the 3Ps haddock stock in 1994 and that by-catches be limited to 500t. Reported catches in 1994 have been minimal, reflecting the closure of the 3Ps cod and American plaice fisheries.

RECOMMENDATION: The Council recommends that there be no directed fishing for 3Ps haddock in 1995 and that by-catches be limited to 100t.

3.2.2.6 Pollock - 3Ps

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	-----	-----	----	1,500	5,400	5,400	5,400	5,400,	5,400	800	500**
Catch	1,800	2,300	7,600	5,100	4,300	3,300	2,000	1,300	500	100	14'

*As of October 26, 1994.
**By-catch limit.

The fishery in the mid-eighties was conducted on a single year-class and the biomass has been declining since 1986 as this year-class **was** fished out. The fishery was reduced from a precautionary quota of **5,400t** in 1992 to a by-catch fishery in 1993. There are very few pollock left in **3Ps.**

In November 1993, the Council recommended that there be no directed fishing for the **3Ps** pollock stock in 1994 and that by-catches be limited to 500t. Reported catches in 1994 are minimal.

RECOMMENDATION: The Council recommends that there be no directed fishing for 3Ps pollock in 1995 and that by-catches be limited to 100t.

3.2.2.7 Redfish - 2+3K

Year											
TAC											
Catch	ACYearCatchtons1984	35,1008,200 1985	35,1007,000 1988	35,1008,500 1987	35,000 1988 8,800	35,000 1989 3,200	5,000 1990 200	20,000 1991 339	20,000 1992 15	20,000 1993 2	1,000 1994 9*

*As of October 28, 1994.

The 1994 Stock Status Report, indicated, as did the 1993 report, that this stock is at a low level due to poor recruitment. There has been no substantial recruitment since the year-classes of the early 1970s. The surveys in Divisions 2J and 3K since 1981 indicate that the biomass is at historically low levels. The stock is expected to continue to decline until good recruitment takes place and prospects for the fishery will not improve until 8-l 0 years after that time.

In 1993, the Council observed that the 1992 TAC of 20,000t was clearly too high and recommended that, as a precautionary measure, the 1994 TAC for the 2+3K redfish stock be set at 1,000t. There has been practically no fishing during 1994, nor is any expected. There is no scientific or fisheries data to support a commercial fishery on this stock.

RECOMMENDATION: The Council recommends that should any directed fishery be contemplated for 2+3K redfish, it be carried out within the framework of a scientifically coordinated test fishery and a nominal amount of 200t be provided for these purposes.

3.2.2.8 Redfish - 30

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	20,000	20,000	20,000	20,000	14,000	14,000	14,000	14,000	14,000	14,000	10,000
Catch**	10,000	12,900	11,100	27,200	34,800	13,300	14,200	8,300	14,300	15,700	1,610*

*As of October 26. 1994. **Includes surveillance estimates outside the Canadian zone

The 1994 Stock Status Report indicated that estimates of biomass from the research surveys have increased steadily beginning in the fall of 1992. However, the stock appears to be mostly comprised of small, immature fish. The lack of changes in the size distribution during this period of increase suggests that the increase in biomass may be related to fish migration at certain sizes. Given the predominance of young fish in the area, a fishery is likely to capture mainly immature fish.

In November 1993, the Council recommended, as a precautionary measure, to reduce the TAC to 10,000t for 1994.

The quota for this stock is mostly allocated to Canadian interests. However, in the past, Canadian vessels have done little fishing in this area (annual catches by Canada have been less than 700t since 1982) and the Canadian quota has generally been reallocated to foreign fleets. In 1993, the Canadian catch was 700t and the foreign catch was estimated to be 15,000t. The catch by domestic fleets for 1994 is currently between 1,500 and 2,000t with an additional 2,000t taken by non-Canadian fleets in the area outside 200 miles. Indications from Canadian vessels fishing in this area are that redfish are extremely small which should result in very little fishing effort during the remainder of 1994. Landings in 1994 are expected to be between 5,000-6,000t.

Based on traditional knowledge of small fish, some industry stakeholders believe that this area may not necessarily represent a distinct stock unit but may be a nursery area for adjacent redfish stocks of Unit 1 and Unit 2.

The Council is concerned over these uncertainties, expressed by both scientists and industry stakeholders, regarding the origin and abundance of the small redfish in this division. Consequently, while indices of abundance suggest an increase in biomass in recent years, the Council believes that a prudent approach is warranted.

3.2.2.8 Redfish - 30 [continued)

RECOMMENDATION: The Council recommends for 30 redfish that:

1. **research be accelerated on an urgent basis to determine the origin of the small fish found in this Division; whether or not it is an important nursery area for other redfish management units; and, the areas of highest incidence of small fish.**

2. **a small fish protocol be established for both domestic and foreign fleets to protect juvenile redfish;**

3. **pending clarification of the possible links with other redfish management units, the 1995 TAC be set at 10,000t.**

3.2.2.9 Redfish • 3Ps4Vs4Wfgj+3Pn4Vn (Jun.-Dec.) • Unit 2

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC**	18,000	18,000	18,000	18,000	15,000	15,000	10,000	15,000	25,000	28,000	25,000
Catch	8,100	11,500	10,800	14,000	10,700	15,400	14,800	23,500	17,300	27,100	21,250*

*As of October 26, 1994.

* TACs for 1984-1992 are for former management unit (3P).

A new management unit was adopted for 1993, based on an evaluation of available data from the fisheries and research in the area. The 1994 Stock Status Report suggests that the stock in this area is probably lower than in previous years because the year-classes of the early 1980's have been fished for about five years. Commercial catch rates have been declining since 1990. While recent surveys have detected a recruitment pulse corresponding to '1984-l 985 and 1987-l 988 year-classes, scientists believe that the contribution of these year-classes to the fishery in the future will be less than that of the year-classes of the early 1980's which the fishery currently targets.

The survey conducted in August 1994 covered most of the area in Unit 2. The preliminary trawlable biomass estimate was 254,000t (200,000t commercial-size redfish.) The estimates from 1994 are not comparable to those from previous years as different gears were used and the areas covered were not identical (due to changes in Management Units). The 1994 survey was the first to cover most of the area of the Laurentian Channel management unit for redfish. There is no evidence of year-classes since those of 1987-l 988.

In November 1993, the Council recommended that the 1994 TAC for Unit 2 redfish be reduced from 28,000t to 25,000t. This fishery is currently ongoing and it is likely that the entire Canadian allocation (24,1 00t) will be harvested before year's end.

Although there is a consensus amongst the offshore fleet that a major shift in fishing pattern has occurred (with recent fishing activity in the Stone Fence area), industry stakeholders are reporting significantly different catch rates. On the issue of stock redefinition for Unit 1 and Unit 2, some stakeholders oppose a change at this time given that the current definition is recent and changes to other fisheries have significantly affected fishing patterns. There is also a difference in views regarding the size of fish in the Stone Fence area.

Following the regular fall consultations and based on requests from stakeholders, the Council held special consultations on redfish. There was no agreement amongst stakeholders on the overall status of the stock, some were optimistic about its overall health while others expressed the need for a prudent approach and reduction in the TAC. Notwithstanding the above, there is a general consensus that this stock is in better shape than the Unit 1 redfish stock. The harvestable biomass of Unit 2 redfish leads to a calculated catch level in the order of 26,000t with 13% exploitation rate which can be considered as an approximation of $F_{0.1}$ catch level for this species. Nevertheless, the Council is concerned over the lack of understanding of redfish migration patterns and

3.2.2.9 Redfish - 3Ps4Vs4Wfqi+3Pn4Vn (Jun.-Dec.) - Unit 2 (continued)

possible links with Unit 1 redfish, especially in late fall and winter. The Council also notes that it is possible that redfish from Unit 1 may go beyond the limits of 3Pn-3Ps and 4Vn-4Vs in winter. In view of the poor state of Unit 1 redfish, we must ensure that any fishery on Unit 2 fish takes in fact fish from this Unit, and not from Unit 1. Also, it is important that industry and DFO work cooperatively to develop an understanding of the status and distribution of Unit 1 and Unit 2 redfish. The Council is also concerned over the changed fishing pattern experience in 1994 and the declining catch rates in some areas. This dispite the fact that redfish are known to be more concentrated during winter months when high catch rates may be maintained even when the stock is declining. A measure of protection should the TAC levels be too high, would therefore be to fish only when redfish are more evenly distributed. For the interim, the Council believes that a cautious approach is warranted.

RECOMMENDATION: The Council recommends for Unit 2 redfish that:

1. **current scientific work be strengthened and elaborated in cooperation with the industry so as to clarify redfish management units, as well as to better understand migration patterns and stock status;**

2. **the 1995 TAC be set at 20,000t;**

3. **a small fish protocol be established to protect juvenile redfish;**

4. **no fishing be permitted in 3Pn and 4Vn during November and December;**

5. **Fisheries and Oceans, in consultation with industry stakeholders, limit the fishery as much as practical during the January to June period.**

3.2.2.10 American Plaice - 2+3K

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	5,000	500**
Catch	1,200	800	3,000	1,100	1,000	4,200	1,800	500	100	80	74*

*As of October 26, 1994. **By-catch limit.

The 1994 Stock Status Report indicates that American plaice in 2+3K is at its lowest level in at least 17 years. Research vessel surveys show that this stock has declined by 95% from the 1980's to the present. It is very unlikely that fishing mortality has contributed substantially to the recent decline in biomass. There is no sign of good recruitment necessary to rebuild the stock and, as plaice aged 9-12 comprise the majority of the commercial catches, a recovery of the fishery is unlikely before at least 10 years.

In November 1993, the Council recommended that there be no directed fishing for 2 + 3K American plaice in 1994 and that by-catches be limited to 500t.

RECOMMENDATION: The Council recommends that there be no directed fishing for 2+3K American plaice in 1995 and that by-catches be limited to 100t.

3.2.2.11 American Plaice - 3Ps

Year											
TAC											
Catch	TAC Year Catch	1984	1	1986	1987	1988	1989				1994

*As of October 26, 1994. **By-catch limit.

This stock has declined markedly since the mid- to late-1980s and is now below any previously observed value. The number of older. fish has declined and there is no indication of increased numbers of young fish. It. is unlikely that reported catches are solely responsible for the observed decline in abundance although fishing mortalities themselves are likely to have been high in recent years. There is no sign of good recruitment and, consequently, no immediate prospects for stock rebuilding.

In November 1993, the Council recommended that there be no directed fishing for 3Ps American plaice in 1994 and that by-catches be limited to 500t.

RECOMMENDATION: The Council recommends that there be no directed fishing for 3Ps American plaice in 1995 and that by-catches be limited to 100t.

3.2.2.12 Witch Flounder - 2J3KL

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	8,000	8,000	8,000	6,000	5,000	5,000	4,000	4,000	4,000	4,000	1,000
Catch	4,800	3,000	3,900	4,500	4,200	4,900	3,600	4,000	2,300	340	10'

*As of October 26, 1994.

The 1994 Stock Status Report indicated that both the total and the spawning stock biomasses are far below any previous estimate in the 16-year time series and are considered to be at a dangerously low level. Recruitment has been poor to non-existent since the mid 1980's.

In November 1993, the Council recommended that the 1994 TAC for 2J3KL witch flounder be reduced to 1,000t as a precautionary measure.

There has been very little fishing effort expended in this area so far in 1994 and this trend is likely to continue for the remainder of the year.

RECOMMENDATION: The Council recommends that there be no directed fishing for 2J3KL witch flounder in 1995 and that by-catches be limited to 100t.

3.2.2.13 Witch Flounder - 3Ps

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	3,000	3,000	3,000	3,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Catch	500	600	1,300	1,300	600	900	1,000	1,100	1,100	1,000	310*

*As of October 26, 1994

While research surveys indicate a relative stability in biomass since the early 1980s, the estimates from the most recent three surveys are at the low end of the range of estimates for the last 16 years. Also, based on the reduction in the older aged fish in the catches, the spawning biomass has likely declined in recent years.

In November 1993, the Council recommended that the 1994 TAC for 3Ps witch flounder be set at 1,000t.

The catch to the end of September of approximately 300t is thought to reflect the difficulties experienced earlier in the year in harvesting of this species because of the incidental catch of other species which are currently under moratoria. The offshore fleet intends to harvest it's remaining allocation in this area late in the year.

RECOMMENDATION: The Council recommends that the 1995 TAC for 3Ps witch flounder be set at 1,000t.

3.2.2.14 Greenland Halibut - O-3

Greenland halibut in the northwest Atlantic (with the exception of those in the Gulf of St. Lawrence) are considered to be one stock extending from Davis Strait, south to the Grand Banks. Until 1994, the management units were SubAreaO+l and 2+3K. In June 1994, the NAFO Scientific Council recommended separate TACs for 1A, 0B+1B-F and 2+3KLMN.

In a special FRCC report to the Minister in June 1994, the Council stated that, to ensure a future for this valuable stock, Greenland halibut in Subareas 0, 1, 2 and 3 inside and outside Canada's 200-mile fisheries zone must be managed by a comprehensive conservation management plan. The fishing pressures tolerated and the conservation initiatives taken should be "precautionary" in nature and should be applied with "consistency" throughout the full range of the stock. In particular, the Council recommended that Canada:

1. Find a permanent solution to regulate Greenland halibut and to significantly reduce fishing effort and catches by foreign vessels in the NAFO Regulatory Area outside the Canadian 200-mile limit in Subarea 3.

2. Strive to limit, to the extent practical, total catches in Subareas 2 and 3 to the 25,000t maximum annual level previously recommended by the Council, until scientific evidence is available to advise differently.

3. Take immediate steps to negotiate an agreement with Greenland to reduce planned catches and ensure equitable harvest levels in Subareas 0 and 1 for both the Canadian fishery in Subarea 0 and the Greenland fishery in Subarea 1.

4. Discontinue any reference to Greenland halibut as being an underutilized or underexploited stock as it is, in fact, overexploited.

5. Initiate the required scientific activity. As a priority, DFO Science, working with scientists from other countries, should design an appropriate scientific program for this stock. Such a program would possibly include additional synoptic surveys and more timely analysis of observer and catch data from the commercial fisheries.

In particular, the Council observed that from a conservation point of view, the stock situation is alarming and is characterized by a significantly declining traditional fishery, the absence of mature individuals, and very few year classes contributing to the total biomass.

3.2.2.14 Greenland Halibut • O-3 (continued)

In June 1994, the NAFO Scientific Council concluded that a reduction in fishing effort would require that the TAC for 1995 be set well below the present catch levels. The Scientific Council recommended that a separate TAC be established for Division OB and Division 1 BCDEF, and that it be set below 11,000t for 1995. A separate TAC of 12,000t was also recommended for Div. 1A. For Subareas 2+3, they considered that any catch level above 40,000t for 1995 would not be adequate to restrict the fishery and expressed the concern that, based on some of the available stock indicators, the catch in 1995 should be substantially lower to halt the decreasing biomass trend.

On June 29, 1994, following the release of the FRCC Special Report and the completion of the work of the NAFO Scientific Council, the Minister of Fisheries and Oceans reduced the Subarea 0 (off Baffin Island) quota from 12,500t to 5,500t and cancelled developmental fisheries in Division 2GH off Labrador. On July 20, 1994, the Minister reduced the Canadian quotas from 12,500t to 3,000t in Subarea 2 and from 12,500t to 3,500t in Subarea 3 (off eastern Newfoundland).

Greenland Halibut - OB+1B-F

Year											
TAC**											
Catch	TAC**		1990				25,000	25,000			

*As of October 28, 1994.

- *TAC for SA0+1; catches are for 0B+1 B-F (in last year's report, SA0+1 were given).

In Area 0B+1 B-F, catches increased considerably since 1990, mainly in Division OB due to a new offshore trawl fishery. The survey biomass indices have declined since 1989. Catch rates have declined significantly since 1991 in Division OB and Division 1 CD. The offshore fisheries in this region are now concentrated in small areas. Both the commercial data and the survey data show a shift towards younger fish and suggest a high exploitation level. The available data from the Cumberland Sound winter fishery indicates relative stability as to both catch rates and size of fish over the past several years.

In November 1993, the Council recommended that the 1994 TAC for Subarea 0+1 Greenland halibut be set at 25,000t (12,500t for Subarea 0). In June 1994, the Council reiterated its previous advice that "the 1994 TAC for Subareas 0+1 be set at 25,000t".

In June 1994, the NAFO Scientific Council recommended that the 1995 TAC be set below 11,000t for Divisions OB and 1 B-F, i.e. below the offshore catch levels (11,000-l 5,000t) seen in recent years.

During industry consultations with the Nunavut Wildlife Management Board representatives and the Inuit of Pangnirtung, concerns were expressed regarding adequacy of research surveys in Cumberland Sound and, as well, the need for a proper hydrographic survey of this Sound was outlined. Fishermen indicated their willingness and desire to participate with the DFO scientists 'in the biological work required for this fishery. They are of the view that perhaps there is a bay stock in the Cumberland Sound, similar to the situation in Greenland Fjords. They also indicated that harp seals are much more numerous, come earlier and stay longer in the local area.

Greenland Halibut - 0B+1 B-F [continued)

RECOMMENDATION: The Council recommends for Greenland halibut in 0B+1 B-F that:

1. **the 1995 TAC be set below 11,000t;**

2. **the Department of Fisheries and Oceans evaluate the conservation merits and the feasibility of closing a spawning area in the Davis Straits;**

3. **in view of the international nature of this resource recommendation 2 be given consideration in bilateral discussions with Greenland on appropriate sharing arrangements; and,**

4. **the Department of Fisheries and Oceans Science, working with scientists from other countries, design an appropriate scientific program for this stock.**

Greenland Halibut - 2+3

Year	1984	1985'	1986	1987	1986	1989	1990	1991	1992	1993	1994
TAC	55,000	75,000	100,000	100,000	100,000	100,000	50,000	50,000	50,000	50,000	25,000
Catch	26,700	20,300	16,000	32,400	16,400	16,900	47,400	55,000 to 75,000	63,000	62,000	35,500'

*As of October 26, 1994 for Canadian catches; as of October 11 for catches reported to NAFO.

Catches increased sharply since 1989, mainly as a result of a developing fishery in the Regulatory Area in Divisions 3L, 3N and 3M. Results of Canadian surveys indicate that abundance has been declining since the mid-l 980s and, by 1993, was far below anything previously observed. Recent surveys and the fishery in Division 2J indicate that the population in this Division is at its lowest level on record. The deep water survey in Division 3KLMN in 1994 also showed, in comparison to a similar survey conducted in 1991, a sharp decline. While the abundance of older fish is declining, there is an increase of ages 2 and 3 in the 1993 survey suggesting that the 1990-l 991 year-classes are above average. These fish, however, will not recruit to the fishery under the present exploitation pattern before they reach age 6-8 years.

In August 1993, the Fisheries Resource Conservation Council called for significant reductions in catches in the Regulatory Area and for a joint commitment to appropriately address the scientific questions related to stock structure in a timely fashion. In November 1993, the Council concluded that the 1994 TAC for 2+3KLMN Greenland halibut should be reduced substantially and that catches in the order of the historical catch level of 25,000t should be a maximum level. In June 1994, the Council repeated its recommendation "that catches in the order of the historical catch level of 25,000t should be a maximum level" for Subareas 2 and 3. The Council also 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."

Preliminary estimates from 1994 suggest that catches may be as high as 52,000-62,000t. At the September meeting of the NAFO Commission, a TAC of 27,000t was agreed upon for Greenland halibut in SubArea2+3 for 1995.

RECOMMENDATION: The Council recommends for Greenland halibut in SubAreas 2+3 that the Department of Fisheries and Oceans Science, working with scientists from other countries, design an appropriate scientific program for this stock.

RECOMMENDATION: The Council continues to believe that catches in the order of the historical catch level of 25,000t should be a maximum level. The Council notes that the NAFO TAC of 27,000t for 1995 is in the right order of magnitude and that a special NAFO meeting will take place at the end of 1994 or the beginning of 1995 to determine the sharing of allocations for this management area.

3.2.2.15 Roundnose Grenadier - 0+1

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC (SA0)	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Catch	100	100	100	400	500	80	160	160	190	100	0*

*As of October 26, 1994.

Catches have been very low. The Scientific Council of NAFO reviewed the information on this stock in June 1994 and advised that the 1995 TAC remain at the 1993 level of 8,000t for roundnose grenadier in Subareas 0+1 (4,000t for Subarea 0). There has been very little fishing activity directed towards this species this year as in previous years and no change is expected.

In November 1993, the Council recommended that the 1994 TAC for roundnose grenadier in Subarea 0 be set at 4,000t.

RECOMMENDATION: The Council recommends that the 1995 TAC for roundnose grenadier in Subarea 0 be set at 4,000t.

3.2.2.16 Roundnose Grenadier - 2+3

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	3,000
Catch	3,900	4,900	7,400	7,300	5,400	4,600	800	5,000-10,000	3,000	4,400	38'

*As of October 28, 1994 (by Canada).

Based on information presented at the 1994 NAFO Scientific Council meeting, the catches previously reported by EU-Portugal to be roundnose grenadier have been re-identified as roughhead grenadiers, and about 50% of the catch of EU-Spain previously reported as roundnose is now believed to have been roughhead. Corrections have been brought to the historical data series. Since about 1989, catches from the "traditional" fishery have declined steadily and were zero in 1993. Catches from the Regulatory Area began to increase in 1992 due to by-catch by EU-Spain in the Greenland halibut fishery. The Scientific Council recommended the continuation of the 3,000t TAC for 1995.

In November 1993, the FRCC recommended that the 1994 TAC 'for SA 2+3 roundnose grenadier be reduced to 3,000t, as recommended by the NAFO Scientific Council in its 1993 report.

There has been very little fishing activity by Canadians directed towards this species this year, as in previous years.

RECOMMENDATION: The Council recommends that the 1995 TAC for SA2+3 roundnose grenadier be set at 3,000t.

3.2.2.17 Stocks in the NAFO Reaulatorv Area

The Terms of Reference of the FRCC state that "The Council may also advise the Minister on the position to be taken by Canada with respect to transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO)".

The FRCC submitted its first report to the Minister of Fisheries and Oceans on NAFO managed stocks and other stocks in the Regulatory Area of interest to Canada in August 1993, prior to the 1993 meeting' of the NAFO Fisheries Commission. That report recommended extending the moratorium on 2J3KL cod; implementing moratoria for 1994 on 3LN0 American plaice, 3LN0 yellowtail flounder, 3N0 witch flounder and 3N0 cod; finding a mechanism to limit catches of Greenland halibut in Subareas 2 and 3 to a maximum of 25,000t per year; and implementing a proper conservation and management regime for 3M shrimp.

The NAFO Scientific Council met in June 1994 to assess "NAFO" stocks and make recommendations for 1995. In August, the FRCC presented the Minister with its advice on these stocks. That advice recommended for 1995:

1. To continue the moratorium for 2J3KL cod, 3LN0 American plaice, 3LN0 yellowtail flounder, 3N0 witch flounder, 3N0 cod and 3N0 capelin.

2. To address the concerns raised by the exploitation of immature fish in the directed fisheries in the Regulatory Area.

3. To take the lead in proposing that NAFO immediately implement a cautious approach to managing 3M shrimp.

4. To take a responsible and conservation-oriented position in dealing with other fisheries which might be considered of lesser importance to Canada, such as those occurring on the Flemish Cap (Division 3M).

The FRCC notes that the recent NAFO Scientific Council Report continues to stress that many of these stocks are at or near all time low levels and that, in order for rebuilding to occur, year-classes must be protected until they are mature.

The NAFO Fishery Commission met in September 1994 and management decisions have been taken for 1995. For completeness, information on the stocks of particular interest to Canadian fishermen follows.

Stocks in the NAFO Reaulatorv Area (continued)

N0

Year	1984	1985		987	1988	1989					
TAC											
Catch											

* No directed fishery in 1994

"As of October 26, 1994 for Canadian catches: as of October 11 for catches reported to NAFO.

In recent years, catches have declined from approximately 51,000t in 1986 to 9,700t in 1993. Fishing mortality declined in 1992 and 1993 in accordance with the reduction in catches. However, fishing mortality remained relatively high on younger, immature ages. While recent assessments do not permit the calculation of absolute biomass estimates, all indices are that the biomass of this stock is near the lowest level ever observed.

In the June 1994 Report of the NAFO Scientific Council, scientists indicated that the number of older mature fish continues to decline and that this stock is now comprised mainly of young, immature fish. While the 1989 and 1990 year-classes are above average, it will be another one or two years before the majority of these fish are sexually mature. In 1993, about 3.7 million fish were caught on these year classes at ages 3 and 4. Scientists have warned that the spawning stock biomass cannot begin to recover unless the 1989 and 1990 year-classes survive to maturity. In particular, rebuilding will not happen if fisheries on immature fish continue at current high levels. The NAFO Scientific Council recommended that there be no fishing for cod in Division 3N and 30 in 1995.

In its letter of August 8, 1994 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended to continue the moratorium in 1995 for cod in Div. 3N0 and pointed at 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.

At the September meeting of the NAFO Commission it was agreed to continue the moratorium on 3N0 cod in 1995.

3.2.2.17 Stocks in the NAFO Regulatory Area (continued)

Year	n plaice - 3LN0
TAC	
Catch	Year TAC Catch

* No directed fishery in 1994

**As of October 26, 1994 for Canadian catches; as of October 11 for catches reported to NAFO.

This stock has experienced a very rapid decline in recent years and is far below its historic average. Catches, which were stable at about 50,000t during the 1970s, declined to 33,000t in 1990-l 991, and to 12,600t-17,300t in 1992 and 1993. Catch rates by Canadian vessels fishing for American plaice in 1993 were the lowest on record and were well below any observed in the 38 year time-series for this fleet.

In the June 1994 Report of the NAFO Scientific Council, scientists indicated that the abundance of American plaice in 3LN0 is estimated to be at the lowest level ever observed. Virtually all indices of stock abundance are at their lowest levels ever recorded, making stock rebuilding uncertain. The NAFO Scientific Council concluded that the spawning biomass will not improve if exploitation of recruiting year-classes continue to occur. Given the extremely low population size in 1993, the concerns with respect to the spawning biomass, and the expectation of very poor recruitment, the Scientific Council of NAFO advised that there be no fishing on American plaice in Division 3LN0 in 1995.

In its letter of August 8, 1994 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended to continue the moratorium in 1995 for American plaice in Division 3LN0. The Council also pointed at the need to address the concerns raised by the exploitation of immature fish in the directed fisheries by non-contracting parties in the Regulatory Area, as well as the suspected high and increasing by-catches of American plaice in the Greenland halibut fishery by both contracting and non-contracting parties.

At the September meeting of the NAFO Commission it was agreed to continue the moratorium on 3LN0 American plaice in 1995.

3.2.2.17 Stocks in the NAFO Regulatory Area (continued)

ail flounder • 3LN0

Year											
TAC											
Catch											

• No directed fishery in 1994

**As of October 26, 1994 for Canadian catches: as of October 11 for catches reported to NAFO.

This stock has shown no sign of rebuilding from the low levels experienced since 1988 and remains close to the lowest levels ever observed. There has also been a change in stock distribution with a contraction, as the stock declined, towards a centre on the western side of the Southeast Shoal in Division 3N. This contraction of the stock to a smaller geographic area makes it very vulnerable to overexploitation.

In the June 1994 Report of the NAFO Scientific Council, scientists indicated that yellowtail flounder in Division 3LN0 remains stable at a low level. Potential growth of the stock from the 1984-l 986 year classes has not occurred, likely because of large catches of juveniles from these cohorts by fisheries in the Regulatory Area and because the TAC has been exceeded each year since 1984. Recent year-classes (1989-1992) appear to be weaker than their immediate predecessors and are estimated to be average to below average. In view of the above, the NAFO Scientific Council recommended that no fishing be permitted on yellowtail flounder in Division 3LN0 in 1995 in an effort to rebuild this stock as fast as possible.

In its letter of August 8, 1994 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended to continue the moratorium in 1995 for yellowtail flounder in Division 3LN0. The Council also pointed at 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.

At the September meeting of the NAFO Commission it was agreed to continue the moratorium on 3LN0 yellowtail flounder in 1995.

3.2.2.17 Stocks in the NAFO Reaulatorv Area [continued)

Witch - 3N0

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	3,000*
Catch	2,800	8,800	9,100	7,600	7,300	3,700	4,200	4,800	4,900	4,400	120**

* No directed fishery in 1994
**As of October 26, 1994 for Canadian catches: as of October 11 for catches reported to NAFO.

During the mid- to late-1980s, catches exceeded TACs by large margins but have been relatively stable at the TAC level of 5,000t to 1993. Catches by Canada ranged from 2,600t to 4,300t since 1990 and were mainly from 30. The catch rates'experienced by Canadian vessels in recent years have been among the lowest ever observed. It is felt that catch rates as low as these are an indication of a seriously depleted stock.

In the June 1994 Report of the NAFO Scientific Council, scientists indicated that the biomass continues to be quite low in Division 3N and that most of the stock in now located in Division 30. There is evidence of a sharp decline in 30 since 1990 and the 1993 estimates are near the lowest observed. This observation is of particular importance since recent surveys have covered a much more extensive depth range. The NAFO Scientific Council was concerned, in particular, with with recent catch levels in Division 30 and recommended that no fishing be permitted on witch flounder in Division 3LN0 in 1995 in an effort to rebuild this stock to former levels.

In its letter of August 8, 1994 to the Minister of Fisheries and Oceans, the Fisheries Resource Conservation Council recommended to continue the moratorium in 1995 for witch flounder in Division 3N0.

At the September meeting of the NAFO Commission it was agreed to continue the moratorium on 3N0 witch in 1995.

3.2.2.17 Stocks in the NAFO Regulatory Area (continued)

Redfish - 3LN

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	25,000	25,000	25,000	25,000	25,000	25,000	25.000	14,000	14,000	14,000	14.000
Catch	14,800	20,800	42,800	79,000	53.300	33,800	29,100	25,800	27,300	24,400	2,200'

*As of October 26, 1994 for Canadian catches; as o October 11 for catches reported to NAFO.

Canadian catches on this stock have been less than 1,000t since 1991. Total catches have exceeded TACs by a considerable amount each year since 1986. All indices of abundance indicate a general decline since the mid-1980s.

In the June 1994 report of the NAFO Scientific Council, the abundance indices presented indicate that the stock is at a low level. In particular, redfish in Division 3L appears to be at a relatively low level of abundance, with the propect of continuing poor recruitment. There are signs of a good upcoming year class in Division 3N but the strength of that year class cannot be assessed at this time. That year-class will not be fully available to the fishery until the late 1990s. There is no sign of good recruitment after this. The Scientific Council of NAFO recommended for 1995 that catches be reduced and that the total catches not exceed 14,000t.

The Fisheries Resource Conservation Council made no specific recommendation on this stock for 1995.

At the September meeting of the NAFO Commission it was agreed to set the 1995 TAC for 3LN redfish at 14,000t.

3.3 Stocks of the Gulf of St..Lawrence

3.3.1 Ecosystem Overview

General features

The Gulf of St. Lawrence is a semi-enclosed sea connected to the North Atlantic Ocean through the Cabot Strait to the southeast, and the Strait of Belle-isle to the northeast. Forces acting upon the Gulf include seasonally variable freshwater runoffs, mainly from the St. Lawrence River and rivers from the Northern Shore. The water column is in three layers: a surface layer which displays large variations in temperature and salinity in response to variations in solar radiation and freshwater discharge; an intermediate cold layer resulting from winter cooling and influx of cold Labrador water through the Strait of Belle-Isle; and a deep layer of warmer and more saline water of oceanic origin penetrating through Cabot Strait and moving upstream through the wide and deep trench of the Laurentian Channel.

Recent trends

Air temperature over the Gulf of St. Lawrence was colder than normal from October 1992 to March 1993. The greatest difference from the average was recorded in February 1993 (-6°C). The cold air mass extended from Baffin Island in the north to Bay of Chaleur. As in recent years, ice coverage was greater than average in the winter of 1992-93. Generally, the thickness of the Cold Intermediate Layer (CIL) has steadily decreased over the last three years. However, on the Magdalen Shallows, the surface area where the CIL was in contact with the bottom was greater than normal for the fourth consecutive year. Water temperatures were generally colder-than-normal throughout the water column, especially in the Laurentian Channel. In the Cabot Strait, waters were much warmer and there has been a progressive warming of the 200-300m depth range since 1991. In view of the general movement of this water mass, this may indicate a warming of the deep waters of the Gulf of St. Lawrence in the future. Extremely cold temperatures were experienced in the 1993-1994 winter, however, as data for 1994 have not yet been analyzed, a comparison with historical trends is not available at this time.

General stock trends

The Gulf of St. Lawrence groundfish fishery is dominated by three species: cod north and south of the Laurentian Channel, redfish in deep waters, and, to a lesser extent, American plaice in the southern Gulf. There are smaller localized directed fisheries for: Greenland halibut in the St. Lawrence estuary and western Gulf, witch along the southwest coast of Newfoundland, white hake in Northumberland Strait, and winter flounder in inshore areas.

3.3.1 Ecosystem Overview (continued)

Based on recent information both cod stocks remain close to the lowest level ever recorded. The low catches in 1993 have arrested the decline of the southern Gulf stock, but the northern Gulf cod may still be declining. The redfish stock, which dropped rapidly in the early 1990's, continues to decline and the situation is likely to continue until a good year-class is produced. The stock of American plaice has been plagued by high levels of discarding and the stock continues to fluctuate at a low level. The abundance of witch flounder appears to be low and rebuilding is expected to be slow. The Greenland halibut stock is at a low level and is expected to decline in the mid-term as recent year **classes** are not abundant. The white hake fishery is poor with a decline in stock abundance to a very low level in 1993 and no signs of improvement in recruitment. Spiny dogfish have increased since the mid-l 980s to reach their maximum abundance in 1993.

In the southern Gulf, the abundance of the herring stock is currently high. For the northeastern Gulf, biomass of the autumn spawners remains high but that of the spring spawners is very low because of heavy exploitation targeted on this spawning component. The biomass of mackerel has likely been decreasing slowly since the mid-1980s in the absence of strong year-classes. However, the exploitation rate is low and catches are much below allowable levels. Capelin are also present in the Gulf and are lightly exploited. Capelin are the principal prey species for cod in the northern Gulf, for seals, and for several whale species present in the Gulf during the summer.

Shrimp biomass increased steadily from the early 1980s to 1990, but has decreased slightly since. There is presently some good recruitment and these stocks are expected to remain stable or to increase in the short term. The biomass of snow crab is presently very high but is expected to decrease substantially beginning in 1995 because of poor recruitment in 1985 and 1987. For lobster, there has been a steady increase in landings which reached a record high in 1990. The increase was mainly due to improved recruitment due to favorable environmental conditions, although increased fishing effort may also have contributed. Landings have declined every year since 1990 and in 1993 were at approximately 87% of the maximum.

The grey seal population is increasing in the Gulf at a rate of 8% per year. The consumption of cod in the Gulf during 1993 by grey seals seems to have been close to 18,000t, primarily pre-recruits. Harp seals are the most abundant species of seals in the Northwest Atlantic; pup production in the Gulf was estimated at 110,000 pups in 1990 (born from a population of around 450,000.) The population is believed to have increased since then. There is little information on the abundance of hooded seals in the Gulf; however, pup production in 1991 was about 2,000 pups.

3.3.2 Stock-bv-Stock Recommendations

3.3.2.1 Cod - 3Pn4RS

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	100,000	100,000	92,100	80,300	73,900	78,540	58,000	35,000	35,000	18,000	Mora-torium
Catch	103,600	88,300	82,800	88.500	48.000	48.900	39,900	31,800	28,900	18,200	500'

'As of October 26, 1994 (includes estimates for by-catches and recreational fishery).

The 1994 Stock Status Report showed that the abundance of this stock in 1993 was very low, possibly at the lowest level ever recorded. Estimates have declined by more than 50% over the past year. Both the 1986 and 1987 year-classes have virtually disappeared. There is no indication of significant recruitment, fish growth is low and their physiological condition is precarious. The industry's complaint of low weight yields in 1993 has been confirmed by measurements of fish condition taken in the course of research vessel surveys and from commercial catch monitoring programs. Natural mortality may have increased recently as a result of the cod's physiological condition. Scientists were not able to obtain significant results from their analytical models.

The recently completed 1994 summer survey indicates that the cod biomass has increased slightly in comparison to last year but remains at a very low level, close to the lowest level ever observed. The stock distribution was similar to that observed last year, cod being mainly found in the southern portion of the Strait of Belle-Isle and, to a lesser degree, around Anticosti Island.

In August 1993, the Council recommended as a precautionary conservation measure that the 1993 TAC for this stock be reduced from 31,000t to 18,000t, the revised $F_{0.1}$ level for 1993. The TAC was reduced by the Minister of Fisheries and Oceans in September 1993. In November 1993, 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 .

Commercial by-catches are estimated to be less than 200t. The recreational/food fishery 'which was originally scheduled to be opened for five 2-day periods during August and September was eventually closed after 4 periods. Estimated catches were in the order of 200t to 300t.

3.3.2.1 Cod - 3Pn4RS [continued)

Most industry stakeholders agree that the stock is at a very low level. However, some have suggested a limited fishery for 1995. Some have also suggested that cod from this stock migrate southward to 3Ps. Fishermen and processors object to the discontinuation of the winter research vessel survey and want more scientific work (including sentinel fisheries), not less. Serious concerns were expressed with respect to the large and ever increasing population of seals and the need to reduce the size of the herd.

RECOMMENDATION: The Council recommends that there be no directed fishing for 3Pn4RS cod in 1995 and that by-catches be kept to the lowest possible level; that no recreational/food fishery be permitted; and that a broad-based sentinel fisheries program be implemented.

Cod - 4T+4Vn (N - A)

Year	TAC	Catch
1984		
1985		
1986		
1987	45,2084,611	
1988		
1989		
1990		
1991	45,1089,411	
1992		
1993	13,111	5,211 Closed'
1994		Mora-torium

* Closed in September 1993.

* * As of October 28, 1994 (includes estimates for by-catches and recreational fishery).

The assessment unit for this stock has been modified to include cod catches made in 4Vn during November and December since this is a better reflection of the timing of the migrations of cod from 4T into 4Vn in the fall. The 1994 Stock Status Report indicated that the stock abundance and biomass remain very low and that prospects for future recruitment are poor as recent year classes are well below average (1988-1991). The biomass at the beginning of 1994 was estimated to be of the order of 93,000t, compared to 350,000t in the early 1980s. Scientists noted that fishing mortality has been reduced and was close to the $F_{0.1}$ target in 1993 but that fishing effort needs to remain at or below this level and recruitment has to improve to achieve recovery to former stock levels. The $F_{0.1}$ reference level for 1995 is about 9,500t (in comparison, annual catches have been of the order of 58,000t, on average, from 1950 to 1992.)

The late summer survey for this stock indicates that the cod abundance remains very low, near the levels observed in 1992 and 1993. The geographic distribution appears to be relatively similar to previous years. However, there was a general shift to the east, with a more even distribution of biomass between eastern and western 4T compared to 1993. In addition, a number of large catches were realized close to shore. The density of cod in 4Vn was similar to that in 4T. There still does not appear to be any sign of good recruitment. Nevertheless, the biomass remains essentially the same as last year and it appears that the closure in 1993 has essentially stopped the decline.

In August 1993, the Council noted the dramatic decline in all of the indicators for this stock and the poor recruitment prospects. It recommended that the 4T+4Vn(J - A) fishery be discontinued at least until June 1, 1994. The fishery was subsequently closed by Fisheries and Oceans.

Commercial by-catches for areas 4T and 4Vn are estimated to be in the order of 320t and 130t respectively. The recreational/food fishery took place on June 24 - October 24. Fish generally appeared to be abundant with most persons easily catching their 10 fish bag limit. Size of cod ranged from 38cm to 70cm, the mean size being 51cm. However, many fishermen at our meetings were opposed to the recreational food fishery.

The views of various local groups of fishermen vary greatly on the status of the stocks. Fishermen report evidence of cod around PEI (in lobster traps and in gillnets fishing for

3.3.2.2 Cod - 4T+4Vn (N - A) (continued]

hake and dog fish) and around Cheticamp in the plaice fishery where cod are "large and fat", which is an improvement over the conditions that were observed previously. However, around Gaspé, many report that there are generally few cod to be found and those have now moved to non-traditional areas in deeper waters. Many are strongly recommending a continuation of the closure to allow for stock rebuilding. There is significant support for sentinel fisheries and for the establishment of closed areas to protect spawning aggregations and juvenile fish. Also, seals are seen as significantly impeding the rebuilding of the stocks.

The Council has been informed that there were problems with the by-catch protocol resulting in misreporting and frequent opening and closing of various fisheries. Nevertheless, the Department of Fisheries and Oceans and fishermen worked together to correct those problems as the season progressed. While some concerns with implementation of the protocol remain, it is believed that the Department and fishermen will be able to effectively resolve difficulties prior to the 1995 season. In particular, to enhance success of the protocol, directed fisheries for black back flounder and American plaice can be set to specific areas at specific times and effectively keep cod by-catch to an absolute minimum.

While there are positive signs for this stock, it is lingering at its present level and no definite recovery is in progress. Consequently, the Council believes that it is best to take a cautious approach for 1995, during which time public hearings will be held on its detailed document "Criteria for Reopening a Closed Fishery."

RECOMMENDATION,: The Council recommends that there be no directed fishing for 4T+4Vn(N-A) cod in 1995 and that bycatches be kept to the lowest possible level.

Redfish - 4RST+3Pn (Jan.-May)+4Vn (Jan.-May) - Unit 1

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC**	AC			43,400	55,600	51,900	56,000	52,500	57,000	61,900	57,000
Catch											19,100

*As of October 26, 1994.

** TACs for 1984-1992 are for former management unit (4RST)

The 1994 Stock Status Report indicated that this stock is declining-and the exploitation rate is high for a slow-growing species like redfish. The one large year-class (1988) identified in the 1990 survey declined sharply since that time and, by 1993, had virtually disappeared. Heavy fishing pressure, for the most part in accordance with recommended TACs and low recruitment levels have been experienced in the past 4 years. The stock will continue to decline until one or more good year-classes are produced. There is no evidence of such a year-class at present and when such a year-class does appear, it will not be recruited to the fishery until seven or eight years later. Therefore no recovery is expected before the year 2000. Scientists also noted that the November and December catches in subdivisions 3Pn and 4Vn consisted primarily of redfish from Unit 1 and that the management unit should therefore be modified so as to include catches in these months.

In the 1994 summer survey, the estimate of biomass for Unit 1 redfish was lower than that of last year (by about 15%), at a level of about 100,000t (75,000t commercial size), but is much lower than the'estimates obtained in 1990 (about 400,000t). Most fish were concentrated in the Gulf around the southwest coast of Newfoundland, close to the Cabot Strait. Small fish were not abundant, suggesting that recent year-classes are poor.

The total quota for this area is 30,000t, down from 60,000t in 1993. To date approximately 18,000t has been taken and it is not anticipated that the quota will be taken during the remaining months of 1994. Problems with cod by-catch, which constrained harvesting during the winter months, together with the lower TAC and the lack of fish have contributed to a reduction of more than 50% in redfish landings from Unit 1. Fishermen indicate that catch rates are lower than the previous few years and that more searching was required in 1994. According to mid-September data, the overall cod by-catch was in the order of 0.5%.

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

There is agreement throughout the industry that the stock has further declined. Many industry stakeholders believe that there is a close relationship with Unit 2, especially in the fall and that southerly migration of redfish increases with increasing stock decline.

3.3.2.3 Redfish - 4RST+3Pn (Jan.-May)+4Vn (Jan.-May) - Unit 1 (continued)

Others are of the view that changes in fishing pattern would explain higher catches in the 3Pn area in the November to December period. Some industry stakeholders are recommending a closure of the fishery for the months of May and June to protect spawning aggregations. Some fishermen are indicating that the good catch rates in the winter fishery for mobile gear less than 65 feet simply reflect dense concentrations of fish as opposed to overall abundance. Most say that the stock is very low and declining.

Following the regular fall consultations and based on requests from stakeholders, the Council held special consultations on redfish. Stakeholders reaffirmed their observations that the stock has declined and expressed their frustrations with the inadequacy of scientific information on this stock. There were conflicting views on the need for redefining the management unit, the reasons for changes in fishing pattern and the appropriate management approach for dealing with these issues. Some were of the view that redfish have been migrating further south for the past few years and that this is an indication that the stock'is in real trouble.

The harvestable biomass of Unit 1 redfish could lead to a calculated catch level in the order of 9,500t with 13% exploitation rate which can be considered as an approximation of $F_{0.1}$ catch level for this species. Nevertheless, the Council is very concerned over the massive reduction in this stock, the greatly reduced catch rates and the lack of understanding of redfish migration patterns and possible links with Unit 2 redfish. The Council is also concerned over the "disappearance" of the 1988 year class. Redfish are known to be more concentrated during winter months when high catch rates may be maintained even when the stock is declining. A measure of protection should the TAC levels be too high, would therefore be to fish only when redfish are more evenly distributed. The Council therefore believes that a cautious approach is warranted.

RECOMMENDATION: The Council recommends for Unit 1 redfish that:

1. **current scientific work be strengthened and elaborated in cooperation with the industry so as to clarify redfish management units, as well as to better understand migration patterns and stock status;**

2. **the 1995 TAC be set at 7,500t;**

3. **a small fish protocol be established to protect juvenile redfish;**

4. **Fisheries and Oceans, in consultation with industry stakeholders, limit the fishery as much as practical during the January to June period.**

merican Plaice • 4T

Year	TAC	Catch
TAC Year Catch		
1989		

*As of October 26, 1994.

The 1994 Stock Status Report indicated that the abundance of American plaice continues at a low level, near the lowest level on record since 1971. Because of high levels of discards (perhaps as high as 30 • 40%) in the past, actual catch levels are uncertain. Discarding appears to have persisted in 1993 despite a mandatory landing regulation. This has significantly reduced the yield from this resource. In the 1994 September survey, plaice remains at about the same low level seen in recent years.

In November 1993, the Council recommended that the 1994 TAC for the 4T American plaice stock be set at 5,000t. The Council also noted the apparent high incidence of small plaice and recommended that conservation measures such as those instituted in 1993 to protect small fish be continued.

Historically, fishing activities for 4T American plaice have been dominated by the mobile gear fleet less than 45 feet and the 1994 fishery was characterized by increased landings for this fleet. A target fish size of 30cm was established. Although the conservation harvesting plan requires a minimum square mesh size of 145mm, most fishermen opted to voluntarily use 155mm square mesh so as to target larger plaice and minimize by-catches of cod. As such, managers believe that the significant dumping problem of past years has all but disappeared. There has been a marginal increase in fishing effort.

Fishermen are indicating that plaice are virtually absent in the northwesterly portion of 4T. As well, some fishermen who participated actively in the fishery in the southern areas are recommending that the TAC be reduced by 50%. Others are of the view that there is no appreciable difference in abundance compared to 1993 and catches could have been higher had they not had to move off traditional plaice grounds due to high cod by-catches. The Council notes that much of the earlier discards were by-catch from the cod fishery that is now closed. Efforts to target larger plaice should continue as well as avoiding redirection of effort.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4T American plaice be set at 5,000t.

3.3.2.5 Witch Flounder - 4RST

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	3,500	3,500	---	3,500	3,500	3,500	3,500	3,500	3,500	3,500	1,000
Catch	1,100	1,700	1,800	2,800	2,500	2,300	1,300	1,000	1,000	900	100'

*As of October 28, 1994.

The 1994 Stock Status Report indicated that the abundance of this stock is low and that, given the current stock size and age of recruitment, stock rebuilding is expected to be slow. Landings in 1993 were at their lowest level on record since 1960. The old management unit, 4RS, was inadequate since this stock is distributed across boundaries within the Gulf of St. Lawrence, and-scientists recommend that it be changed to 4RST.

In November 1993, the Council recommended that, as a precautionary measure, the 1994 TAC for 4RS witch flounder be set at 1 ,000t, and that pending clarification of stock boundaries, catches of witch flounder in 4T be monitored. The TAC was reduced to 1,000t in 1994.

This stock is exploited mainly by inshore danish seiners from Western Newfoundland and Cape Breton and a small number of Quebec based vessels fishing in the St Lawrence Estuary. A minimum fish size of 30cm was established for this stock. Increased mesh sizes have contributed to a reduction in overall landings which, according to fishermen, are substantially down again in 1994.

RECOMMENDATION: The Council recommends that the management unit be redefined to include 4T and that the 1995 TAC for 4RST witch flounder be set at 1,000t.

3.3.2.6 Greenland Halibut • 4RST

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	5,000	5,000	5,000	8,700	10,500	10,500	10,500	10,500	10,500	4,000	4,000
Catch	2,100	2,300	8,500	11,100	8,000	5.000	2,400	2.300	3,400	2.800	3,300'

*As of October 26, 1994.

The 1994 Stock Status Report indicated that this stock is low. The abundance indices available show a large decline between 1992 and 1993 and low recruitment is expected in the near future. The fishery, which is dominated by gillnets, is heavily dependent upon annual recruitment and catches large numbers of immature fish. It is important that the fishing effort be reduced, together with the proportion of immature fish caught, to permit the protection and conservation of Greenland halibut in the Gulf of St. Lawrence. Scientists warn that if large quantities of immature fish continue to be caught, no sustained recovery can be expected. In the 1994 summer survey, the biomass estimate for Greenland halibut remained comparable to that of preceding years.

In November 1993, the Council recommended that the 1994 TAC for 4RST Greenland halibut be reduced to **4,000t.**

April to August data show an increase of 706 sea-days in comparison to 1993. This is despite the decrease in the number of participants which dropped from 157, to 123 in 1994.

Fishermen report that stocks are down but not to the extent to justify a closure. Some fishermen and processors have expressed serious concerns with respect to the predominant catches of small, immature fish. The need for significant improvement in monitoring of landings, a strict control on number of **gillnets** and control on redirection of effort to this fishery were also identified.

The Council is concerned with the indications of a declining stock and the large quantities of immature fish being caught.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4RST Greenland Halibut be set at 4,000t; and that the Department of Fisheries and Oceans take steps to reduce the catch of undersize fish by introducing management measures to promote targeting of fish larger than 50 cm.

3.3.2.7 White Hake - 4T

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	12,000	12,000	12.000	9,400	5,500	5,500	5,500	5,500	5,500	3,600	2,000
Catch	7,100	6,000	5,000	6,400	3,900	5,400	5,200	4,500	3,600	1,500	650*

*As of October 26, 1994.

The 1994 Stock Status Report indicated that white hake in 4T may be at its lowest level since the first quota was introduced in 1982. Early recovery of this resource is unlikely given the current low abundance and indications of weak incoming recruitment. It was noted that the closure of the cod fishery and the possibility of competitive prices for hake in 1994 could result in increased effort directed at hake. Index fishermen have reported that hake were "smaller" and "scarcer" in recent years and other comments from the industry indicate that the abundance of white hake has declined.

In November 1993, the Council recommended that the 1994 TAC for 4T white hake be set at 2,000t as a precautionary measure. The Council also noted the historically high incidence of small fish in the catch, and recommended that measures such as those instituted in 1993 to protect small fish be continued. The Council 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.

The conservation measures introduced in 1994 for the mobile gear fleet, such as a target fish size of 46 cm, increased mesh size and the opening of the season on July 15 to allow white hake to spawn, were positive but resulted in a decrease in mobile gear landings. The inshore fixed gear fishery experienced frequent interruptions due to the incidence of cod by-catch. There are also important catches of very small hake in the open water smelt bag net and box net fisheries. Industry is of the view that the stock is down considerably and that only by-catch should be permitted in 1995.

In the 1994 September survey, the abundance remained comparable to that of last year, which itself was about half that of 1992. As in 1993, white hake were virtually absent from the western part of 4T.

RECOMMENDATION: The Council recommends that there be no directed fishing for 4T white hake in 1995 and that by-catches be kept to the lowest possible level. The Council also recommends that measures be taken to avoid catches of small hake in smelt and eel traps.

3.3.2.8 Atlantic Halibut - 4RST

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	....	....	....	....	300	300	300	300	300	300	300
Catch	180	150	315	280	240	290	450	'340	160	150	110'

'As of October 26, 1994.

The 1994 Stock Status Report indicated that there is too little information available to assess the condition of this stock. However, an index fishermen program has been established and more information will thus be available in the future. It was noted that the impact of the shrimp fishery on catching small halibut should decline considerably now that the Nordmore grate has been introduced. However, the practice of putting a second bag on the escapement vent could result in the shrimp fishery catching significant amounts of small halibut and should be prohibited.

In November 1993, the Council recommended that the 1994 TAC for the 4RST Atlantic halibut stock be set at 300t.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4RST Atlantic halibut be set at 300t.

3.3.2.9 Winter Flounder - 4T

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC											
Catch	100	1,200	2,000	1,800	1,400	2,100	2,100	2,500	1,900	1,200	400*

*As of October 26, 1994.

This stock is not under the Groundfish Management Plan. There is uncertainty as to the total catches due to discarding, unreporting and incorrect identification of the species in landings statistics. The stock is believed to be at a level of abundance that is intermediate to the abundance since 1971.

In November 1993, the Council recommended that landings of 4T winter flounder be monitored more closely and that the measures introduced to protect against high mortality of juveniles be continued.

This fishery is prosecuted mainly by inshore mobile gear fishermen in the Northumberland Strait and the Bay of Chaleur. Management measures to control the catches of small fish introduced in 1994 included increased mesh size and a target fish size of 25 cm. There is also a phase out of the inshore commercial bait fishery which traditionally directs for small flounder. This resource may be composed of some number of localized populations across the southern Gulf - some of which are reported to be depleted and in need of protection.

RECOMMENDATION: The Council recommends that this fishery continue to be monitored and that the Department of Fisheries and Oceans in consultation with the industry introduce measures to allow directed fisheries only in specific and well defined areas and allow the release of small fish.

3.4 Stocks of the Scotian Shelf, Bay of Fundy and Georges Bank

3.4.1 Ecosystem Overview

General features

The continental shelf off Nova Scotia is separated from the Newfoundland area by the Cabot Strait and the Laurentian Channel. The shelf is marked by depressions, depths greater than 200 m, and several shallow banks. Georges Bank is located in the most southern part of the region.

The inner part of the shelf, between the banks and the shore line, is influenced by waters originating from the Gulf of St. Lawrence and flowing south. These waters are characterized by low salinity and seasonal temperature variations. The seasonal variations create a warm surface layer in summer that overlays a water body, the Cold Intermediate Layer (CIL), that remains cold (less than 4 - 6°C) all year round. Slope water invades the deep basins on the Scotian Shelf, below the CIL. The slope water is formed, in variable proportions, from a mixing of Shelf, Gulf Stream, and Labrador Current waters.

Recent trends

The relatively cold winter of 1993 produced severe ice conditions in the Gulf of St. Lawrence with earlier ice formation, longer duration, greater areal extent and later retreat than usual. Ice flowed out of the Gulf onto the Scotian Shelf and extended southwestward along the coast of Nova Scotia during late February and early March. The southward extent of ice on the Scotian Shelf at that time was at, or near, the long term maximum.

In 1993, the waters in the Bay of Fundy and on Lurcher Shoals were colder-than-normal down to depths of 100m. The surface waters over the Scotian Shelf were also generally colder than normal. The Cold Intermediate Layer (50 to 100m), which has been relatively cold in recent years, has warmed slightly.

In contrast, waters in the deep basins, such as Emerald and Georges, and in the channels and gullies, such as Laurentian and Northeast channels, were warmer-than-normal. In the Laurentian Channel and in Emerald Basin, temperatures rose for the second year from very cold values observed in 1991. Preliminary information from 1994 suggests that the conditions observed in 1993 are continuing.

3.4.1 Ecosystem Overview (continued)

General stock trends

The Scotian Shelf and Georges Bank groundfish fisheries are dominated by cod, haddock and pollock. Important fisheries for flatfish (plaice, yellowtail, witch and winter flounder), Atlantic halibut, redfish and silver hake are also conducted.

For the past several years, there are very few stocks for which fishing effort has been at a level low enough to allow stock rebuilding. Most stocks are at low to critically low levels of spawning biomass. For most of the stocks, the declines observed since the mid-1980s are continuing. All the cod stocks are qualified as being low to critically low with some signs of recruitment for the southern Scotian Shelf stock. Haddock stocks remain at low to very low levels but the 1992 and, perhaps the 1993, year-classes look promising. The pollock stock is low and shows some signs of incoming good year-classes (1988-l 989), followed by poor year-classes in the early 1990s. The silver hake stock is showing improvement in its recent year-classes and is expected to increase somewhat while redfish on the southern Scotian Shelf appear relatively stable. Flatfish are under increasing fishing pressure and there is growing concern about redirection of effort onto these stocks.

Although indices of abundance for herring indicate a healthy population, changes in the geographical distribution have led to concerns that some spawning components may have been lost. The Georges Bank herring population was fished to commercial extinction prior to extension of Canadian jurisdiction in 1977. Since that time, there have been signs of a steady recovery, such that an experimental fishery of 5,000t has been permitted since 1992. Mackerel, which is a seasonal inhabitant of the Scotian Shelf, is only exploited at a very low level. Capelin has been observed in quantity on the eastern Scotian Shelf since the late 1980s, coincident with the increased intrusion of cold water into that region.

Lobster landings increased substantially during the 1980s, attaining a peak in 1991 representing a three-fold increase in comparison to the average landings from 1965 1980. In 1992, landings decreased some 19% from the 1991 maximum and a further decrease of 4% occurred in 1993. Sea scallop landings on Georges Bank are expected to go down in 1995.

The grey seal population of Sable island has been increasing steadily at a rate of over 12% annually since the early 1960s. The estimated biomass of cod consumed by grey seals in the eastern Shelf was estimated to be 17,300t in 1993 (this represents about 13% of the total consumption by grey seals.) This level of consumption most likely will have an impact on recruitment of the eastern Scotian Shelf cod stock.

3.4.2 Stock-by-Stock Recommendations

3.4.2.1 Cod - 4Vn (M - O) .

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC*	14,000	12.000	12,000	9.000	7,500	7.500	7,500	10,000	10,000	1,800 Closed"	Cbsed
Catch	8,300	10,500	10,300	8.900	7,900	5,800	3.200	2,800	2,300	850	50***

* TACs are for former management unit (i.e. May to December)
** Closed in September 1993
. ** As of October 26, 1994

The 1994 Stock Status Report indicated that catches continue to decrease, particularly in the fixed gear sector which had been unable to catch its allocation in the past four years. The fishery has been closed since September 1993. This stock is in a very depressed state and there has been little or no recruitment since the'1987 year-class. This stock was surveyed in July 1994 as part of the regular groundfish survey series conducted on the Scotian Shelf since 1971. The 1994 catch per tow is very low compared with the early 1980s. There are no signs of improved recruitment.

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.

Managers report that the inshore fixed gear fleet fished for species such as halibut, hake and cusk with a 10% or 200 lbs. maximum by-catch of cod. For the MG<65 fleet, which concentrated on Unit 2 redfish and flounder, by-catch levels were set at 5% daily or 2% overall for cod . Observed cod by-catch while fishing for redfish or flounder were not a concern. The majority of the cod by-catch was caught while directing for pollock but was below the permitted limits.

There is industry concurrence on the low level of the stocks. Some inshore fishermen question the by-catch for other fisheries and, as well, recommend a limited hook and line fishery, 550 hooks per tub, with a restricted fishing season from August 15 to October 15.

The Council continues to be concerned about the depressed state of this stock and the need to protect the 1987 year class.

RECOMMENDATION: The Council recommends that there be no directed fishing for 4Vn(M-O) cod in 1995 and that by-catches be kept to the lowest possible level.

3.4.2.2 Cod - 4VsW

Year											
TAC										Closed'	
Catch	TAC Year				43,3044,000 1987	35,3000,000 1988	34,2085.200 1989			35,4085,200 1992	11,000 1993 3,800	280[2]

1. Closed in September 1993
2. As of October 26, 1994

Poor recruitment and high fishing mortality have characterized this stock through the 1980's and early 1990's. Recruitment has been very poor for almost a decade with only the 1987 and 1990 year-classes being of moderate strength. The spawning stock biomass and the total biomass are currently at the lowest levels ever recorded. The severely reduced level of spawning stock size and the indications of only moderate recruitment imply that stock rebuilding will be slow, even in the absence of a directed fishery. The conjunction of overfishing, low recruitment and the increasing population of grey seals has placed this stock in a critical condition.

The 1994 July survey for this stock indicated that it remains at the lowest level observed since the survey commenced in 1970. In addition, there was no indication that incoming recruitment is strong. These results are consistent with the information presented in the Stock Status Report.

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.

Managers report that the 4VsW cod catch to date for the inshore mobile fleet directing for flounder and redfish is 13t and by-catch has not been a problem. The fixed gear fleet landed 92t of cod while directing for other species. By-catch in the fixed gear fisheries was not a problem although there are rumours that some vessels were directing for cod.

Industry concurs with continuation of a closure but are strongly recommending a major reduction in the size of the seal herd. They believe that seals are a major impediment to stock rebuilding. The Council shares this view and the seal issue is addressed elsewhere in this report.

RECOMMENDATION: The Council recommends that there be no directed fishing for 4VsW cod in 1995 and that by-catches be kept to the lowest possible level.

3.4.2.3 Cod - 4X

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	30,000	30,000	20,000	17,500	14.000	12,500	22,000	26,000	26,000	15,000	13,000
Catch	25,300	21,400	19,900	16,700	19,600	19,600	23,600	27,500	26,000	16,000	11,130'

* As of October 26, 1994

The 1994 Stock Status Report indicated that the strong 1985 and 1987 year-classes have sustained the recent high catches but that, with the exception of the 1990 year-class which is about average, there are no indications of subsequent good recruitment. The stock has decreased to its lowest abundance but the decline has been arrested by the recruitment of the 1990 year-class. Greater stability and dampening of fluctuations in abundance require a lower exploitation rate and rebuilding of the adult stock biomass.

The report also states that the yield for 1995 at $F_{0.1}$ (0.2) would be about 6,300t. This assessment has been characterized by a retrospective pattern where successive estimates have been lower by about 25%. Therefore, a catch of about 4,400t in 1995 would more closely approximate the $F_{0.1}$ catch that would be calculated in retrospect if the pattern persists.

Results from the July 1994 survey showed a marginal increase in abundance from the 1993 level. The survey index is higher for age 3, the 1991 year-class. For this year-class, the mean recruitment value was used as a population estimate in the Stock Status Report. The 1994 survey suggests that the 1991 year-class may be more abundant than average. In addition, the relatively high catch of cod around 10cm in length was particularly noticeable. The 1 Ocm length corresponds to the 1994 year-class. While this is a positive sign, it is too early to state whether or not this represents good recruitment.

In August 1993, the Council recommended, as a precautionary conservation measure, that the 1993 TAC be reduced from 26,000t to 15,000t, a level still about twice the $F_{0.1}$ level. 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.

Landings in 1994 by all gear sectors are behind last year with the offshore showing the biggest percentage decrease. The mesh sizefor offshore was increasedfrom 145 mm

3.4.2.3 Cod - 4X (continued)

diamond to 155 mm in 1994. The ITQ square mesh size of 130 mm did not change while the fixed gear did not support any changes to hook size until 1995.

However, the ITQ fleet opted to voluntarily use 140mm square mesh. The presence of small cod was not a problem this year especially in the spring. The FG fleet felt that 1994 haddock management measures reduced their ability to fish actively for cod, while many agree that overall abundance is less in 1994. Inshore fleets in the Bay of Fundy reported good signs of cod in the fall while others reported that cod in the eastern portion of 4X was more scarce.

Fishermen do not agree with the stock assessment. Some report the best catches in years and are convinced that cod are much more abundant. They are recommending that the 1994 TAC of 13,000t should be maintained in 1995. It is notable that stakeholders did not object to suggestions that this stock could withstand fishing pressures that would result in mortality at two and even four times $F_{0.1}$. However, it was recognized that a high TAC for 4X cod would require a higher TAC for 4X haddock as there are significant by-catch problems that have resulted in dumping at-sea. There was recognition by stakeholders that the level of harvest of this stock is contingent on the availability of haddock.

The Council was struck by the acknowledged dumping of 4X haddock in the 4X cod fishery. Control of this problem through enforcement appears to have been extremely difficult and the Council believes that new approaches must be developed focusing on multispecies management.

3.4.2.3 Cod - 4X (continued)

RECOMMENDATION: The Council recommends that the 1995 TAC for 4X cod be set at 9,000t.

RECOMMENDATION: The Council recommends that prior to .the 1995 fishing season, 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.

RECOMMENDATION: The Council recommends that, should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved.

'The Council appreciates the complexities of the mixed species fisheries in 4X and was particularly impressed by the briefs and recommendations made to improve fishing practices. Such measures included mandatory use of square mesh for mobile; bigger hooks for fixed gear; mandatory hail and/or dockside monitoring; effort control measures such as limits on gillnets (which would have to be attended;) gear limits per vessel; extensive closed seasons; etc. These industry recommendations clearly demonstrate a positive intent by industry. The FRCC does not have the mandate or capability to deal with such operational matters. it is for this reason that we recommend a formal workshop with the Department and the industry as the most effective way to address this complex issue.

3.4.2.4 Cod - 5Zj,m

Year									1993	1994
TAC										
Catch	TAC Year Catch 16,38	1984 17,100 1985	14,100 1986	16,600 1987	20,600 1988	14,200 1989	20,700 1990	[illegible]	15,000 12,500	5,100*

*As of October 26, 1994 (Canadian catches only)

This is a transboundary stock, the majority of which appears to be in Canadian waters. The 1994 Stock Status Report indicated that the total and spawning biomasses. are at the lowest level observed since 1978 when observations began. Fishing mortalities have been very high and have increased to three to four times the $F_{0.1}$ level since 1991. An immediate and substantial reduction in exploitation is required if the decline in stock biomass is to be slowed or reversed. With the exception of the 1990 year-class, recent year-classes have been below average. The 1993 year-class is the lowest observed. This resource is being exploited at exceptionally high levels and recruitment in the short-term will be below average. Scientists consider that urgent measures to protect the spawning stock are required.

In August and in November 1993, the Council concluded that, from a conservation perspective, the fishery for this stock should be closed. The Council noted, however, that a closure by Canada alone would not be sufficient to protect the stock without corresponding action by the United States. The Council urged that consultations continue with the United States with the objective of undertaking urgent and immediate management action to rebuild this stock. The Council also recommended that, if fishing was to continue on this stock, a conservation harvesting package be considered containing such measures 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.

In 1994, the fishery **was** closed to all sectors from January I 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 . Fixed gear landings are ahead of 1993 landings while both mobile gear sectors are far behind. The decrease in mobile landings may not be indicative of abundance as the fishing strategy has changed significantly in response to the decreased quota as well as the extended closure. In 1993, mobile gear fished during January - February and the offshore sector in 1994 was excluded from the bank for the month of June. As well, the offshore chose to direct for pollock in 1994 using cod and haddock as a by-catch. The fixed gear harvesting strategy was also altered in 1994 as fishermen had to choose to fish either in 4X or 5Z for the period of June 1 to Sept 30. Once a choice was made they could not change for that period.

3.4.2.4 Cod - 5Zi.m (continued)

Fishermen have expressed various views on the recommended level of TAC for 1995, from the status quo to an increase. They are reporting good catches and greater abundance of large fish than implied in the stock status report. The Council remains concerned over the high exploitation on this stock and is particularly cognizant of the considerably different views of stock status from the two sources.

RECOMMENDATION: The Council therefore recommends that bilateral consultations continue with the objective of undertaking management action appropriate to re-build this stock. In the meantime, the Council recommends that the fishery be closed until June 1995, prior to which tlme the Council will provide a definitlve recommendation, with respect to the 1995 TAC.

3.4.2.5 Haddock - 4TVW

Year	1 984	1 985	1986	1987	1 988	1989	1990	1991	1992	1993	1994
TAC	15,000	15,000	17,000	By-catch	BY-catch	6,700	6,000	By-catch	By-catch	By-catch	By-catch
Catch	6,000	11,700	16,900	3,900	4,500	9,100	7,000	5,400	6,100	1,200	76'

• As of October 26, 1994

Both the 1994 and the 1993 Stock Status Reports indicated that this stock has essentially disappeared from 4Vn and 4Vs and abundance in 4W is low. The estimates of spawning biomass are at very low levels. There are no indications of strong year-classes after that of 1988. The bulk of the stock is concentrated in Division 4W and is mainly of the 1988 year-class. Fishing mortality is believed to have been high but to have decreased in 1993.

The summer 1994 survey indicates that while the stock is still at a low level, it has remained relatively stable for the past three years. The 1988 year class is predominant but there are also indications that the 1992 and 1993 year classes are of average to above average strength. As there are few fish above spawning size, incoming recruitment should be protected to allow the biomass to increase.

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.

Managers report no concern with by-catch. Industry concurs with a continuation of the closure of the nursery area in 4VW.

RECOMMENDATION: The Council recommends that there be no directed fishing for 4TVW haddock in 1995 and, that the closure of the haddock box to all gears be continued.

3.4.2.6 Haddock - 4X

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	32,000	15,000	15,000	15,000	12,400	4,600	4,600	By-catch	By-catch	By-catch 6,000 •	4.500
Catch	19,600	14,900	15,000	13,600	11,000	6,700	7,300	9,700	10,300	6,600	3,830**

• Closed in September 1993
• * As of October 26, 1994

The Stock Status Report indicates that 1993 landings of 6,800 tonnes for this stock are well below the long-term average of about 20,000t. Stock abundance is low, perhaps at its lowest level since estimates were initiated in 1970. Recruitment has been weak since 1983, except for the 1987 and 1988 year-classes which were relatively strong. The 1989 year-class is very weak and those of both 1990 and 1991 appear below average; the 1992 year-class may be of average abundance, or above.

The July 1993 survey biomass index was the lowest since at least 1970 and the 1994 results increased only slightly from the low 1993 value. A large number of fish-of-the-year (spawned in 1994) were encountered, together with one year old haddock (spawned in 1993). While this may indicate incoming recruitment, it needs to be confirmed by future surveys. It will be two to three years before these fish have grown enough to enter the fishery.

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. The Council indicated- that there could be additional benefits to implementing 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, in this fishery.

A decrease in 1994 landings is believed to be a result of quota constraints., Information from the industry however suggests an increase in the dumping of haddock particularly in the fixed gear sector who are fishing under low trip limits.

There is overwhelming industry consensus that the abundance of the stock is much greater than indicated in the stock status report and warrants an in-season increase in TAC as well as an increase for 1995. They are of the view that there are significant deficiencies in the research vessel survey both in the effectiveness of the vessel and the portion of the stock area covered by the survey, i.e. a large portion of the grounds are not trawlable. There were indications of a large problem of dumping of haddock at

3.5.2.6 Haddock - 4X (continued)

sea(shacking off of fish by fixed gear) and suggestions were made to impose effort controls and a competitive fishery to address this issue. Some suggested that an "allowance" only be set for the longline fishery. Some have also suggested a return to some form of a more stringent specie exchange program. There were also suggestions that a dockside monitoring program be implemented for all gear sectors to address the underreporting issue.

The Council was struck by the acknowledged dumping of 4X haddock in order to maintain the cod fishery. In certain circumstances, it has been acknowledged by fishermen that, regardless of the effects on conservation, "fish would be dumped anyway." There appears to be a concerted effort among some fishermen to ensure that DFO does not know what is happening at sea. Control of this problem through enforcement has not been possible and the Council believes that new approaches focusing on multispecies management must be developed.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4X haddock be set at 6,000t.

RECOMMENDATION: The Council recommends that, prior to the 1995 fishing season, a workshop[2] 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.

RECOMMENDATION: The Council recommends that, should dumping, discarding and misreporting persist, the fishery be closed for the gear type Involved.

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[2]**The Council appreciates the complexities of the mixed species fisheries in 4X and was particularly impressed by the briefs and recommendations made to improve fishing practices. Such measures included mandatory use of square mesh for mobile; bigger hooks for fixed gear; mandatory hail and/or dockside monitoring; effort control measures such as limits on gillnets (which would have to be attended;) gear limits per vessel; extensive closed seasons; etc. These industry recommendations clearly demonstrate a positive intent by industry. The FRCC does not have the mandate or capability to deal with such operational matters. It is for this reason that we recommend a formal workshop with the Department and the industry as the most effective way to address this complex issue.**

Year	TAC	Catch

Haddock - 5Zj,m

TAC Catch Year	1984	1985	9861	1988	1989	1990	5,000			

*As of October 26, 1994 (Canadian catches only)

This is a transboundary stock, the majority of which appears to be in Canadian waters. The 1994 Stock Status Report points out that this stock has increased slightly from levels which were near the lowest recorded (in the mid-1970s). Indications are that the 1992 year-class, and perhaps the 1993 year-class, may be of moderate strength. Fishing mortality has been very high, having been about twice $F_{0.1}$ with a marked increase since 1991 to reach, in 1993, the highest level observed. While the stock appears to be increasing, it should be noted that this is due primarily to one year-class, that of 1992. This year-class will be 3 years old in 1995 and scientists warn that restraint should be exercised to allow these fish to grow and to contribute to spawning. They consider that continuing conservation efforts are needed to rebuild the population biomass and to expand the age structure.

In August 1993, the Council recommended that the 5Zjm haddock fishery be closed. In November 1993, the Council reiterated that from a conservation perspective, the 5Zj,m haddock fishery should be closed. The Council urged the continuation of the consultations with the United States with the objective of undertaking urgent and immediate management action to rebuild this stock. The Council also recommended that, if fishing is to continue on this stock, a conservation harvesting package be considered containing such measures 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.

The fishery was closed to all sectors from January 1 to May 31 and for an additional month, to June 30, for the offshore. The management measures concentrated on avoiding the capture of the 1992 year class estimated to be 45 cm throughout most of the year. Fishermen report that catch rates are up significantly for fixed gear, that longliners are catching a lot of large fish (>4lbs) and that the lower catch rates for mobile gear are due to square mesh being used. Various industry groups are recommending that the TAC be increased in 1995.

3.4.2.7 Haddock - 5Zj,m (continued)

RECOMMENDATION: The Council recommends that bilateral consultations continue with the objective of undertaking management action appropriate to re-build this stock. In the meantime, the Council recommends that the fishery be closed until June 1995, prior to which'time the Council will provide a definitive recommendation with respect to the 1995 TAC.

3.4.2.8 Pollock - 4VWX5Zc

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	53,000	42,400	40,000	43,000	43,000	43,000	38,000	43,000	43,000	21,000	24,000
Catch	35,400	43,800	44,300	46,100	43,100	43,000	37,500	39,500	34,300	21,100	13,700*

* As of October 26. 1994

The 1994 Stock Status Report indicates that the spawning biomass has been declining steadily from 1985 to the present and is projected to continue declining into 1995. Pollock abundance is very low with poor recruitment prospects for the near future. In the 1993 assessment of this resource, the 1988 and 1989 year-classes were estimated to be well above average in size. In the 1994 assessment, the 1989 year-class is estimated to be closer to the long-term average and the 1988 year class is above average. These two year-classes will be nearly fully recruited to the fishery in 1994. The 1990 and 1991 year-classes are estimated to be amongst the weakest observed. Assuming that the full 1994 TAC of 24,000t would be taken, the level of catch in 1995 corresponding to $F_{0.1}$ was estimated at 13,000t.

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 4VWX5Zc pollock be set at 24,000t, the $F_{0.1}$ catch then calculated for 1994.

The abundance index from the 1994 summer survey is considerably lower than the 1993 value. However, as indicated in the Stock Status Report, the survey estimates have been highly variable with no trend since the mid-1980s and are not felt to be reflective of stock trends. The 1994 survey gives no indication of strong year classes recruiting to the fishery.

Industry concurs with scientific evidence on the presence of small fish. However, there were differing views on the proposed level of TAC for 1995, some suggesting the status quo, others an increase, while others were perplexed as to why the TAC was even increased in 1994. There is also a plea for identification and protection of pollock spawning areas.

3.4.2.8 Pollock - 4VWX5Zc (continued)

Landings to date in 1994 are lower than for the same period in 1993 for **all** gear sectors. Total catches in 1994 are expected to be less than 17,000t and, based on this estimate, the $F_{0.1}$ catch level in 1995 is estimated to be 14,500t.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4VWX5Zc pollock be set at the revised $F_{0.1}$ calculation of 14,500t. The Council also recommends that Fisheries and Oceans scientists work with the industry to determlne If, and during what times of the year, it would be appropriate to establish closed areas for 4VWX5Zc pollock to protect the spawning stock.

3.4.2.9 Redfish • 4WdehklX • Unit 3

a TAC Year	1984 5,500	1985 6,000	1986 6,900	1987 6,100	1988 3,900	1989 3,200	1990 2,300	1991 2,000	1992 2,400	1993	1994

'As of October 26, 1994

The 1994 Stock Status Report indicated that the biomass has been constant or declining slightly over the last 10 years, with low exploitation rates. There is no indication of significant recruitment in recent years. Recent information gives no reason to expect significant changes in this stock in 1994 and if recruitment remains low, the situation of the past 10 years should continue.

In November 1993, the Council recommended that the 1994 TAC for Unit 3 redfish be set at 10,000t.

As predicted, both the effort and landings on this stock have increased. Small fish were reported in the IQ fishery in the spring, resulting in a series of closures. The relatively good prices offered for small redfish as lobster bait may have contributed to the increased landings of small redfish

Fishermen say that the TAC should not be increased in 1995 and many have expressed the need for taking a prudent approach with respect to avoiding the catch of small fish. Fishermen are concerned over redirection of effort towards redfish in this area.

RECOMMENDATION: The Council recommends that the 1995 TAC for Unit 3 redfish be set at 10,000t; 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.

3.42 10 Flaffishes - 4VWX

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	10,000
Catch (total)	13,440	10,760	11,840	12,700	11,350	10,240	12,340	10,360	10,775	7,942	5,400*
Plaice - 4 v w	5,800	4,100	3,100	4,600	3,100	3,400	1,900	400	600	100	
-4X	340	320	590	260	370	480	470	990	420	10	
Witch -4vw	1,340	1.750	2,380	2,730	2,410	1,770	1,300	1,330	1.030	530	
-4x	800	530	830	490	540	530	850	800	830	370	
Y-tail - 4 v w	2,290	950	890	1,040	990	1.480	2,930	1,330	1,370	1,850	
- 4 x	170	70	110	110	80	50	80	140	120	50	
Winter fl. 4vw	10	30	10	10	110	190	80	40	5	2	
-4x	880	800	1,030	1,040	1.480	1,290	1,890	800	580	340	
Unsp. - 4 v w	10	10	70	40	90	90	30	1,480	1.880	1,880	
- 4 x	2,000	2,200	3.230	2,380	2.200	980	3.010	3.450	3,980	3,230	

*As of October 26, 1994

In 1992, scientists recommended that, in order to better protect flatfish resources on the Scotian Shelf, it would be more appropriate to assess the species separately and that the stocks be separated into 4X and 4VW management units. It was also noted that accurate landings data by species, including the partitioning of unspecified flounder to species, were required in order to assess these individual stocks. The separation into two management units was accomplished in 1994 by the Department of Fisheries and Oceans in consultation with industry. The TAC was divided 5,500t for 4VW and 4,500t for 4X.

For the Eastern Scotian Shelf (4VW), a substantial reduction in effort is required in order to reverse current trends. The 1994 Stock Status Report notes that fishing mortality is thought to have recently increased with a redirection of effort on flatfish from the cod, haddock and pollock fisheries. For plaice and yellowtail, the stocks appear to be decreasing, particularly in 4V where their biomass is the lowest on record. Witch appears stable although the 4W portion of the stock is declining. Based on the surveys, the abundance of winter flounder is increasing and is particularly high in 4W.

3.4.2.10 Flatfishes - 4VWX (continued)

In the 1994 summer survey, plaice and yellowtail flounder remained relatively stable in comparison to 1993. The 1994 index for yellowtail is the lowest in the 24-year time series and, for plaice, it remains among the lowest on record. Contrary to the trends reported in the 1994 Stock Status Report, winter flounder also appears to be declining, while the witch resource appears to be increasing.

For the Southern Scotian Shelf and Bay of Fundy (4X), plaice and yellowtail flounder are relatively stable. Witch flounder appears to be decreasing in abundance. For winter flounder, abundance remains relatively high in the surveys but these do not cover the inshore area of 4X which represents a large portion of the winter flounder habitat. For winter flounder, anecdotal reports indicate increased effort but low catches, an indication that the stock may be declining.

In the 1994 summer survey for 4X, the numbers and weight per tow have increased for plaice, yellowtail and witch since 1993, with much of this being due to the entry of small fish.

In November 1993, the Council recommended that efforts underway to obtain better information on the landings by species and area be encouraged in order to provide a more rational basis for conservation measures for this resource complex in future years. The Council also recommended that, pending the provision of more reliable catch data on flatfish on the Scotian Shelf, the 1994 TAC for 4VWX flatfish be set at 14,000t. The 1994 Groundfish Management Plan set the TAC at 10,000t.

The new management units implemented in 1994 make comparison difficult and landings are down, due to some extent to the reduced quota. In 4V, the size of flounder landed this year was larger due primarily to the increased mesh size. By-catch of cod. or haddock was not a problem for the IQ fishery. In 4X, some vessels in the head of the Bay of Fundy reported increased signs of flounder but, overall throughout the Bay of Fundy, the abundance is reported to have been variable. Overall landings and catch rates appear to be down from 1993.

3.4.2.10 Flatfishes - 4VWX (continued)

The Council is concerned about the status of these various flatfish stocks in that, generally, exploitation is high, effort appears to be increasing, catches are down and the stocks appear to be declining, most noticeably in 4VW. Even in 1993 more than 60% of the catches were still unspecified although it is understood that much of this is in fact American plaice in 4VW and black-back flounder in 4X. The Council notes and encourages the continuing efforts in consultation with industry, to better manage flatfish in these two new management units, 4VW and 4X.

RECOMMENDATION: Based upon available information, the Council has concluded that both the effort and the TACs for these stocks need to be reduced and, as well, the proportions between the two units should be changed to better reflect relative stock abundance. The Council recommends that the global 1995 TAC for all 4VWX flatfishes be set at 7,500t.

3.4.2.11 Silver Hake - 4VWX

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	
TAC ('000t)	100	100	100	100	120	135	135	100	105	75	
Catch ('000t)	74	75	83	82	74	88	70	88	32	29.0	

*As of October 26, 1994

Catches from this stock peaked in 1973 at 300,000t. In recent years, catches have dropped from 91,000t in 1989 to about 30,000t in 1992 and 1993. The reduction in landings in recent years is a result of lower than average recruitment in the late 1980s and early 1990s as well as the implementation of certain management measures. However, recent surveys indicate that the 1992 year-class is above average and, possibly, the 1993 year-class could be of average size. As a result of this, the stock is expected to increase in the short term.

Consequently, in June 1994, the NAFO Scientific Council calculated that the catch at $F_{0.1}$ for 1995 would be 79,000t. However, they note that this calculation could be overestimated by as much as 20,000t.

The 1994 fishery started later than anticipated and optimal fishing conditions in March and April were therefore missed. As well, in order to further reduce by-catches, the Silver Hake Box was redrawn in 1994 to move its northern boundary into deeper waters: this change initially disrupted routine fishing operations. Mandatory use of the Nordmore grate and mandatory fishing in deeper waters were imposed in 1994. By-catch of cod/haddock/pollock was only 0.3%, lower in tonnage and percentage than in any previous years. The combination of serious delays in granting allocations, sudden shifting of the fishing zone, and the early closing of the season to avoid gear conflicts led to reduced catches in 1994. On the other hand, considerable concern continues to be expressed by some fishermen. They believe that the stock is not as healthy as indicated by scientific assessments and that the fishery should be reduced as silver hake is an important food for cod.

The Council notes that the mandatory use of the Nordmore grate resulted in reducing the by-catch of other species.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4VWX silver hake be set at 60,000t.

3.4.2.12 Araentine - 4VWX

Year	1984	1985	1988	1987	1988	1989	1990	1991	1992	1993	1994
TAC	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	1,000
Catch	380	292	203	83	351	107	217	143	--	---	---

Catches from this stock, which are taken as by-catch in the silver hake fishery, have not exceeded 360t since 1983. The existing TAC of 10,000t was established some years ago based on an estimated $F_{0.1}$ from survey biomass estimates. Research vessel surveys in the late 1980s and early 1990s suggest the biomass may be lower than in the early 1980s. Exploitation has been by foreign vessels only and directed fishing for argentine was opportunistic and ancillary to the silver hake and squid fishery. The Fundian Channel area, which accounted for much of the directed catch in the 1970s has been closed to small mesh fishing since 1977.

No interest has been expressed by Canadian fishermen in this fishery. 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.

RECOMMENDATION: The Council recommends that the 1995 TAC for 4VWX argentine be set at 1,000t.

3.4.2.13 Atlantic Halibut - 3NOPs4VWX5Zc

Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TAC	....	....	....	....	3,200	3,200	3,200	3,200	3,200	3.200	1,500
Catch	3,000	4,000	3,300	2.600	2,300	1,900	2.100	2,200	1,400	1,200	1,150'

*As of October 26, 1994 for Canadian catches; as of October 11 for catches reported to NAFO

The 1994 Stock Status Report indicates that, based on declining commercial and survey catch rates and on landings, this stock is decreasing. Commercial catch rates have decreased since 1981 despite the introduction of the more efficient circle hook. Landings are at their lowest in recent decades despite the fact that directed effort has been increasing as the cod and haddock stocks have declined. Scientists consider that restrictions on groundfish fishing effort are necessary for stock rebuilding.

In the 1994 summer survey, the mean numbers per tow and mean weight per tow declined in comparison to the 1993 values. However, the survey gear catches a different size distribution than the longline fishery and the survey index may relate more to future recruitment rather than fishable biomass.

In November 1993, the Council recommended that the 1994 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 1,500t as a precautionary measure. The Council also recommended that the mandatory landing provisions be reviewed with the aim of allowing halibut smaller than 32 inches to be released, if feasible. This was implemented in 1994.

The total quota for this species is 1,500t with 120t allocated for the 3NOPs area. The total catch up to the end of September is about 800t with only about 50t of this coming from 3NOPs.

The Council is concerned that this stock is rapidly declining and that redirection of effort towards halibut may result in higher mortality of undersized halibut.

RECOMMENDATION: The Council recommends that as a precautionary measure, the 1995 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 850t; and, that mandatory landing provisions be reviewed regarding the discarding of incidental catches of halibut smaller than 32 inches.

3.5 Summarv Table of TACs and Catches (as per Stock Sequence of the 1994 Groundfish Manaaement Plan)

Stock	1993 TAC	1993 Catch	1994 TAC	1994 Catch (to Oct. 26)	FRCC 1995 TAC/Fishing Recommendation
Cod 2GH	1,000	3	1,000	0	200t for test fishery
Cod 2J3KL	Closed	11,400	Closed	955	Moratorium
Cod 3Ps	20,000	14,900	Closed	500	No directed fishing
Cod 3Pn4RS	18,000	18,200	Closed	500	No directed fishing
Cod 4T+4Vn(N - A)	13,000	5,200	Closed	850	No directed fishing
Cod 4Vn (M - O)	1,800	650	Closed	50	No directed fishing
Cod 4VsW	11,000	3,500	Closed	280	No directed fishing
Cod 4X	15,000	16,000	13,000	11,130	9,000t
Cod 5Zj,m	15,000	12,500	10,000	5,100	No directed fishing to June,1995;review prior to then
Haddock 3LNO	500	900	500**	1	No directed fishing
Haddock 3Ps	500	100	500**	10	No directed fishing
Haddock 4TVW	By-catch	1,200	By-catch	76	No directed fishing
Haddock 4X	6,000	6,800	4,500	3,830	6,000t
Haddock 5Zj,m	5,000	4,100	3,000	2,020	No directed fishing to June,1995;review prior to then
Pollock 3Ps	600	100	500**	14	No directed fishing
Pollock 4VWX5Zc	21,000	21,100	24,000	13,700	14,500t
Redfish 2+3K	20,000	2	1,000	9	200t for test fishery
Redfish 3O	14,000	15,700	10,000	1,610	10,000t; small fish protocol

Stock	1993 TAC	1993 Catch	1994 TAC	1994 Catch (to Oct. 26)	FRCC 1995 TAC/Fishing Recommendation
Redfish 4RST+3Pn (Jan.-May)+4Vn (Jan.-May) - Unit 1	60,000	51,100	30,000	19,100	7,500t; small fish protocol; fishing season to be defined
Redfish - 3Ps4Vs4Wfgj+3Pn (Jun.-Dec.)4Vn(Jun.-Dec.) - Unit 2	28,000	27,100	25,000	21,250	20,000t; small fish protocol; no fishing Nov.-Dec. in 3Pn-4Vn
Redfish 4WdehklX - Unit 3	10,000	5,100	10,000	4,900	10,000t
American plaice 2+3K	5,000	80	500**	8	No directed fishing
American plaice 3Ps	3,000	800	500**	74	No directed fishing
American plaice 4T	10,000	1,900	5,000	1,940	5,000t
Witch flounder 2J3KL	4,000	340	1,000	10	No directed fishing
Witch flounder 3Ps	1,000	1,000	1,000	310	1,000t
Witch flounder 4RST	3,500	900	1,000	100	1,000t
Flatfishes - 4VWX	14,000	7,942	10,000	5,400	7,500t
Greenland halibut 0B+1 B-F	25,000	11,900	25,000	4,700	11,000t; evaluate merits of closing of spawning area.
Greenland halibut 2+3KL	50,000	62,000	25,000	35,500	25,000t
Greenland halibut 4RST	4,000	2,800	4,000	3,300	4,000t; measures to target fish larger than 50cm
Roundnose grenadier 0+1	4,000	100	4,000	0	4,000t
Roundnose grenadier 2+3	11,000	4,400	3,000	37	3,000t
Silver hake 4VWX	75,000	29,000	30,000	7,200	60,000t
White hake 4T	3,600	1,500	2,000	690	No directed fishing

Stock	1993 TAC	1993 Catch	1994 TAC	1994 Catch (to Oct. 26)	FRCC 1995 TAC/Fishing Recommendation
Argentine 4VWX	10,000	0	1,000	0	1,000t
Atlantic halibut 3NOPs4VWX5Zc	3,200	1,200	1,500	1,150	850t; review mandatory landing proivisions
Atlantic halibut 4RST	300	150	300	110	300
Winter flounder 4T (Not in the Groundfish Manaaement Plan)	No TAC	1,200	No TAC	400	Allow directed fisheries only in specific areas

4. Status Report on FRCC Subcommittees

4.1 FRCC Subcommittees

In its November 1993 report to the Minister, the Council unveiled six Subcommittees in the following areas: (1) stock assessment; (2) historical perspectives; (3) environment and ecology; (4) communications; (5) management and regulations; and (6) gear technology. The purpose and operational framework for each Subcommittee was outlined. The value of the Subcommittees was further underlined by specific undertakings contained in the recommendations for 1994.

The Council is pleased to report that the Subcommittees have made key strides in fulfilling their mandate by helping the Council to study the conservation aspects of important issues affecting the industry in a more in-depth and substantive manner.

4.1.1 Stock Assessment Subcommittee

One of the first tasks of the Stock Assessment Subcommittee in the past year was to re-examine the format used for the Annual Stock Status Report on Groundfish and to suggest modifications which would enhance its utility without making it appear too unfamiliar. The format of the 1994 Stock Status Report was a result of this exercise.

The Subcommittee also requested a report on the so-called retrospective discrepancy pattern, whereby successive population analyses of many stocks yielded progressively smaller estimates in successive years. While the conclusion reached was that there was no systematic way to correct for this potential discrepancy, its effects were noted in relation to the reliability of current and future estimates.

Over much of 1994, the Subcommittee has been concerned with issues surrounding the re-opening of those fisheries which are now closed. The Subcommittee met on six occasions and participated in a joint workshop (held in St. Andrews, N.B., on July 19-20) with stock assessment scientists of the Department of Fisheries and Oceans to discuss possible biological criteria for re-opening closed fisheries and conservation. The Subcommittee's work led to the preparation of a summary discussion paper entitled "Considerations on How to Re-open a Closed Fishery" which was made available to the public at the time of the FRCC's consultative meetings in September 1994. A more extensive document, which includes explicit discussion of the hierarchy of issues surrounding re-opening a closed fishery and pursuing a

sustainable fishery, is also being prepared for public review early in 1995. This document will be the basis for extensive consultations.

Another issue of concern to the Subcommittee is the manner in which traditional knowledge, based on fishers' experience, may be incorporated within, or used in parallel, with scientific survey and analysis methods. The Subcommittee will begin to focus more closely on this issue in the months ahead.

4.1.2 Historical Perspectives Subcommittee

The purpose of the Subcommittee is to review case studies of fish stocks throughout the world, which have exhibited dramatic collapses and recoveries, with the view of understanding how the present state of the groundfish stocks in Atlantic Canada developed and, more importantly, identify science and management priorities to assist recovery.

The Subcommittee met five times in 1993. At the first meeting, the following criteria to select stocks for in-depth examination were agreed upon: at least one stock from each of the ecological regions used by the FRCC, namely, Newfoundland Shelf, Scotian Shelf, and Gulf of St. Lawrence: cod stocks from outside the Canadian zone from ecological regions broadly similar to the above-mentioned regions; and stocks which have collapsed and recovered as well as stocks that have apparently never recovered. Based on these criteria, the following stocks were selected: northern cod (2J3KL), southern Gulf cod (4T-4Vn, Jan-Apr), eastern Scotian Shelf cod (4VsW), West Greenland cod, Icelandic cod, Barents Sea cod, Unit 1 redfish and Grand Banks haddock.

The Subcommittee discussed parameters and possible considerations including the quantity and quality of historical data, fluctuations in stocks, the impact of technology, the incidence of such practices such as discarding, highgrading, misreporting, and their spiralling distortion on stock assessment, the role of overcapacity as an incentive to cheat and overfish, increasing seal populations, and the quality of scientific information.

4.1.3 Environment and Ecoloav Subcommittee

The central objective of the Environment and Ecology Subcommittee is "to develop an understanding of the links between physical oceanographic conditions and biological indicators, an understanding of predator-prey relationships and to recommend appropriate steps towards the FRCC goal of a more ecological approach to conservation and management of fisheries resources." The Subcommittee has met on four occasions during the past year and has pursued the subject by receiving expert presentations on the current state of knowledge on the physical oceanography of the east coast of Canada, seal population dynamics and their ecology, and modelling coastal marine ecosystems.

In addition to the Subcommittee's deliberations, the full FRCC has had two sessions designed towards defining an ecosystem approach. Topics considered include: limitations of classical fisheries models, environment-fish'production relationships, plankton productivity, cod-capelin interactions, and analysis of seal predation. Further defining, developing and implementing such an approach is a key priority of the Subcommittee for the near term.

In accordance with a commitment made in the FRCC report of November 1993, the Subcommittee also prepared a discussion paper "Some Issues Related to Seal-Fisheries Interactions in Eastern Canada". This paper, released by the FRCC in September 1994, provides a brief summary of what is currently known by scientists in the form of addressing five key questions, namely: (1) What are the current population estimates and trends in the numbers of grey seals, harp seals and hooded seals in Eastern Canada? (2) What is the seasonal distribution of these species? (3) What do the three seal species eat? (4) What are the food requirements of grey harp and hooded seals? and (5) What are the impacts of seals on commercial fish stocks?

4.1.4 The Communications Subcommittee

The Communications Subcommittee assists the FRCC by designing plans and strategies for explaining the FRCC mandate, process and activities especially the public consultations of the Council. The Subcommittee met on 6 occasions in 1994 to discuss ways to improve communications with FRCC stakeholders. This year, Council members formed core groups which were responsible for organizing the public consultations.

A newsletter is planned for the near future. Its goal is to better inform stakeholders and interested individuals and groups of the ongoing work of the FRCC and its subcommittees. The FRCC believes that development of conservation attitudes toward fishery resources is a fundamental element of sustainable fisheries. In 1995, the Subcommittee will undertake communications and establish partnerships to assist in developing a conservation ethic.

4.1.5 Manaaement and Reaulations Subcommittee

The Management and Regulations Subcommittee undertook to study the conservation implications of management measures. For example, the subcommitte held consultations with those involved in the redfish fishery and with DFO staff. A report was tabled for the council which noted that serious questions need to be addressed such as the definition of Unit 1 and 2 redfish, catch of small fish and cod bycatch rules.

The Subcommittee has recently undertaken an examination of the problem of re-direction of effort to other species when groundfish stocks remain closed or fished at reduced levels. This study is expected to be completed in the new year.

4.1.6 Gear Technology Subcommittee

This Subcommittee met 7 times in 1994 and has as its goal the determination, for each harvesting technology, the conservation implications, optimum manner of usage and relative desirability from a resource conservation perspective. This evaluation will be based on an objective analysis of historical experience and current evidence concerning habitat impact, gear selectivity, inherent manageability, the potential for improvement or abuse of the technology, and any other relevant considerations.

In the first phase of its work, the Fishing Gear Technology Subcommittee was empowered to commission an independent and objective study on the state of knowledge of conservation implications of the major fishing gears used in Atlantic Canada. The study was based on existing literature and on relevant experience. This work has been conducted in collaboration with the Canadian Centre for Fisheries Innovation in St. John's and the Fishing Industry Services Branch of the Department of Fisheries and Oceans in Ottawa.

From the results of this study, the FRCC has prepared a discussion paper, to be issued before the end of 1994, which describes conservation advantages and disadvantages of each gear, including the selectivity of each gear, the environmental

and/or habitat impacts of each gear technology, the manageability implications, and the potential for abuse. A small industry working group has also conducted a "truthing" review of the document.

5. Public Consultations On 1995 Conservation Requirements

The FRCC conducted two rounds of extensive consultations on groundfish with stakeholders throughout Atlantic Canada, Quebec and the Northwest Territories in 1994. Following the release of the Stock Status Report on June 28, the Council held a series of information dissemination meetings. The main purpose of these meetings was to allow DFO scientists to present the most recent stock status information on locally relevant groundfish stocks and to discuss this information directly with fishermen and fishing industry representatives.

The second round of consultations was conducted in September, with the exception of a special consultation on redfish which was held on October 7. A list of briefs presented at these meetings as well as other submissions sent to the FRCC is contained in Appendix Ill.

Gaspe, Quebec ▪ July 5, 1994

There were 18 stakeholders, 3 FRCC members, and 3 officials from DFO at this meeting.

Concerns were expressed about the following issues: the movement of cod to deeper waters and the implications for research methodology; the urgency of sentinel fisheries; the definition of the three Units of redfish; higher populations of seals and possible impact on groundfish rebuilding; recreational fishery; a request that the FRCC review pelagic species; and general fishery management issues such as misreporting of catches.

Meteghan, Nova Scotia ▪ July 5, 1994

The meeting was attended by 16 stakeholders and 5 members of the FRCC. In addition, there were 4 officials from DFO, and representatives from the governments of Nova Scotia and New Brunswick in attendance.

Issues raised during the meeting included: the need to understand the fishery as a whole and the impact of increased effort and management initiatives such as trip limits and ITQs; possible relationship between recruitment and water temperature; the need to make the research vessel trawl survey more representative by sampling more inshore areas; the banning of the diamond mesh for mobile gear vessels,less than 65ft, fishing under the offshore temporary vessel replacement policy ; dumping of

small haddock because of possible closures if the small fish were landed; the shortage of information on flatfish in SW Nova Scotia and the Bay of Fundy; the growth in seal populations and the increasing incidence of worms in groundfish; the effectiveness of the haddock box closure; the methodology of pollock assessments and the comparison of survey and commercial catch rates; and the integrity of the redfish Units.

Caraquet, New Brunswick - July 6, 1994

There were 15 stakeholders, including the provincial Minister of Fisheries and Aquaculture, 3 FRCC members and 3 officials from DFO in attendance.

The following issues were discussed: the continuing absence of cod and flatfish on the fishing grounds as compared to 1993; the possible impact of a large abundance of snow crab on cod and flounder stocks; a redefinition of the 4TVn (J-A) cod stock to include November and December; drop in landings of winter flounder due to cod by-catch restrictions rather than reduction in biomass; the sightings of seals in non-traditional waters and possible impact on stock rebuilding; the rationale for a recreational cod fishery as opposed to such a fishery for lobster and snow crab; reports of dumping of cod in the mobile gear plaice fishery near Cheticamp; and the need for one DFO region to manage the 4TVn cod stock.

Liverpool, Nova Scotia - July 6, 1994

The meeting was attended by 17 stakeholders, a representative from the Nova Scotia government, 5 members of the FRCC, and five DFO officials and .

Discussion covered the following issues: the need for a closure of the herring roe fishery to protect an important food source for cod; the cyclical nature of the fisheries; the mistrust between scientists and fishermen; the conflict between a policy which forces the landing of all catches and a policy which closes the fishery if too many small fish were landed; the number of fish killed should be more important than fish weight; otter trawl surveys are not representative of inshore areas; the examination of a seal's stomach contents taking into account the consumption of the soft tissues of cod; the prey relationship between cod and haddock in 4X; the impact of the silver hake fishery on immature haddock and cod; and the status of Unit 3 redfish.

Cheticamp, Nova Scotia ▪ July 7, 1994

The meeting was attended by 22 stakeholders, 3 FRCC members and 10 officials from DFO. Participants also included 10 DFO regional officials including 4 from the Moncton office and 6 from the Antigonish and Cheticamp offices.

Issues raised during the meeting included: large concentrations imply that the biomass estimate is too low; the timing of research surveys and their methodolgy; the capture of large cod in the directed plaice fishery using 145mm-155mm square mesh; the need for sentinel fisheries; the closure of 4Vn winter cod fishery; the local abundance of American plaice is higher than past years; the impact of seals on cod, plaice and lobster; a suggested seal cull and the need for more information on seals; fishermen ready to assist scientists in collecting more information on the relationship between cod and lobster especially during moulting season; the need to build some flexibility in the groundfish recreational fishery for lobster-only fishermen; dumping in the plaice fishery to avoid cod bycatch problems and possible closures and the need for flexibility in those rules; and the dumping of small undersize plaice and misreporting of cod for hake.

Petit-de-Grat, Nova Scotia ▪ July 7, 1994

The meeting was attended by 11 stakeholders, 3 FRCC members, 7 DFO officials and a representative from the government of Nova Scotia.

The discussion covered the following issues: the restrictions on the recreational fishery need to be tightened; the otter trawl surveys do not include enough samples of inshore areas; the closure of herring and mackerel fisheries to protect important feed stocks for cod; sentinel fisheries should be put in place to monitor abundance of groundfish stocks, especially contentious stocks like 4Vn (M-O) cod; the redfish stocks and the linkage between year-classes; the possibility of 30 as a nursery area for redfish which later migrate into other areas; the need for further consultations on redfish prior to any recommendations for 1995; the impact of seals and the need for immediate action to stop the-growth of the herds; and the need to curb effort re-direction onto flatfish stocks.

Moncton, New Brunswick - July 8, 1994

The participants included 11 stakeholders, 6 members of the FRCC and 13 DFO officials.

The issues raised included the following: the reports of large concentrations of cod on the north side of P.E.I.; the need for sentinel fisheries to allow fishermen to assist scientists and provide for more effective information on appropriate timing of directed hake and flounder fisheries; the methodology and timing of research surveys; the poor condition of the hake and plaice fisheries and dumping of small hake caught in past years due to small mesh size; the definition of redfish stocks and the disappearance of the 1988 year-class; the impact of seals on cod and the need for a commercial harvest; the need for more flexibility on cod bycatch for directed hake and flounder fisheries; the efforts of fixed gear fishermen to develop a conservation harvesting plan; and the concern over the unnecessary burden imposed on traditional black-back flounder fishermen due to increasing mesh size.

Clarenville, Newfoundland - July 12, 1994

Participants included 12 stakeholders, 3 FRCC members, 2 DFO officials, a representative from the provincial government of Newfoundland and an official from Parks Canada.

Concerns expressed at the meeting touched on the following issues: the shortage of inshore sampling in otter trawl surveys; the timing of the 3Ps survey which should be conducted in November rather than February or March; the importance of sentinel fisheries in determining resident stocks and changes in abundance; the frustration with the lack of response by either DFO or the FRCC on this initiative; the need to control foreign fishing; the need to review spawning and juvenile area closures; controlling re-direction of effort to lumpfish and lobster fisheries; the apparent contradiction of closing groundfish fisheries in 3Ps due to high cod bycatch and the lack of cod in the scientific surveys; and the possible linkage between the southward movement of turbot into deeper water and predation by harp and hooded seals.

la Tabatière, Quebec • July 12, 1994

The meeting was attended by 65 stakeholders, 3 FRCC members and 4 DFO officials.

Issues discussed at the meeting included the following: the overall poor condition of the stocks; the discard of small redfish in the shrimp fishery and the positive impact of the Nordmore grate; the need to keep the bycatch of cod and Greenland halibut to an absolute minimum; the importance of a sentinel fishery project put forward by the Lower North Shore Fishermen's Association; the enforcement of the bag limit on recreational fishery and the need to restrict any fishery to fishermen only; the increasing abundance of seals in non-traditional areas and their impact on lumpfish; and the role of fishermen in helping science by collecting oceanographic data.

St. Anthony, Newfoundland • July 13, 1994

Participants at this meeting included 35 stakeholders, 4 FRCC members, 2 DFO officials and a representative from Human Resources Development.

Issues raised by the participants included the following: the skinny condition of the fish, similar to observations in the 1950s; the origin of fish caught in the Strait of Belle Isle; the detection of plankton on sounders and possible value in cod assessments: the causes of the current decline, "technology and man" ; the problem of highgrading; the use of the Nordmore grate in the shrimp fishery along with cod end adjustments to allow small fish to escape; the use of sentinel fisheries to collect information rather than provide jobs; and the explosion of the seal populations and the urgency of completing research on the impact of predation on cod stocks.

Stephenville, Newfoundland • July 14, 1994

This meeting was attended by 3 stakeholders, a representative of the provincial government, 4 FRCC members and 2 DFO officials.

During the discussions, the following issues were raised: the abundance of squid and warmer waters in the Cabot Strait area; the possible movement of redfish to deeper and warmer waters; the small size and low abundance of capelin; the value of the Nordmore grate to protect small redfish; the ineffectiveness of a top codend given the small cod bycatch allowed; the need to have sentinel fisheries because there is no fishery and no information for assessment purposes; the bag limit in the recreational fishery and a black market fishery; the presence of seals and their consumption not

only of cod but also other species which provide food for the cod; and the need for better communications among organizations to promote public meetings.

Twillingate, Newfoundland ▪ July 14, 1994

This meeting was attended by 12 stakeholders, a provincial government official, 3 FRCC members and a DFO scientist.
The discussions included the following issues: the need to change otter trawl surveys to better cover inshore areas; the use of sentinel fisheries to promote a partnership between fishermen and scientists; the need to improve fisheries management before any re-opening of fisheries; the need for a conservation campaign targeted at fishermen; tour boats should not be allowed to fish; the need to take an ecosystem approach for understanding and exploitation; large by-catches of cod are not being monitored; the closure of capelin seine fishery to protect an important food stock for cod; the consumption of cod and other species like capelin by seals; the closure of the northern turbot fishery; and the predator-prey linkage between cod and crab has allowed crab population to explode.

Iqaluit, Northwest Territories ▪ August 2, 1994

Following a regular meeting of the Council, a meeting was held with representatives of the Nunavut Widlife Management Board,(NWMB), to discuss Greenland halibut.

Issues raised during the discussions included the following: the possible presence of a Canadian bay stock similar to the Greenland Fjord stocks; why the stock had gone from underutilized to overfished in such as short period of time; the lack of survey work done in the Nunavut Settlement Area; the lack of scientific knowledge for resource assessments; and the need to appoint a representative from the NWMB to the FRCC.

Pangnirtung, Northwest Territories ▪ August 4, 1994

This meeting was attended by 21 stakeholders, 7 FRCC members and 2 lnuit interpreters.

The issues brought forward during the discussions included the following: the inadequacy of surveys in Cumberland Sound and the need for a proper hydrographic survey; the willingness of fishermen to cooperate with scientists; the increasing number of harp seals with longer stays in the areas; and the problems posed by sharks.

St. John's, Newfoundland - September 12, 1994

This meeting was attended by approximately thirty-five stakeholders, 9 FRCC members and 6 DFO officials . There were 9 briefs presented at the meeting (see Appendix III).

Issues raised during the meeting included: the scarcity and poor condition of 2J3KL cod; the state of the capelin stock and its impact on rebuilding cod; the value of traditional ecological knowledge and the status of various projects in Newfoundland; the need for early decisions in the Greenland halibut fishery in order to avoid the disruptions of in-season adjustments; concern about large number of nets used in that fishery and concern that the stock may be in even poorer shape than is currently believed; with respect to Gulf redfish, concern with bycatches in the 1994 offshore winter fishery and the need for more flexible bycatch protocol; the current and potential contribution of aquaculture; the very poor shape of the capelin fishery and the possibility of closing it for 1995; the ongoing concerns about increasing seal population and serious negative impact on stock rebuilding and the need for government intervention to significantly reduce population of seals through commercial harvesting if possible; the recreational fishery was strongly criticized and recommended that it be immediately closed since catches are generally low and made up of very small fish; widespread support for sentinel fisheries and the need to get things moving; the discussion paper "Other Conservation Measures" was seen by some as concrete measures for the "fishery of the future" and the need to undertake further consultations on criteria outlined; the significant redirection of effort to the scallop fishery and the likely impact on this stock; the perception by many fishermen that DFO has a "use it or lose it" policy which is, in itself, having an impact on effort redirection; and the need to implement a rationalization program to reduce harvesting capacity.

Plum Point, Newfoundland - September 13, 1994

Approximately 75 stakeholders attended this meeting along with 5 FRCC members and 4 DFO officials. Three formal briefs were presented (Appendix Ill).

The discussions included the following issues: the interaction between seals and species such as cod and capelin; the expansion of the seal herds into areas at times of the year when they were not normally seen, such as the sighting of 200 grey seals in the Strait of Belle Isle; the need for an expanded seal hunt or cull; the declining state of the capelin stocks and the concern that these stocks are following the same decline as cod; the need for DFO and the FRCC to listen to the concerns about the

status of the caplin stocks; sentinel fisheries should be implemented in 1995; the recommended closure of the recreational fishery and the need to restrict it to commercial fishermen only, with a ban on jiggers; the tendency of redfish to "bunch up" in winter and catch results by midwater trawl during that period may not necessarily mean a healthy stock; the role of technology as a major contributing factor to the decline of the cod; a ban on the commercial capelin fishery, at least until the cod come back; and the need to change our fisheries management system before the re-opening of any fishery.

Port Aux Basques, Newfoundland - September 13, 1994

There were approximately 20 stakeholders at this meeting. Participants also included 6 FRCC members and a representative from the provincial government. Four briefs were presented to the Council (see Appendix Ill).

Issues raised during the meeting included: the negative impact of the recreational fishery on fragile cod stocks; the need to enhance, rather than discontinue, research vessel surveys; the urgency of getting the sentinel fisheries started; less flexibility for mixed species fisheries as fishermen can avoid other species; the generally poor condition of cod in 3Pn; the need for effort control and dockside monitoring and the importance of having further discussions; the level of abundance of tommy cod in harbours; increased concern with respect to large populations of seals and their impact on rebuilding cod stocks; low abundance of capelin and the impact on the feeding pattern of cod; increased. use of Traditional Ecological Knowledge in stock assessment; and the possible negative impacts of the increased level of effort in lumpfish fishery.

Harbour Breton, Newfoundland - September 14, 1994

Approximately 30 stakeholders attended the consultation. There were 5 FRCC members and 2 officials from Fisheries and Oceans. Two formal presentations were given to the Council (see Appendix Ill).

The meeting covered a number of issues including: the state of the redfish stocks and recent experience by Fishery Products International with redfish and turbot; the number of pockets of redfish are fewer and harder to find; the quality of scientific information available to the Council and the concern that the Council could pay undue attention to management issues and overlook the integrity of the scientific advice; the importance of the quality of science available to the Council and the need to make a strong case for ensuring that the DFO program review does not diminish that quality;

the value of an ecosystem approach to fisheries conservation; the concern that DFO mmanagement policies such as licensing (use it or lose it) are causing conservation problems; the decline in Unit 1 redfish; the lack of support for a developmental program for turbot; the need for a moratorium until we have better science on the stock; significant opposition to the recreational fishery; the negative effects of some fisheries management measures on conservation; the effectiveness of the dockside monitoring program; the importance of sentinel fisheries; the closure of spawning areas during the spawning season; a ban on a commercial capelin fishery, and the need for a more conservation-oriented attitude among all stakeholders.

Cap-Aux-Meules, Iles de la Madeleine, Quebec - September 27, 1994

The meeting was attended by approximately 25 stakeholders, 6 FRCC members, 2 representatives from the province of Quebec and 8 DFO officials. . There were three formal presentations (see Appendix Ill).

Issues raised during the meeting included: the need for a continued closure of the Gulf cod fishery; the negative impact of the recreational fishery and a lack of control which undermines all efforts to rebuild stocks; only permit a charter boat fishery to reduce numbers of participants; the lack of scientific knowledge on Greenland halibut but problems with stock not as serious as other fisheries; the substantial increase in the number of participants in the fixed gear turbot fishery (32 boats) was contrary to Minister's directive on not allowing a redirection of fishing effort; the lack of bycatch restrictions for mobile gear which have 23% bycatches while fixed gear are restricted to 10%; concerned about lack of implementation of sentinel fisheries; the overall situation with seals; and the need for different approach for controlling bycatch, for instance, combining ITQs with other measures such as effort control and gear selectivity.

Carleton, Québec - September 27, 1994

There were approximately 40 stakeholders in attendance. In addition to the 4 FRCC members, there were 7 officials from DFO in attendance. Three written presentations were submitted (see Appendix Ill).

The issues raised during the discussions included: the need for wider representation of fishermen on the Council; the need for drastic decisions for the future of the fisheries; need for more formal presentations by DFO biologists during public meetings; the consumption of "marine resources" by seals is potentially large and timing for any action is now; seals are an economic resource that is not fully utilized

at present; the need for more funds to allow scientists to sample seals in offshore areas; decisions on re-opening fisheries must be based on scientific information as complete as possible; sentinel fishery programs are an essential element of the knowledge base, mainly if closures are to be prolonged; the timeliness of scientific advice, needs to be matched with seasonality of the fisheries; quotas should be given in number of fish rather than tonnage to discourage the capture of small fish; should not catch only spawning fish as fishing pressure on these could become large; need to have more selective gear such as the Nordmore Grate; the need to control fishing effort as some fishermen who began with 60 nets are now using 350 gillnets; the costs for dockside monitoring should be paid by fishermen; the large bycatch of cod in the turbot fishery; the disappearance of cod in the areas where dogfish has arrived; the need to develop a dogfish fishery; the lack of access to the turbot fishery in the north; the 46 hour notice of closure not adequate to recover 10 miles of gillnets; the Nordmore grate should improve redfish recruitment; and the reproductive cycle of redfish.

Moncton, New Brunswick ▪ September 28, 1994

Approximately 15 stakeholders attended this meeting. There were 7 FRCC members along with 3 representatives from DFO. Two formal presentations were made to the Council (see Appendix Ill).

Issues raised during the meeting included: the need for a broader discussion with stakeholders on the 1995 issues that have inter-regional and inter-provincial implications, for instance, redfish; the need to involve all gears, and particularly mobile, in sentinel fisheries programs to develop a realistic index; the state of Units 1 and 2 redfish; the need for protected areas as essential to ensure diversity of species, to protect “a piece of the marine ecosystem”; the work on documenting the consumption of marine resources by seals should continue to be encouraged: re-opening criteria based solely on conservation rather than socio-economic considerations; the overcapacity problems must be addressed; the need to consider fundamental biological questions, such as migrations, when defining the fisheries of the future; the need to include gear selectivity in the conservation measures; universal dockside monitoring; the limitation of fishing seasons rather than fishing days to control effort; importance of continuing scientific work to further refine our understanding of migration in the 4Vn area; the low abundance of cod in 4T surveys; the virtual disappearance of American plaice in 4T in 1994; and the closure of the winter flounder often due to high levels of (small) cod bycatch.

Charlottetown, Prince Edward Island ▪ September 28, 1994

There were approximately 20 stakeholders in attendance. In addition to the 6 FRCC members, participants included a representative from the provincial government of P.E.I. and members from DFO offices in Moncton and Charlottetown. The Minister of Agriculture, Fisheries and Aquaculture also attended the early portion of the meeting. There were three formal submissions (see Appendix Ill).

Issues discussed during the meeting included: the possible role and establishment of Marine Protected Areas in resource conservation: the need to control fishing effort by measures that are ecologically sound; the need to protect spawning stocks; the relative merits of different gear types; the need for more accurate scientific advice on entire food chain; the integration of traditional knowledge into scientific work; the reliability of research surveys especially the September survey which found no improvement in total abundance of cod; a possible re-opening of southern Gulf cod fishery with reports of large abundance of cod all along the PEI shore; frustration with closures of fixed gear fisheries due to high cod bycatches; the inshore concentrations of cod due to herring spawning activities; the poor condition of 4T hake and possible closure; the impact of seals on stock rebuilding; and the need for better communications to counter the anti-sealing lobby.

Port Hawkesbury, Nova Scotia - September 29, 1994

Approximately 50 stakeholders attended this meeting along with 10 FRCC members. In addition, there were 6 officials from Fisheries and Oceans who participated in the consultation. There were 11 presentations (see Appendix Ill).

Issues discussed at the meeting included: the status, definition and recent catches of redfish Units 1 and 2; suggestions that the minimal impacts of area closures show that observers, dockside monitoring, requirements to land all fish, selective fishing practices and effective at sea deterrence would be more effective; need for better science and more effort control given that TACs and single species assessments have failed; the fairest means of effort control would be to set a TAC and limit the amount of gear; the consumption of seals which now exceeds the commercial harvest; need for immediate and effective action such as a regulated cull; the extension of dockside monitoring to all gear types; the involvement of more gear types in sentinel fisheries; a ban on any capelin fishery in 4VsW; a possible moratorium on the harvest of herring and mackerel in 4VsW by seiners; and the need to maintain 4X haddock at current levels; the silver hake stock haddock in 4VsW should remain closed; closed areas should be closed to all gear types; increase 4X

haddock quota in 1995; a groundfishery in 4T in 1995 with a mesh size of 145mm; recommendation that December to April fishery in 4TVn remain closed; and re-opening of fisheries only when stocks are healthy enough to sustain a viable fishery,

Pubnico, Nova Scotia - September 30, 1994

Approximately 90 stakeholders attended the meeting. There were 11 FRCC members along with 7 DFO officials in attendance. There were 11 presentations made to the Council (see Appendix ill).

Issues raised at the meeting included: the increased catch rates for stocks at variance with scientific reports, for instance, 5Z cod and haddock; the need for a seal cull; the difficulty of running a mixed species fishery through establishing single species quotas; the use of marine protected areas as another tool for management; the impact of otter trawling and discarding practices; the health of the haddock stocks, an estimated 25% increase in haddock in 1994 over 1993; ban draggers from landing halibut; increasing stocks including cod and haddock; recommendation for trip fishing for gill nets ; pollock, cod and haddock could support a larger TAC; for 1995, eight trips per month for longline, restricted to 20 tubs of trawl with 500 hooks per tub and landing of all fish caught; the use of selective gear used by draggers such as square mesh; suggestion that good accounting for fish landed should have precedent over cost of accounting system; and the historical fishing patterns of 4X cod, which has been fished at twice $f_{0.1}$ and haddock, which has always been fished at 3 or 4 times $f_{0.1}$.

Dartmouth, Nova Scotia - October 14, 1994

In response to requests from industry stakeholders during the regular 1994 summer and fall consultations, a separate meeting on Redfish (Unit 1, 2 and 3 and NAFO Division 30) was convened by the Council.

The meeting was attended by 15 stakeholders, one provincial representative, 7 members of the Council and 9 DFO representatives.

Most of the discussions centred on Unit 1 and Unit 2 with some discussion on redfish in NAFO Division 30 and very limited discussions on Unit 3. The issues that were discussed included: status of the stocks with more emphasis on decline in Unit 1 and need for more scientific research and data on all of these redfish stocks; changes in fishing patterns in 1994, catch rates and sizes of fish; migration of redfish

and stock definition related to catch& of redfish in 3Pn and 4Vn in November and December; and the origin and abundance of small redfish in NAFO Division 30.

6. SUMMARY OF RECOMMENDATIONS [3]

2. CONSERVATION RECOMMENDATIONS FOR 1995: ISSUES

2.1 Science Priorities

The Council remains convinced of the appropriateness of the direction recommended in its Report on Science Priorities and of the benefits to be derived from achieving it.

2.1 .1. An Ecological Approach

With respect to an "ecological approach", until we develop more of an empirical understanding of this complex process, we have to characterize many of the interactions in the ocean intuitively. In the face of uncertainty • good decisions can be made using common sense. We must be cognizant however, of the risks involved, but we must not be unduly fearful of proceeding down this road.

2.1.2. The Need for Better Information

Existing expertise in ocean acoustics within the Department of Fisheries and Oceans and within other government departments should be brought to focus on this problem of quantitative fish counting technology as a matter of priority.

2.1.3. Sentinel Flsherles

We reiterate the importance of sentinel fisheries; the need for a simplified procedure to implement them; the need for a sufficiently long commitment and sufficiently comprehensive coverage to ensure quality and continuity of the data obtained; and the need to develop a close rapport between sentinel fishermen, DFO scientists and managers, and the industry generally.

2.1.4. Traditional Knowledge

The Council reiterates its 1994 recommendation that DFO Science develop and implement effective mechanisms to systematically collect and use information from fishermen and the commercial fishery in stock assessment. The Council repeats the

[3] following the order In which they are found In the Report

need to develop closer ties between Department scientists and fishermen and suggests that if the results of scientific surveys are not accepted in parts of the community, scientists should engage in a dialogue with fishermen on the issues. We welcome in this respect a number of initiatives, including the recently formed Fishermen's and Scientists Research Society in Nova Scotia, as positive steps in that direction and urge the Department to encourage participation.

2.1.5. Focused Research

We recommend focused research on the causes of the continuing low levels of fish stocks and the wide-spread lack of recruitment.

2.2. Predator-Prey Relationships

2.2.1. Prey Species

However, prior to taking a definitive decision to close the capelin fishery, it is recommended that DFO conduct a full consultation with the industry (groundfish as well as capelin industry) and take into account both the then most current scientific advice on capelin and the serious concern expressed by the Council that fishing pressure on this prey species is a constraint to groundfish recovery.

Likewise, fisheries for other species which are at or near the base of the food chain such as herring and shrimp should be evaluated in the context of their dual role; these stocks are the base of fisheries in their own right but are also at the base of a food chain upon which the majority of commercially-fished groundfish stocks are precariously perched.

2.2.2. Predators of Groundfish - Seals

The FRCC has concluded that early action should be taken to significantly reduce the populations of all three species of seals to help the recovery of groundfish stocks.

There are a number of alternate approaches to achieve this, probably varying by species. To find the most appropriate one requires more discussion and, as much as possible, consensus. The Council therefore recommends that the Minister of Fisheries and Oceans, on a priority basis, convene a special forum on this issue, with all interested parties; that the forum consider the alternate approaches with all their implications, and develop for early implementation an action plan to achieve a meaningful reduction in the seal populations.

2.3. Foreign Overfishing

The Council is convinced it is essential to avoid the catch of juveniles if straddling stocks are to recover from their precariously low levels.

2.4. Fisheries Management - Conservation Concerns

The Council recognizes the tensions and sensitivities within the current environment. Nevertheless the Council recommends that the Department systematically review these management initiatives, and any new ones contemplated, with industry to ensure that, working together, the conservation effects are maximized.

2.5. Other Conservation Measures

The FRCC will be pursuing its evaluation of these other conservation measures over the coming months. In the meantime, the Council urges the Department of Fisheries and Oceans officials, together with industry groups, to continue to evaluate the feasibility of these measures as conservation tools to be used in conjunction with TACs and to develop suitable implementation plans for specific fisheries.

The FRCC believes that there is a need to protect special areas as part of future management and therefore, the use of' Marine Conservation Areas is a tool to be considered.

3. CONSERVATION RECOMMENDATIONS FOR 1995: STOCK-BY-STOCK

3.1 General

The FRCC continues to be concerned about by-catch controls and recommends that:

1. by-catches be truly incidental and kept to an absolute minimum;

2. all target fisheries be closed when the recommended “upset limit” for by-catch is reached.

3.2 Stocks of Labrador, Northeast Newfoundland Shelf, Grand Banks and Southern Newfoundland

3.2.2 Stock-by-Stock Recommendations

3.2.2.1 Cod - 2GH

The Council recommends that should any directed fishery be contemplated for 2GH cod, it be carried out within the framework of a scientifically coordinated test fishery and a nominal amount of 200t be provided for these purposes.

3.2.2.2 Cod - 2J3KL

The Council recommends for 2J3KL cod that the moratorium on fishing be continued in 1995; that, no recreational/food fishery be permitted; and, that a broad based sentinel fisheries program be implemented.

3.2.2.3 Cod - 3Ps

The Council recommends 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 recommends that efforts be made to expand surveys into inshore areas; that no recreational/food fishery be permitted; and, that a broad-based sentinel fisheries program be implemented.

3.2.2.4 Haddock - 3LN0

The Council recommends that there be no directed fishing for 3LN0 haddock in 1995 and that by-catches be limited to 100t.

3.2.2.5 Haddock - 3Ps

The Council recommends that there be no directed fishing for 3Ps haddock in 1995 and that by-catches be limited to 100t.

3.2.2.6 Pollock - 3Ps

The Council recommends that there be no directed fishing for 3Ps pollock in 1995 and that by-catches be limited to 100t.

3.2.2.7 Redfish - 2+3K

The Council recommends that should any directed fishery be contemplated for 2+3K redfish, it be carried out within the framework of a scientifically coordinated test fishery and a nominal amount of 200t be provided for these purposes.

3.2.2.8 Redfish - 30

The Council recommends for 30 redfish that:

1. research be accelerated on an urgent basis to determine the origin of the small fish found in this Division; whether or not it is an important nursery area for other redfish management units; and, the areas of highest incidence of small fish.

2. a small fish protocol be established for both domestic and foreign fleets to protect juvenile redfish;

3. pending clarification of the possible links with other redfish management units, the 1995 TAC be set at 10,000t.

3.2.2.9 Redfish - 3Ps4Vs4Wfgj+3Pn4Vn (Jun.-Dec.) - Unit 2

The Council recommends. for Unit 2 redfish that:

1. current scientific work be strengthened and elaborated in cooperation with the industry so as to clarify redfish management units, as well as to better understand migration patterns and stock status;

2. the 1995 TAC be set at 20,000t;

3. a small fish protocol be established to protect juvenile redfish;

4. no fishing be permitted in 3Pn and 4Vn during November and December;

5. Fisheries and Oceans, in consultation with industry stakeholders, limit the fishery as much as practical during the January to June period.

3.2.2.10 American Plaice - 2+3K

The Council recommends that there be no directed fishing for 2+3K American plaice in 1995 and that by-catches be limited to 100t.

3.2.2.11 American Plaice - 3Ps

The Council recommends that there be no directed fishing for 3Ps American plaice in 1995 and that by-catches be limited to 100t.

3.2.2.12 Witch Flounder - 2J3KL

The Council recommends that there be no directed fishing for 2J3KL witch flounder in 1995 and that by-catches be limited to 100t.

3.2.2.13 Witch Flounder - 3Ps

The Council recommends that the 1995 TAC for 3Ps witch flounder be set at 1,000t.

Greenland Halibut - 0B+1B-F

The Council recommends for Greenland halibut in 0B+1B-F that:

1. the 19.95 TAC be set below 11,000t. :

2. the Department of Fisheries and Oceans evaluate the conservation merits and the feasibility of closing a spawning area in the Davis Straits;

3. in view of the international nature of this resource recommendation 2 be given consideration in bilateral discussions with Greenland on appropriate sharing arrangements; and,

4. the Department of Fisheries and Oceans Science, working with scientists from other countries, design an appropriate scientific program for this stock.

Greenland Halibut - 2+3

The Council recommends for Greenland halibut in SubAreas 2+3 that the Department of Fisheries and Oceans Science, working with scientists from other countries, design an appropriate scientific program for this stock.

The Council continues to believe that catches in the order of the historical catch level of 25,000t should be a maximum level. The Council notes that the NAFO TAC of 27,000t for 1995 is in the right order of magnitude and that a special NAFO meeting

will take place at the end of 1994 or the beginning of 1995 to determine the sharing of allocations for this management area.

3.2.2.15 Roundnose Grenadier - O+1

The Council recommends that the 1995 TAC for roundnose grenadier in Subarea 0 be set at 4,000t.

3.2.2.16 Roundnose Grenadier - 2+3

The Council recommends that the 1995 TAC for SA2+3 roundnose grenadier be set at 3,000t.

3.3 Stocks of the Gulf of St. Lawrence

3.3.2 Stock-by-Stock Recommendations

3.3.2.1 Cod - 3Pn4RS

The Council recommends that there be no directed fishing for 3Pn4RS cod in 1995 and that by-catches be kept to the lowest possible level; that no recreational/food fishery be permitted; and that a broad-based sentinel fisheries program be implemented.

3.3.2.2\ Cod - 4T+4Vn (N - A)

The Council recommends that there be no directed fishing for 4T+4Vn(N-A) cod in 1995 and that bycatches be kept to the lowest possible level.

3.3.2.3 Redfish - 4RST+3Pn (Jan.-May)+4Vn (Jan.-May) - Unit 1

The Council recommends for Unit 1 redfish that:

1. current scientific work be strengthened and elaborated in'cooperation with the industry so as to clarify redfish management units, as well as to better understand migration patterns and stock status;

2. the 1995 TAC be set at 7,500t;

3. a small fish protocol be established to protect juvenile redfish;

4. Fisheries and Oceans, in consultation with industry stakeholders, limit the fishery as much as practical during the January to June period.

3.3.2.4 American Plaice - 4T

The Council recommends that the 1995 TAC for 4T American plaice be set at 5,000t.

3.3.2.5 Witch Flounder - 4RST

The Council recommends that the management unit be redefined to include 4T and that the 1995 TAC for 4RST witch flounder be set at 1,000t.

3.3.2.6 Greenland Halibut - 4RST

The Council recommends that the 1995 TAC for 4RST Greenland Halibut be set at 4,000t; and that the Department of Fisheries and Oceans take steps to reduce the catch of undersize fish by introducing management measures to promote targeting of fish larger than 50 cm.

3.3.2.7 White Hake - 4T

The Council recommends that there be no directed fishing for 4T white hake in 1995 and that by-catches be kept to the lowest possible level. The Council also recommends that measures be taken to avoid catches of small hake in smelt and eel traps.

3.3.2.8 Atlantic Halibut - 4RST

The Council recommends that the 1995 TAC for 4RST Atlantic halibut be set at 300t.

3.3.2.9 Winter Flounder - 4T

The Council recommends that this fishery continue to be monitored and that the Department of Fisheries and Oceans in consultation with the industry introduce measures to allow directed fisheries only in specific and well defined areas and allow the release of small fish.

3.4 Stocks of the Scotian Shelf, Bay of Fundy and Georges Bank

3.4.2 Stock-by-Stock Recommendations

3.4.2.1 Cod - 4Vn (M - 0)

The Council- recommends that there be no directed fishing for 4Vn(M-O) cod in 1995 and that by-catches be kept to the lowest possible level.

3.4.2.2 Cod - 4VsW

The Council recommends that there be no directed fishing for 4VsW cod in 1995 and that by-catches be kept to the lowest possible level.

3.4.2.3 Cod - 4X

The Council recommends that the 1995 TAC for 4X cod be set at 9,000t.

The Council recommends that prior to the 1995 fishing season, a workshop[4] 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.

The Council recommends that, should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved.

[4]**The Council appreciates the complexities of the mixed species fisheries in 4X and was particularly impressed by the briefs and recommendations made to improve fishing practices. Such measures included mandatory use of square mesh for mobile; bigger hooks for fixed gear; mandatory hail and/or dockside monitoring; effort control measures such as limits on gillnets (which would have to be attended;) gear limits per vessel; extensive closed seasons; etc. These industry recommendations clearly demonstrate a positive intent by industry. The FRCC does not have the mandate or capability to deal with such operational matters. It is for this reason that we recommend a formal workshop with the Department and the industry as the most effective way to address this complex issue.**

3.4.2.4 Cod - 5Zj,m

The Council therefore recommends that bilateral consultations continue with the objective of undertaking management action appropriate to re-build this stock. In the meantime, the Council recommends that the fishery be closed until June 1995, prior to which time the Council will provide a definitive recommendation with respect to the 1995 TAC.

3.4.2.5 Haddock - 4TVW

The Council recommends that there be no directed fishing for 4TVW haddock in 1995 and, that the closure of the haddock box to all gears be continued.

3.4.2.6 Haddock - 4X

The Council recommends that the 1995 TAC for 4X haddock be set at 6,000t.

The Council recommends that, prior to the 1995 fishing season, a workshop (see footnote 3) 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.

The Council recommends that, should dumping, discarding and misreporting persist, the fishery be closed for the gear type involved.

3.4.2.7 Haddock - 5Zj,m

The Council recommends that bilateral consultations continue with the objective of undertaking management action appropriate to re-build this stock. In the meantime, the Council recommends that the fishery be closed until June 1995, prior to which time the Council will provide a definitive recommendation with respect to the 1995 TAC.

3.4.2.8 Pollock - 4VWX5Zc

The Council recommends that the 1995 TAC for 4VWX5Zc pollock be set at the revised $F_{0.1}$ calculation of 14,500t. The Council also recommends 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 4VWX5Zc pollock to protect the spawning stock.

3.4.2.9 Redfish - 4WdehklX - Unit 3

The Council recommends that the 1995 TAC for Unit 3 redfish be set at 10,000t; 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.

3.4.2.10 Flatfishes - 4VWX

Based upon available information, the Council has concluded that both the effort and the TACs for these stocks need to be reduced and, as well, the proportions between the two units should be changed to better reflect relative stock abundance. The Council recommends that the global 1995 TAC for all 4VWX flatfishes be set at 7,500t.

3.4.2.11 Silver Hake - 4VWX

The Council recommends that the 1995 TAC for 4VWX silver hake be set at 60,000t.

3.4.2.12 Argentine - 4VWX

The Council recommends that the 1995 TAC for 4VWX argentine be set at 1,000t.

3.4.2.13 Atlantic Halibut - 3NOPs4VWX5Zc

The Council recommends that as a precautionary measure, the 1995 TAC for 3NOPs4VWX5Zc Atlantic halibut be set at 850t; and, that mandatory landing provisions be reviewed regarding the discarding of incidental catches of halibut smaller than 32 inches.

Appendix I - Science Priorities

January 28, 1994

Honourable Brian Tobin, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, Ontario
K1A OE6

Re: Science Priorities

Dear Minister:

The mandate of the Fisheries Resource Conservation Council includes the responsibility **"... to advise the Minister on research and assessment priorities".**

By necessity, in this its first year of existence, the Council has concentrated on reviewing stock assessments and conducting public hearings primarily on the state of Atlantic groundfish stocks. Recommendations on fishing levels and related conservation measures have been made in two reports:

1. August 23 - "We Must Stop Chasing Quotas Down to the Last Fish!"

2. November 29 - "Partners in Rebuilding Fish Stocks for our Future"

At this stage, the Council is not in a position to provide a comprehensive assessment and detailed recommendations with respect to 'Science Priorities', nor do we believe this is expected. **We are, however, able to recommend basic directions with respect to certain Science priorities; some specific research needs; and, an important change in the "philosophy" of the way things are done generally.** These recommendations are based on a combination of views expressed at our public hearings conducted from July to November 1993, **a** presentation to the Council by senior DFO Science management in December, and discussion within the Council itself.

We believe that this is merely the start in what will become an important on-going process between the FRCC and DFO in which the Council will: work closely with DFO Science in following up the issues raised in this report; discuss Science

priorities at its public hearings; and, in time, make more comprehensive recommendations regarding Science priorities for the Department.

NEW APPROACH

1. It is important that a real move be made towards an ecosystem approach to fisheries management. The various bits and pieces of ecological knowledge must be reflected in a better understanding of the whole system. Thinking in terms of the whole ecosystem must become an essential and integral part of day-to-day activities, not just for Science, but within the Department of Fisheries and Oceans generally.

2. It is important that a multidisciplinary team approach be implemented in addressing fishery research questions - both in the laboratory and in the field.

3. It is important that scientists study "fishing" scientifically as a system and strive to better understand the relationship between fish (resource) and fishing (fishing practices, gear technology, capacity analysis, etc.). This must reflect the recognition that fishery science involves more than the natural sciences and that scientific research is a part of the development, implementation and evaluation of fishery management measures and economic policy tools.

4. It is important that a genuine thrust be made to give a more effective role in fishery science to those with practical experience and knowledge in the fishery, and the role must be rigorous and transparent.

5. It is also important that there be better integration and coordination in DFO Science between regions, between the Science, and the Operations, Policy and Enforcement Sectors, and as well, between the Department and the fishing industry generally.

PRIORITIES

1. Specifically, to realize improved fish stock assessments and a more effective role for those with practical knowledge and experience, we recommend that Science develop and implement effective mechanisms:

   a) to systematically collect and use information from fishermen and the commercial fisheries (including observer data) in stock assessments;

b) to continue the acquisition of commercial fishery data when fisheries are closed, through the means of test fisheries, sentinel fisheries, or other means involving members of the fishing industry;

c) to effectively involve fishermen and fishing vessels in scientific research;

d) to forge real partnerships with fishermen and the fishing industry which will improve the quality of the data available and hence improve the science. In so doing, DFO must choose partners who are representative (not necessarily those who volunteer or are highliners) and who are respected (otherwise the partnership will have no credibility). Also, the partnership must work both ways, otherwise the truly responsible individuals will not stay involved;

e) to use a variety of indicators in providing yearly reviews (including formal assessments where possible) for all stocks; and,

f) to resolve the question of "retrospective error" in current stock assessment practice.

2. We recommend "moving towards an ecosystem approach to fisheries management". In the short term this means that many of the interactions within the ocean may have to be characterized more intuitively, until we develop an empirical understanding of the ecosystem. We must not be fearful of starting down this road. In the longer term, it requires major undertakings including:

a) a plan for creating a database on the environment where the collection of environmental data is more oriented towards a global understanding of the ecosystem rather than studying a particular ecological problem in a specific small geographical area;

b) understanding the nature of the food chain and the role of its components by developing an explicit representation of the ecosystem as a tool for integrating new knowledge and testing ideas;

c) understanding the fishery system and its dynamics, including the role of fishermen as predators and the impact of fishing practices; and

d) analyzing the relative importance of the various factors impacting *on* each fish stock (e.g. the fishery, ocean conditions, predators, food availability, etc.).

SPECIFIC RESEARCH INITIATIVES

1. At this stage, no one has a full understanding of "the forces driving the decline" of the Atlantic groundfish resource. Finding answers to this has to be among the highest research priorities and. implies the use of emergency-type research teams.

2. How to best involve, communicate with and form partnerships with fishermen and the fishing industry requires a specific research effort, including the involvement of social scientists.

3. An interdisciplinary team is recommended to define, champion and implement both a short term and a long term approach to ecosystem management.

4. It is recommended that research be undertaken into increasing the efficacy of surveys without reducing the quality of assessments, in particular through the use of smaller research vessels and/or fishing vessels.

5. Research is required into determining optimal fish sizes for harvesting, and determining the conservation benefits of area closures and of closures during spawning seasons.

6. There is an immediate need for:

   - a better understanding of the Unit 1, Unit 2 and Unit 3 redfish situation which may include more surveys, research into migration patterns and species differentiation and the centralization of research and assessment responsibility for all three units:

   - .a better understanding of Greenland halibut in areas 0+1 and subareas 2+3KLMN plus a program to assess the situation in Cumberland Sound and adjacent areas.

The Council understands that to implement the directions recommended in this letter will require funds and resources which will have to be re-allocated from less important programs. We have not made any specific recommendations on how to do it, i.e., we have not addressed the funding, resources or structure required for delivery. However, we believe that Science managers must have some flexibility (money and resources) to respond to current situations as they develop, and to accommodate this, a percentage of each budget should be set aside to deal with unforeseen and immediate demands.

Finally, Minister, the Council acknowledges the superb cooperation and professional assistance it has received consistently from individual scientists, and DFO Science generally, through the sometimes difficult periods of the past year.

Yours truly,

Herbert M.
Clarke
Chairman

Appendix II ▪ Summary Fact Sheet ▪ Seals

Grey Seals

Grey seals are resident in Eastern Canada throughout the year, and do not undergo large scale migrations. There are two centres of pup production: Sable Island and the southern Gulf of St. Lawrence. Pup production has increased at about 13% per year on Sable Island and about 10% per year in the Gulf. The population in both areas was estimated to have been 142,000 animals in 1993. Grey seals consume about 9 kg per day of a typical mixed diet. Sand lance are the most important prey of grey seals on the Scotian Shelf followed by Atlantic cod and flatfishes. Other prey, such as herring, mackerel, silver hake, and squid are important seasonally. Atlantic cod appears to be a more important food of grey seals in the Gulf of St. Lawrence than on the Scotian Shelf. Other important prey in the Gulf include winter flounder and other flatfish, lumpfish, herring, mackerel, wolffish and capelin. Fishermen have also documented consumption of Atlantic halibut on longline gear. Grey seals are the primary host of the seal worm parasite.

Hooded Seals

Hooded seals undertake large-scale migrations but are present in Atlantic Canadian waters (in the Gulf and off Newfoundland and Labrador) from about December to early June. The 1990 population was estimated at about 400,000 animals and is thought to be increasing. Like grey seals, hooded seals are thought to consume about 9 kg per day of a typical mixed diet. Existing data suggests that Greenland halibut, redfish, herring, and Arctic cod are the main prey of hooded seals. In a recent small, offshore sample, Atlantic cod was an important prey. Hooded seals are capable of diving to great depths and turbot and redfish comprise a large portion of their diet while in the Newfoundland region. A recent study reconstructing the stomach contents of 72 seals collected from nearshore waters of Newfoundland between 1987-91 showed Greenland halibut and redfish to make up approximately 63% of the wet weight.

Harp Seals

Harp seals undertake a long-distance seasonal migration between their winter range in the Gulf of St. Lawrence and the Front (northeastern Newfoundland) and their summer range in arctic waters. In recent years, harp seals have moved south earlier and stayed longer. Moreover, they are moving further south than previously recorded. Observations suggest that many harp seals are in Canadian waters in NAFO subarea 2 and further south from October to June. The 1990 aerial survey estimated pup production at about 580,000 from which a population estimate of 3.1 million animals was made. This is the largest seal herd in Canada. Harp seals are smaller than grey seals and hooded seals and a 100 kg harp seal is estimated to consume about 5 kg of mixed species diet. Arctic cod, herring, redfish, capelin, and invertebrates seem to be the most important prey. Between 1990 and 1993, Atlantic cod accounted for about 2-10% of the weight of food eaten by harp seals in Canadian waters.

APPENDIX III

Summary of Briefs and Submissions Received During Summer and Fall as of October 26, 1994

St. John's, Newfoundland, September 12, 1994

David C. Schneider, Oceans Sciences Centre, Memorial University of Newfoundland

Dr. Lawrence Felt, Traditional Ecological Knowledge and Sentinel Fisheries Management Project, Memorial University of Newfoundland

Laura Jackson, Executive Director, Protected Areas Association of Newfoundland and Labrador

Paul Ripley, TEC Research Group, Memorial University of Newfoundland

Harry Harding, Beothuck Fisheries, Valleyfield (2)

Tom Best, Petty Harbour Fishermen's Cooperative, Petty Harbour

Earl Johnson, Inshore Fishermen's Improvement Committee, North Harbour, Placentia Bay

Dr. Richard L. Haedrich, Memorial University of Newfoundland

Dr. D. W. Steele, Memorial University of Newfoundland

George Chafe, Fisherman, Petty Harbour

Bruce Chapman, President, Fisheries Association of Newfoundland and Labrador

Charles Power, Sea Forest Plantation Co. Ltd.

Port aux Basques, September 13, 1994

David Feltham, Gulf Seafoods Inc.

Dave Johnson, UFCWU **

Hartley Hayman, representing Fishermen's Committees of LaPoile, York Harbour, and Burgeo

Lawrence Kavasek, Innovative Regional Community Futures Committee

Maxwell Seaward, Seaward Seafoods Co. Ltd.

Plum Point, September 13, 1994

Harry Hopkins, Chairman, Englee Fishermen's Committee

Andrew Hynes, representing fishermen's regional committees from Eddies Cove East to Port au Choix • *

Fishermen's Committee, Main Brook

Roland Hedderson, Fisherman, Straitsview

Dennis Coates, Fishermen's Resource Centres

Harbour Breton, September 14, 1994

Bill Wells, Vice-President, Fishery Products International

Jim Woodworth, Grand Falls-Windsor

Carleton, Quebec, September 27, 1994

Jean-Paul Gagné, L'Association Québécoise de l'Industrie de la Pêche

Gilbert Scantland, C.R.C.D. de la Gaspesie et des Îles-de-la-Madeleine

Rosaire Gauthier, Regroupement des pêcheurs professionnels du Nord de la Gaspesie

Alain Dugas, Regroupement des pêcheurs professionnels du Nord de la Gaspesie

Cap-Aux-Meules, Quebec, September 27, 1994

François Poulin, Directeur General, L'Alliance des pêcheurs professionnels du Quebec

Randy Jones, Quebec Lower North Shore Fishermen's Association **

Paul F. Delaney, president, Madelipêche Inc.

Gabrielle Landry, Regroupement des pêcheurs professionnels des I.M. **

Alain Dugas, Executive Director, Regroupement des pêcheurs professionnels du Nord
de la Gaspesie

Moncton, New Brunswick, September 28, 1994

Michael O'Connor, National Sea Products

Colin Stewart, Federation of Nova Scotia Naturalists

Charlottetown, Prince Edward Island, September 28

Diane Griffin, Executive Director, Island Nature Trust

Irene Novaczek, Environmental Coalition of P.E.I. • *

Kip Smith, 4T Enterprises Inc., Belle River

Port Hawkesbury, Nova Scotia, September 29, 1994

Michael O'Connor, National Sea Products Ltd.

Don Hart, Vice-President, Halifax West Commercial Fishermen's Association, Sambro

Ronald Henneberry, Eastern Shore Fishermen's Protective Association, Eastern Passage

Clifford Aucoin, Northern Cape Breton Fishing Vessels Association, Cheticamp

Kevin Nash, Glace Bay Inshore Fishermen's Association

Gary Dedrick, SW Nova Fixed Gear Association, Shelburne • *

Dave Bollivar, Seafreez Foods Inc., Dartmouth **

Mac Schrader, W.M. Schrader Fisheries Ltd., Tor Bay

Herb Nash, Local 6, Maritime Fishermen's Union, Glace Bay

Paul Bonin, Bay St. Lawrence Fishing Vessel Association • *

Percy Haynes Jr., Gulf N.S. Bonafide Fishermen's Association, Merigomish • *

C.T. Smith, Usen Fisheries Ltd.

Pubnico, Nova Scotia, September 30, 1994

Adlai Cunningham, President, Sea Star Seafoods, Clark's Harbour

Ricky Nickerson, Maritime Fishermen's Union

Nancy Schackell, Dalhousie University, Marine Protected Areas Network

Mark Butler, Ecology Action Center, Halifax

Sarah Huskilson-Cotter, Eastern Shelburne Fishermen's Association, Lockeport (2)

John Decker, Director, SW Nova Fixed Gear Association, Lockeport (2)

Evan Walters, Scotia Fundy Inshore Fishermen's Association, Barrington

Peter Surrette, Pubnico Ledge Fisheries

Russel Acker, Fisherman, SW Nova Fixed Gear Association

Claude d'Entremont, Inshore Fisheries Limited

Tim Nickerson, Fisherman, SW Nova Fixed Gear Association, Gulf of Maine Advisory Committee

Glenn Wadman, D.B. Kenney Fisheries Ltd.

Brian Giroux • SF Mobile Gear Fishermen's Assoc.

Dartmouth, Nova Scotia • October 7, 1994

Eric R. Roe, Cleat-water Fine Foods Inc.

David Decker, West Coast Representative, FFAW, Corner Brook

Other submissions received:

Sylvain D'Eon, D'Eon Fisheries Ltd., West Pubnico

Cheri A. Reechia, Marine Protected Areas, World Wildlife Fund

Leslie Beckmann, Marine Conservation Advisor, Canadian Arctic Resources Committee and Canadian Nature Federation

Mary Granskou, Executive Director, Canadian Parks and Wilderness Society

Eastern Fishermen's Federation

Clifford Aucoin, Northern Cape Breton Fishing Vessels Association, Cheticamp

Gabrielle Landry, Federation des pêcheurs semi-hauturiers du Quebec, Levis Quebec (2)

**** Indicates oral presentation only.**
( ) Indicates number of submissions.

Appendix IV ▪ FRCC Terms of Reference

TERMS OF REFERENCE

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 may also advise the Minister on the position to be taken by Canada 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 V - List of Members. of the Fisheries Resource Conservation Council

CHAIRMAN:

Herbert M. Clarke, St. John's, Newfoundland

Mr. Clarke came to his position as Chairman of the Fisheries Resource Conservation Council from Fishery Products International *(FPI),* the largest seafood company in Canada, where he was an Executive Vice-President from 1988 to 1992.

Prior to this, Mr. Clarke was an operations research analyst at Alcan, Director of Systems and Programming at Newfoundland and Labrador Computer Services Limited, a Deputy Minister in several provincial departments, and from 1985 to 1988, he was Clerk of the Executive Council and Secretary to Cabinet, the most senior public servant in the provincial government.

Mr. Clarke has served on the boards of the *Ocean Production Enhancement Network, the Canadian Centre for Fisheries-Innovation,* the *Centre for Cold Ocean Resource Engineering,* the *Newfoundland and Labrador Science Council,* and was Chairman of *Marystown Shipyards Ltd.* Mr. Clarke was a member of the *Canadian Delegation to the Earth Summit* in Rio de Janeiro in 1992.

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.

Dr. Jean-Claude BrQthes, Rimouski, Québec

A Professor of Oceanography at the *Université du Québec à Rimouski,* Dr. BrQthes' research interests lie in fisheries development, population dynamics and ecology, and coastal oceanographic processes. Dr. BrQthes has been at UQAR since 1978; during this time he has worked abroad on several projects, especially in Africa. Dr. BrQthes has done extensive research on some Atlantic fish stocks, and was one of four external members of the *Canadian At/antic Fisheries Scientific Advisory Committee.*

Dr. Anthonv 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, policy, strategic planning and bioeconomic modelling. He has written extensively on the Atlantic fishing industry, and has contributed to fishery science internationally. Prior to taking up his position at Saint Mary's in 1985, Dr. Charles was a stock assessment. scientist with the Department *of Fisheries and Oceans.*

Dr. Charles holds research grants from the Natural Sciences and Engineering Research Council and the International Development Research Centre. He is coordinator of an interdisciplinary Fisheries Seminar Series in Halifax, and is an Associate Editor of the Journal of Natural Resource Modeling.

Frank d'Entremont, West Pubnico, Nova Scotia

Mr. d'Entremont has been involved in the Atlantic fishery since 1972. He began his career fishing for herring and redfish in the Gulf of St. Lawrence. Since 1979, Mr. d'Entremont has been involved in dragging for haddock, cod and pollock in the Scotia-Fundy Region.

Mr. d'Entremont has worked in many capacities, including fisherman, vessel master and owner, and has a direct experience with a variety groundfish, shellfish and pelagic species. In 1986, Mr. d'Entremont, along with two partners, founded **Pubnico Ledge Fisheries** in southwestern Nova Scotia.

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.

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 also 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

A Professor of Oceanography at the University of British Columbia since 1965, Dr. LeBlond is the Director of the University's *Program in Earth and Ocean Sciences.* A world-renowned oceanographer, Dr. LeBlond is interested in the study of oceanic waves, coastal oceanography and fisheries problems. Dr. LeBlond was elected a Fellow of the *Royal Society of Canada* in 1982.

Dr. Jon Lien, St. John's, Newfoundland

A Professor of Psychology at Memorial University of 'Newfoundland (MUN), Dr. Lien is a researcher in animal behaviour and its application to the resolution of problems in animal management. He has spent ten years studying the interactions of inshore fishermen with whales and sharks in Newfoundland and Labrador. More recently, in his work at the Ocean Science Centre, Dr. Lien has been interested in resource education, conservation attitudes and the traditional ecological knowledge of resource users.

Dr. Victorin Mallet, Moncton, New Brunswick

The 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.*

Jones R. Sheehan, Cap Rouge, Québec

A self-employed fisheries consultant, Mr. Sheehan has considerable experience in the fishing industry in Quebec, He managed a salt fish processing plant from 1984 to 1986. He then worked as Secretary General for */'Association québécoise de l'industrie de /a pêche (AQIP),* the association representing Quebec's fish processors, and became its President and CEO in 1988. From 1989 to 1991 he was the CEO of *La Société de commercialisation Socomer Inc.,* a marketing consortium for fresh and frozen fish products. Mr. Sheehan has been a member of the boards of directors of the *Fisheries Council of Canada (FCC)* and of the *Canadian Association of Fish Exporters (CA FE).*

Trevor Taylor, Corner Brook, Newfoundland

Trevor Taylor was born 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 has 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 (FFAW) 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, Newfoundland.

Fred Woodman, Sr., New Harbour, Newfoundland

Owner and President of *Woodman's Fisheries,* Mr. Woodman has 40 years' experience in various aspects of the fishing industry. He has served as Chairman of the *Fisheries Association of Newfoundland and Labrador,* a Director and Chairman of the *Fisheries Council of Canada,* and Chairman of *Newfound Resources Ltd.,* a consortium of Newfoundland fish processors.

Maureen Yeadon, Halifax, Nova Scotia

Mrs. 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. Mrs. Yeadon served two terms as a Canadian Commissioner to the *Northwest Atlantic Fisheries Organization,* has been a member of the boards of directors of the *Fisheries Council of Canada* and of the *Seafood Producers Association of Nova Scotia,* as well as serving as Chairman of the Association. Mrs. Yeadon was also a member of the *Offshore Groundfish Vessel 0 wners Working Group.*

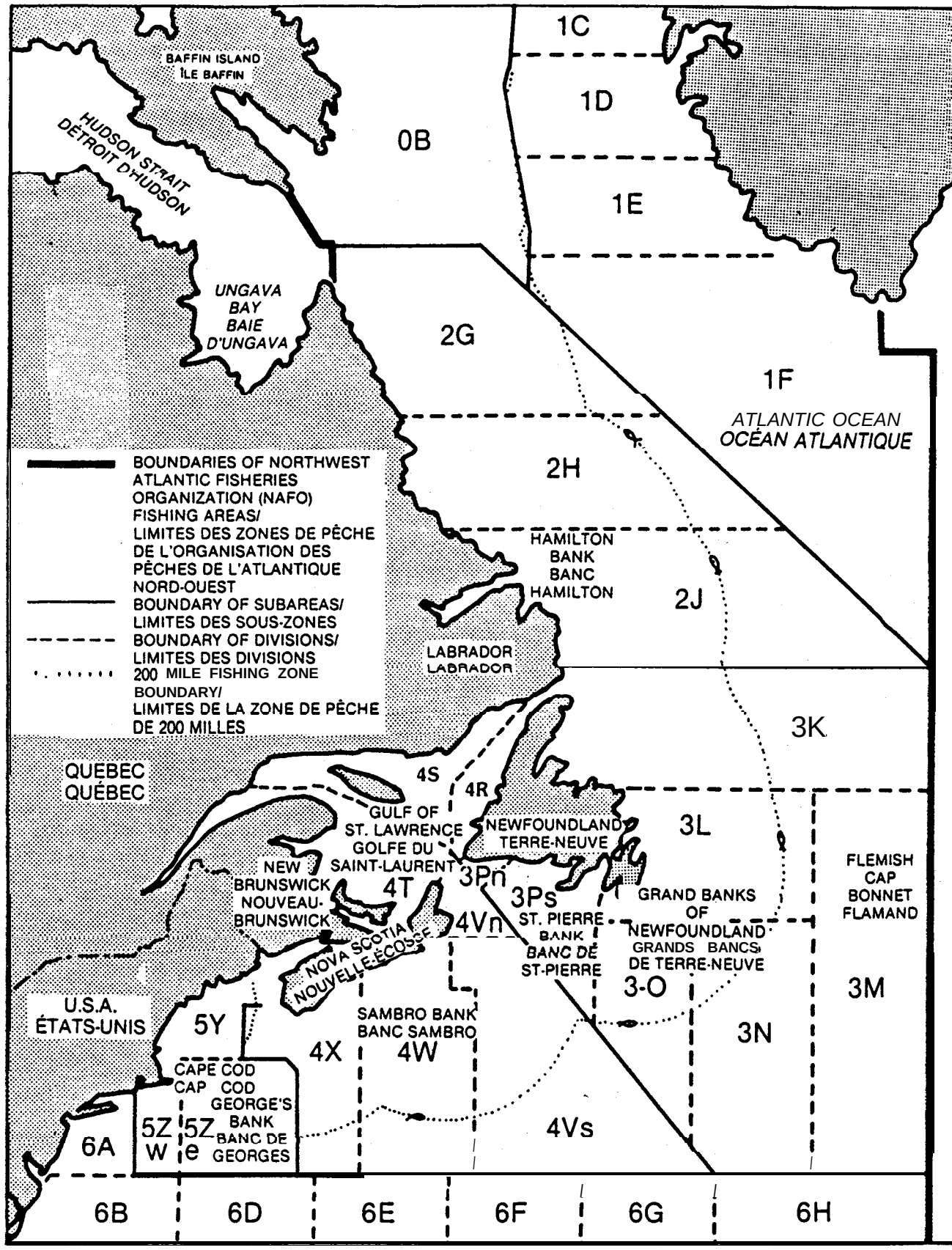
EX OFFICIO MEMBERS

From the Department of Fisheries and Oceans:

Dr. W. Doubleday	Director General, Biological Sciences
Jean-Eudes Haché	Executive Director, Fisheries Operations
Catrina Tapley	A/Director, Strategic Policy and Cabinet Affairs

From the Provincial Governments:

Jean-Paul Lusiaà-Berdou	Province of Quebec
Maryanne Janowicz	Province of New Brunswick
Clarrie MacKinnon	Province of Nova Scotia
David Gillis	Province of Prince Edward Island
Glen Blackwood	Province of Newfoundland and Labrador
Don Vincent	Government of the Northwest Territories


BAFFIN ISLAND
ÎLE BAFFIN
HUDSON STRAIT
DÉTROIT D'HUDSON
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6G
6H
ATLANTIC OCEAN
OCÉAN ATLANTIQUE
HAMILTON BANK
BANC HAMILTON
LABRADOR
LABRADOR
QUEBEC
QUÉBEC
GULF OF ST. LAWRENCE
GOLFE DU SAINT-LAURENT
NEWFOUNDLAND
TERRE-NEUVE
NEW BRUNSWICK
NOUVEAU-BRUNSWICK
NOVA SCOTIA
NOUVELLE-ÉCOSSE
ST. PIERRE BANK
BANC DE ST-PIERRE
GRAND BANKS OF NEWFOUNDLAND
GRANDS BANCS DE TERRE-NEUVE
FLEMISH CAP
BONNET FLAMAND
SAMBRO BANK
BANC SAMBRO
CAPE COD
CAP COD
GEORGE'S BANK
BANC DE GEORGES
U.S.A.
ÉTATS-UNIS
BOUNDARIES OF NORTHWEST ATLANTIC FISHERIES ORGANIZATION (NAFO) FISHING AREAS/
LIMITES DES ZONES DE PÊCHE DE L'ORGANISATION DES PÊCHES DE L'ATLANTIQUE NORD-OUEST
BOUNDARY OF SUBAREAS/
LIMITES DES SOUS-ZONES
BOUNDARY OF DIVISIONS/
LIMITES DES DIVISIONS
200 MILE FISHING ZONE BOUNDARY/
LIMITES DE LA ZONE DE PÊCHE DE 200 MILLES