FISHERIES RESOURCE CONSERVATION COUNCIL

1998 Conservation Requirements for the Gulf of St. Lawrence Groundfish Stocks and Cod Stocks in Divisions 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in Division 3Ps

Report to the Minister of Fisheries and Oceans

FRCC.98.R.1
March 1998

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Chapter 1: Introduction

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

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

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

Consultations

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

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

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

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

Effective communication between Science and the industry has never been more important. However, with the dramatic cuts to Science budgets and to personnel, communications and public relations are often seen as luxuries as Scientists are forced to do the work once done by several people. Unless proper communications are addressed, the unrest will continue to grow, and Science's credibility within the fishing community will continue to decline. The FRCC addresses this issue, in part, in our stock-by-stock recommendations and more fully in our Science Priorities Letter to the Minister of Fisheries and Oceans (FRCC.98.L.1 - Appendix 6)

Groundfish Conservation Framework

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

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

Index Fisheries

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

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

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

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

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

Natural Mortality

As part of the assessment of groundfish stocks in 1998, DFO Science adopted changes to the assumptions it has made about natural mortality on cod stocks. Natural mortality is any mortality observed outside of reported fishing landings or legal catches. In many cases, the calculated natural mortality has doubled and in some cases it has more than tripled. For certain stocks this means that in the absence of any commercial fishing, the stocks will still continue to decline. Changes in natural mortality are caused by harsh

environmental conditions, seal predation (and other predators) and removals from the stock through bycatches, recreational and food fisheries and illegal catches.

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

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

Seals

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

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

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

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

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

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

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

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

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

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

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

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Recreational and Food Fisheries

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

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

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

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

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

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

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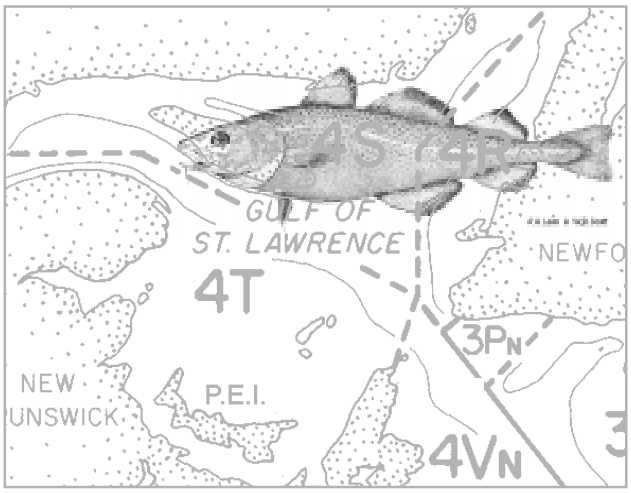
Chapter 2: Groundfish Stocks of the Gulf of St. Lawrence

2.1. Cod 3Pn4RS



History of FRCC Recommendations:

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

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

1997 Consultations:

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

Analysis:

The 1998 stock status report indicates:

- Mortality other than that induced by fishing catches, has increased in the recent years and is estimated at twice as high as observed in the 1980's.

Recommendation # 1:

The FRCC recommends that:

1.1. the TAC for 1998 be set at 5,000t to allow for a limited commercial fishery in this area;

1.2. the same conservation measures imposed as part of the CHP in 1997 apply again in 1998;

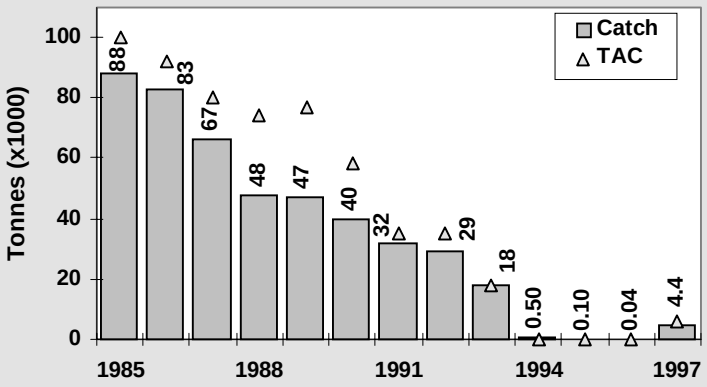
1.3. fishing not be concentrated on 1993 year-class;

1.4. fishing be minimized during peak spawning periods and on spawning concentrations;

1.5. tools be developed to accurately incorporate inshore biomass indicators in the assessment process;

1.6. strict controls be implemented in both the shrimp and turbot fisheries to avoid by-catch of juvenile cod; and

1.7. the winter fishery on Burgeo Bank should be limited to protect 3Pn4RS stock components.



*** 1997 Catch: as of Dec.31/97**

- The abundance of cod declined sharply in the late 1980s and early 1990s.
- The biomass was 26,000t at the start of 1998, which is only 10% of the average spawning biomass for the period 1974 to 1986.
- The low 4400t catch of 1997 induced a fishing mortality factor of 0.26, which is close to the $F_{0.1}$.
- The growth rate and condition of fish has improved in recent years.
- The 1993 year-class is the highest observed since 1991, but remains below average recruitment.
- Any catch in excess of 6,000t is likely to induce a decline of the stock biomass.
- A catch of 5,000t has an 80% certainty of allowing for stock rebuilding.

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

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

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

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

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

Sentinel Fishery:

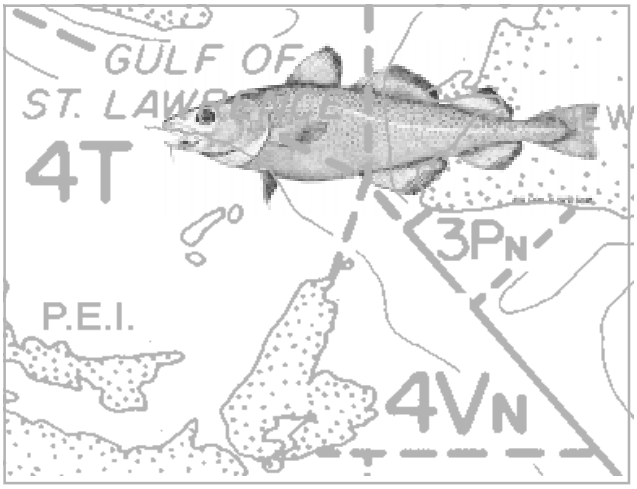
For the offshore mobile gear survey, the July abundance index doubled between 1995 and 1997, however remains low in absolute terms. The October index rose between 1995 and 1996 but declined in 1997. Inshore surveys are carried on by fixed gears (gillnets and hook-and-lines). Sentinel fishermen are allowed to fish where they want and their activities are monitored more as an Index Fishermen Program. Catch rates for all gears increased in 1996 but declined in 1997. Gillnet catch rates remain more or less stable in 4R area. Fishermen involved feel that the decline is chiefly caused by the commercial fishery that was taking place, as a great deal of effort was developed in a small region. In general terms, catch rates declined from 3Pn area to the north and this pattern is consistent over the three years of the sentinel fishery. Catch rates remained high, in 1997, for the fishing sites in southern 4R and in 3Pn areas.

Council's views on Stock Status:

Overall Stock Indicator:	**stock rebuilding, however at low level with limited improvement; better geographical distribution**
	Compared to average
Overall biomass :	**much lower than average**
Spawning biomass :	**lower than average with light increase**
Recruitment :	**weak 1991-1992 year-classes, 1993 year-class better**
Growth and condition :	**condition factor improving about average, growth rate back to normal rate**
Age structure :	**some improvement**

Recent exploitation level: fishery closed 1994-96, 1997 catch of 4,400t

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



History Of FRCC Recommendations:

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

Analysis:

The 1998 DFO Stock Status Report indicates that:

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

Recommendation # 2:

The FRCC recommends that:

2.1. there be no directed commercial fishery on this stock for 1998;

2.2. in order to be able to gather a grounded industry opinion on the state of this resource, where such strong and diverse views have become impediments to conservation and good management, an index program be established, in part, to gather information on seasonal changes in biomass distribution;

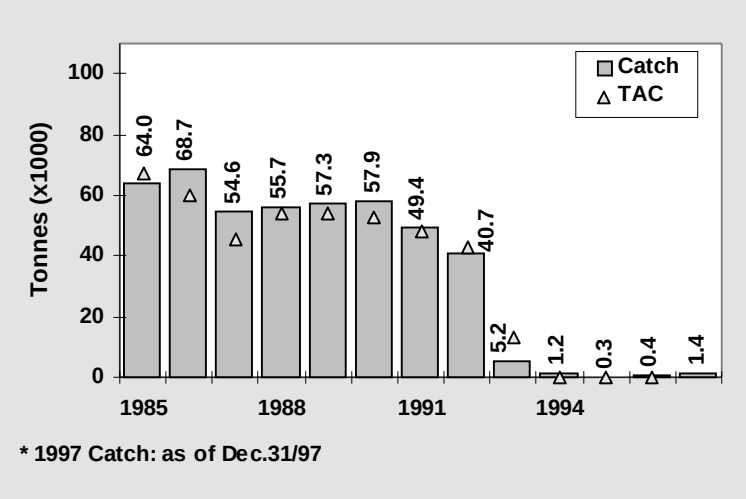
2.3. total removals for this program, the sentinel fishery and bycatches should not exceed 3,000t;

2.4. as part of this program:

- **the activity should be closely monitored and strictly enforced**
- **measures be taken to minimize activities during peak spawning seasons**
- **measures be taken and enforced to protect young fish**
- **an organized and coordinated system be implemented to gather information on catch and effort, and to build a reliable data base, including information on juvenile abundance and distribution;**

2.5. the planning for this program take place in conjunction with a special zonal session with DFO Science and the fishing industry to identify the concerns associated with the research vessel survey and methodically respond and/or address them in detail; and,

2.6. additional financial resources be made available to carry out this program.



*** 1997 Catch: as of Dec.31/97**

- the total biomass is near the lowest level ever observed;
- the total biomass is composed mainly of adult fish which are still growing but dying in greater numbers;
- the natural mortality rate for cod in 4T approaches 0.4, which is twice the expected rate. This means that approximately 33% of the adult fish are dying each year. This includes natural deaths, death by predators, sickness, malnutrition and unreported catches. It does not include death by reported catches, whether it is through recreational fishing or by-catches in other fisheries.

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

Sentinel Fishery

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

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

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

1997/98 Consultations

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

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

In Moncton, the meeting was attended by fishermen from N.B. and P.E.I.. At the meeting DFO scientists were asked to present their latest evaluations of the state of the stock. The picture was even worse than anticipated. According to the spokesman, the stock spawning biomass is now at its lowest around 80,000 tonnes and there is barely any recruitment. The natural

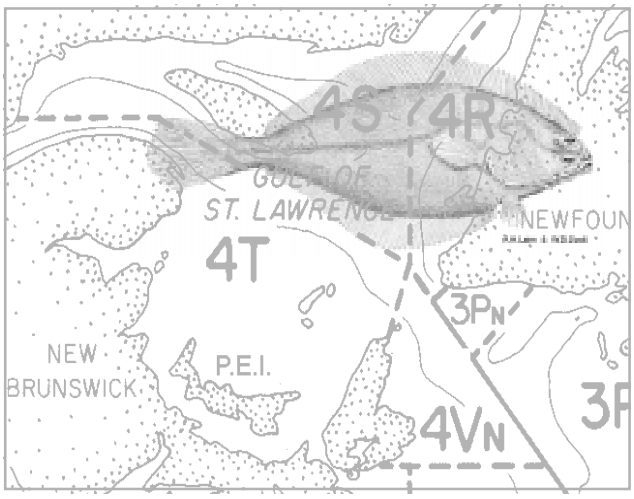
mortality which up till now had been estimated at 0.2 is now doubled at 0.4. The causes of this increased natural mortality are not clear. The usual culprits: environmental conditions, seals and other predators and unreported catches were mentioned. Some fishermen alluded to the fact that abuse during the recreational fishery was very serious and that the 300 tonnes estimated by DFO was more likely to be 10 times more. This would certainly have an impact on the calculations of the natural mortality. The fishermen recommended that the fishery be reopened. Their recommendations ranged from a small handline fishery of 2000 tonnes to a multigear fishery of 15,000 tonnes.

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

COUNCIL'S VIEWS ON STOCK STATUS:

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

2.3. American Plaice 4T



History of Recommendations:

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

1997/98 Consultations:

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

Analysis:

The 1998 Stock Status Report states that:

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

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

Recommendation #3:

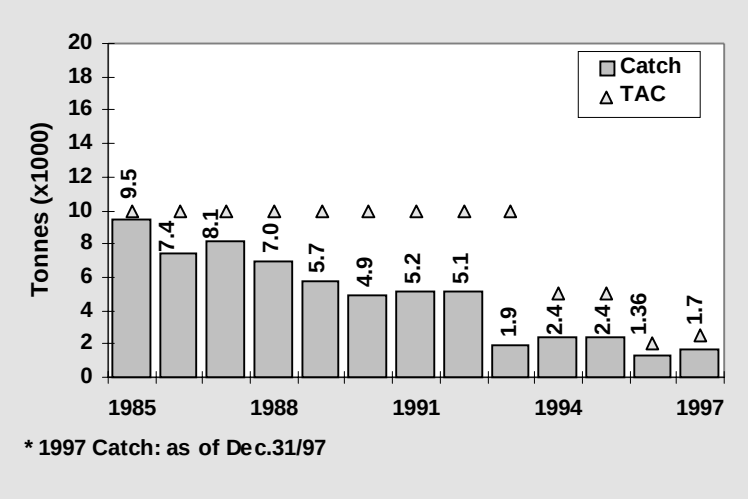
The FRCC recommends that:

3.1. the TAC be set at 1,500;

3.2. the mandatory hailing system and dockside monitoring be maintained;

3.3. DFO convene discussions with industry to:
- **a) ensure no increased effort in eastern 4T from 1997 levels;**
- **b explore an increase in the minimum mesh size to optimal levels for all gears;**
- **c) establish the use of indexed vessels as controls to project quantities discarded, and to establish proper CPUE indices for future stock evaluation;**
- **d) launch a joint DFO/Industry research survey using commercial vessel(s).**

3.4. DFO establish measures to ensure that effort is reasonably dispersed and is not concentrated on stock components.

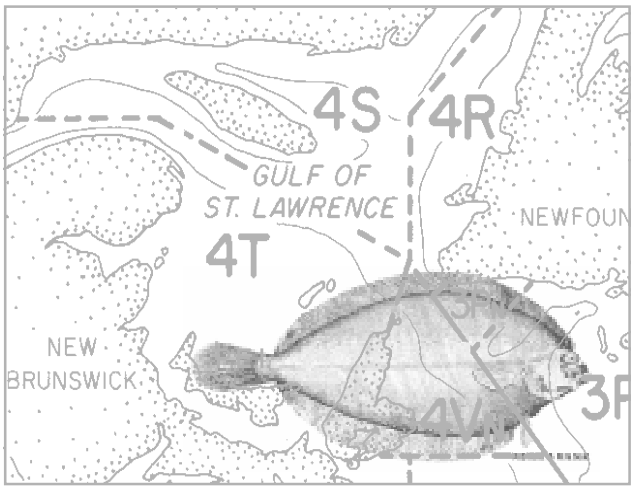


research survey where indicators continue to be alarming. The presence of larger, more productive females continues to decline and is at the lowest recorded level. The abundance of juvenile fish continues to decline and is at the lowest recorded level. The main biomass index continues to decline and is at the lowest recorded level, for both eastern and western sectors of the southern Gulf. The stock range remains concentrated in smaller, localized areas. There is evidence that the length at age (condition) of the fish may be a problem. While we continue to hear contrary beliefs from fishermen in eastern 4T, the balance of evidence, as well as the continuing extreme levels of virtually every indicator measured by DFO research surveys is compelling. It is our view that this stock will not begin to rebuild at current levels of fishing mortality; indeed there is ample evidence that the stock maybe in a dangerous condition.

Council's views on Stock Status:

Overall Stock Indicator :	**the balance of evidence points to a stock in continued decline at worst, or in stagnation at very low levels at best; the approach should be to protect against further decline and/or to promote rebuilding.**
	Compared to average
Overall biomass :	**less than 1/3 of 26 year mean; about ½ of average of the last 10 years; at the lowest level in the time series.**
Spawning biomass :	**cannot be quantified**
Recruitment :	**at the lowest level in the time series.**
Growth and condition :	**generally good fish caught in directed fishery but continued reports of small fish discards arising from other fisheries; poor length at age over the past two year.**
Age structure :	**no particular observation**
Recent exploitation level:	**15% higher than average of the last 5 years but within TAC levels.**

2.4. Witch Flounder 4RST



History Of FRCC Recommendations

In November 1993, the Council recommended that the TAC for the stock unit 4RS in 1994 be set at 1,000MT as a pre-cautionary measure, and that, pending clarification of stock boundaries, catches of witch flounder in 4T be monitored closely. For 1995, the Council recommended that the stock unit for this species be amended to include 4T, and that the TAC be set at 1,000MT for this expanded area in 1995. In its reports for 1996 and 1997, Council recommended that the TAC of 1,000MT for 4RST witch be maintained. All of these TAC recommendations were implemented as stated.

For 1997, the FRCC also recommended that measures be taken to harmonize mesh sizes used for this species over the entire stock area.

1997/98 Consultations

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

Analysis

The 1998 DFO Stock Status Report indicates that;

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

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

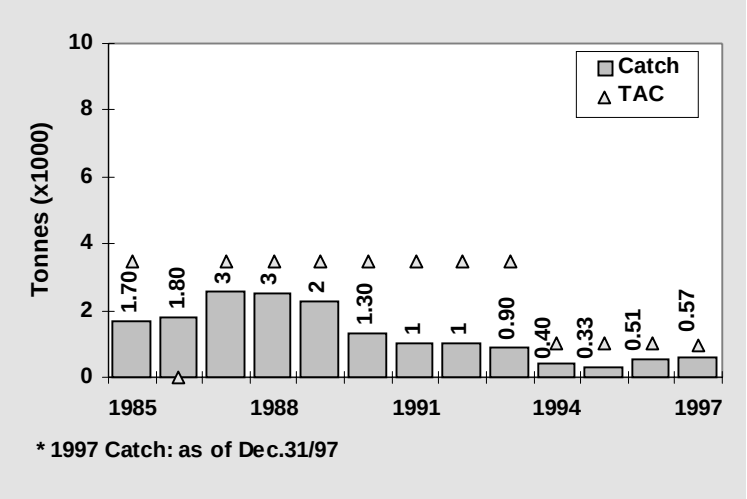
Recommendation # 4:

The FRCC recommends that:

4.1. to guard against further declines and enhance prospects of re-building, the TAC be set at 800t for 1998;

4.2. the information available concerning spawning times and areas for this stock be compiled and assessed, with a view to introducing measures to protect the stock; and,

4.3. measures be taken to protect juvenile fish, such as increased mesh size.



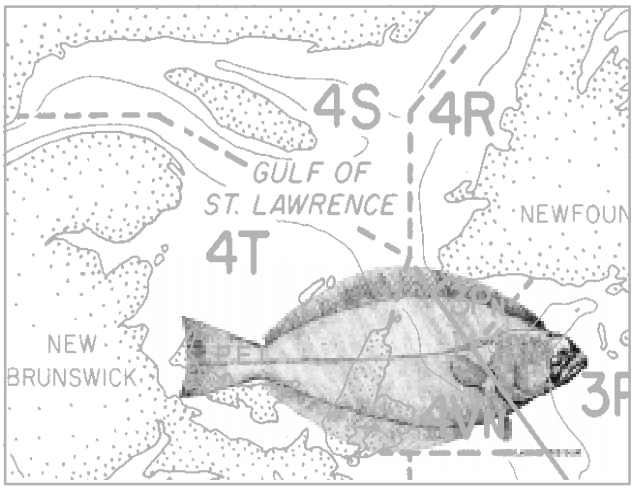
overall TACs have not been reached and the fishery now selects larger fish with an increased mesh size. Scientists indicate that recently observed levels of recruitment will not promote a re-building of this stock toward historical levels at current rates of harvest.

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

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator :	**stable at a reduced level**
	Compared to average
Overall biomass :	**Below historical averages**
Spawning biomass :	**low**
Recruitment :	**Some improvement over earlier levels**
Growth and condition :	**No particular observation**
Age structure :	**No particular observation**
Recent exploitation level:	**Moderate**

2.5. Greenland Halibut 4RST



History Of FRCC Recommendations:

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

1997/98 Consultations

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

Analysis

The 1997 Stock status report indicates that:

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

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

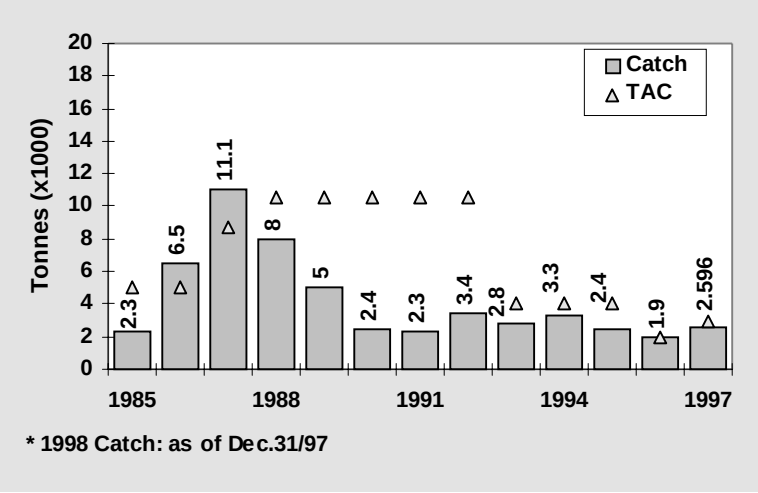
Recommendation #5:

The FRCC recommends that:

5.1. the 1998 TAC should raised to 4000t;

5.2. measures regarding the protection of juveniles, such as small fish protocol, mesh-size and Nordmore grate, be maintained; and,

5.3. further scientific research be pursued in order to develop a more precise view on stock delineation and migration patterns.



COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator : **Stock still rebuilding**

Compared to average

Overall biomass : **Increasing since 1990**

Spawning biomass :

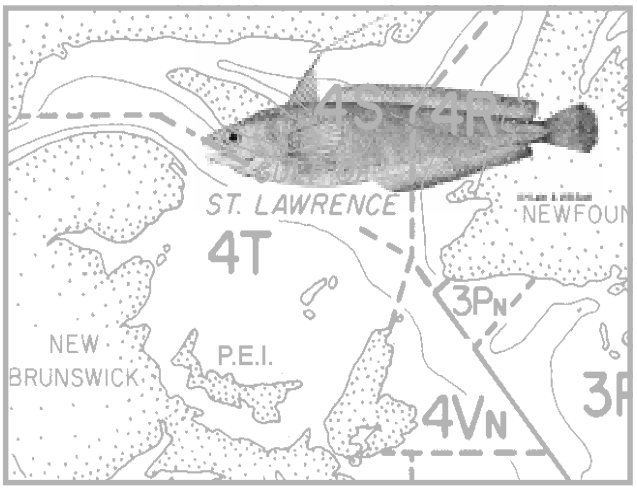
Recruitment : **Young year-classes appearing; 1991-92-93 year-classes are weak.**

Growth and condition : **Data not available.**

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

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

2.6. White Hake 4T



History Of FRCC Recommendations

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

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

1997/98 Consultations

No hake, thus no comments outside of Port Hawkesbury

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

Analysis

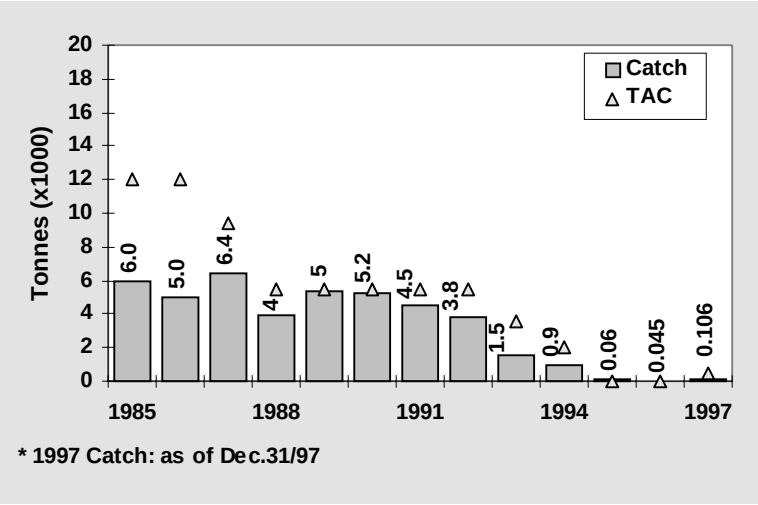
- Sentinel and RV results confirm that hake remain most abundant in the southeast corner of the Gulf and that this species is in very low abundance across the rest of its range. The Channel component appears slightly more abundant than the Strait component.
- With no directed cod fishery, by-catches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

Recommendation #6:

The FRCC recommends that:

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

6.2 work be undertaken to determine if this is a resident Gulf stock or if this is a component of the Eastern Scotian Shelf stock.



*** 1997 Catch: as of Dec.31/97**

- The RV survey provides the main index, which in 1997 was slightly higher than 1996 but still near the lowest range.
- Landings and RV catches are primarily composed of fish age 4 and younger.
- Age 0 fish in the RV survey declined in 1997.
- Total mortality of older (age 5-8) fish remains relatively high (~1.0), in the absence of any substantial fishery.
- Science feels the current amount harvested, albeit very low, may be excessive and have grave concerns for this stock.

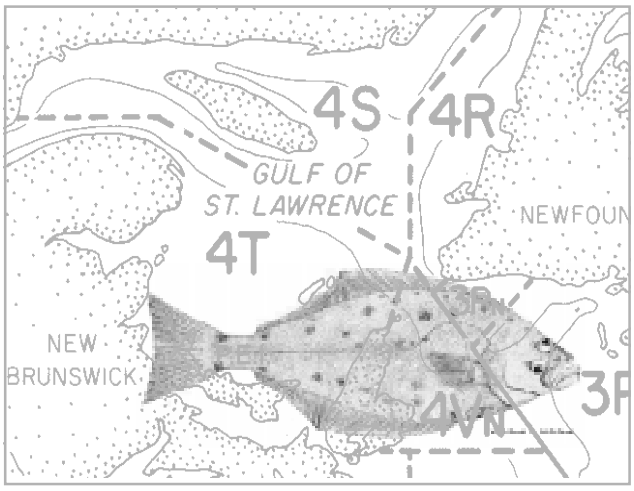
The Council considers that this stock is very low and directed fishing would jeopardize any chances of recovery.

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator :	**Stock at very low level**
	Compared to average
Overall biomass :	**at lowest level despite local improvement; contraction of geographical distribution, may be improving.**
Spawning biomass :	**very low.**
Recruitment :	**some encouraging signs but limited**
Growth and condition :	**no information**
Age structure :	**abundance of larger hake (larger than 45cm) close to lowest level observed**

Recent exploitation level: High prior to moratorium

2.7. Atlantic Halibut 4RST



History of FRCC recommendations

Since 1993, the FRCC has recommended a constant TAC at 300t. In 1995, the Council also recommended that the release of fish of size under 81cm be mandatory.

1997/98 Consultations

Few comments were made by fishermen during 1997-1998 consultations. Some stakeholders estimate that he stock is becoming healthy and could sustain a 400t TAC. They also recommend that the regulation on minimal legal size should also apply to the recreational fishery. In Port-aux-Choix, fishers raised concerns about undersized Atlantic Halibut being landed and sold as Greenland Halibut. There is a general mistrust on the validity of landings statistics.

Analysis

The 1996 Stock Status Report indicates that :

- Few biological data available.
- Stock currently stable at low level.
- Exploitation of individuals smaller than 81cm remains too high.

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

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

Recommendation #7:

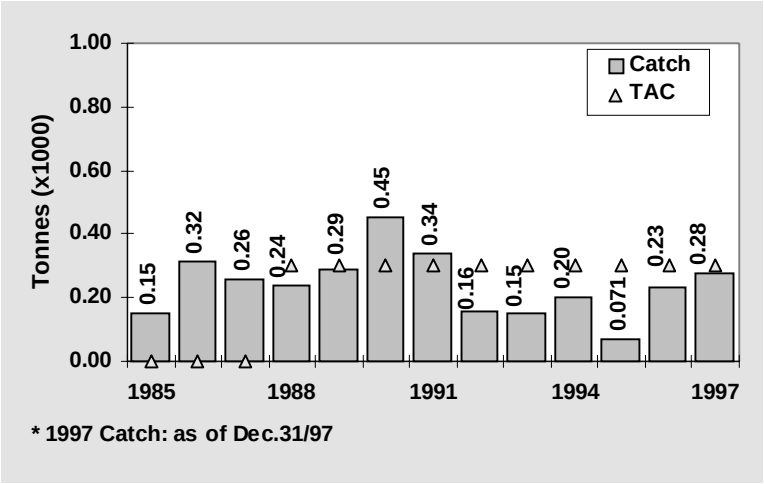
The FRCC recommends that:

7.1. the 1998 TAC remain at 300t;

7.2. release of fish smaller than 81cm and enforced for both commercial and recreational fisheries;

7.3. landings be properly monitored and small fish protocols be effectively enforced; and

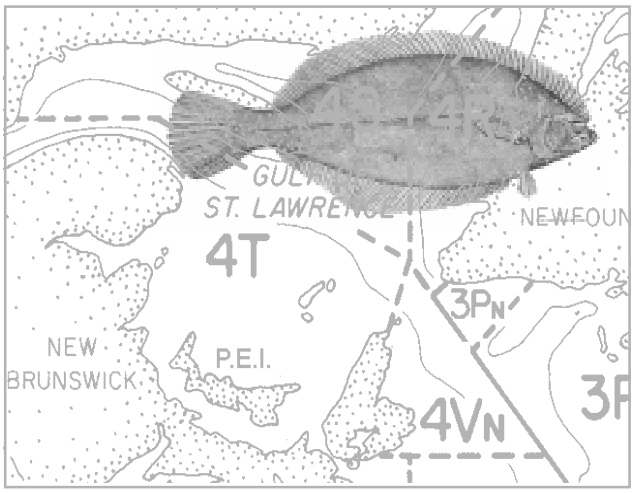
7.4. measures to protect juvenile halibut and to reduce by-catches should be maintained and strictly enforced.



COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator :	**Stock at very low level.**
	Compared to average
Overall biomass :	**Stable at low level.**
Spawning biomass :	**Unknown**
Recruitment :	**Some, as per catch of immature.**
Growth and condition :	**Not available.**
Age structure :	**No reliable indicator.**
Recent exploitation level:	**TAC at 300t since 1991. by-catches of juveniles remain at concerns.**

2.8. Winter Flounder 4T



History Of FRCC Recommendations

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

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

1997 Consultations

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

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

Recommendation # 8:

The FRCC recommends that:

8.1. **the overall catches in 1998 not be allowed to exceed 1,000 t, through the maintenance of a precautionary TAC;**

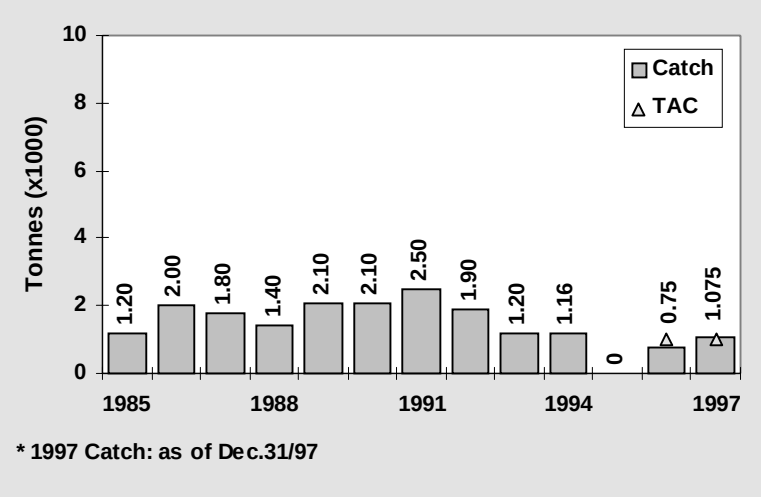
8.2. **strong measures be maintained to guard against over-fishing of localized concentrations;**

8.3. **as added protection for localized concentrations in future, DFO Science and industry address the practicality of establishing sub-area quotas within the 4T stock for 1999;**

8.4. **recent and historic trends in changes in landings by gear types be studied in 1998, particularly in relation to gear and area specific size distributions in the catch;**

8.5. **by-catch and small fish protocols be effectively applied; and,**

8.6. **monitoring programs be applied vigorously to ensure mis-reporting of other commercial species does not take place.**



Analysis

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

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

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

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

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

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

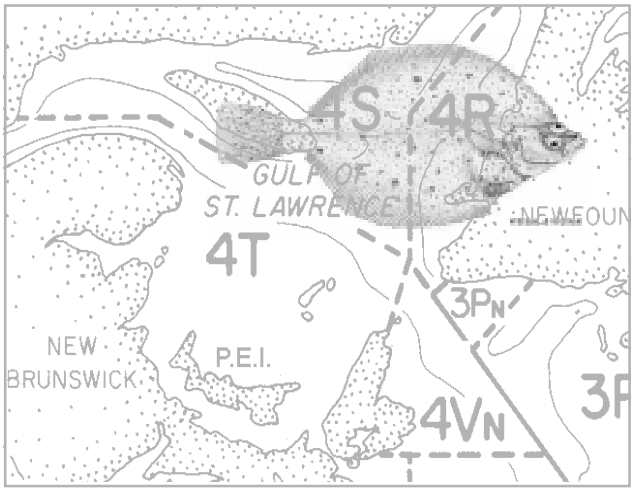
Changes in the mix of gears directed toward this species in the 4T area might be increasing exploitation of the resource over previously lightly-exploited rough bottom, and taking larger individuals previously protected from the fishery.

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

Council's views on Stock Status:

Overall Stock Indicator :	**Average overall, some regional depletion**
	Compared to average
Overall biomass :	**Average overall, varies by region**
Spawning biomass :	**No information**
Recruitment :	**No information**
Growth and condition :	**Varies by region**
Age structure :	**No information**
Recent exploitation level:	**Overall effort reduced due to moratorium, exploitation rates would vary locally**

2.9. Yellowtail Flounder 4T



History Of FRCC Recommendations

The Council has not made previous recommendations on this stock.

1997/98 Consultations

Interest in this species was increased in 1997 as a result of an expanded fishery in and around the Magdalen Islands. Fishers there felt this fishery was still in the exploratory phase and should be continued or expanded for 1998.

Analysis

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

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

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

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

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

Recommendation # 9:

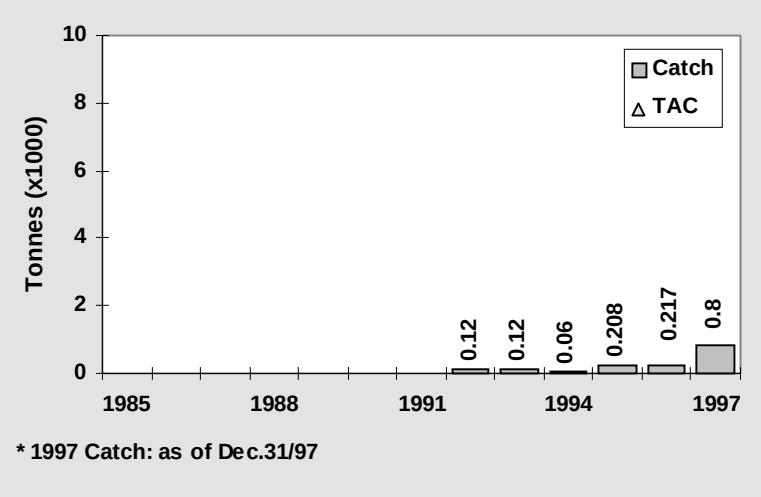
The FRCC recommends that:

9.1. until the impact of the harvest levels in 1997 are fully reviewed in the spring 1998 assessment, a catch level not exceeding 300 t be set for the Magdalen Islands directed fishery;

9.2. the development of directed fisheries in other localized areas be undertaken with similar caution;

9.3. a small fish protocol be formally established for this fishery; and,

9.4. measures be established for the collection of biological data to give a better assessment of this stock.



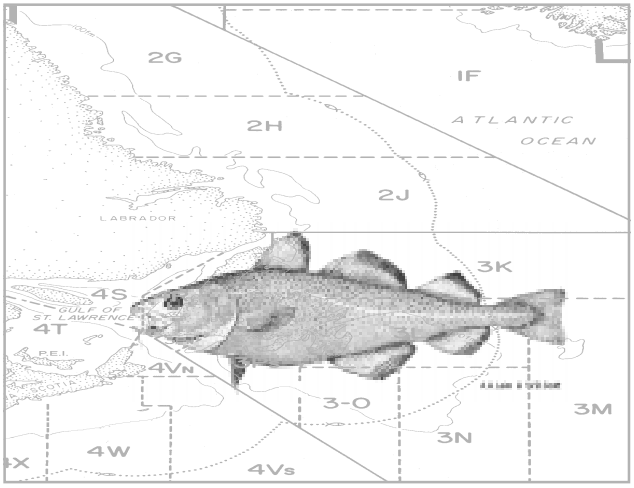
impact of continued landings of the order observed in 1997 in this area might have on the biomass of this species within this relatively small area.

COUNCIL'S VIEWS ON STOCK STATUS:

Overall Stock Indicator :	**Stable**
	Compared to average
Overall biomass :	**Average**
Spawning biomass :	**Average**
Recruitment :	**Average**
Growth and condition :	**No information**
Age structure :	**Constricted in Madeleine Islands, wide elsewhere**
Recent exploitation level:	**May have been high in the Madeleine Islands in 1997, likely light elsewhere**

Chapter 3: Cod Stocks in Divisions 2GH, 2J3KL, 3Ps, 4VsW and Witch Flounder in division 3Ps

3.1. Cod 2GH



History of FRCC Recommendations:

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

1997/98 Consultations:

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

Analysis:

The 1996 DFO Stock Status Report indicates that:

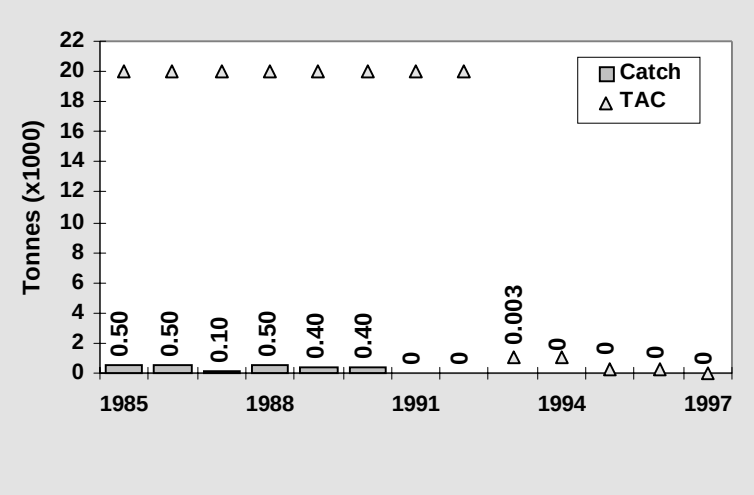
- the catch has been negligible since 1990.
- the survey conducted in 1991 detected very few fish.
- there are possible links with northern cod.
- the status remains unknown but abundance is assumed low.

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

Recommendation #10:

The FRCC recommends that:

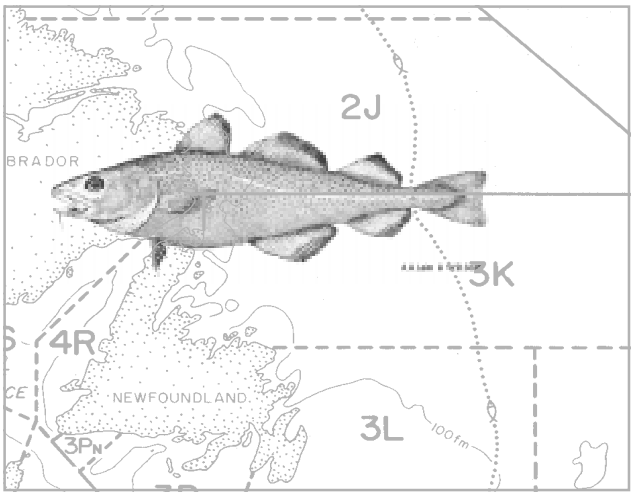
10.1. there be no directed fishery on this stock.



COUNCIL'S VIEWS ON STOCK STATUS:

Overall indicator :	**very low, status unknown**
	Compared to average
Spawning biomass:	**unknown**
Total biomass:	**unknown**
Recruitment:	**unknown**
Growth/Condition:	**unknown**
Age structure:	**unknown**
Distribution:	**unknown**
Recent exploitation:	**none - no fishery**

3.2. Cod 2J3KL



History Of FRCC Recommendations:

In l993, the Council indicated that this stock was at a very low level with poor recruitment prospects, and that a recovery of the spawning biomass was unlikely before the year 2000 at the earliest. The Council recommended that the moratorium on fishing 2J3KL cod be continued for l994 and that strict limits be placed on food fisheries. In l995, the Council emphasized the importance of the Sentinel Fishery in monitoring this stock during the moratorium. The Council recommended the moratorium be continued for l996 and again in 1997. As part of the recommendations for 1997, the FRCC recommended the sentinel fishery be expanded to include the offshore.

1997/98 Consultations:

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

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

Recommendation #11:

The FRCC recommends that:

11.1. there be no directed commercial fishery for 2J3KL cod in 1998;

11.2. an index program be established to provide additional information to supplement sentinel programs and to add confidence, inshore and offshore, in cod population estimates;

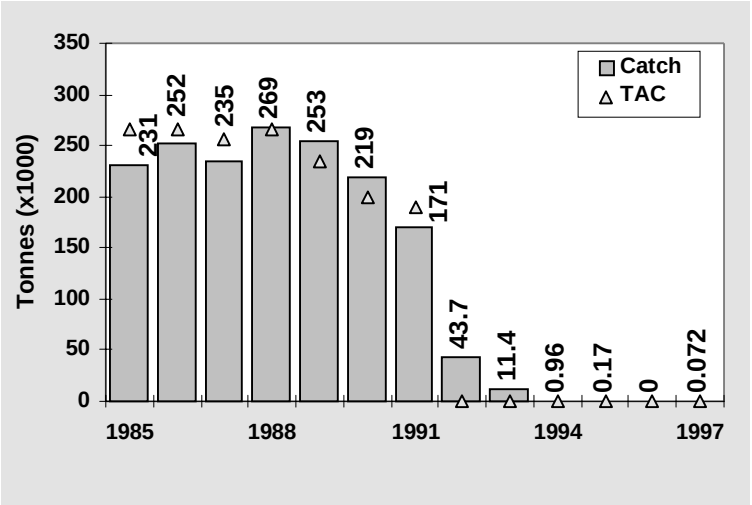
11.3. as part of this program:
- **a) no more than 4,000 tonnes be caught**
- **b) catches should be spread over the full range of the stock area and over time,**
- **c) gear and effort restrictions be applied to ensure catches are kept within 4,000 t; and,**
- **d) a planning workshop should be held by the Department of Fisheries and Oceans (DFO) and the industry to design this program and its protocols such that this program supplements (and not duplicates) the sentinel survey data.**

11.4. immediate implementation of the offshore sentinel survey;

11.5. strict controls be established for all shrimp fisheries in this area e.g. Nordmore grate, observer coverage, by-catch protocols;

11.6. tools be developed to determine inshore biomass; and,

11.7. additional financial resources be made available to carry out this program.



Analysis:

The 1998 DFO Stock Status Report indicates that:

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

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

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

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

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

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

Uncertainties

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

Lack of information

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

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

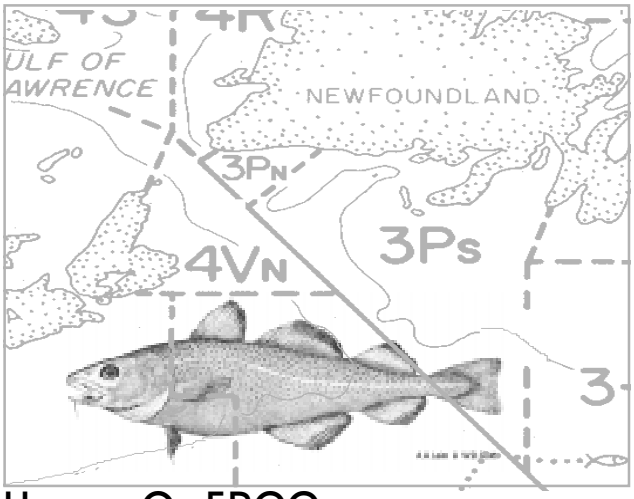
Sentinel Fishery:

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

Council's views on Stock Status:

Overall indicator:	**very low; signs of improvement in 3L**
	Compared to average
Spawning biomass:	**very low**
Total biomass:	**very low**
Recruitment:	**poor**
Growth/Condition:	**growth poor, condition good**
Age structure:	**poor - no old fish**
Distribution:	**improving in south, still abnormal**
Recent exploitation:	**low**

3.3. Cod 3Ps



History Of FRCC Recommendations:

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

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

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

1997/98 Consultations:

The FRCC held two rounds of consultations in Newfoundland, one in the fall of 1997 and again in February of 1998. Fishers in Grand Falls and Clarenville noted that the biomass is much higher then calculated as part of the SSR. They all spoke about high densities of cod inshore and their catch rates are much higher than during the pre-moratorium period. Most fishers requested a TAC of 30 000 t and felt that this was a very conservative/conservation minded request as the $F_{0.1}$ level mentioned in the SSR was 40,000t.

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

Recommendation #12:

The FRCC recommends that:

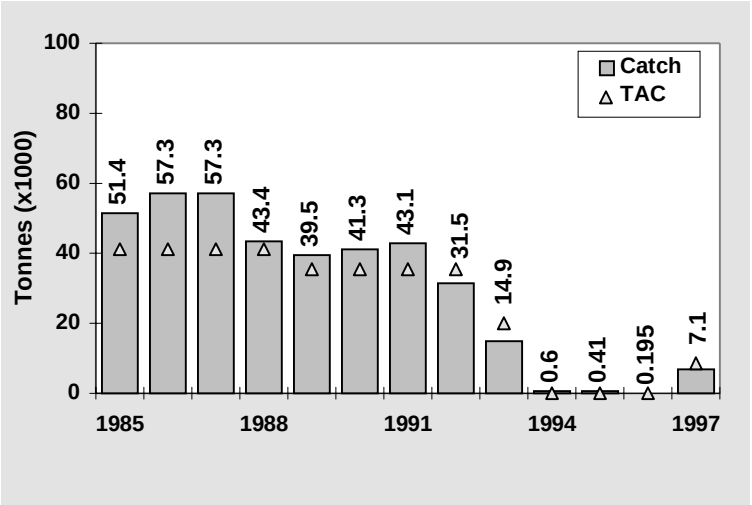
12.1. the 1998 TAC for 3Ps cod be set at 20,000t;

12.2. measures be taken to reasonably disperse the total catch over the period of the fishing year to minimize impacts on stock sub-components;

12.3. fishing on spawning concentrations be minimized during the peak spawning season;

12.4. Conservation Harvesting Plans include:
a) mandatory monitoring and strict enforcement;
b) effort be better controlled including limiting the amount of gear used by fishing enterprises so as to better match the available resource and quota.

12.5. tools be refined to develop inshore biomass estimate.



Analysis:

The 1998 DFO Stock Status Report indicates that:

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

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

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

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

The truncation of the age distribution is of concern.

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

Sentinel Fishery:

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

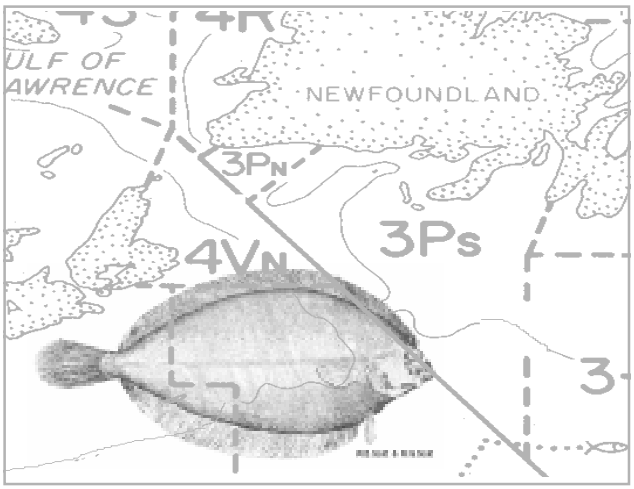
The offshore industry/science survey conducted by the Groundfish Enterprise Allocation Council (GEAC) using a mobile gear vessel arrived at biomass estimate of 105,000t for the offshore (with limits of 29,000t – 180,000t).

Council's views on Stock Status:

Overall indicator: improving; mixed signals

	Compared to average
Spawning biomass:	**improving with 1989 year class**
Total biomass:	**uncertain**
Recruitment:	**no signs offshore; inshore indications of small fish**
Growth and Condition:	**average growth, good condition**
Age structure:	**1989 year class strong; 1993, 1994 show improvements**
Distribution:	**good inshore; poor offshore**
Recent exploitation:	**low**

3.4. Witch Flounder 3Ps



History Of FRCC Recommendations:

In November 1993, the Council noted that this stock had been relatively stable and recommended that the TAC level of 1,000t be maintained for 1994. In November 1994, the Council re-iterated its recommendation for the continuation of a TAC level of 1,000t for 1995. Because biomass estimates were historically low the Council recommended that the TAC be reduced to 500 t for l996 and again in 1997. For 1997 the Council recommended that an industry /science survey be encouraged.

1997/98 Consultations:

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

Analysis:

The 1996 DFO Stock Status Report indicates that:

- recent biomass estimates are at the low end of observations.
- the survey does not cover the entire stock range.

Quota for witch were first set in the mid-l970s at 3,000t; these were reduced to l,000t in the late l980's. Catches come mainly from St. Pierre Bank in depths of 200-900 m. The research survey relative biomass index has shown substantial variation but no trend between l976-l994. The research survey does not cover Fortune Bay where 35% of the catch occurs. The survey biomass index was high for l996 but this may reflect a more efficient survey trawl used for the first time this year. Recruitment levels are at the long-term average. Because the fishery is concentrated on a pre-spawning aggregation in a very small area, catch rates may not be an indicator of a high level of biomass.

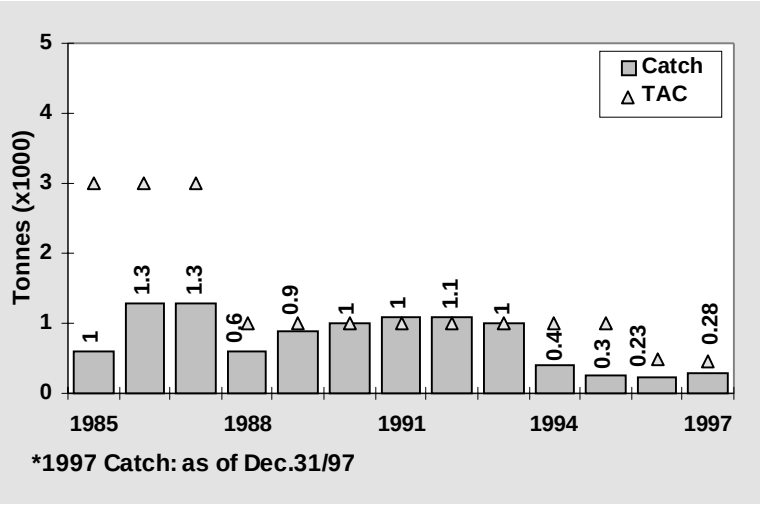
Recommendation #13:

The FRCC recommends that:

13.1. the 1998 TAC for 3Ps witch flounder be set at 650t;

13.2. to meet optimum maturity levels for this stock, the mesh size be set in accordance with selectivity studies; and,

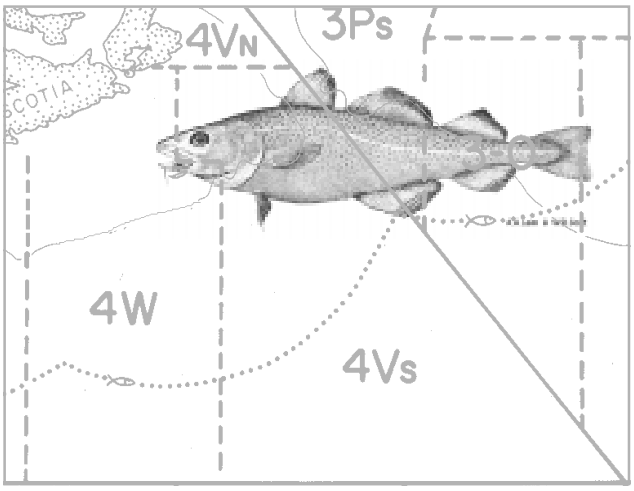
13.3. given there has been no new assessment of this stock since 1996, a joint DFO/industry study be conducted in the inshore areas to assist in the overall assessment process such as appropriate biological sampling, a tagging/movement component, and identification of stock sub-components.



COUNCIL'S VIEWS ON STOCK STATUS:

Overall indicator:	**About recent average**
	Compared to average
Spawning biomass:	**No trend; unknown and variable, low**
Overall biomass:	**Unknown**
Recruitment:	**About long term average**
Growth and Condition:	**Not available**
Age structure:	**Not available**
Distribution:	**In deep water**
Recent exploitation:	**low**

3.5. Cod 4VsW



History Of FRCC Recommendations:

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

1997/98 Consultations:

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

Analysis:

The 1998 DFO Stock Status Report indicates that:

- Average weight at age has shown some improvement in the last few years from the historic minimum in 1992.
- Surveys indicate that, since the mid-1980s, there has been an increase in the mortality of cod, other than that attributable to fishing, and which has persisted even after the closure of the fishery.
- The scientific evidence indicates that the increase in mortality from sources other than reported landings including discarding, direct and indirect effects of harsh environmental conditions, and predation by seals.
- The spawning stock biomass is at or near the lowest level seen, between 5% to 16% of the average from 1979-89. Making plausible assumptions about seal consumption and other

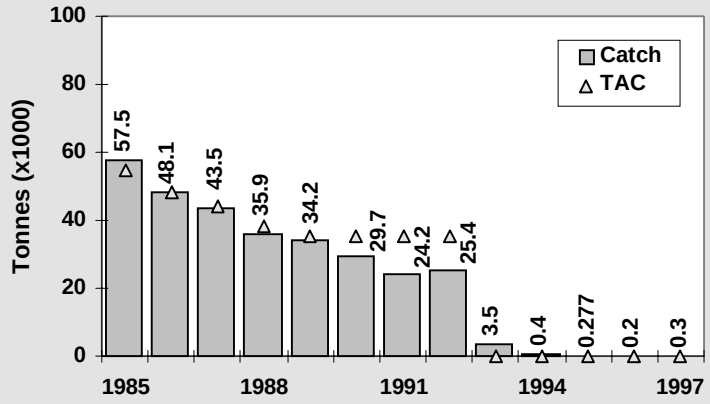
Recommendation #14:

The FRCC recommends that:

14.1. there be no directed fishery for 4VsW cod in 1998;

14.2. no recreational or food fisheries take place given the very precarious state of the cod stock in this area; and,

14.3. the March Research Vessel (RV) survey be re-instated immediately.



*** 1997 Catch: as of Dec.31/97**

Sentinel Fishery:

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

natural mortality, the biomass is projected to decline 5% to 20%, even in the absence of any fishery.

- There are inconsistent indicators of recent year-class strength, however, the weight of evidence suggests that recruitment has been poor.
- The models of cod consumption by grey seals imply a range from 5,400t to 22,000t of cod being removed by seals. These are relative to estimated biomass of 32,000t to 37,000t respectively. It is not possible with the available data to choose among these models.

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

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

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

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

Council's views on Stock Status:

Overall indicator:	**low**
	Compared to average
Spawning biomass:	**below average**
Overall biomass:	**well below average**
Recruitment:	**below average level of recruitment**
Growth/Condition:	**below average**
Age structure:	**below average (smaller fish at age)**
Distribution:	**below average**
Recent exploitation:	**fishery closed since September 1993**

APPENDIX 1:

FRCC MANDATE AND MEMBERSHIP

APPENDIX 1: FRCC TERMS OF REFERENCE AND MEMBERSHIP

1. INTRODUCTION

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

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

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

2. DEFINITION OF CONSERVATION

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

3. COUNCIL OBJECTIVES

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

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

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

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

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

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

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

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

3.7 To make public recommendations to the Minister.

4. Mandate and Scope

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

4.2 The Council will:

4.2.1 advise the Minister on research and assessment priorities;

4.2.2 review DFO data and advise on methodologies;

4.2.3 consider conservation measures that may be required to protect fish stocks;

4.2.4 review stock assessment information and conservation proposals, including through public hearings, where appropriate; and,

4.2.5 make written public recommendations to the Minister on TACs and other conservation measures.

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

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

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

5. Size, Structure and Make-Up

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

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

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

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

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

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

5.7 Members appointed from DFO serve 'ex officio'.

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

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

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

5.10.1 provide administrative support for the functioning of the Council;

5.10.2 provide a technical science and fisheries management support;

5.10.3 organize Council meetings;

5.10.4 record decisions of the Council;

5.10.5 undertake a professional communications function for the Council, providing a central point for communications to and from the Council; and

5.10.6 undertake such other matters as from time to time might be appropriate.

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

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

6. ACTIVITIES:

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

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

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

6.4 Recommends TACs and other conservation measures.

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

6.6 Ensures an open and effective exchange of information with the fishing industry and contributes to a better public understanding of the conservation and management of Canada's fisheries resource.

FRCC MEMBERSHIP:

MEMBERS:

Fred Woodman, Chairman
Jean-Claude Brêthes, Vice-Chair
Michael Belliveau
Bruce Chapman
Tony Charles
Sam Elsworth
Sally Goddard
Jean-Claude Grégoire
Tom Hallett
Frank Hennessey
Paul LeBlond
Victorin Mallet
Trevor Taylor
Maureen Yeadon

PROVINCIAL DELEGATES:

Stephen Atkinson, Northwest Territories
Rob Coombs, Newfoundland and Labrador
Yvon Chiasson, New Brunswick
David Gillis, Prince Edward Island
Dario Lemelin, Québec
Clarrie MacKinnon, Nova Scotia

EX OFFICIO:

Bill Doubleday
Barry Rashotte

SECRETARIAT:

Catrina Tapley, Executive Director
Linda Brisebois
Renée Brisson
Marny Brown
Debra Côté
Denis Rivard
Lisa Tenace

GULF OF ST. LAWRENCE FRCC GROUNDFISH ASSESSMENT TEAM:

Frank Hennessey, Chair
Michael Belliveau
Bruce Chapman
Jean-Claude Grégoire
Victorin Mallet
Yvon Chiasson
David Gillis
Dario Lemelin
Clarrie MacKinnon

COD ASSESSMENT TEAM:

Fred Woodman, Chair
Jean-Claude Brêthes
Rob Coombs
Frank Hennessey
Trevor Taylor
Maureen Yeadon
Catrina Tapley

APPENDIX 2:

Letter to Stakeholders and Questions for Discussion at the Gulf of St. Lawrence Groundfish Consultations

APPENDIX 2: LETTER TO STAKEHOLDERS - GULF OF ST. LAWRENCE GROUNDFISH CONSULTATIONS

November 7, 1997

To Stakeholders:

The Fisheries Resource Conservation Council (FRCC) will hold public consultations to gather information on Gulf of St. Lawrence groundfish stocks to assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for 1998 conservation requirements for these groundfish stocks.

Consultations will take place at 1PM Monday, December 1 at the Quality Inn in Gaspé, 9:30AM Tuesday, December 2 at the Hotel Beauséjour in Moncton and 9:30AM Wednesday, December 3 at the Nautical Institute in Port Hawkesbury. Discussion will center around the following stocks:

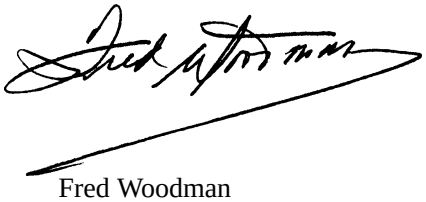
COD (4T, 4Vn, 3Pn4RS)
AMERICAN PLAICE (4T)
WITCH FLOUNDER (4RST)
GREENLAND HALIBUT (4RST)
WHITE HAKE (4T)
ATLANTIC HALIBUT (4RST)
WINTER FLOUNDER (4T)

Although new stock status reports for Gulf cod stocks have not yet been produced, DFO has made available the results of the fall survey in the southern Gulf and the FRCC is eager to hear your views on all Gulf of St. Lawrence groundfish fisheries, including cod.

DFO Science will conduct a full zonal assessment of 2J3KL, 3Ps, 4TVn, 4RS,3Pn, and 4VsW cod stocks in January 1998 which will include the results of sentinel fisheries and fall and winter research surveys. Following this, the FRCC will hold a full round of public consultations in Newfoundland, and the Council will give stakeholders in Québec and the Maritimes an additional opportunity to comment on these stocks prior to forming its advice to the Minister.

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

The challenge for groundfish conservation and sustainability is great for all species. The Council bases its advice on sound conservation principles, and advocates a precautionary approach. The success of these consultations is of interest to all stakeholders. Your views are important and we hope you will participate fully.



Fred Woodman
Chairman

Questions For Discussion At Gulf of St. Lawrence Groundfish Consultations

4T, 4Vn Cod

1. There are numerous reports that cod have been abundant in 1997 in many inshore ground, especially in the southeastern Gulf. What was observed in 1997 in midshore and offshore waters?

2. What indications are there regarding the presence of small (juvenile) cod in the Gulf in 1997? Are you seeing incoming recruitment? Should there be areas/times set aside in the Gulf for spawning or nursery areas?

3. How did the size and fitness of the cod observed in 1997 compare with normal expectations?

4. Do you believe there is sufficient spawning stock biomass to warrant a limited commercial fishery for 1998?

4RS,3Pn Cod

5. Fishermen and Scientists have observed that northern Gulf cod has been concentrated off western Newfoundland with very few signs of cod in 4S (Québec North Shore). What have you observed in 1997 from the limited commercial fishery in this area? Size, condition, abundance?

4T Hake

6. In recent years, the distribution of the hake resource has shrunk into an area between Eastern PEI and St.Georges Bay. Are the Hake still present in this area? In other areas?

7. What indications are there regarding the presence of small (juvenile) hake in the Gulf in 1997?

4T American Plaice

8. Fishery and survey information from recent seasons indicate that the abundance of plaice has dropped sharply on grounds in the western Gulf but there is little or no decrease in the east. What observations were made in 1997?

4T Winter Flounder

9. Efforts directed at Winter flounder have increased in some areas since the closure of the cod and hake fisheries and the lowering of the plaice quota. Blackback stocks are very localized and do not migrate far. What is your impression of the state of the blackback resource in your fishing grounds?

4RST Greenland Halibut (turbot)

10. In your experience what is the status of this stock in comparison to the fishery in the past ten years? How do catch rates per net compare in 1997 to past years when the fishery was conducted with 5.5 inch mesh as opposed to the current 6 inch mesh size? Should the mesh size be increased beyond 6 inches?

4RST Witch Flounder

11. What are your observations in this fishery in 1997 with respect to fish size, abundance and geographical distribution? Are additional measures needed, if any, to allow for the rebuilding of this stock?

Recreational Fishery

12. What have you observed with respect to the abundance of cod and what have you seen with respect to landings of juvenile cod in the recreational fishery? Are you seeing more or less cod than previous years and have you noticed any changes in size and condition? Are you catching more or less cod than in previous years? Are there sufficient controls on this fishery to limit abuses?

Science Priorities

13. The FRCC is mandated to provide the Minister of Fisheries and Oceans with recommendations on DFO science priorities. Are there specific issues you feel that need to be addressed, as research priorities, for groundfish in the Gulf of St. Lawrence?

APPENDIX 3:

BRIEFS RECEIVED FOR THE GULF OF ST. LAWRENCE GROUNDFISH CONSULTATIONS

APPENDIX 3: Briefs Received for the Gulf of St. Lawrence Consultations

A. DEC. 1, 1997 - Gaspé, Québec

FRCC.97.GR-QUÉ.30 *1998 Turbot Management Prospects*, Jean-Marc Ouellet, President, Regroupement des pêcheurs Professionnels du Nord de la Gaspésie, Les Méchins, Québec

A. FEB. 18 - Moncton, N.B.:

FRCC.98.GR-NB.2 P.E.I.F.A. Groundfish Committee, P.E.I.

FRCC.98.GR-NB.3 Association des Crevettiers Acadiens du Golfe Inc., Shippagan, N.B.

B. FEB. 19 - Port Hawkesbury, N.S.:

FRCC.98.GR-NS.4 Osborne Burke, Federation of Gulf NS Groundfishermen (Fixed/Mobile <45ft Competitive), Ingonish, N.S.

FRCC.98.GR-NS.5 Osborne Burke, Gulf NS Fixed Gear Sentinel (1997), Federation of Gulf NS Groundfishermen (Fixed/Mobile <45ft Competitive), Ingonish, N.S.

FRCC.98.GR-NS.9 Reginald E. Grand, President, Gulf Nova Scotia Bonafide Fishermen's Organization, Antigonish Co., N.S.

D. <u>Briefs Received by Mail</u>

FRCC.98.GR-NB.10 Ghislain Chouinard, Department of Fisheries and Oceans, Science Branch, Moncton, N.B.

FRCC.98.GR-NB.11 Daniel Gionet, Association des Crevettiers Acadiens du Golfe Inc., Shippagan, N.B.

FRCC.98.GR-QUÉ.31 Regroupement des pêcheurs Professionnels des Iles, Québec

FRCC.98.GR-PEI.32 James A. MacDonald, P.E.I.F.A. Groundfish Advisory Committee, PEI

FRCC.98.GR-QUÉ.33 Jean-Marc Ouellet, President, Regroupement des pêcheurs Professionnels du Nord de la Gaspésie, Les Méchins, Québec

FRCC.98.GR-NB.34 Alyre Gauvin, Président, A.P.P.F.A., Acadian Groundfish Fisherman's Association Inc., Lamèque, N.B.

FRCC.98.GR-QUÉ.35 *Achieving a viable and sustainable turbot fishery in the Gulf of St. Lawrence for the Quebec Industry*, L'Alliance des pêcheurs professionels du Québec - La fédération des pêcheurs semi-hauturiers du Québec - Le groupe Forillon, Moncton, N.B.

APPENDIX 4:

LETTER TO STAKEHOLDERS COD STOCKS IN DIVISIONS 2GH, 2J3KL, 3PS, 4VSW AND WITCH FLOUNDER IN DIVISION 3PS

APPENDIX 4: LETTER TO STAKEHOLDERS - COD STOCKS IN DIVISIONS 2GH, 2J3KL, 3PS, 4VSW AND WITCH FLOUNDER IN DIVISION 3PS

January 19, 1998

To Stakeholders:

In February 1998, the Fisheries Resource Conservation Council (FRCC) will gather information from stakeholders on Atlantic groundfish stocks. This will assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for 1998 groundfish conservation requirements for Gulf of St. Lawrence groundfish stocks, and cod stocks in Divisions 2GH, 2J3KL, 3Ps, 4RS,3Pn and 4TVn.

The FRCC will review DFO's January zonal assessments of cod stocks, the results of sentinel fisheries, and fall and winter research vessel surveys. The Council will then consult with interested stakeholders in the following areas:

a) full round of Newfoundland consultations to discuss Newfoundland cod stocks

b) two meetings to discuss all Gulf of St. Lawrence groundfish stocks, including cod

c) Atlantic-wide consultation to discuss all Atlantic cod stocks, prior to forming advice to the Minister.

February 18 9:00AM - Hotel Beauséjour (ballroom B) Moncton, NB *translation - Gulf groundfish stocks

February 19 9:00AM - Nautical College (auditorium) Port Hawkesbury, NS - Gulf groundfish stocks

February 20 9:00AM - Holiday Inn Select, 1980 Robie Street, Halifax, NS - all cod stocks

February 23 9:00AM - Alexis Hotel, Port Hope Simpson, Labrador - 2GH, 2J3KL

February 24 9:00AM - Hotel Port-aux-Basques, Port-aux-Basques, NF - 4RS, 3Pn, 2J3KL, 3Ps

February 25 10:00AM - Town Council Office, Port-au-Choix, NF - 4RS,3Pn, 2J3KL

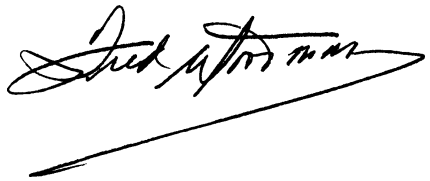
February 26 10:00AM - Mount Peyton Motel, Grand Falls, NF - 2J3KL, 3Ps

February 27 9:00AM - Lion's Club, Clarenville, NF - 2J3KL, 3Ps

Although discussion will focus on the above stocks, the FRCC welcomes all stakeholders' comments and questions and is interested in your views on all groundfish stocks.

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

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



Fred Woodman
Chairman

APPENDIX 5:

BRIEFS RECEIVED FOR THE CONSULTATIONS ON COD STOCKS IN DIVISIONS 2GH, 2J3KL, 3PS, 4VSW AND WITCH FLOUNDER IN DIVISION 3PS

APPENDIX 5: BRIEFS RECEIVED FOR THE CONSULTATIONS ON COD STOCKS IN DIVISIONS 2GH, 2J3KL, 3PS, 4VSW AND WITCH FLOUNDER IN DIVISION 3PS

A. FEB. 20 - Halifax, N.S. - ATLANTIC WIDE CONSULTATION:

FRCC.98.GR-NS.1 *The Recovery of Overexploited Fish Stocks*, Ransom A. Myers and Jill Casey, Dalhousie University, Halifax, N.S.

FRCC.98.GR-NS.6 *A Stochastic, Age-Structured Life History Model of Atlantic Cod, Gadus Morhua, Population Growth*, Jeffrey A. Hutchings, Dalhousie University, Halifax, N.S.

FRCC.98.GR-NS.7 *Mate Competition and Mate Choice in Atlantic Cod, Gadus morhua, and Possible Demographic Consequences of their Mating System*, Jeffrey A. Hutchings, Dalhousie University, Halifax, N.S.

FRCC.98.GR-NS.8 E.L. Walters, Executive Director, Scotia Fundy Inshore Fishermen's Association, Barrington, N.S.

B. FEB. 23, l998 - Port Hope Simpson, Labrador

No briefs received

C. FEB. 24, 1998 - Port-aux-Basques, Nfld

No briefs received

D. FEB. 25, 1998 - Port-au-Choix, Nfld

No briefs received

E. FEB. 26, 1998 - Grand Falls, Nfld

FRCC.98.GR-NF.13 Captain Wilfred Bartlett, Brighton, Notre Dame Bay, Newfoundland

F. FEB. 27, 1998 - Clarenville, Nfld

FRCC.98.GR-NF.12 *Inshore Fishery Survival*, Earl Johnson, Chairman, Inshore FIshermen's Improvement Committee, Clarenvill, Nfld

FRCC.98.GR-NF.15 Bill Broderick, Inshore Fishermen, Bonavista Bay, Newfoundland

FRCC.98.GR-NF.17 FFAW, St. John's, Newfoundland

FRCC.98.GR-NF.18 *3Ps Cod Assessments*, Earl Johnson, Placentia Bay, Newfoundland

FRCC.98.GR-NF.19 *The Newfoundland Cod Stocks*, Atlantic Harvesting Group Inc., St. John's, Newfoundland

FRCC.98.GR-NF.20 Jerome Kerrivan, Placentia Bay Action Committee, Placentia Bay, Newfoundland

FRCC.98.GR-NF.21 Alliance for the Survival of Coastal Fishing Communities, Petty Harbour, Newfoundland

FRCC.98.GR-NF.22 *Fishermen, Science and Community - A Partnership*, Petty Harbour Fishermen's Co-operative Sentinel Fisehries Survey, 1997, Thomas E. Best, Project Coordinator, Petty Harbour, Newfoundland

FRCC.98.GR-NF.23 *Comparative Analysis of 1995, 1996 and 1997 Sentinel Data with Interpretive Information From Fish Harvesters - 2J3KL*, Harvey Jarvis, FFAW, presented by Earl McCurdy, St. John's, Newfoundland

FRCC.98.GR-NF.24 *Comparative Analysis of 1995, 1996 and 1997 Sentinel Data with Interpretive Information From Fish Harvesters - 3Ps*, Harvey Jarvis, FFAW, presented by Earl McCurdy, St. John's, Newfoundland

G. Briefs Recieved by Mail

FRCC.98.GR-NF.1 Jon Lien, Memorial University, St. John's, Newfoundland

FRCC.98.GR-NF.2 Kenneth Sheppard, Fisherman's Committee, Rencontre East, Newfoundland

FRCC.98.GR-NF.3 Dr. Fred Winsor, Vancouver, B.C.

FRCC.98.GR-NF.4 Sidney Poole, Belleoram, Newfoundland

FRCC.98.GR-NF.5 David Hiscock, Town Clerk, Town of Bonavista, Bonavista, Newfoundland

FRCC.98.GR-NF.6 Eric King Fisheries Ltd., Burnt Islands, Newfoundland

FRCC.98.GR-NF.7 Groundfish Enterprise Allocation Council, Gloucester, Ontario

FRCC.98.GR-NF.9 Will Reid, FFAW, Grand Falls-Windsor, Newfoundland

FRCC.98.GR-NF.10 Evan Walters, Executive Director, Scotia Fundy Inshore Fishermen's Association, Barrington, N.S.

FRCC.98.GR-NF.11 Alfie MacLeod, MLA, Cape Breton West, House of Assembly, Nova Scotia, Halifax, N.S.

FRCC.98.GR-NF.25 Wayne Squires, Trinity Bay, Newfoundland

FRCC.98.GR-NF.26 Lloyd Sullivan, Calvert Southern Shore, Newfoundland

FRCC.98.GR-NF.28 Alastair O'Reilly, President, Fisheries Association of Newfoundland and Labrador Ltd., St. John's, Nfld.

FRCC.98.GR-NF.29 *A Critique of the 3Ps Cod Assessment*, Ransom A. Myers, Dalhousie University, Halifax, N.S.

APPENDIX 6:

SCIENCE PRIORITIES

APPENDIX 6: SCIENCE PRIORITIES

25 March 1998

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

Dear Minister:

One component of the mandate of the Fisheries Resource Conservation council (FRCC) is to advise the Minister on research and assessment priorities. Recommendations were presented in our last Science Priorities letters to the Minister (January 1994, December 1996) as well as in our report *Building the Bridge* (FRCC.96.R.2, October 1996). At the Minister's request, the FRCC produced an important report called *A Groundfish Conservation Framework for Atlantic Canada* (FRCC.97.R.3, July 1997). While analyzing the main issues that face our Atlantic groundfish fisheries, that report emphasized scientific issues that should be addressed as a priority. The FRCC emphasizes that the research recommendations expressed in the *Groundfish Conservation Framework for Atlantic Canada* remain relevant. Although there has been noticeable improvements, some issues already raised have to be expressed again.

> Fisheries should be looked at as a system with research seeking to how such a system works, including studies on: fishing effort, the effects of gear on habitat and fish populations, and the various interactions within the ecosystem. Our reports raised the necessity of building interdisciplinary research , involving scientists from different regions, as well as scientists from social and economic sciences, inside and outside the Department of Fisheries and Oceans.
>
> To get the best view possible on the stocks' status, the FRCC believes that it is necessary to use multiple sources of information, to complement scientific research vessel surveys, such as sentinel fisheries surveys and cooperative-operative science-industry surveys and projects. Including fishermen's knowledge and experience in the scientific process is a major challenge for DFO scientists.
>
> The seal issue continues to be a major concern. This concern has been continually expressed by fishermen, and this seriousness of this issue is now considered by scientists, both within the Department and within the NAFO Scientific Council. Quantification of the effect of seal predation on the various species, exploited or not exploited (forage species) was expressed as a very high priority.

We have to note that research groups still have a tendency to work in isolation and do not take full advantage of the expertise existing in other disciplines and/or in other regions, and that the integration of social sciences remain marginal. In a time of limited financial resources, maximizing the use of all resources through zonal approaches and cross-regional teams is critical. The recent Zonal Advisory Process dealing with the Atlantic Cod stocks, which appeared as a very valuable achievement, was however, unable to show common views and approaches in stocks assessment among Regions.

The FRCC is pleased to note that considerable progress has been made with respect to many of our previous recommendations on Science Priorities:

- The Science Sector considers new approaches in the scientific process.
- Sentinel fisheries data are now routinely considered in stock assessment.
- Joint science-industry initiatives are in place (*e.g.* the Fishermen and Scientists Research Society, the inshore Mobile Gear survey in southwestern Nova-Scotia, and the industry funded offshore survey in the division 3Ps).
- The Regional Advisory Process (RAP) involves not only DFO scientists, but also industry representatives and other interested scientists. This appears to be an open, transparent and effective table for discussion.

- The implementation of multi-disciplinary teams and "Zonal" approaches are now more common to address several science issues.
- Risk analyses are systematically carried out, when feasible, and scientists are already trying to suggest multiple references points and scenarios of the potential effects of the decisions. Those elements appear to be important and valuable improvements.
- Ecosystem considerations are becoming an integral part of the RAP sessions and of the groundfish stock status reports.

The FRCC regrets, however, that many of these initiatives and accomplishments are poorly publicized, and that the Council, and the public, may not be aware of them. The communication system has to be improved. For example, DFO could provide the FRCC and key industry organizations with a list of ongoing projects with a brief statement on the achievements of each: this would certainly help the Council to appreciate the work being done and to allow the FRCC to more strategically focus its recommendations.

This present letter builds from previous recommendations and underlines issues that are perceived as current priorities in the context of the current situation of our groundfish fisheries. The Council's recommendations in this letter are grouped under a few headings. The elements presented under each heading should be seen as a whole and should be considered as part of a global strategy, and not in isolation from each other.

1. The recruitment dilemma

The various closures in place with respect to directed groundfish fisheries were adopted with the principal objectives of stopping the downward plunge in biomass abundance, and promoting stock recovery. There was a clear expectation that the absence of directed fishing mortality would lead to a significant turnaround in the health of the stocks within a reasonable time-frame. It is apparent, after 4-5 years, that the health of most of these stocks has not turned around; some continue to decline even without directed fishing pressure. In light of the protracted closures and/or continuing declines, there is a heightening frustration among all concerned parties who are demanding answers to the question "why are the stocks not recovering" ? The fishing industry has done its part — enduring painful fishing closures. We have to look at other aspects of the fisheries system that could help stock recovery.

We recommend that a focused initiative, based on a coordinated "Zonal" approach, be undertaken by DFO Science Sector to address the recruitment issue, to articulate a reasoned and reasonable response to the above questions, and, to determine whether or not additional action can be taken to address the problem. The FRCC appreciates that much of this information already exists, however it is very disperse. The Council recommends that existing information be consolidated and presented as a formal report, in language accessible to fishers, underlining what is considered as scientifically acceptable, the current hypotheses and the knowledge gaps, and research to be undertaken. That report should be communicated before the end of the year 1998. As part of this report, the FRCC recommends the preparation of a "Zonal Strategy" to address the recovery issue. This strategy should be built from the conclusions of the report. The Council views the following points as particularly interesting and important.

Possible changes in natural mortality have raised concerns, as emphasized by recent scientific work. The effects of starvation, predation, stress, toxicity, etc., should be scrutinized, with particular focus on juveniles.

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

DFO scientists have shown that the calculation of spawning biomass alone is not sufficient to assess the reproductive potential of fish populations. More work is needed to clarify the nature of spawning potential. Studies have to be carried out as well to examine the reproduction rates, as well as egg and larval survival.

Conservation measures to aid in the recovery of stocks must also be considered:

- identification of spawning grounds and nursery grounds should become a priority;
- identification of critical habitats subject to special protection should be undertaken;

- the effect of spatial and temporal closures must be assessed (*e.g.* the "Haddock Box" in Nova Scotia, as recommended in the FRCC Science Priorities letter of December 1996).

2. Identification and verification of stock management units

The effectiveness of management tools and resource conservation measures are improved in those cases where the management units utilized for a stock correspond closely to the biological stock boundaries. In many cases, existing stock boundaries were established prior to the availability of improved knowledge of actual stock limits. In others, stock management units developed for one species, often cod, were then applied to other species in the same general area without full analysis of their applicability. In recent years, new analytical tools for delineating distinct populations have been introduced. These tools are now illuminating certain discrepancies in areas such as the Laurentian Channel, where a number of species and stocks mix and share grounds. These new tools offer an opportunity to study these important issues in more detail and more cost-effectively than previously possible. Their development and application in known or suspected cases where stock boundaries may affect conservation should be supported. In its consideration of the stocks over the last number of years, the FRCC feels such investigations should be considered in the following cases:

3Ps cod: Fish from 3Pn4RS on the west and from 3L on the east appear to utilize grounds within the 3Ps stock management area.

2J3KL cod: This stock has been suspected to be composed of various sub-stocks.

4X cod Fishers and geneticists all understand this stock to be composed of several sub-stocks.

4T white hake, 4T Greenland halibut and 4T American plaice: These stocks are now known to winter in the Laurentian Channel, though the extent and consequences are not yet clear.

Redfish: The delineation of stocks was changed in 1993 with the introduction of Units 1 and 2, but part of the industry continues to feel the current boundaries do not adequately describe these stocks.

The FRCC appreciates that the most modern scientific tools (*e.g.* otolith fingerprints, DNA probes) are currently being used to address these issues. While these studies must continue, they should be complemented by other sources of data. The FRCC strongly recommends that a major tagging program, using the most appropriate mix of technologies, be implemented on cod stocks as soon as the summer of 1998 to help clarifying exchanges between stock management units: 1998 should become known as "The Year of Tagging Programs".

More accurate delineation of stock boundaries is important in order that the industry, DFO scientists and managers, and the Council itself, have the clearest possible view of stocks in formulating advise and conservation measures, especially as considerations focus on the issue of reopening of fisheries.

3. The scientific process

3.1. Scientific surveys

The FRCC recognizes the importance of research surveys as one of the major tools in stock assessment. In a context of very limited commercial fishing activity due to fisheries closures, we view these surveys as an even more critical source of information about the status of groundfish stocks.

The FRCC is aware that decisions are being taken to eliminate groundfish surveys in an effort to address budgetary constraints. For instance, we have been informed that the March 4VsW survey is scheduled to be eliminated from the Maritime region 1997/1998 budget. The juvenile survey in 2J3KL cod, may also come to end. As far as we know, there have been no consultation about this with industry or with the FRCC.

Surveys are an essential element of the stock assessment process, additionally, they gather basic information on oceanographic data and fundamental biological data (*e.g.* spawning success, survival of early life history). Therefore, the FRCC recommends that they should not be cut from the Department's activities without a full assessment of the potential impact on the reliability of scientific data. While we realize the need for fiscal restraint, we want to

be certain that cuts to fundamental elements of the science program are not made only for financial reasons. Those cuts should not be made on an *ad hoc* regional basis but should be included in an overall assessment of the direction of Science Sector. These decisions must be made in a broader context of a global strategy of Science Sector.

Acoustic surveys appear to become more and more important to assess the inshore components of stocks. The FRCC encourages all scientific endeavors, both inside and outside the Department, with acoustic surveys, which also appear to be less expensive than the trawl surveys.

3.2. Science-industry initiatives

The FRCC would like to congratulate the Department on its efforts to involve the industry both in the Sentinel Fisheries Program and in other DFO-Industry science initiatives. In the context of both fiscal constraints and fisheries closures, the need to find alternative sources of information about stock status becomes even more crucial. It is the FRCC's view that these activities not only provide important information but also improve the relationship between the parties.

Sentinel Fisheries have proven to produce highly valuable data and are now an integral part of the stock assessment process. The present programs mainly address the inshore components of stocks, which is a sensible starting point since such components were not well covered by research vessel surveys. However, it is also important to have industry involved in offshore surveys. The FRCC understands that some offshore sentinel surveys are already in place while others have had difficulties being implemented. The Department should develop a flexible administrative system that would facilitate and accelerate the implementation of science-industry initiatives in those areas. The FRCC considers that independent indices, complementary to ongoing research vessel surveys, will be an ongoing priority. In addition to the sentinel fisheries, the Department should work with industry to develop "indexed" commercial catch rate indices.

Sentinel surveys and other science industry surveys are, however, variable in nature and design among regions and thus provide different type of data which may be difficult to understand and compare. The FRCC recommends the appointment of an Atlantic coordinator whose mandate would be to: (a)coordinate and harmonize the various science-industry initiatives, seeking to ensure the most useful results, while allowing local autonomy in each initiative; (b)promote such initiatives within the Department and help in their implementation, and (c) promote such activities with stakeholders and communicate their results. The FRCC also recommends that a workshop be organized to discuss and compare the various sentinel fisheries surveys.

3.3. Fishing effort

The FRCC re-emphasizes the necessity to get accurate data on fishing effort. Effort distribution in space and time must be monitored and the impact of technological changes must be assessed. As but one example of the need for such studies, the Council is especially concerned about the possible effort shift in the 4X area, which would lead to a greater concentration of effort at the entrance of the Bay of Fundy.

4. Precautionary Approach

The FRCC noted in the *Groundfish Conservation Framework for Atlantic Canada* the need to follow the Precautionary Approach in managing groundfish fisheries. The Science Branch must be prepared to provide the data necessary for the implementation of the precautionary approach. The following elements are of major importance to the FRCC:

Stock-recruitment analyses are crucial. They must be presented routinely as part of stock assessments, with analysis of the impact on the assessment of stock trends along with potential effect on decisions.

Risk analyses represent a major improvement in stock assessments. They rely largely, however, on the reliability of analytical models, and are based on only a small sub-set of uncertainties involved. Further efforts are needed to implement other available approaches to risk assessment, to complement current methods.

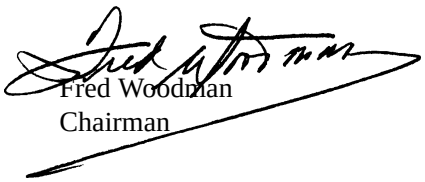
The precautionary approach implies the definition of critical limits and buffer zones that would be incorporated in the "report card" proposed by the FRCC as a tool to guide its decisions. Limit values (spawning biomass, recruitment level, mortality,...) have to be calculated for each stock, based on available information. Knowledge gaps have to be recognized and measures need to be implemented to increase the knowledge base. The FRCC notes that scientists are expanding work on reference points and scenario analysis; those efforts are to be commended.

The FRCC is still concerned by the lack of information on several stocks, being either newly exploited or considered as "marginal". The Council recommends that DFO intensify the process of collecting data on these resources.

The precautionary approach also requires "ecosystem thinking" at every step of the decision making process. While the stock assessment process remains important, it is necessary that the basic biology is not missed. This requires a proper balance between stock assessment and basic research in biology, oceanography and ecology. The management system should also be involved and new innovative management approaches developed to implement "ecosystem thinking" in management practices.

The FRCC takes this opportunity to thank the Department for the excellent support the Council has received over the past years and reiterates its confidence in the work of DFO scientists. The support received has enabled the Council to make diligent recommendations towards the rebuilding and conservation of fish stocks.

Sincerely,



Fred Woodman
Chairman