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**Overview of the Status of Canadian Managed Groundfish  
Stocks in the Gulf of St. Lawrence and in the  
Canadian Atlantic**

*Original*

**Atlantic Stock Assessment Secretariat  
Science Branch  
Department of Fisheries and Oceans  
P.O. Box 1006, Stn. B 215  
Dartmouth, N.S. B2Y 4A2  
Canada**

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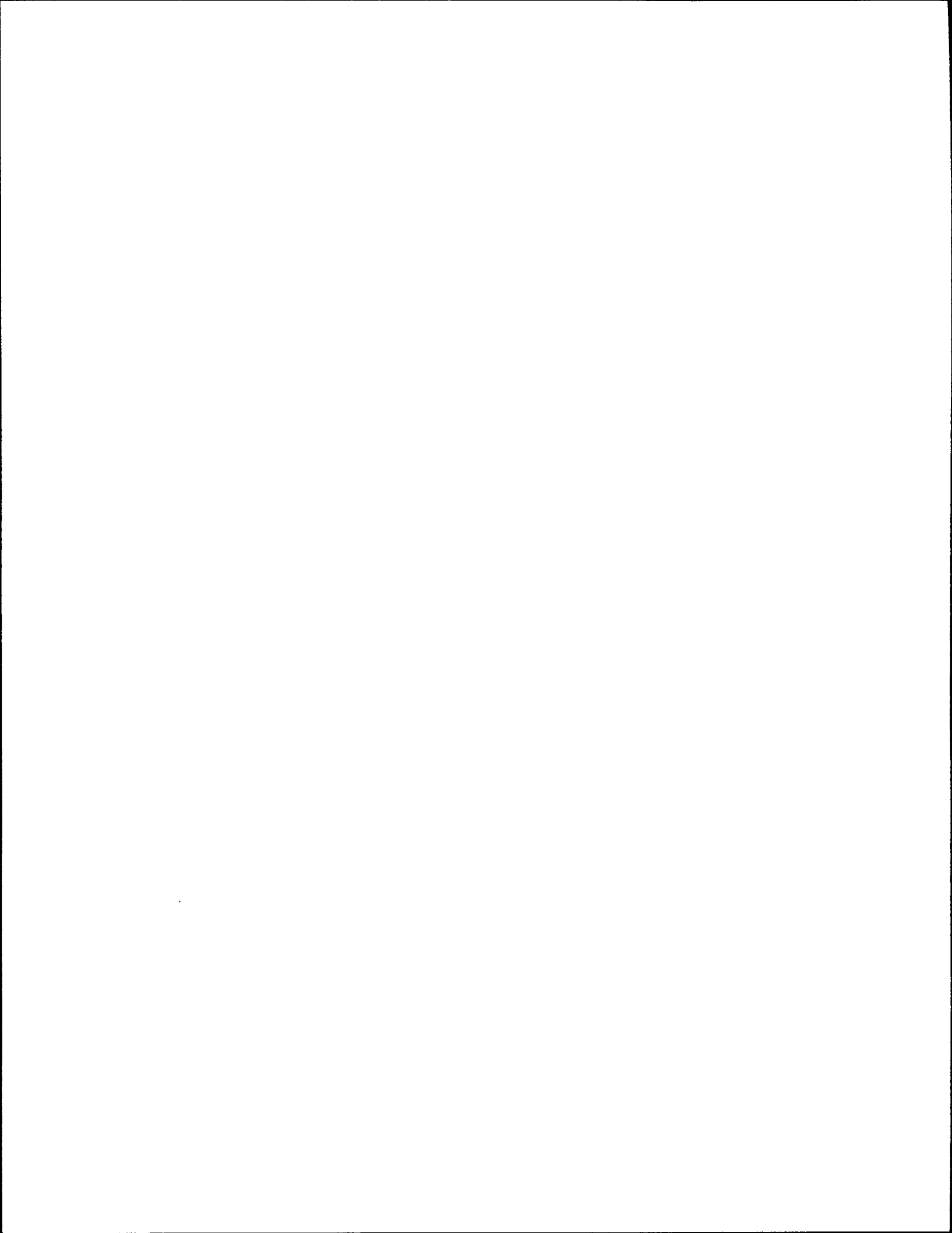
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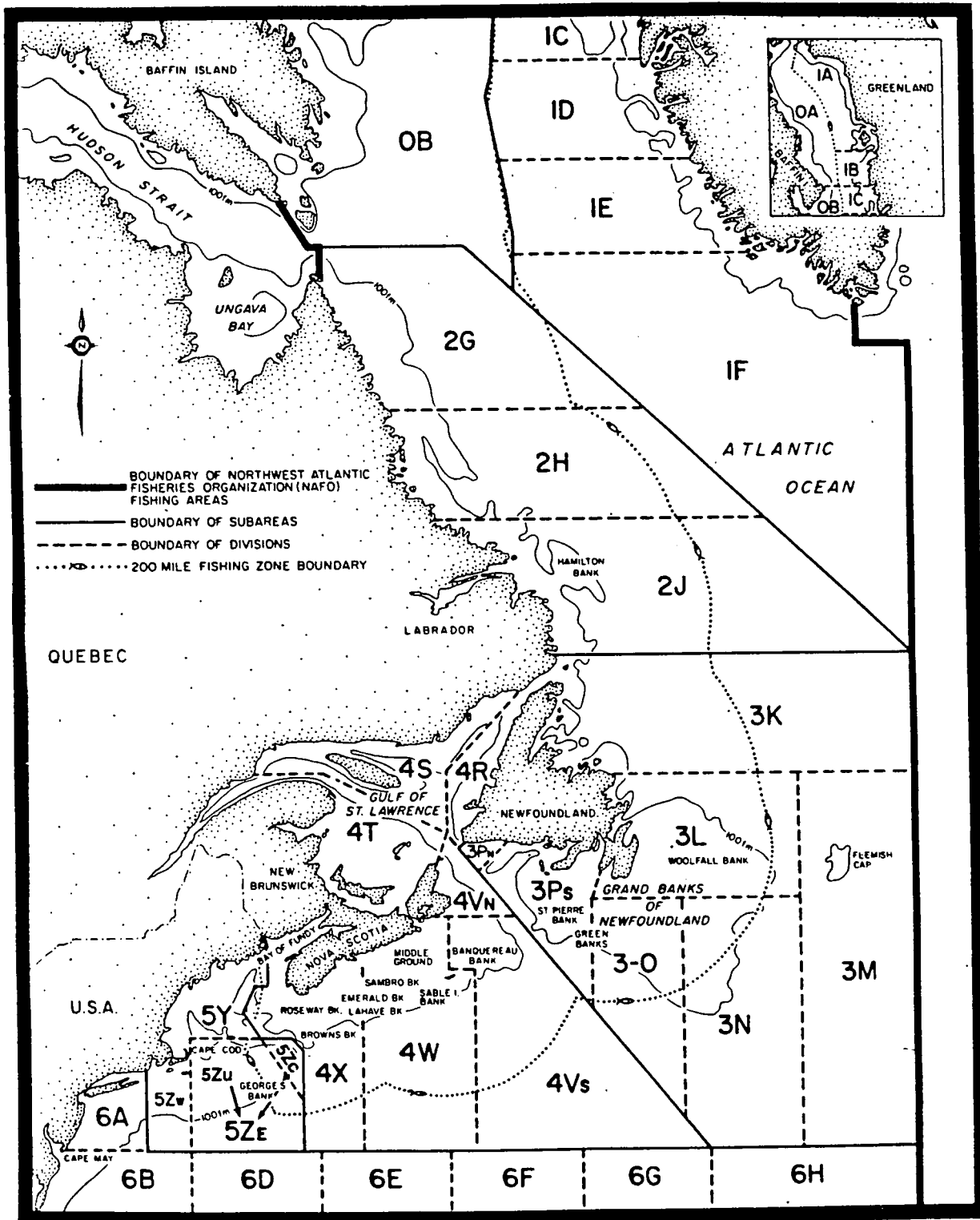


Figure 1. Subareas and divisions of the NAFO Convention Area and limits of Canadian fishing zones (east coast). Includes modifications to Subdivision 5Ze to take into account the Canadian side of 5Ze (5Zc) and USA side of 5Ze (5Zu).

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## Overview of the Status of Canadian Managed Groundfish Stocks in the Gulf of St. Lawrence and in the Canadian Atlantic

### Introduction

Cod stocks off Canada's east coast rebuilt rapidly after extension of jurisdiction in 1977. Strong year-classes had been produced either in the years immediately preceding extension of jurisdiction or shortly thereafter. At the same time, fishing mortality was decreased markedly, mostly as a result of a reduction in the foreign fleets fishing effort, therefore protecting the strong year-classes and allowing the rebuilding to begin rapidly.

Domestic fishing effort quickly replaced that previously exerted by the foreign fleets and by the mid-1980s, stocks had either stopped growing or started to decline. Fishing mortality nevertheless continued to increase while recruitment in the late 1980s was decreasing. Ocean climate in the late 1980s-early 1990s was harsh, decreasing growth and possibly increasing mortality while predation may also have increased. These conditions, combined with optimistic assessments, bad fishing practices, and poor enforcement of fishing regulations led to stock collapses and fishery closures.

Unfortunately, there were no strong year-classes in the sea in 1992-1993 and there are no indications, except perhaps for the haddock stocks on the Scotian Shelf and in the Gulf of Maine area, that strong year-

classes have been produced either immediately prior to or since the restrictions on fishing. The 1995 stock assessments show that the status of groundfish stocks in the Gulf of St. Lawrence and in the Canadian Atlantic show little sign of improvement despite severe restrictions on fishing, including fishery closures on 11 stocks. The rebuilding of groundfish stocks has therefore yet to begin.

Where it has been possible to estimate it, total mortality appears to have decreased (4T-Vn cod, 4VsW cod, 3Ps cod, 4X cod, 5Zj,m cod) but it remains high for northern (2J3KL) cod despite no fishing since July of 1992. For stocks where fisheries are allowed (4X cod, 5Zj,m cod), fishing mortality, although it has decreased, remains substantially higher than the stated target of harvesting approximately 20% of the adult stock.

For those stocks where mortality has been reduced, the potential to rebuild the spawning stock biomass exists if strong year-classes are produced and mortality remains low. For those cod, white hake and redfish stocks, it will take between 5 and 10 years for year-classes to become mature once they are produced. A single year-class may be sufficient to rebuild the Unit 1 redfish spawning stock biomass but it will be necessary to have several year-classes to successfully rebuild the spawning stock biomasses for cod and white hake. It will

therefore take at least 7 to 10 years from the time a strong year-class is produced before stocks can be expected to begin to rebuild.

Such rebuilding, however, would run the risk of being short lived if fishing effort is not matched to stock potential. Re-opening the fisheries with the same sized fleet and using the same management approach as when the stock declined would probably result in immediate overfishing.

### Active Fisheries

Several groundfisheries are now largely supported by stocks and species such as skate, monkfish, winter flounder, etc. which were considered of minor importance prior to 1992. Less is known about their biology than is available for the more studied cod, haddock, pollock and redfish stocks. Because of the paucity of biological information on those species, greater care is required in their management.

In order to estimate with confidence the reference catches which could be harvested each year, considerable information on stock abundance, growth, mortality and future recruitment is required. Such information is not available for the former minor stocks on which the groundfisheries currently depend. The TACs for these stocks are generally "precautionary" and intended to give a general indication of the stock's possible production. At the time the "precautionary" TACs were set, it was expected that the fisheries would develop gradually and that, in the process, the information gathered would allow refining of the estimates. With the sudden collapse of traditional groundfish

stocks, the interest increased rapidly on the former minor stocks as a result of fishing restrictions on "traditional" species.

In such cases, when the information is not sufficient to precisely calculate reference catches for each year, it may be useful to limit directly the amount of fishing that is allowed. This approach will probably not be sufficient in the mid- to long-term because the efficiency of the fishing effort has a tendency to increase, therefore defeating the original intent. The increase in the number of days per trip in the 4X cod fishery provides an example of such an adjustment in fishing strategy which may offset the expected benefits of a management measure.

The former minor stocks therefore require new approaches which will ensure that they are managed with caution even if there is limited biological information available. This could be achieved through a close partnership between DFO and the fishing industry to gather information and implement measures which have a high probability of ensuring conservation while knowledge is acquired.

A stock by stock summary is provided in annex to this report.

### Climate

The cold air temperatures experienced in Atlantic Canada during the winter of 1994 had moderated to near normal by the spring of 1994, and to above normal by summer. As a result, surface waters off the east coast of Newfoundland also warmed to above normal during this period. The deeper waters

however, remained below normal through the fall.

Although the volume of the cold intermediate layer (CIL) off Newfoundland and Labrador remained somewhat above the longer term average, it was much less than that of the previous four years.

Off the south coast of Newfoundland, the relatively cold conditions which began around the mid-1980s have moderated somewhat, but below normal temperatures continue, particularly on the eastern portion of St. Pierre Bank, Placentia Bay and in the area of the continental slope.

Climate in the Gulf of St. Lawrence has been cold since the late 1980s. In 1994, annual air temperatures were slightly colder than normal but warmed in comparison to recent years. Summer and autumn air temperatures were warmer than normal, but winter air temperatures were below the 1961-1990 average for the sixth consecutive year.

These cold winter air temperatures and accompanying strong northwest winds caused ice to form early and be of greater areal extent than normal. By early February, the entire Gulf was ice-covered, and ice extended out onto the Scotian Shelf. Ice duration was longer than normal (by over 2 weeks) throughout most of the Gulf. New records for ice duration and for the latest date of the last presence of ice were set on the Magdalen Shallows.

Water temperature were colder than normal at the bottom on the Magdalen Shallows in

September. The area of the Shallows with bottom temperatures below 0°C was much greater than normal for the fifth consecutive year. Data collected throughout the Gulf in August and September indicated that the cold intermediate layer was colder than normal for the ninth consecutive year. In contrast, temperatures in deep (200-300 m) water at Cabot Strait were above average for a second year.

Discharge from the St. Lawrence River was slightly higher than average in 1994.

On the Scotian Shelf and in the Gulf of Maine area during 1994, atmospheric circulation patterns produced near normal annual precipitation, stronger than normal easterly winds during the winter, and stronger southwesterly to westerly winds in the summer. The winter winds advected northern air masses into the region which led to colder than normal winter air temperatures for the 10<sup>th</sup> year in a row. However, the summer winds produced warmer than normal summer temperatures with the net result of a warmer than normal or near normal annual mean air temperature for the region.

The wind and temperature patterns of the cold winter of 1994 caused ice to flow out of the Gulf of St. Lawrence onto the Scotian Shelf such that the ice extended along the coast of Nova Scotia beyond the 1962-87 long-term maximum in February and near the maximum in March.

Ocean temperature depended upon the location with temperatures in the Gulf of Maine being above normal, those in the northeast Scotian Shelf remaining below



normal, and those in the deep basins and channels remaining above normal.

### Condition Factor

A stock's capacity to tolerate fishing depends on its productivity, that is, its capacity to replace the biomass of individuals as they are eliminated either by the fishery or by natural causes. Biomass increases through individual growth and through reproduction. In a laboratory setting, unfavourable environmental conditions result in slower growth and therefore lower weight for a given age. Under clearly bad environmental conditions, growth slows to the point where the condition of fish, in terms of weight at a given length, declines. It may be assumed that the same effects occur in nature. The condition of a fish reflects its energy content and thus its relative success in its environment.

When the condition of cod specimens from the sea is compared to that of cod subjected to severe environmental conditions in the laboratory, fish from the natural environment—or at least cod from the northern Gulf of St. Lawrence (3Pn4RS) in the 1990s—are found to be in a similar condition in the spring to cod that die of starvation. When a fish stock is in such poor condition, its natural mortality rate changes. Abundance prediction models have not reflected these changes so far, and this may have contributed to underestimating total mortality. It is therefore essential to assess the condition of stocks subjected to severe environmental conditions.

There are some indications that productivity in the southern Gulf has been low for the last 9 years; mean weight of cod has remained low, mean weight of herring has declined and recruitment of most groundfish species has been below average.

### Multispecies Considerations

Cod is a voracious predator and the considerable decrease in its abundance in the late 1980s-early 1990s would have been expected to have affected several of its prey species. Although, the increased shrimp abundance off Labrador and Flemish Cap may be related to less predation by cod, it also appears to be related to colder water conditions. Similarly, the continued presence of capelin on the Scotian Shelf, indicates that water temperatures have been colder in recent years. Generally speaking, however, prey species have not increased in proportion to the decrease in cod abundance, possibly due to increased predation by dogfish, seals or other predators.

Adult cod have few predators, but juveniles have several, including seals and adult cod. Six species of seals can be encountered in Atlantic Canada: harp seals (4.8 million), hooded seals (450,000), and grey seals (154,000) are the most common. Harbour seals have historically been estimated at less than 30,000 while ringed and bearded seals are Arctic species which make occasional occurrences. Per capita, grey seal have the highest potential consumption of cod, but in total, harp seals can also consume large quantities of cod because of their high abundance.

Seals, especially greys and harps, have the potential to slow the rebuilding of cod stocks either directly through predation or indirectly through competition. Increasing seal populations will likely result in increasing negative effects. The results of birth control experiments presently underway may eventually help curb the growth of seal populations.

### **Highlights of Groundfish Stocks Status**

Because of the many fishery closures now in place, data from fisheries related activities which previously made up an important part of the assessment database, are no longer available. Ongoing assessments of these resources will therefore be more critically dependent on research activities such as research surveys and sentinel fisheries, as well as research on trends in abundance of juveniles.

#### **Newfoundland and Labrador Shelf**

The 'traditional' groundfish resources in the waters off Labrador, northeast, and southern Newfoundland continue to be at or very near their historical low. For Canadian managed stocks where fisheries are still active, the information suggests that they may be in decline.

The scientific information available for lumpfish and monkfish is too limited to assess stock status with confidence. Data for skate suggests that the high unrestricted catches made outside 200 miles have had a negative impact on the resource in divisions 3LN. In Division 3O and Subdivision 3Ps,

the resource appears to have remained approximately stable through the 1980s and into the 1990s, but careful management is required in view of the paucity of information available.

For the NAFO managed resources excluding those of Flemish Cap, directed fisheries remain open only for Greenland halibut and 3LN redfish. The NAFO Scientific Council has expressed concern that overfishing on these is gradually reducing stock sizes. Updated information on the status of these resources will be provided by NAFO after the annual meeting of the Scientific Council.

#### **Gulf of St. Lawrence**

Invertebrate and pelagic stocks in the Gulf of St. Lawrence are, with a few exceptions, in good condition, with biomasses near or above long-term averages.

In the southern Gulf of St. Lawrence, the cod fishery was closed in 1994, but there were directed fisheries for witch, white hake (closed in 1995), winter flounder, plaice and dogfish. Regulations designed to limit the by-catch of cod led to several closures of those fisheries.

Input from industry indicated that catch data from groundfish fisheries during the mid-1980s up to the closure in 1992 were unreliable.

The annual groundfish survey in the southern Gulf in September provided abundance estimates for groundfish stocks, which were all at low abundance, and herring, which was wide-spread in 1994. The juvenile cod survey

found no signs of new recruitment, which was consistent with the groundfish survey.

Cod biomass is low and stable while fishing mortality has been reduced. Abundance of white hake is at the lowest level since 1972, there are few older hake and fishing mortality is high. Plaice and witch abundance are at very low levels while there appears to be a decline in winter flounder abundance.

Intensive fishing combined with diminished biological production has led to the catastrophic decline of northern Gulf cod and Unit 1 redfish. Both components of production—individual growth and recruitment—have declined considerably since the mid-1980s.

Greenland halibut stocks also show signs of overfishing. Understanding of stock dynamics is complicated by uncertainties about stock movements. It is known, however, that the commercial fishery has virtually eliminated the stock's adult component and is concentrating on immature individuals.

### **Scotian Shelf and Gulf of Maine Area**

In Scotia-Fundy, landings of traditional species increased after extension of jurisdiction in 1977 to almost 300,000t in 1982. They have declined since to 60,000t in 1994, the lowest ever recorded.

The declines have been most dramatic for cod, but are evident for haddock, pollock, silver hake and the flatfishes. While some of this decline has been compensated by

increased exploitation of other fish species such as skate and monkfish, much of the economic value of the fishery now depends on invertebrates such as snow crab, shrimp, and scallops. The groundfish decline has been most dramatic on the eastern Scotian Shelf. In the mid-1980s, this area provided much of the region's yield in groundfish.

Despite very low spawning stock biomasses, recruitment in 1992-93 appears to have been good for haddock stocks in 4TVW, 4X and 5Zj,m.

Flatfishes on the eastern Scotian Shelf have been the target of increased exploitation since the decline in the cod stocks. American plaice, yellowtail and witch show signs of declining biomass and contraction of the population age structure into the younger age groups--a sign of overexploitation.

On the southern Scotian Shelf, while the flatfishes are being heavily exploited, there are mixed signals on the resource trends. While plaice and witch appear to be declining, there are signs that yellowtail may be increasing. Winter flounder, however, a major resource in 4X, appears to be in decline, particularly in the main fishing areas.

The Unit 3 redfish appears to be stable with signs of small fish entering the stock since the late 1980s, and recent harvest rates are below the recommended level. However, as with the flatfishes, the information base is limited and therefore a cautious approach to management is appropriate.

**For more information:**

Area	Stocks	Contact
Newfoundland and Labrador Shelf	Cod: 2GH, 2J3KL, 3Ps Haddock: 3LNO, 3Ps Pollock: 3Ps Redfish: 2+3K, 3O, Unit 2 A. Plaice: 2+3K, 3Ps Witch: 2J+3KL, 3Ps G. Halibut: 2+3KL Skates: 3LNOPs	D.B. Atkinson: Tel.: 709-772-2052 Fax: 709-772-4188
Gulf of St. Lawrence	Cod: 4T-4Vn White Hake: 4T-4Vn A. Plaice: 4T Witch: 4RST Winter flounder: 4T	M. Chadwick Tel.: 506-851-6206 Fax: 506-851-2387
	Cod: 3Pn4RS Redfish Unit 1 G. Halibut: 4RST A. Halibut: 4RST	S. Labonté Tél.: 418-775-0637 Fax: 418-775-0679
Scotian Shelf and Gulf of Maine area	Cod: 4Vn, 4VsW, 4X, 5Zj,m Haddock: 4TVW, 4X, 5Zj,m Pollock: 4VWX+5Zc Redfish: Unit 3 A. Plaice: 4VW, 4X Witch: 4VW, 4X Yellowtail: 4VW, 4X A. Halibut: 3NOPs4VWX+5Zc S. Hake: 4VWX Argentine: 4VWX	R.N. O'Boyle Tel: 902-426-4890 Fax: 902-426-1506

**Highlights: 1995.**

**GROUND FISH: Labrador Shelf, Grand Banks and Southern Newfoundland.**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>Cod: Northern Labrador (2GH)</b>								No change	<ul style="list-style-type: none"> <li>- Catch negligible since 1990.</li> <li>- Survey made in 1991 detected very few fish.</li> <li>- Possible links with northern cod.</li> </ul>
TAC	20	20	20	20	1	1	0.2		
Catch	0.4	0.4	0	0	0	0			
<b>Cod: Southern Labrador &amp; Northern Grand Banks (2J-3KL)</b>								Stock extremely low	<ul style="list-style-type: none"> <li>- 1994 biomass estimate from survey is lowest observed.</li> <li>- Year-classes weak since 1987, improving in '93+'94.</li> <li>- Biomass at an all time low.</li> <li>- Adult biomass very low.</li> <li>- No signs of recovery.</li> </ul>
TAC	235	199	190	-*	-	-	-		
Catch	253	219	171	44	11	1			
*Moratorium imposed on July 2, 1992									
<b>Cod: St. Pierre Bank (3Ps)</b>								Uncertain	<ul style="list-style-type: none"> <li>- Cod from the 1989 year-class are now mature and must be protected</li> <li>- No evidence of strong year-class after 1990; increase in 1995 survey due to one large tow.</li> <li>- Considered to be at a low level of abundance</li> <li>- Older fish have disappeared; growth rates have declined.</li> </ul>
TAC	50	45	35	35	20	-	-		
Catch	39.5	41	43	31.5	15	1			
<b>Haddock: Grand Banks (3LNO)</b>								No change	<ul style="list-style-type: none"> <li>- High catches of the 1980s due to strong 1980 and 1981 year classes, which have been fished out.</li> <li>- No signs of improved recruitment in recent years.</li> <li>- No prospects of the stock improving in the near future.</li> </ul>
TAC	8.1	10	4	4	0.5	0.5	0.1		
Catch	6.7	3.2	1.3	1	1	+			
<b>Haddock: St. Pierre Bank (3Ps)</b>								No change	<ul style="list-style-type: none"> <li>- Stock increased in mid-1980's due to the 1981 year class, which has been fished out.</li> <li>- No signs of improved recruitment in recent years.</li> <li>- No prospects of the stock improving in the near future.</li> </ul>
TAC	3.2	3.2	3.2	3	0.6	0.5	0.1		
Catch	2.9	1.5	0.5	0.5	0.1	+			
<b>Pollock: St. Pierre Bank (3Ps)</b>								No change	<ul style="list-style-type: none"> <li>- At the extreme north of geographic distribution for pollock.</li> <li>- Recent surveys showed low abundance and biomass.</li> <li>- Schools of small pollock observed in 1995 in some inshore areas.</li> </ul>
TAC	5.4	5.4	5.4	5.4	0.6	0.5	0.1		
Catch	3.3	2	1.3	0.5	0.1	0.1			

**GROUND FISH: Labrador Shelf, Grand Banks and Southern Newfoundland.**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>Redfish: Labrador and northern Newfoundland (2+3K)</b>								No change	- Virtually no recruitment since year-classes of the early 1970s. - Stock at a very low level.
TAC	35	35	20	20	20	1	0.2		
Catch	3.2	2.4	0.2	+	+	+			
<b>Redfish: Laurentian Channel (Unit 2)</b>								To be determined	- Late 1980s year-classes good but not as strong as those of early 1980's. - Status to be reviewed in fall 1995.
TAC	-	-	-	-	28	25	14		
Catch	15	15	24	17	27	24			
<b>Plaice: Labrador &amp; Northeast Newfoundland (2+3K)</b>								No change	- Decline in recruitment in recent years. - Abundance very low. - Spawning stock abundance about 2% of peak values. - Reported catches cannot explain decline in stock.
TAC	10	10	10	10	5	0.5	0.1		
Catch	4.2	1.8	0.5	0.1	0.1	0.1			
<b>Plaice: St. Pierre Bank (3Ps)</b>								No change	- Recruitment very low. - Stock currently at a very low level. - Spawning stock biomass the lowest since 1975.
TAC	5	4	4	4	3	0.5	0.1		
Catch	4.0	4.8	4.4	2.3	0.8	0.1			
<b>Witch: Labrador &amp; Northern Grand Banks (2J-3KL)</b>								No change	- Area of distribution shrinking. - Stock presently at an extremely low level.
TAC	5	4	4	4	4	1	0.1		
Catch	4.9	4.0	4.0	2.3	0.3	+			
<b>Witch: St. Pierre Bank (3Ps)</b>								Candidate for reduced TAC	- Recent biomass estimates at the low end of observations.
TAC	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
Catch	0.9	1.0	1.1	1.0	1.0	0.4			
<b>Skates: Grand Banks (3LNOPs)</b>								Spread fishing effort	- Interest in skates growing with decline in traditional species. - Biomass estimates declining since 1986. - Average size declining quite dramatically. - Consider managing 3LN, 3O and 3Ps separately.
TAC	-	-	-	-	-	-	6		
Catch	N.A.	N.A.	28	5	2	3			
<b>Lumpfish: east and south coast Newfoundland (3KLP)</b>								New conservation measures needed	- 25% decline in roe landings. - Proportion of females in survey catch declining. - Catch rates declining in 3K; low in 3Ps for 1994.
TAC	-	-	-	-	-	-	-		
Catch	N.A.	N.A.	2.0	2.0	2.0	2.0			

**GROUND FISH: Gulf of St. Lawrence**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>Cod: Northern Gulf (3Pn-4RS)</b>								No change	<ul style="list-style-type: none"> <li>- Cod condition, growth and recruitment have been poor; some improvement in condition in fall '94.</li> <li>- Biomass estimates are very low; no signs of good recruitment.</li> <li>- All indications are that the spawning biomass is very low.</li> </ul>
TAC	76.5	58	35	35	18	-	-		
Catch	47	37	32	29	18	0.4	-		
<b>Cod: Southern Gulf (4T-4Vn:n.a.)</b>								No change	<ul style="list-style-type: none"> <li>- Recruitment has been poor in late 1980s and early 1990s; there is no indication of improvement in recruitment.</li> <li>- Biomass close to the lowest observed.</li> <li>- Spawning biomass would increase slightly (6-10%) if there is no fishery in 1996.</li> </ul>
TAC	54	53	48	43	13	-	-		
Catch	57	58	49	41	5	1	-		
<b>Redfish: Gulf (Unit 1)</b>								To be determined	<ul style="list-style-type: none"> <li>- 1988 year-class, which was strong, has disappeared from survey estimates.</li> <li>- Biomass estimates from surveys declining rapidly.</li> <li>- Status to be reviewed in fall 1995.</li> </ul>
TAC				67	60	30	-		
Catch	53	60	60	77	51	20	-		
<b>Plaice: Southern Gulf (4T)</b>								No change	<ul style="list-style-type: none"> <li>- Biomass estimate in 1994 is the lowest since 1971.</li> <li>- Recruitment has generally been poor since mid 1970s.</li> <li>- Discarding of undersized plaice remains a problem.</li> </ul>
TAC	10.0	10.0	10.0	10.0	5.0	5.0	5.0		
Catch	5.7	4.9	8.2*	8.3*	1.9	2.4	-		
* including estimates of discards									
<b>Witch: Gulf of St. Lawrence (4RST)</b>								No change	<ul style="list-style-type: none"> <li>- Large decline in abundance in 4RS; marginal increase in 4T.</li> <li>- The new management unit is more appropriate.</li> <li>- TAC was reduced in 1994; recent catches much below TACs.</li> </ul>
TAC	3.5	3.5	3.5	3.5	3.5	1.0	-		
Catch	2.3	1.3	1.0	1.0	0.9	0.4	-		

**GROUND FISH: Gulf of St. Lawrence**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>A. halibut: Gulf (4RST)</b>								Need to avoid catching immature fish	- Signs of good recruitment. - 60% of captures below 81 cm (estimated size at maturity)
TAC	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
Catch	0.3	0.4	0.3	0.2	0.1	0.2			
<b>G. halibut: Gulf (4RST)</b>								Reduce exploitation	- Low recruitment after 1988. - Abundance low. - Exploitation likely high and targeting immature fish.
TAC	10.5	10.5	10.5	10.5	4.0	4.0	4.0		
Catch	5.0	2.4	2.3	3.4	2.8	3.6			
<b>Winter flounder (4T)</b>								No change	- Landings uncertain due to inaccurate reporting. - Overall abundance is about average. - Shallow water species; likely several separate stocks.
TAC									
Catch	2.1	2.1	2.5	1.9	1.2	1.2			
<b>White hake: southern Gulf (4T)</b>								No change	- Fishing mortality has been high. - Incoming recruitment weak. - Biomass is at a very low level. - Contraction of geographical range in recent years.
TAC	5.5	5.5	5.5	5.5	3.6	2.0	-		
Catch	3.9	5.2	4.5	3.8	1.5	0.9			
<b>Spiny Dogfish: southern Gulf (4T)</b>								Need to address management approach	- Not under TAC control - Significant increase in landings since 1990. - Predation on commercial species could be significant. - Transboundary resource (SA 2-6)
TAC	-	-	-	-	-	-	-		
Catch	+	0.6	0.1	0.2	0.5	1.0			



**GROUND FISH: Scotian Shelf and Georges Bank**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>Cod: Sydney Bight (4Vn:m.-o.)</b>								No change	<ul style="list-style-type: none"> <li>- Catches continue to decrease.</li> <li>- Little or no recruitment since 1989.</li> <li>- Stock in a very depressed state; no signs of improvement.</li> <li>- Unit redefined as Nov.-Dec. catches from 4T stock.</li> </ul>
TAC	7.5	7.5	10.0	10.0	1.8	-	-		
Catch	5.8	3.2	2.8	2.3	0.7	0.1			
NOTE: TACs refer to the May-December period									
<b>Cod: Banquereau and Sable Island (4VsW)</b>								No change	<ul style="list-style-type: none"> <li>- Fishery closed since September 1993.</li> <li>- Recruitment has been poor since 1984.</li> <li>- Adult population at historic low levels.</li> <li>- Predation by grey seals is significant.</li> <li>- Growth and condition of the fish are poor.</li> </ul>
TAC	35.2	35.2	35.2	35.2	11.0	-	-		
Catch	37	34	33	30	3.5	0.4			
<b>Cod: Browns Bank (4X)</b>								Reduction in catches	<ul style="list-style-type: none"> <li>- Exploitation rate more than twice the target.</li> <li>- The 1990 and 1992 year-classes are about average;</li> <li>- Stock showing slight increase in 1995, from the low levels observed in 1993 and 1994 (lowest in time series).</li> <li>- <math>F_{0.1}</math> for 1996 around 6,300 t.</li> </ul>
TAC	12.5	22	26	26	15	13	9		
Catch	20	24	28	26	16	13			
<b>Cod: Georges Banks (5Zj,m)</b>								Status report previously released	<ul style="list-style-type: none"> <li>- Fishing mortality very high.</li> <li>- '91+'92 year-classes below average; '93+'94 lowest observed.</li> <li>- Stock biomass lowest observed.</li> <li>- Need to develop stock rebuilding strategy.</li> <li>- <math>F_{0.1}</math> for 1995 around 2,500 t.</li> </ul>
TAC	8	-	15	15	15	6	-		
Catch	14	21	20	17	13	7			
<b>Haddock: Central Scotian Shelf (4TVW)</b>								No change	<ul style="list-style-type: none"> <li>- Adult biomass near lowest observed since 1970.</li> <li>- Likely improvement in recruitment with 92-93 year classes; needs to be protected to promote rebuilding.</li> <li>- Stock has essentially disappeared from 4Vn and 4Vs.</li> </ul>
TAC	6.9	6.0	-	-	-	-	-		
Catch	9.1	7.0	5.4	6.1	1.2	0.1			

**GROUND FISH: Scotian Shelf and Georges Bank**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>Haddock: Browns Bank (4X)</b>								More protection for small, immature fish	<ul style="list-style-type: none"> <li>- Exploitation rate decreasing but still well above reference.</li> <li>- Recruitment below average since 1988 year-class; possible improvement with 1992 and 1993 year-classes which need protection to promote rebuilding.</li> <li>- Adult biomass at historically low level.</li> </ul>
TAC	4.6	4.6	-	-	6.0	4.5	6.0		
Catch	6.7	7.3	9.7	10.4	6.8	4.3			
<b>Haddock: Georges Bank (5Zj,m)</b>								Status report previously released	<ul style="list-style-type: none"> <li>- Fishing mortality generally high, peaking in 1993.</li> <li>- Indications of improved recruitment (1992 year class); 1993 year class weak.</li> <li>- Stock increasing from near historical lowest level due to 1992 year class.</li> <li>- <math>F_{0.1}</math> for 1995 is 3,000t.</li> </ul>
TAC	8.3	-	5 Can	5 Can	5 Can	3 Can	-		
Catch	3.8	4.5	6.4	5.7	4.1	2.7			
<b>Pollock: Scotian Shelf (4VWX+5Zc)</b>								Likely reduction in catches	<ul style="list-style-type: none"> <li>- 1990 year-class weak.</li> <li>- Stock is at a very low level; exploitation twice <math>F_{0.1}</math>.</li> <li>- Decline in weight at age.</li> <li>- Fishing at <math>F_{0.1}</math> in 1996 would yield 11,000 t.</li> </ul>
TAC	43	43	43	43	21	24	15		
Catch	43	38	40	34	21	15			
<b>Silver hake: Scotian Shelf (4VWX)</b>								Likely decrease in TAC	<ul style="list-style-type: none"> <li>- 1990-93 year classes variable; weak 1994 year class.</li> <li>- Commercial catch rates have dropped since 1989; remained stable in 1992-1994 at 40% of the 1989 level.</li> <li>- Weight at age declining.</li> <li>- Biomass appear stable but lower than in mid-1980s.</li> </ul>
TAC	135	135	100	105	86	30	60		
Catch	91	70	65	32	29	8			

**GROUND FISH: Scotian Shelf and Georges Bank**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>Redfish: southern Scotian Shelf (Unit 3)</b>								Need to protect small fish	<ul style="list-style-type: none"> <li>- 7% small fish in 1994.</li> <li>- Some improvement in recruitment in recent years.</li> <li>- Exploitation believed to be low; effort increased in '93 + '94.</li> <li>- Abundance stable since the late 1980s.</li> <li>- 10,000t in 1996 is consistent with target harvest rate.</li> </ul>
TAC				10	10	10			
Catch	3.2	2.3	2	2.2	5.2	5.2			
<b>Flatfish on Central Scotian Shelf (4VW)</b>								Reduce to 1994 catch level	<ul style="list-style-type: none"> <li>- New management unit implemented in 1994.</li> <li>- Overall landings declining.</li> <li>- Plaice depleted with signs of recruitment.</li> <li>- Yellowtail flounder at very low level.</li> <li>- Witch flounder low with signs of recruitment.</li> <li>- Restrict 1996 catches to 1994 level.</li> </ul>
TAC					5.5	4.1			
Total catch	6.9	6.2	4.6	4.7	4.0	2.8			
Plaice	3.4	2.0	0.4	0.5	0.1	0.1			
Yellowtail flounder	1.5	3.0	1.3	1.4	1.6	1.0			
Witch flounder	1.8	1.3	1.3	1.0	0.5	0.3			
Winter flounder	0.2	0.1	0.0	0.0	0.0	0.0			
Unspecified	0.1	0.0	1.5	1.9	1.7	1.4			
<b>Flatfish on Browns Bank (4X)</b>								No change	<ul style="list-style-type: none"> <li>- New management unit implemented in 1994.</li> <li>- Overall landings declining.</li> <li>- Plaice stable with signs of recruitment.</li> <li>- Yellowtail flounder stable or increasing.</li> <li>- Witch at a very low abundance with signs of recruitment.</li> <li>- Winter flounder abundance declined in 1993 and 1994 but still above average.</li> </ul>
TAC					4.5	3.4			
Total catch	3.3	6	5.8	5.9	4.0	3.3			
Plaice	0.5	0.5	1.0	0.4	0.0	0.0			
Yellowtail flounder	0.0	0.0	0.1	0.1	0.0	0.0			
Witch flounder	0.5	0.6	0.6	0.8	0.4	0.4			
Winter flounder	1.3	1.9	0.6	0.6	0.3	0.5			
Unspecified	1.0	3.0	3.4	4.0	3.2	2.2			
<b>Yellowtail flounder on Georges Bank (5Zj,m)</b>								Status report previously released	<ul style="list-style-type: none"> <li>- 5Zjm could be management unit.</li> <li>- Present harvest likely above <math>F_{max}</math>.</li> <li>- Stock stable at a low level; much lower than in late 1960s.</li> <li>- Signs of good recruitment (1992 year class).</li> <li>- 1995 yield should not exceed 435t.</li> </ul>
TAC									
Catch	0.0	0.0	0.0	0.0	0.2	1.0			
	(Canadian catch only)								

**GROUND FISH: Scotian Shelf and Georges Bank**

Catches and TACs ('000 t)								Prospects for 1996	COMMENTS
1989	1990	1991	1992	1993	1994	1995			
<b>A. halibut: Grand Banks &amp; Scotian Shelf (3NOPs-4VWX)</b>								No change	<ul style="list-style-type: none"> <li>- TAC was reduced in 1994 and 1995.</li> <li>- Total effort stable since 1992.</li> <li>- Necessary to maintain present restrictions in the fishery over several years.</li> </ul>
TAC	3.2	3.2	3.2	3.2	3.2	1.5	0.9		
Catch	1.9	2.1	2.2	1.4	1.6	1.1			
<b>Skates: Scotian Shelf</b>								Reduce catch and control discards	<ul style="list-style-type: none"> <li>- New directed fishery.</li> <li>- Declining biomass of thorny skates.</li> <li>- Discard rates are likely very high in the fishery.</li> <li>- Harvest of 1,200t consistent with conservation.</li> </ul>
TAC						2.0	1.6		
Catch	3.8	5.0	4.3	2.3	2.1	3.1			
<b>Wolffish: Scotian Shelf (4VWX)</b>								No change	<ul style="list-style-type: none"> <li>- Biomass declining.</li> <li>- Increase in small fish.</li> <li>- Yield of 600t should be maintained.</li> </ul>
TAC	-	-	-	-	-	-	-		
Catch	0.6	0.6	0.5	0.7	0.6	0.4			
<b>White hake: Scotian Shelf (4VWX)</b>								No change	<ul style="list-style-type: none"> <li>- Current abundance compares to that in 1970s.</li> <li>- Increasing pressure on stock.</li> <li>- Yield should be restricted to 2,500t for 1996.</li> </ul>
TAC	-	-	-	-	-	-	-		
Catch	3.4	3.7	2.9	3.4	3.6	3.1			
<b>Cusk: Scotian Shelf (4VWX)</b>								Yield to decline	<ul style="list-style-type: none"> <li>- Biomass declining.</li> <li>- Yield for 1996 should be restricted to below 2,000t.</li> </ul>
TAC	-	-	-	-	-	-	-		
Catch	2.7	3.1	3.8	4.2	2.4	1.9			
<b>Monkfish: Scotian Shelf (4VWX)</b>								Yield to decline	<ul style="list-style-type: none"> <li>- Biomass declining.</li> <li>- High exploitation rates.</li> <li>- Should limit catch to 800t.</li> </ul>
TAC	-	-	-	-	-	-	-		
Catch	0.6	0.8	0.8	0.8	0.6	1.2			

