

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

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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 were depleted by intensive foreign fisheries through the 1960s and 1970s. These stocks rebuilt rapidly after extension of jurisdiction in 1977. Strong year-classes had been produced in the years immediately preceding extension of jurisdiction and shortly thereafter. Growth rates of cod in these yearclasses also were high. Reductions in the fishing effort of foreign fleets led to a large decrease in fishing mortality. Together these factors allowed rebuilding to proceed rapidly.

Domestic fishing effort progressively replaced the effort previously exerted by the foreign fleets. By the mid-1980s, stocks had either stopped growing or started to decline. Moreover, year-classes of cod were not as strong as in the preceding years. As a result, fishing mortality began to increase markedly in the mid 1980's.

By the late 1980s and early 1990s, the ocean climate had become harsh, decreasing growth and condition (an indication of how well-fed and plump a fish is) of cod. It is possible that natural mortality increased due to predation and the harsh environment. These factors, combined with optimistic assessments, wasteful fishing practices, and inadequate enforcement of fishing regulations led to stock collapses and fishery closures. Moreover, unlike the situation in the late

1970s, there were no strong yearclasses recruiting in the early 1990s to provide the foundation for rapid rebuilding.

Many of the factors associated with the collapse of the cod stocks, such as declines in abundance, growth, and condition factor, showed up first, and most strongly, in the more northerly stock components. However, all cod stocks were affected. In fact, marked declines were observed in groundfish stocks which had been fished at very different intensities, and even some species not subjected to directed fishing at all. Where species supported directed fisheries, such as many haddock and flatfish stocks, increases in fishing mortality undoubtedly contributed to the declines. However, the diverse fishing histories of the many species in decline over the late 1980s and 1990s implicates some contribution of the environment to the declines.

Are The Stocks Still Declining?

When stocks are at a very low level, biologists expect a series of indicators to appear, as the status of the stock stabilizes and begins to improve. First of all, there must be a decline in overall mortality; otherwise the decline in stock biomass cannot be arrested. It is important to monitor mortality rates, even when fisheries are closed, to establish when and by how much mortality has declined

The first signs of improvement in stock status often show that the status of individual fish is improving; their growth rates, lengths and weights at age, or condition factors go up. Stronger year-classes are often a subsequent step, although many factors, such as a harsh ocean climate or high predation, may keep recruitment poor even when the spawning adults are individually healthy. Only after a number of strong year-classes have been produced, survived, and matured, will the stock have rebuilt. At the intermediate stages, the stock is composed solely of a few year-classes and is highly vulnerable to any source of increased mortality.

As the signs of collapse in the Canadian Atlantic groundfish stocks showed up first and strongest in northernmost areas, stocks in the southern areas may exhibit signs of improvement sooner than more northerly stocks. By 1996, some of the more southerly stock units are showing indications of a potential for recovery. Signs of improving growth, body condition and recruitment are beginning to appear in a few species and areas. The encouraging signs seen last year in the haddock stocks on parts of the Scotian Shelf and in the Gulf of Maine persist, and there is some indication of improved growth and recruitment in some Scotian Shelf flatfish stocks. There are fewer encouraging signs for cod stocks, and stocks in more northerly areas.

The 1996 stock assessments show that severe restrictions on fishing, including fishery closures on 11 stocks, have allowed some stocks to take advantage of a less harsh ocean environment. However, even for stocks enjoying some improvement in recruitment and condition, the status of groundfish stocks in the Gulf of St. Lawrence and in the Canadian Atlantic remains precarious. Although the declines have been arrested, the rebuilding of groundfish stocks has only

partially begun. Essentially all groundfish stocks remain vulnerable to any increase in mortality, including fishing.

By the early 1990s, some cod fisheries may have been removing half the biomass of fishable sizes each year. Since moratoria were instituted, total mortality on cod has decreased for many stocks, including 4TVn, 3Ps, and 4VsW, generally to levels which would allow rebuilding, were good recruitment to occur. Mortality 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 has decreased, generally to levels which are sustainable as long as the stock maintains the current level of productivity. Research surveys indicate that for many cod stocks mortality rates due to causes other than fishing may be higher than had been estimated in the 1970s and 1980s.

Direct restrictions on fishing, or indirect constraints due to bycatch limits for cod, have contributed to reductions in mortality of many other groundfish stocks as well, for example Scotian Shelf flatfish and 4T white hake. Again, however, mortality due to sources other than fishing may be higher than it had been thought to be previously. For example, biomass of some flatfish on the Newfoundland Banks continues to decline, despite very low recent catch levels.

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 cod, flatfish, 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 spawning biomass of depressed redfish stocks. However, it will be necessary to have several year-classes mature in order to successfully rebuild the spawning stock

biomasses and secure a potential sustainability for cod, flatfish, and white hake. For those stocks it will take at least 7 to 12 years from the time the strength of year-classes increases before spawning stocks can be expected to rebuild.

Potential for rebuilding can be squandered easily if fisheries are reopened while a stock is still vulnerable. Similarly, once underway, rebuilding still runs 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 approaches or abusive fishing practices as when the stocks declined would probably result in immediate overfishing.

Active Fisheries

The sudden collapse of traditional groundfish stocks prompted imposition of stringent regulations or closures for the traditional groundfish fisheries. Where they are open, fisheries on traditional stocks usually are proceeding under TACs which have been greatly reduced from the 1980s. Consequently, interest increased rapidly on stocks formerly of minor interest. Several fisheries are now largely supported by stocks or species such as skate, monkfish, winter flounder, etc. which were considered of minor importance prior to 1992.

In order to estimate with confidence safe annual catch levels, considerable information on stock abundance, growth, mortality and future recruitment is required. However, much less is known about the biology of the previously minor species than is known for the better studied cod, haddock, pollock and redfish stocks. Because of the paucity of biological information on the previously minor species, greater care is required in their management.

The TACs for these stocks originally were pre-emptive, intended to keep some cap on removals. At the time the pre-emptive TACs were set, it was expected that the fisheries would develop gradually and that, in the process, the information gathered would allow refining estimates of sustainable harvest levels.

More recently, management of previously minor stocks has been based on a precautionary approach, intended to give general indications of the stocks' possible productivities. To be precautionary when information is insufficient to calculate safe annual catch limits precisely, it is often advisable to limit directly the amount of fishing effort that is allowed, as well as the amount of catch. This approach is usually not sufficient in the mid- to long-term because the efficiency of the fishing effort tends to increase, defeating the precautionary intent.

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. The goal of the partnership would be to gather information and implement measures which have a high probability of ensuring conservation while knowledge is acquired.

Climate

During 1995, Newfoundland and Labrador air temperatures were warm during spring, summer, and autumn, in contrast to cold conditions earlier in the decade. Winter temperatures were cold, relative to long-term conditions, but warmer than 1994 and the very cold winter temperatures in the early 1990s. Both extent and duration of sea ice coverage were shorter in 1995 than in recent years.

As a result, surface waters off the east coast of Newfoundland also warmed to near normal during this period. The deep offshore waters also continued to warm up, and by fall were slightly above the long-term average. In general the very cold trends of the early 1990s have moderated further, to or above average conditions. However the volume of the cold intermediate layer (CIL) off Newfoundland and Labrador remained somewhat above the longer term average, although at the lowest level in 10 years. Nonetheless, much of the water on the Newfoundland Banks and nearshore troughs remains cold, in the neighborhood of a half degree colder than the long-term average.

Climate in the Gulf of St. Lawrence has been cold since the late 1980s but, as in the Canadian Atlantic, conditions are returning towards their average. Although in 1995 air temperatures in February and March were cold, particularly in the eastern Gulf, spring, summer, and autumn were generally normal or slightly above average. Sea ice in the winter of 1995 was of above average extent, but less than the very heavy ice conditions from 1990-1994.

The Gulf waters continue to be dominated by the Cold Intermediate Layer, which remains colder than the long-term average, and of the great extent observed since the late 1980s. The area covered by bottom waters colder than 0°C reached a record high in 1995. Summer sea surface temperatures did warm significantly, in many areas several degrees warmer than in 1994.

In the Scotian Shelf area, above normal air temperatures observed in late 1994 continued into 1995. However, the generally warm air temperatures were punctuated by colder than average months in April, May, and September. In the winter of 1994/95 sea ice formed late on the Scotian Shelf, and

generally lasted later than usual as well. On the western part of the Scotian Shelf and in the Gulf of Maine, sea surface temperatures were above normal through most of 1995, whereas on the eastern Shelf they were somewhat below normal. Bottom temperatures in the deep channels and Gulf of Maine remained warmer than normal. However, in the intermediate depths of 50-100m and through the northeast parts of the Scotian Shelf water temperatures in 1995 remained colder than normal, continuing a pattern which has persisted since the mid 1980s.

Individual Biological Factors

Last year's Overview (SSR 95/3) explained the important relationship between the productivity of a stock and its ability to tolerate fishing. Productivity of a stock reflects the interactions among sources of mortality, growth, reproduction, and ability of individuals to store energy. The Overview also reported findings that cod in the northern Gulf of St. Lawrence (3Pn4RS) in the 1990s were in a similar condition in the spring to cod that die of starvation. These findings have been extended to Northern Cod (2J3KL), as well, where the condition factor of cod, particularly in the northern two-thirds of its range, showed a very large drop between 1988 and 1992. The annual growth of cod also declined through the 1980s in several other cod stocks, for example 4VsW, as well as in other species including pollock, herring, capelin, and silver hake.

Length at age is a useful indicator of how well individual fish are doing because it reflects the conditions the fish has experienced for feeding and growth, and can be obtained from many sources. For example, the sentinel fisheries programmes may make contributions in this area soon, whereas several years may be needed before trends can be identified in their catch rates.

In the most recent few years, there are indications in a few stocks that biological factors may be improving. Compared to the early 1990s, since 1993 increases in length at age have been seen for 5Z haddock and some components of Northern cod. Also since the early 1990s, condition factor has improved in Northern cod and cod in 3Pn4RS.

Traditional models used to predict abundance often do not take account of changes in these important biological characteristics of fish stocks. As biologists expand their studies and analyses, more of these biological factors are being included in the evaluation of stock status. This leads to evaluations which are more complex, but more biologically realistic.

Multispecies Considerations

Cod and other groundfish are voracious predators. The considerable decrease in finfish abundance in the late 1980s-early 1990s would have been expected to have affected several prey species. Many invertebrate species, such as shrimp off Labrador, the Flemish Cap, the Gulf of St. Lawrence and Cape Breton Island; lobster throughout the Maritimes and Newfoundland; crab and scallops in several areas were at very high levels in the early 1990s. Some of the pelagic stocks, such as herring and sand lance were also at average or high levels, and produced strong year-classes. Since about 1991-1993 biomasses of many of these stocks has begun to decline from the peaks at the beginning of the decade.

Although the increased abundance of many pelagic and invertebrate stocks may have some association with less predation by cod, it also appears to be related to colder water conditions. The growth of many of the shrimp stocks, the abundance of Arctic cod off Newfoundland and Labrador, and the continued presence of capelin on the Scotian

Shelf, all indicate that water temperatures have been colder in recent years. Also, many 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 (estimated at 4.8 million in 1995), hooded seals (estimated at 450,000 in 1995), and grey seals (estimated at 154,000 in 1993) are the most common. Harbour seals have historically been estimated at less than 30,000 (1993) whereas 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, the large population of harp seals consumes more cod. Seals, especially greys and harps, have the potential to slow the rebuilding of cod stocks either directly through predation or indirectly through competition.

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 the northeast Newfoundland Shelf and Labrador continue to be at or very near their historical low. Since 1977, catches of cod-like species managed by Canada peaked at

388,000t in the mid 1980s. By 1995, the total catch was under 15,000t, of which more than half were grenadiers. Where redfish fisheries are open, TACs remain at reduced levels, with much of the catch taken by non-Canadian vessels.

Fisheries for non-traditional species such as lumpfish, monkfish, wolffish, skates, and winter flounder now support much of the groundfish fishery. Generally scientific information is too limited to assess the status of these stocks with confidence. The limited evidence available suggests that unrestricted harvests outside the 200 mile limit may have had a negative impact on stocks such as skate in divisions 3LN. Non-traditional stocks within the 200 limit appear to have remained approximately stable. As explained above, all these stocks require careful management 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. Catches were dominated by Greenland halibut taken outside the 200 mile limit, although the catch reported in 1995 was less than half that reported in 1994. For 1996 the NAFO Scientific Council recommended closures for 3NO cod, 3LNO American plaice, 3LNO yellowtail, and 3LNO witch flounder.

Significant new information is being collected in conjunction with inshore fishers. Both the sentinel fishery programme and systematic interviews with fishers are contributing additional information on the status of cod stocks at present, and the changes in inshore effort and catches over the past two decades.

Gulf of St. Lawrence

Invertebrate and pelagic stocks in the Gulf of St. Lawrence are, with a few exceptions, in

good condition. Biomasses are generally near or above long-term averages, although somewhat lower than the very high levels seen at the beginning of the 1990s. Some of the higher value invertebrate species, such as lobster, crab, and scallops have attracted substantial fishing effort.

Groundfish stocks are generally depressed. In the Gulf of St. Lawrence, there were closures in two cod stocks [3Pn4RS and 4TVn(N-A)], Unit 1 redfish, and white hake. TACs were reduced in most groundfish fisheries which remained open, particularly flatfish fisheries. Regulations designed to limit the by-catch of cod in any fisheries continue to cause closures of flatfish fisheries.

The annual groundfish survey in the southern Gulf in September provided abundance estimates for groundfish stocks, which were all at low abundance. Herring remain abundant, but indications of lower recruitment in recent years suggest biomass may decline. Although the summer groundfish survey took one large set of small cod in the southern Gulf, the directed juvenile cod survey, and the overall results of the groundfish survey indicate cod recruitment remains poor throughout the Gulf. The sentinel fishery programme began somewhat later than desired, but the data it provided indicate no change in status of Gulf cod stocks between 1994 and 1995.

Cod biomass is low, but has stabilized. Abundance of white hake is at the lowest level since 1972, although there is some evidence of improved recruitment. Plaice and witch flounder abundance are at low levels and Greenland halibut may be declining as well. Winter flounder abundance remains about average. Redfish have suffered from an absence of strong year-classes since the early 1980s, and the directed fishery was closed in 1995.

Scotian Shelf and Gulf of Maine Area

Landings of traditional species and silver hake increased after extension of jurisdiction in 1977 to almost 300,000t in 1982. They declined thereafter to under 40,000t in 1995, the lowest ever recorded. 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.

The declines have been most dramatic for cod, but are evident for haddock, pollock, silver hake and the flatfishes. Although some of this decline has been compensated by increased exploitation of other fish species such as skate, monkfish, cusk, and white hake, much of the economic value of the fishery now depends on invertebrates such as lobster and scallops. Shrimp and lobster appear in good condition. There is evidence of medium to high recruitment to some of the scallop stocks, but also concerns about high levels of exploitation.

Despite low spawning stock biomasses, recruitment in 1992-94 appears to have been good for haddock stocks in 4TVW, 4X and 5Zj,m. Recruitment prospects still appear poor for cod.

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. However, there are indications of fair recruitment.

On the southern Scotian Shelf, although the flatfishes are being heavily exploited, there are mixed signals on the resource trends. Witch flounder appear to be declining, but there are signs that winter flounder, American

plaice, and yellowtail are stable. There are indications of average to good incoming recruitment for each of these resources.

For more information:

Area	Stocks	Contact
Newfoundland and Labrador Shelf	Cod: 2GH, 2J3KL Haddock: 3LNO Redfish: 2+3K A. Plaice: 2+3K Witch: 2J+3KL G. Halibut: 2+3KL	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	G. Chouinard Tel.: 506-851-6206 Fax: 506-851-2387
	Cod: 3Pn4RS G. Halibut: 4RST A. Halibut: 4RST	J. Gagne Tél.: 418-775-0637 Fax: 418-775-0679
Scotian Shelf and Gulf of Maine area	Cod: 4Vn, 4VsW, 5Zj,m Haddock: 4TVW, 4X, 5Zj,m Redfish: Unit 3 A. Plaice: 4VW, 4X Witch: 4VW, 4X Yellowtail: 4VW, 4X A. Halibut: 3NOPs4VWX+5Zc	R.N. O*Boyle Tel: 902-426-4890 Fax: 902-426-1506
Stocks to be reviewed in September 1996:	Cod: 4X Pollock: 4VWX+5Zc White Hake: Scotian Shelf Monkfish: Scotian Shelf Skates: Scotian Shelf Redfish: Unit 1, Unit 2, 3O	

Highlights: 1996**GROUNDFISH: Labrador Shelf, Grand Banks and Southern Newfoundland.**

Catches and TACs ('000 t)								Prospects	Comments	
	1989	1990	1991	1992	1993	1994	1995	1996	1997	
Cod: Northern Labrador (2GH)										
TAC	20	20	20	20	1	1	0.2	0.2	No -change	- Catch negligible since 1990. - Survey conducted in 1991 detected very few fish. - Possible links with northern cod. - No recent surveys; status unknown but assumed low.
Catch	0.4	0.4	0	0	0	0	0	0		
Cod: Southern Labrador & Northern Grand Banks (2J-3KL)									No change	- Biomass remains very low. - Year-classes weak since 1986-87. - 1995 sentinel survey indicated varying amounts inshore. - 1995 estimate in Smith Sound only 17,000 metric tons. - No signs of recovery.
TAC	235	199	190	0*	0*	0*	0*	0*		
Catch	253	219	171	44	11	1	0.2			
*Moratorium since July 2, 1992										
Cod: St. Pierre Bank (3Ps)									(From 1995 SSR)	
TAC	50	45	35	35	20	0	0	0	To be determined in August 96	- Cod from the 1989 year-class are now mature and must be protected - No evidence of strong year-class after 1990; increase in 1995 survey due to one large tow. - Considered to be at a low level of abundance - Older fish have disappeared; growth rates have declined.
Catch	39.5	41	43	31.5	15	1	0.4			
Haddock: Grand Banks (3LNO)									No change	- High catches in the 1980s due to strong 1980 and 1981 year classes. - No evidence of more recent strong year-classes. - No prospects of the stock improving in the near future.
TAC	8.1	10	4	4	0.5	0.5	0.1	0.1		
Catch	6.7	3.2	1.3	1	1	+	+			
Haddock: St. Pierre Bank (3Ps)									(From 1995 SSR)	
TAC	3.2	3.2	3.2	3	0.6	0.5	0.1	0.1	To be determined in August 96	- Stock increased in mid-1980's due to the 1981 year class, which has been fished out. - No signs of improved recruitment in recent years. - No prospects of the stock improving in the near future.
Catch	2.9	1.5	0.5	0.5	0.1	+	+			

GROUNDFISH: Labrador Shelf, Grand Banks and Southern Newfoundland.

Catches and T ACs ('000 t)	1989	1990	1991	1992	1993	1994	1995	1996	Prospects 1997	COMMENTS
Pollock: St. Pierre Bank (3Ps)										(From 1995 SSR)
TAC	5.4	5.4	5.4	5.4	0.6	0.5	0.1	0.1	To be determined in August 96	- At the extreme north of geographic distribution for pollock. - Recent surveys showed low abundance and biomass. - Schools of small pollock observed in 1995 in some inshore areas.
Catch	3.3	2	1.3	0.5	0.1	0.1	0.2			
Redfish: Labrador and northern Newfoundland (2+3K)										- Virtually no recruitment since early 1970s. - Stock at a very low level. - No recovery possible until good recruitment.
TAC	35	35	20	20	20	1	0.2	0.2	No change	
Catch	3.2	2.4	0.2	+	+	+	+			
Redfish: Western Grand Banks (30)										(From 1995 SSR)
TAC	14	14	14	14	14	10	10	10	To be determined in Sept. 96	- Larger fish found in deeper hard-to-fish areas. - Fishing at shallower depths targets small, immature fish. - Conflicting stock indices; not possible to estimate stock abundance.
Catch	11.0	9.0	7.5	12.5	12.6	5	3			
Unreported	2.2	5.2	0.8	1.8	3.1	-	-			
Total	13.2	14.2	8.3	14.3	15.7	5	3			
Redfish: Laurentian Channel (Unit 2)										(From 1995 SSR)
TAC	-	-	-	-	28	25	14	10	To be determined in Sept. 96	- Late 1980s year-classes good but not as strong as those of early 1980's. - Abundance of fish larger than 25 cm expected to decline. - Summer surveys suggest stable abundance in '94 and '95. - Proportion of older, commercial sized fish declined from 1994 to 1995.
Catch	15	15	24	17	27	24	12.0			
Plaice: Labrador & Northeast Newfoundland (2+3K)										
TAC	10	10	10	10	5	0.5	0.1	0.1	No change	- Abundance and biomass very low. - Spawning biomass about 2% of peak values. - Reported catches cannot explain decline. - Low recruitment in recent years. - Prospects for rebuilding in foreseeable future poor.
Catch	4.2	1.8	0.5	0.1	0.1	0.1	0.0			
Plaice: St. Pierre Bank (3Ps)										(From 1995 SSR)
TAC	5	4	4	4	3	0.5	0.1	0.1	No change	- Recruitment very low. - Stock currently at a very low level. - Spawning stock biomass the lowest since 1975.
Catch	4.0	4.8	4.4	2.3	0.8	0.1	0.1			

GROUNDFISH: Labrador Shelf, Grand Banks and Southern Newfoundland.

Catches and TACs ('000 t)										Prospects 1997	COMMENTS
	1989	1990	1991	1992	1993	1994	1995	1996			
Witch: Labrador, Northeast Newfoundland & Northern Grand Banks (2J-3KL)											
TAC	5	4	4	4	4	1	0.1	0.1	No change		- Stock remains at a very low level. - Some indications of movement to deeper waters of 3L.
Catch	4.9	4.0	4.0	2.3	0.3	+	+				
Witch: St. Pierre Bank (3Ps)									To be determined in August 96		(From 1995 SSR)
TAC	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5			- Recent biomass estimates at the low end of observations.
Catch	0.9	1.0	1.1	1.0	1.0	0.4	0.3				
Skates: Grand Bank and Newfoundland South Coast											(From 1995 SSR)
TAC	-	-	-	-	-	-	6	2	To be determined in August 96		- Interest in skates growing with decline in traditional species. - Biomass estimates declining since 1986. - Average size declining quite dramatically. - Consider managing 3LN, 30 and 3Ps separately.
Catch	N.A.	15	28	5	6	9	8				
Lumpfish: east and south coasts Newfoundland (3KLP)											(From 1995 SSR)
TAC	-	-	-	-	-	-	-	-	To be determined in August 96		- 25% decline in roe landings. - Proportion of females in survey catch declining. - Catch rates declining in 3K; low in 3Ps for 1994.
Catch	N.A.	N.A.	2	2	2	2	1				

GROUNDFISH: Gulf of St. Lawrence

Catches and T ACs ('000 t)	1989	1990	1991	1992	1993	1994	1995	1996	Prospects 1997	COMMENTS
Cod: Northern Gulf (3Pn-4RS)										
TAC	76.5	58	35	35	18	0	0	0	No change	- Stock remains very low. - Recent year-classes (1991, 1992 and 1993) are poor. - Some improvements in condition in the fall of 1994 with large improvement in fish condition during 1995
Catch	47	37	32	29	18	0.4	0.1			
Cod: Southern Gulf (4T-4Vn:n.-a.)										
TAC	54	53	48	43	13	0	0	0	No change	- Recruitment has been poor in late 1980s and early 1990s. - There are some signs of improvement in recruitment but it is too early to be certain. - Biomass close to the lowest level observed. - Spawning biomass would increase slightly (5%) if there is no fishery in 1997.
Catch	57	58	49	41	5	1	1			
Redfish: Gulf (Unit 1)										(From 1995 SSR)
TAC				67	60	30	0	0	To be determined in Sept. 96	- No sign of incoming recruitment. - Biomass at very low levels. - Recovery may only occur 7-9 years after significant recruitment has occurred.
Catch	53	60	60	77	51	20	0.1			
Plaice: Southern Gulf (4T)										
TAC	10.0	10.0	10.0	10.0	5.0	5.0	5.0	2.0	No change	- Biomass estimate in 1995 is the lowest since 1971. - Recruitment has generally been poor since mid-1970s. - Discarding of undersized plaice remains a problem.
Catch	5.7	4.9	8.2*	8.3*	1.9	2.4	2.3			
* including estimates of discards										
Witch: Gulf of St. Lawrence (4RST)										
TAC	3.5	3.5	3.5	3.5	3.5	1.0	1.0	1.0	No change	- Large decline in abundance in 4RS; marginal increase in 4T. - Management unit was extended from 4RS to 4RST in 1995 - Recent catches much below TAC.
Catch	2.3	1.3	1.0	1.0	0.9	0.4	0.3			

GROUNDFISH: Gulf of St. Lawrence

Catches and T ACs ('000 t)									Prospects 1997	COMMENTS
	1989	1990	1991	1992	1993	1994	1995	1996		
A. halibut: Gulf (4RST)										
TAC	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	No change	- Recent catches about 10% of long term historical values (1900-1950)
Catch	0.3	0.4	0.3	0.2	0.1	0.2	0.1			
G. halibut: Gulf (4RST)										
TAC	10.5	10.5	10.5	10.5	4.0	4.0	4.0	2.0	No change	- Low recruitment after 1988. - Abundance low. - Exploitation likely high and targetting immature fish. - Impact of mesh increase to be reviewed in the fall 1996
Catch	5.0	2.4	2.3	3.4	2.8	3.6	2.3			
Winter flounder (4T)								1.0	No change	- Landings uncertain due to inaccurate reporting. - Overall abundance is about average. - Shallow water species; likely several separate stocks.
TAC								1.0		
Catch	2.1	2.1	2.5	2.0	0.9	1.2	0.6			
White hake: southern Gulf (4T)									No change	- Fishing mortality has been high prior to the closure. - Incoming recruitment weak but some very young fish seen in 1995 survey - Biomass at lowest level in history of survey. - Contraction of geographical range in recent years.
TAC	5.5	5.5	5.5	5.5	3.6	2.0	0.0	0.0		
Catch	3.9	5.2	4.5	3.9	1.5	1.0	0.1			
Black Dogfish in the Gulf (4RST)									Experimental	- Not currently under exploitation, but interests expressed. - Moderately abundant in deep waters of Laurentian channel. - Probably vulnerable under exploitation.
TAC	-	-	-	-	-	-	-	-		
Catch	0	0	0	0	0	0	0	0		

GROUNDFISH: Scotian Shelf and Georges Bank

Catches and TACs ('000 t)									Prospects 1997	Comments
	1989	1990	1991	1992	1993	1994	1995	1996		
Cod: Sydney Bight (4Vn:m.-o.)										- Fishery closed since September 1993.
TAC	7.5	7.5	10.0	10.0	1.8	0.0	0.0	0.0	No change	- Recruitment has been poor since 1987. - Adult population continues to be low. - Short-term prospects remain bleak.
Catch	5.8	3.2	2.8	2.3	0.7	0.1	0.1			
NOTE: TACs refer to the May-December period										
Cod: Banquereau and Sable Island (4VsW)										- Fishery closed since September 1993.
TAC	35.2	35.2	35.2	35.2	11.0	0.0	0	0	No change	- Recruitment has been poor since 1987. - Adult population near historical low . - Fish condition and growth poor. - Predation by seals is significant. - Environment continues to be cold.
Catch	37	34	33	30	3.5	0.4	0.3			
Cod: Browns Bank (4X)										(From Fall 1995 assessment)
TAC	12.5	22	26	26	15	13	9	11	To be determined in Sept. 96	- Biomass increasing from 1994 historical low. - Exploitation rate in 1994 at 47% and above reference. - 1992 year-class strong; that of 1993 is weak. - F _{0.1} for 1996 is 7,400 t.
Catch	20	24	28	26	16	13	9			
Cod: Georges Banks (5Zj,m)										- Adult biomass increased slightly from 1994 historical low. - Exploitation rate below F _{0.1}
TAC	8	-	15	15	15	6	1	2	To be determined in Spring 97	- Recruitment since 1990 has been poor.
Catch	14	21	20	17	13	7	2			
NOTE: TACs for Canada only.										
Haddock: Central Scotian Shelf (4TVW)										- Spawning biomass continues to be low. - 1992-1994 year-classes are average to good.
TAC	6.9	6.0	-	-	-	-	-	-	No change	- Yield prospects better than for 4VsW cod. - Need to continue closure to promote rebuilding.
Catch	9.1	7.0	5.4	6.1	1.2	0.1	0.1			

GROUNDFISH: Scotian Shelf and Georges Bank

Catches and TACs ('000 t)									Prospects 1997	COMMENTS
1989	1990	1991	1992	1993	1994	1995	1996			
Haddock: Browns Bank (4X)										- New age-based analysis. - Spawning biomass starting to increase. - 1995 exploitation rate of 36%. - DFO summer survey shows improving abundance. - Strong 1993 and 1994 year-classes. - Require measures to protect incoming recruitment.
TAC	4.6	4.6	-	-	6.0	4.5	6.0	6.5	Yield at F _{0.1} would be 6,700t	
Catch	6.7	7.3	9.7	10.4	6.8	4.3	5.4			
Haddock: Georges Bank (5Zj,m)										- Biomass has been rebuilding, but now more gradually. - Age structure expanding. - 1990s recruitment not exceptional but better than in 1980s. - Exploitation rates were high but now below F _{0.1} . - Spring 1996 survey indicates strong 1995 year-class.
TAC	8.3	-	5	5	5	3	2.5	4.5	To be determined in Spring 97	
Catch	3.8	4.5	6.4	5.7	4.1	2.7	2.1			
NOTE: TACs for Canada only.										
Pollock: Scotian Shelf (4VWX+5Zc)										(From 1995 SSR)
TAC	43	43	43	43	21	24	15	10	To be determined in Sept. 96	- 1990 year-class weak. - Stock is at a very low level; exploitation twice F _{0.1} . - Decline in weight at age. - Catch in 1996 must be below 10,000t to arrest decline.
Catch	43	38	40	34	21	15	10			
Silver hake: Scotian Shelf (4VWX)										(From 1995 SSR)
TAC	135	135	100	105	86	30	60	64	To be determined in June 1996	- 1990-93 year classes variable; weak 1994 year class. - Commercial catch rates have dropped since 1989; - remained stable in 1992-1994 at 40% of the 1989 level. - Weight at age declining. - Biomass appear stable but lower than in mid-1980s.
Catch	91	70	65	32	29	8	17			

GROUNDFISH: Scotian Shelf and Georges Bank

Catches and TACs ('000 t)									Prospects 1997	COMMENTS
1989	1990	1991	1992	1993	1994	1995	1996			
Redfish: southern Scotian Shelf (Unit 3)										(From 1995 SSR)
TAC				10	10	10	10	To be determined in Sept. 96		<ul style="list-style-type: none"> - 7% small fish in 1994. - Some improvement in recruitment in recent years. - Exploitation believed low; effort increased in '93 + '94. - Abundance stable since the late 1980s. - 10,000t in 1996 is consistent with target harvest rate.
Catch	3.2	2.3	2	2.2	5.2	5.2	9.8			
Flatfish on Central Scotian Shelf (4VW)										
TAC				5.5	4.1	3.5		Catches at 1996 level expected to lead to continued biomass decline		<ul style="list-style-type: none"> - Effort has been declining. - Biomass of all four species in decline. - Except for yellowtail, signs of incoming recruitment.
Total catch	6.9	6.2	4.6	4.7	4.0	2.8	2.3			
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				
Flatfish on Browns Bank (4X)										
TAC				4.5	3.4	3.4	No change, except for witch.			<ul style="list-style-type: none"> - Winter flounder, plaice and yellowtail abundance stable. - Witch declining. - Incoming recruitment for all resources.
Total catch	3.3	6	5.8	5.9	4.0	3.3	2.5			
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				
Yellowtail flounder on Georges Bank (5Zhjmn)									To be determined in Spring 97	
TAC				0.4	0.4					<ul style="list-style-type: none"> - New Canadian fishery. - Resource depressed compared to historical levels. - 87, 90, and 92 year-classes near average recently. - Exploitation rate of 40% (above F_{0.1}) in 1995.
Catch	NA	NA	1.8	2.8	2.8	3.6	1.5			
NOTE: TACs for Canada only.										

GROUNDFISH: Scotian Shelf and Georges Bank

Catches and TACs ('000 t)									Prospects 1997	COMMENTS
1989	1990	1991	1992	1993	1994	1995	1996			
A. halibut: Grand Banks & Scotian Shelf (3NOPs-4VWX)									Catch not sustainable with current effort	<ul style="list-style-type: none"> - Effort increased slightly in 1995. - Survey and commercial indices of abundance declining. - Decline in recruiting year-classes. - Resource in severely depleted state.
TAC	3.2	3.2	3.2	3.2	3.2	1.5	0.9	0.9	To be determined in Sept. 96	(From 1995 SSR) <ul style="list-style-type: none"> - New directed fishery. - Declining biomass of thorny skates. - Discard rates are likely very high in the fishery. - Harvest of 1,200t consistent with conservation.
Catch	1.9	2.1	2.2	1.4	1.6	1.1	0.9		No change	<ul style="list-style-type: none"> - Biomass declining. - Signs of incoming recruitment, especially in 4V. - Continued high fishing pressure.
Skates: Scotian Shelf									To be determined in Sept. 96	(From 1995 SSR) <ul style="list-style-type: none"> - Current abundance compares to that in 1970s. - Increasing pressure on stock. - Yield should be restricted to 2,500t for 1996.
TAC	-	-	-	-	-	-	-	-	No change	<ul style="list-style-type: none"> - Primarily caught in 4X. - Slow decline in abundance since early 1970s. - Survey at historical low.
Catch	0.6	0.6	0.5	0.7	0.6	0.4	0.2		To be determined in Sept. 96	(From 1995 SSR) <ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.
Wolffish: Scotian Shelf (4VWX)									No change	<ul style="list-style-type: none"> - Biomass declining. - Signs of incoming recruitment, especially in 4V. - Continued high fishing pressure.
TAC	-	-	-	-	-	-	-	-	To be determined in Sept. 96	<ul style="list-style-type: none"> - Biomass declining. - Signs of incoming recruitment, especially in 4V. - Continued high fishing pressure.
Catch	N.A.	3.7	4.4	4.7	4.8	4.3	4.2		No change	<ul style="list-style-type: none"> - Biomass declining. - Signs of incoming recruitment, especially in 4V. - Continued high fishing pressure.
Cusk: Scotian Shelf (4VWX)									To be determined in Sept. 96	(From 1995 SSR) <ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.
TAC	-	-	-	-	-	-	-	-	No change	<ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.
Catch	2.7	3.1	3.8	4.2	2.4	1.5	1.8		To be determined in Sept. 96	(From 1995 SSR) <ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.
Monkfish: Scotian Shelf (4VWX)									No change	<ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.
TAC	-	-	-	-	-	-	-	-	To be determined in Sept. 96	<ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.
Catch	0.6	0.8	0.8	0.8	0.6	1.2	0.7		No change	<ul style="list-style-type: none"> - Biomass declining. - High exploitation rates. - Should limit catch to 800t.

GROUNDFISH: Scotian Shelf and Georges Bank

Catches and TACs ('000 t)									Prospects 1997	COMMENTS
1989	1990	1991	1992	1993	1994	1995	1996			
Greenland halibut: Eastern Scotian Shelf (4VW)									No change	<ul style="list-style-type: none"> - Increase in abundance coincides with cold water intrusions. - Confined to Eastern Shelf. - Mostly immature fish. - May be extension of Gulf resource.
TAC	-	-	-	-	-	-	-			
Catch	NA	0.1	0.1	0.1	0.1	0.1	0.1			
Spiny Dogfish: Northwest Atlantic (SA 2-6)									Fully exploited	<ul style="list-style-type: none"> - Most catches in U.S.A. waters. - High discard rates in directed and bycatch fisheries. - Recent resource expansion into Canadian waters. - Biomass high on account of good recruitment in mid-1980s.
TAC	-	-	-	-	-	-	-			
Catch	NA	18.2	15.6	19.2	23.0	22.2	NA			