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THE NORTHERN COD CRISIS

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BACKGROUND

The northern cod stock (cod in NAFO statistical division 2J, 3K and 3L, commonly referred to as 2J3KL, see Chart 1)(1) has been exploited by fishermen through four

centuries at least. By the opening decade of the 16th century, the fishing ports of northern Europe were rife with stories of fish here so abundant that they impeded the progress of ships and could be caught by simply lowering a basket over the side and drawing it up filled. The fishery was subsequently the economic foundation for European settlement along the eastern coast of Newfoundland and Labrador.(2) Though other marine species such as salmon, herring, seals and whales were harvested, northern cod was the *raison d'être* for the existence of Newfoundland as a colony and later as a Dominion, and contributed to a lesser extent to the well-being of several Nova Scotian coastal communities.(3)

Prior to the June 1992 moratorium, the northern cod fishery was the single most important fishery on Canada's East Coast; it represented 46% of total available cod quotas and 21% of all groundfish quotas. In 1991, a year when the Total Allowable Catch (TAC) was at its lowest in a decade, the fishery had an estimated value to the Canadian economy of over $700 million, and supported directly and indirectly some 31,000 jobs in the region, 90% of which were based in Newfoundland and Labrador.(4) Although some economic diversification has taken plan in the last century, most of the province's coastal communities that were built upon the northern cod fishery are still entirely dependent upon that resource for their existence.(5)

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The fishery has evolved over this century. Beginning in the 1950s, new technologies were introduced; among them were the more mobile and heavily powered vessels with otter trawls capable of fishing in deeper waters and of harvesting the large concentrations of fish assembled at the end of autumn for spawning in the outer regions of the continental

shelf. Subsequently, inshore (small boat) fishermen(6) also began to acquire larger diesel-powered vessels (e.g., the longliner fleet) with extended range and seakeeping capacities, equipped with electronic navigational and fish-finding instruments. Hydraulic net haulers permitted the greater use of gillnets. The inshore effort was therefore extended into deeper waters upwards of 50 miles from shore. Later came the development of offshore technology and the notorious assault of European fleets on the spawning stocks of the northern banks during the 1960s and 1970s.

QUOTAS AND CATCHES

In the century prior to 1950, northern cod yielded an annual production of some 250,000 tonnes. In general, the harvest gradually moved upward in the late 1950s and early 1960s as the fishing effort increased. Except for some localized failures in the fishery (which sometimes lasted for a number of years), the historical record indicates that northern cod sustained the fishing pressures imposed on it without showing any obvious sign of decline. However, with nominal catches reaching 800,000 tonnes in the peak year of 1968, the result was a collapse of the fishery and a gradual decline in the harvest to a low of 139,000 tonnes in 1978. This has led one recent federal Commission to conclude that "an annual harvest of 300,000 tonnes was a sustainable figure in the years between 1902 and 1958, while harvests in excess of 600,000 could not be sustained during the later 1960s and early 1970s as was clearly evident from the notable and rapid decline in both catches and estimated stock size."(7)

Total Allowable Catches for northern cod were introduced in 1973, but during the 1973-76 period these did not result in the restriction of catches by any fleet sector. Earlier management measures were limited to minimum mesh size regulations.(8) Although the United Nations Convention on the Law of the Sea (UNCLOS) was still unratified, a steep decline in the resource prompted Canada to declare (unilaterally) a 200-nautical mile fisheries management zone on 1 January 1977.(9) This provided Canada with the opportunity to begin the process of rebuilding depleted stocks and establishing fishing strategies that would ensure the long-term viability of both the inshore and offshore fishery. Since 1984, the core of the Canadian management effort has been the strategy known as the FO.1 level of fishing effort,(10) which implied annual fish landings of approximately 16% of the exploitable biomass.(11)

The extension of Canada’s fisheries limit also resulted in a change in the share of the catch: prior to 1977, most of the fish within 200 miles were taken by foreign trawlers, but since then, the fishery has mainly been a Canadian endeavour.(12) Although extended jurisdiction did not include the edges of the continental shelf (with important fishing grounds on the "Nose" and "Tail" outside the maritime boundary subject to largely unregulated foreign fishing), the euphoria engendered among Canadian fishermen and processors by the establishment of the 200-mile zone was reinforced by a steady growth of the stock, by improved catches, and by the belief that the FO.1 objective was, indeed, being met. In short, it was widely believed that the management strategy was resulting in the recovery of the stock that had been shamelessly overexploited in the decades of the 1960s and 1970s. The TAC increased progressively from 135,000 tonnes in 1978 to 266,000 tonnes between 1984-88, during which time a major restructuring of the industry had been carried out. With renewed confidence, investors and fishermen alike began to believe that the resource could be so managed as to represent an illimitable future.(13)

Beginning in early 1989, however, it became clear that the stock was no longer growing, and TACs were set at progressively lower levels.

> The reasons for this altered view were variously ascribed but principally to the introduction of new and more sophisticated statistical modelling techniques and to the availability of data in an increasingly longer time series. The revised position was that while the stock had not declined relative to previous years, it had not grown at a sufficiently rapid rate to justify the TAC of a year earlier, i.e, 266,000 tonnes. In essence, the new calculations indicated that the previous estimate of fishing mortality had been too low with the consequence of offering a brighter view of stock growth than had been warranted. Consequently, it was recommended that if the FO.1 strategy were indeed to be realized so as to encourage an increased growth rate in the spawning stock, the TAC would have to be reduced by one-half.(14)

The TAC was set at 235,000 tonnes in 1989, at 199,262 tonnes in 1990 and at 190,000 tonnes in 1991. It was later lowered to 185,000 tonnes in December 1991 and cut again in February 1992 to 120,000 tonnes (Table 1). This effectively shut down the offshore fishery, affecting as many as 8,000 jobs.

From 1982 to 1990, the total catch (Canadian and foreign) was in the range of 219,000 to 269,000 tonnes. Canada's share increased from a low of about 36,000 tonnes in 1974 to 214,000 in 1983. The harvest then declined to 190,000 tonnes in 1986, but increased to a high of 242,000 in 1988. Since then, Canadian catches have decreased and in 1991, the harvest was approximately 120,000 tonnes.(15) It is noteworthy that the TAC of 235,000 tonnes for 1989 was exceeded because of foreign fishing on the Nose of the Grand Bank (NAFO area 3L) despite a moratorium on the fishery set by the Northwest Atlantic Fisheries Organization.

In recent years, Canadian catches have been less than allocations, with major discrepancies being mainly for the fixed gears (traps, gillnets, hardlines and longlines). The inshore declined considerably for successive years in the mid-1980s, during which time the state of the stock came under severe questioning by the coastal (small boat) fleet in particular. In 1991, the sector's harvest was about 50% lower than its allowance, the largest discrepancy since an allowance was first introduced in 1978.(16)

Table 1
Catches of Cod in NAFO Divisions 2J3KL, 1974-1992
(in '000 tonnes)

	Inshore Catch (Fixed Gears)	Offshore Catch (Canadian and Foreign)	Total Catch (Canadian and Foreign)	TAC
1974	35	337	37	657
1976	60	154	214	300
1978	81	57	138	135

1980	97	79	176	180
1982	113	117	230	230
1983	106	126	232	260
1984	98	135	232	266
1985	80	151	231	266
1986	72	179	251	266
1987	79	156	235	256
1988	101	168	269	266
1989*	103	151	253	235
1990*	113	106	219	199
1991*	60	90**	150	190
1992*	-	?	?	120

* Provisional
** Canadian surveillance estimated at 111,000 tonnes.

Source: Northwest Atlantic Fisheries Organization, Report of the Special Meeting – Scientific Council, 1-4 June 1992, p. 6.

FOREIGN OVERFISHING OUTSIDE THE 200-MILE LIMIT

When Canada extended jurisdiction over fisheries in 1977 and created a 200-mile Exclusive Fishing Zone (EFZ), three areas of the continental shelf remained largely beyond Canadian control: the northeastern portion of the Grand Bank (NAFO division 3L or the "Nose of the Bank"), the southeastern portion (division 3NO or the "Tail of the Bank"), and the outcropping of the shelf east of the Bank (division 3M or the "Flemish Cap"). Five species of groundfish, including northern cod, cross outside the limit during their seasonal migrations. Excessive fishing by foreign distant water fleets outside the 200-mile line is said to undermine Canadian conservation measures inside the zone and deprive Canada of the benefits it hoped to gain from the extension of its jurisdiction. Overfishing of the so-called "straddling stocks" is widely believed to be a major factor contributing to the current malaise in the Atlantic fishing industry, especially the northern cod fishery.

Since 1 January 1979, the Northwest Atlantic Fisheries Organization (NAFO) has been the regulatory agency responsible for fisheries conservation and management of Atlantic stocks beyond Canada’s 200-mile limit. The contracting parties to NAFO are Bulgaria, Canada, Cuba, Denmark (with respect to the Faroe Islands and Greenland), Estonia, the European Community (EC), Iceland, Japan, Latvia, Lithuania, Norway, Poland, Romania and Russia. Because only a fraction of the northern cod stock is usually present outside the 200-mile limit, about 3% to 5% on average throughout the year, Canada manages the entire stock. The stock was assessed by NAFO until 1986 and has been assessed by the Canadian Atlantic Scientific Advisory Committee (CAFSAC) since 1987.

The Canadian view is that NAFO had worked smoothly until the impending entry of Spain and Portugal to the European Community.(17) The major weaknesses of NAFO in providing "rational management and conservation of the fisheries resources" of the Northwest Atlantic Ocean include: lack of unanimity as to how to conserve the resource; voluntary compliance and an objection procedure which serves to legitimize the

overfishing of established TACs; weak inspection and surveillance procedures; and lack of third party enforcement.(18) European catches of Canadian-managed northern cod, despite a NAFO moratorium on fishing outside Canada's 200-mile zone since 1986, have contributed to the problems with the stock. In sum, the EC has argued that, as a sovereign body, it is entitled to fish in international waters in accordance with the Law of the Sea Convention; that a moratorium for northern cod (3L) could not be justified since a fishery on the same stock is being conducted inside the Canadian zone; and that Community vessels have fished in the area for hundreds of years.

Extending Canadian jurisdiction in one form or another beyond 200 miles is widely supported in the Canadian fishing industry as an option for resolving NAFO's problems. Such action would involve NAFO members agreeing to give Canada functional management jurisdiction over the straddling stocks in the Organization's Regulatory Area. As proposed by the Fisheries Council of Canada, the Oceans Institute of Canada, the Northern Cod Review Panel and others, the purpose of such action would not be to enable Canada to claim a sole right to harvest straddling stocks on the high seas, but rather to preserve Canadian and the international community's interests in conserving these stocks. A limited extension of jurisdiction has also been suggested, such as declaring a provisional extension until an appropriate resolution process or a negotiated arrangement acceptable to Canada is reached.(19)

THE FISHERY IN 1992

Virtually all of this year's (1992) Canadian offshore harvest of northern cod was taken by March. The presence of small fish and reduced catch rates led to a reduction in fishing activity. The Canadian catch in 2J3KL in mid-May was approximately 14,400 tonnes (compared to 41,700 tonnes for the same months in 1991), much of which was taken by large offshore otter trawlers in area 3KL. As mentioned earlier, fishing ceased in early July 1991 when a two-year moratorium on northern cod fishing was announced.

The catch of cod by non-Canadian fleets in NAFO area 3L is estimated by Canada to be about 48,900 tonnes in 1991; of this total, 41,900 tonnes are believed to have been taken by the European Community, with the remainder (7,000 tonnes) being harvested (primarily during the first six months of 1991) by non-NAFO states. Canadian estimates are based on information collected from fishing logbooks and sightings from surveillance platforms. Interestingly, the officially reported provisional EC catch (Portugal 9,459 tonnes, Spain 8,546 tonnes, and Germany 6,459 tonnes) for 1991 was about 40% lower than that estimated by Canadian surveillance.(20)

In the early months of 1992, the non-Canadian (i.e., foreign) fleet fishing on the Nose of the Grand Bank also experienced lower catch rates and catches of small fish. The EC harvest of cod in NAFO area 3L from January to April 1992 was some 6,900 tonnes (as estimated by Canadian surveillance), down from 21,600 tonnes for the same months in 1991, even though the numbers of vessels fishing in the area in 1991 and 1992 were similar.(21) At NAFO's annual meeting in September 1992, EC delegates agreed for the first time not to fish northern cod outside Canada's 200-mile zone in 1993.(22)

Stock assessments suggest an abrupt reduction in the biomass (the volume of fish aged three years or older) and in the spawning biomass (the volume of fish generally seven years or older). The biomass of northern cod now stands at between 520,000 and 640,000

tonnes, possibly the lowest level ever observed. The spawning biomass is estimated to be between 72,000 and 110,000 tonnes; 30 years ago, the spawning biomass stood at 1.6 million tonnes, and four years ago, it was at about 400,000 tonnes.(23)

THE TASK FORCE ON ATLANTIC FISHERIES – 1982

The declaration of the 200-mile fishing zone for Canada's coastal waters in 1977 was accompanied by a wave of optimism and highly leveraged capital investment in both fishing vessels and processing plants. By 1981, however, the Atlantic groundfish industry faced serious financial trouble due to declining markets in the United States, increased competition from fish exporting countries such as Iceland and Norway, new species, price competition from other protein sources, and increased energy costs and high interest rates.

Within the federal government (which was under considerable pressure from the banks and the ailing industry to do something), there were different perceptions of what the basic problems were:

> Some of the central agencies, e.g., Treasury Board, Department of Finance, and Ministry of State for Economic Development, appeared to have been lobbied effectively by the processing interests for they tended to view the problem as at least partly due to DFO overregulating and allocating too much fish to the inshore or seasonal fisheries at the expense of the offshore interests. This view was disputed by DFO which maintained that percentage shares of allocation had, in fact, remained substantially the same in the 1977-81 period. DFO also maintained that overregulation, if it did exist, was a symptom of the fact that there is no proven method of regulating a common property resource. Also, DFO could only move as fast as industry, which had only recently agreed to experiment with enterprise allocations – a by no means proven tool. DFO, in contrast, saw the problem as stemming from mismanagement in the processing sector and a false sense of optimism on the part of industry and its lenders, as well as the external problems already identified above. This latter view was apparently endorsed by the banking institutions in their analysis of industry problems.(24)

In November 1981, an Atlantic Fisheries Policy Review (an interdepartmental planning review) was set in motion, but could not arrive at a consensus on any major decisions regarding the funding of an assistance package. In January 1982, the federal government appointed Dr. Michael Kirby to head up a Task Force on Atlantic Fisheries.

The Report of the Task Force on Atlantic Fisheries ("Navigating Troubled Waters: A New Policy for the Atlantic Fisheries")(25) was released the following year. Building on the material from previous research and government policy papers, as well as on extensive consultation with industry and data generated by Task Force research staff and consultants, the report provides a comprehensive overview and analysis of the Atlantic groundfish and herring fisheries. Its approach is "pragmatic" in that the feasibility of its proposals and the process of implementation were considered important.

Although the Kirby Report's 57 recommendations defy simple summarization, the paper's underlying thrust can be found in the policy objectives (prioritized) it set for the East Coast fishery:

- The Atlantic fishing industry should be economically viable on an ongoing basis, where to be viable implies an ability to survive downturns with only a normal business failure rate and without government assistance.

- Employment in the Atlantic fishing industry should be maximized subject to the constraint that those employed receive a reasonable income as a result of fishery-related activities, including fishery-related income transfer payments.

- Fish within the 200-mile Canadian zone should be harvested and processed by Canadians in firms owned by Canadians wherever this is consistent with Objectives 1 and 2 and with Canada's international treaty obligations.(26)

With respect to the relationship between Objectives 1 and 2, the report noted:

> Nevertheless, by stating Objectives 1 and 2 in order of priority, we hope we have given decision-makers guidance when it comes to making tradeoffs between them. If, for example, a firm can show that closing a processing plant is essential for the firm to remain viable, then this closing should be allowed even though it will cost plant workers their jobs, at least in that community. On the other hand, if a firm proposes to close a plant to increase profits when the firm would remain reasonably profitable, and hence economically viable, even if the plan stayed open, then this closure should be discouraged (p. 182)…
>
> The order of priority given to Objectives 1 and 2 is of fundamental significance because, if adopted by the federal government, it would be almost universally regarded as a definite change in government policy. Until now, it has appeared to most people familiar with the Atlantic fishery that federal government decisions have been based on Objectives 1 and 2 being in the reverse order of priority or, at most, equal in priority.(27)

In 1982, the Kirby Task Force projected the Canadian quota for northern cod to be 400,000 tonnes by 1987, and believed that most of the growth in groundfish stocks inside the 200-mile limit would occur in this stock.(28) The Task Force therefore dealt with the issue of how to allocate the remainder of the northern cod TAC among fleet sectors. It concluded that, given the projected growth in the stock and the glut phenomenon associated with the summer fishery, the allowance to inshore vessels should not be increased proportionally to the growth of the TAC. The feasibility of freezing and storing inshore cod for off-season processing, however, was deemed a technical and economic question that deserved further investigation.(29) As mentioned earlier, the Canadian harvest has never exceeded the TAC, which in turn never exceeded 266,000 tonnes.

THE NORTHERN COD REVIEW PANEL – 1989

In January 1989, federal scientists suggested that a reduction in the TAC to 125,000 tonnes would be necessary to maintain the fishing effort at the FO.1 level. Scientific findings showed that the stock was much smaller or two-thirds the size estimated by CAFSAC in 1987,(30) and the Task Group on Newfoundland Inshore Fisheries (TGNIF) later that year.(31) As a precautionary measure, the Minister of Fisheries and Oceans announced on 8 February 1989 a provisional TAC for northern cod (235,000 tonnes), a level permitting more fishing than FO.1, but which would "minimize job losses and maintain the stock close to its present size."

On 12 February 1989, the federal government established the seven-member Northern Cod Review Panel, headed by Dr. Leslie Harris, to examine the possible factors which affect the stock and the data and methods used in assessing and forecasting catches to ensure that reliable scientific advice would be available to manage the fishery. In May 1989, the Special Cabinet Committee on Northern Cod, chaired by the Secretary of State for External Affairs, was formed to address the social and economic implications of stock reductions.(32) An Interim Report was released in May 1989, which admittedly presented "minimal discussion and few recommendations."(33) Adjustment programs for fishermen and fishplant workers affected by closures due to reduced 1989 quotas were announced by the Minister for International Trade on behalf of the Cabinet Committee on 11 December 1989.

In releasing the Report of the Northern Cod Review Panel on 30 March 1990,(34) the Minister of Fisheries and Oceans accepted "the basic principles of the Harris Report as well as its major recommendations." The Panel's main recommendations on stock management involved reducing the level of the catch, restrictions on fishing activity during the spawning season, reducing the catch of small fish and ensuring the distribution of the offshore effort (Appendix 1). Three of the 29 recommendations, however, could "not be directly accommodated"; these were: (1) a further reduction in the 1990 TAC (Recommendation #1); (2) a new fisheries management board or commission (Recommendation #23); and (3) unilateral action by Canada to acquire management rights for straddling stocks beyond the 200-mile limit (Recommendation #5).

The Harris Panel strongly recommended that "in respect of the northern cod stock(s), and as a matter of urgency, there should be an immediate reduction of fishing mortality to the level of at least 0.30 and, at the earliest feasible date, to the level of 0.20."(35) According to Harris, a downturn in recruitment suggested that the catch level could not be maintained without causing a significant decline in the exploitable and spawning biomasses.(36) The federal government responded by stating the following:

> The TAC has already been reduced by 25% since 1988 in order to conserve the resource. The lowering of the TAC is consistent with the government's long-term conservation goals. Future TACs will depend on scientific assessments and industry consultations, taking into account the socio-economic impact. (37)

The recommendation had earlier been "rejected by the [Minister of Fisheries and Oceans] on 30 March 1990 because of the additional hardships it would produce in 1990…"(38)

The Northern Cod Panel suggested that "the Government of Canada and the Government

of Newfoundland and Labrador … jointly establish a Board or Commission in the context of which information can be shared, management objectives clarified, coordinated policy directions set, and strategies developed." The Panel concluded in a section on "Federal/Provincial Conflicting Goals" that potential sources of conflict between the two levels of government "derive from the fact that the federal authority manages the resource and licenses fishermen while the province licenses processing facilities and processors and plays a critically important role in respect of the acquisition by fishermen of vessels and gear."(39)

> Without appropriate coordination, it is not difficult to envision plants constructed or vessels financed to achieve certain political objectives without adequate reference to the availability of resources to justify the investment.
>
> [Conflict] may arise when conservational goals are set by a federal authority which has not consulted and which may not support the social goals identified by the province. Thus, the interests of one jurisdiction may be to maximize employment, those of the other to reduce the number of fishermen; the interests of one to decentralize processing in small plants supplied primarily by inshore fishermen, those of the other to promote the interests of large vertically integrated corporations. Whether or not such conflicts emerge as realities or remain as hypothetical possibilities, they clearly carry with them the potential to place intolerable pressures upon fish stocks inadequate to support them. What should never be forgotten is that every fisherman issued with a fishing licence expects, as a right, access to sufficient fish to provide a livelihood; every processor who is given a plant licence expects access to sufficient fish to make the enterprise profitable; every new vessel built and every loan advanced for the purchase of fishing gear demands an increase in fish landings to justify the investments. The temptations to grant the licences or to approve the loans may be nearly irresistible. But, so may be the pressures subsequently generated to allocate the resources to justify the earlier decisions. The repercussions may be disastrous for the stocks.(40)

The Harris Panel's advice in this matter was for a mechanism that permits and encourages communication between federal and provincial governments and one that ensures "a rational decision-making process that reconciles the basic objectives of both jurisdictions. (41) In response, the federal government stated that "a number of existing consultative mechanisms [already] provide Newfoundland with the opportunity to receive information and to advise the federal government on management objectives, policy directions and strategies for fisheries of interest to Newfoundland" and that "this [would] continue."(42)

With respect to the problem of overfishing outside Canada's 200-mile zone, the Northern Cod Review Panel suggested that Canada

> … redouble its efforts to gain through diplomacy, if possible, effective management rights over the entire northern cod stock

> complex. If diplomatic efforts should fail, other options should be considered including the unilateral declaration of management rights predicated upon the principle of adjacency. In the meantime, serious thought should be given to the possibility of participating in the rape of the "Nose" and "Tail" of the Bank. this would be to admit that the unwillingness of the European Community to behave in a responsible fashion has rendered NAFO useless as a regulatory agency. It might, however, if we were sufficiently aggressive in our approach, convince the European Community that the game was no longer worth the candle and that their best interests might be served by giving NAFO teeth. In any case, since European Community countries already take every fish they can possibly catch on the "Nose" and "Tail," a Canadian fishery on those zones could not possibly harm the stocks more than they are already being harmed and would have the salutary effect of reducing the profitability of the European enterprise and, perhaps, sufficiently to make them repent of their intransigence.(43)

The Panel recommended that Canada "seek international agreement to permit its management of all fish stocks indigenous to the Canadian Continental Shelf and that extend beyond the 200-mile economic zone; and that, failing achievement of this objective, Canada should take unilateral action to acquire management rights in accordance with provisions of the Law of the Sea Convention."(44) The federal government responded by stating that "this recommendation is incompatible with the international Law of the Sea."(45) As well, it commented that:

> International law does not at this stage permit a coastal state to take unilateral management action beyond the 200-mile zone.
>
> Canada continues to work through NAFO and existing mechanisms to provide for conservation of straddling stocks. A high-level diplomatic initiative, public information campaign and legal consultations have been undertaken.
>
> Canada is pursuing initiatives directed towards strengthening coastal state management rights and conservation duties over fish stocks that straddle the 200-mile limit.(46)

THE IMPLEMENTATION TASK FORCE ON NORTHERN COD – 1990

Following the release of the Harris Panel Report, an Implementation Task Force on Northern Cod (also known as the Dunne Task Force) was given the mandate to carry out the necessary consultation with "fishermen, fishermen's organizations, processors, municipal leaders and provincial government officials in order to work out an acceptable implementation plan." The Task Force was asked to provide the Minister "specifically, but not exclusively, with recommendations on how best to implement Harris recommendations 1-4, 6, 19-22, 24, 25, 27 and 29."(47) It subsequently conducted a series of closed meetings with government and industry representatives, as well as public meetings with fishermen between July and September 1990.

The Dunne Report was released to the public on 25 October 1990 and presented to the Atlantic Groundfish Advisory Committee for consideration later that year. The general thrust of its recommendations was "accepted in principle" by the federal government, with most of its recommendations to be implemented in 1991(48) (Appendix 2).

RECENT DEVELOPMENTS

Following an initial response in the fall of 1989 (a $130-million short-term program for workers and communities affected by fish plant closures), the federal government unveiled, on 7 May 1990, a five-year $584-million Atlantic Fisheries Adjustment Program (AFAP) designed to address the major challenges facing the Atlantic fishery (i.e., a declining resource base and overcapacity in fish harvesting and processing).(49) The Program comprised the following three major components as described by the Department of Fisheries and Oceans:

- Rebuilding Fish Stocks ($150 million). To rebuild fish stocks, the Department continues to significantly expand scientific research, implement new conservation measures to protect young fish, expand surveillance and enforcement and dockside monitoring activities, strengthen the observer program, improve the accuracy of fisheries data and increase the involvement of fishermen in scientific research. While a number of stocks have been targeted, northern cod is the primary focus of the Department’s efforts.

- Adjusting to Current Realities ($130 million). This component focuses primarily on establishing a new $120-million program for older fish plant workers and trawlermen to assist them in the event of layoffs from plant closures resulting from Total Allowable Catch (TAC) declines. As well, this component envisages the introduction of Individual Quotas in fisheries management and the development of a professionalization and certification program for fishermen which may eventually become a prerequisite for licensing.

- Economic Diversification ($146 million). This element of AFAP is composed of programs to diversify within fisheries ($50 million), outside the fisheries ($90 million) and to conduct a sector campaign geared to Canadian fish produce market expansion ($6 million). Responsibility for these endeavours is shared by the Department, Atlantic Canada Opportunities Agency (ACOA) and Industry, Science and Technology Canada (ISTC) respectively.(50)

The Department later refocused its involvement in AFAP by identifying the following priorities:

- Projects that directly assist fishermen or plant workers, including initiatives under AFAP;

- Projects that assist industry associations, institutes and organizations that are clients of the Department. Projects could cover activities such as feasibility studies, adoption of new technology or market research; and

- Projects carried out by the Department that are directly linked to AFAP objectives,

such as northern cod research, surveillance and enforcement in the Atlantic fishery. (51)

On 24 February 1992, the Minister of Fisheries and Oceans introduced a "conservation ceiling" on northern cod, that is to say a 35% reduction in the TAC originally established for 1992, which effectively concluded the winter offshore trawler fishery. Other measures included:

- shutting down the offshore capelin fishery in the Canadian zone in 1992;
- banning the harvesting of cod by trawlers during peak spawning season;
- allowing the traditional inshore fishery to continue to operate without catch limits;
- limiting the catches of larger inshore vessels operating in offshore areas;
- possibly placing further limits on the fall offshore fishery to ensure that Canadian catches do not exceed 120,000 tonnes; and
- establishing in 1993 an independent panel to advise the federal government on the use of foreign vessels and foreign allocations within the Canadian zone.(52)

Canada also requested a special meeting of NAFO's Scientific Council (pursuant to Article VII of the NAFO Convention) to consider the state of a number of Canadian-managed fish stocks, including northern cod. Fisheries scientists participating at the international forum represented five member states of the European Community (Portugal, Spain, the United Kingdom, Germany and France), the European Commission, Canada, Russia, the United States, Cuba, Japan and Denmark (Greenland and the Faroe Islands). The meeting was called to examine, verify and validate Canada's data, analysis and assessment of the northern cod stock. Canada took this unprecedented step to demonstrate to all NAFO Contracting Parties that the stock was in a critical condition.(53) In brief, the Scientific Council's Standing Committee on Fishery Science (STACFIS) concluded that:

- the 2J3Kl cod (northern cod) stock had recently declined rapidly and was at or near the lowest level observed;
- the cause(s) of the decline was not clear;
- it would not be prudent to provide stock projections beyond 1992 until additional data (commercial and research) could be collected and analyzed;
- fishing mortality should be reduced in 1992 from the level of recent years;
- it would be wise to consider the FO.1 catch in 1992 to be 50,000 tonnes; and
- the present level of the spawning stock was such as to cause concern.

The Scientific Council endorsed the recommendations made by STACFIS, namely that:

- further research be conducted into the relationships between water temperature and northern cod recruitment;(54)

- further investigations be made to determine the linkage between ocean conditions in West Greenland and Labrador; and

- all data on the northern cod stock be made available to it at the earliest possible date in 1993.

The Council also noted that:

- the waters off northern and eastern Newfoundland were below normal in 1991, and temperatures in the bottom water layers (from the Labrador Shelf to southern Newfoundland) had continued a declining trend that began in the mid-1980s;

- a general cooling trend in the West Greenland area (since 1969) and a similar trend off southern Labrador may have influenced the distribution of northern cod;

- the population of harp seals was estimated to be in the range of 3 to 4 million animals (likely fewer than 3.2 million) in 1990;

- STACFIS concluded that the increase in the seal population had probably had an effect on cod (either directly by predation or indirectly by competition) and could have contributed to, but not accounted for, the decrease in the northern cod stock;

- more fish at younger ages were taken in 1990 than had previously been estimated; and

- because the factors contributing to the decline were largely unknown (and could still be at work), it was not possible to project stock biomass and prudent catch levels beyond 1992.(55)

On 2 July 1992, a two-year moratorium on the northern cod fishery was announced by the federal Fisheries Minister, as well as emergency assistance payments to the 19,000 or so fishermen and plant workers affected by the closure and who had either exhausted their unemployment insurance or lacked sufficient weeks of work to qualify. The federal government's plan includes:

- options for voluntary early retirement for older fishermen and plant workers;

- voluntary retirement of fishing licences for those who choose to leave the fishery;

- skills training outside the fishery, especially for younger participants;

- professionalization and certification for those who choose to remain in the fishery;

- measures to deal with the costs faced by vessel owners to maintain vessels made idle by the moratorium;

- a test fishery to determine harvesting practices for a sustainable fishery; and
- working with fish processors to seek new sources of fish for northern cod plants. (56)

In brief, under the federal government's compensation package,

> Fishermen and plant workers will qualify for at least $225 a week, and as much as $406 depending on individual average UI benefits over the past three years. This will be subject to taxes, and reduction if there is income from other sources (a clawback provision that has prompted some protest). Individuals have until 31 December 1992 to decide on a course of action. Those choosing to enhance their fisheries' skills, or undertake non-fishery-related job training, will then continue to qualify for more generous payments, up to $406 a week.
>
> Compensation will run to the end of the moratorium in 1994. Those over 50 years old can take early retirement, if they wish, with benefits continuing until age 65. Fishermen can also choose to retire licences, initially targeting either inactive or part-time licences. For both early retirement and licence retirement, compensation will be higher than the minimum. Those who choose none of the above will revert, in 1993, to the minimum weekly payment of $225 for the duration of the moratorium.
>
> At the individual level, the package aims to encourage both professionalization within the fishery, and training (beginning with literacy upgrading if needed) in skills not necessarily fishery-related. It offers some aid to keep boats in repair during the moratorium, although it does not deal with servicing loans taken out to prepare gear and vessels in anticipation of the start of the summer fishery. Many aspects of the package are still under negotiation.(57)

CONCLUDING REMARKS

The northern cod fishery has not become the great generator of economic activity that was predicted 15 years ago. Several reasons have been put forward for the sharp decline in the stock: quotas set above sustainable levels as a result of questionable stock assessment methods or the need to accommodate social concerns; poorly understood environmental factors, including unusually cold water temperatures; and overfishing by foreign vessels. Seals, an inadequate enforcement regime, misreporting, wasteful fishing practices, harvesting fish that were too small or immature, ghost fishing by abandoned gillnets, and catch pressures on capelin (a major food for cod) may have also contributed to the decline. As well, there has been much controversy regarding the environmental effects of groundfish trawlers on the ecosystem (i.e., whether overall productivity is reduced or enhanced).(58)

A major theme of the Harris Report on Northern Cod was the increased fishing effort brought about through improved technology "in boat design, in motive power, in range and seakeeping capacities, in gear design, in quality of materials used, in electronic fish finding instruments," and in other numerous ways.(59)

> To reiterate the oft repeated maxim, technology is a marvellous servant but a very poor master. If we are not prepared to curb our technological capacities in the interests of environmental integrity and in cognizance of human dimensions of all our activities, then we will obviously invite the inevitable disaster that we will undoubtedly deserve to have visited upon us.(60)

The Panel warned in 1990 that overcapitalization tends not only to increase fishing pressure but to "conceal the true level of fishing mortality by encouraging an underestimation of the effort involved in the landing of a given quantity of fish and thereby suggesting interpretations of abundance that would justify higher TACs as opposed to a policy of conservation."(61)

APPENDIX 1
THE HARRIS REPORT RECOMMENDATIONS

Recommendations

Management Actions

1. That the Panel strongly recommends that in respect of the northern cod stock(s) and as a matter of urgency there should be an immediate reduction of fishing mortality to the level of at least 0.30 and, at the earliest feasible date, to the level of 0.20.

2. That DFO must establish regulations to limit fishing mortalities imposed during the spawning period proportionally with the general reduction in total fishing mortality and should explore with the affected sectors of the fishing industry whether this objective can be best achieved through a straight reduction in the winter catch (i.e. during the spawning period) or through a combination of seasonal closure coupled with a catch reduction proportional to the reduction of the TAC during the remainder of the spawning period.

3. That DFO should for both biological and economic reasons examine immediately the selectivity of traps, small and large trawlers, gillnetters and other gear types with the intent of improving the yield in cod fisheries; the goal should be to eliminate harvest of two, three, four and five year olds and to reduce the bycatch of these year classes.

4. That DFO should reexamine current regulations requiring equal levels of effort in each of statistical divisions 2J, 3K and 3L with the objective of distributing fishing effort by large trawlers throughout the statistical divisions in the manner that is to the greatest degree possible relative to the distribution of the exploitable biomass.

International Issues

5. That Canada should seek international agreement to permit its management of all fish stocks indigenous to the Canadian Continental Shelf, and that extend beyond the two hundred mile economic zone; and, that failing achievement of this objective, Canada should take unilateral action to acquire management rights in accordance with provisions of the Law of the Sea Convention.

6. That the Government of Canada should reexamine its policies regarding the authorization of foreign fisheries within the Canadian economic management zone with the clear intention of eliminating any catch or bycatch of cod.

7. That Canada officially adopt a policy analogous to the Hague Preferences that would take into account in respect of stock allocations both the principle of contiguity and the "vital needs" of particular communities particularly depending upon fishing and industries allied thereto.

Scientific Research

8. That DFO should develop means to estimate stock or relative stock trends beyond current RV and large trawler CPUE data and should place particular emphasis on establishing a CPUE index for elements of the inshore fishery, e.g. small trawlers, gillnetters, etc

9. That DFO should expand scientific efforts to understand the integrity and interrelationship of spawning aggregations as they relate to recruitment and the distribution of spawning fish to feeding grounds and their availability to inshore fisheries. The goal should be to attain a clearer understanding of the effectiveness of current area management strategies as they relate to rebuilding the spawning stocks and potential gear/area or other allocational goals.

10. That DFO should examine in detail current and past stock recruitment relationships.

11. That DFO should undertake an in-depth analysis of cod bycatch losses in inshore and offshore target fisheries, as well as in other fisheries taking cod as a bycatch, including fish caught and not sold because of quality and/or operational problems; and estimate bycatch losses for each component of the Canadian and foreign directed cod fisheries, shrimp, capelin, and herring fisheries, and ground fisheries not targeting on cod.

12. That DFO should increase the RV sampling level in order to improve the level of precision of the estimate of minimum stock size and should, also, give consideration to RV surveys during other times of the year.

13. That DFO arrange, as a matter or urgency, for a harp and hooded seal census commencing with an aerial survey of pup production in the spring of 1990.

14. That DFO scientists should pay greater attention to the integration of information from the biological and oceanogaphic disciplines into the assessment process so that

all available data may be employed to reduce the risk of future errors in estimating key population parameters.

15. That research be undertaken or commissioned to establish seal feeding patterns and consumption rates throughout the year.

16. That every reasonable effort be made to understand the cod-capelin-seal interactions and to incorporate appropriate data into cod population assessments.

17. That DFO should expand data collections to improve the knowledge of effort levels and factors influencing quality of data on inshore fisheries and landing records.

Technology

18. That DFO institute a dedicated systematic effort to improve and expand relevant technologies in the annual assessment process and in management activities; and that the Government of Canada investigate the use of satellite or other advanced technologies for purposes of surveillance; and that arrangements be imposed or negotiated as appropriate for fitting all vessels involved in the Canadian shelf fisheries with transducers for ease of monitoring their movements and location.

Goals

19. That the Government of Canada should carefully reexamine its biological, ecological, and socio-economic goals in respect of the fisheries to ensure that they are clearly defined, internally consistent, and attainable.

Institutional Arrangements and Procedures

20. That DFO review its management structures and approaches with the end of establishing a more focused and coordinated approach to the management of the northern cod stocks.

21. That DFO should expand the observer programme to include observation on the inshore sector of the fleet and to expand support services for analyzing observer data.

22. That the Government of Canada undertake the provision of additional patrol vessels for offshore surveillance to provide adequate on-site action in respect of violations reported by aircraft or by observers and that helicopters be employed in conjunction with smaller patrol boats for inshore surveillance.

23. That the Government of Canada and the Government of Newfoundland and Labrador should jointly establish a Board or Commission in the context of which information can be shared, management objectives clarified and coordinated, policy directions set, and strategies developed.

24. That the Government of Canada should urge the appropriate authorities to treat violations of fisheries regulations aimed at conservation as serious offenses and to

ensure that penalties imposed upon convicted violaters be sufficiently onerous as to fully offset any potential gain from violations.

APPENDIX 2
THE DUNNE REPORT RECOMMENDATIONS

Chapter XIII

LISTING OF RECOMMENDATIONS

III – FISHERIES MANAGEMENT GOALS FOR 2J3KL COD

1. We recommend that the following list of goals be taken as a minimum starting point for further discussion with industry:

BIOLOGICAL GOALS

- Age 3 + Biomass = 1,000,000 t by 1994 and 1,300,000 t by 2000.
- Spawning Stock Biomass = 450,000 t by 1994 and 650,000 t by 2000.
- Multi-year TACs be used to reach F0.1 and continued thereafter to maintain stable catches and reduce pressure for major upward revisions.
- A larger stock with more fish in older age groups.

ECOLOGICAL GOALS

- State of the 2J3KL cod stock to be prime imperative for all other fishery management and enforcement initiatives.
- Avoidance of excessive catches in other food chain fisheries by incorporating cod feeding requirements in annual allowable catches.
- Domestic bycatches of cod kept within total cod allocations for licensed operators.
- Strict enforcement of rules against retention of cod catches in other gears.
- Zero bycatch target for foreign fisheries in 2J3KL.
- Early quantification of seal predation of 2J3Kl cod.
- Caution to be prime tenet for management decisions under uncertainty.

SOCIO-ECONOMIC GOALS

- Maximization of participation to be tempered by adequate economic returns.

- Licensed access to improve average income level of current participants.
- Allocation priority to the inshore sector.
- Historical dependency and adjacency to be priorities in future allocations.
- Allocation of future quota increases to more selective gears.

IV – REBUILDING THE 2J3KL COD STOCK

2. A decision must be made if the short-term objective is:

   (a) to continue the status quo and keep the biomass constant,
   (b) to start rebuilding by lowering catches, or
   (c) rely solely on future recruitment to improve stock status.

3. Decisions on allocating any TAC reduction should be in line with management goals for this fishery.

V – FISHING DURING THE SPAWNING PERIOD

4. That, in 1991, a closure be implemented for directed northern cod fisheries for March in 2J; April in 3K and mid-May to mid-June in 3L. If heavy ice conditions should prevent fishing in 2J during January and February, a limit equal to 20% of the 2J proportion could be applied for March. This limit represents 74% of the average March catch in 2J since 1987. (Any further TAC reduction would mean a lower monthly limit).

5. That Science Branch and industry continue the sampling program initiated in 1990 to further delineate the peak spawning periods in each of the three Divisions.

6. That, in the long-term, these measures be altered depending on the outcome of the two research initiatives on the impacts of trawling on spawning behaviour and on the benthos.

VI - IMPROVING THE YIELD FROM THE 2J3KL COD FISHERY

7. That no Department of Government, at either level, encourage or assist the processing or marketing of small cod.

Cod Traps

8. In 1991, the current minimum fish size regulation 41 cm (i.e. 16") should apply to cod taken in traps.

9. In the next three years, there should be no new cod trap operators licenced to fish in Division 2J3KL.

10. The Department of Fisheries and Oceans should immediately implement a gear

conversion program for cod trap fishermen. This program should fully cover all gear conversion costs to encourage fishermen to convert the "drying twine" of their traps at least 13 mm (1/2") above the required 89 mm (3 ½") mesh size. A "catch adjustment incentive" should also be offered for each trap converted. Both incentives could be scaled to encourage changes in trap configurations as well.

11. The Department of Fisheries and Oceans should immediately establish a cod trap conversion committee (in conjunction with the NFFAWU). This committee would design, demonstrate and evaluate various methods of reducing the catch of small fish in cod traps. Fishermen have indicated there are many ways to reduce the catch of small fish besides regulating a mandatory increase in mesh size.

12. The Department and fishermen work jointly in 1991 to quantify the extent of discarding in the cod trap fishery and identify ways to reduce it.

13. Beginning in 1991, the Department of Fisheries and Oceans will rigorously enforce the 89 mm (3 ½") minimum mesh size in cod traps in all areas.

14. If these measures do not reduce the catch of small fish in cod traps, the Department should implement a mandatory minimum mesh size of 102 mm (4") in January 1993.

Otter Trawls

15. That, in 1991, the minimum mesh size for otter trawls in the directed 2J3KL cod fishery be increased from 130 mm diamond mesh to either a 140mm square mesh or a 155 mm diamond mesh.

16. That the necessity of future increases be considered after comparative trawling studies this autumn and next spring and the results of the 1991 winter fishery are known.

Handlines/Longlines

17. That a minimum hook size regulation be established immediately for cod handlines and longlines, and as an initial step this minimum hook size should be set at No. 16 gauge or equivalent.

18. That hook selectivity studies be carried out to determine if an increased minimum hook size is needed in the future.

19. That the regulations be reviewed to ensure that they apply to artificial baited gears and amended, if necessary.

Small Cod Bycatch in Other Fisheries

20. That these various, non-cod directed fisheries be managed by season in a more focused way to eliminate the catch of small cod. Seasons should be set so that such gear is not used to target cod when the licensed species is not available.

21. That existing regulations with respect to the catch of cod in unlicensed gear be strictly enforced.

22. That the use of inshore/onshore observers be initiated to monitor and identify problem areas or activities that produce a bycatch of small cod.

23. That Northern Shrimp licence holders be required to attain a target of a zero bycatch of cod and other groundfish.

VII – PROPORTIONATE HARVESTING BY DIVISION

24. That the proportionate harvesting requirement be maintained in the short-term with no individual transfers between Divisions. Inter-company arrangements that ensure the requirement is met in total at year end should be encouraged.

25. That, beginning in 1991, offshore catches of 2J3KL cod be reported and recorded by latitude and longtitude to delineate catches on each offshore bank.

26. That the proportionate harvesting requirement be incorporated in the enterprise allocations licences.

VII – FOREIGN FISHERIES IN 2J3KL

27. That the current initiatives of the Government of Canada to reduce overfishing outside the Canadian Zone continue, both with NAFO members and other non-member countries, so that recent progress can be sustained.

IX – SURVEILLANCE AND ENFORCEMENT

28. That 100% observer coverage be implemented on 65-100 ft vessels fishing northern cod Eas to prevent misreporting of areas, quantities and species fished.

29. That observer coverage on the small dragger fleet be at a minimum of 50%. Wherever logistically possible, observers should collect biological samples from this fleet.

30. That, in 1991, a pilot project of observer coverage for the under 65 ft fleet prosecuting the gillnet fishery offshore in Division 3L be initiated.

31. That observers measure and record mesh sizes and types at the beginning of each trip. This information should be recorded in DFO’s domestic and foreign catch and effort systems.

32. That surveillance and enforcement efforts be focused on activities which contribute to improvements in the status of 2J3KL cod. This should involve particular emphasis on minimum mesh size requirements and catch of small cod.

33. That consultations be held with fishermen’s committees prior to develop local priorities for surveillance and enforcement activities.

34. That industry be encouraged to take a public stance on the seriousness of fishing violations that negatively impact on resource conservation.

35. That the passage into law of the Fisheries Act amendments receive wide publicity including special emphasis on licence suspension.

36. That the conservation consciousness of the industry and the public be raised by mounting an ongoing public information campaign.

37. That observer coverage be mandatory in any new EA program in the northern cod fishery. costing for such a program would be worked out jointly between government and the industry.

38. That existing EA holders in the 65-100 ft category should, as a condition of licence, land at designated landing sites, give advance notice of landing and offload in the presence of a Fishery Officer, or designate.

39. That EA holders in the 65-100 ft category be licensed on a "trip by trip" or monthly basis only and not for the calendar year. Licence validation for the next fishing period would be contingent on submission of full catch and effort reports to the Department.

X – THE CONCEPT OF INSHORE AND OFFSHORE

40. That Science Branch undertake a sampling program of offshore gillnet landings in Division 3L this fall for inclusion in the 1991 2J3KL cod assessment.

41. That the total 3L cod fishery be reviewed by CAFSAC to determine if present trends in activity have potential negative impacts on management of the total stock.

42. That the current level of effort by 35-65 ft vessels be frozen in each Division, at least for 1991.

43. That the principle and application of the inshore allowance be reviewed in conjunction with the review of licensing and that it take account on findings from (48) as well as the historical fishing patterns by 35-65 ft vessels in each Division of 2J3KL.

XI – LICENSING OF INSHORE FISHERMEN AND VESSELS

44. The following licensing measures are recommended for implementation in 1991:

- That the freeze of fixed gear groundfish licences be continued.

- That transfers of active fixed gear groundfish licences only be permitted to another full-time fishermen in the same NAFO Division.

- That current restrictions on the replacement of vessels between 35 and 65 ft be continued but the combining of cubic numbers within vessel classes be permitted

only for active vessels.

- That a freeze be placed on additional vessel registrations under 35 ft. Vessels under 35 ft can continue to be replaced with a vessel up to 34 ft 11 inches in the case of full-time fishermen. Part-time fishermen will be permitted to replace the same size vessel as the only currently registered.

- That part-timers not be allowed to transfer vessel registrations.

- That new part-time personal fishing registrations be restricted to crew members only. Individuals requesting a new part-time fishing registration will be required to obtain certification from an existing enterprise owner indicating that he/she will be employed as a crew member by that owner.

- That renewals of part-time personal fishing registrations be limited to active commercial fishermen. Renewal of part-time registrations in 1991 will require proof of commercial fishing activity in 1989 or 1990.

- That current long-term leasing provisions not apply if the leasing arrangement involves an inactive groundfish licence. Activity will be defined as recorded commercial fishing activity in one of the previous two years. In the case of long-term leases the vessel will be registered only in the licence holder's name during any given calendar year.

- That the movement of additional fishermen and vessels from all Divisions into Division 2J be frozen. Fishermen from outside of Division 2J with a record of historical participation in this area can continue to fish in Division 2J. Historical participation will be based on a majority of the past three years.

- That individuals who are permanently downgraded to part-time status not be permitted to retain any limited entry licences. Part-time fishermen who currently hold a limited entry licence would not be permitted to retain these licences after January 1, 1993, if their status remains unchanged.

- That a freeze be placed on capelin fixed gear licences in 1991.

- That no new cod trap operations be licensed to fish in 1991-1993.

45. That the licensing review in 1991 include an examination of:

- the part-time/full time categorization system

- the transferability policy for limited entry licences

- the handline/jigger provision for personal registrations

- the linkage of DFO's licensing system with the professionalization/certification of fishermen

- the linkage of DFO's licensing system with CSI requirements
- leasing/registration of vessels across sectors
- holding of fishing licences by processing companies
- participation criteria for limited entry licences
- participation in the squid fishery

XII – IMPROVING COMMUNICATIONS WITH CLIENTS

46. That an advertising and promotion campaign to promote conservation of the resource be developed to raise the conservation consciousness of the fishing industry and the general public.

47. That development of a fisheries educational strategy by the appropriate agencies in Newfoundland and Labrador be encouraged.

48. That increased attention be given to providing the industry with up-to-date information on a systematic basis. This should include such things as the results of specific fisheries or in season status reports.

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(1) The waters off Canada's East Coast are divided into zones defined by an alphnumeric code (see p. 8-9).

(2) The "northern cod stock" is a complex of four overlapping groups that spawn on the Hamilton Bank, the Belle Isle Bank, the Fund Island Bank, and the northern Grand Bank: Department of Fisheries and Oceans, Newfoundland Region, "The Science of Cod," *Fo'c'sle*, Vol. 8, No. 2 (Special Edition), February 1988, p. 10.

(3) There are basically 12 stocks of cod within Canadian waters, from Frobisher Bay in the north to Georges Bank in the south. The fish migrate according to seasonal cycles triggered by spawning behaviour, food and temperature. In early summer, they typically move inshore where they feed on capelin, herring and other small fish and invertebrates. By the early winter months, the fish have moved offshore, where they spawn. Although the commercial fishery has depended on the movements of cod for centuries, scientists know relatively little about where and why cod migrate. Cod stocks from southern waters grow much faster than northern cod. The fish are also very prolific; the mortality rate, however, is tremendous: of the several million eggs each female lays, one in a million lives to maturity. See Department of Fisheries and Oceans, "Inshore Cod Migration," *News Release*, 8 February 1991, p. 1; Department of Fisheries and Oceans, "Northern Cod," *Backgrounder*, February 1992, p. 6, 10; Department of Fisheries and Oceans, "Factsheet on the Atlantic Fishery," *Backgrounder*, May 1989, p. 1.

(4) Department of Fisheries and Oceans, "Northern Cod," *Backgrounder*, February 1992, p. 1. Some 19,000 fishermen and plant workers in 400 communities have been directly and

immediately affected by the recent moratorium on northern cod. Northern cod accounted for 12% of groundfish landings in Nova Scotia in 1989; by 1991, this had fallen to less than 4%. See Atlantic Provinces Economic Council, "The Newfoundland Fishery: What to Do, What to Do?," *APEC Newsletter*, Vol. 36, No. 5, August 1992, p. 1.

(5) L. Harris *et al., Independent Review of the State of the Northern Cod Stock: Final Report*, February 1990, p. 1, 19-21; Ian Jackson (Institute for Research on Public Policy), *Global Warming: Implications for Canadian Policy*, for Atmospheric Environment Services, Canadian Climate Centre, September 1990, p., 53.

(6) The practical distinctions between the "inshore" and the "offshore" sectors of the Atlantic fishery generally depend on the specific purpose for which they are made. There are at lest four factors by which one can differentiate the two: size and ownership of vessel; fishing gear, horsepower and operational mobility; environmental constraints; and on a community basis. For fisheries management purposes (e.g., matters having to do with licensing, quotas, vessel replacement), the "inshore" sector generally includes all vessels greater than 100 feet LOA – generally 150-foot trawlers. Vessels in the 65 to 100-feet range are classified as "midshore" or "middle-distance." In Newfoundland, inshore vessels are less than 35 feet (10.7 m) LOA; nearshore vessels are between 35 feet (10.7 m) and 65 feet (19.8 m) LOA. Put simply, the inshore is made up of smaller, owner-operated vessels; the offshore comprises larger, company-owned trawlers. The midshore fleet has elements of both, but is considered closer to the offshore in its basic characteristics. The distinction between the inshore and offshore has become somewhat blurred over the years with the emergence of a class of medium-sized vessels capable of fishing in offshore waters. Karl Laubstein, "Canada's Atlantic Fisheries: The Role of the Inshore Section," *Maritime Affairs Bulletin*, No. 2, 1989; Department of Fisheries and Oceans, *An Analysis of Price Formation in Port Markets in Atlantic Canada*, Economic and Commercial Analysis Report No. 3, Gardner Pinhold Consulting Economists Limited, Halifax, January 1989.

(7) Harris *et al*. (February 1990), p. 1, 26. See also Department of Fisheries and Oceans, "Advice for 1989 on the Management of Cod in Divisions 2J3KL," Canadian Atlantic Scientific Advisory Committee, CAFSAC Advisory Document 89/1.

(8) The first attempt to bring some order to the offshore fishery in the Northwest Atlantic came with the establishment of the International Commission for the Northwest Atlantic Fisheries (ICNAF), which was established in 1949. Regulatory controls and enforcement measures, however, were not effective in curbing overexploitation by mobile distant-water fleets with on-board freezing capabilities. Beginning in the 1950s, the Northwest Atlantic fishery became less economically viable year by year. Under pressure from the Canadian fishing industry and provincial governments on the East Coast, Canada extended its territorial sea from 3 nautical miles to 12 miles and declared the Gulf of St. Lawrence and Bay of Fundy to be within its exclusive jurisdiction in 1971.

(9) Since 1977, the Minister of Fisheries and Oceans has issued an annual Atlantic Groundfish Management Plan. Total Allowable Catches are set for 44 commercial groundfish stocks following the review of analyses and recommendations of the Canadian Atlantic Fisheries Scientific Advisory Committee. This committee is the forum for debate on scientific methodology and the development of biological advice for stocks off the Atlantic Coast that fall within the 200-mile zone. The Advisory Committee draws heavily on commercial catch data and on research and survey activities carried out by the

Department of Fisheries and Oceans. Department of Fisheries and Oceans, "Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC)," *Backgrounder*, February 1992, p. 1; Department of Fisheries and Oceans, "Organization and Management of Northwest Atlantic Fisheries," *Backgrounder*, June 1992, p. 1-2.

(10) The level of fishing mortality at which the increase in yield (marginal yield) from adding one more unit of fishing effort is 10% of the increase in yield from adding the same unit of fishing effort to a lightly exploited stock.

(11) Fishing activity in Canadian waters is tightly regulated by the federal government through various means, including quotas for specific species and areas, limits on sizes, and control of entry to the industry.

(12) Following the declaration of a 200-mile limit, Canada allocated surplus resources in return for co-operation on conservation and for explicit commitments to facilitate the development of markets for Canadian fish products. It allowed allocations of non-surplus fish (i.e., stocks which Canadian fishermen had demonstrated an ability to harvest) to foreign countries in return for specific commitments to improve market access. Since 1986, the stated objective has been the elimination of non-surplus allocations, except under existing treaty commitments.

(13) Harris *et al*. (February 1990), p. 9.

(14) *Ibid*., p. 10.

(15) Northwest Atlantic Fisheries Organization, *Report of the Special Meeting – Scientific Council*, 1-4 June 1992, p. 5.

(16) *Ibid*., p. 7. The predominant gear in the fixed gear fishery consists of traps and gillnets. Catches have been mainly during the summer months.

(17) At the September 1985 (seventh) NAFO Annual Meeting, the EC argued for the first time that Total Allowable Catches should be set well above previous levels. The Community has since set its own quotas higher than those set for it by NAFO. In some cases, the EC's catch has not only exceeded its assigned quota, but even the entire NAFO quota.

(18) See, for example, Karl M. Sullivan, "Conflict in Management of a Northwest Atlantic Transboundary Cod Stock," *Marine Policy*, April 1989; Oceans Institute of Canada, *Managing Fishery Resources Beyond 200 Miles: Canada'Options to Protect Northwest Atlantic Straddling Stocks*, Report prepared for the Fisheries Council of Canada, January 1990, p. 25.

(19) See Government of Newfoundland and Labrador, *The Problem of Foreign Overfishing Off Canada's Atlantic Coast*, St. John's, August 1986; Gordon R. Munro, *A Promise of Abundance: Extended Fisheries Jurisdiction and the Newfoundland Economy*, A Study prepared for the Economic Council of Canada, Supply and Services Canada, 1980; Karl Sullivan, "Conflict in Management of a Northwest Atlantic Transboundary Cod Stock," *Marine Policy*, April 1989; and Department of Fisheries and Oceans, "Estimates of

EC Catches in the NAFO Area in 1990," *Backgrounder*, 28 February 1991.

(20) Department of Fisheries and Oceans, "Northern Cod Assessment Reviewed," *News Release*, 17 February 1992, p. 1; Northwest Atlantic Fisheries Organization, *Report* …, 1-4 June 1992, p. 7.

(21) Northwest Atlantic Fisheries Organization, *Report*…, 1-4 June 1992, p. 10.

(22) Department of Fisheries and Oceans, "NAFO Unanimously Adopts 1993 Ban on Northern (2J3KL) Cod Fishing Outside 200 Miles," *News Release*, 18 September 1992, p. 1.

(23) Atlantic Provinces Economic Council, "The Newfoundland Fishery…," August 1991, p. 1; Northwest Atlantic Fisheries Organization, *Report*…, 1-4 June 1992, p. 29; Department of Fisheries and Oceans, "Northern Cod," *Backgrounder*, February 1992, p. 2.

(24) R.D.S. Macdonald, "Canadian Fisheries Policy and the Development of Atlantic Coast Groundfisheries Management," in *Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies*, Cynthia Lamson and Arthur J. Hanson, eds., Dalhousie Ocean Studies Programme, 1984, p. 53. At the time of writing, Mr. Macdonald was Chief, Economic Research and Policy Division, Economics Branch, Scotia-Fundy Division, Department of Fisheries and Oceans.

(25) Task Force on Atlantic Fisheries, *Navigating Troubled Waters: A New Policy for the Atlantic Fisheries*, Supply and Services Canada, December 1982.

(26) *Ibid*., p. vii.

(27) *Ibid*., p. 188.

(28) *Ibid*., p. 233.

(29) *Ibid*., p. 246.

(30) Department of Fisheries and Oceans, "Advice on the Status and Management of the Cod Stock in NAFO Divisions 2J, 3K and 3L," *Canadian Atlantic Fisheries Scientific Advisory Committee (AFSAC): Annual Report*, Vol. 9, Dartmouth, N.S., October 1987, p. 293-294.

(31) Task Group on Newfoundland Inshore Fisheries, *A Study of Trends of Cod Stocks off Newfoundland and Factors Influencing Their Abundance and Availability to the Inshore Fishery*, November 1987. TGNIF, made up of an international team of scientists, concluded that a decline in inshore catches was due to a combination of factors: changes in availability and slower growth of the stock, uneven distribution of fishing effort offshore, possible depletion of local stocks by inshore fishermen, redeployment of inshore effort, effects of fishing on recruitment, and slower growth of fish.

(32) Department of Fisheries and Oceans, "Special Committee of Cabinet on Northern Cod," *Backgrounder*, May 1989, p. 1.

(33) L. Harris *et al*., *Independent Review of the State of Northern Cod: Interim Report*, 15 May 1989; Department of Fisheries and Oceans, "Report on Northern Cod Released," *News Release*, 26 May 1989, p. 1-4.

(34) Department of Fisheries and Oceans, "Minister Valcourt Releases Harris Report," *News Release*, 30 March 1990, p. 1-2.

(35) Harris *et al*. (February 1990), p. 151.

(36) *Ibid*., p. 71. Recruitment can be defined as the number of young fish that enter the commercial fishery for the first time in a given year. The biomass is the total weight of a fish stock.

(37) "Independent Review of the State of the Northern Cod Stocks (Harris Report); Response from the Government of Canada," 7 May 1990, p. 4.

(38) *Ibid*., p. 1.

(39) Harris *et al*. (February 1990), p. 106.

(40) *Ibid*., p. 106-107.

(41) *Ibid*., p. 42. See also p. 108.

(42) "Independent Review of the State of the Northern Cod Stocks … Response," 7 May 1990, p. 13. See also p. 1.

(43) Harris *et al*. (February 1990), p. 114.

(44) "Independent Review of the State of the Northern Cod Stocks … Response," 7 May 1990, p. 5.

(45) *Ibid*., p. 1.

(46) *Ibid*., p. 5.

(47) Implementation Task Force on Northern Cod (E.B. Dunne, Chairman, Director General, Newfoundland Region, Department of Fisheries and Oceans), *Report*, October 1990, Appendix A, p. A2-A3. Underline added.

(48) Department of Fisheries and Oceans, "Fisheries Management Recommendations of the Implementation Task Force on Northern Cod," *Backgrounder*, 14 December 1990, p. 2; Department of Fisheries and Oceans, "Response of the Minister of Fisheries and Oceans to the Recommendations of the Implementation Task Force on Northern Cod," *Backgrounder*, undated, p. 1.

(49) Department of Fisheries and Oceans, "Atlantic Fisheries Adjustment Program," *Backgrounder*, June 1991, p. 1.

(50) Department of Fisheries and Oceans, *Estimates, Expenditure Plan, Part III*, 1992-93, Supply and Services Canada, 1992, p. 110.

(51) *Ibid*., p. 111.

(52) Department of Fisheries and Oceans, "'Conservation Ceiling' for Northern Cod," *News Release*, 24 February 1992, p. 1-4. In March, the federal Minister of Fisheries and Oceans also announced the membership and terms of reference of a Task Force on Incomes and Adjustment. Department of Fisheries and Oceans, "Fishery Incomes and Adjustment to be Studied," *News Release*, 23 March 1992, p. 1.

(53) See Department of Fisheries and Oceans, "NAFO Council to Review Northern Cod," *News Release*, 1 June 1992, p. 1; Department of Fisheries and Oceans, "NAFO Scientists Agree on Threat to Northern Cod," *News Release*, 5 June 1992, p. 1; Department of Fisheries and Oceans, "Organization and Management of Northwest Atlantic Fisheries," *Backgrounder*, June 1992, p. 2; Denise Claveloux, "Report Silent on EC Overfishing," *The Chronicle Herald*, 6 June 1992, p. A8.

(54) Recruitment may be defined as the number of young fish which enter the commercial fishery for the first time in a given year.

(55) Northwest Atlantic Fisheries Organization, *Report of the Special Meeting – Scientific Council*, 1-4 June 1992, p. 2, 11, 14, 15, 32.

(56) See Department of Fisheries and Oceans, "Crosbie Announces First Steps in Northern Cod (2J3KL) Recovery Plan," *News Release*, 2 July 1992, p. 2; Department of Fisheries and Oceans, "Fishermen, Plant Workers Eligible for Payments," *News Release*, 2 July 1992, p. 1.

(57) Altantic Provinces Economic Council, "The Newfoundland Fishery…," August 1992, p. 3. On 25 September 1992, the Province of Newfoundland and Labrador announced its own special programs for both moratorium and non-moratorium areas; these concern the Fisheries Loan Board, the marine service centres and the provincial Interest Free Loan Program. "Special Assistance Program Announced for Fishermen," *The Packet*, 29 September 1992, p. 7.

(58) Trawling is a method of commercial fishing in which a vessel drags a large conical net or trawl along the ocean bottom. The net is closed at the small end and held open at the mouth or large end. Trawls may be dragged at various depths between the surface and bottom. See, for example, Mark Vaughan-Jackson, "Technology Caused Crisis in Fishery, U.N. Tour Told," *The Evening Telegram*, 30 June 1992, p. 1; Owen Myers, "Draggers Have Destroyed Fishery," *The Evening Telegram*, 21 March 1992, p. 5; Barbara Dean-Simmons, "Fish Preservation May Mean Choice between Offshore, Inshore – Analyst," *The Packet*, 12 November 1991, p. 3; Beth Gorham, "Some Fishermen Say Canadians Have Also Raped the Sea," *The Journal Pioneer*, 28 February 1992, p. 14; "Big Companies Blamed for Fishery Demise," *The Evening Telegram*, 9 July 1992, p. 10.

(59) Harris *et al*. (February 1990), p. 42.

(60) *Ibid*., p. 44.

(61) *Ibid*., p. 42.