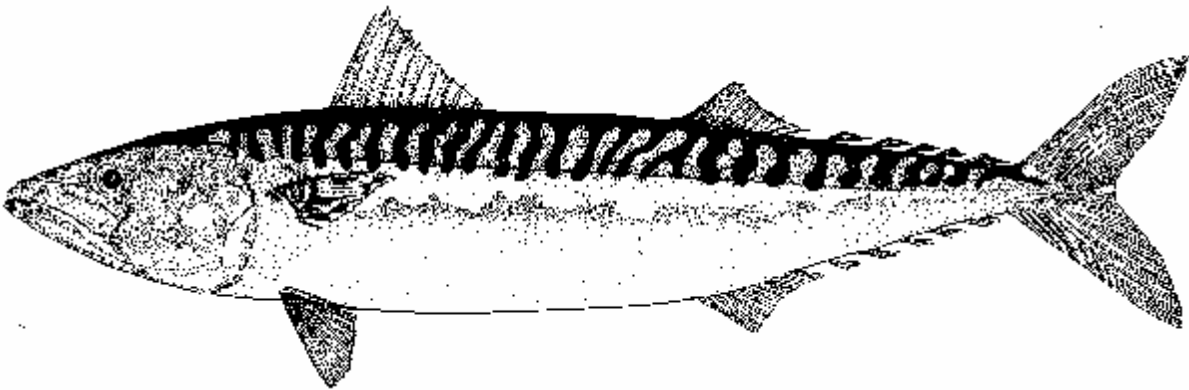


INTEGRATED FISHERIES MANAGEMENT PLAN

ATLANTIC MACKEREL

effective from 2007



**Fisheries and Oceans
Canada**

**Pêches et Océans
Canada**

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1. INTRODUCTION

This Integrated Fisheries Management Plan (IFMP) sets out the policy of the Minister of Fisheries and Oceans (the Minister) with respect to the management of the mackerel fishery on the Atlantic coast of Canada (Northwest Atlantic Fisheries Organization [NAFO] Subareas 2 to 5). This IFMP governs the harvesting of Atlantic mackerel from 2007 onwards.

This is an evergreen plan with no set expiry date. It is reviewed annually during a post-fishing season evaluation conducted by the Department of Fisheries and Oceans (DFO). In addition, the Atlantic Mackerel Advisory Committee (AMAC) meets at least every two years to review and discuss the Plan. Any member of the AMAC may advance amendments to the Plan at any time. If consensus is reached, amendment per the consensus will be considered by DFO; if not, the proposed amendment does not proceed. DFO retains the right to make decisions in the best interest of conservation and the fishery.

Annual reviews of the available scientific information may lead to changes in the Total Allowable Catch (TAC) over the period of this Plan. The Minister may change any provision of this Plan, as the need arises, consistent with all applicable legislation. However, it is the expectation and intention of DFO to follow the management process set out in this IFMP with a view to contributing to increased certainty and stability for this fishery.

2. OVERVIEW OF THE FISHERY

2.1 Background

Very little is known about early mackerel fishing methods. When the Europeans arrived in Canada, a number of First Nations were already harvesting mackerel using gillnets. The first settlers also used gillnets and beach seines. In the 1800s, handlines, weirs and traps appeared. The first traps, which are believed to have been used in the area of Digby, Nova Scotia, likely consisted of modified beach seines. They had no bottom and were therefore used only near the shore, in water no more than about 10 fathoms deep. In the 1960s, traps with bottoms were used, enabling the fish harvesters to explore new fishing grounds offshore. The late 1800s saw the advent of the purse seine, which became increasingly popular and important in part because of the development of mechanized pulleys.

The pattern of Canadian historical landings is characterized by annual variations associated with market demand (e.g. salted mackerel in the 1800s), the advent of new fishing methods (purse seine), the harvesting of new areas, natural fluctuations in year-class strength and changes in migration routes. Annual Canadian landings declined between 1880 and 1900 and subsequently stabilized at approximately 10,000 t until 1938 (Figure 1). They increased during the years of World War II, before gradually declining in the 1950s, likely due to a fungal infection that primarily affected herring at the time.

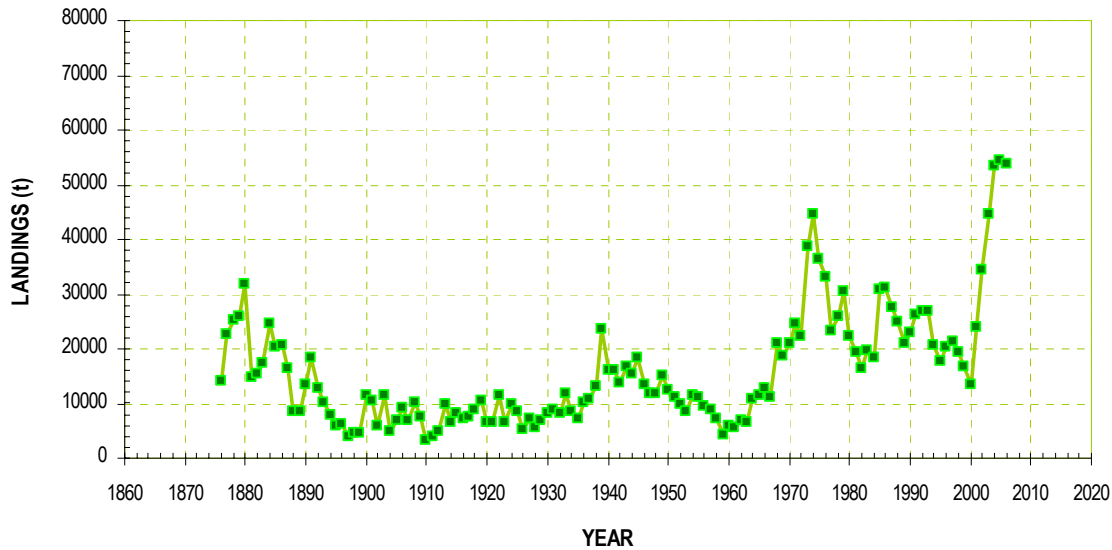


Figure 1. Historical mackerel landings (t) in NAFO subareas 3 and 4 since 1876.

2.2 Recent Years

Canadian landings increased in the 1960s, 1970s and 1980s (Figure 1) due primarily to the strong 1967, 1974 and 1982 year classes. They gradually declined in the 1990s but, since 2000, have been increasing due to the strong 1999 year class and to the significant increase in fishing effort directed at this species. Historic peaks were reached in 2004, 2005 and 2006, with annual landings of over 50,000 t.

2.2.1 By Province and Gear

Up to 1990, the three provinces with the largest landings were Nova Scotia, Prince Edward Island and Quebec. In the 1990s, the fisheries in the Gulf of St. Lawrence and Nova Scotia were predominant. Since 2000 however, landings by fish harvesters in Newfoundland and Labrador have exceeded those of other provinces by a large margin. In fact, annual landings in that province have exceeded 40,000 t since 2004, which represents 76% to 82% of total Canadian landings in these most recent years (Table 1).

Up to the early 2000s, gillnets, jiggers and traps accounted for the majority of Canadian mackerel catches. They were replaced by the small (<19.8 m) and large (>19.8 m) purse seines, which were used primarily in Newfoundland. Between 2002 and 2007, small seine landings ranged from 10,833 t to 29,161 t, and large seine landings from 6,074 t to 14,645 t (Table 2).

The ‘tuck’ seine (a modified bar seine) is a new gear type that was first used in Newfoundland to catch mackerel. In 2005, tuck seine landings reached 6,393 t, second only to purse seine landings.

2.2.2 Northwest Atlantic

In the early 1970s, annual mackerel landings in the northwest Atlantic ranged from 300,000 t to 400,000 t. The high landings were due to the large number of foreign vessels fishing in U.S. and

Canadian waters (Figure 2). However, with the establishment of the 200-mile exclusive economic zone (EEZ) in 1977, mackerel landings declined significantly.

With the signing of agreements between the U.S. and the former USSR, landings in the northwest Atlantic once again increased in the early 1980s, totalling 86,891 t in 1990. A gradual reduction in the quotas allocated by the United States, followed by the complete phase-out of all foreign fishing in U.S. waters in 1992, led to the subsequent decline in landings.

Between 1993 and 1999, landings in the northwest Atlantic remained stable at approximately 33,000 t. Total landings fluctuated from a low of 29,922 t in 2000 to 108,819 t in 2004, 96,338 t in 2005 and 110,313 t in 2006. In the U.S. and Canadian domestic fisheries alone, mackerel landings in 2004 and 2006 reached historic highs.

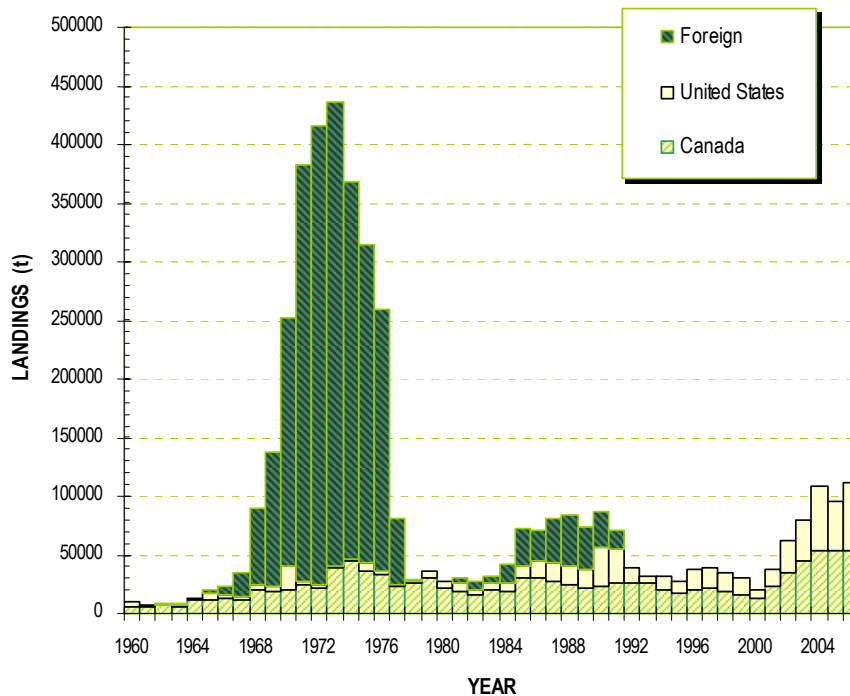


Figure 2. Annual Atlantic mackerel landings (t) in the northwest Atlantic (NAFO subareas 2 to 6) since 1960.

2.3 Description of Canadian catches

2.3.1 Catch-at-age

One of the main characteristics of the demographics of mackerel in the northwest Atlantic is the presence of strong year classes, which can dominate commercial catches for several years. For example, since the early 2000s, Canadian mackerel catches were heavily dominated by the 1999 year class (Figure 3). Between 2001 and 2004, this year class alone accounted for between 45% and 77% of total catches (in number). This is the first time since 1968, the year in which Canada began collecting biological data on mackerel, that such year-class dominance was observed.

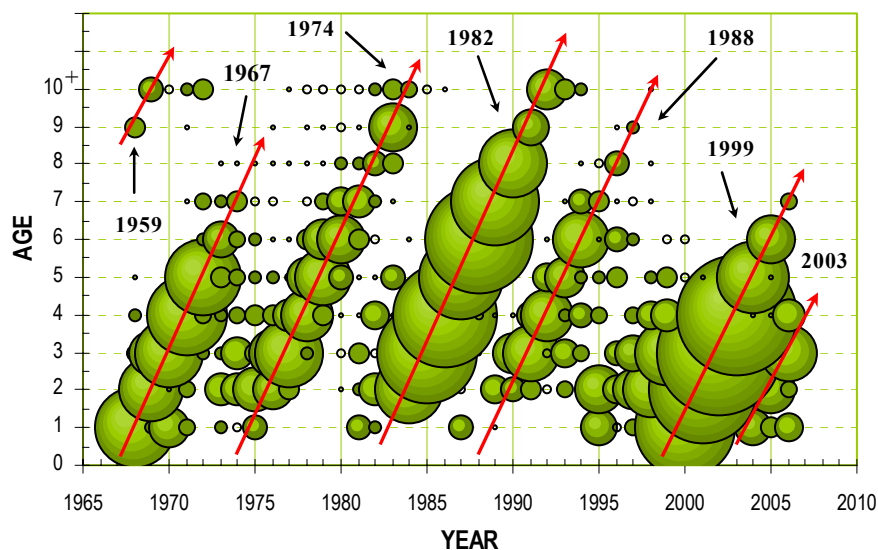


Figure 3. Catch-at-age (%) of Atlantic mackerel in NAFO subareas 3 and 4 for the period between 1968 and 2006 (year classes that dominated the fishery for several years are indicated; the age group 10+ represents all fish aged 10 years and over).

Between 2000 and 2003, annual landings attributed to the 1999 year class ranged from 4,927 t to 35,970 t (Figure 4). They declined from 30,792 t and 24,805 t in 2004 and 2005, respectively, to only 6,429 t in 2006. At age 7, i.e. in 2006, cumulative catches attributed to this single year class were close to 150,000 t.

The relative importance of the 1999 year class declined rapidly in 2005 and 2006, and was replaced by the 2003 year class, which accounted for 32% and 35% of total Canadian catches.

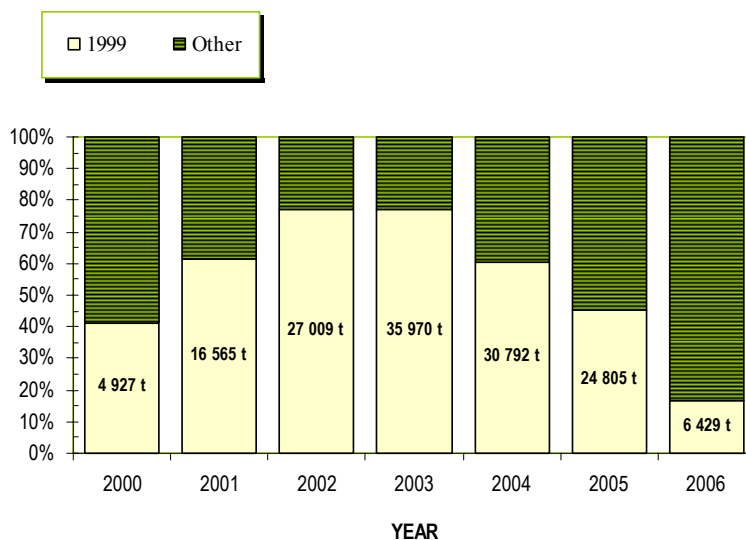


Figure 4. Canadian Atlantic mackerel catches (%) and (t) since 2000, associated with 1999 year class.

2.3.2 Length frequency and recruitment to the fishery

Each dominant year class of Atlantic mackerel can be monitored by examining the principal modes present in the annual length frequency distributions. Such was the case, for example, for the 1974, 1982, 1988 and 1999 year classes. The examination of length frequencies by fishing gear type also indicates that the length of the fish samples varies little when a year class heavily dominates the fishery. In addition, the arrival or recruitment of a year class into a fishery is highly dependent on the selectivity of the gear used. For example, fish from the 1999 year class have been observed since 2000 in length frequencies of samples from handline and purse seine fisheries. However, fish from this year class were not observed in samples from gillnet fisheries until 2002 due to the greater selectivity of this gear type.

2.4 Participants

In the Maritime Provinces, Newfoundland and Labrador, and Quebec (NAFO Subareas 2 to 5), about 10,000 commercial licences plus 7,400 personal use bait licences were issued for the mackerel fishery in 2006. This number has increased from 15,000 licences overall in 1997. The fish harvesters fish mainly inshore using gillnets, jiggers, handlines, purse seines and traps. The type of gear used varies according to the region and time of the year. Landings reported by Canadian fish harvesters in the recent past were rather stable from one year to the next, averaging around 22,000 t per year since the early 1980s. However, there has been a significant increase since the early 2000s, reaching a record high of 54,279 t in 2005. This upsurge is mostly due to the marked increase of landings by small seiners on both east and west coasts of Newfoundland (Divisions 3K, 3L and 4R). The occurrence of mackerel in this area in such remarkable quantities is unusual.

Table 3 gives an overview of the number of fish harvesters who held an Atlantic mackerel fishing licence in 2006, by gear type and by Department of Fisheries and Oceans (DFO) Region.

2.5 Location and Time Frame of the Fishery

Maps of the Atlantic Mackerel Fishing Areas 3 to 21 and of the Northwest Atlantic Fisheries Organization (NAFO) Areas 2 to 5 are attached at Annex 1.

In Nova Scotia, the gillnet and trap fisheries for mackerel take place primarily in June and July, as does the gillnet fishery in the Gulf of St. Lawrence. Most nets are fixed, except for a drift fishery in Chaleurs Bay and in the part of the Gulf between New Brunswick, Prince Edward Island and the Magdalen Islands. In late summer and fall, commercial mackerel fish harvesters carry out a handline fishery in the Gulf of St. Lawrence and Nova Scotia and a purse seine fishery on the west and east coasts of Newfoundland and in Cape Breton. The mackerel handline fishery (with feather lures) expanded substantially in the mid-1980s, as did the purse seine fishery on the west coast of Newfoundland. In the 1970s and 1980s, fish harvesters from Prince Edward Island engaged in a purse seine fishery. However, since the mid-1990s, they have increasingly turned to a spring drift gillnet fishery. Fish harvesters from the Gaspé region have recently begun a fall handline fishery.

Mackerel generally arrives in southwestern Nova Scotia in May. It arrives in Cape Breton in early June with impressive regularity. The migration of mackerel to the Gulf of St. Lawrence is believed to be relatively fast. In 1980 and 1990, 50% of total landings were taken in just over 12

days. Spring mackerel migration generally ends in early July. At that point, immature mackerel are present in the immediate vicinity of Cape Breton and St. Margaret's Bay near Halifax. They may enter the Gulf of St. Lawrence, depending on temperature conditions.

Migration out of the Gulf of St. Lawrence begins in September and the fishery can continue into October and even early November. On the east coast of Newfoundland, small seiners can continue to catch mackerel until very late in the fall. These fish are generally from the Gulf of St. Lawrence, which they leave earlier in the season, i.e. in July and August, through the Strait of Belle Isle, if water temperature conditions are favourable. In the past, juvenile mackerel have been caught on Newfoundland's Grand Banks in July. The presence of these fish at that time of year is an indication that adults had spawned in that region. In addition, the latter likely came not from the Gulf of St. Lawrence but from the Scotian Shelf or the region between Cape Breton and Newfoundland.

2.6 Landings

The Northwest Atlantic mackerel fishery was characterized by a period of very intensive activity from the mid-1960s to the introduction of the 200 nautical mile economic exclusion zone in 1977. During that period, foreign vessels fishing primarily in the Georges Bank and Scotian Shelf region took annual landings of several hundred thousand tonnes (Figure 2).

A second period of intensive fishing occurred in U.S. waters in the 1980s under agreements between the United States and the former USSR. During that period, mackerel catches totalled close to 100,000t per year.

In Canadian waters, Newfoundland and Labrador and Nova Scotia account for the largest share of commercial mackerel landings, with annual averages of 13,602 t and 5,206 t, respectively, for the period 1995 to 2005 (Table 1). They are followed by Prince Edward Island, Québec and New Brunswick, with average annual landings of 4,931 t, 3,489 t and 1,770 t, respectively. Average commercial landings for Newfoundland and Labrador have increased substantially in the past five years, from 8,810 t in 2001 to almost 44,200 t in 2006. Table 4 also provides a breakdown of catches by NAFO Division.

2.7 Landed/Production Value

In the late 1980s and early 1990s, landings of Atlantic mackerel averaged more than 21,000t annually. From 1995 to 2000, landings dropped, averaging about 19,000t per year. However, from 2001-2005 average annual landings for the fishery rose to about 42,500t. The overall landed value of the fishery has also increased, from an annual average of \$7 million in the early 1990s, to about \$29.6 million in 2005 which was an exceptional year in the recent past. Annual landed value averaged \$12.7 million over the period 2000-2005.

Canadian exports of mackerel are shown in Table 5 and illustrated in Figure 5 (below). The United States has been a consistently important market for Canadian mackerel over the years, with Japan next in importance in most years. However, in the 2000s, China has become a large market for Canadian mackerel, exceeding the United States' and Japan's imports since 2003. Mackerel is exported in various forms, mainly in recent years as whole, frozen fish to China, Japan, Bulgaria, Romania, the Russian Federation and the United States. Smaller, but important

quantities are also exported as whole, fresh fish to the United States and Romania, as pickled/cured fish to the United States, and as canned fish to Lithuania and Asia.

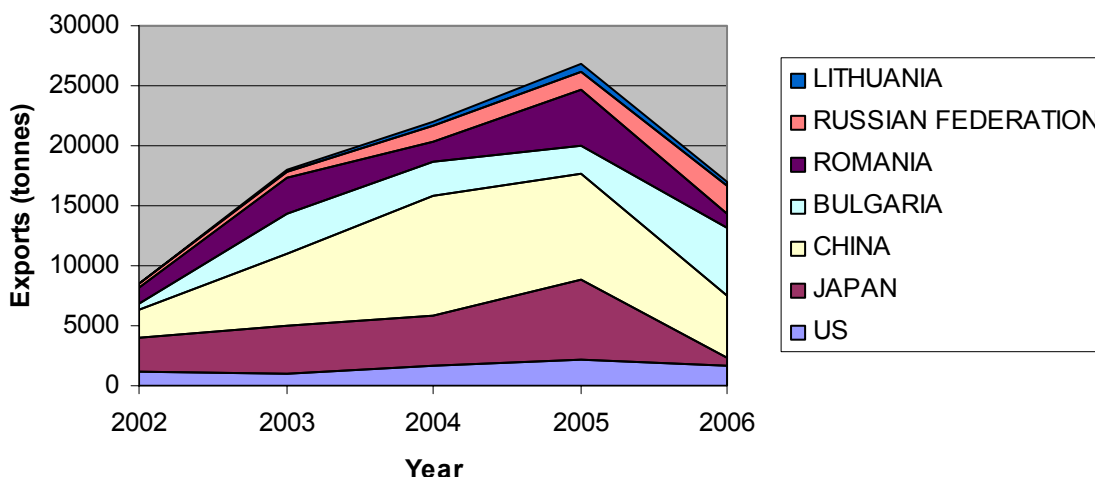


Figure 5. Canadian Exports of Atlantic Mackerel from 2002 to 2006

3. CONSULTATIVE PROCESS

Throughout Atlantic Canada and in Québec, the Department of Fisheries and Oceans holds regional/local consultations annually on small pelagic fish issues, including mackerel issues. At least every second year or more often if needed, the Atlantic Mackerel Advisory Committee (AMAC) will meet to address the multi-year Atlantic-wide mackerel plan. This Atlantic-wide Committee provides the main forum for representatives of industry, governments and other interested groups to provide input into the development of management measures for the mackerel fishery.

The AMAC is composed of representatives from the fishing industry (Aboriginal groups, inshore fleets and large seiners), the processing industry, the provinces of Newfoundland and Labrador, Nova Scotia, Québec, New Brunswick and Prince Edward Island, and the Department of Fisheries and Oceans (Resource Management, Science, Conservation and Protection and others). To ensure orderly meetings, the number of members per DFO Region who sit at the meeting table is limited to one representative per Aboriginal group or community, three for the inshore fleets, one for the large seiners, and two for the processing industry. In addition, there is one government representative per province. Other interested parties may attend as observers. Meetings of the AMAC are generally open to the public.

Final approval and distribution of Atlantic-wide plans is handled by DFO-Resource Management in Ottawa, in concert with regional representatives.

4. MANAGEMENT STYLE

The Canadian Atlantic mackerel fishery is a competitive fishery, with an Atlantic-wide TAC that is reviewed annually, taking in account the annual scientific advice.

The TAC is shared 60:40; 60% for inshore vessels less than 65' (19.8 m) and 40% for vessels 65' (19.8 m) and greater i.e. large seiners.

The current TAC does not appear to present a constraint on the mackerel fishery Atlantic-wide, with catches in recent years averaging 29,000t annually. However, a marked increase in reported catches has been observed since 2001; the highest landings being in 2005 at 54,279 t. The majority of this increase has been seen in NAFO Divisions 3KL and 4R. In addition, as there is uncertainty with respect to the levels of bait and recreational catches, actual landings from all sources could be at or near the TAC level.

5. LINKS WITH ACTIVITIES UNDER OTHER PLANNING INITIATIVES

There is a variety of national and Atlantic zonal policies, plans and regulations that constrain actions that can be taken within the context of this plan. Of particular interest are the Atlantic Fisheries Policy Review (AFPR) and the Forage Species Policy (currently in draft form).

Other acts and policies of relevance include those concerned with Aboriginal fisheries, commercial fisheries licensing, and oceans management under the *Oceans Act*. It is recognized that this plan must be consistent with these various acts and policies.

Species at Risk Act

The prohibitions under the *Species at Risk Act* (SARA) became enforceable in June 2004. These prohibitions make it illegal to kill or harm species listed under the Act, or to destroy their critical habitats. These prohibitions apply unless a person is authorized, by a permit issued in accordance with the Act, to engage in an activity affecting the listed species or their critical habitat.

If a listed species is found to be a bycatch in the mackerel fishery, management measures in the mackerel fishery will be examined to determine if a permit can be issued to authorize fish harvesters to engage in mackerel fishing while affecting the listed species or its habitat where:

- Affecting the species at risk is incidental to the mackerel fishery and all reasonable alternatives to the mackerel fishery that would reduce the impact on the species at risk are considered and the best solution is adopted.
- All feasible measures are taken to minimize the impact of the mackerel fishery on the species at risk or the residences of its individuals.
- The mackerel fishery will not jeopardize the survival or recovery of the species at risk.

If a permit is issued, the Minister of Fisheries and Oceans must include in the public registry, an explanation of why it was issued, taking into account the matters referred to above.

If the species at risk is found in an area in respect of which a wildlife management board is authorized by a land claims agreement to perform functions in respect of wildlife species, the Minister of Fisheries and Oceans must consult the wildlife management board before issuing a permit concerning that species in that area.

The permit must contain any terms and conditions governing the activity that the Minister of Fisheries and Oceans considers necessary for protecting the listed species, minimizing the

impact of the mackerel fishery on that species or providing for its recovery. Permits may be issued for a maximum period of three years.

Research in this subject area is ongoing and management measures may have to be changed in the mackerel fishery to take account of species listed under the SARA that may be affected by this fishery.

6. BIOLOGICAL SYNOPSIS

The Atlantic mackerel (*Scomber scombrus* L.) belongs to the order Perciformes, family Scombridae and genus *Scomber*. The family Scombridae is widely distributed throughout the world's tropical and temperate waters and includes a very large number of species, the best known of which are tunas and bonitos. Of the three species of the genus *Scomber*, the Atlantic mackerel has the most northerly distribution.

The Atlantic mackerel is found in the waters of the North Atlantic, from the Mediterranean to Norway on the east and from North Carolina to Newfoundland on the west. In spring and summer, it is found in coastal waters. Late in the fall and in the winter, it is found in deeper warmer waters along the edge of the Continental Shelf.

6.1 Life cycle

6.1.1 Spawning

In Canadian waters, the southern Gulf of St. Lawrence is generally recognized as being the primary mackerel spawning ground. Spawning in the Gulf occurs mainly in June and July. Spawning begins when the water temperature reaches 9°C and the maximum is between 10°C and 12°C. At these temperatures, the egg incubation time is approximately one week. Reproduction is described as multiple because each female spawns several times, and as asynchronous, because spawning can occur at any time of the day or night.

Spawning occurs near the surface. During incubation, the eggs, which contain an oil globule, float in the water layers above the thermocline. Newly hatched mackerel measure about 3 mm. They then undergo three developmental stages: (1) yolk sac; (2) larva; and (3) juvenile. The first stage lasts several days and the second, roughly two months. The second stage is characterized by the absorption of the yolk sac and the development of fins. At 50 mm, the larvae transform into juveniles, which then form schools.

6.1.2 Growth

Mackerel is a very fast-growing species and by the end of the second year (age 1+), the mean length and weight (somatic) can reach close to 260 mm and 220 g, respectively (Figure 6). Growth varies not only from year to year, but also from year class to year class. For example, slower growth was measured in the dominant year classes of 1967, 1974, 1982, 1988 and 1999, which strongly suggests the presence of an inverse relationship between growth and year-class strength.

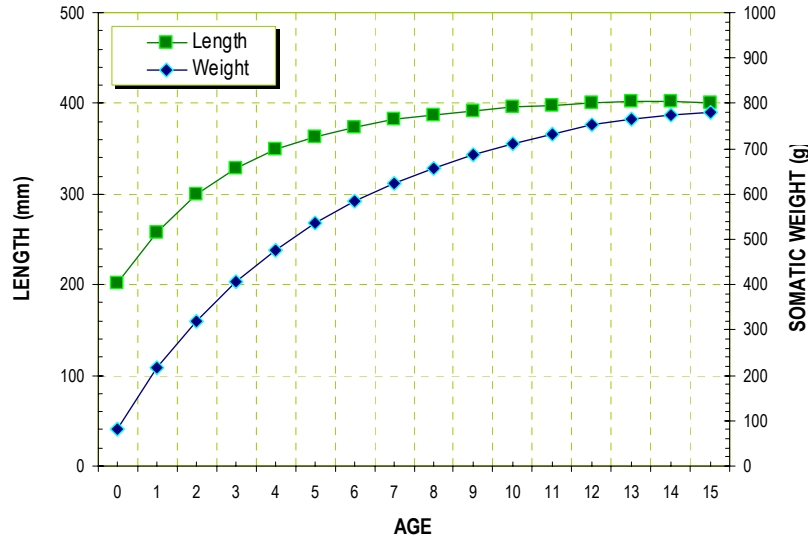
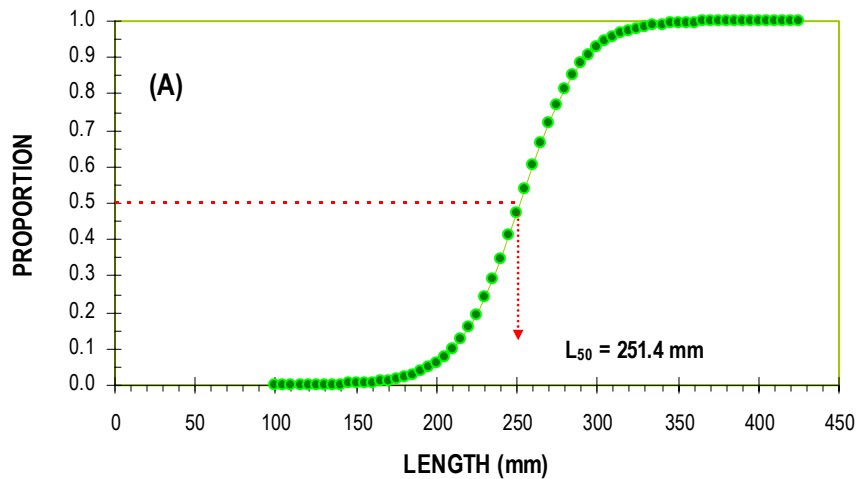


Figure 6. Mean length-at-age (mm) and somatic weight-at-age (g) in Atlantic mackerel of NAFO subareas 3 and 4 for the period 1973 to 2006.

6.1.3 Maturity

Compared to other fish species, mackerel reach sexual maturity at an early age. For example, in 2006, the size at which 50% of the population was mature, or L_{50} , was only 251.4 mm (Figure 7A), and all fish 340 mm and over were mature. The L_{50} values vary annually (Figure 7B) and by year class. Since 2000, annual L_{50} values are below or slightly above the minimum legal size of 250 mm (fork length). At one year, less than 40% of all mackerel are mature, and at age 4+, 100% are mature.



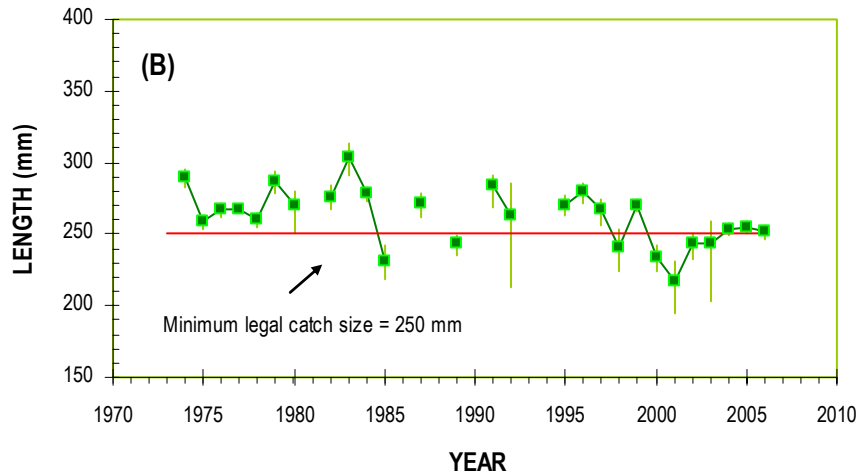


Figure 7. Mean proportion of mature fish at length in 2006 (A) and mean L_{50} values calculated by year (B) in Atlantic mackerel of NAFO subareas 3 and 4 for the period 1973-2006 (L_{50} represents the size at which 50% of fish are mature). The current minimum legal catch size is 250 mm.

6.2 Interspecies relationships

6.2.1 Prey

Data collected in the mid-1980s show that mackerel in the northern Gulf of St. Lawrence fed almost exclusively on small (< 5 mm; primarily copepods, small planktonic crustaceans) and large (≥ 5 mm; primarily euphausiids, hyperid amphipods and chetognaths) zooplankton. Newer estimates obtained in the mid-1990s indicate that small and large zooplankton still represented the major prey of mackerel (83% of the diet) and that capelin (*Mallotus villosus*) accounted for close to 15% of its diet. In the early 2000s, the proportion of small and large zooplankton continued to decline, accounting for only 75% of their diet, with northern shrimp (*Pandalus borealis*) and capelin accounting for 14% and 4%, respectively.

6.2.2 Predators

According to various models of the marine ecosystem of the northern Gulf of St. Lawrence, predation is the primary cause of mortality in Atlantic mackerel. In the early 1980s, the main predators were cetaceans, Atlantic cod (*Gadus morhua*) and large demersal fish (Figure 8). In the mid-1990s and early 2000s, cetaceans remained the main predators of Atlantic mackerel. The same models indicate that mortalities caused by fishing gradually increased over the three periods, from 2% of total mortality in the early 1980s to 15% in the mid-1990s and 30% in the early 2000s.

At the 2007 meeting of the Atlantic Mackerel Advisory Committee, many participants raised the issue of predation on mackerel by grey seals and their impact on fishing activities (see AMAC minutes at: http://www.dfo-mpo.gc.ca/communic/fish_man/Reports-Rapports/AMAC-CCMB/AMAC-CCMB_070207_e.htm). The grey seal population in waters off Nova Scotia has increased in recent years. The Department is studying seal impacts on ecosystems in general and convened a preliminary workshop in November 2007.

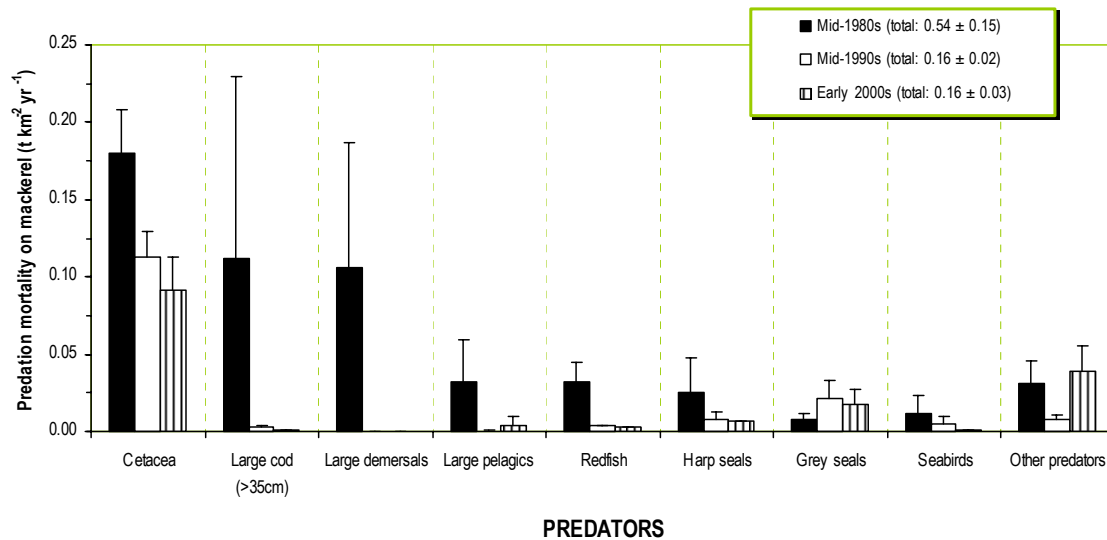


Figure 8. Detail of Atlantic mackerel mortality by predation according to various models of the northern Gulf of St. Lawrence marine ecosystem from the mid-1980s to the early 2000s (from Savenkoff et al. 2005).

6.3 Critical habitat

Critical habitat is defined as a specific geographic area that has the physical features (salinity, temperature, substrate, etc.) essential to the long-term conservation of a species and that may require management and special protection. Critical habitat may include a region that is not occupied by a species but that would be essential to its recovery.

The critical habitat of a pelagic fish, such as mackerel, is generally associated with the presence of three oceanographic processes:

An enrichment process, such as upwelling or some other source of nutrients.

A concentration process, such as a convergence or frontal formation, that allows food and larvae to accumulate.

A retention process comprising areas that allow the larvae to remain within the stock range or drift towards an appropriate habitat (e.g. nursery habitat).

Little is currently known about the role of these processes or of coastal habitats in determining growth and survival of mackerel eggs, larvae and juveniles.

7. STOCK STATUS

7.1 Egg survey

The abundance of demersal fish is generally evaluated using a bottom trawl survey. However, this type of survey cannot be used with confidence for pelagics, such as mackerel, which can be found in different parts of the water column, depending on the region, time of year and temperature conditions. The catch rates of the commercial fishery are unreliable given the poor

quality of the fishery data and the frequent changes in the species' distribution. These problems have been resolved by assessing abundance on the basis of a survey whose data are independent of the fishery and which is carried out at a life cycle stage and location at which large numbers of mackerel congregate, i.e. during spawning in the southern Gulf of St. Lawrence.

The idea of using the egg production of a stock to assess its abundance is several years old. In the northwest Atlantic, the Europeans have been using egg surveys to assess mackerel abundance since the mid-1970s. In Canadian waters, exploratory ichthyoplankton surveys have been used since the mid-1960s. According to the survey results, the southern Gulf of St. Lawrence is the main mackerel spawning area and spawning occurs primarily in June and July.

The first egg surveys aimed at assessing mackerel abundance date back to the 1980s. Over the years, various improvements were made to the surveys. The results are used to assess the abundance of breeding stock biomass in the southern Gulf of St. Lawrence and as an abundance index of the population that occurs in Canadian waters.

7.2 Problems Caused by Oceanographic Changes

In recent years, specific environmental conditions (cold waters) have prevailed in the southern Gulf of St. Lawrence. At the same time, a significant decline in breeding biomass has been measured by the egg survey. A decline in landings in the southern Gulf is also associated with this decrease in biomass. Spring mackerel migration could be delayed or migration routes could be altered to avoid the cold waters of the Gulf of St. Lawrence. The substantial increase in landings on the east coast of Newfoundland could be attributable to changes in migration routes.

7.3 Analytical Assessment

An analytical assessment cannot be conducted at this time due to problems associated with the poor quality of the fishery data (e.g. underestimation of catch-at-age) and to uncertainties associated with the results of the last egg surveys.

7.4 Precautionary Approach

For demersal fish, reference points have been established on the basis of stock-recruitment relationships developed using analytical assessments. This approach cannot be used for mackerel given the lack of a proper analytical assessment.

7.5 Sources of Uncertainty

7.5.1 Unrecorded Catches

Catches of mackerel for use as bait are not included in the DFO's official statistics, which are based on purchase slips from sales to processing plants or on dockside weighing. Similarly, catches in the recreational fishery, which is very popular during the summer months, are not recorded. Given that these activities are carried out throughout eastern Canada, actual mackerel catches may be significantly underestimated.

7.5.2 Discards of Small Mackerel

In recent years, a troubling phenomenon has been reported by many fish harvesters in the southern Gulf of St. Lawrence: very large numbers of small mackerel below the minimum legal size or the size accepted by processing plants are being discarded in the handline fishery. Mortality associated with discards is difficult to quantify. However, given the predominance of the handline fishery in the southern Gulf during the fall, discards are a cause for major concern.

7.5.3 Fishing Gear Definition

Mechanical jiggers are increasingly being used in the southern Gulf of St. Lawrence. The data collection system currently in place does not distinguish between this type of gear and traditional jiggers or handlines.

7.6 Research and Prospects

7.6.1 Work Plan

The work plan presented in Annex 2 describes the main research projects that should be undertaken to improve knowledge of the biology, distribution and abundance of Atlantic mackerel, not only in Canadian waters but also in the entire northwest Atlantic.

Of these projects, two are priorities and should be implemented as soon as possible. The first concerns the egg survey, i.e. its extension outside the Gulf of St. Lawrence in order to take account of recent changes in distribution. An international egg survey that would cover spawning sites located in United States waters. Such a survey has never been conducted in the northwest Atlantic.

The second priority project involves identifying or distinguishing the Atlantic mackerel stock(s) that occur in the waters of the northwest Atlantic. The results of such a project will have a direct impact on upcoming discussions on resource sharing between the United States and Canada.

The work plan makes reference to industry cooperation in certain research projects. This cooperation can take several forms, and is essential given the needs of industry and the knowledge acquired over the years and from generation to generation, by the individuals and communities that depend on mackerel for their livelihood. The maintenance of this fishery and the traditions associated with it, the future of the fishery and the long-term conservation of mackerel resources are objectives that also fall under the responsibility of industry.

7.7 References

- Grégoire, F., ed. 2000. The Atlantic mackerel (*Scomber scombrus* L.) of NAFO subareas 2 to 6. Canadian Stock Assessment Secretariat Res. Doc. 2000/021. 452 pp.
- Molloy, J. 2004. The Irish mackerel fishery and the making of an industry. Killibegs Fishermen Organisation Ltd. Marine Institute. Ireland. 245 pp.

DFO, 2007. Assessment of the Atlantic mackerel stock for the Northwest Atlantic (subareas 3 and 4) in 2006. DFO Can. Sci. Adv. Sec. Sci. Advis. Rep. 2007/012.

Savenkoff, C., F. Grégoire, M. Castonguay, D. P. Swain, D. Chabot, and J. M. Hanson. 2005. Main prey and predators of Atlantic mackerel (*Scomber scombrus* L.) in the northern and southern Gulf of St. Lawrence during the mid-1980s, mid-1990s, and early 2000s. Can. Tech. Rep. Fish. Aquat. Sci. 2619. v + 29 pp.

7.8 Internet Site

Science Advisory Reports and related material can be found on the website of the Canadian Science Advisory Secretariat:

<http://www.dfo-mpo.gc.ca/csas/>

8. CURRENT MANAGEMENT ISSUES

8.1 Fishing Capacity

With recent increases in commercial landings and uncertainties related to both unreported catch (bait and recreational) and to the scientific information concerning the level of biomass, there is some concern about the level of fishing capacity (active and latent) in the Atlantic mackerel fishery. Consequently, a freeze on authorizations for new mobile gear activities for fishing Atlantic mackerel, including for new midwater trawl activities, was introduced in 2007.

8.2 Catch Reporting

The majority of commercial mackerel landings are reported to DFO through dockside monitoring, hails and processing plant purchase receipts. However, catches of mackerel used for bait do not appear in the DFO's official statistics, nor do catches from recreational mackerel fishing. As these two activities are common in several parts of the Maritimes and Québec, real mackerel catches may well be underestimated. DFO Regions, in consultation with local industry, are working to adopt mechanisms to improve data quality (timeliness, reliability, etc.) while recognizing regional and fishery-specific differences and limitations. A marine recreational fishing licence is also under consideration and could provide a mechanism to obtain recreational catch data.

8.3 Quota Allocations

In the context of increased landings, particularly by the inshore fleet (vessels less than 65'), and a management objective which establishes priority access for the inshore fleet, a flexible approach to managing the TAC has been accepted by the AMAC. Under this approach, if the less than 65' fleets reach their allocation (i.e. 60% of TAC) and uncaught quota remains within the greater than 65' fleet allocation, consideration may be given to allow the less than 65' fleets to continue fishing within the overall TAC.

8.4 Scientific Research

Stakeholders are in general agreement that more resources for mackerel science are required. There is concern that the signal from the egg survey in the Gulf is no longer relevant as the distribution of mackerel has shifted and the survey has not been conducted at the right time of year. AMAC members have indicated a willingness to contribute to science work.

9. LONG-TERM OBJECTIVES FOR THE FISHERY

- Conservation of the resource for long-term sustainable use.
- Co-management of the mackerel resource to ensure full participation by the stakeholders (holders of mackerel licences), developing partnerships where applicable.
- Priority access to the mackerel fishery will be provided to the inshore sector.
- Protection of traditional inshore markets.

10. SPECIFIC MANAGEMENT OBJECTIVES

10.1 Conservation/Sustainability

A major objective in the Atlantic mackerel fishery is to improve data collection and management through regional management regimes that will collect catch data on a more timely and effective basis. This may include the implementation of dockside monitoring programs and/or logbooks. In 2007, Newfoundland and Labrador Region introduced a full dockside monitoring program for all commercial small pelagics landings (mackerel, herring and capelin). Mackerel landings in that Region represent about 80% of the mackerel landings for all of Atlantic Canada and Quebec. The Department will also be taking measures to ensure the data is used in a timely manner in quota management and stock assessment processes. Additionally, a marine recreational licence regime could provide a mechanism for the Department to obtain data on recreational catches of mackerel. The extent to which the objective of improving fishery statistics is achieved will be assessed during the post-season analysis conducted each year.

The Atlantic Mackerel Advisory Committee has recommended that more research on the Atlantic mackerel resource is required and industry members have indicated their interest in assisting by providing vessel time, collecting samples, etc. (see minutes of AMAC meeting held February 7-8, 2007 at: http://www.dfo-mpo.gc.ca/communic/fish_man/Reports-Rapports/AMAC-CCMB/AMAC-CCMB_070207_e.htm). A proposed workplan of research projects is attached at Annex 2. Better data from the bait and recreational fisheries is also urgently required and improvements in this area will greatly assist in the overall assessment of the stock.

10.2 International Considerations and Obligations

Two components of the mackerel stock are found in the Northwest Atlantic and each has its own spawning areas. The southern component spawns in March and April along the New

York/New Jersey coast while the northern component spawns in June and July mainly in the Gulf of St. Lawrence.

Because of the transboundary nature of the stock components, a joint (international) management plan is considered essential to ensure the long-term sustainability of the fisheries in both countries. Discussions have been initiated with the United States to establish a joint working group as a mechanism for cooperation on the management of the stock. Before a management regime can be worked out, a better understanding of the mackerel biomass and distribution in the waters of both countries is needed. As a first step, Canada is exploring the possibility of a common egg survey in both US and Canadian waters to obtain the necessary information.

10.3 Domestic Considerations

(a) Aboriginal

It is the policy of the DFO to encourage Aboriginal participation in and integration into coastal, commercial fisheries.

There are currently 212 mackerel licences that are issued to Aboriginal groups in Atlantic Canada, the vast majority (181) being in the Gulf Region. These licences were retired, then re-issued to Aboriginal groups through the DFO Allocation Transfer Program (ATP), a component of the Aboriginal Fisheries Strategy (AFS). In keeping with DFO's overall objective of resource conservation, the ATP facilitates the voluntary retirement of commercial licences and the issuance of licences to eligible Aboriginal groups and organizations in a manner that does not add to the existing fishing effort on the resource.

(b) Recreational Fishery

A person may engage in recreational fishing for mackerel with a handline or by angling without a licence. The recreational mackerel fishery has grown considerably in recent years. Uncertainties related to unreported recreational catches are a concern for both fisheries managers and scientists. Further consideration needs to be given to finding a mechanism to get a better understanding of removals by this fishing activity. Implementation of a recreational licence for mackerel could provide a mechanism for the Department to obtain data on catches from this fishery sector. DFO is working towards a consistent Atlantic-wide recreational licensing program.

(c) Commercial

The Department, in collaboration with the industry, will strive to maximize the value of the available quota for the commercial fishing and processing industries.

(d) Exploratory

There is currently a freeze in place on the issuance of new mobile gear licences for Atlantic mackerel in Canadian waters. The renewal of existing exploratory licences is evaluated on an annual basis at the DFO regional level.

Exploratory licence holders may be required to sign a Memorandum of Agreement containing terms and conditions aimed at ensuring the protection of traditional inshore markets.

Exploratory fishing licence holders are required to use Canadian vessels.

10.4 MANAGEMENT MEASURES effective from 2007

10.4.1 Fishing Seasons

Fishing seasons are defined in the Regional Management Measures, Annexes 3 to 6.

10.4.2 Control and Monitoring of Fishing Activities

The main control on Atlantic mackerel fishing activities is the Atlantic-wide TAC. The TAC is fished competitively among the four DFO Regions (Gulf, Maritimes, Newfoundland and Labrador, and Quebec).

Monitoring of fishing activities and catches is done through dockside monitoring, at-sea observers, hails of departures and arrivals, buyer hails and purchase slips, and the submission of logbooks.

Fishing activities are restricted to areas defined in the Regional Management Measures, Annexes 3 to 6.

10.4.3 Quota Allocations

The Total Allowable Catch (TAC) is reviewed annually and adjusted where necessary in accordance with scientific recommendations and consultations with industry.

The present sharing arrangement of the TAC is 60% for the less than 65' (19.8 m) fleets and 40% for fleets 65' (19.8 m) or greater. The fishery is conducted on a competitive basis within these allocations. If in any year of the Plan, the less than 65' fleets reach their allocation (i.e. 60% of TAC) and uncaught quota remains within the greater than 65' fleet allocation, consideration may be given to allow the less than 65' fleets to continue fishing within the overall TAC.

10.4.4 Other Relevant Elements

a) Licensing

The Atlantic mackerel fishery is a limited entry fishery, except for the issuance of fixed gear licences, as identified in the Regional Management Measures, Annexes 3 to 6.

A freeze on new midwater trawl activities for mackerel was put in place in 2006. This measure was continued in 2007 along with a freeze on the issuance of any new mobile gear licences for Atlantic mackerel.

Exploratory licence holders may be required to sign a Memorandum of Agreement containing terms and conditions aimed at ensuring the protection of traditional inshore markets.

Exploratory fishing licence holders are required to use Canadian vessels. The renewal of existing exploratory licences is evaluated on an annual basis at the regional level.

Specific licensing policies governing the issuance of commercial fishing licences for Atlantic Canada are contained in the Commercial Fisheries Licensing Policy for Eastern Canada (http://www.dfo-mpo.gc.ca/communic/lic_pol/index_e.htm).

Regional licensing policies may also apply. Region-specific licensing provisions are contained in Regional Management Measures, Annexes 3 to 6.

b) Key Legislation

- *Fisheries Act*
- *Fishery (General) Regulations*
- *Atlantic Fishery Regulations, 1985*
- *Oceans Act*
- *Species at Risk Act*

c) Regulatory Measures

Minimum Size

It is prohibited by regulation to fish for, buy, sell or possess any mackerel that is less than 25 cm in length. However, this prohibition does not apply if undersized mackerel is caught during directed mackerel fishing activities and the number of undersized mackerel caught during a fishing trip does not exceed 10% of the number of larger mackerel caught. In addition, the minimum size regulation does not apply to mackerel caught in gillnets.

Bycatch of Mackerel in Other Fisheries

Where a person is prohibited from fishing for mackerel while directing for herring, mackerel can be retained in an amount up to 10% of the weight of herring caught.

Bycatch of Other Species in the Mackerel Fishery

The only species which may be retained as a bycatch in the mackerel fishery is herring. For fishing areas where herring quotas are available, herring bycatch will be deducted from the fleet or individual quota, as the case may be. Herring may be retained as a bycatch in a directed mackerel fishery when the quantity of herring is no more than 10% of the weight of mackerel caught and retained during a fishing trip. The taking of herring as a bycatch in quantities greater than 10% is permitted by a person who is licensed for herring, with a gear, in an area and at a time that is permitted for the capture of herring. If required, the bycatch limit can be varied by the DFO Regional Director General.

If discarding of herring is significant, consideration will be given to imposing more restrictive measures such as:

- variation of bycatch limit to 0%;
- temporary closure of the mackerel fishery in the affected fishing area;

- complete closure of the mackerel fishery for the remainder of the season;
- increased levels of industry-funded at-sea observer coverage.

Gear

Gillnet fish harvesters in all areas are required to use a mesh size less than 83 mm. Restrictions also apply on the use of monofilament in gillnets.

There are other Region-specific requirements that apply to fishing gear, as outlined in Regional Management Measures, Annexes 3 to 6.

d) Safety at Sea

This Plan endeavours to ensure that its implementation will not result in unsafe situations for fish harvesters at sea. As of this writing, there are no known aspects of the Plan, which would make it inconsistent with relevant federal and provincial acts and regulations pertaining to health and safety at sea. Under an existing MOU between DFO and Transport Canada, both departments will work together through established committees with stakeholders and other government departments to identify and propose solutions to improve safety at sea. Specific measures will be incorporated into future management plans.

In Newfoundland and Labrador, changes to the DFO Vessel Replacement Policy were announced in April 2007 (http://www.dfo-mpo.gc.ca/media/newsrel/2007/nl-tnl12_e.htm). These changes provide Core enterprise owners in Newfoundland and Labrador the flexibility to acquire larger vessels in order to address issues such as seasonality, fish quality, crew comfort and safety, fuel efficiency, and other operational issues.

11. ENFORCEMENT MEASURES

11.1 Overview

Although the amount of enforcement effort dedicated to mackerel is relatively small, most fisheries for this species occur in close proximity to other activities for which the patrol frequency may be higher. The St. Margaret's Bay trapnet fishery is a good example of this as it occurs in an area that supports numerous other fisheries for which officers must conduct patrols.

11.2 Main Program Activities / Patrol Vessels / Air Surveillance

Approximately 2,370 fishery officer hours were dedicated to Atlantic mackerel in all areas in 2007, up significantly since 2001 (about 1,000 hours). Activities involve mainly small vessel patrols and landings checks. Aerial surveillance of mackerel fisheries is mostly ancillary to patrols for other activities. Table 6 shows the profile of violations in the mackerel fishery since 2002.

11.3 Enforcement Issues and Strategies

Issue	Enforcement Strategy
Fishing during closed time/in closed area	Air surveillance/vessel patrols of Fishing Areas; investigation of complaints and follow up with appropriate action.
Bycatch of salmon and groundfish in pelagic traps	At sea checks to observe bycatch, mesh size requirements and overall compliance with conditions of licence; deployment of observers to monitor fishery; dockside monitoring of catch; recommend closures as dictated by high bycatch levels.
Undersize mackerel	At sea checks to sample mackerel to ensure size requirements are met; deployment of observers to conduct random sampling; dockside monitoring; recommend closure of fishery if large percentage of small fish being caught.
Any conservation-related offence	Proactive communications strategy, publishing convictions for conservation related offences and encourage courts to impose fines that will provide for an adequate deterrent.

12. OTHER RESPONSIBILITIES

12.1 Industry / Fish Harvesters

Where applicable, fish harvesters are responsible for:

- payment of fees for fishing licences;
- submission of fishing-related data, e.g. logbooks including scientific data to assist in research on a continuing basis;
- all costs associated with the Dockside Monitoring Program;
- carrying at-sea observers when requested, and paying for the sea-day charges and expenses related to the observer's travel and accommodations;
- sampling of catch at sea.

As needed, all stakeholders in the Atlantic mackerel fishery are also responsible for:

- providing independent advice and recommendations on conservation concerns and Total Allowable Catches;
- providing input on conservation objectives, how they might best be achieved, the enforceability of management measures and the socio-economic aspects and effects of proposed management measures;
- developing management proposals;
- identifying the activities that could be assumed under a co-management approach;

- participating in the management of the fishery under a co-management approach, if applicable.
- in addition, provincial governments are responsible for the licensing of fish processing activities.

12.2 Fisheries and Oceans

The Department of Fisheries and Oceans pays the internal administration costs related to the dockside monitoring and at-sea observers, as well as the normal operating costs associated with other routine monitoring of landings, managing and surveillance of the fishery, the costs associated with the planning, direction, analysis and reporting related to the science program, consulting with the industry in public fora, and reporting on the fishery by various means. See Annex 7 for the specific roles and responsibilities of the various Sectors of the DFO and a list of DFO contacts, with respect to this Plan.

13. PERFORMANCE EVALUATION

The measures established for each year's Atlantic mackerel fishery are reviewed on an annual basis, both at the local and DFO Regional levels, and by an inter-regional working group of DFO led by Resource Management in Ottawa. These reviews take place following the fishing season, usually in January each year. Where the performance of the fishery or the management measures are considered inadequate, adjustments will be considered and implemented. It is the intent of DFO to introduce objective-based management to the mackerel fishery, in consultation with industry. Over time, as measurable objectives are developed for this fishery, the extent to which these objectives have been achieved will be assessed during the annual reviews and changes made as required.

Table 1. Annual Atlantic mackerel landings (t) by Canadian province, (NAFO subareas 3 and 4) since 1995

PROVINCE	ANNÉE / YEAR													MOYENNE / AVERAGE (1995-2006)
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007*	
Nouvelle-Écosse / <i>Nova Scotia</i>	6,681	5,517	5,669	4,562	4,797	4,546	4,058	3,989	7187	5,325	4,935	2,577	2,337	4,987
Nouveau-Brunswick / <i>New Brunswick</i>	2,206	2,684	1,990	1,682	1,373	972	2,199	2,182	1734	1,398	1,047	1,517	0	1,749
Île-du-Prince- Édouard / <i>Prince Edward Island</i>	2,518	4,018	6,693	6,784	3,842	4,134	5,886	6,181	4543	4,692	4,946	3,617	30	4,821
Québec	3,382	4,317	5,769	4,066	5,104	1,711	2,904	4,095	4380	1,618	1,035	1,818	857	3,350
Terre-Neuve / <i>Newfoundland</i>	2,919	3,857	1,188	2,149	1,445	2,020	8,810	17,955	26631	40,333	42,315	44,147	44,032	16,148
Non déterminé / <i>Unknown</i>	0	0	0	91	0	0	0	0	0	0	0	0	0	8
TOTAL	17,706	20,394	21,309	19,334	16,561	13,383	23,857	34,402	44,475	53,365	54,279	53,676	47,256	

*Preliminary / Préliminaire

Table 2. Annual Atlantic mackerel landings (t) by gear type, for NAFO subareas 3 and 4 since 1995

ENGIN / GEAR	ANNÉE / YEAR													MOYENNE / AVERAGE (1995-2006)
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007*	
Chalut / Trawl	59	68	92	9	12	1	3	5	0	2	1	7	7	22
Chalut pélagique / Midwater trawl**	0	0	0	0	0	0	0	0	0	0	0	14	0	1
Senne "Tuck" / Tuck-Ring Seine	0	0	0	0	0	0	0	0	0	2,448	6,393	4,748	3,560	1,132
Senne Bourse / Purse Seine < 65'	1,415	1,853	801	1,406	1,044	1,348	4,443	10,833	11,668	25,334	28,212	29,161	26,650	9,793
Senne Bourse / Purse Seine > 65'	1,312	1,782	315	167	304	492	3,579	6,074	14,645	11,612	5,065	6,011	8,686	4,280
Autres Sennes / Other Seines	0	0	9	0	0	0	227	0	0	0	845	2,696	4,056	315
Filet maillant / Gillnet	4,481	6,420	6,657	7,638	5,128	5,294	6,554	5,000	4,541	4,734	3,929	4,508	847	5,407
Trappe / Trap	4,728	3,821	3,889	3,999	4,057	3,920	0	2,073	3,628	4,690	3,330	2,354	2,842	3,374
Palangre / Longline	0	0	0	7	3	3	20	18	13	3	59	48	0	15
Ligne à main / Handline	899	1,231	3,029	1,998	569	90	160	169	9	694	1,119	3,244	607	1,101
Turlutte / Jigger	3,823	4,708	6,204	3,651	5,435	2,229	5,676	9,839	9,856	3,843	5,296	877	1	5,120
Fascine / Weir	177	0	1	141	8	0	3,148	48	74	2	20	3	0	302
Autres / Other	812	510	313	320	0	5	0	344	40	2	4	2	0	196
Non déterminé / Unknown	0	0	0	0	0	0	46	0	0	0	6	4	0	5
TOTAL	17,706	20,394	21,309	19,334	16,561	13,383	23,857	34,402	44,475	53,365	54,279	53,676	47,256	

* Préliminaire / Preliminary

** Chalut pélagique, pêche exploratoire en Nouvelle-Écosse / Midwater trawl, exploratory fishery in Nova Scotia

Table 3. Atlantic Mackerel Fishing Licences in 2006

DFO REGION	NUMBER OF LICENCES IN 2006							
	[F I X E D G E A R]							
	Mackerel Weirs	Handline	Gillnet	Trapnet	Mobile seiners <65' (<19.8 m)	Mobile seiners >65' (>19.8 m)	Personal Use Bait Licences	TOTAL
Quebec	nil	30	720*	8	23	nil	1,044	1,825
Newfoundland & Labrador**	nil	←	2,450	→	287	5	2,770	5,512
Gulf	nil	484	2,413*	20	304	4	2,364	5,589
Maritimes	49	1,035	1,706*	206	44	18	1,198	4,256
TOTALS**	49	←	9,072	→	658	27	7,376	17,182

* Most are also authorized to use handlines.

** No breakdown for fixed gear licences (includes bar/"tuck" seines, traps, gillnets and handlines).

Table 4. Annual Mackerel Landings by NAFO Division since 2000

DIVISION ET RÉGION / DIVISION AND AREA	ANNÉE / YEAR													MOYENNE / AVERAGE
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007*	(1995-2006)
3K	11	3	0	0	0	0	322	6,566	588	16,360	24,024	19,158	8,611	5,586
3L	11	0	0	0	0	0	10	3	0	59	4,068	7,925	10,552	1,006
3P	90	60	8	65	7	19	102	135	105	30	82	266	294	81
4R	2,807	3,794	1,181	2,175	1,438	2,001	8,375	11,251	25,938	23,885	14,141	16,799	24,577	9,482
4S	30	9	1	1	2	0	16	2	0	0	35	76	19	14
4T	8,184	11,358	15,358	12,739	10,562	7,005	11,915	14,251	14,106	8,790	9,238	7,851	867	10,947
4V	1,475	1,591	838	554	762	576	125	308	60	13	126	224	375	554
4W	622	1,182	716	138	127	120	248	115	9	59	36	75	57	287
4X	4,477	2,398	3,208	3,662	3,663	3,663	2,743	1,771	3,669	4,169	2,529	1,303	1,905	3,105
Plateau néo-écossais (4VWX) / Scotian Shelf (4VWX)	6,574	5,170	4,762	4,355	4,552	4,358	3,117	2,194	3,737	4,241	2,691	1,602	2,336	3,946
Golfe du Saint-Laurent (4RST) / Gulf of St. Lawrence (4RST)	11,021	15,161	16,540	14,914	12,002	9,006	20,306	25,504	40,044	32,676	23,414	24,726	25,462	20,443
Côtes est et sud de Terre-Neuve (3KLP) / Eastern and southern coasts of Newfoundland (3KLP)	112	63	8	65	7	19	434	6,704	693	16,449	28,174	27,348	19,457	6,673
TOTAL	17,706	20,394	21,309	19,334	16,561	13,383	23,857	34,402	44,475	53,365	54,279	53,676	47,256	

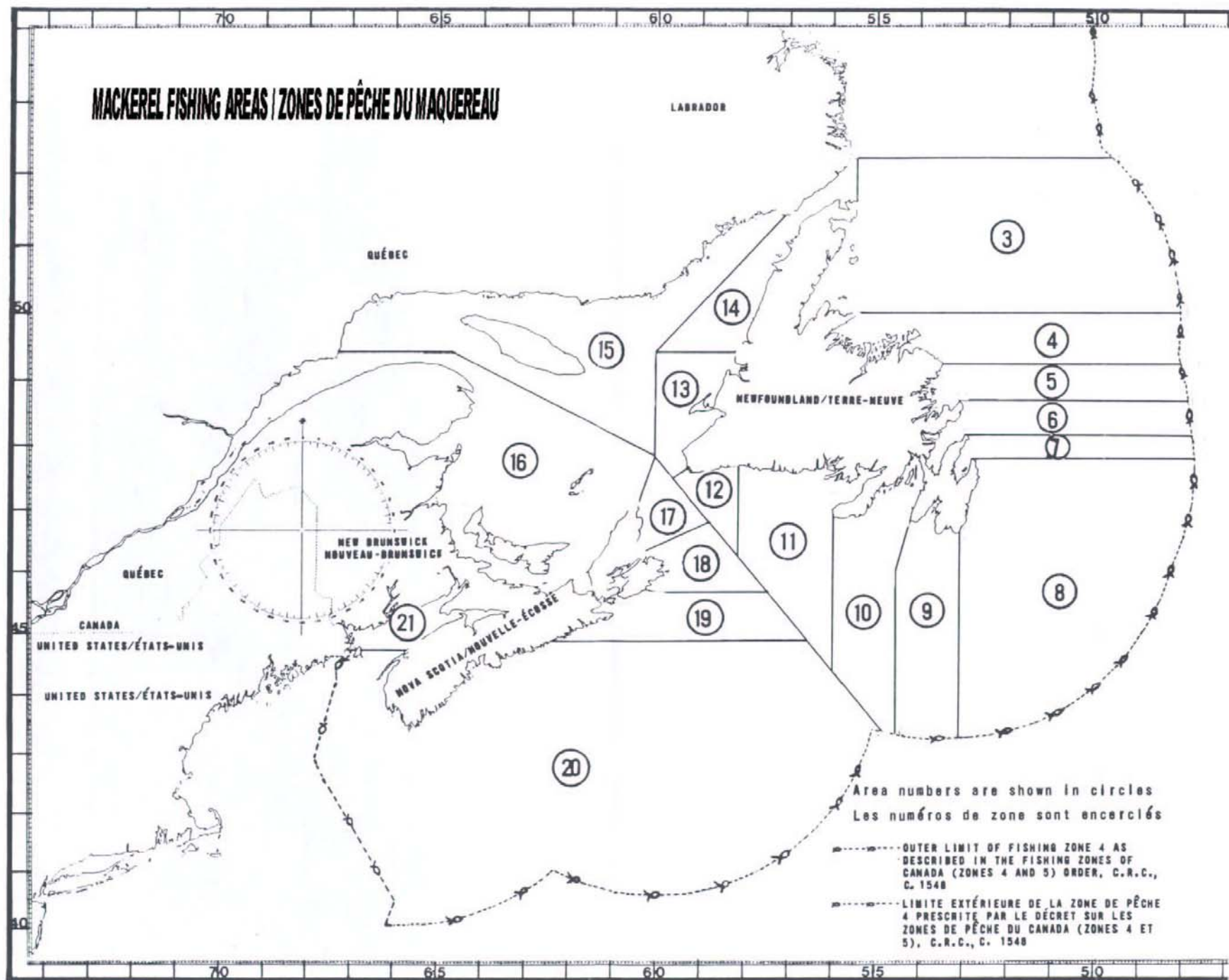
* Préliminaire / Preliminary

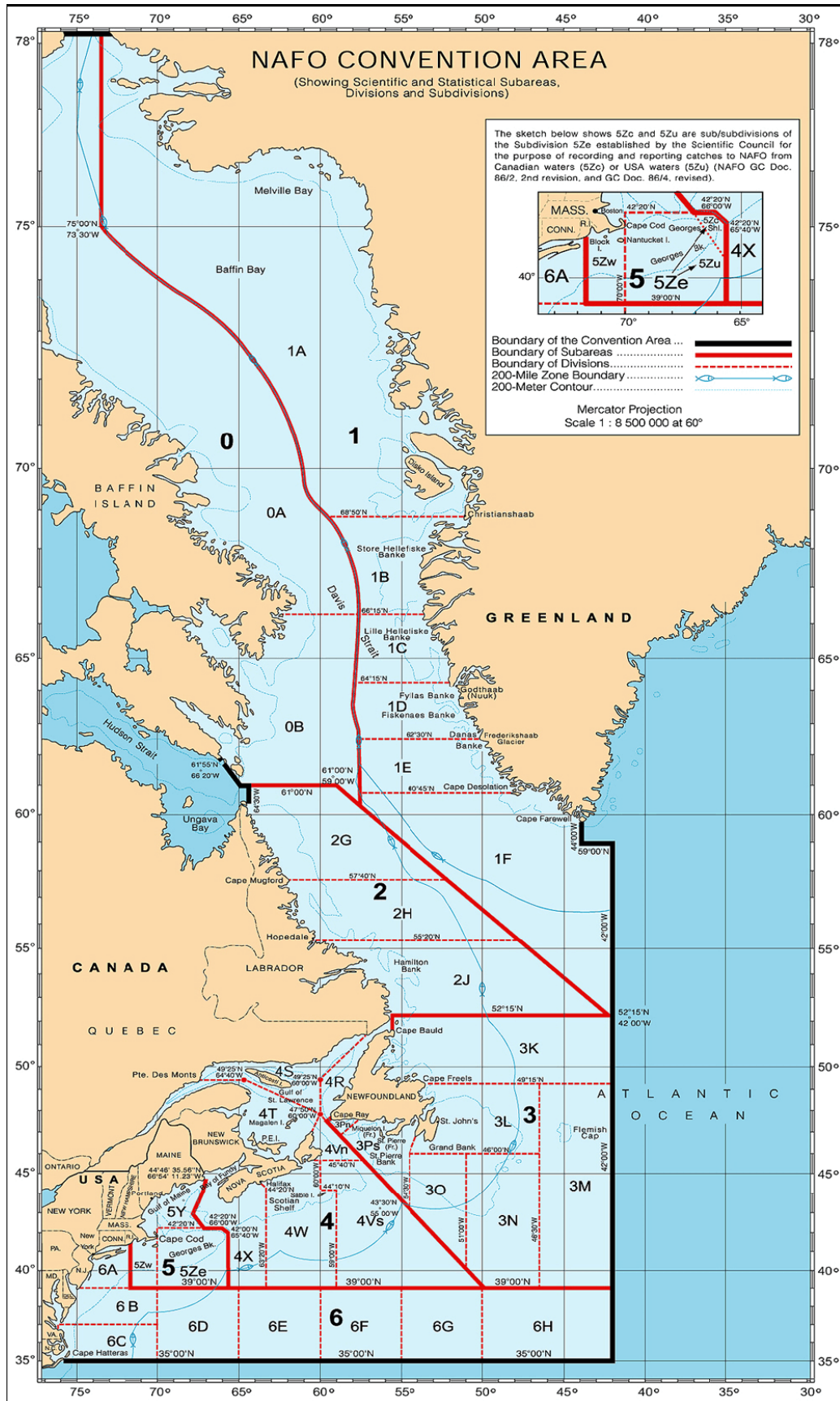
Table 5. Canadian Exports (tonnes) of Atlantic Mackerel from 2002 to 2006

Year	US	JAPAN	CHINA	BULGARIA	ROMANIA	RUSSIAN FEDERATION	LITHUANIA	Total	Total all countries
2002	1,129	2,819	2,348	560	1,382	259	77	8,574	14,573
2003	1,058	3,935	6,040	3,345	3,007	529	79	17,993	21,604
2004	1,741	4,011	10,118	2,796	1,745	1,194	403	22,008	26,227
2005	2,157	6,607	8,950	2,270	4,608	1,541	773	26,906	33,572
2006	1,702	605	5,227	5,667	1,163	2,277	409	17,050	33,285

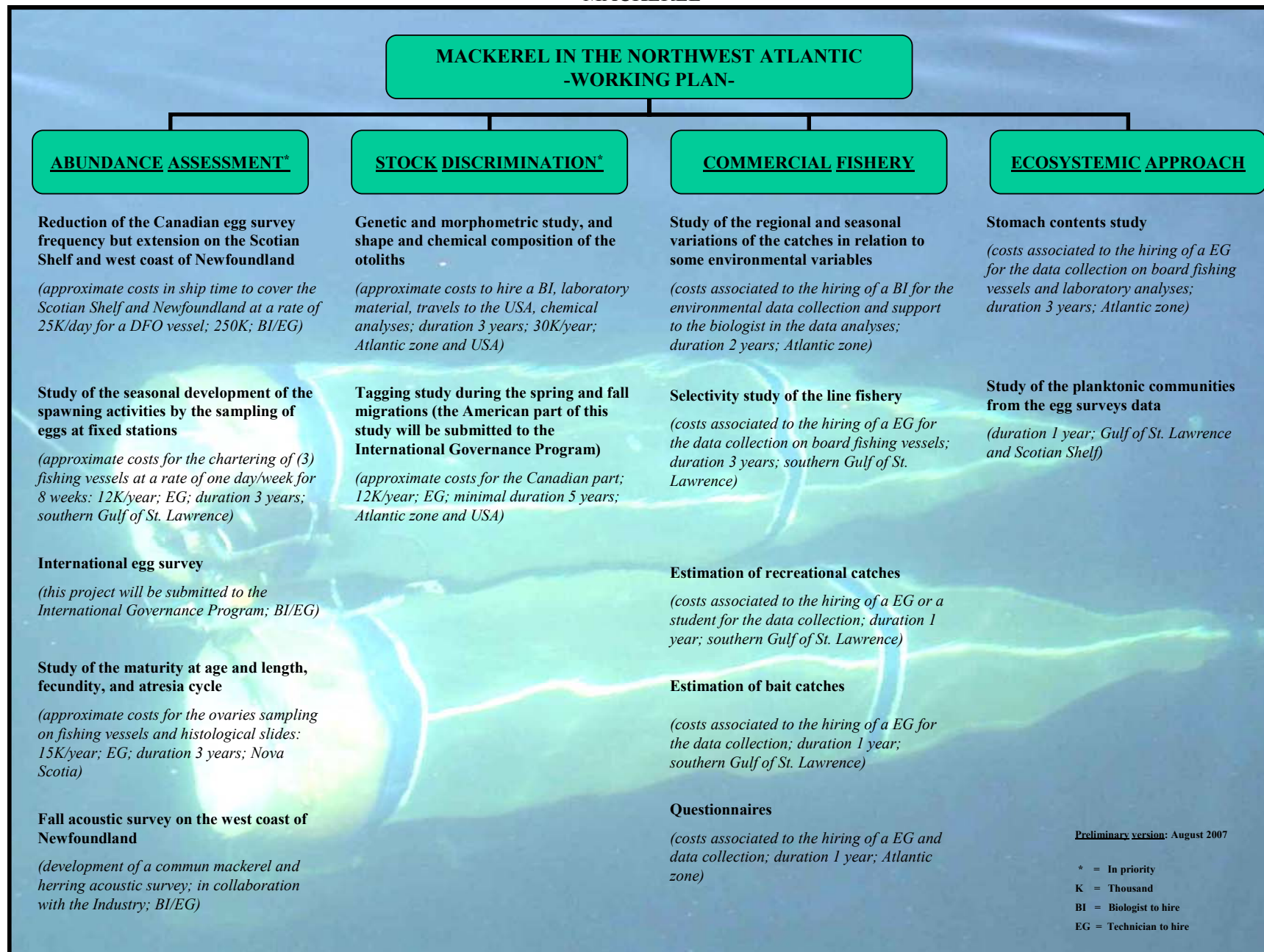
Table 6. Violation profile in Atlantic mackerel fishery, since 2002

VIOLATION TYPE	2002	2003	2004	2005	2006	2007
Area/Time	0	1	1	0	2	0
Assault / Obstruction	0	2	0	0	3	0
Gear – Illegal/Used Illegally	1	2	2	3	2	0
Illegal buy/sell/possess	1	0	1	1	22	3
Registration/Licence	46	19	10	7	19	16
Reporting	0	0	0	2	2	0
Size Limit	0	0	0	0	2	0





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ANNEX 2
WORKPLAN FOR SCIENTIFIC RESEARCH ON ATLANTIC
MACKEREL



MANAGEMENT MEASURES – QUEBEC REGION

A. Fishing Seasons

The mackerel fishing season opens for all gear types on June 1. Should mackerel appear in an area prior to June 1, consideration will be given to opening the season earlier for that area. In areas where there is an absence of commercial quantities of mackerel or where there is a potential for a significant bycatch of other species, the opening date for the fishery may be delayed.

B. Fishing Areas

Quebec Region mackerel fishing vessels will be restricted to the fishing area(s) indicated on the licence. Purse seiners (<65') are restricted to Areas 15-16. Fixed gear vessels may be licensed for Areas 13-16.

The area of validity for mackerel fishing licences in all areas will be reviewed prior to the 2008 fishing season.

C. Licensing

In general – The Quebec Region mackerel fishery remains a limited entry fishery except for the issuance of fixed gear licences which may be issued to any full-time fish harvester who holds a herring fixed gear licence for a vessel less than 15.2 m (50') LOA. Handline licences may be issued to any inshore full-time fish harvester who holds another limited entry licence.

Exploratory purse seine fishery – Fish harvesters who held mackerel exploratory purse seine licences in the previous year may be eligible to renew the exploratory licence for the current year, subject to review at the regional level.

Bait fishery – Mackerel bait fishing licences form part of a generic bait licence that includes herring. These licences are issued to fish harvesters who require bait for their main fishery (for example, lobster, crab, whelk, and fixed gear groundfish).

D. Fishing Gear

The majority of fishing gear authorized is gillnet and handline. Trapnet or purse seine is also authorized in some cases.

In order to limit the bycatch of salmon in certain areas, specific provisions have been added to the conditions of licence for those fish harvesters using traps and gillnets.

E. Fisheries Monitoring

If indicated on licence conditions, fish harvesters must complete and submit a fishing logbook and submit their catches to dockside monitoring, and must carry at-sea observers when requested.

MANAGEMENT MEASURES – NEWFOUNDLAND AND LABRADOR REGION

A. Fishing Seasons

In Newfoundland, the scheduled opening date for mackerel in all areas and for all gear types is August 1; however, consideration will be given to an earlier opening date in any area where mackerel appear prior to August 1. As well, in areas where there is an absence of commercial quantities or where there is a potential for a significant bycatch of other species the season may be delayed. Test fisheries may be authorized as a means of determining when the fishery should open.

B. Fishing Areas

Fixed gear licences will be valid only for the quota area in which the fish harvester resides or has historically fished (any one of fishing areas 1 to 14).

Mobile gear vessels in Mackerel Fishing Areas 1 to 11 are restricted to fishing these areas.

Mobile gear vessels less than 65' in Mackerel Fishing Areas 13 and 14 are permitted access to Mackerel Fishing Areas 12 to 14 inclusive.

Mobile gear vessels greater than 65' in Mackerel Fishing Areas 13 and 14 are permitted access to Mackerel Fishing Areas 12 to 16 inclusive.

The area of validity for mackerel fishing licences in all areas will be reviewed prior to the 2008 fishing season.

C. Licensing

Commercial

Mackerel fixed gear and purse seine licences are available to fish harvesters who held such a licence in the previous year.

New fixed gear licences are available to independent core fish harvesters.

Reissuance (transfer) of purse seine mackerel licences may only occur between the following parties:

- Independent Core to Independent Core
- Core to Independent Core
- Independent Core or Core to Professional Level II as part of a complete Core or Independent Core enterprise. The Professional Level II fish harvesters must be independent in order to qualify.
- Professional Level I or II, to Independent Core.

The recipient of a purse seine licence must be a resident of the area of the licence and must hold a commercial fishing vessel registration 40' LOA or greater. If disposing of an enterprise 40' LOA or

greater for an enterprise less than 40' LOA, the purse seine licence must remain on the 40' LOA or greater enterprise.

All other aspects of licensing will adhere to the provisions of the *Commercial Fisheries Licensing Policy for Eastern Canada*.

Bait

Bait licences for mackerel form part of a generic bait licence that includes herring and blackback (winter flounder) with the exception of those issued in western Newfoundland Mackerel Fishing Areas 12-14.

C. Fishing gear

To reduce the potential for bycatch of other species (especially salmon), the use of trapnet leaders with a mesh size between 2 and 7 inches will be prohibited. As well, the use of monofilament netting material in trapnet leaders will be prohibited.

The maximum amount of fixed gear permitted to be fished at any one time by a licence holder is limited to 10 gillnets (each net shall not exceed 50 fathoms in length), 2 traps and one bar seine.

Bar seines fitted with rings (i.e. 'tuck seines') that allow the bottom and sides of the seine to be hauled or brought together shall not exceed a length of 80 fathoms.

When fishing with a handline or a mechanical device, fishing is restricted to only one of these two fishing methods per fishing trip. A maximum of three handlines or two mechanical devices are permitted.

D. Fisheries monitoring

Logbooks

All fish harvesters operating vessels greater than 35' in length must complete and submit a fishing log.

Dockside Monitoring Program

All fixed and mobile gear licence holders fishing mackerel in NAFO Divisions 2J3KLPs and 4R3Pn are subject to a dockside monitoring program.

Observers

The purse seine fishery is subject to industry funded at-sea observer coverage.

E. Other

Core enterprise owners in the fleet sector using 35' to 64' 11" vessels who opt to acquire a larger vessel will continue to operate on the basis of inshore licensing policies applicable to vessels under 65 feet. Replacement with a larger vessel will not result in changes to allocations, fleet shares or access.

MARITIMES REGION MANAGEMENT MEASURES

A. Fishing Seasons

The mackerel fishery primarily occurs from April to November throughout the Maritimes Region for the weir, trapnet, gillnet and handline gears.

The less than 45 feet purse seine mackerel vessels operate twelve months of the year.

B. Fishing Areas

Mobile gear vessels < 45' are restricted to fishing in Mackerel Fishing Areas 17 to 19 (Cape Breton).

Fixed gear vessels may fish in MFAs 17 to 21.

Mackerel trapnets are located in three management areas - St. Margaret's Bay (West of Pennant Point to the Bacarro Line); Chedabucto Bay and Aspy Bay (East of Pennant Point); and the Bay of Fundy.

The area of validity for mackerel fishing licences in all areas will be reviewed prior to the 2008 fishing season.

C. Licensing

In general, the Maritimes Region mackerel fishery is a limited entry fishery. Mackerel fixed gear and mobile licences are available to fish harvesters who held such a licence in the previous year.

Gillnets – Mackerel gillnet licensees are eligible to acquire (stack) other types of mackerel licences by gear, but cannot stack gillnet licences, once stacked these licences are not permitted to be split. Also, Mackerel gillnet licensees are eligible to acquire a mackerel handline licence.

Handline – New mackerel handline licences may only be issued to existing mackerel licence holders.

Trapnets - licensees are eligible to acquire other mackerel licences (e.g. gillnet)

Exploratory Mobile Gear - An exploratory fishery will be authorized on an annual basis via the issuance of exploratory mackerel licences to existing herring mobile gear licence holders.

Weirs in Bay of Fundy Herring Areas 20 and 21 are eligible to acquire a mackerel licence to retain mackerel

Bait fishery – Mackerel bait fishing licences form part of a generic bait licence that includes herring. These licences are issued to Maritimes Region fish harvesters who require bait for their main fishery (for example, lobster, crab, whelk, and fixed gear groundfish).

A person may, without being registered or licensed and from a vessel that is not registered, engage in recreational fishing for mackerel with a hand-line or by angling.

D. Fishing Gear

Fish harvesters will be restricted to the type of gear that appeared in previously held licence or, in the case of change of ownership, the type of gear permitted by the previous licence holder.

Mackerel **gillnet** licensees will be limited to designated set or drift gillnets as identified in their licences.

In the case of **set gillnets**, a person is limited to the quantity of gear that appeared in previously held licence or, in the case of change of licence holder, the quantity of gear permitted by the previous licence holder, or ten (10) nets (max 300 fathoms), whichever is greater.

All transfers of mackerel **trapnet** sites, proposals for new berth sites, alteration of existing sites, changes in gear composition, size, length and/or direction of leaders, will require a formal reapplication to the appropriate DFO, Area Office by the licensee.

Mobile Gear > 65' - vessels may not exceed 125' LOA and must be Canadian registered.

Mobile Gear < 45' – are limited to purse seine gear only.

Trapnets – licensees are eligible to register up to a maximum of five trapnet licences. Grandfather provisions apply as of April 30, 1997.

E. Fisheries Monitoring

If indicated on licence conditions, fish harvesters must complete and submit a fishing logbook and submit their catches to dockside monitoring, and must carry at-sea observers when requested.

GULF REGION MANAGEMENT MEASURES

A. Fishing Seasons

The mackerel fishing season opens for all gear types on June 1. Should mackerel appear in an area prior to June 1, consideration will be given to opening the season earlier for that area. In areas where there is an absence of commercial quantities of mackerel or where there is a potential for a significant bycatch of other species, the opening date for the fishery may be delayed.

B. Fishing Areas

Mackerel fishing with vessels less than 19.8 m (65 ft) will be restricted to Mackerel Fishing Area (MFA) 16. Vessels greater than 19.8 m (65 ft) will be restricted to MFAs 12, 13, 14, 15 and 16.

The area of validity for mackerel fishing licences in all areas will be reviewed prior to the 2008 fishing season.

C. Licensing

The mackerel fishery remains a limited entry fishery except for the issuance of fixed gear licences, which may be issued to any head of a core enterprise who holds a herring fixed gear licence for a vessel less than 15.2 m (50 ft) length overall and handline licences, which may be issued to any head of a core enterprise.

Fish harvesters who held mackerel exploratory purse seine licences in the previous year are eligible to renew the exploratory licence for the current year, subject to review at the regional level. Some experimental licences may be issued to existing mackerel licence holders for the purpose of experimenting with new fixed gear.

A person may, without being registered or licensed and from a vessel that is not registered, engage in recreational fishing for mackerel with a hand-line or by angling.

D. Fishing Gear

Fishing gear is restricted to gillnets, trapnets, handline, mechanical devices and purse seines. Only one gear type may be used on a fishing trip. Harvesters using mechanical devices or handlines are restricted to two mechanical devices or three handlines, and a mechanical device is limited to a maximum of four single lines, with a maximum of 100 hooks in the aggregate.

E. Fisheries Monitoring

Mackerel fishing conducted under an exploratory or experimental licence other than with a purse seine requires dockside monitoring, some at-sea observer monitoring and a written evaluation of the project at the end of the fishery. An exploratory purse seine fishery requires dockside monitoring and other measures as needed to address conservation concerns.

DFO SECTORS ROLES AND RESPONSIBILITIES AND DFO CONTACTS

Resource Management

- Integration of all aspects that support the sustainable management of the fishery under one Integrated Fisheries Management Plan;
- Development of management options with other DFO sectors and with stakeholders;
- Consultations with resource users and other stakeholders;
- Coordination of the pre- and post-season analyses and processes.

Science

- Provision of resource outlook for upcoming season
- Raising conservation concerns;
- Advising on appropriateness of management options with respect to conservation
- Specification of data requirements;
- Advice on research projects required for proper stock assessments.

Oceans

- Informing and working with Resource Management on initiatives under the Oceans Act (e.g. Marine Protected Areas) which might have implications for the fishery.

Conservation and Protection

- Identification of potential enforcement problems to be addressed in IFMP;
- Identification of possible specific enforcement measures;
- Ensuring that enforcement measures identified in the IFMP can be realized within existing resources;
- Development, implementation and evaluation of the fishery enforcement plan.

International

- With input from other DFO sectors, leading international negotiations affecting fish stocks;
- Providing input on international obligations and concerns.

Aboriginal Affairs

- Ensures that fiduciary obligations to First Nations are met
- Monitors impact of agreements on aboriginal fisheries
- Negotiates and approves agreements with aboriginal groups

Senior Management

- Approves management plans

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