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# CANADIAN ATLANTIC SHARK Integrated Fisheries Management Plan

## 2002-2007

Fisheries Resource Management

# ATLANTIC

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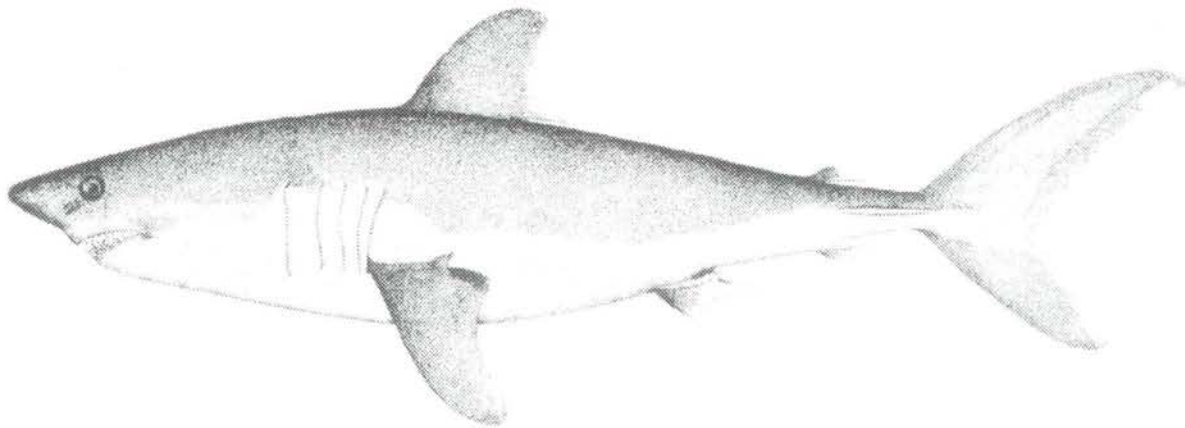
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# CANADIAN ATLANTIC PELAGIC SHARK INTEGRATED FISHERIES MANAGEMENT PLAN

2002 - 2007



  
**Canada**

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## 1. INTRODUCTION

This plan is designed to govern the exploitation of the following shark species during 2002-2007:

- porbeagle
- blue
- shortfin mako and other sharks, excluding spiny dogfish.

Pelagic sharks have been exploited on Canada's East Coast since the 1960s. They have traditionally been caught by established east coast fisheries, such as the large pelagic longline fisheries for swordfish and other tunas, as well as certain groundfish fixed gear fisheries. However, as a result of the general downturn in the traditional groundfish fisheries, including mobile gear fisheries, there was an increase on the part of other Canadian fishers to directly exploit large pelagic sharks off Canada's East Coast. The species of primary commercial interest is the porbeagle shark (*Lamna nasus*), with mako (*Isurus oxyrinchu*) and blue shark (*Prionace glauca*) also being of commercial interest. The federal government wanted to assist with diversifying away from the dependence on groundfish where opportunity appeared to present itself, such as in under-exploited fisheries. At that time, sharks were considered to possibly be under-exploited; however, it was also known that in assessing this resource as to its ability to support additional, directed effort under diversification, caution would have to be exercised.

The reason for proceeding with caution is related to the particular life history characteristics of sharks. They are typically slow growing and produce few young per year. This makes them more susceptible than groundfish species to over-exploitation, despite the fact that their survival rate from birth is high.

The first shark management plan in 1995 laid out the first management measures for a limited number of new, exploratory, directed shark licences. Because scientific information on the stock status of sharks was still limited, the intent of the subsequent management plan (1997-1999) was to provide the basis for reliable calculations of growth, mortality, abundance and yield by continuing to enable the limited number of Canadian exploratory shark fishing licences to direct for shark, provided they contributed to providing detailed scientific data. The traditional swordfish/other tunas fleets also contributed financially to this effort, which was carried out under the auspices of a Joint Project Agreement (JPA) with the Department of Fisheries and Oceans (DFO). The information derived from this Scientific Monitoring fishery, or commercial/exploratory fishery as it was also called, and the JPA, improved the accuracy and precision of the stock assessment for porbeagle, in an effort to ensure the sustainability of the fishery. The fishery, under the 2000-2001 plan, continued to support the scientific study of Canada's large pelagic Atlantic sharks through scientific data collection and JPA contributions, making possible a more detailed porbeagle stock assessment in April 2001.

The most recent porbeagle stock assessment indicates the current population is seriously depleted and a greatly reduced fishing mortality is required if the population is to recover. The assessment determined that recent fishing mortality levels are unsustainable. The current plan focuses primarily on porbeagle stock recovery measures intended for the next five years.

## 2. BIOLOGICAL SYNOPSIS

The **porbeagle** shark (*Lamna nasus*) is a cold-temperate species that occurs in the north Atlantic, south Atlantic and south Pacific Oceans. In the west Atlantic, the species range extends from Newfoundland and Labrador to New Jersey, and possibly to South Carolina. In the east Atlantic, the range extends from Iceland and the western Barents Sea to Morocco and the Mediterranean. In the northwest Atlantic, this pelagic shark inhabits inshore and offshore waters colder than 14°C, and is commonly seen in the 5-10°C range. Porbeagle shark moves onto the Scotian Shelf in early spring and into the Gulf of St. Lawrence, and onto the Grand Banks during the summer and early fall. Segregation occurs by sex and size. Mating occurs in the early fall off southern Newfoundland. Porbeagles move south and into deeper water in late fall and are captured off the Continental Shelf in winter. They are also taken in deep water areas such as Emerald Basin and in the Gulf of Maine during the winter.

The stock structure of the porbeagle shark is relatively unstudied, but independent tagging studies all indicate that there is little or no exchange between the east and west Atlantic. The same studies suggest that only one stock resides in the northwest Atlantic, migrating between the Gulf of Maine and southern Newfoundland on an annual basis. Therefore, the range of the northwest Atlantic stock appears to be defined by Northwest Atlantic Fisheries Organization (NAFO) Sub-Areas 3-6.

Unlike most of the teleosts (bony fishes), the fertilization of eggs occurs internally in elasmobranchs (sharks, skates and rays). Like many shark species, porbeagle sharks give birth to live, fully formed young. Porbeagle eggs are fertilized and continue to develop in the uterus of the female until the young are born as fully formed juveniles or "pups" after a gestation period of 8-9 months. The young are born at a relatively large size of 65-70 cm, thus reducing the number of potential predators and enhancing chances for survival of the young. Pregnant porbeagle females continue to release eggs and the embryos obtain nourishment by consuming unfertilized eggs in the uterus. This is known as oophagy. The number of young produced annually averages only 4 pups per litter. Males mature at about 174 cm fork length, while females mature at about 218 cm fork length. The age of sexual maturity in males occurs at age 8, but is closer to age 13 in females. Porbeagle sharks may live to an age of more than 40 years. Maximum reported size is 320 cm fork length and 250 kg; however specimens over 250 cm are rare.

The diet of the porbeagle shark consists primarily of mid-water and pelagic fishes, but includes squid and a variety of other fishes. The only likely natural predators are other large sharks.

The **blue** shark (*Prionace glauca*) is a cosmopolitan species, occurring throughout tropical, sub-tropical and temperate waters of the Atlantic, Pacific and Indian Oceans, and is probably the most widely distributed of all shark species. The species range extends from Newfoundland and Labrador to Argentina in the west Atlantic and from Norway to South Africa in the east Atlantic, and includes the mid-Atlantic and the Mediterranean. Based on tagging data, it has been suggested that the stock area may include the entire north Atlantic, and that a clockwise migration occurs around this area. Blue sharks may utilize or be carried by the major current systems over the entire Atlantic Ocean basin. The blue shark prefers water temperatures in the range of 13-20°C but can tolerate from 7-27°C. In Canadian Atlantic waters, blue sharks move onto the Scotian Shelf in the late spring, and into the Gulf of St. Lawrence and onto the Grand Banks during the summer and early fall. Blue sharks move into deeper water in late fall and are taken off the Continental Shelf in winter.

The blue shark is viviparous, meaning it gives birth to live, fully formed young, but unlike the porbeagle, its embryos obtain nourishment in the uterus through a yolk-sac placenta, not through ingestion of unfertilized eggs in the uterus. The number of young produced (litter

size) ranges from 1 to 135, with an average of 25-50 pups per litter. Size at birth is 40-50 cm. The reproductive cycle is thought to be one year long, but may be two years. Females mature at age 5-6, at a total length of approximately 270 cm, while males mature at age 4-6, at a length of approximately 230 cm. Blue sharks are among the faster growing species of sharks. Maximum reported size is 383 cm total length.

Diet of the blue shark consists primarily of small pelagic schooling fishes, such as herring, mackerel, sardines and anchovies. Squid is also an important diet item. The blue shark is an opportunistic feeder and will take any locally abundant fish. The list of reported prey items includes many species of pelagic and benthic fishes and invertebrates, small sharks, wounded marine mammals and mammalian carrion, and seabirds. The only likely natural predators are other large sharks.

The **shortfin mako** (*Isurus oxyrinchus*) is a warm-temperate and tropical species that occurs in the Atlantic, Pacific and Indian Oceans. The species range extends from Newfoundland and Labrador to Argentina in the west Atlantic and from southern Norway and the British Isles to South Africa in the east Atlantic, and includes the mid-Atlantic and the Mediterranean. The preferred water temperature for the shortfin mako shark is close to 18°C, and ranges from 17-22°C. Based on tagging data, it has been suggested that the Mid-Atlantic Ridge may separate east and west Atlantic stocks of shortfin mako. Mako sharks occur in Canadian Atlantic coastal waters during the summer and fall months, but are taken primarily off the Continental Shelf. Tagging data and commercial catch data show distinct seasonal movements by mako sharks northward and inshore of the western margin of the Gulf Stream during the spring and summer and, it is hypothesized, offshore to wintering grounds in the Gulf Stream and Sargasso Sea during the fall and winter.

The shortfin mako, like the porbeagle, is ovoviviparous. Pregnant females continue to release eggs and the embryos obtain nourishment by consuming these unfertilized eggs in the uterus. The number of young produced (litter size) ranges from 4 to 25, with an average of 14 to 16 pups per litter. Size at birth is approximately 70 cm. The reproductive cycle of mature females is thought to be 15 to 18 months. Males mature at approximately 210 cm total length while females mature at approximately 285 cm total length. Maximum reported size is 394 cm and 570 kg. Shortfin mako appears to have a lifespan of at least 22 years.

Diet of the shortfin mako consists primarily of fishes of a wide variety of species including bluefish, mackerels, tunas, bonitos, swordfish and other sharks. Squid is also an important diet item, and marine mammals are occasionally found in the stomach. The only likely natural predators are other large sharks.

**FIGURE 1**

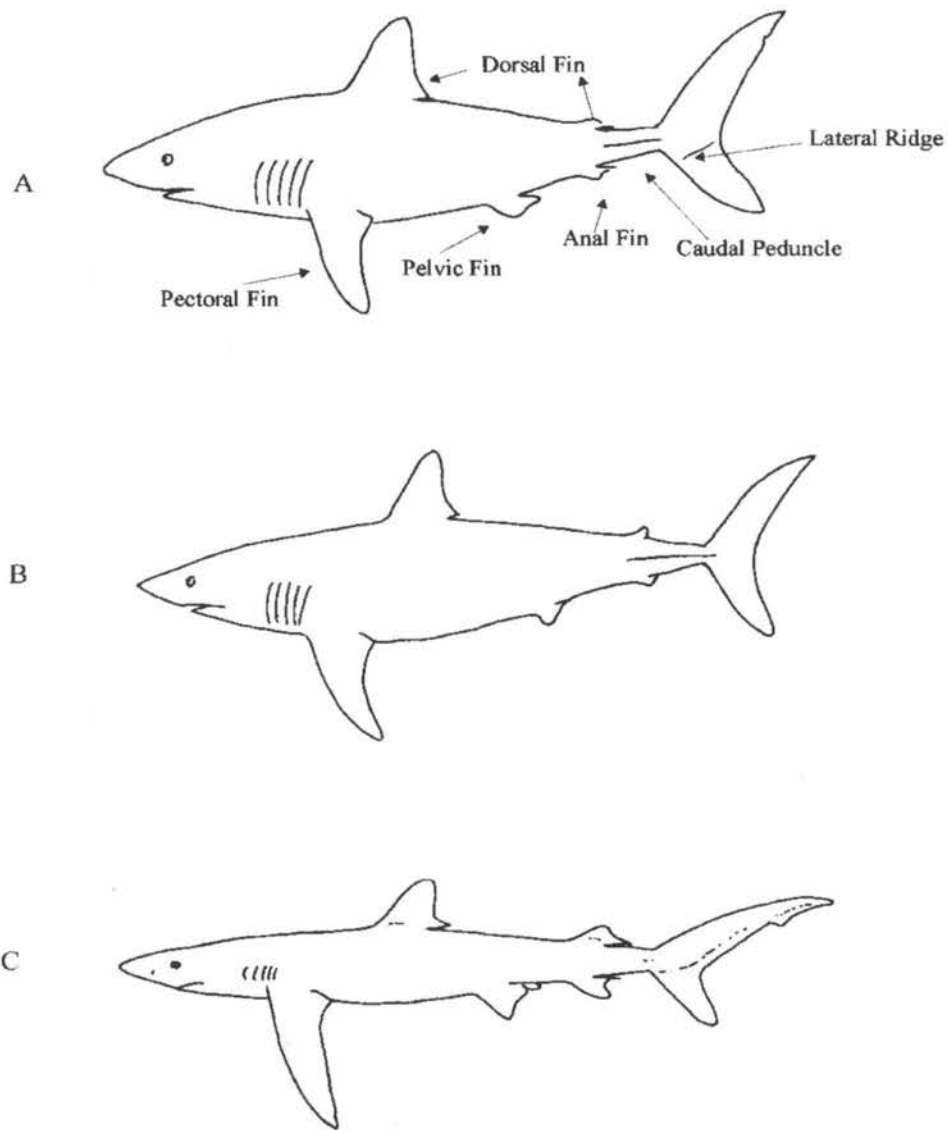


Figure 1. Lateral views of (A) Porbeagle; (B) Mako; (C) Blue Sharks

### **3. OVERVIEW OF THE FISHERY**

#### **General**

There are three main species of large pelagic sharks that are commercially fished in Atlantic Canada, with the porbeagle and blue shark fisheries having directed licences, and mako being a retained by-catch only. Porbeagle and blue shark traditional by-catch fisheries continue to exist under the same restrictions as in the previous plan. Other species of shark, such as tiger and thresher, are also caught and retained as by-catch but in lesser amounts.



## **Gear**

Directed commercial fishing for shark is almost exclusively done by large pelagic longline gear, although handline and rod and reel gear are also permitted. Recreational fishing is restricted to rod and reel gear only.

## **Finning**

In international waters, and in the past in Canadian waters, the practice of "finning" is believed to have been a likely, undocumented, source of mortality. Finning refers to the practice of removal and retention of the fins, but discarding of the carcass, then not reporting the fins as landings. This practice is now banned in Canadian waters, and elsewhere. The prohibition on finning in Canadian waters was introduced in 1994, and extends to any Canadian licensed vessel fishing outside of the 200-mile Exclusive Economic Zone (EEZ). Mortality levels due to finning may continue to be significant by foreign vessels in international waters, especially for species that do not have good market value for the meat, such as the blue shark.

## **Porbeagle Shark**

In 1961, the Norwegian fleet began exploratory fishing for **porbeagle** shark, using pelagic longline gear, in the waters from New England to Newfoundland. They were joined by vessels from the Faroe Islands during the next few years. Reported landings in the northwest Atlantic rose from 1,924t in 1961 to 9,360t in 1964, and then fell to less than 1,000t in 1967, the stock presumably having been fished down to unprofitable levels during this period. Subsequent effort levels remained low and reported landings were less than 600t until 1991.

In 1991, reported landings of porbeagle in the northwest Atlantic rose to 1,468t due to increased effort by Faroese vessels and entry of Canadian vessels into the fishery, and by 1992 reached 1,778t. Previously, the fishery had been concentrated most heavily in Divisions 4WX during the spring, but in 1991, the fall fishery in more northerly waters of the Gulf of St. Lawrence and the Grand Banks of Newfoundland became much more pronounced. The southerly spring and northerly fall fisheries have both been very active ever since. Participation in the fishery by Faroese vessels was restricted in 1993 and total landings dropped to 1,369t. Foreign participation was eliminated altogether from the directed fishery in 1994. In that year, landings by three Canadian offshore freezer vessels totalled about 1,470t, while a number of inshore vessels took about 80t (total landings 1,549t). A reduction in effort in 1995, with only two vessels still active after June, saw landings drop to 1,378t. Up until 1995, access to the fishery by Canadian fishers was not restricted by policy or regulation.

In addition to the current scientific/monitoring fishery, porbeagle sharks taken as by-catch in the Canadian swordfish longline fishery, the Japanese tuna longline fishery, and various inshore fisheries are minimal, seldom exceeding 40t in recent years. Also, interest in angling for sharks in Atlantic Canada has increased over the last few years, based primarily on blue shark catches, but porbeagle sharks are occasionally taken. Until 1994, removals by the recreational fishery had not been recorded, but were likely low. Current removals by the recreational fishery are low to negligible, as most of this fishery is catch and release only. Landed shark from the handful of recreational derbies in Atlantic Canada each summer is all recorded and is almost always blue shark.

## Blue Shark

**Blue** shark meat has been difficult to market, owing to its tendency for rapid spoilage at sea and its low prices. As a result, there has been very little directed fishing for this species to date. These sharks are routinely captured as an incidental catch in a number of fisheries, but are usually not retained, being released alive or discarded dead. The participants in the small scale, directed fishery for blue shark have been trying to develop markets for this species, but that fishery depends on there being sufficient porbeagle shark quota available in the summer months to keep the directed blue shark fleet viable. Primarily due to market considerations, reported Canadian landings (combined total of commercial and recreational) have fluctuated from a low of 8t in 1990 to a high of 152t in 1995, with recent landings of 35t and 8t in 2000 and 2001, respectively.

Fisheries in the Canadian zone that incidentally catch or caught blue sharks while directing for other species include the Canadian swordfish, porbeagle and non-bluefin tuna pelagic longline fisheries, the former Faroese porbeagle fishery (active until 1993) and the Japanese tuna longline fishery. Peak fishing activity for these other species occurs during the summer to early winter, primarily in waters off the Scotian Shelf and southern Grand Banks. Other fisheries in the north Atlantic, which probably incur a by-catch of blue shark, include international large pelagic longline fisheries. There is likely also some by-catch in fisheries using other gear types.

Recreationally, the blue shark is regarded as an important sportfish in many parts of its range, but is rarely retained due to its fast spoilage reputation. Removals by the relatively small Canadian recreational fishery are currently only permitted when fishing is conducted as part of a fishing derby, and all carcasses are subject to scientific study.

## Shortfin Mako Shark

Atlantic Canadian waters are home to a number of other shark species, including basking, thresher, Greenland, mackerel, great white and most particularly **shortfin mako**, generally caught as a by-catch to other fisheries. Only in the case of shortfin mako are the catches and prices of commercial interest.

Reported shortfin mako landings by Canadian vessels occur from June to October, when Scotian Shelf and southern Grand Banks waters are warm enough for shortfin mako to venture inshore from the Gulf Stream. They are often not caught very far from the Gulf Stream, rarely being taken from northerly portions of the Grand Banks or from the Gulf of St. Lawrence. The Food and Agriculture Organization (FAO) statistics indicate less than 100t caught annually (by the United States (US)) in the northwest Atlantic during 1990-1994. However, with the exception of recent Canadian catches, landings generally have not been systematically recorded; historical landings were often included with other species and recorded as mackerel shark, or large shark unspecified. There is little directed fishing reported for shortfin mako shark, but the species has been reported as by-catch in a number of fisheries. Prior to 1991, Canadian landings of mako sharks were recorded as sharks unspecified, with porbeagle - a closely related species of similar appearance - and mako sharks both being coded as mackerel sharks. During 1992 and 1993 shortfin mako and porbeagle sharks were recorded separately, but the shortfin mako component of mackerel shark landings was probably reported as unidentified shark. Since the introduction of dockside monitoring in various Canadian fisheries, landings by species have been refined, such that 157t and 107t from the Canadian swordfish longline fishery for 1994 and 1995, respectively, have been reported. There is the possibility, however, that a proportion of the reported 1994-95 mako landings were mis-identified porbeagle sharks.

Shortfin mako sharks may have also been taken in appreciable numbers as by-catch in the Japanese longline fishery for tuna; however, reported annual Japanese by-catch of mako shark in Canadian waters ranges from 0 to 34t for the 1987 to 1999 period. There is no data on shortfin mako shark catches outside the Canadian zone, as they are either not reported as catch or discards, or they are reported simply as catch of "large sharks". Makos could represent a significant portion of the by-catches of any of the northwest Atlantic large pelagic longline fisheries.

Recreationally, the shortfin mako is a prized sportfish throughout its range, particularly in recreational fisheries of the Atlantic coast of the US, where warm waters are found much closer to shore than in Atlantic Canada year round. Interest in angling for sharks has increased somewhat in Atlantic Canada over the last few years, and, as previously discussed, is based primarily on the ubiquitously present blue shark, but shortfin makos are occasionally reported. Shark landings by Canadian recreational fisheries are not permitted, being catch and release only, with the exception of the relatively few numbers of summer derbies held in the region. All landings from recreational derbies are now reported directly to DFO Science.

### **3.1 Participants**

Prior to 1995, access to sharks by Canadian fishers was not restricted, and there was no formal management of the shark fishery. Thus, the fishery could be considered as being open to anyone. However, the rise in interest in shark fishing in the early 1990s called for the need to control entry.

The first formal Shark Management Plan, in 1995, stated that eligibility for a commercial shark licence required documented proof that the applicant had landed 1,500 kg of shark during any of the years 1990, 1991 or 1992, as well as landing 1,500 kg in 1994. The plan also allowed that in areas where the shark fishery was limited, extra licences could be authorized. The 1995 plan was rolled-over into 1996 with the provision for species-specific licences. Existing licences effectively became porbeagle/blue shark licences. Eligibility for the commercial blue shark licence required documented proof that the applicant had landed 2,500 kg of shark during 1994 and 1995. These criteria resulted in the authorization of 22 exploratory porbeagle/blue shark licences and two blue shark licences in the Scotia-Fundy sector of the Maritimes Region plus, in keeping with the DFO policy on integrating Aboriginals into commercial fisheries where possible, four additional exploratory porbeagle/blue shark licences were made available to First Nations in 1996. There were also 19 exploratory porbeagle/blue shark licences authorized in the Gulf sector, ten exploratory porbeagle/blue shark licences in the Newfoundland Region (reduced to a maximum of five licences authorized in the 2000-2001 Plan) and three exploratory porbeagle/blue shark licences in the Quebec Region.

The 2000-2001 Shark Management Plan specified that annual renewal of the exploratory licences would be contingent on having met minimum performance requirements and upon the Department determining that there is sufficient quota available for all licences seeking renewal. In 2001, subsequent to the stock assessment, it became clear that sufficient quota would not be available for all licences. In response, a ministerial decision was made not to issue in 2001 any exploratory porbeagle/blue shark licences that did not meet in 2000 the minimum performance requirements stipulated in the 2000-2001 Integrated Fisheries Management Plan (IFMP). This reduced the total number of porbeagle/blue licences to 25 Atlantic-wide, with the remaining distribution summarized in Table 1. The number of exploratory blue shark licences remains unchanged at two in the Maritimes Region.

TABLE 1

Initial and Current Number of Exploratory Porbeagle/Blue Shark Licences

REGION	INITIAL LICENCES AUTHORIZED	LICENCES ISSUED IN 2002
Maritimes	26	14
Gulf	19	9
Quebec	3	2
Newfoundland & Labrador	10 (5)*	0

\* Reduced to 5 in 2000/2001 IFMP.

The traditional large pelagic by-catch fisheries for swordfish and non-bluefin tuna remain unrestricted in terms of the by-catch levels they could retain, and the traditional groundfish fixed gear by-catch fishery is permitted to retain a restricted amount per vessel per trip of shark.

The recreational fishery is composed of charter boats, derbies and anglers. A single licence type is used to manage entry into this fishery. It is catch and release only, except for DFO-authorized derbies. In 1996, the Scotia-Fundy sector authorized 421 recreational licences (hook and release only); however, this number varies from year to year, depending on the demand. In 2002, six shark derbies were held in the Maritimes Region, with a total of 911 recreational licences issued. The main shark species caught was blue shark. In 2002, 13 recreational licences were issued in the Gulf Region (PEI) and 11 in the Newfoundland and Labrador Region. No DFO-authorized derbies were held in other Regions.

To facilitate on-going management of the Maritimes Region shark derbies for scientific benefit, a Recreational Shark Derby Management Plan was developed in 2002, in consultation with DFO Science and derby representatives (Appendix IV).

**3.2 Location of Fishery**

Shark fishing is permitted for Canadian vessels throughout the NAFO Convention Area.

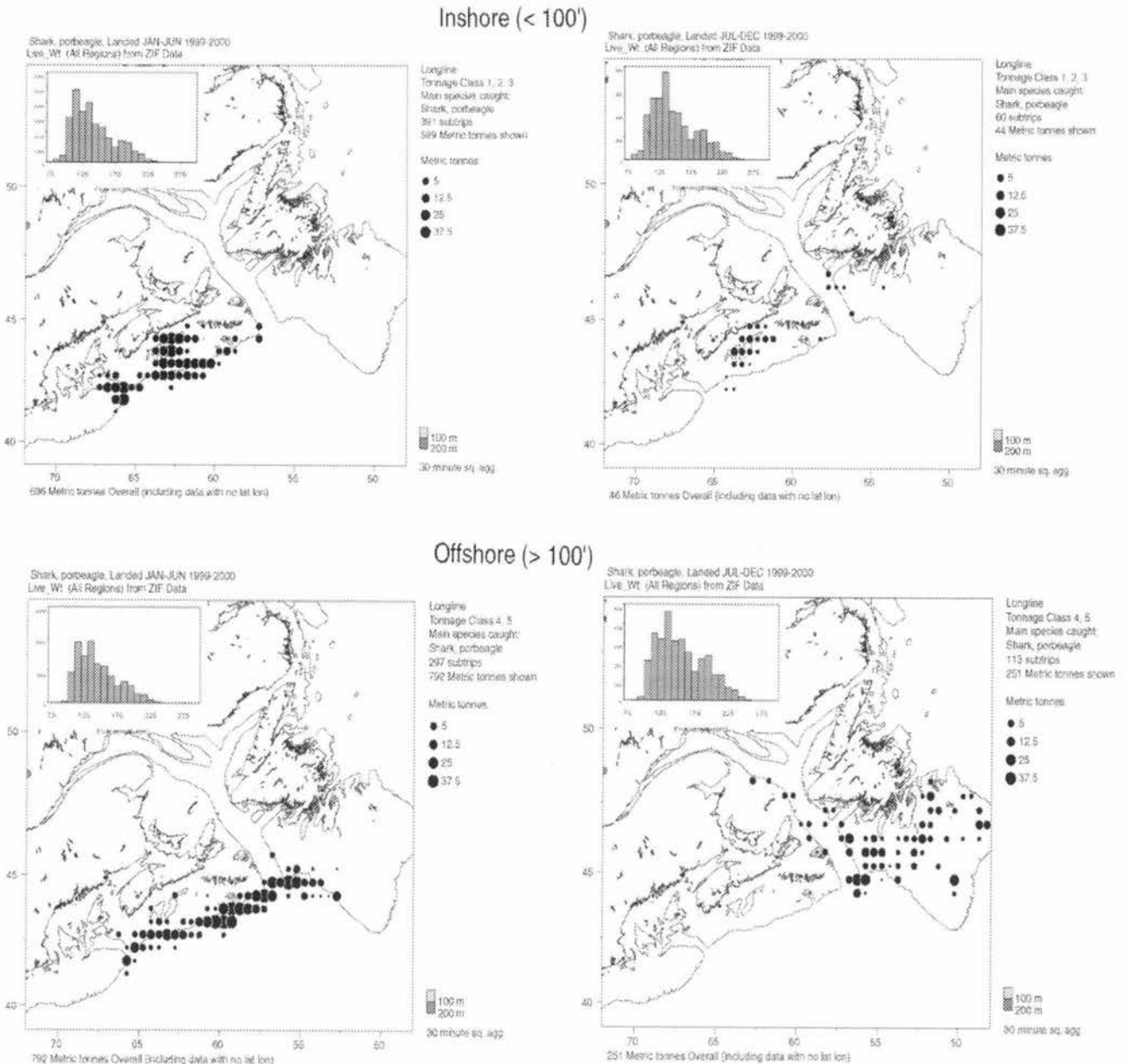
The Canadian fishery for **porbeagle** shark occurs in the western North Atlantic, following the shark as they move onto the Scotian Shelf in late spring, then into the Gulf of St. Lawrence and onto the Grand Banks during the summer and early fall. Porbeagle shark move into deeper water in late fall and are taken off the Continental Shelf in winter. They are also taken in deep water basins such as Emerald Basin and the Gulf of Maine during the winter. Figure 2 illustrates the seasonal catch locations as well as size composition of the catches in the porbeagle fishery. As previously indicated, stock studies suggest that only one stock resides in the northwest Atlantic in the area within NAFO Sub-Areas 3-6. The licensed Canadian offshore vessels greater than 100' in length overall (LOA) have usually been the first to start the seasonal fishing pattern in early- to mid-spring, but there can be some exploratory activity from both inshore and offshore vessels in January or February as well. From 1997 to 2000, the extent of fishing into the fall has depended on quota being available, and in 2001 was further curtailed by a fall closure of NAFO Divisions 4Vn and 3LNOP.

The Canadian **blue** shark commercial/exploratory fishery includes the same participants as the porbeagle fishery for the most part, with fewer of the licensed vessels actually directing for blue shark, and then doing so mainly in the summer months when their other fisheries are closed. Because blue shark may utilize the entire Atlantic Ocean basin and can tolerate a wide temperature range in Canadian Atlantic waters, from 7-27°C, blue sharks could be fished

on the Scotian Shelf from spring to fall, and in the Gulf of St. Lawrence and on the Grand Banks from summer to fall.

Canadian catches of **shortfin mako** primarily occur as by-catch in directed pelagic longline fisheries for porbeagle, swordfish, or non-bluefin tuna off the Continental Shelf. Occasionally, during the summer months, they may also be taken as by-catch in coastal waters by other fleets, including groundfish. Only those fishers using registered fishing vessels greater than 65' LOA may access the shark fisheries on an Atlantic-wide basis. In all other cases, both commercial and recreational fishing, DFO's Sector Management Policy will apply.

**FIGURE 2**



**Figure 2: Porbeagle catch location and associated length composition for inshore and offshore vessels in spring (Jan.-Jun.) and fall (Jul.-Dec.) of 1999-2000**

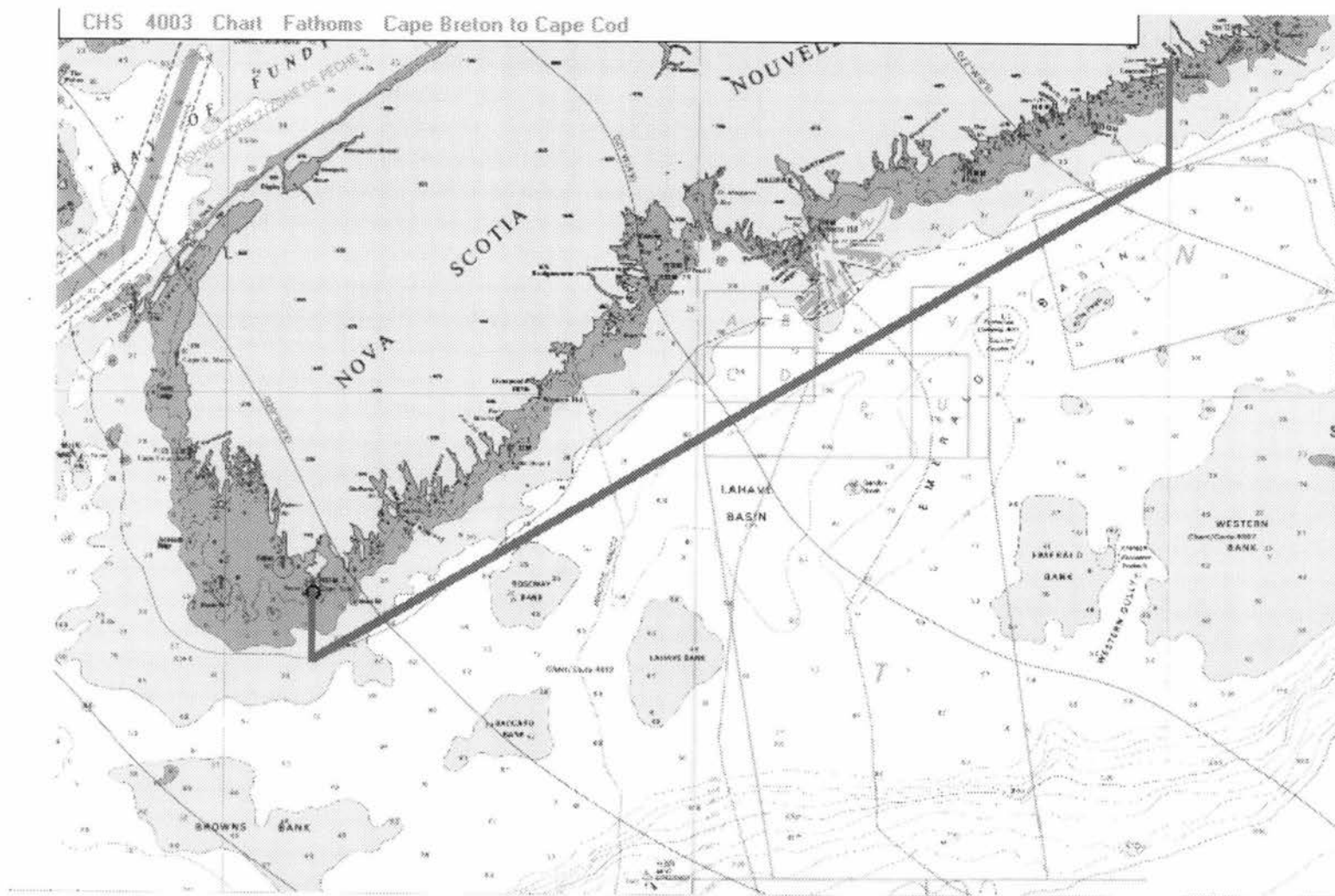
### 3.3 Timeframe of Fishery and Area Restrictions

Until 2001, no seasonal or area restrictions applied to the shark fishery, due to the need for further collection and study of stock assessment data on all three species of commercial interest, including porbeagle shark, during the exploratory phase of development. The *Atlantic Fishery Regulations, 1985 (AFR)* are structured to allow the opening or closure of directed shark fisheries, but do not allow openings or closures by individual species or by type of fishery (commercial vs. recreational). Therefore, voluntary seasonal and area restrictions implemented by industry working in close collaboration with DFO were instrumental in managing the fishery until 2001. Since then, two key season and area restrictions have been introduced to the shark fishery and are enforced by licence condition. These restrictions include the Divisions 4Vn3LNOP fall closure to protect pupping females, and an area inside 12 miles off the southwest coast of Nova Scotia known as the Bluefin Exclusion Zone (BEZ) from August 1 annually (Figure 3). The latter closure is aimed at preventing bluefin tuna by-catch. Further details on season and area closures are included in section 8.1 of this plan.

Up to and including 2002, the shark fishery operated on a calendar year basis. However, at the request of Maritimes Region industry, the fishing season is changed to a 12-month period running from April 1 to March 31 annually. A three-month fishing hiatus, from January 1 to March 31, 2003, bridged the transition period. This change allows industry to better plan their fishing activities around the newly implemented season and area closures, and to avoid gear conflicts with the swordfish longline fishery that occurs in the Emerald Basin area in the summer and fall months.

Season and area closures as well as fleet closures continue to be managed by a combination of licence conditions, and are strongly dependent on Conservation Harvesting Plans (CHPs) as well as continued cooperation by industry with voluntary measures when required. To date, this approach has worked well, due largely to stability in licence holders over the years (the exploratory licences being non-transferable). However, to strengthen the basis for long-term management of this fishery under a commercial phase, it will be necessary to initiate appropriate amendments to the *AFR* to permit closures targeted to individual species or to type of licence (commercial or recreational). This is identified in section 6 of this plan as one of the key objectives to be accomplished during this five-year plan, and ideally should precede consideration to commercialize the licences.

**FIGURE 3**  
**BLUEFIN EXCLUSION ZONE**



### 3.4 Landings and Value of the Fishery/Markets

TABLE 2

1990-2001 Canadian and Foreign Atlantic Shark Reported Landings  
(metric tonnes)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001#
<b>Canada</b>												
Porbeagle	-	346	741	919	1549	1305	1014	1212	1008	965	902	498
Blue	8	32	101	21	133	123	9	7	4	31	18	8
Shortfin Mako	78	124	119	152	157	107	60	106	70	69	76	68
Unspecified*	24	61	47	23	104	38	9	43	37	14	10	19
<b>Total Canada</b>	<b>110</b>	<b>563</b>	<b>1008</b>	<b>1115</b>	<b>1943</b>	<b>1573</b>	<b>1092</b>	<b>1368</b>	<b>1119</b>	<b>1079</b>	<b>1006</b>	<b>593</b>
<b>Foreign**</b>										***	****	****
Porbeagle	537	1122	1036	411	2	4	9	4	12	0	0	0
Blue	118	198	345	269	328	173	169.6	36	34	1	0	0
Shortfin Mako	13	18	34	17	23	4	5	2	1	0	0	0
Unspecified*	140	198	522	38	134	0.5	0		0	5	0	0
<b>Total Foreign</b>	<b>808</b>	<b>1536</b>	<b>1937</b>	<b>735</b>	<b>487</b>	<b>181.5</b>	<b>183.6</b>	<b>42</b>	<b>47</b>	<b>6</b>	<b>0</b>	<b>0</b>
<b>Total All</b>	<b>918</b>	<b>2099</b>	<b>2945</b>	<b>1850</b>	<b>2430</b>	<b>1754. 5</b>	<b>1275. 6</b>	<b>1410</b>	<b>1166</b>	<b>1085</b>	<b>1006</b>	<b>593</b>

\* May include porbeagle, mako and blue sharks

\*\* These are catches by foreign vessels fishing in the Canadian zone as reported by Canadian fisheries observers (including catches from directed fishing for porbeagle shark and by-catches incidental to other fisheries).

\*\*\* Note that in 1999, fewer Japanese vessels fished in the Canadian zone.

\*\*\*\* No Japanese fishing occurred in the Canadian zone in 2000 and 2001.

# Total Allowable Catch (TAC) was reduced in-season, and fishery closed early for conservation.



TABLE 3

## Atlantic Shark Landed Value by Region, 1992-2001

	Landed Value (\$000)									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001p
<b>Scotia Fundy</b>										
Porbeagle	1,878	1,869	3,475	2,816	1,924	2,477	1,916	1,467	1,964	815
Blue	68	18	113	82	12	8	3	88	31	
Mack, Mako	182	239	231	185	104	169	105	92	91	92
Unspecified	49	24	160	41	14	28	26	16	11	16
<b>Total</b>	<b>2,177</b>	<b>2,150</b>	<b>3,979</b>	<b>3,124</b>	<b>2,054</b>	<b>2,682</b>	<b>2,050</b>	<b>1,663</b>	<b>2,097</b>	<b>923</b>
<b>Gulf</b>										
Porbeagle				13.6	18.3	30.8	3.0	10.6	27.2	1.8
Blue				5.6	5.1	2.7	1.1	0.8	0.5	0.3
Mack, Mako				0.2		0.1	0.3	0.3	0.1	0.3
Unspecified	7.3	4.3	15.1	0.8	3.1	20.9	19.5	7.3	6.7	6.5
<b>Total</b>	<b>7.3</b>	<b>4.3</b>	<b>15.1</b>	<b>20.2</b>	<b>26.5</b>	<b>54.5</b>	<b>23.9</b>	<b>19.0</b>	<b>34.5</b>	<b>8.9</b>
<b>Newfoundland &amp; Labrador</b>										
Porbeagle			0.7	184.6	2.2	212.1	127.2	0.1	0.3	1.5
Blue			7.9	23.6	5.6		0.5	0.1		0.1
Mack, Mako	6.9	6.9	11.1	11.9	10.2	14.4	24.7	19.9	27.6	13.3
Unspecified	2.4	4.1	1.3	4.8	4.9	1.3	0.9	0.4	2.0	1.8
<b>Total</b>	<b>9.3</b>	<b>11.0</b>	<b>21.0</b>	<b>224.9</b>	<b>22.9</b>	<b>227.8</b>	<b>153.3</b>	<b>20.5</b>	<b>29.9</b>	<b>16.7</b>
<b>All Regions</b>										
Porbeagle	1,878	1,869	3,476	3,014	1,945	2,720	2,046	1,478	1,992	818
Blue	68	18	121	111	23	11	5	89	32	0
Mack, Mako	189	246	242	197	114	184	130	112	119	106
Unspecified	59	32	176	47	22	50	46	24	20	24
<b>Total</b>	<b>2,194</b>	<b>2,165</b>	<b>4,015</b>	<b>3,369</b>	<b>2,104</b>	<b>2,965</b>	<b>2,227</b>	<b>1,703</b>	<b>2,163</b>	<b>948</b>

Notes: 2001 figures are preliminary.

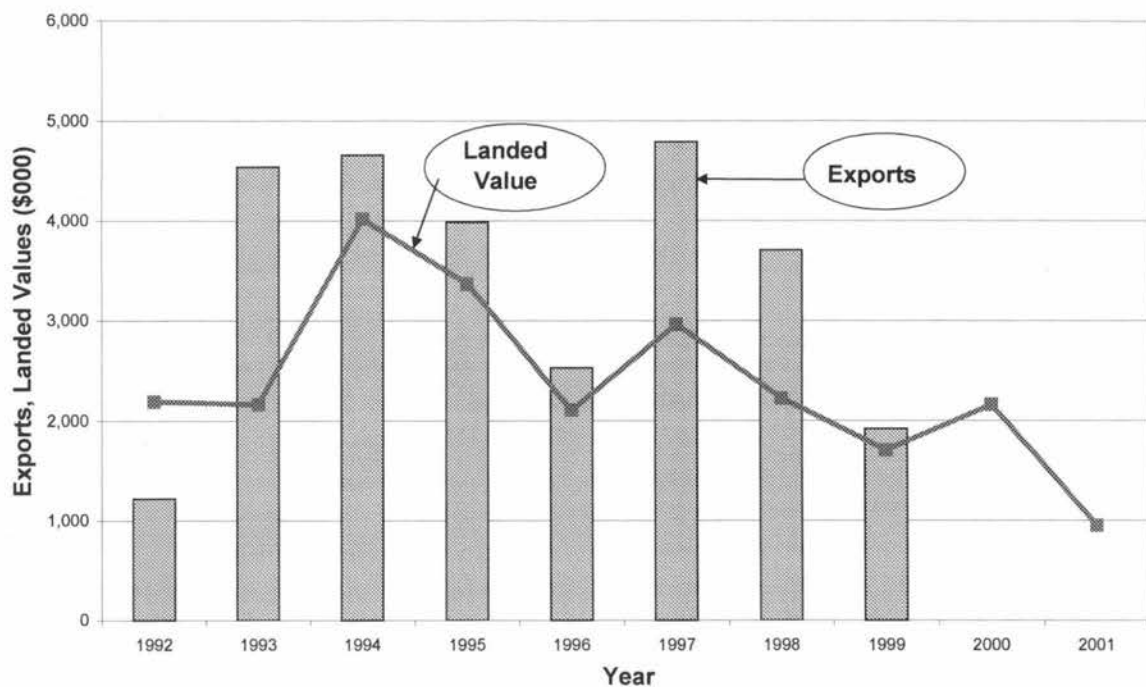
## Shark Markets

Precise data on shark exports are not available, as the export data published by Statistics Canada groups shark and dogfish together. Prior to 1999, the dogfish component of the total shark and dogfish landed values was small, so the Statistics Canada export data was used as an approximation to the shark exports for the 1992-1999 period.

Figure 4 shows the trend in export value plotted against the landed values of shark. Although the relationship between export and landed values is not perfect, the exports do follow the same general trend as the landed values, especially in the years 1994-1999.

**FIGURE 4**

**Atlantic Shark Exports and Landed Values, 1992-2001**

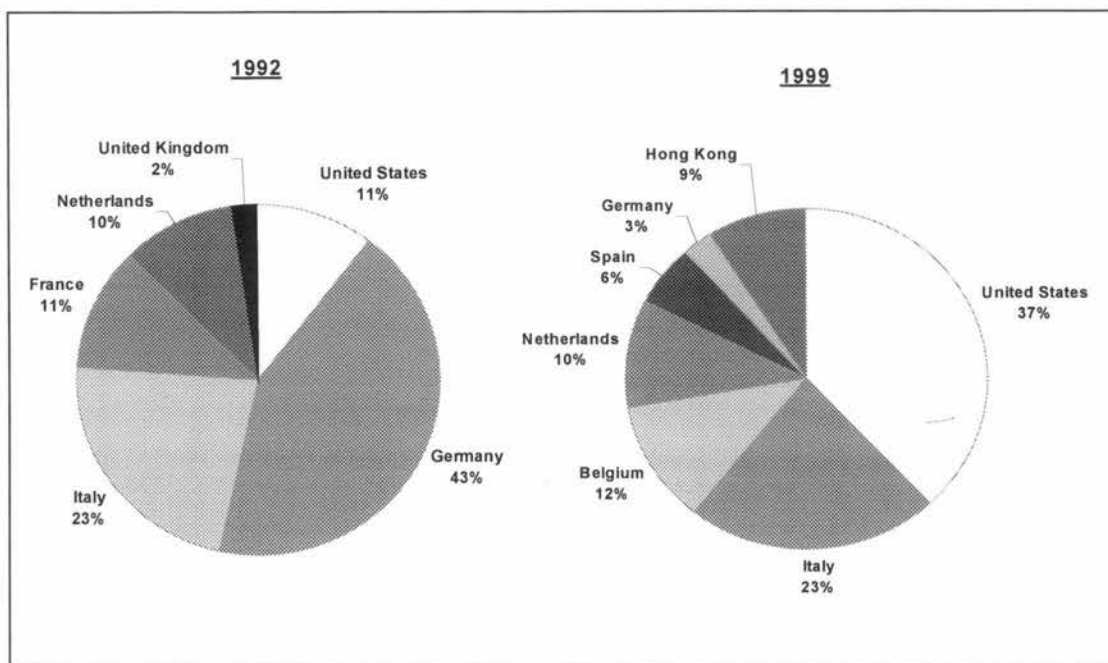


The markets for sharks are mainly in Europe and the US. The dogfish component in the Statistics Canada export data for 2001 was very high, so only the 1999 market data is presented here. The value of shark exports in 1999 was \$1.9 million. In 1999, the US was the biggest importer of sharks landed in Atlantic Canada, accounting for 37% of the total shark export value. Europe accounted for 54% and the remaining 9% was exported to Hong Kong. In Figure 4, the pie chart on the right shows the country distribution of the 1999 Atlantic shark exports.

There have also been changes in the markets for Atlantic shark since 1992. In 1992, the market was concentrated in Europe with five European countries accounting for 89% of the total export value; the other 11% was exported to the US. The country distribution of the 1992 Atlantic shark exports is shown on the left pie chart in Figure 5.

FIGURE 5

Atlantic Shark and Dogfish Exports by Country



3.5 Consultative Process

Scientific

The Maritimes Regional Advisory Process (RAP) provides the scientific basis for management of the fishery. This forum, which is convened by DFO Science, brings together scientists, managers and fishers to develop the outlook for the fishery resource. An intensive research program on porbeagle was initiated in 1998 and continued into 2001 with the support and funding of the Canadian shark fishing industry and the Nova Scotia Swordfishermen's Association (NSSA). The research was also conducted in collaboration with the Apex Predator Program of the National Marine Fisheries Service (NMFS), which contributed technical expertise to the project. RAP reviewed the status of porbeagle in 1999 and again in 2001. The next RAP review of the Canadian porbeagle shark fishery will be in 2007. The RAP also reviewed the catch and by-catch history of blue sharks in 2002. Both the Porbeagle Stock Status Report (SSR) and the Blue Shark Fisheries Status Report from those reviews are available on the RAP website at: [www.mar.dfo-mpo.gc.ca/science/rap/internet/ssr.htm](http://www.mar.dfo-mpo.gc.ca/science/rap/internet/ssr.htm)

Government-Industry

Consultations with shark industry representatives in an advisory forum known as the Atlantic Large Pelagics Advisory Committee (ALPAC) (see Annex I) provides for a review of and planning for the policy and procedural basis for management of the fishery. This forum is usually open to the interested public.

Because the majority of large pelagic sharks are fished on the Scotian Shelf by inshore Scotia-Fundy vessels, and further offshore by the offshore Scotia-Fundy freezer-equipped vessels, almost all of the sharks landed are landed in and by the Scotia-Fundy Sector (although some Scotia-Fundy swordfish and non-bluefin tuna vessels land their catches, which often include shark, in Newfoundland). This has created the need for a second tier government-industry consultative group to discuss this and other large pelagic fisheries, the Scotia-Fundy Large Pelagics Advisory Committee (SFLPAC). This committee provides the principal Regional forum for dialogue on the IFMP for Canadian Atlantic Shark. Fishery reviews and plans are tabled at both ALPAC and SFLPAC for discussion. The Maritimes Region has the lead role in preparing final recommendations and management plan development for this fishery. Other DFO Atlantic Regions input into this process in accordance with their involvement in the fishery. Final approval of the shark management plan occurs at either the Assistant Deputy Minister or Minister level, depending on the significance of any changes from the previous plan.

Minor amendments to the IFMP may be considered on an annual basis. Any major technical analyses required, which would relate to the assessment of the stock, are vetted through DFO's scientific peer review process known as RAP. Amendments would be presented to SFLPAC and ALPAC for consultation.

Because the stock area of each of these species extends beyond the Canadian zone, effective and sustainable management also requires international consultation and co-operation with other users of these stocks, especially the US and Japan in the case of blue and mako shark.

### **3.6 Management Styles**

The assessment of these resources prior to 1999 was limited to a review of landings and catch rates. There was insufficient information available at the time upon which to base any calculations of growth, mortality, abundance or yield. The first shark management plan, which was introduced in 1995, defined a non-restrictive catch guideline of 1,500t. In 1997, a Total Allowable Catch (TAC) of 1,000t was imposed under the 1997-99 Shark Management Plan. Landings exceeded the TAC in 1997 and reached it in 1998.

In 1999, a standardized catch rate analysis indicated that the relative abundance of porbeagle in 1998 was at about 50% of its 1991 level and that the fishing pressure should be further reduced, even below the 1999 TAC. Based on the more extensive scientific evidence subsequently available, the 2000-2001 porbeagle fishery remained exploratory, under a reduced TAC of 1,700t for two years, and other protective measures. The enhanced scientific research program, co-sponsored by all industry participants in the fishery including the swordfish and other tunas large pelagic fleet was also continued.

A total of 902t of porbeagle were landed in 2000, leaving a nominal quota of 798t for 2001. However, following the April 2001 RAP, an in-season reduction of the 2001 quota to 515t and a seasonal closure of August 31 were imposed. As well, effective 2002, the management plan was fully restructured to support a stock recovery program. This involved reduction of the annual directed porbeagle quota to 200t for the next 5-year period, development of regional allocations of quota, and non-renewal of porbeagle/blue shark licences inactive in 2000. No additional restrictions were imposed on the traditional shark by-catch fisheries since these landings have seldom reached 40t hence, coupled with the quota reduction, total landings are not likely to result in more than 250t per year.

No change has been applied to the previous plan's management measures for other sharks (mako and blue). The directed fishery for blue shark will remain limited to a precautionary allocation of 250t, and the fishery for all other shark species, including shortfin mako, will be on a by-catch basis.

### **3.7 Links with Other Planning Initiatives**

Linkages of this plan with other activities and initiatives pursuant to the *Oceans Act* are under development. Such linkages may include the creation of offshore ocean management and marine protected areas. The *Species at Risk Act* (SARA), enacted in June 2003, may also have linkages.

The conservation and management of sharks are also the subject of an International Plan of Action (IPOA) for sharks, adopted by the FAO in 1999. Under this initiative, Canada is developing a National Plan of Action (NPOA) for both its directed and by-catch shark fisheries. Canada's approach to developing the NPOA has focused on the development of domestic management plans for fisheries that direct for shark, with conservation measures to ensure that these fisheries are sustainable and wastage is minimized.

## **4. STOCK STATUS**

### **4.1 Biology, Environment, Habitat**

The **porbeagle** is common in the pelagic and littoral zones of eastern Canada between the Gulf of Maine and Newfoundland, as well as in the Gulf of St. Lawrence, and inhabits water down to a depth of 370 m (1,120 feet). It is most commonly found on the Continental Shelf or near the shelf edge, but sometimes comes inshore. It prefers cool waters and is usually found in temperatures between 5-10°C. It is the second most commonly observed large shark in Atlantic waters.

Adults can attain a size of over 3 m (10-12 feet), but usually average between 1.5-1.8 m in length and about 135 kg. They have an average life expectancy of 30 to 40 years. Unlike other sharks the porbeagle must swim at all times in order to breathe. The porbeagle undertakes extensive migrations in the North Atlantic from Massachusetts up along the Scotian Shelf to Newfoundland. It feeds upon a large range of pelagic and groundfishes, as well as squid.

The porbeagle is ovoviviparous, retaining the developing young within the brood chamber before giving birth to live young. Young are born in the late winter and spring. The females generally produce 4 pups that are around 60-75 cm long at birth. Female porbeagles reach sexual maturity at a size of about 217 cm (age of about 13 years), while the males are mature at about 174 cm (age 8).

The **blue** shark occurs between Newfoundland and the Gulf of St. Lawrence to the Gulf of Maine. It is a wide ranging pelagic species occurring near the surface where water depths are greater than 200 m. It prefers temperatures between 10-20°C. Blue sharks are commonly seen near the surface over deep waters off the coast of Nova Scotia and Newfoundland during the summer and fall. It is probably the most common large shark seen in Canadian waters.

The blue shark can grow to a length of 383 cm, but the average size is usually around 180-240 cm and 30-52 kg in weight. Maximum lifespan is unknown at this time, but they

are thought to live to at least 20 years of age. Seasonal migrations of blue sharks are typically associated with changes in water temperature. As waters warm, blue sharks migrate northward and inshore with large males preceding smaller males and females. Larger females are found further offshore. The blue shark has also been known to make some trans-Atlantic crossings. The diet of this shark includes many types of fish and squid, and sometimes includes seals and dead marine mammals. Fish caught on longlines during fishing are often attacked and consumed by blue sharks, which in turn often become ensnared in the fishing gear.

The blue shark is a viviparous species, nourishing the young in the uterus and giving birth to live pups. The newborn pups measure 40-51 cm in length and litters usually consist of between 25 to 50 individuals. Females reach sexual maturity at a size of 2.2-3.2 m, while for males it is achieved at lengths of 1.8-2.8 m, at about 6 years old. After copulation the females may retain and nourish the spermatozoa in the oviducal gland for months or even years while she awaits ovulation. Once the eggs have been fertilized there is a gestation period of between 9 and 12 months.

The **shortfin mako** is found on and off the Continental Shelf of Nova Scotia and in the Gulf of St. Lawrence, but is not particularly abundant in Canadian waters. This is a pelagic species that occurs from the surface down to depths of 500 m. It is seldom found in waters colder than 16°C. In some years, warm water conditions can bring them to within 10 miles from shore. The shortfin mako feeds mainly upon squid and bony fishes including mackerel, tuna, bonitos and swordfish, but may also eat other sharks, marine mammals and sea turtles.

The shortfin mako can grow to lengths of 3.9 m. There is still some uncertainty about its lifespan, but it is suspected to reach ages of at least 23 years. It is a highly migratory species with evidence of crossing the Atlantic to European waters.

Female shortfin mako usually becomes sexually mature at a length of about 2.8 m (7-8 years), while males mature at 2.1 m (4-5 years). Developing embryos feed on unfertilized eggs in the uterus during the gestation period of 15 to 18 months. The 4 to 25 surviving young are born live in the late winter and early spring at a length of about 70-77 cm. Females may rest for 18 months after giving birth before the next batch of eggs are fertilized.

#### **4.2 Species Interactions**

Porbeagle, blue and shortfin mako sharks are part of a large pelagic species complex that includes tuna, swordfish, billfish and other species of large sharks. By-catches of other species in the complex are likely in a directed fishery for any large pelagic species. Significant by-catches of shortfin mako and blue shark can occur in pelagic longline fisheries directing for swordfish and tunas, both in the Canadian zone and elsewhere in the Atlantic. The close association between the shortfin mako shark and swordfish would likely result in high by-catches of swordfish if attempts were made to direct for shortfin mako using pelagic longlines. Similarly, attempts to direct for blue shark using pelagic longlines would likely result in by-catches of swordfish and/or several species of tunas unless these were restricted by area and season.

Observer reports indicate that by-catches of swordfish and tuna in the directed pelagic longline fishery for porbeagle shark have been very low in the past. The by-catch of shortfin mako shark in this fishery has also been very low while the by-catch of blue shark has been larger.

### 4.3 Assessment

Detailed stock assessments for **porbeagle** were tabled in November 1999 and again in April 2001. The assessments were based on reported landings since 1961, set by set catch-effort information for both the foreign and domestic fleet, an extensive time series of length measurements collected by Science, observers and industry, reliable estimates of age and growth, and tagging studies carried out by Canadian, American and Norwegian scientists. Resource status was based on annual trends in length composition, trends in commercial catch rate, stock abundance based on Peterson analysis of tag recaptures, an age-structured population model, and annual trends in mortality. Recent fishing mortality was compared to  $F_{0.1}$  and replacement mortality yields in order to advise on sustainable catches for the future.

The stock assessment was peer-reviewed via DFO Science's RAP before being provided to managers. The standardized catch rate of mature porbeagle has declined to 10% of its 1992 level. Yield per recruit analysis produced an  $F_{0.1}$  reference fishing mortality of 0.08, but this level is unsustainable. Independent estimates of recent fishing mortality all suggest that fishing mortality is now about 0.20. Natural mortality was determined to be about 0.1. The current population of porbeagle shark is seriously depleted. It was recommended that fishing mortality be reduced to 0.04-0.05 to allow the population to recover, and that the aggregations of large, breeding female porbeagles off of southern Newfoundland and near the mouth of the Gulf of St. Lawrence be protected.

There are major gaps in our understanding of stock area and **blue** shark biology. Given the limited information available, it has not yet been possible to conduct a full assessment of this resource. Nevertheless, an analysis of catch and by-catch by foreign and domestic fisheries over the period from 1986-2000 was completed and peer-reviewed by RAP in the fall of 2002.

Although blue shark landings by Canadian vessels have been minimal, analysis of at-sea observer data indicated that most of the blue shark are caught in the large pelagic longline fishery, and that virtually all are discarded at sea. Blue shark by-catch accounted for 26-152% of the total large pelagic catch, and Canadian and Japanese longliners caught most of the catch. The by-catch rate for the Canadian and Faroese porbeagle fishery was low at 7%. Canadian fisheries accounted for more than 80% of the total estimated blue shark catch, with most of that coming from the swordfish fishery. Total estimated annual catch ranged between 243-4,048t since 1986, with an overall mean catch of 1,346t. Inconsistencies in the data suggest that the by-catch rate could be 50% higher than was reported, although survival of discarded sharks would reduce by-catch mortality. Observations from the 2000 and 2001 Canadian pelagic longline fishery noted that 88-93% of blue sharks captured were released alive. Of those, an additional 3-17% was noted as being injured at the time of release. It is not known what proportion of released shark survives the capture event.

There are uncertainties concerning the stock area of **shortfin mako**, and its biology is poorly understood. Given the limited information available to this point, it has not yet been possible to assess this resource.

#### 4.4 Research

The intensive research program on **porbeagle** shark, initiated in 1998 with the financial and in-kind support of the Canadian shark and swordfish longline fishing industries, resulted in a substantial increase in our understanding of porbeagle biology and population dynamics. On-board collection of detailed measurements and tissues were made by scientific staff, while members of the fishing industry measured more than 75% of all shark landed since 1998. This information provided a view of the resource that is seldom possible in other fisheries, and greatly assisted in the preparation of the stock assessment. This work is now largely completed. Research to determine pupping and overwintering grounds is proceeding, but is dependent on funds for archival satellite pop-up tags.

Research on **blue** shark is continuing through collection of biological information from shark landed at shark derbies. The emphasis is on biological data, particularly the size and age of sexual maturity, in preparation for a future stock assessment. A recently completed analysis of blue shark by-catch in large pelagic fisheries will play a central role in that stock assessment. Such an assessment has now been scheduled by both the International Council for the Exploration of the Sea (ICES) and the International Commission for the Conservation of Atlantic Tunas (ICCAT), and will encompass the entire North Atlantic stock. An additional research program is designed to estimate hooking mortality during recreational shark fishing, through use of acoustic transmitters.

Research on **mako** shark is currently restricted to the collection and processing of information from the current and historic fishery.

#### 4.5 Prospects for 2002-2007

A sustainable spawning stock of **porbeagle** will require an overall fishing mortality that is considerably less than  $F_{0.1}$ . Fishing mortality will need to be reduced to 0.04-0.05 to allow the population to recover. In light of the apparent size segregation by season and location, reduced mortality of mature females may be achieved by restricting access to areas and/or seasons where large females are present. Porbeagle stock status is presented in more detail in DFO Science SSR B3-09 (2001), available on the RAP website at: [www.mar.dfo-mpo.gc.ca/science/rap/internet/ssr.htm](http://www.mar.dfo-mpo.gc.ca/science/rap/internet/ssr.htm)

Relative to other species of shark, the **blue** shark is faster growing with higher fecundity, offering some potential as a sustainable fishery if properly managed. However, substantial by-catches of blue shark occur in other large pelagic longline fisheries, as well as in other fisheries using different gear types, including certain groundfish fisheries. The precautionary catch level of 250t (SSR 96/34E) originally suggested in the 1995 plan and carried over into subsequent shark management plans, will remain as a guideline for directed catches during this current plan. In addition, directed commercial effort, in terms of the number of authorized exploratory licences, will not increase above the 1997-1999 levels until the status of the resource can be more fully determined.

**Shortfin mako** on grounds fished by Canadian vessels is at the northern limit of its range, and is associated with the warm water of the Gulf Stream. Therefore, a detailed stock assessment may not be possible. Any directed fishery for mako would likely result in high by-catch levels of swordfish and bluefin tuna, due to their presence in the same waters. The precautionary catch level of 250t (SSR 96/32E), originally suggested in the 1995 plan and carried over into subsequent shark management plans, should continue to be used as a guideline for by-catch amounts during the period of this plan. No directed licences will be issued for mako shark during the period of this plan.



References:

- DFO 2001. Porbeagle shark in NAFO Sub-Areas 3-6. DFO Sci. SSR B3-09 (2001).
- Anon. 1997-1999 Canadian Atlantic Pelagic Shark Management Plan.
- SSRs referenced in the text.

## **5. CURRENT MANAGEMENT ISSUES**

### **Conservation**

Sharks are considered to be less resilient to fishing pressure than most other fishes, and globally, most shark populations are at low levels. Therefore, all three shark species of commercial importance in Atlantic Canada will continue to be managed with a very conservative approach, including continued research in collaboration with industry, into the stock status of porbeagle, the species of greatest commercial importance to the Atlantic Canadian shark fishery. Industry-funded JPAs in support of porbeagle research will not be pursued for the period of this management plan, due to the significant reduction in quota level. As well, performance requirements stipulated in the 2000-2001 and previous plans are dropped under the 2002-2007 plan.

### **Conflicts between Ocean Resource Users**

The offshore oil industry can pose a resource use conflict especially during seismic surveys offshore. Co-operation between the two sectors seems to hinge on improved (advance and on-site) communications between these two sectors. Recently, efforts have been made to make these improvements.

### **Habitat Disruptions**

There are no permanent or long-term habitat disruptions associated with the large pelagic shark fisheries. By-catch of unwanted or protected species by the gear, which temporarily attracts or blocks the swim paths of such species, does not appear to be an issue.

### **Orderly Conduct of the Fishery**

Within the limited quota available and with the establishment of regional allocations, CHPs are required from industry to ensure adherence to national and region-specific management measures.

### **By-Catch Fisheries**

In addition, according to the current policy on exploratory or developing fisheries, the impacts on related, traditional fisheries are to be considered prior to any changes being made in the status of a developing fishery.

This plan is intended to govern the domestic shark fishing activities of the four Atlantic regions. No change in status of this scientific monitoring, or fishery management measures, is expected during the period of this plan.

## **6. LONG-TERM OBJECTIVES FOR THE FISHERY**

The long-term vision of this plan is the establishment of a biologically and commercially sustainable resource supporting a self-reliant fishery. Conservation will not be compromised and a precautionary approach will guide decision-making.

The current porbeagle population is seriously depleted and a greatly reduced fishing mortality is required if the population is to recover. Due to the low productivity of the species, recovery is not expected to be rapid. However, the long-term goal is annual catch levels of about 1,000t, which will be sustainable over the long-term once the population is recovered. In order to achieve the recovery, a number of specific objectives have been identified in Section 11.1 of this plan.

Presently, the fishery is still at the exploratory (commercial and stock assessment) stage, in which the emphasis has been on determining whether or not the resource can sustain a commercially viable operation and collecting scientific data in order to build a preliminary database on stock assessment and distribution. In light of the recent advances made in the stock assessment and the fishing effort reduction to biologically and commercially sustainable levels, the Department can now consider full commercialization of the remaining licences, consistent with the guiding principles outlined in the New Emerging Fisheries Policy (NEFP) (2001).

## **7. SPECIFIC MANAGEMENT OBJECTIVES**

### **7.1 Conservation/Sustainability**

1. There will be no by-catch of tunas or swordfish allowed. Any such incidental catch shall be released immediately back to the fishing grounds, using methods that will minimize damage to the fish.
2. There will be no directed, commercial fishery for shortfin mako or shark species other than porbeagle and blue shark. Landings of mako and species other than porbeagle and blue shark can only occur as a by-catch and must be less than 50% of the total weight of directed shark species on board.
3. Subject to item 5, in other large pelagic fisheries, shark by-catch in traditional fisheries shall not be restricted for the duration of this plan.
4. Incidental catch of sharks in fisheries other than large pelagics will be limited to the lesser of 10% or 500 kg by weight on board the vessel per trip, providing the vessel has a condition of licence authorizing by-catch of shark.
5. In order to ensure that the total catch remains within the TAC during the period of this plan, the needs of traditional by-catch fisheries will be considered first when determining when and how to close the directed fisheries each year of the plan. Based on an Atlantic-wide review of all available shark by-catch data prior to the establishment of the first shark management plan in 1995, traditional fisheries were identified as the swordfish and other tunas longline fleet and groundfish fixed gear fleets for all shark species. A review of 1998-2002 Gulf Region data later determined that by-catch of blue and mako shark has also occurred in that Region's mackerel gillnet fishery.

## **7.2 Precautionary Approach**

Porbeagle sharks produce few offspring and mature at a late age compared to the age of first capture. Due to this combination of life history characteristics, which make porbeagle and other sharks more susceptible to over-exploitation, participation in these exploratory fisheries will require each licence holder not only to fish within the available science-based TAC, but also to continue to assist in the provision of an enhanced scientific research program on the stock. Up until 2001, this was accomplished through a JPA (Ref: the JPA with Scotia-Fundy based industry in Appendix IV of the 2000-2001 IFMP) to provide enhanced monitoring and research. Effective 2002, this will be accomplished through a mandatory 5% level of certified at-sea observer coverage (by number of fleet sea days) on all active vessels Atlantic-wide. In addition, captains will be required to provide DFO Science with length frequency data on catch through provision of "Pelagic Shark Receiving Tally" sheets (Annex III) with each trip.

The life history characteristics of the porbeagle shark also indicate that the diminishing population of mature females needs to be protected, and for this reason the 2002-2007 plan limits fishing in NAFO Divisions 4Vn3LNOP, in order to reduce fishing pressure on mature females. Specifically, directed fishing will be closed in the fall, between September 1 and December 31.

## **7.3 International Considerations and Obligations**

Canada is one of several fishing nations accessing these stocks, which are highly migratory. Therefore, sustainable management of these resources will depend not only on responsible and effective domestic management of these fisheries, but also on international consultations, co-operation, and fisheries monitoring and controls. Efforts under the United Nation's (UN) IPOA are underway to address this issue. In addition, ICCAT will be sponsoring blue shark and mako shark stock assessments in 2004 for the first time.

Canada is a signatory to the FAO IPOA for sharks, a voluntary initiative, under which nations are expected to assess whether conservation problems exist for shark targeted by their fishers or that are caught as by-catch in other fisheries. Canada is developing a NPOA, which includes research completed on shark species and management regimes to conserve shark stocks. Canada already has management plans in place for directed shark fisheries and by-catch protocols to protect shark species caught in other fisheries, including a total prohibition on shark finning first introduced in 1995. Emphasis has been placed on the collection of scientific data for stock assessment and on biologically sustainable harvesting strategies.

## **7.4 Domestic Considerations**

### **a) Aboriginal Fishery**

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

**b) Recreational Fishery**

There will be no limit on the number of recreational shark licences issued, as this fishery will remain a hook and release fishery, with the exception of derbies authorized by DFO. The recreational fishery is restricted to rod and reel gear only. Derby participants assist with the scientific analysis of the stocks, especially of blue shark which is their major catch, by landing shark whole, in accordance with a rotational schedule developed co-operatively by derby organizers in the Maritimes Region specifically to meet science needs. The schedule is an integral part of the recreational shark fishing CHP approved by DFO in 2002 (Annex IV). Both hook and release and derby participants are required by condition of licence to complete and submit scientific data logs to DFO (Annex V).

**c) Exploratory/Experimental Fishery**

The purpose of the exploratory classification of this fishery, since the inception of the first management plan in 1995, was to collect data to support scientific assessments from which to develop management measures for a sustainable fishery. This goal was accomplished with the 2001 porbeagle stock assessment and subsequent reduction in the number of licences to commercially viable levels under the reduced TAC. Industry is now requesting that the remaining porbeagle/blue shark exploratory licences be converted to limited entry commercial licences under the current plan. The status of the blue shark stock remains uncertain, hence the same assertions cannot be made for the few blue shark licences at this time.

**d) Processing of Caught and/or Landed Shark**

1. Porbeagle and shortfin mako sharks are closely related species and are similar in appearance. To assist in the correct identification of these species when dressed at sea, fishers landing fresh shark must do so with the pelvic fins and caudal peduncle (including the lateral ridge) intact and attached to the carcass. This does not apply to the offshore freezer vessels operating under the Quality Management Program (QMP).
2. Finning (the practice of removing only the fins from sharks and discarding the remainder of the shark while still at sea) is prohibited. Additionally, no shark carcass may be discarded at sea, with or without fins, once it has been taken on board.
3. Fins from the commercial fishery may be sold, traded or bartered (as a condition of licence) only in proper proportion to carcasses sold, traded or bartered with a maximum of 5% by weight of fins per dressed carcass weight. Fins may not be stored aboard the vessel after associated carcasses are sold, traded or bartered and must be weighed and monitored at the time of landing.

## 8. MANAGEMENT MEASURES FOR THE DURATION OF THE PLAN

The fishery will continue to be prosecuted on a competitive basis. Specific management measures, in addition to the closures previously described, are outlined below.

### 8.1 Fishing Seasons/Areas

The fishing season was set at January 1 to December 31 in the first shark IFMP in 1995. However, provisions to further refine the season if necessary were included in the 2000-2001 plan. New management measures, including the 4Vn3LNOP and Bluefin Exclusion Zone (BEZ) time and area closures implemented in 2002, led to a request by industry to change from a calendar year fishing season to enable improved fleet planning around these closures. Effective 2003, the fishing season is amended to April 1 to March 31. A three month fishing hiatus between January 1 and March 31, 2003, bridged the transition period.

Certain area closures are enforced by condition of licence. Others can be imposed by the Department by using the powers of the *Fisheries Act* when needed. To date, the strong level of voluntary compliance have precluded the need to invoke closures by variation order in the Maritimes Region. Variation orders are used in the Gulf Region to implement closures.

Examples of potential and mandatory closures are as follows:

- Potential closure of the area west of 65°30' from May 1 until August, to minimize the potential by-catch of other large pelagic species such as tunas – by licence condition.
- Potential closure of the "Hell Hole", if by-catches of bluefin tuna become a conservation problem. This area is delineated by straight lines joining the following points in the order listed below – by invocation of the *Fisheries Act*:

<u>Point</u>	<u>Latitude</u>	<u>Longitude</u>
1.	42°06.0'N	65°41.4'W
2.	42°06.0'N	65°27.5'W
3.	41°55.8'N	65°27.5'W
4.	41°55.8'N	65°41.4'W
5.	42°06.0'N	65°41.4'W

- Closure from August 1 to December 31 of the BEZ, to avoid bluefin by-catch. This area is enclosed by the coastline of Nova Scotia and straight lines joining the following points, in the order in which they are listed – by licence condition.

<u>Point</u>	<u>Latitude</u>	<u>Longitude</u>
1.	43°23'18"N	65°37'10"W (Cape Sable, NS)
2.	43°10'48"N	65°37'10"W
3.	44°42'N	62°00'W
4.	45°00'N	62°00'W (Liscomb Point, NS)

- Potential closure of fishing area 4Wd inside 10 miles to directed shark fishing during the bluefin tuna rod and reel fishery for the period from August 1 – November 1, if bluefin by-catch is identified as a conservation problem. Restrictions in 4Wd currently include a requirement that vessels carry an observer when fishing inside the portion of 4Wd bounded by the points below, between September 1 and October 31. When

sufficient observer data has been obtained for this period, this measure may be reviewed.

<u>Point</u>	<u>Latitude</u>	<u>Longitude</u>
1.	45°08'N	61°39'W
2.	45°00'N	61°30'W
3.	45°20'N	60°40'W
4.	45°34'N	60°41'W

- Closure of NAFO Divisions 4Vn and 3LNOP to all shark fishing from September 1 to December 31 – by licence condition.

## **8.2 Quota Allocations**

1. An annual science-based TAC of 200t is set for porbeagle shark for each of the years 2002-2007 for the directed fishery.
2. The porbeagle TAC is allocated on a regional basis, with 190t for the Maritimes Region and 10t for Gulf and Quebec Regions combined, and is fished on a competitive basis within these allocations. The 190t allocation for the Maritimes Region is intended to be shared by the inshore and offshore fleet sectors as per their CHP (Annex VII).
3. No roll-over of unused regional allocation will be permitted. However, each region will be responsible for its own allocation overruns.
4. No TAC or allocation is set for porbeagle by-catch landings, however, it is expected that combined directed and by-catch landings are not likely to exceed 250t, given that maximum historical by-catch levels have only ever reached the 30-40t range. Porbeagle by-catch levels should be closely monitored for the duration of this plan to detect and remedy, as required, any significant jumps in landings which may be indicative of directed effort. All by-catch of porbeagle must continue to be dockside monitored.
5. The directed fishery for blue shark continues to be limited to a precautionary allocation of 250t.
6. The fishery for all other shark species, including shortfin mako, will continue to be on a by-catch basis only, with all landings monitored at dockside.
7. There is no allocation for the recreational fishery; however, shark derbies may be approved if conducted in accordance with the recreational shark CHP approved by DFO in 2002 (Annex IV). Shark landed in authorized derby or fishing tournaments become the responsibility of the organisers to dispose of appropriately, once DFO Science has had sufficient opportunity to analyze the catches. Such shark carcasses may be sold with the proceeds to go to a recognized charity. No landed shark from recreational fishing is to be retained for personal consumption or financial gain during the period of this plan.

### **8.3 Control and Monitoring of Fishing Activities**

#### **Conservation Harvesting Plans**

Scientific monitoring will be ensured during the period of this plan via certified at-sea observer coverage of 5% of total sea days and through the mandatory provision of length frequency data on pelagic shark receiving tally sheets by all participants in the directed fishery. These measures are in addition to the standard log document mandatory for all vessels. Before being licensed each year, all individual licence holders or group of licence holders must submit a CHP to DFO outlining how the licence holder or group of licence holders plans to address the monitoring requirements of this current management plan.

The inshore and offshore fleet sectors of the Maritimes Region have developed a CHP (Annex VII) to serve as the basis for their sharing arrangement of the 190t regional allocation. Unless the parameters of the management plan change during the course of the next five years, this CHP is intended to serve as the Maritimes Region industry's annual plan to DFO.

#### **Dockside Monitoring**

All shark landings (100%) from both directed and by-catch fisheries will be monitored at dockside by an approved dockside observer at industry's cost. All fishing trips for shark must be hailed out and in, in accordance with the licence conditions, whether fish are caught or not on any particular trip. In addition, all fishers must complete a logbook report for each trip, whether they catch fish or not, and submit these within the required time to DFO, either directly or via the fisher's Dockside Monitoring Program (DMP) company if landings are involved, in accordance with their licence conditions. This is to also include completion and submission of the Pelagic Shark Receiving Tally provided with the licence conditions.

#### **At-Sea Observers**

Licence holders may be required by the Department to carry certified fishery observers, with all field costs to be borne by the licence holder when the Department deems it necessary for conservation or enforcement reasons. A minimum coverage of 5% of sea days per annum, calculated on a fleet-wide basis, will be required each year.

#### **Reporting documents**

For the commercial fishery, Atlantic swordfish/shark longline monitoring documents must be completed on a set-by-set basis by the vessel operator and be submitted to the dockside monitor at time of dockside monitoring, or as stipulated in the licence conditions.

For the recreational fishery, a Recreational Shark Fishing Log must be completed on a catch-by-catch basis by the licence holder and submitted to DFO within two weeks of the end of the trip or derby, or as stipulated in the licence conditions.

## Conversion Factors

The following conversion factors apply to determining the equivalent round weights of shark that has been dressed prior to being offloaded and weighed at dockside:

- |    |                                     |     |
|----|-------------------------------------|-----|
| 1. | Round (whole): fresh or frozen      | 1.0 |
| 2. | Dressed: head off, tail off, gutted | 1.5 |
| 3. | Dressed: head off, tail on, gutted  | 1.2 |

### 8.4 Other Relevant Elements

#### a) Licensing

1. As of January 1, 2003, all licences are still exploratory and must be renewed on an annual basis to be maintained. Receipt of authorization to participate in the shark fishery in any given year does not constitute guarantee of future authorization. Renewal is contingent upon having adhered to all conditions of licence when the licence holder last held the licence, and up until 2000, to having met the **performance requirements** of holding the licence (see 2000-2001 IFMP). Due to the in-season reduction in TAC in 2001, the early closure of the fishery on August 31, 2001, and the need for continued reduced landings in 2002 and beyond, the performance requirements were abolished in 2001. Annual renewal is also contingent upon the Department determining that there is sufficient quota available for all licences seeking renewal.
2. Dual licensing with bluefin or swordfish licences continues to be prohibited on shark trips.
3. The fishery will be managed via separate licences for the exploratory porbeagle/blue shark fishery, the exploratory blue shark fishery and the recreational shark fishery.
4. Licences must be carried on board the vessel at all times.
5. There will be no expansion of the total number of exploratory porbeagle/blue shark licences beyond the current number authorized, which was 25 on January 1, 2002. Previous inactive licences will not be reissued while the shark resource is at a low level. When the shark resource recovers, access will be re-evaluated for the Newfoundland Region where previously held licences were not issued.
6. There will be no expansion in the number of exploratory blue shark licences beyond the current number authorized, which was two on January 1, 2002.
7. Only one licence per fisher or company will be issued.
8. The Department may consider whether the current exploratory porbeagle/blue shark fishery can be converted to limited entry licences.
9. There will be no limit on the number of recreational licences issued, as this is a hook and release fishery.



## **b) Key Legislation**

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

## **c) Conservation Harvesting Techniques and Selective Fishing Requirements**

There are no minimum size requirements for retained shark nor particular marketing prohibitions related to size. There are no specific hook size or type requirements although only certain gear may be used for the directed fishery. Since size of the animal is not a marketing or licence condition issue, there is little incentive to highgrade at sea for reasons of fish size (discard fish of undesirable size).

Measures such as area and time closures, quota restrictions, the prohibition against finning, the requirement to hail in before landing and have all fish weighed out at dockside, all contribute to conservative harvesting and selectivity for species. Directed shark licences are also not permitted to fish for or retain non-shark species. In addition, a minimum of 5% of the total days at sea are subject to observer coverage by a DFO approved company to provide continued baseline information in the fishery.

## **d) Safety at Sea**

This plan endeavours to ensure that its implementation will not result in unsafe situations for fishers at sea. There are no known aspects of the plan that would make it inconsistent with relevant federal and provincial acts and regulations pertaining to health and safety at sea.

# **9. ENFORCEMENT MEASURES**

## **9.1 Overview**

The objectives of this plan are reflected in the conditions of licence for shark fishers and DFO will support these through enforcement action to ensure that the conditions of licence are respected.

## **9.2 Main Program Activities**

The Conservation and Protection Branch (C&P) of DFO enforces all regulations and conditions of licence that pertain to the shark fishery. It should be noted that since the taking of sharks as a by-catch is permitted in a number of fisheries such as groundfish, swordfish and tuna, some enforcement requirements for sharks will be addressed through at-sea and on-land surveillance of these fisheries. Otherwise, directed shark fisheries will be regulated as follows:

- prohibition on finning (practice of removing fins and discarding carcass);
- stipulation that to sell or trade fins, they must be landed in appropriate proportion to quantity of carcasses;
- seasonal and area closures as governed by the *AFR*, variation orders, and licence conditions;

- gear restrictions (i.e. longlines/rod and reel/hand line);
- by-catch restrictions including limits on quantities and prohibition on retention of non-shark species;
- requirement to land sharks with pelvic fins and caudal peduncle attached to facilitate sex determination and species identification of the dressed catch.;
- logbook requirements;
- quota (TAC) controls on porbeagle and blue shark;
- hail requirements for both departures and landings; and
- dockside monitoring requirement for all shark landings.

Surveillance aimed at ensuring compliance with the above may be conducted through:

- at-sea boardings;
- aerial surveillance;
- dockside checks;
- plant checks; and
- observer coverage, as needed.

The following penalty mechanisms may be applied to those found to be in contravention of their conditions of licence:

- warnings;
- prosecution;
- requests for court imposed licence suspensions and quota penalties; and
- loss of the privilege of renewal of the exploratory licence.

### **9.3 Fishery Patrol Vessels**

While most offshore patrol vessel surveillance targets fisheries such as groundfish, swordfish and tuna, which may include shark as a by-catch, there may be direct coverage in the shark fishery. Officers assigned to offshore patrol vessels may conduct boardings on a random basis and will be in a position to respond to serious problems if required.

Fishery officers will conduct surveillance of near shore shark fisheries and derbies using smaller program vessels.

### **9.4 Air Surveillance**

Routine aerial patrols are conducted several times a week in the areas covered by this plan. While this surveillance is intended to cover all fisheries activity in a patrol area, it will be the primary means of detecting violations of seasonal and area closures for sharks.

### **9.5 Enforcement Issues and Strategies**

Fishery officers in the Maritimes Region dedicated 169 hours to shark enforcement in 2001 and recorded 148 hours from January to November in 2002. Most of this effort was confined to DFO detachments, which include ports where significant quantities of sharks are landed. As noted above under patrol vessels, much of the shark enforcement effort is incremental to surveillance of other larger scale fisheries.

Recent enforcement problems have been mostly confined to the by-catch of sharks in other fisheries. In particular, there were six cases in 1998 and 1999 involving the retention of porbeagle shark on mobile gear groundfish vessels, contrary to conditions of licence. The warnings that were issued in those cases appear to have served their purpose as there have been no new cases of this type in recent years. In another more recent case, a porbeagle shark was included with a groundfish catch that was not verified by a dockside observer. Charges were laid in this case.

## **10. FINANCIAL RESPONSIBILITIES**

### ***10.1 Industry and/or Other Harvesters***

Under the 1998-1999 and 2000-2001 Shark Management Plans, the industry cost shared in the delivery of an enhanced scientific study of the resource, either through a JPA with the Department or by other means, such as funding of certified at-sea observers. It will not be feasible to pursue JPAs for enhanced scientific work under the significantly reduced TAC.

The industry participants also pay for all costs associated with the contracts for dockside observers for offloading and, in some regions, the cost of data entry of all data associated with hauls and landing weigh-outs. These costs are in addition to the licence fees that must be paid before a licence is issued. If at-sea observers are also required, all field and travel costs for the at-sea observers are the responsibility of the licence holder.

### ***10.2 Fisheries and Oceans***

DFO assumes the internal operating costs associated with the routine monitoring of the landings, managing and surveillance of the fishery, consulting with the industry in public fora and reporting on the fishery by various means.

## **11. PERFORMANCE REVIEW**

### ***11.1 Management Plan Evaluation Criteria***

In order to determine whether this IFMP meets its goals, the following management, science and enforcement performance indicators will be reviewed annually or at the end of this plan period, as appropriate.

- achieve a porbeagle fishing mortality of 0.04-0.05, which corresponds to the Maximum Sustainable Yield (MSY) and is required if the population is to recover;
- complete the next porbeagle RAP in 2007; completion of a blue shark and mako shark assessment by ICES and ICCAT;
- percent of trips, which collected accurate, detailed logbook information by region;
- percent of trips, which submitted Pelagic Shark Receiving Tally sheets by region;
- achieve annual total porbeagle shark landings (combined directed and by-catch, all regions) not exceeding 250t;
- the number of porbeagle/blue and blue shark licences issued does not increase throughout the 2002-2007 plan;
- annual total directed porbeagle landings by region remain within the prescribed allocations;
- annual total porbeagle by-catch from all regions remains within historic levels;

- annual review of total landing trends of shortfin mako and blue sharks by fleet;
- minimum observer coverage target of 5% (by number of sea days) achieved by each active region;
- number of enforcement hours annually;
- numbers and types of violations recorded, summarized annually; and
- vessel and gear inspections.

## 11.2 Annual (Post-Season) Review Results

### Quota and Fishing Pressure

The previous plan was successful in achieving a scientific basis for the management of the porbeagle fishery under partnership arrangements with industry. The resulting stock assessment was instrumental in identifying and implementing precise management measures needed for the recovery and conservation of the stock. The extent of the depletion of the porbeagle stock was not anticipated when the 2000-2001 plan was developed, and in-season adjustments in 2001 were necessary for an immediate reduction in fishing pressure on the stock. In addition to dropping the performance requirements in 2001, Table 4 captures the sum of reductions achieved as measured against the criteria identified in the 2000-2001 plan.

**TABLE 4**

**Evaluation of 2000-2001 Shark Plan Results**

<b>Evaluation Criteria</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
<b>Porbeagle/Blue</b> Number of directed licences authorized	58			53	25
Annual total landings - porbeagle	1,212t	1,008t	965t	902t	498t
Annual fleet-specific effort (hooks fished)	591,778	618,968	622,791	592,047	not yet compiled
Logbook data collection rate	High – ranged from 90-100% throughout the period				
% trips with observer or DFO technician	~65%	~25%	~50%	~35%	~5%
<b>Blue</b> Number of directed licences authorized	2			2	
Annual total landings - blue*	20t	15t	67t	35t	8t
Logbook data collection rate - Commercial	Activity level negligible – 1 commercial logbook received during period				
Logbook data collection rate - Recreational	n/a	n/a	n/a	6%	6%
% trips with observer or DFO technician	Activity level negligible – 0% coverage				
<b>Mako/Other</b> Number of directed licences authorized	n/a				
Annual total landings - shortfin mako*	106t	70t	69t	76t	68t
Annual total landings - shark unspecified *	43 t	37 t	14 t	13 t	19 t

\*Includes recreational landings.

# ANNEX I

## CONSULTATIVE GROUPS

### *ATLANTIC LARGE PELAGICS ADVISORY COMMITTEE*

#### **Terms of Reference**

##### **Purpose**

The purpose of the Atlantic Large Pelagics Advisory Committee (ALPAC) is to provide advice to the Department of Fisheries and Oceans Canada (DFO) on the management and development of the fisheries for tunas, swordfish, porbeagle shark and other large pelagic species of Atlantic Canada. It has replaced the Atlantic Bluefin Tuna Advisory Committee (ABTAC) and Atlantic Swordfish Advisory Committee (ASAC).

Regional committees, similarly structured, provide input to the Atlantic Committee. Membership for the Atlantic committee is drawn from those regional committees.

##### **Scope**

The Committee provides the opportunity for consultation between various parties with interest in or jurisdiction over the industry. Membership includes the federal government, provincial governments, fishers and processors.

Advice from the various regional advisory committees is consolidated by ALPAC.

The Committee provides input on annual management plans which may include, but is not restricted to advice on: quota allocations, regulatory amendments, enforcement efforts, licensing policies, seasons, size limits, gear restrictions, the administration of enterprise allocation programs, allocation of foreign quotas and developmental activities.

The Committee takes into consideration biological, marketing and other relevant information when formulating its advice.

##### **Sub-Committees**

Ad hoc sub-committees and/or working groups can be established to review and assess specific policy options and management measures.

##### **Meetings**

Meetings will be held at the call of the Chairperson and there will be no less than one meeting convened each year. Additional meetings may be necessary as determined by the Committee.

##### **Membership**

Membership of the Committee shall be made up of representatives from industry sectors having major involvement in the harvesting and processing/marketing of the resource, provincial governments, Aboriginal groups, International Commission for the Conservation of Atlantic Tunas (ICCAT) Commissioners and DFO. Current membership lists can be obtained from DFO.

# **SCOTIA-FUNDY LARGE PELAGICS ADVISORY COMMITTEE**

## **Terms of Reference**

### **Purpose**

The Scotia-Fundy Large Pelagics Advisory Committee (SFLPAC) provides input and advice to the Department of Fisheries and Oceans (DFO) on the conservation, protection and utilization of the Canadian east coast fisheries resources of tunas, swordfish and shark, and on the management of the fisheries for these large pelagics resources. This Committee will serve as the pre-eminent consultative forum for Scotia-Fundy based large pelagics fishing industry and government.

### **Scope**

The Committee will provide recommendations and advice on Maritimes (Scotia-Fundy) regional policy issues related to these fisheries. Consequently, the Committee can review recommendations made by sub-committees to determine what management measures could be included in regional fishing plans.

The Committee will provide advice on annual fishing plans, regulatory measures, fishing seasons, licensing policies, size limitations, by-catch provisions, gear restrictions and other aspects of the Integrated Fisheries Management Plans (IFMPs) that may arise.

The Committee gives consideration to biological, marketing and other information as it may affect the management of the large pelagics resource.

SFLPAC is supported by separate working groups for tunas, swordfish and shark.

### **Structure**

Any changes to the structure and administration of the Committee will be decided by the Committee membership, as determined by the most recently updated membership list available.

### **Sub-Committees**

*Ad hoc* committees/working groups can be established to review and assess specific policy options and management measures.

### **Meetings**

Meetings can be held throughout the Maritimes (Scotia-Fundy) Region. When feasible, meetings will be held at times and places convenient to the membership.

Meetings will be held at least once per calendar year. Additional meetings may be held if required.

### **Expenses**

Non-DFO members do not receive funding for expenses incurred when attending meetings.

### **Voting Procedures**

No formal voting procedures will be established. The Committee will seek to operate on a consensus basis. Where no consensus is possible, the majority opinion will be noted as well as outstanding objections.

## **Minutes of Meetings**

Minutes will be prepared and distributed by DFO in a timely manner. First draft review of minutes is the privilege of Committee members, prior to public release/review of minutes in draft form.

## **Public Access**

Unless a majority of Committee members say otherwise before a meeting starts, and have justification for doing so, the meetings and proceedings of SFLPAC are open to public and media scrutiny. However, no electronic recording devices are permitted without the express permission, on a case-by-case basis, of the members and of the Chairperson.

## **Attendance**

If a member cannot attend, an alternate may be nominated and the Chairperson notified as far in advance of the meeting date as possible.

## **Chairperson, Rapporteur and Membership**

### ***Chairperson and Rapporteur***

The Committee will be chaired by a DFO official. An industry co-chair may be appointed at the discretion of the Committee members. The Chair may appoint a meeting rapporteur from amongst the DFO members or other DFO attendees. Industry members may also assist with this task, if the selection has the support of all members.

### **Membership**

The composition of the Committee membership shall reflect the structure and nature of the Scotia-Fundy large pelagics fisheries. In addition to DFO staff, the membership may include representatives of the following Scotia-Fundy based groups where related to the large pelagics fisheries:

- licence holders' associations for all the relevant gear sectors,
- Aboriginal groups, in addition to representation they may receive via their commercial licence associations,
- processors or other industries related to the large pelagics fisheries, and
- provincial government fisheries departments/branches (Nova Scotia and New Brunswick).

With the exception of the offshore tuna licence, which is a unique licence, individual licence holders will not sit as members of this Committee.

Each group separately identified as a member in the Membership List below is permitted to have a maximum of two representatives on the Committee, with the exception of the unique offshore tuna licence, which is permitted one representative. Additional representatives from member groups may attend as observers if the meeting is public, or with the approval of the Chair if the meeting is not open to the public, as might happen on occasion. DFO staff will be represented as issues demand, with the minimum representation to include the following Maritimes (Scotia-Fundy) Region Branches: Resource Management, Conservation & Protection, and Science.

### **Definition**

For the purposes of this Committee, in order for a fishers' association to be a member, it must represent a minimum of 30 Scotia-Fundy based large pelagics licence holders who are not otherwise represented on this Committee for those same licences, or a clear majority of the large pelagics licence holders in a distinct group if fewer than 30 members in that group and they are otherwise unrepresented on this Committee.

**Scotia-Fundy Associations Representing Licence Holders**

**Contact**

Nova Scotia Swordfishermen's Association

Troy Atkinson  
George Rennehan

Swordfish Harpoon Association and  
Atlantic Shark Association

Patrick Gray  
Dale Richardson

Offshore Tuna Licence\*

Andy Henneberry

4Vn Management Board

2 Representatives to  
be rotated among:  
Wallace Cartwright  
Robert Courtney  
Lloyd MacInnis

Southwest Nova Bluefin Tuna Association

Sam Elsworth  
Chris Malone

St. Margaret's Bay Tuna Fishermen's Association

Robert Conrad

Eastern Nova Scotia Tuna Association\*\*

Mike Newell

Recreational Sector

Bob Gavel

One fleet rep. from each non-Scotia-Fundy large pelagic fishery as  
*ex-officio* participants on relevant issues

Gulf:  
Maurice Theriault  
Rory McClellan  
Moses Coady  
Nfld: Varies  
Quebec: Varies

**Notes:**

\* This licence is unique and represents itself via one seat on the Committee

\*\* This group represents a distinct sub-group of 10 4Wd licence holders within the Scotia-Fundy mobile gear bluefin tuna sector, which are not represented by the SW Nova Tuna Association. An additional 10 licences were transferred from Gulf Nova Scotia to 4Wd in 2001, the representation of which was not determined at the time of writing this plan.



**Scotia-Fundy Processors/Buyers**

Seafood Producers of Nova Scotia

Clearwater Fine Foods, Inc.

Sambro Fisheries Ltd.

Ivy Fisheries Ltd.

Nova Scotia Fish Packers Assoc.

Karlsen Shipping

**Aboriginal Groups**

Atlantic Policy Congress of First Nations

Netukulimkew'e'l Commission

New Brunswick Aboriginal People's Council

Union of New Brunswick Indians

**Provincial Governments**

Nova Scotia Department of Agriculture and Fisheries

New Brunswick Department of Fisheries and Aquaculture

**Department of Fisheries & Oceans**

Scotia-Fundy Resource Management  
Senior Advisor, Large Pelagics

Science  
Tunas & Swordfish  
Shark

Scotia-Fundy Conservation & Protection

Observer Program

Scotia-Fundy Area offices

Scotia-Fundy Economics

Ottawa Resource Management

DFO Large Pelagics officers from Gulf, Quebec and Newfoundland  
Regions as observers or *ex-officio* advisors for inter-regional  
issues, as required

**Contact**

Sandra Farwell

Christine Penney

Don Hart

Andy Henneberry

Denny Morrow

George Myra

**Contact**

John G. Paul

Tim Martin

Phil Fraser

Darrell Paul

**Contact**

Alan Chandler

Ron Cronk

**Contact**

Odette Murphy

Dr. John Neilson, Stacey Paul  
Dr. Steve Campana

B. Wood  
P. MacClung  
J. Jacklyn  
D. Brown

Hugh Parker

Area Managers or alternates

D. Liew

M. Calcutt

D. Tremblay  
A. Hebert  
B. Mayne

## ANNEX II

### DEPARTMENT OF FISHERIES AND OCEANS (DFO) ROLES AND RESPONSIBILITIES

#### Within DFO

##### Resource Management

- Coordinates the development of management options between DFO sectors
- Coordinates consultations with resource users and other stakeholders
- Coordinates the pre/post season processes
- Drafts the Integrated Fisheries Management Plan (IFMP)

##### Science

- Provides stock forecast (or Total Allowable Catch (TAC)) for upcoming season
- Indicates conservation concerns
- Advises on appropriateness of management options with respect to conservation
- Specifies data requirements
- Advises on research projects required for proper stock assessments

##### Oceans

- Responsible for informing Resource Management about initiatives under the *Oceans Act* (e.g. Marine Protected Areas), which might have implications for the plan

##### Conservation and Protection

- Identifies any potential enforcement problems to be addressed in plan
- Suggests specific enforcement measures
- Ensures that enforcement measures identified in the plan can be realized within existing resources
- Develops, carries out and evaluates enforcement plan

##### Finance

- Reviews IFMP and ensures that financial aspects of plan are in order

##### International

- With approval of other sectors, leads in international negotiations affecting fish stocks
- Provides input on international obligations/concerns

##### Policy

- Responsible for advising on economic and policy issues tied to the IFMP

##### Communications

- Should be brought into the process early to ensure that documents meet quality requirements for publication
- Assists in the posting of completed plans on Internet
- Assists in the announcement of approved plans

##### Aboriginal Affairs

- Ensures that fiduciary obligations are met
- Monitors impact of agreements on Aboriginal fisheries and Aboriginal Fisheries Strategy agreements
- Negotiates and approves agreements with Aboriginal groups

### **Senior Management**

- Approves plans as per guidelines

### **Outside DFO**

#### **External Advisory Bodies (e.g. Atlantic Large Pelagics Advisory Committee)**

- Provides independent advice as to conservation concerns and TAC

#### **Fishery Clients (through advisory committees)**

- Provides input as to the conservation objectives, how they might best be achieved, the enforceability of management measures and the socio-economic aspects and effects of proposed management measures
- Develops management proposals
- Identifies the activities that can be assumed under a co-management approach

#### **Provinces/Other Regulatory Agencies**

- Level of involvement will vary between fisheries
- Develops management plans jointly with DFO as per the terms of the specific agreement
- Approves plans as per terms of specific agreements

## DEPARTMENT OF FISHERIES AND OCEANS CONTACTS

### Ottawa

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### Maritimes Region

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### Newfoundland Region

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### Quebec Region

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### DFO Science

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Maritimes Region  
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# ANNEX III

## PELAGIC SHARK RECEIVING TALLY

Vessel VRN \_\_\_\_\_ Vessel Name \_\_\_\_\_  
 Licence No. \_\_\_\_\_ Trip No. \_\_\_\_\_  
 Confirmation No. \_\_\_\_\_  
 Gear Type (longline: 01; Harpoon: 18; Rod/Reel 90) \_\_\_\_\_ NAFO Division (4V, 4W, 4X, etc.) \_\_\_\_\_  
 Time (hhmm) \_\_\_\_\_ Date (ddmmyy) \_\_\_\_\_  
 Port Landed \_\_\_\_\_ Sample Code: TRIP (10) or SET (20) \_\_\_\_\_

Complete one line for each fish landed. If additional space is required, please use another sheet.

#	Species			Dressed Weight Pounds	Dressed Length cm	Sex	Dressed Condition
	Sword = 1	Big = 2 Yel = 3 Nob = 4 Mer = 8 Blufn = 10	Mako = 5 Porb = 6 Blue = 7 Thres = 9 Tiger = 11				
Species Name		Species Code					
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
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38							
39							
40							

\* See attached sheets for instructions on species measurement and sex determination.  
 Mail completed form to: Shark Program, Marine Fish Division, Bedford Institute of Oceanography, PO Box 1096, Dartmouth, NS B2Y 4A2

Comments \_\_\_\_\_ Dockside Monitoring Company \_\_\_\_\_  
 Dockside Observer's Signature \_\_\_\_\_

## ANNEX IV

# RECREATIONAL SHARK DERBY FISHING PLAN VALID EFFECTIVE 2002

### **Background**

This plan was first drafted to supplement the 2000-2001 Shark Integrated Fisheries Management Plan (IFMP) and is intended as an integral part of the 2002-2007 plan. The 2000-2001 IFMP touched briefly on the recreational fishery, but did not address scientific sampling requirements. The objective is to provide a long-term plan for meeting scientific sampling requirements from derbies on an annual and on-going basis.

Some five to seven shark derbies are authorized annually by the Department of Fisheries and Oceans (DFO). Recreational shark licences normally permit catch and release only. Authorized derbies are exempt from this rule on the provision that scientific data collection needs are met. This means conducting length, weight, sex and location of every shark caught at a minimum, and may also include detailed scientific sampling of shark landed to determine sexual maturity. To do this requires examination of the whole shark. To that end, DFO has required on occasion that shark be landed round to permit scientific sampling. Some derby organizers have reported that landing the shark round spoils the meat, hence eliminates market disposal opportunities. In 2000, a practice of "gut bagging" at sea was implemented on a trial basis. However, the practice yielded inconsistent results and the data was of limited value. To that end, DFO no longer authorizes the practice and in 2001, returned to the requirement that some derbies land their fish round.

### **Reporting Requirements**

Reporting requirements are stipulated in detail on the annual licence condition, which includes a data reporting log document.

### **Science Support**

DFO Science will be present to sample all shark landed for derbies, which are required to land their shark round. Science support will be available for derbies, which land shark dressed only as operational requirements permit.

### **Dockside Monitoring Requirements**

Dockside Monitoring Program (DMP) requirements will be waived for derbies, which are required to land round since scientific staff will be present for all shark weigh-outs. All other derbies are required by licence condition to have all shark landings monitored at dockside by one of the DMP companies approved by DFO. A list of DFO authorized DMP companies is available from DFO. It is the derby organizer's responsibility to make all necessary DMP arrangements.

### **Scientific Sampling Requirements**

In order to ensure that all derbies share equally in supporting annual scientific shark sampling requirements, effective 2002, DFO is implementing a mandatory annual rotational sampling requirement on authorized derbies as outlined in Table 5. To also ensure an adequate geographic distribution of sampling on an annual basis, the existing derbies have been split into zones. The requirement to land shark round will be rotated among the derbies within each zone on an annual basis. Each new derby will be assigned to a particular zone and notified of their zone and sampling schedule. In 2003, the schedule will be rotated, unless any new derbies are approved in addition to these six, in which case a revised schedule will be communicated to derby organizers.

**TABLE 5**

**DFO-Approved Scientific Sampling Schedule for Shark Derbies – 2003**

Zones	Derby	2003 Dates	Landing Round Required	Landing Dressed*
Southwest Nova Scotia	Yarmouth Shark Scramble	Aug. 16-17	X	
	Lockeport Sea Derby	Aug. 8-9-10		X
Lunenburg	Queen's Co. Sea Fest, Brooklyn	Aug. 22-23-24	X	
	Riverport Sea Festival	Aug. 1-2-3		X
Halifax/Dartmouth	Boondocks Shark-Arama	July 26 (Rain date July 27)		X
	Nova Scotia Shark Derby	to be determined	X	

\*These derbies may land round or dressed at their discretion.

**Marketing**

Commercial sale of recreationally caught fish is not normally authorized. However, DFO permits the sale of derby landings as a means of disposal of the carcasses upon conclusion of the event, provided all proceeds are donated to a registered charity.

DFO recognizes that the requirement to land shark round has posed a marketing problem for some derby organizers in the past, as the practice can result in spoiled meat. However, based on industry feedback, results are mixed and appear to be a function of the use of commercial vessels versus recreational vessels, as the latter do not have ice and fish stowing capacity. In the long run, continued waste disposal of the shark carcasses risks contributing to a poor image of this recreational sector. Hence, DFO encourages the recreational sector to work cooperatively to identify and develop suitable practices that can be conveyed to participants on how to handle the fish to reduce the incidence of spoilage, and to ultimately aim toward full marketability of all shark landed.





## ANNEX VI

### APPROVED MANAGEMENT MEASURES – 5-YEAR PLAN

Due to the limited number of licence holders in the directed shark fishery, in 2002 the management measures approved by the Department of Fisheries and Oceans (DFO) were communicated directly to participants at the regional level, rather than by news release. The plan approved by DFO on February 25, 2002, contained the following measures:

- A multi-year rebuilding plan for the period 2002-2006 under the following conditions:
  1. The directed fishery will be limited to a 200t Total Allowable Catch (TAC). Of the 200t TAC, 10t will be set aside for the Gulf fishery, which starts later in the year.<sup>1</sup>
  2. The participation clause included in past plans will be dropped given the current stock status and the fact that no stock assessment is planned until 2007. Fishers will be required to collect and submit length frequency data, in addition to maintaining accurate logbooks.
  3. A fall closure of 4Vn3LNOP to protect females, implementation of a Bluefin Exclusion Zone, as well as certain restrictions in 4Wd (for gear conflict reasons) during the bluefin season.
  4. Minimum observer coverage of 5%.
  5. The plan should also make reference to the fact that, upon stock recovery, access will be re-evaluated for regions where previously held licences have not been re-issued.

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<sup>1</sup> Note: It was understood that the Gulf allocation was also intended to cover the Quebec landings, which have been negligible historically (under 1t).

## ANNEX VII

### MARITIMES REGION 2002 SHARK INDUSTRY CONSERVATION HARVESTING PLAN

Prepared by: The Atlantic Shark Association (ASA), Karlsen Shipping, Clearwater Fine Foods Inc., and the Nova Scotia Swordfish Association, March 8, 2002.

#### **Fishing Plan 2002**

- 1) Industry agrees to abide by all terms and conditions still applicable from the 2000-2001 management plan, in addition to any new or superseding management measures recently approved by the Assistant Deputy Minister for the period 2002-2007. These include the following:
  - The directed shark fishery will be limited to a 200t Total Allowable Catch (TAC) of porbeagle shark, of which 190t will be allocated to the Maritimes Region;
  - The participation clause will be dropped, given the current stock status and the fact that no stock assessment is planned until 2007;
  - Fall closure of 4Vn3LNOP; Bluefin Exclusion Zone closure and 4Wd restrictions during the bluefin seasons (100% observer coverage inside approx. 10 miles in September and October);
  - Minimum observer coverage of 5% (noting that 20% may be possible under the ASA's Habitat Stewardship proposal for 2002); and
  - The 2002-2007 plan, when drafted, should make a reference to the fact that upon stock recovery, access will be re-evaluated for regions where previously held licences have not been re-issued.

The TAC for the blue shark fishery remains at 250t, and the porbeagle by-catch limit per trip has been reduced to 5% by weight from 25% in 2001.

#### **Participants and Licensing**

- 1) Participants will be limited to the licence holders who qualify for a shark licence in 2002. This includes two offshore licences, 12 inshore shark unspecified licences, and two inshore blue shark licences.
- 2) Taking into account the significant reduction in the 2002 TAC, the offshore industry has requested a review of their licence fees. This issue has been flagged to the Department of Fisheries and Oceans (DFO) Licence Fee Review Team as a priority for review when the Licence Fee Review takes place. Industry supports that all existing licences in 2002 be made permanent. The industry feels that there is adequate scientific information to allow this fishery to move from an exploratory phase to a commercial fishery.

#### **Scientific Data Collection**

- 1) Active license participants will continue to collect and supply DFO scientific data, i.e. length frequencies, on a mandatory basis, and to collect samples upon request.
- 2) The next full stock assessment will be scheduled for 2007.

## **Industry Quota Management**

Maritimes-based industry, recognizing that the offshore catch history has been in the 70% range since 1995, reached a compromise position that the offshore sector's share of the catch for 2002-2007 should be based on 60% of the Canadian porbeagle TAC. Based on the Maritimes Region allocation of 190t, this works out to 120t for the offshore sector or 63.2% of the regional allocation, leaving 70t for the inshore sector or 36.8%.

The offshore industry participants both agree to notify the DFO in writing, no later than March 31 annually, of their fishing plans. If they do not intend to fish, their share of the Maritimes regional allocation will automatically roll-over to the Maritimes Region inshore fleet sector (all members of the ASA). If they intend to fish, once their fishing is complete, any unused balance of their share may be rolled-over to the inshore sector at that time.

The ASA proposes to fish their allotment in two segments: one half of their 70t share (35t) before March 31, and the remaining 35t after March 31. If any roll-over from the offshore sector occurs, if before March 31, it would be divided half before and half after, otherwise all after March 31. This will be reviewed annually and DFO will be advised in writing of any desired changes.

Taking into account scientific advice, uncaught quota remaining at year-end would NOT be rolled-over to the next fishing year.