

Canada's Progress Report *on the* Implementation of
Key Actions Taken Pursuant *to the* National Plan of
Action *on the* Conservation and
Management of Sharks (March 2007)

July 2012

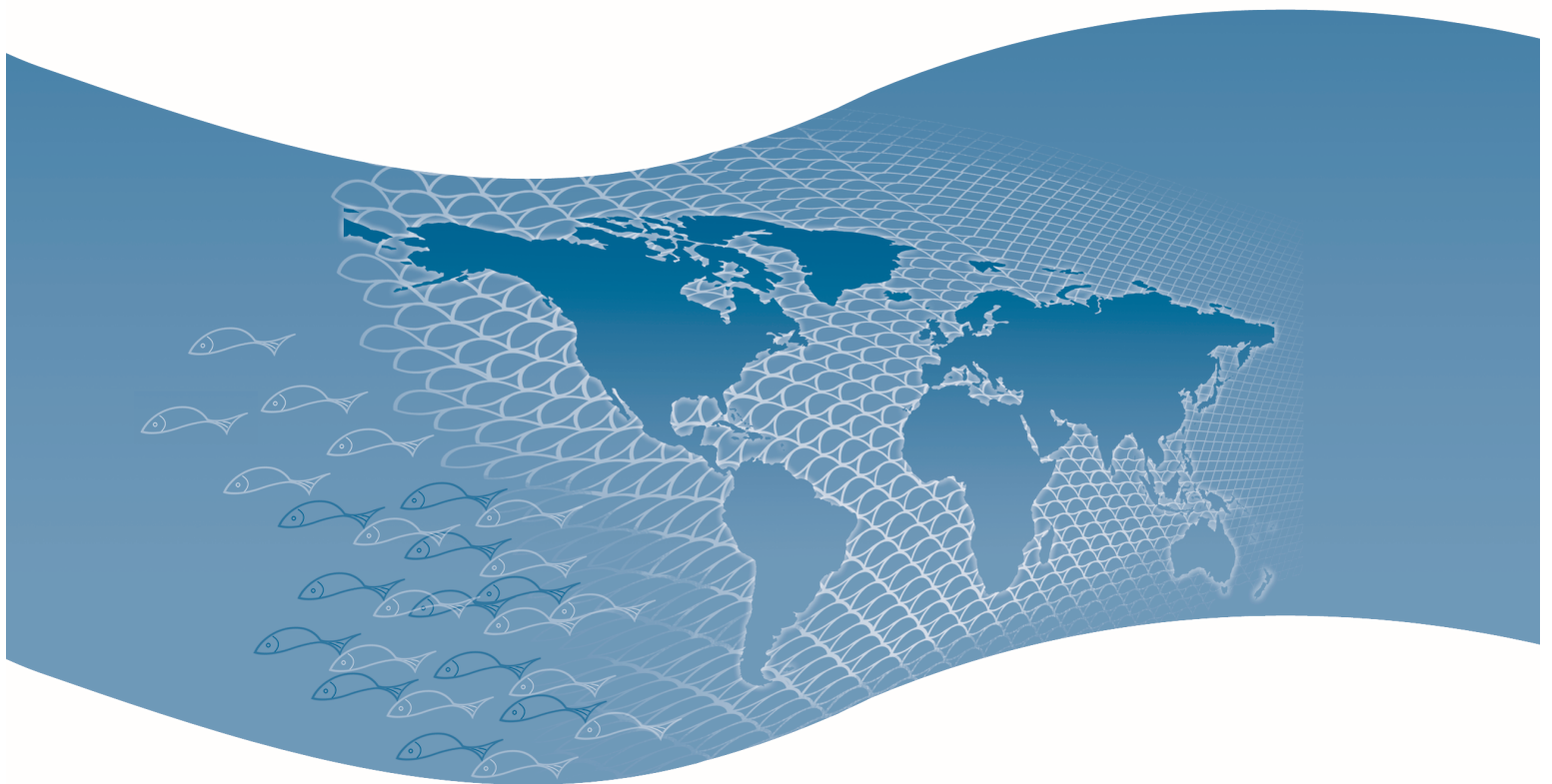


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ACRONYMS AND SHORT FORMS

ALPAC	Atlantic Large Pelagics Advisory Committee
Bycatch Guidelines	Food and Agriculture Organization's International Guidelines on Bycatch Management and Reduction of Discards
Canada's Bycatch Policy	Policy Framework on Managing Bycatch and Discards
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSAS	Canadian Science Advisory Secretariat
DFO	(Department of) Fisheries and Oceans Canada
FAO	United Nations Food and Agriculture Organization
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
IFMP	Canada's Integrated Fisheries Management Plan
IPOA – Sharks	International Plan of Action for Conservation and Management of Sharks
MPA	Marine Protected Area
NAFO	Northwest Atlantic Fisheries Organization
NPOA – Sharks	Canada's National Plan of Action for the Conservation and Management of Sharks
RFMO	Regional Fisheries Management Organization
SFF	Canada's Sustainable Fisheries Framework
WCPFC	Western and Central Pacific Fisheries Commission

LIST OF SPECIES – COMMON AND LATIN NAMES*

Basking Shark	<i>Cetorhinus maximus</i>
Blue Shark	<i>Prionace glauca</i>
Bluntnose Sixgill Shark	<i>Hexanchus griseus</i>
Brown Cat Shark	<i>Apistururs brunneus</i>
Pacific Spiny Dogfish	<i>Squalus suckleyi</i>
Porbeagle Shark	<i>Lamna nasus</i>
Shortfin Mako Shark	<i>Isurus oxyrinchus</i>
Skate Species	<i>Rajidea</i>
Smooth Skate	<i>Malacoraja senta</i>
Spiny Dogfish	<i>Squalus acanthias</i>
Thorny Skate	<i>Amblyraja radiata</i>
White Shark	<i>Carcharodon carcharias</i>
Winter Skate	<i>Leucoraja ocellata</i>

*NB: This is a sample list of species found in Canadian waters. For more comprehensive data on sharks and shark-like species found in Canadian waters, please refer to Canada's 2007 National Plan of Action for the Conservation and Management of Sharks.

1. INTRODUCTION

There have been growing international concerns about the sustainability of shark populations given an increase in commercial exploitation, population vulnerability to overfishing, slow population recovery rates and limited knowledge about sharks and related fishery practices. Prior to 1995, there were no specific restrictions on the fishing of sharks. Historically, these species were considered commercially undesirable and were readily discarded. In an effort to improve the conservation and management of sharks, the International Plan of Action for Conservation and Management of Sharks (IPOA - Sharks) was adopted by the Food and Agriculture Organization (FAO) in 1999. The IPOA - Sharks is a voluntary international instrument that was elaborated within the framework of the FAO's Code of Conduct for Responsible Fisheries.

The IPOA – Sharks calls upon States that conduct directed fisheries for sharks or that have regular catch of sharks in non-directed fisheries to adopt national plans of action for the conservation and management of shark stocks. Several States, including Canada, have responded by developing and implementing national plans of action.

Fisheries and Oceans Canada (DFO) recognizes the importance of implementing a precautionary approach to fisheries management and that sustainability of fisheries is an international as well as a national challenge. In March 2007, Canada presented its National Plan of Action for the Conservation and Management of Sharks (NPOA – Sharks) with the goal of improving the management and conservation of these species. It was developed in accordance with guidance from the IPOA – Sharks and the 2000 FAO Technical Guidelines on the Conservation and Management of Sharks, focusing on providing details of the state of shark stocks, populations and associated fisheries within Canada and of shark management and enforcement.

Canada supports regular reporting of implementation of FAO instruments as part of performance-based management. Regular reporting is a key tenet of prudent financial and resource planning for governments. As such, Canada presents this report on progress made, lessons learned and effective strategies implemented for the conservation and management of sharks. The report is structured similarly to Canada's NPOA – Sharks and should be read in conjunction with that document. This report first begins with an outline of the current state of management of sharks in Canada and then outlines management actions that have been completed, planned or are ongoing. The report concludes with an outlook of future initiatives.

2. CURRENT STATE OF MANAGEMENT OF SHARKS

Traditionally, fisheries management has focused on regulating fishing on the targeted species. However, in recent years there has been a shift, both internationally and domestically, towards implementing ecosystem-based approaches in fisheries management to ensure the sustainability of fish stocks and fisheries. In order to implement ecosystem-based approaches, managers and policy makers consider not only impacts on the targeted species, but also impacts on non-targeted species and habitat. Canada has been proactively engaged in the elaboration of ecosystem-based and precautionary approaches and their application to fisheries management.

At the domestic level, Canada undertakes ecosystem-based and precautionary approaches to fisheries management through:

- Fisheries Management Policies;
- Integrated Fisheries Management Plans; and
- Fisheries Monitoring Programs.

Ecosystem-based and precautionary approaches are key components for the conservation and management of sharks in Canada. Commercially directed shark fishing is minimal in Canada, with the exception of Dogfish harvesting on the west and east coasts of Canada and Porbeagle Shark harvesting in Atlantic Canada. There are some notable incidental catches of Blue shark (*Prionace glauca*), Greenland Shark (*Somniosus microcephalus*), Shortfin Mako Shark (*Isurus oxyrinchus*) and multiple skate species along with, to a lesser extent, Basking Shark (*Cetorhinus maximus*) and Porbeagle Shark (*Lamna nasus*) in other targeted fisheries, such as groundfish, tuna and swordfish longline fisheries, and also mackerel driftnet fisheries off Prince Edward Island. In fisheries where there is a significant bycatch of sharks, DFO is working with fleets to both get a better understanding of the impact on the resource of these bycatches and implement mitigation measures to reduce the mortalities associated with bycatch.

2.1 Sustainable Fisheries Framework

Canada's fisheries renewal initiative aims to achieve sustainable fisheries, economic prosperity and greater stability in fisheries management. Central to this initiative is the Sustainable Fisheries Framework (SFF), established in 2009 to consolidate existing and new fisheries management policies and tools. This Framework provides the foundation for ecosystem-based and precautionary approaches to fisheries management in Canada. Combined with reforms to socio-economic policies and initiatives, the SFF is a key instrument in developing environmentally sustainable fisheries that also support economic prosperity in the industry and fishing communities. It comprises two main elements: conservation and sustainable use policies, and planning and monitoring tools. The conservation and sustainable use policies include, among others, A *Fishery Decision-Making Framework Incorporating the Precautionary Approach* (Precautionary Approach Policy) and Canada's Policy Framework on Managing Bycatch and Discards (Canada's Bycatch Policy), currently under development.

The Precautionary Approach Policy requires that a harvest strategy consistent with the precautionary approach be incorporated into respective fisheries management plans. The policy focuses on the management of stocks that are the specific and intended targets of a fishery. Canada's new Bycatch Policy will focus on the impacts of Canadian fisheries on non-targeted species. The management of bycatch for non-targeted species has become a key topic of international interest.

In February 2011, the FAO adopted the *International Guidelines on Bycatch Management and Reduction of Discards* (Bycatch Guidelines). The Bycatch Guidelines indicate that States and regional fisheries management organizations (RFMOs) should establish and implement national and regional policies for the effective management of bycatch and reduction of discards, based on the application of ecosystem-based approaches to fisheries, and should give consideration to all significant sources of mortality of both targeted and non-targeted species. Canada actively participated in the FAO's efforts leading to the development and adoption of these Bycatch Guidelines and attaches great value to them as they have provided direction for Canada's new Bycatch Policy.

Canada's *Policy Framework on Managing Bycatch and Discards* (under development) aims to ensure that all Canadian fisheries, which include shark fisheries, are managed in a manner that supports sustainable harvesting of aquatic species. The two main objectives of the policy consist of minimizing the risk of fisheries causing serious or irreversible harm to bycatch and discard species and accounting for total mortalities, including retained bycatch and discards.

2.2 Integrated Fisheries Management Plans

Canada's Integrated Fisheries Management Plans (IFMPs) are developed by DFO, in consultation with regional and advisory stakeholder committees, to identify goals and measures relating to conservation, management and science for a particular fishery. IFMPs also outline licensing requirements and identify total allowable catch (TAC) limits for users and for the geographic areas in which licences are applicable while also providing information related to area closures. In Canada, different species of sharks fall under different IFMPs; for instance, some species, such as spiny dogfish and a variety of skates, are managed under groundfish IFMPs. IFMPs and subsequent TACs are reviewed and updated regularly, through consultations with regional and advisory stakeholder committees. Since the development of the NPOA – Sharks, several of the IFMPs for directed shark fisheries have been updated, including the recent update to the IFMP for Pacific Groundfish. An update to the IFMP for Atlantic Pelagic Sharks is currently being drafted. The IFMPs applicable to shark fisheries are available online through DFO's website¹.

As of the 2010 fishing season, the *Integrated Pacific Commercial Fishery Groundfish*, which was first introduced in the commercial groundfish fisheries in 2006, became a permanent program. A key element of the program is a comprehensive and consistent catch monitoring system for all fleets that is intended to account for total catch, which includes incidental catch of non-targeted species like Blue Shark and Brown Cat Shark (*Apistururs brunneus*). The program focuses on 100% at-sea monitoring and 100% dockside monitoring to ensure vessel accountability for all catch. Harvester logs are audited against the video footage recorded to verify the accuracy of catch reporting. Should logbooks accounting for non-directed catch not match the video footage during an audit of 10% of the logs, it is possible for the harvester to fail the audit and be subject to a 100% review of their reporting. The video footage audit program currently focuses on the bycatch of aquatic fish and other marine species such as sharks.

In Atlantic Canada, licence conditions for the commercial Porbeagle Shark fishery include a number of requirements that form part of the monitoring, control and surveillance program. In directed fisheries for sharks, and in fisheries where sharks make up a significant portion of incidental catches, at sea observers are deployed on a representative proportion of commercial trips. Additionally, hail-ins to observer or monitoring companies approved by DFO are also a requirement. Hail-ins must include, among other things, the accurate round weight of the retained sharks by species, the area or sub-area from which the fish was taken and the place where the fish will be offloaded.

Licence holders are also subject to 100% dockside monitoring of all landings. No catch may be offloaded before the stated time in the hail-in and the weight and species of the catch are verified by a dockside

1. <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/index-eng.htm>

observer. All shark carcasses must be landed with the caudal peduncle attached in order to facilitate species identification. The licence holder or operator is required to ensure that the observer is able to maintain visual continuity of the catch being removed from the vessel at the time of offloading.

DFO is also considering increasing observer coverage in the swordfish fishery in the Emerald Basin to collect data on the discard of young Porbeagle Shark as this fishery and area are thought to have a high incidence of young Porbeagle Shark discards.

3. CONSERVATION AND MANAGEMENT ACTIONS

3.1 Data Collection and Research

In Canada, science advice is a key consideration in the decision-making process for fisheries management. In the management and conservation of sharks, DFO considers a broad scope of knowledge and advice, both scientific and traditional, such as advice received from regional peer review processes like those completed by the Canadian Science Advisory Secretariat (CSAS), and those from other advisory bodies such as the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Both CSAS advisory reports and COSEWIC assessments have contributed extensively to Canada's efforts to conserve and manage sharks. Research efforts on sharks have also included collaborative knowledge sharing through consultations with harvesters, Aboriginal groups, conservation organizations, academics and others. As data are collected, Canada has been able to identify existing gaps and propose remedial steps to be implemented for the conservation and management of sharks.

Several regional advisory meetings have been held to review various shark fisheries, such as those held in both the Pacific and Northwest Atlantic regions for Spiny Dogfish (*Squalus acanthias*). Furthermore, there have been assessments under COSEWIC for species that are thought to be at risk in Canada, such as the assessment of the Porbeagle Shark completed in 2004. The Porbeagle Shark population was considered to be at risk due to its low population growth rate and high exploitation. Given the low productivity of this species, it was expected to take several decades to recover from its low abundance level. Subsequently, a recovery potential assessment for the Porbeagle Shark was completed. This assessment entailed analysis of the Porbeagle Shark stocks and their recovery potential using three variant age and sex-structured, forward projecting population models that used the landings, catch-per-unit-effort, the proportions-at-length in the catch and tagging data on the population. A similar recovery potential assessment was also completed for Winter Skate (*Leucoraja ocellata*) in the southern Gulf of St. Lawrence. This assessment involved the development of stage-structured population models to estimate mortality trends, assess threats and evaluate recovery potential. Other recovery potential assessments that have been completed include those for the populations of Shortfin Mako Sharks, the Atlantic population of White Shark (*Carcharodon carcharias*) and the Pacific population of Basking Shark. In Canada, the Pacific population of Basking Shark and the Atlantic population of White Shark are both listed as Endangered under the Species at Risk Act; making it illegal to kill, harass, capture or harm these species in any way. The Pacific population of the Bluntnose Sixgill Shark (*Hexanchus griseus*) is listed as a Species of Special Concern. A recovery strategy for the Pacific population of Basking Shark and a management plan for the Bluntnose Sixgill Shark are both available on the Species at Risk Public Registry.²

In addition to recovery potential assessments, stock assessments have been completed for various shark populations since the NPOA – Sharks was published. These stock assessments, such as the one completed in 2010 for Pacific Spiny Dogfish³ (*Squalus suckleyi*), include analysis on population dynamics, stock structure and stock status. These assessments provided the opportunity to collect data on the stock populations in order to identify gaps where shark conservation and management measures may be required. Other stock assessments for species being reviewed by COSEWIC, such as those for Smooth Skate (*Malacoraja senta*) and Thorny Skate (*Amblyraja radiata*) populations are being planned. Additionally, a joint stock assessment of the population of Pacific Spiny Dogfish in Canada and the United States and a suitable transboundary population model for assessing both geographic portions are being considered. The stock assessment would include measuring the extent of transboundary movement using satellite and acoustic tags.

2 http://www.sararegistry.gc.ca/default_e.cfm

3 The 2010 Canadian Science Advisory Secretariat stock assessment for Pacific Spiny Dogfish can be found at: http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_057_e.pdf

Canadian research and data collection efforts are ongoing with many projects being planned for future implementation. Canada is in the midst of completing a study of the skate complex off Newfoundland and Labrador in order to update knowledge of skate species (*Rajidae*) in Canadian waters and also to present data for some species that have not been examined in depth previously.

In the southern Gulf of the St. Lawrence and on the Scotian Shelf, population modeling has been conducted to describe changes in mortality over the past 40 years for juvenile and adult stages of Thorny, Smooth and Winter Skates. Research related to skate growth, reproduction, morphometrics and distribution of population is ongoing. A study of the migration patterns of Shortfin Mako Shark using satellite tags also began in 2011 where eight Shortfin Mako Sharks were tagged. Similarly, a study is underway off the Pacific coast where Basking Shark are tagged to learn more about their habitat range and distribution in the North Pacific Ocean. Canada is also conducting model simulations to help identify and define critical habitat for the Pacific population of Basking Shark.

In the southern Gulf of St. Lawrence, where adult abundance of Thorny, Smooth and Winter Skates has declined, work is ongoing to identify the impacts of fisheries and ecosystem change on the status of these species. An in-depth evaluation has been completed of bycatch mortality of the Winter Skate in the southern Gulf of St. Lawrence scallop fishery, based on the at-sea sampling data. The study concluded that most Winter Skate captured in the scallop fishery were released alive and in very good condition, suggesting that post-release survival is high. The study also concluded that bycatch mortality of both juvenile and adult Winter Skate in this fishery appears to be very small, relative to natural mortality of the Winter Skate species. Additional work in this area includes the development of improved methods to estimate skate bycatch in other fisheries using observer data, a study of discard mortality of skates and other fish and the development of methods to estimate fishery-scale rates of discard mortality. Work to examine the potential impacts of predation on these skate species is also ongoing.

With the recent interest in the incidental catch and discards of sharks and other non-targeted species, there has also been an increased need for scientific advice and guidance on the management of bycatch species. In March 2012, CSAS held a peer review process in Montreal, Quebec to discuss and determine the key components of a science-based framework to establish safe biological limits for bycatch species. The peer review⁴ aimed to identify a range of risk-based techniques available for determining sustainable mortality levels of Canadian bycatch species.

3.2 Adoption of Ecosystem-based and Precautionary Approaches as Key Elements of Fisheries Management Renewal

Canada is dedicated to fisheries management renewal and the adoption of ecosystem-based and precautionary approaches to fisheries management. As mentioned above, the suite of policies within Canada's SFF provides the foundation for the conservation and management of aquatic species and the management of bycatch. A new draft policy under this framework, the *Policy Framework on Managing Bycatch and Discards* (under development) will provide guidance on the management of bycatch and discards, including sharks. Other frameworks for implementing the precautionary approach in decision making are being developed and applied in major fisheries, guided by the *Fishery Decision-Making Framework Incorporating the Precautionary Approach*.

Fisheries management renewal is implemented by DFO's regional offices; regional IFMPs incorporate ecosystem-based and precautionary approaches where the impacts of fisheries on habitat and the incidental catch of non-targeted species are considered as well as the impacts of fisheries on targeted species.

4. The Canadian Science Advisory Secretariat advisory report for the peer review on Guidance Related to Bycatch and Discards in Canadian Commercial Fisheries will be posted on the Secretariat's website when available: <http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm>

3.3 Standardizing Reporting and the Management Plan Process

DFO has implemented a standardized framework for the preparation of IFMPs to ensure national consistency in the objectives and approaches to fisheries management. The framework also ensures the engagement of stakeholders in the development of the plans, defining of objectives and management plan enhancement. Minor amendments to IFMPs and management strategies are generally considered on an annual basis and addressed through the Advisory Committee process. Analyses required that relate to the assessment of the stock are vetted through DFO's scientific peer review process. The IFMP for Atlantic Pelagic Sharks, which includes the Atlantic Porbeagle Shark fishery, has been rewritten under this new standardized framework.

The Atlantic Large Pelagics Advisory Committee (ALPAC) has struck an Ecosystem Working Group made up of interested ALPAC members and environmental nongovernment organizations. The Ecosystem Working Group aims to provide advice and recommendations to ALPAC on the implementation of ecosystem-based and precautionary approaches to large pelagic fisheries.

In Atlantic Canada, DFO has initiated a comprehensive work plan to address the incidental catch of non-targeted species in Canadian large pelagic fisheries, with a focus on six key species of which three are shark species: Porbeagle Shark, Shortfin Mako Shark and Blue Shark. The work plan was vetted through the Ecosystem Working Group of ALPAC and consists of a number of projects with three main objectives: examining appropriate levels of observer coverage; managing discards for all targeted species; and controlling incidental mortality of non-targeted species.

3.4 Bycatch Reduction and Reporting of Discard Mortality

Canadian fisheries management renewal has focused on total accountability of catch and the reduction of bycatch through more comprehensive reporting regimes. Currently, Canada has implemented a variety of measures to manage bycatch effectively in domestic fisheries and to report mortality rates of discards in fisheries. Improvements in the identification and reporting of bycatch and associated mortality enable a better understanding of how and why bycatch occurs. As more knowledge becomes available, mitigation measures to reduce bycatch of sharks can be implemented to support shark conservation and management throughout Canadian fisheries.

The 2009 stock assessment for Porbeagle Shark, which was presented to the International Council for the Exploration of the Sea (ICES) and the International Commission for the Conservation of Atlantic Tunas (ICCAT) in June 2009, estimated shark discards for all Canadian gear sectors, areas and seasons. The assessment determined that the amount of shark discards for all fisheries and areas except for longline swordfish and tuna fisheries was limited to less than 5 metric tonnes annually. The combined annual discards for longline swordfish and tuna fisheries were determined to average approximately 27 metric tonnes. DFO plans to incorporate these discard estimates into existing Porbeagle Shark population models and use the models to calculate new sustainable catch quotas, which would then be included in future stock assessments. The determination of the discard allocation of Shortfin Mako Shark based on the Porbeagle Shark discard estimates will also be incorporated in the next stock assessment. Additional research is planned to quantify the post-release mortality of Porbeagle and Shortfin Mako Sharks, discarded alive, from swordfish and tuna longline fisheries.

DFO completed a review of large pelagic bycatch, including sharks, in 2011. The review enabled DFO officials to conduct a comparative evaluation of data, methods and results for reporting total estimated discards, both alive and dead, for Porbeagle, Shortfin Mako and Blue Sharks from all Canadian fisheries. Although the conclusion from the Shortfin Mako Shark assessment indicated that discards in Canadian fisheries were not appreciable, bycatch and discards were present for the other species. Similar research to quantify discard mortality of other shark species, such as Spiny Dogfish, is still required.

In the southern Gulf of St. Lawrence, one mitigation measure that has been implemented to reduce interactions between giant scallop fishing gears and juvenile American lobster habitats is the designation of buffer zones of varying depths (10 to 20 meters) in the near coastal zone. Preliminary evidence suggests that this measure also protects deposition areas of egg-cases and inshore nursery habitats of Winter Skate and other species, in addition to preserving the American lobster habitats.

DFO officials have worked with both commercial and recreational fleets through advisory committees to increase awareness of the risks facing sharks and shark-like species. Officials have also worked with the fishing industry to mitigate the incidence of shark bycatch and discards through conservation-based practices. These practices include area closures, such as shark pupping grounds, and practices that maximize the survival of incidentally-harvested sharks, like the use of de-hooking devices in pelagic longline fisheries. Industry stakeholders and environmental non-governmental organizations are continuing to work together on the implementation of measures to reduce the incidental harvest of sharks in other directed fisheries in Atlantic Canada. The Atlantic Pelagic Longline Fleet has implemented, to the extent possible, the live release of all sensitive species or other non-targeted species that are captured, including sharks.

3.5 Extending Conservation and Management Measures to the Arctic Coast

There is no directed fishery for sharks within Canada's Arctic fisheries waters; however, certain species of shark are taken as bycatch and usually discarded at sea. The overall fishery in the Arctic which includes commercial, recreational and food, although much smaller than that in the Pacific and Atlantic, is an important source of income and sustenance for Aboriginal and northern communities, often tied with traditional culture. Increased knowledge of the life history and abundance of Arctic shark species, such as Greenland sharks, and their abundance in the Arctic require further research. Satellite tagging of Arctic shark species has been completed with the publication of the results forthcoming following the data analysis currently underway. Canada is also considering developing future projects to evaluate how changing conditions in the Arctic (climate change, increased shipping, etc.) may affect shark species.

3.6 Enhancing Outreach and Education Efforts

Public awareness of the type of shark species within Canadian waters and their importance to sustainable ecosystems has grown in Canada in recent years. DFO has made significant efforts to educate the public along with fish and marine harvesters about shark species. Annual shark fishing derbies provide ongoing opportunities to collect data on sharks but also to inform and educate the public and recreational fish harvesters about shark species, their biology and identification criteria. The fishing industry has also received information concerning shark species and their conservation and management through regional advisory processes. These regional advisory processes provide peerreviewed reports on the status of shark species throughout the Atlantic, Pacific and Arctic coasts. Additionally, enhanced identification and reporting in fishery observer programs have increased efforts to classify and record rarer species of sharks and skates. As such, many harvesters and Canadians in general are becoming more informed and aware of the importance of taking action to conserve and manage sharks.

3.7 International Perspective

Within the international community, many steps have been taken to implement measures for the conservation and management of sharks. Canada actively participates in various RFMOs that manage species such as sharks and is supportive of conservation and management measures for these species. Canada is a member of several RFMOs that address shark conservation, including ICCAT, the Northwest Atlantic Fisheries Organization (NAFO), the Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC).

In recent years, ICCAT has developed a variety of recommendations and resolutions related to the conservation of sharks within ICCAT's Convention Area. Although the RFMO is to manage highly-migratory fish species, sharks are known to be caught as bycatch in many targeted fisheries such as swordfish and tuna. As a Contracting Party, Canada fully complies with and supports ICCAT's management measures for the conservation of sharks, whether they are targeted in a fishery or caught incidentally. Canada also continues to work with other States in other RFMOs, such as NAFO, to implement measures to enhance data collection on sharks, to encourage other States to develop national plans of action for sharks and to allow for better stock assessments to be completed within the regulatory area. For example, Article 12 of the NAFO Conservation and Enforcement Measures, "Conservation and Management of Sharks", requires Contracting Parties to report all catches of sharks, bans discards of any part of the shark retained on board aside from the head, guts or skin, and includes requirements for the release of live sharks. At its 2011 annual meeting, NAFO members also agreed to revise Article 25, "Monitoring of Catch", to specify that all shark species shall be reported at the species level. As a member of WCPFC and IATTC, Canada also complies with their respective shark conservation and management measures despite having no directed shark fishery or known interactions with sharks in their respective regulatory areas.

Canada, as party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), aims to ensure that international trade in specimens of wild animals and plants does not threaten the species' long-term survival. Canada takes seriously its legal obligation to prevent the import of products from shark species that are currently listed under Appendix II of the Convention: Great White, Whale and Basking Sharks. Furthermore, Canada continues to promote the implementation of a precautionary approach to fisheries management, ensuring there are no directed fisheries or retention of shark species that are listed under CITES. Canada has encouraged other States to collect and share data on shark stocks within their jurisdictions and to develop action plans to deal with shark conservation and management. For instance, in 2009, Canada sent a mission to meet with counterparts in Caribbean countries to share information on domestic large pelagic management and to assist them in developing means to collect data on these populations.

Shark finning, the practice of removing the fins and discarding the remainder of the carcass while at sea, was banned in Canada in June 1994. Canada's shark catches are subject to dockside-monitoring by an independent third party and total landings are weighed separately to ensure that fins do not exceed 5% of the overall landings (dressed weight). Canada supports strengthening management measures for directed shark fisheries and for shark bycatch within the respective geographic areas managed by regional fisheries management organizations.

4. STEPS FORWARD

DFO has planned many research initiatives to be undertaken in the future aimed at further increasing scientific knowledge of shark populations. These initiatives include using satellite tags to track the movements of various shark species. For instance, DFO has planned a study of migration patterns of Greenland Shark in the Arctic and off the Atlantic coast of Canada using archival satellite pop-up tags. DFO is also developing a new template for at-sea observers to classify injury status of sharks upon release to assess post release mortality. Another future initiative is the development of a more accurate growth curve for Great White Shark, using bomb radiocarbon for age validation. These initiatives intend to increase the scientific knowledge of shark populations to ultimately strengthen conservation and management measures.

Under Canada's *Oceans Act*, marine protected areas (MPAs) are an important conservation tool. They are established to protect and conserve special or unique marine features and habitats, areas of high productivity or biodiversity, endangered marine species, commercial or non-commercial fishery resources or any other marine resource or habitat necessary to fulfill DFO's mandate. Currently in Atlantic Canada, an area within the Laurentian Channel is undergoing an MPA establishment process. The goal of the Laurentian Channel MPA, if established, would be to conserve biodiversity through the protection of key species and habitats, ecosystem function and scientific research. Some of the key conservation priorities and research objectives under consideration for inclusion within this MPA would include Black Dogfish, Porbeagle Shark and Smooth Skate.

5. CONCLUSION

Canada remains dedicated and committed to an integrated ecosystem-based and precautionary approach to fisheries management and bycatch management through improved monitoring, reporting, scientific research and consultation. The conservation and management of sharks is and will remain an ongoing process, as new knowledge is developed, additional actions will be taken.

Since the NPOA – Sharks was published, more stringent conservation and management measures for sharks have been implemented in Canada. As a result, bycatch and discards of large pelagic sharks in Canadian Atlantic Fisheries have declined. Recent stock assessments also indicate that recovery of Atlantic pelagic shark populations has already begun, subsequent to management measures like reduced catch quotas. For instance, the stock assessment of Porbeagle Shark completed jointly by ICCAT and the International Council for the Exploration of the Sea estimated total biomass of Porbeagle Sharks in 2009 was 10,000t, up from an estimated 4,400t in 2001. Stock assessments of Pacific shark populations, such as Spiny Dogfish⁵, also concluded that there is no immediate conservation concern for stocks and that stock populations remain stable. Additionally, scientific knowledge of shark species and populations has improved in recent years with increased research efforts leading to enhancements in conservation and management practices.

Canada will continue to monitor progress in implementing its NPOA – Sharks and review management efforts taken in order to identify and report on effective strategies and best practices.

5. The 2011 Canadian Science Advisory Secretariat research document on Pacific Spiny Dogfish assessment and recommendations can be found at: http://www.dfo-mpo.gc.ca/Csas-sccs/publications/resdocsdcrech/2011/2011_034-eng.pdf