# North Atlantic Swordfish (*Xiphias gladius*) Canadian Pelagic Longline Fishery

# VOLUME 1: FINAL REPORT AND DETERMINATION

Contract Number: 09-01 Nova Scotia Swordfish
Version: Final Report and Determination

Certificate No.:

Date: 22 August 2011

Client: **Nova Scotia Swordfishermen's Association**

MSC reference standards:

MSC Principles and Criteria for Sustainable Fishing, Nov, 2004.
MSC Accreditation Manual Version 5, August 2005
MSC Fisheries Certification Methodology (FCM) Version 6, September 2006
MSC TAB Directives (All)
MSC Chain of Custody Certification Methodology (CoC CM) Version 6. November 2005
MSC Fisheries Assessment Methodology, Version 1, July 2008

Accredited Certification Body:

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| 1 Client Review Draft (v.1) | December 10, 2009 | First Draft |
| 2 Client Draft Report (v.2) | June 30, 2010 | Second Draft |
| 3 Peer Review Report | January 15, 2011 | Client comment edits |
| 4 Public Comment Draft Report | March 1, 2011 | Peer review edits |
| 5 Final Report and Determination | August 24, 2011 | Final Public Report |
| 6 | | Public Certification Report |

# EXECUTIVE SUMMARY

In 2009, the client group consisting of the Nova Scotia Swordfishermen's Association, the Swordfish Harpoon Association, and the SHQ Swordfish Harpoon Quota Society contracted TAVEL Certification to conduct a fisheries assessment under the Marine Stewardship Council Sustainable Fisheries Program on the North West Atlantic Swordfish (*Xiphias gladius*) Canadian Harpoon and Longline Fisheries. The assessment included two Units of Certification (UoC) differentiated by gear type: harpoon and longline. While the two units entered certification at the same time, as one assessment, the UoCs have not proceeded forward at the same rate, therefore, resulting in two certification reports.

This report is only applicable to swordfish harvested using longline gear by harvesters operating under a longline licence, and who are a member of the Nova Scotia Swordfishermen's Association.

The assessment was conducted by Moody Marine Ltd. (Mr. Steve Devitt and Ms. Amanda Park) and its' Assessment Team (Mr. Robert O'Boyle, Mr. Jean-Jacques Maguire, and Dr. Michael Sissenwine). The fishery was assessed using the MSC Principles and Criteria for Sustainable Fishing (Issue 2, November 2002), the MSC Fisheries Certification Methodology (FCM) (Version 6, September 2006) and MSC Fisheries Assessment Methodology and Guidance to Certification Bodies (Version 1, dated 21 July 2008). The assessment included information up to and including May 31, 2010 and the management at that time.

Several information sources informed scoring rationales including: the client submission, written submissions from stakeholders, available science and management documents, and information and testimony attained during the fishery site visit. Conducted in July 2009 in Nova Scotia, the fishery site visit enabled the assessment team to meet with DFO scientists and managers, individual harvesters; the clients; and representatives from environmental/conservation organizations. At that time the assessment team also had the opportunity to tour both a harpoon and longline vessel and to talk with crew members about fishing gear and practices.

Over the course of the assessment, functionally efficient relationships between all stakeholders with respect to the management of the longline swordfish fishery; clearly defined and rigorous stock assessment; clearly defined harvest control rules and tools; and the operation of the fishery under an ITQ management regime were identified as strengths within the fishery considered under this Unit of Certification. However, the Assessment Team also identified several weaknesses in the fishery including, the lack of an explicit limit reference point and the uncertainty surrounding the impact of the fishery on other ecosystem components. The main concern associated with the fishery is the detail of information available on incidental catch, and the limited knowledge associated with interactions with endangered, threatened and protected (ETP) species.

Following the review of the fishery and its' management, Moody Marine and its Assessment Team determined that the North Atlantic Swordfish (*Xiphias gladius*) Canadian Longline Fishery, conducted in the Atlantic Canadian EEZ and in international waters within the ICCAT Northern Swordfish Boundary Area (North of $5^0$N and west of $30^0$W), unit of certification is to be certified with conditions in accordance with the MSC Principles and Criteria for Sustainable Fishing.

The scores attained for the longline UoC, and the number of conditions issued in each Principle is as follows:

| | **Pelagic Longline Fishery** | |
|---|---|---|
| **MSC Principle** | **Fishery Performance** | **Number of Conditions Issued** |
| Principle 1 | 80.6 | 2 |
| Principle 2 | 82.0 | 6 |
| Principle 3 | 81.3 | 3 |

The assessment team determined that the fishery scored over 80 with respect to all Principles, and all performance indicators scored above 60. As such, it is recommended that the North Atlantic Canadian longline swordfish fishery is ***certified with conditions***.

This report provides the details of the certification process that was undertaken for the candidate fisheries, however, much of the information that is referred to in this document is either directly appended to the report or can be downloaded from the MSC website at the following address:

(http://www.msc.org/track-a-fishery/in-assessment/north-west-atlantic/north-west-atlantic-canada-longline-and-harpoon-swordfish/assessment-downloads)

TAVEL Certification was contracted to conduct a full assessment of the North Atlantic Swordfish Canadian Harpoon and Longline fishery in February 2009. In January 2010 TAVEL Certification merged with Moody Marine Ltd, an Intertek Moody International company. In recognition of this fact, the assessment report now bears the Moody International company name and has been reviewed by the Moody Marine Governing Board in accordance with the Marine Stewardship Council's Fisheries Certification Methodology.

# 1. INTRODUCTION

The Marine Stewardship Council (MSC) is a non-profit organization whose mandate is the long-term protection of the world's marine fisheries and the associated ecological components. Through a process of consultation with various stakeholders over a two-year period commencing in 1996, the MSC established its standard for well managed and sustainable fisheries called the "MSC Principles and Criteria for Sustainable Fishing" (MSC P&Cs).

The finalized MSC Fisheries Certification standard was issued in 1998, and has since been used as the basis by which fisheries are evaluated under the MSC program. The fisheries certification methodology (FCM) has since been updated periodically with the current version (FCMv6) issued in September 2006.

The objective of the MSC is to promote fisheries certified as sustainable directly in the marketplace through the use of the MSC Fish-tick eco-label on certified fish products. Ultimately, through educating fish product consumers about the plight of fishing stocks in the world and the MSC Program, it is hoped they will reward sustainable fisheries by choosing those fish products originating from certified sustainable fisheries.

Interested fisheries can submit their candidature to an accredited certification body for comparison against the MSC P&Cs. The comparison is a three part process inclusive of a pre-assessment (data gap analysis of the fishery), a full assessment (measurement of the fishery against the MSC P&Cs) and certification (5 year validity with annual surveillance requirements) for those fisheries that meet the standard. Successfully certified fisheries can claim their fishery is well managed and sustainable through the use of the MSC Fish-tick eco-label on product and marketing materials.

## 1.1 Unit of Certification

The MSC certification methodology defines a candidate fishery unit of certification (UOC) as follows "The fishery or fish stock (=biologically distinct unit) combined with the fishing method/gear and practice (=vessel(s) pursuing the fish of that stock) and management framework."

The candidate fishery has two units of certification, defined as:

**Unit of Certification 1**

| | |
|---|---|
| **Species:** | Atlantic Swordfish (*Xiphias gladius*) |
| **Geographic Area:** | Atlantic Canadian EEZ and international waters within the ICCAT Northern Swordfish Boundary Area (North of 5$^{o}$N and west of 30$^{o}$W) |
| **Method of Capture:** | Pelagic Longline |
| **Fleet:** | All swordfish and other tuna licenses holders who are active members of the Nova Scotia Swordfishermen's Association and |

harvest swordfish using pelagic longline gear. The fleet does not include the one offshore tuna license.

**Stock:** ICCAT evaluates and manages swordfish on three distinct units of management: North Atlantic, South Atlantic and Mediterranean. This certification assesses the North Atlantic swordfish stock. The North Atlantic stock moves into Canadian waters each summer after wintering from January through March in subtropical and tropical areas. This assessment considers the health of the North Atlantic stock and the effect of the harvest on that stock, across the range of migration.

**Management:** Due to the highly migratory nature of the species, North Atlantic swordfish are managed at both an international and national level. The International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for the assessment process and for managing the species at the international level. Nationally, Fisheries and Oceans Canada (DFO) is responsible for ensuring that relevant ICCAT regulatory recommendations are implemented within the Canadian Atlantic swordfish fishery. It is the responsibility of DFO, in consultation with members of the industry advisory committees, to control the fishery in order to remain within quota recommendations of ICCAT.

**Traceability within Fishery:** All landings from the pelagic longline fishery targeting swordfish are subject to 100% dockside monitoring.

**At-Sea Processing:** All swordfish within the fishery are headed and gutted at sea. Product is offloaded and shipped to markets in a headed and gutted form.

**Point of Landing:** Product must be landed at designated ports at which dockside monitors are available to monitor offloading.

**<u>Candidate Fishery 2 – Harpoon -Unit of Certification: (now Certified)</u>**

**Species:** Atlantic Swordfish (*Xiphias gladius*)

**Geographic Area:** NAFO Areas 3, 4, 5, and 6 and international waters within the ICCAT Northern Swordfish Boundary Area (North of 5$^{o}$N and west of 30$^{o}$W)

**Method of Capture:** Harpoon

**Fleet:** All permitted harpoon harvesters licensed to harvest swordfish, including harpoon only license holders represented by the Swordfish Harpoon Association, the SHQ Swordfish Harpoon Quota Society, as well as harvesters represented by the Nova Scotia Swordfish Association that harvest swordfish using harpoon gear in compliance with the combination of the harpoon only conditions of their license

**Stock:** ICCAT evaluates and manages swordfish on three distinct units of management: North Atlantic, South Atlantic and

Mediterranean. This certification assesses the North Atlantic swordfish stock. The North Atlantic stock migrates into Canadian waters each summer after wintering from January through March in subtropical and tropical areas. This assessment considers the health of the North Atlantic stock and the effect of the harvest on that stock, across the range of migration.

**Management:** Due to the highly migratory nature of the species, North Atlantic swordfish are managed nationally by DFO under the auspices of the International Convention for the Conservation of Atlantic Tunas. The International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for the assessment process and for managing the species at the international level. Nationally, Fisheries and Oceans Canada (DFO) is responsible for ensuring that relevant ICCAT regulatory recommendations are implemented within the Canadian Atlantic swordfish fishery. DFO, in consultation with members of the industry advisory committees, is responsible for controlling the fishery in order to remain within quota recommendations of ICCAT.

**Traceability within Fishery:** All landings from the harpoon swordfish sector are subject to 100% dockside monitoring.

**At-Sea Processing:** All swordfish within the fishery are headed and gutted at sea. Product is offloaded and shipped to markets in a headed and gutted form.

**Point of Landing:** Product must be landed at designated ports at which dockside monitors are available to monitor offloading.

**Certification Status:** The harpoon swordfish fishery was certified in accordance with the MSC Principles and Criteria on June 18, 2010. See http://www.msc.org/track-a-fishery/certified/north-west-atlantic/north-west-atlantic-canada-harpoon-swordfish.

### 1.1.1 Point of Entry in Chain of Custody and Eligibility

The specific scope of this full certification assessment is the North Atlantic Canadian swordfish (*Xiphais gladius*) pelagic longline and harpoon fishery conducted in the Atlantic Canadian EEZ and international waters within the ICCAT Northern Swordfish Boundary Area (North of 5$^{o}$N and west of 30$^{o}$W). Product from the fishery is landed in Nova Scotia and Newfoundland ports at which certified dockside monitors are present.

Integrity of the landings for MSC Chain of Custody requirements was only checked to the point of first landing for swordfish, landed by legally permitted, swordfish longline and harpoon fishing vessels with valid swordfish licenses where the landings can be monitored in accordance with monitoring requirements.

This assessment evaluated both the longline and harpoon fisheries in two separate units of certification, with the harpoon and longline UoCs being scored individually. The evaluation of

the two units of certification has progressed at different rates; as such separate reports were generated for each UoC.

**As required by MSC Policy Advisory 4, Moody Marine and the swordfish certification client has agreed that the eligibility date for this certification will be the date on which the fishery is certified.**

## 1.2 The Client

The client of certification assessment is the Nova Scotia Swordfishermen's Association (NSSA).

The Nova Scotia Swordfishermen's Association is comprised of the 77 swordfish and other tuna license holders in Nova Scotia, Newfoundland, and New Brunswick, as well as those individuals that are involved in support industries such as fish processors, bait and gear suppliers. The Nova Scotia Swordfishermen's Association provides a forum for the large pelagic longline industry to interact with Fisheries and Oceans Canada and other regulatory bodies, both domestically and internationally. Through the NSSA, large pelagic longline harvesters work to insure the viability of their fishery while addressing other important issues that may affect other interest groups and regulators.

## 1.3 Summary

The certification considered stock status and fishery management practices to the end of the 2009 fishing season and includes information updated until the end of November 2010.

The North Atlantic Canadian swordfish longline and harpoon commercial fisheries entered the pre-assessment process of the MSC in May and July 2008 respectively; pre-assessments were completed in September and October of the same year. The harpoon and longline sectors of the swordfish fishery underwent separate pre-assessment processes; it was not until the full certification assessment that the sector representatives decided to move forward as one client. There were no site visits conducted as part of the pre-assessment for either the longline or harpoon sector, rather the meetings to further understand the fishery, its management and relevant scientific work were conducted by teleconference calls. The full assessment of the candidate fishery commenced with contract signing in late February 2009. Once the assessment team was contracted, through electronic discussion, following the review of the default PISGs, the assessment team accepted the default assessment tree as appropriate for use in assessment in April 2009. The fishery site visit was conducted in July 2009, with meetings held in Dartmouth, Nova Scotia. The assessment was conducted using the MSC Principles and Criteria for Sustainable Fishing, Issue 2, November 2002. The MSC Fisheries Certification Methodology (FCM) Version 6, September 2006 was used for all steps of the assessment process. The default assessment tree and related guidance used in the certification of the candidate fishery can be found in the MSC Fisheries Assessment Methodology and Guidance to Certification Bodies, Version 1, 21 July 2008.

Within the swordfish fishery conducted in the North Atlantic Canadian Swordfish waters and on the adjacent high seas, international and national agencies have defined roles with respect to

roles, responsibilities and authority for fisheries management. At an international level fishing for tuna, both on the high seas and in zones of national jurisdiction, is governed by the International Convention on the Conservation of Atlantic Tuna of 1966. The International Commission for the Conservation of Atlantic Tuna (ICCAT) was established under the Convention and is tasked to co-ordinate scientific research and to make recommendations designed to maintain populations of tuna at levels which will permit maximum sustainable yield (MSY). To obtain this objective, the Commission has adopted minimum permissible size (weight) limits for tuna caught and retained, overall catch limits for various species, gear regulations and schemes for international and port inspection (Churchill and Lowe 1999).

At a national level, Fisheries and Oceans Canada (DFO) is the authoritative body responsible for implementing management measures in the Canadian swordfish fishery. As a member to ICCAT, Canada has representatives that attend ICCAT meetings, contribute to scientific research and participate in management discussions with respect to large pelagics harvested in Canada. DFO, in consultation with the industry advisory committees, controls the fishery to maintain harvest within the quota recommendations of ICCAT. Management measures implemented by DFO are reflective of those stated by ICCAT and are defined within the 2004-2006 Canadian Atlantic Swordfish and Other Tunas Integrated Management Plan. The Plan outlines how the fishery is managed based on defined boundaries and control measures such as quotas, by-catch limitations, season, time area closures and size restrictions. While the current plan has been rolled over since 2006, changes to management have been outlined and implemented in annual Conservation Harvest Plans for each gear sector.

The assessment team consisted of three expert assessors and one lead auditor to provide guidance on the certification methodology as required by the MSC FCM. The team members were, in order of MSC Principle, Mr. Robert O'Boyle, Mr. Jean Jacques Maguire and Dr. Michael Sissenwine. The Lead Auditor was Mr. Steven Devitt, B.Sc.. Ms. Amanda Park acted in the capacity of Auditor-in-training and provided project management support and report preparation throughout the process.

The assessment team considered the default performance indicators and scoring guideposts defined by the MSC in the 2008 Fisheries Assessment Methodology appropriate to evaluate the candidate fishery against. Following the prescribed process of public comment, and subsequent consideration of comments received, the assessment team confirmed its decision to use the default assessment tree. Stakeholders were contacted personally and/or through the electronic media, and were given the opportunity to make written and oral submissions.

After consideration of all objective evidence presented, the assessment team recommends that the fishery **should be certified with conditions.**

## 1.4 Strengths and Weaknesses of Client Operation

### Strengths

Within the candidate fishery, there are clearly defined relationships between all principle stakeholders. These include fishery scientists, resource managers, longline harvesters and

harvesters of the harpoon sector who target the same swordfish stock. These relationships appear to be functionally efficiently with respect to the successful management of the fishery under consideration.

The stock assessment process is clearly defined, rigorous and covers the geographic range of the stock under assessment. The stock assessment process incorporates data collected from fishery dependent sources across the stock's range. Stock assessments are reviewed through a formal peer review process which incorporates opportunities for both scientific and industry feedback from members of ICCAT. Allocations of the swordfish quota to Canada, and within Canada between the harpoon and longline sector are well defined.

Within the Canadian swordfish fishery, there is a clear system of harvest management with appropriate harvest control rules and tools implemented. Compliance with regulations is thought to be high, and there is a system in place to deal with issues of non-compliance. In addition to management measures taken by both ICCAT and DFO, the longline sector has taken several steps in implementing voluntary measures, outlined in their Code of Conduct, within the fishery to minimize interactions with incidental species during the harvest.

**Weaknesses**

With respect to the requirements of attaining MSC Certification for this UOC, one of the weaknesses in the candidate fishery is the lack of an explicit limit reference point. MSC certification requires at a minimum that generic limit reference points are in place and are based on justifiable and reasonable practices. Explicit limit reference points are not being used, and there does not appear to be an explicit harvest control rule to reduce fishing mortality rates as biomass declines towards the level at which recruitment would be impaired.

The primary weakness identified for the pelagic longline sector UOC with respect to MSC certification is the limited information available on incidental catch. Estimates in some years are based on low percentage coverage of at-sea monitoring, which is a source of concern regarding the accuracy of extrapolated numbers for total fishery catch. Additionally, with exception to retained species, there is no recording of bycatch (i.e. discards or released catch) by harvesters; therefore estimates of the total catch of bycatch species are based on extrapolation of observer data. The assessment team does recognize the requirement of harvesters to report catch and interaction with species listed under SARA regulation in the mandatory SARA logbook. This includes the recording of information on species, hooked or entangled, condition upon release, and whether the gear was removed or not.

The impact of removals of the target species from the North Atlantic ecosystem is not well understood. Impacts of the fishery on other ecosystem components remain a source of uncertainty and additional analysis is required.

## 1.5 Conditions and Recommendations

Conditions, condition intents and suggestions provided by the assessment team are in Section 10. There are eleven (11) conditions associated with the certification of the candidate fishery.

The client, with the support of DFO, has provided a client action plan which responds to the conditions and has been accepted by the assessment team.
Some conditions will require the cooperation of scientists and managers nationally and internationally. In the instance that the client requested assistance from these agencies to conduct specific condition tasks, Moody Marine has formally confirmed that those agencies are prepared to assist with those action undertakings.

## 2.0 BACKGROUND TO THE REPORT

### 2.1 Authors and Peer Reviews.

The assessment team consisted of three assessors and the lead auditor and project management support from Moody Marine (formerly TAVEL Certification):

**Mr. Robert O'Boyle** – Mr. O'Boyle received his B.Sc. and M.Sc. from McGill and Guelph Universities in 1972 and 1975 respectively. He joined Canada's Department of Fisheries and Oceans (DFO) at the Bedford Institute of Oceanography (BIO) in Dartmouth, Nova Scotia in 1977 as a stock assessment scientist and was with DFO for over 30 years, retiring in October 2007. During his first 10 years at DFO, he was heavily involved in the development of stock assessment approaches and personally conducted assessments of most of the Maritime region's fish resources (herring, capelin, cod, haddock, pollock, the flatfishes, and more recently, the large pelagic sharks). He started his career in science program management about this time, heading up the Scotian Shelf Ichthyoplankton Program, the Biomathematics and Computer Section, and the Population Dynamics Section. In 1987, he became a division manager with responsibility for the finfish research programs and assessment-related activities of over 70 scientific and support staff. He remained in this position until 1996, at which time he became responsible for the peer review of the science and advice on the Maritimes Region's finfish, invertebrate and marine mammal resources, on its habitat management, and on its ocean management practices and approaches. He became the Associate Director of Science in 2000, a position that he held until his retirement in 2007, and as such was heavily involved in DFO science program management at the regional and national level. He has been involved in a number of national and international reviews, ranging from science program design to resource assessment. Since 2000, his research interests have focused on the policies and implementation of an Ecosystem Approach to Management. He is currently an emeritus scientist with BIO, pursuing research projects related to resource and ocean management and assessment. He is also president of Beta Scientific Consulting Inc., a company which provides a wide range of consulting services related to oceans management, including stock assessment and related analyses, provision of in-depth reviews, meeting and workshop coordination / facilitation, and policy analyses.

**Mr. Jean-Jacques Maguire** – Jean-Jacques Maguire worked for the Canadian Department of Fisheries and Oceans (DFO) from 1977 to 1996. He has led stock assessment teams in DFO and participated in stock assessment review processes on both coasts of North America in both Canada and in the USA, in the International Council for the Exploration of the Sea (ICES) and in the International Commission for the Conservation of Atlantic Tunas (ICCAT) whose bluefin tuna working group he chaired. He chaired both the pelagic and the groundfish

subcommittees of the former Canadian Atlantic Fisheries Scientific Advisory Committees before chairing its Steering Committee. He was a member of the Advisory Committee on Fisheries Management (ACFM) of the International Council for the Exploration of the Sea during 1989-1999. As a consultant in fisheries science and fisheries management since 1996 he chaired the ACFM of ICES, he works regularly for the Food and Agriculture Organization of the UN, for national and international organizations as well as for fishermen organizations and environmental non-governmental organizations. He has been a member of the Canadian Fishery Resource Conservation Council since 2002.

**Dr. Michael Sissenwine** – Dr. Sissenwine is the Chair of the Advisory Committee of the International Council for Exploration of the Sea (ICES) (Copenhagen, Denmark) and also a Visiting Scholar of the Woods Hole Oceanographic Institution. In the past he has served as the Director of Scientific Programs and Chief Science Advisor for the U.S. National Marine Fisheries Service (2002-2005), where his organization's mission was to provide the scientific basis for conservation and management of marine living resources and their ecosystems. From 2002 until mid-2004, he led eleven NOAA programs which supported the Agency's stewardship mission. From 1996-2002, he served as Director of the Northeast Fisheries Science Center, comprised of five laboratories and approximately 300 staff. Previously, Dr. Sissenwine served almost six years as the Senior Scientist of the National Marine Fisheries Service, overseeing the Agency's scientific programs throughout the USA.

Dr. Sissenwine has over 30 years of experience as a research scientist, authoring over 100 scientific reports and publications on a wide range of topics including ecosystem dynamics, fisheries oceanography, resource assessments and fishery management theory and case studies. He is also the co-editor of three books. Dr. Sissenwine has convened several international scientific conferences, given testimony to the US Congress and the European Parliament, participated in radio talk shows and frequently been interviewed by the news media.

Dr. Sissenwine was the President of the International Council for Exploration of the Sea (ICES) from 2003-2006. In addition to his involvement with ICES, Dr. Sissenwine has participated in numerous national and international scientific organizations including the North Atlantic Fisheries Organization, the Pacific Science Association (PSA) and the US Global Ecosystem Dynamics program (GLOBEC). Dr. Sissenwine has been a member of the Fishery Resources Commission of the World Humanity Action Trust of the UK, and a member of the Advisory Committee on Fisheries Research for the United Nations Food and Agricultural Organization (FAO). He has participated in FAO "Expert Consultations" on Fisheries Management Techniques, the Precautionary Approach, Indicators of Sustainability, and Ecosystem Approaches to Fisheries. He served as the chair of the Interagency Working Group of the National Oceanographic Partnership Program and served as an advisor to the Pew Foundation Conservation Fellows Program. He was a member of a Presidential panel on ocean exploration. He serves on many other advisory and scientific review groups and he has advised on research and resource management problems worldwide. Throughout Dr. Sissenwine's career, he has provided scientific advice to policy makers and managers concerned with conservation and management of marine living resources, such as legislatively mandated Fishery Management Councils. He is currently a member of the Scientific and Statistical Committees of the New England and Caribbean Fishery Management Councils.

**Lead Auditor – Certification Process**

**Mr. Steven Devitt, B.Sc.** – Operations Manager and Lead Auditor for TAVEL Certification Inc since 2000. His principle responsibilities include management of the project, verification of proper MSC Fisheries Certification Methodology (FCM) procedural implementation during the full assessment, preparation of report and client contact. Mr. Devitt brings a broad environmental and fisheries background to the project, he is a trained ISO 14000 lead auditor. He also has a strong working knowledge of anthropogenic causes of disturbance to coastal zones.

**Ms. Amanda Park, M.M.M.** – Ms. Park completed a Masters of Marine Affairs at Dalhousie University in 2002. She has worked in a variety of fisheries research positions which include at-sea observer, policy analyst, habitat impact analyst and as an educator on Species at Risk in Newfoundland and Labrador. She provides project management, research and report preparation during pre-assessments and full assessments.

**Peer Reviewers**

As required by MSC Fisheries Certification Methodology, version 6, the client reviewed report must be peer reviewed by two individuals. The peer reviewers for this report are as follows:

**Dr. John Musick** – John A. (Jack) Musick, Ph.D. is the Marshall Acuff Professor Emeritus in Marine Science at the Virginia Institute of Marine Science (VIMS), College of William and Mary, where he has served on the faculty since 1967. He earned his B.A. in Biology from Rutgers University in 1962 and his M.A. and Ph.D. in Biology from Harvard University in 1964 and 1969, respectively. While at VIMS he has successfully mentored 37 masters and 49 Ph.D. students. Dr. Musick has been awarded the Thomas Ashley Graves Award for Sustained Excellence in Teaching from the College of William and Mary, the Outstanding Faculty Award from the State Council on Higher Education in Virginia, and the Excellence in Fisheries Education Award by the American Fisheries Society. In 2008 Dr. Musick was awarded The Lifetime Achievement Award in Science by the State of Virginia. He has published more than 150 scientific papers and co-authored or edited 16 books focused on the ecology and conservation of sharks, marine fisheries management, and sea turtle ecology. In 1985 he was elected a Fellow by the American Association for the Advancement of Science. He has received Distinguished Service Awards from both the American Fisheries Society and the American Elasmobranch Society (AES), for which he has served as president. In 2009 the AES recognized him as a Distinguished Fellow. Dr. Musick also has served as president of the Annual Sea Turtle Symposium (now the International Sea Turtle Society), and as a member of the World Conservation Union (IUCN) Marine Turtle Specialist Group. Dr. Musick served as co-chair of the IUCN Shark Specialist Group for nine years, and is currently the Vice Chair for Science. Since 1979, Dr Musick has served on numerous Stock Assessment, and Scientific and Statistics committees for the Atlantic States Marine Fisheries Commission, the Mid-Atlantic Fisheries Management Council, the National Marine Fisheries Service, and the Chesapeake Bay Stock Assessment Program. He has chaired the ASMFC Shark Management Technical Committee and ASMFC Summer Flounder Scientific and Statistics Committee. His consultancies have included analyses of sea turtle/ long-line interactions off the Grand Banks of Newfoundland for the Bluewater Fishermen's Association, a major trade organization

representing the US Atlantic swordfish and tuna long-line fishery. Many of Dr. Musick's research papers over the last decade have been devoted to problems focused on fisheries bycatch of long-lived marine animals such as sharks and sea turtles.

**Dr. Joseph Powers** – Dr. Powers currently serves as a professor of stock assessment in the School of the Coast and Environment, Louisiana State University. Previously he served as Senior Stock Assessment Scientist of the Southeast Fisheries Science Centre. He has had extensive experience in conducting population dynamics studies, scientific stock assessments, in communicating results to constituents and managers, and serving as a fisheries manager. He has been the lead US scientist conducting stock assessments for Atlantic tuna and billfish species for the International Commission for the conservation of Atlantic Tunas (ICCAT).

Additionally, Dr. Powers served as the Chairman of the Scientific Committee of ICCAT (1998-2002). His research interests continue to be the modeling of robust sustainable management procedures, integrating ecosystem factors into stock assessments, risk analysis in decision making and the role of scientific investigations in fisheries management policy.

## 2.2 Previous Assessments

This is the first full assessment of conformity of the North Atlantic Canadian Swordfish pelagic longline fishery to the MSC Principles and Criteria for Sustainable Fishing.

## 2.3 Field Inspections

While field visits to the fishery were not conducted over the course of the pre-assessment for either the harpoon or longline sector, site visits were conducted during the full assessment. In the absence of a site visit during the pre-assessment, meetings were conducted via teleconference. Interviews were conducted in the pre-assessments with the clients, Canadian federal government representatives (DFO), representatives from the Canadian delegation of ICCAT, and monitoring companies.

The first assessment team meeting was conducted in June 2009. A conference call was held to review the certification assessment process, current fishery context, and to discuss the fishery site visit.

The fishery assessment visit was conducted during the period of July 21-24, 2009 with meetings held in Dartmouth, Nova Scotia (Table 1). These meetings included discussions with members of the client group, stock assessment biologists, resource management staff, Canadian representatives participating at ICCAT, Fisheries and Oceans Canada (DFO) and representatives from several Environmental Non-Governmental Organizations (ENGO). Contained in the agenda in Table 1 is a list of individuals that attended sessions during the site visit. In addition to interested stakeholders, all meetings were attended by all members of the assessment team, and Amanda Park and Steve Devitt of Moody Marine. All meetings were observed by Wetjens Dimmlich, Fisheries Assessment Manager with the MSC.

## 2.4 Consultations

Two groups of stakeholders provided input during the consultation process. The first group included those who were specifically invited by the assessment team to obtain specific information about the fishery and its management. This group included the clients, industry representatives, DFO personnel, and Canadian representatives to ICCAT.

The second group included those parties whose information was not specifically requested by the assessment team but who choose to present information about the fishery, the stock health science, fishery impacts and the fishery management system. This group included all other parties who have a concern about some aspect of the fishery and its management. The main topics discussed were the stock assessment process, and how the 2009 assessment expected in the Fall of 2009 would be considered. Additionally, the importance of swordfish as apex predators in the ecosystem was discussed. With respect to the longline sector, the impact of longline harvest on species caught incidentally was a main concern of ENGO's. Concerns related to the catch composition, quantity of catch, post-release mortality and interactions with endangered and sensitive species (i.e. sea turtles). All issues and concerns raised by stakeholders were considered in the scoring of the appropriate Performance Indicators.

Moody Marine received written feedback and personal communications from ENGOs including: David Suzuki Foundation, Ecology Action Center, Caribbean Conservation Corporation, Greenpeace, Canadian Shark Conservation Society, World Wildlife Fund, Turtle Island Restoration Network, Oceania, Blue Ocean Institute, and Canadian Parks Areas and Wilderness Society.

**Table 1: Agenda for the North Atlantic Swordfish Longline and Harpoon Certification Assessment Visit, July 21-24, 2009**

| Date | Location | Activity |
|---|---|---|
| | | |
| 07/21/09 TAVEL Boardroom, Dartmouth, NS | TAVEL Office Dartmouth, NS | 09:00-10:00 Briefing Meeting<br>Meeting plans, organization (Closed to client and stakeholders) |
| 07/21/09 DFO – Queens Square, Dartmouth, NS | DFO - Queen's Square, Dartmouth | Assessment Interviews<br>10:30-12:00 DFO<br><br>12:00 - 13:00 Lunch<br><br>13:00 - 17:00 DFO<br><br>DFO Representatives: Chris Annand (Director, Special Projects, Fisheries and Aquaculture Management), Steven Campana (Research Scientist, Science Branch), Scott Coffen-Smout (Biologist, Oceans, Habitat and Species at Risk Branch), Kerri Graham (Senior Policy Advisor, Policy and Economics Branch), Laura Hussey (Staff Officer, Resource Management), Brian Lester (Resource Management Officer, Resource Management), John Neilson (Research Scientist, Science Branch), Bryan Wood (Staff Officer, Enforcement Programs Conservation and Protection). |
| 07/22/09 TAVEL Boardroom, Dartmouth, NS | TAVEL Office, Dartmouth, NS | Assessment Interviews<br>09:00 - 10:30 Client Interview - NS Swordfish Longline Association (Troy Atkinson and Lenwood Smith)<br><br>10:30 - 12:00 Client Interview - NS Harpoon Association (Dale Richardson and Larry Sears)<br><br>12:00 - 13:00 Lunch<br><br>13:00 - 16:30 Recap of interviews, review of written submission. Possible visit to harpoon vessel |
| 07/23/09 TAVEL Boardroom, Dartmouth, NS | TAVEL Office, Dartmouth, NS | Assessment Interviews<br>09:00 - 10:00 World Wildlife Fund – Canada (Tonya Wimmer, Robert Rangeley, Aureue Cosandey-Godin)<br><br>1:00 - 2:00 Ecology Action Center (Rob Johnson, Alex Curtis) and the David Suzuki Foundation (Scott Wallace, Bill Wareham), interested citizen (Romney McPhie)<br><br>2:00 - Recap and scoring discussions |
| 07/24/09 TAVEL Boardroom, Dartmouth, NS | TAVEL Office, Dartmouth, NS | Scoring – Assessment Team |

Owing to the amount of time that had passed between the initial site visit conducted for the fishery under consideration and the generation of the Peer Review report, Moody Marine, in agreement with the client, chose to implement an additional 30 day stakeholder consultation period prior to the publication of the Public Consultation Draft Report. The intent of the consultation period was to provide stakeholders with an opportunity to submit any relevant new information related to the fishery for consideration by the assessment team.

Written submissions were submitted by Oceana, Sea Turtle Conservancy, Turtle Island Restoration Network, and the Ecology Action Centre and David Suzuki Foundation. The submissions, as well as MML responses to the points raised can be found in Appendix 4 of this report.

During the Public Comment Draft Report (PCDR) review period from March 10 to April 11, 2011, written stakeholder comments pertaining to the PCDR were received from groups and individuals. In accordance with the MSC Fisheries Certification Methodology in force for this assessment, the Certification Body and assessment team:

- reviewed all submitted comments,
- considered the validity and veracity of the comments,
- made changes to the report and, in some instances, to scores, and;
- provided written responses to all relevant comments.

These responses can be found in Appendix 8 of the Final Certification Report.

# 3.0 FISHERY BACKGROUND INFORMATION

## 3.1 The Target Species

*Distribution*

Swordfish are highly migratory species and their distribution is influenced by environmental conditions, in particular water temperature. Therefore, their presence in Canadian waters is often seasonal and distribution is closely related to cycles in water temperature. While in Canadian waters, individuals feed heavily but there are no records of reproduction (DFO, 2004a).

While the swordfish is an oceanic species, it can sometimes be found in coastal waters, above the thermocline. Of all billfish, the swordfish is the species with the greatest tolerance to temperature, tolerating waters ranging from 5-27$^0$ C. However, swordfish are most often found in surface waters with temperatures greater than 13$^0$C (ICCAT, 2008a).

Swordfish are cosmopolitan, and can be found in the tropical and temperate waters of all the oceans between 45$^o$N and 44$^o$S. This broad distribution explains the large number of fisheries developed for this species. Over the range of the swordfish, variation in vertical distribution by size and sex is evident. Larger individuals are found in deeper colder waters and males are more prevalent in warmer waters than females.

*Life History*

Swordfish have been observed spawning in the Atlantic Ocean, in water less than 250 ft. (75 m) deep. Estimates vary considerably, but females may carry from 1 million to 29 million eggs in their gonads. Solitary males and females appear to pair up during the spawning season. Spawning occurs year-round in the Caribbean Sea, Gulf of Mexico, the Florida coast and other warm equatorial waters, while it occurs in the spring and summer in cooler regions. The most recognized spawning site is in the Mediterranean, off the coast of Italy. The height of this well-known spawning season is in July and August, when males are often observed chasing females. The pelagic eggs are buoyant, measuring 1.6-1.8mm in diameter. Embryonic development occurs during the 2 ½ days following fertilization. As the only member of its family, the swordfish has unique-looking larvae. The pelagic larvae are 4 mm long at hatching and live near the surface. At this stage, body is only lightly pigmented. The snout is relatively short and the body has many distinct, prickly scales. With growth, the body narrows. By the time the larvae reach half an inch long (12 mm), the bill is notably elongate, but both the upper and lower portions are equal in length. The dorsal fin runs the length of the body. As growth continues, the upper portion of the bill grows proportionately faster than the lower bill, eventually producing the characteristic prolonged upper bill. Specimens up to approximately 9 inches (23 cm) in length have a dorsal fin that extends the entire length of the body. With further growth, the fin develops a single large lobe, followed by a short portion that still reaches to the caudal peduncle. By approximately 20 inches (52 cm), the second dorsal fin has developed, and at approximately 60 inches (150 cm), only the large lobe remains of the first dorsal fin (Florida Museum of Natural History, date unknown).

Swordfish exhibit sexual dimorphism of growth; with males growing more slowly and reaching a lower asymptotic length than females. Growth is very rapid during the first year of the lifecycle and then slows considerably (ICCAT, 2007a). ICCAT recognizes these growth processes and has recommended pursuit of assessment approaches that more fully incorporate biological information and the associated uncertainties.

*Reproduction*

Swordfish spawn in warm tropical and subtropical waters throughout the year, and are found in colder temperate waters during the summer and fall months. Traditional spawning areas are the Gulf of Mexico, south of Sargasso Sea and east of the Antilles in the Straits of Florida, along the south east coast of the US, with new spawning areas recently identified between 10 and $15^0$N and longitudes 30-$40^0$W. Spawning may occur year round however peak activity is between December and July, in water temperatures ranging from 23-$26^0$ C (ICCAT, 2007a).

The size at sexual maturity of swordfish, varies with location, the SCRS has adopted the size at first maturity (L50%), of 179cm (5 years) for female swordfish in the North Atlantic stock. Males reach maturity one year earlier than females. Research in 2007 indicated that reproductive activity of females appears to be related to temperatures in the epipelagic layers, and is largely restricted to the warm tropical regions of the western Atlantic (ICCAT, 2008a)

Recruitment is strongly correlated with atmospheric indicators, especially Winter North Atlantic Oscillation Index (Winter NAO) and oceanographic indicators (NW Gulfstream

current). The NAO moves large water masses to the NE moving eggs and larvae to higher latitudes with colder deeply convected water in the Labrador Sea. Alternatively, negative NAO leads to eggs and larvae being held in areas with the most appropriate physical conditions for development and survival during the critical first stages of life for the larvae and pre-recruits (ICCAT, 2008a).

*Mortality*

Swordfish are known as apex predators, located at the top of the food chain with no real predators in the wild. Fishing pressure is the main source of mortality of adult swordfish. Younger swordfish may be preyed upon by sharks and larger predatory fishes (NOAA, date unknown).

*Behaviour*

Larvae swordfish feed on copepods, but at an early juvenile age their diet consists of almost entirely fish. Adults feed on a wide variety of prey including groundfish, invertebrates, pelagic and deep-water fish. Adults are believed to feed throughout the water column, and undertake diurnal migrations, rising to the surface mixed layer at night and descending to deeper waters during day to feed on fishes and squids (ICCAT, 2008a). Smaller prey is generally eaten whole, while larger prey is often observed with slash marks from the swordfish rostrum. It still remains unclear when and how often the bill is used during feeding (ICCAT, 2007a).

*Migration*

The following was extracted from ICCAT (2007a).

The results of the tagging programmes conducted in the North and South Atlantic indicate that the swordfish move significantly between the relatively hot subtropical waters and the temperate waters of the North and South Atlantic (Anon. 2006) (Figure 1). However, traditional tagging has not shown any movements across the Equator (Garcia-Cortés et al., 2003).

Furthermore, the results of these programmes have not shown the existence of extensive trans-Atlantic migration of this species (Brown, 1995; Garcia et al., 2003; Sperling et al., 2005) but these observations are limited by problems associated with use of conventional tags. Nonetheless, the analysis of the gonad-somatic index of female swordfish caught in the Atlantic area adjacent to the Straits of Gibraltar did show a genetic migration of this species during the second quarter of the year from the Atlantic to the Mediterranean, and a second trophic migration in the opposite direction (El Hannach, 1987; De la Serna et al., 1990).

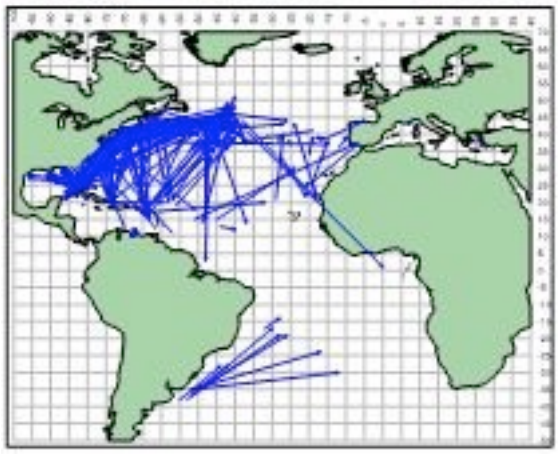

**Figure 1: Swordfish migration based on tagging data from ICCAT Secretariat. Source: ICCAT (2007a)**

*Stock Delineation*

ICCAT evaluates and manages swordfish on three distinct units of management: North Atlantic, South Atlantic and Mediterranean (ICCAT, 2007a). Recent biological and genetic studies and tagging programs clearly support this hypothesis.

Significant differences in size of initial sexual maturity, and growth parameters between the Atlantic and Mediterranean stock provides evidence of distinct stocks. In addition, three distinct spawning areas have been defined; one in the Mediterranean, and two in tropical waters of the northwest and south Atlantic. Recent genetic work indicates there is significant difference in the genetic structure of swordfish between the populations of the four regions: North Atlantic, South Atlantic, Mediterranean and Indian Ocean, with a Mediterranean population significantly distinguished from the others (ICCAT, 2007a).

The designation of two distinct Atlantic stocks is supported by tagging research that has shown a lack of migration of individuals across the Equator.

There are several studies that suggest there is some exchange between the different stocks, the importance of the exchange varies in spatio-temporal terms. ICCAT currently considers an area of mixing of the North and South Atlantic Stock around latitude $5^0$N, others believe the mixing of the two stocks occurs further north, between 10 and $20^0$N. In addition there is evidence to support the fact that exchanges between the Mediterranean and Northeast Atlantic. Some consider the area of mixing of these two stocks to be around $10^0$W (ICCAT, 2007a).

While the existence of separate North and South Atlantic stocks is well supported by the above data sources, the boundary between the stocks is less well delineated. Currently, the boundary is defined by the 5 degree North line which coincides with ICCAT reporting areas and with a generally lack of catches near that line, recognizing that mixing occurs across this boundary.

## 3.2 Candidate Fishery

The scope of this full certification assessment is the North Atlantic Canadian swordfish pelagic longline fishery conducted in the Atlantic Canadian EEZ and the international waters within the ICCAT Northern Swordfish Boundary Area (North of 5$^{o}$N and west of 30$^{o}$W) and supplying their product to shore side processors and brokers in Nova Scotia.

The certification clients eligible to use this certification are:

**NOVA SCOTIA SWORDFISHERMEN'S ASSOCIATION**
**Address:** RR# 3
**City:** Shelburne, Nova Scotia
**Postal Code:** B0T 1W0
**Country :** Canada
**Contact:** Mr. Troy Atkinson
**Email:** hiliner@ns.sympatico.ca

## 3.3 Historical Management Context

Due to the highly migratory nature of the species under consideration, Atlantic swordfish and other tunas (bigeye, albacore and yellowfin), are managed by the International Commission for the Conservation of Atlantic Tunas (ICCAT). Established in 1969, ICCAT objectives are three-fold: protect under-sized fish, limit effort and maintain or, in the case of swordfish and bigeye tuna, restore biomass to a level that achieves MSY (DFO, 2004a). The management objective of ICCAT is to obtain and maintain population that would support fishing equivalent to the maximum sustainable yield (MSY).

Since its establishment, ICCAT has implemented a wide range of tools for the conservation and management of stocks, including total allowable catch (TAC) and catch quotas, size limits, effort restrictions, observer programs, closed areas and seasons, vessel registration and information exchange, gear restrictions, and enforcement measures. ICCAT is the only regional fisheries management organization that can undertake the range of work required for the study and management of tunas and tuna-like fishes in the Atlantic. ICCAT is responsible for conducting research focused on the effects of fishing on stock abundance, collection and analysis of information relative to current conditions and trends on the fishery resource in the area, and undertakes work in the compilation of data for other fish species caught incidentally, such as sharks, that are not investigated by another international fishery organization (ICCAT 2007a).

The first specific ICCAT measures were put in place for the North Atlantic swordfish stock in 1991, when countries were requested to reduce their catch by 15% over their 1988 levels. Minimum size limits were also introduced at that time. In Canada, this resulted in the reduction of quotas and the introduction of domestic measures to limit the harvesting of undersized swordfish. In 1999, ICCAT implemented the Atlantic swordfish recovery plan, with the objective of rebuilding declining population. A successful introduction of methods to decrease effort lead to improved stock status, and in 2003, ICCAT approved a substantial increase to the TAC of North Atlantic swordfish, to 14,000t in 2003 from 10,400t the previous year, including discards (DFO, 2004a).

As a member to ICCAT, Canadian representatives attend ICCAT meetings, contribute to scientific research and participate in management discussions with respect to large pelagics harvested in Canada. On a national level, DFO, in consultation with the industry advisory committees, controls the fishery in order to keep it within the quota recommendations of ICCAT. Management measures have been outlined by DFO in Management Plans (DFO 2004). The current plan was implemented in 2004 and was the first management plan that addressed the management of swordfish and other tunas together. Prior to this, these fisheries were governed by separate plans, in particular the Canadian Atlantic Swordfish Fishery 2000-2002 Integrated Management Plan and the the "Canadian Atlantic Integrated Fisheries Management Plan (IFMP) - Bigeye, Yellowfin, Albacore Tunas 1998-1999. The current plan was put in place outlining conditions until 2006 but has been adopted and rolled over since that time (ICCAT, 2010a).

Prior to 2000, the Canadian allocation of swordfish was not separated by fleet sector. The Canadian fishery for Atlantic swordfish operated on a competitive basis under a limited entry regime. While the total number of harpoon and longline licenses was limited, there was competition between the fleets for the quota. Strict monitoring was in place including at-sea observers, hail out and hail in provisions, log books, at sea fishery officer boarding's and industry funded DMP of all landings (DFO, 2004a). However in 2000, as a means to improve the ability to monitor and control harvest activities in a co-operative management style, the national quota was divided among the longline and harpoon fleet targeting swordfish. The longline fleet received 90% of the Canadian allocation, with the harpoon sector receiving the remaining 10%. The quantity of the allocation was based on the Canadian quota remaining after the deduction of 5t for the offshore tuna licence (DFO, 2004a).

In addition to distinct gear sector allocations, the 2000-2002 management plan for swordfish introduced self-administered trip limits in the longline fleet, as a pilot to move away from a competitive fishery. Results were inconsistent, so by 2002, a new management strategy was deemed necessary and ITQs were introduced on a trial basis. These became permanent in 2003. Since 2003, the swordfish component of the fishery has been managed on ITQ, with quotas set based on sharing formulas. The maximum concentration of quota through permanent transfer is limited to 5% (DFO, 2004a).

Management plans are compiled in consultation with fishing industry and incorporate all relevant ICCAT regulatory recommendations and implemented under the Fisheries Act. The necessary ICCAT regulatory recommendations are either specified in the Atlantic Fishery Regulations (1985) or as written Conditions of License, both of which are legally binding for licenses holders (ICCAT, 2008b).

### 3.4. The Fishery Area of Operation

The candidate fishery is conducted both inside and outside the Canadian EEZ. The boundary for the swordfish/other tuna fishery is restricted to the North Atlantic Swordfish stock boundary, defined by ICCAT as north of the 5-degree north line. Currently, the fishery is conducted from April to December with vessels capable of fishing in the winter focusing on

other species from January to March (DFO, 2004a). Prior to the introduction of ITQ into the fishery, the fishery was conducted primarily in the summer months.

The large pelagic longline fishery follows the seasonal migration of swordfish and other tuna through Canadian waters, in accordance with the limitation of gear type, weather, and the availability of quota (DFO, 2004a). Fishing activity for these species extends from Georges Bank south of Nova Scotia to beyond the Flemish Cap east of Newfoundland when swordfish, the main target species, migrate into and adjacent to the Canadian EEZ. Longline fishing effort generally progresses from west to east and back again and from offshore to inshore along the edge of the continental shelf following swordfish movements associated with seasonal warming trends of surface water temperature, and a northward movement of the edge of the Gulf Stream. Swordfish migrate into the Canadian EEZ during summer and fall to feed in the productive waters of the continental shelf slope and shelf basins, areas where water temperatures form a distinct thermocline (DFO, 2004a) (Figure 2).

Since 1998, there has been an increase in fishing activity east of the Grand Banks (beyond the Canadian EEZ) out to and beyond the Flemish Cap where catch rates have tended to be higher than other areas. However, the vast majority of Canadian catch still occurs within the EEZ. This is also an area where fleets from other nations, such as Japan and the US, longline for large pelagic species. This change in the Canadian fishing operations is attributed to a change in strategy, given the good market prices for other tuna species (i.e., bigeye, yellowfin, albacore) and the decline in swordfish quotas that occurred in the late 1990s (DFO, 2004a).

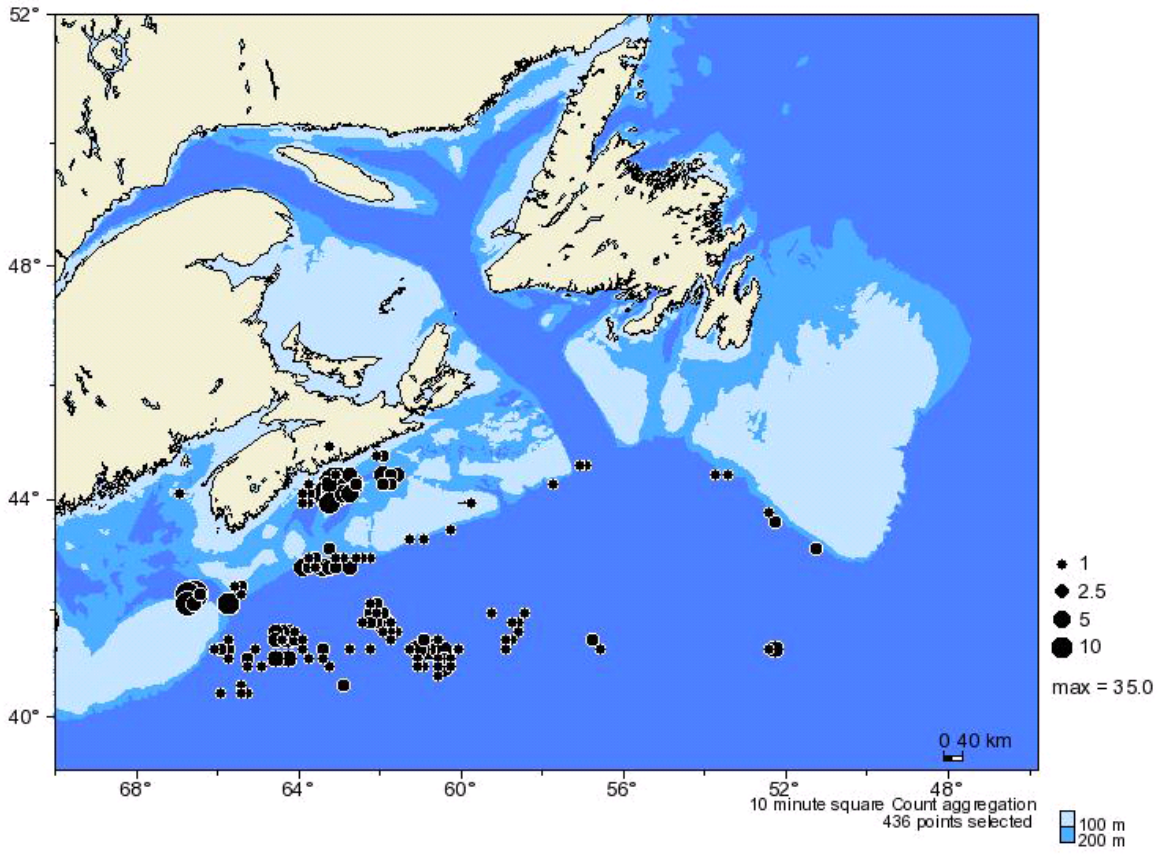

**Figure 2: Distribution in longline swordfish fishing effort in 2007. Source: Presentation - The Pelagic Longline Fishery Distribution (2005-2007) (B. Lester).**

### 3.5 Fleet, gear and harvest controls

Swordfish in Atlantic Canada are harvested using both harpoon and longline gear. The UOC considered in this report is the pelagic longline fleet.

Pelagic longlining occurs throughout the worlds' oceans, and has been used as a method of harvest since the 19th century. This gear type involves the use of a main fishing line with a series of shorter lines with baited hooks attached at intervals. A string of longline gear is deployed off the vessel as the vessel slowly runs over the fishing grounds. Buoy lines are attached to both ends of the longline and fastened to brightly colored floats and flags that mark the location of the gear at the surface. Longline gear may be demersal, set at the seabed, or pelagic, suspended from a line drifting freely at the surface (DFO, 2004a). The lines are set near the surface, suspended over depths greater than 150 meters. The lines are not anchored and may drift from the original setting location (Breeze, 2002).

In this fishery, an average of 30-50 miles of gear is set per night, with the number of hooks per set ranging between 600 and 1,100. Leaders are approximately 4 fathoms, however sometimes gear may be set at the surface, depending on weather or fish location. Hooks are baited with mackerel or squid, depending on the target species. During an average 14 day trip, up to 10 sets will be deployed (T. Atkinson, pers. comm.).

The Atlantic Canadian longline fleet has taken several steps in order to minimize the environmental impact of the harvest of swordfish and other tunas. The longline fishery uses all monofilament line, with no wire leaders to minimize environmental impact. In addition, although not mandatory, the use of circle hooks is encouraged to prevent deep hooking of unintentionally caught by-catch species (NSSA, 2002). Currently, it is estimated that over 90% of the hooks set are circle hooks (Troy Atkinson, pers. comm.); however the Atlantic Canadian Loggerhead Turtle Conservation Action Plan states that by December 2011 the use of non-corrodible 16/0 circle hooks will be mandatory. Additional measures taken to minimize the impact on sea turtles are outlined in a Code of Conduct for Responsible Sea Turtle Handling and Mitigative Measures, including setting and hauling practices and gear configuration recommendations (NSSA, 2002).

Management of North Atlantic swordfish stocks came under the stewardship of ICCAT, in 1969. The first national allocations to ICCAT Contracting Parties were made for 1995 and went to those member countries with a history of fishing swordfish, namely Canada, the USA, Spain and Portugal. Canada is one of 38 Contracting Parties to ICCAT, and as a result, Canada receives a portion of the allocation annually. With respect to bigeye and albacore tuna, Canada is classified as a minor harvesting nation, defined as a nation harvesting less than 2100mt/year. While minor harvesting nations do not receive an allocation of the TAC for these species, there are alternate restrictions in place to limit harvest. Bigeye tuna does not have a quota restriction, however effort is restricted to the number of vessels directing for this species to the average in 1991-1992. The Canadian catch limit for albacore is 200mt. Yellowfin and mahi

mahi have no quota, yellowfin is not considered to be fully exploited by ICCAT, and the status of mahi mahi has not been assessed.

The 2004-2006 IFMP (DFO, 2004a) was the first management plan that addressed the management of swordfish and other tunas together. This new plan follows the DFO defined IFMP development process, and includes aspects of objectives-based fisheries management (OBFM) in the planning process, including: clearly stated long term objectives, risk analysis of the management strategies and measures, post season review of plan performance, and the development of indicators of success in plan implementation and in meeting objectives (DFO 2004). Since the implementation of the 2004-2006 Plan, the plan has been reviewed annually and rolled over, management measures have been altered and adjusted as necessary through the conservation harvest plans that are developed annually for each sector with any changes in management outlined and implemented in the Conservation Harvest Plans (ICCAT, 2010a).

The current management measures governing the Canadian harvest of swordfish and other tunas (bigeye, albacore, yellowfin) are outlined in the 2004-2006 Canadian Atlantic Swordfish and Other Tunas Integrated Management Plan administered by DFO. The Plan outlines how the fishery is managed based on defined boundaries and control measures such quotas, by-catch limitations, seasons, time-area closures and size restrictions.

The IFMP identifies a number of objectives for management of the Scotia Fundy Swordfish Fishery which includes both the longline and harpoon fisheries. The objectives identify both the strategies and management measures for the fishery which address a number of different concerns. These are defined in Table 2 and 3 below.

**Table 2: Objectives Hierarchy for Management of the Scotia-Fundy Swordfish Fishery**

| General Objectives | Strategies | Management Measures |
|---|---|---|
| 1. Conservation of the ecosystem by: | | |
| 1.1 Maintaining community diversity by protecting benthic communities susceptible to disturbance. | Protect benthic communities in the Gully | Establish the Gully as an MPA and associated regulations (swordfish longline gear excluded from Zone 1). |
| 1.2 Maintaining species diversity. | - Keep stock size of target species above established limits.<br>- Minimize incidental mortalities on non-target species, particularly species at risk. | - Control fishing mortality (F)<br>- Restrict directed catches and account for bycatch through use of concurrent bluefin and longline licences and by-catch quotas.<br>- Release of sensitive species such as turtle and marlin. |
| 1.3 Maintaining population diversity | - Maintain spawning components of target | - Define management areas that correspond to stock distributions |

| | | |
|---|---|---|
| | species | (ICCAT). |
| 1.4 Maintaining trophic structure. | - (Insufficient knowledge at this time to establish strategies) | |
| 1.5 Maintaining productivity of populations by managing exploitation of target species. | -Keep exploitation rates at moderate levels.<br><br>-Avoid wastage by managing size and species selection during fishing. | -Control fishing mortality (F) through annual TACs and by-catch rules.<br><br>-Specify aspects of gear construction.<br>-Establish minimum fish size limits and tolerance levels with evaluation of dead discards. |
| 2. Manage the swordfish resource in a manner consistent with: | | |
| 2.1 Meeting Aboriginal obligations. | -Increase participation in the commercial fishery | -Issue communal licences through Aboriginal Fisheries Strategy (AFS).<br>-Acquire and transfer licences, quotas, boats and gear to FN through Marshall Response Initiative. |
| 2.2 Creating conditions for economic self-reliance in the commercial fishery. | - Balance fleet capacity with resource availability by managing access and supporting resource sharing arrangements that allow resource users to meet their economic objectives | - Limit entry through licensing.<br>Improve options for transferability of shares and quotas.<br>-Use of ITQ systems in some fleets |
| 3. Co-management | - Support swordfish research Code of conduct for responsible Sea Turtle handling and Mitigative Measures.<br>-Build industry management capacity. | -DFO industry research and cooperative projects and contribution agreements.<br>-Code implemented in 2004 CHP.<br>-(To be established when appropriate) |

**Table 3: Summary of International and Domestic Objectives and Management Measures for the Swordfish and Other Tunas Fisheries by Species**

| Objective | Species | Management Measures |
|---|---|---|
| 1. Conservation / Sustainability | | |
| Protect undersized fish | SWO | ICCAT has set two min. size options: 125 cm LJFL with a 15% tolerance, or 119 cm with zero tolerance |

| | | |
|---|---|---|
| | | and evaluation of dead discards. (ICCAT Rec. 95-10)<br>In 2004, the 125 cm LJFL with 15% tolerance option will be implemented in the Canadian fishery on a trial basis. |
| | BET | Min. size of 3.2kg adopted in 1980. (ICCAT Rec. 79-1)<br>Not an issue in Canadian fisheries. |
| | YFT | Min. size of 3.2 kg with a 15% tolerance in number of fish per landing adopted in 1973. (ICCAT Rec. 72-1)<br>Not an issue in Canadian fisheries. |
| Limit on effort | All species | No new swordfish (harpoon or longline) or other tunas licences issued in Canada, and non-separation of swordfish and other tunas longline licences. |
| | ALB | Since 1999, limit on the number of vessels to the average number in the period 1993-1995. (ICCAT Rec. 98-8)<br>Directed effort in Canada remains limited to a max. of 78 vessels (77 large pelagic and 1 offshore tuna), the same since 1993-95. |
| | BET | Since 1999, cap on the number of vessels >24 m LOA to the average no. that fished in 1991 and 1992. The limitation on number of vessels is associated with a limitation on GRT so as to not increase the total fishing capacity. (ICCAT Rec. 98-3)<br>Directed effort in Canada remains limited to one offshore tuna licence and 8 of the 77 pelagic longline licences authorized to use vessels between 65-100 ft. |
| | YFT | Since 1993, no increase in the level of effective fishing effort over the level observed in 1992. (ICCAT Rec. 93-4)<br>Directed effort in Canada remains limited to a max. of 78 vessels, the same level since 1992. |
| Stability of SSB | ALB | ICCAT set a TAC of 34,500t for 2004 - 2006. With the exception of the EC, US, Venezuela and Japan, Contracting Parties shall limit their catches to 200t, with an adjustment provision for overages/underages of the quota/catch limit.<br>(ICCAT Rec. 03-06)<br>Canada's albacore catch limit is 200t annually. |
| Restore biomass to a level that would allow MSY to be attained. | SWO | In 1999, implement a rebuilding program to achieve, with greater than 50% probability, stock and catch |

| | | |
|---|---|---|
| | | levels consistent with the objective of the Convention within 10 years. (ICCAT Rec. 99-2)<br>Maintain catches within the Canadian swordfish allocation and evaluate dead discards to account for all sources of fishing mortality. |
| | BET | In 2004, limitation on catches to the average catch taken in 1991 and 1992, except Contracting Parties whose 1999 reported catches were less than 2,100t. (ICCAT 03-01)<br>Canada reported less than 2,100t in 1999, therefore its effective catch limit is 2,100t in 2004. |
| Reduce bluefin tuna dead discards in the pelagic longline fleet | BFT | In 2004, allow quota transfers between bluefin tuna fleets and pelagic longline vessels on a one-year trial basis (subject to individual fleet CHPs).<br>Allow concurrent bluefin tuna and pelagic longline licence holders to retain bluefin tuna caught with longline gear.<br>To account for by-catch related to pelagic longline fisheries in the vicinity of the east/west Atlantic bluefin tuna management boundary (ICCAT Rec. 02-7), in 2003, Canada was allocated a 15t bluefin tuna by-catch quota for use in the central north Atlantic (east of 54°30'W, north of 10ºN). Canada will implement a closure of the area to the pelagic longline fleet when the 15t quota is taken. Any unused portion of the 15t by-catch allocation will be used to cover dead discards in excess of Canada's 5.6t discard allocation.<br>Implement time/area closures to avoid bluefin tuna by-catch in known bluefin tuna hot spots.<br>Permanent closure of the Hell Hole to pelagic longline gear from July 1-Nov. 30 annually, effective 2004. |
| Non-target species by-catch reduction | Various | The longline fleet practices live release of non-target, sensitive species, such as marlins and all turtle species. |
| 2. Monitoring and Reporting | | |
| Enhance monitoring and control | All species | Ensure reporting accuracy of areas fished, in particular for bluefin, and help enforce time/area closures inside and outside of Canadian EEZ;<br>Partial implementation of VMS on the pelagic longine fleet in 2004, with full implementation by 2005; and<br>Daily catch notification of bluefin by-catch for vessels with tags. |

| | | |
|---|---|---|
| Collection, analysis and submission of high quality data annually to ICCAT | All species | 100% hail in/hail out;<br>100% dockside monitoring and log submission; and<br>Min. 5% at-sea observer coverage on pelagic longline fleet.<br>Ensure comprehensive, accurate and timely reporting. |
| 3. Co-Management | | |
| Support swordfish research | SWO | Agreements on DFO/industry research and co-operative projects.<br>Contribution agreements with Harpoon groups in lieu of observer coverage, renewable annually. |
| Endangered species recovery | LBT and other pending species | Incidental harm permits issued to longline vessels in 2004.<br>Code of Conduct for Responsible Sea Turtle Handling and Mitigative Measures incorporated by industry in their 2004 CHP.<br>Link IFMP and CHP development to relevant recovery strategies. |
| 4. Conservation of the Ecosystem/species diversity | | |
| Gully MPA | All species | Enforce closure of zone 1 of the Gully MPA to all fishing activity. |
| 5. Constitutional Obligations | | |
| Meet Aboriginal and Treaty rights | All species | Increase participation in the commercial fishery where applicable.<br>Acquisition and transfer of licences and quota to FN. |

Management measures in place under the 2004-2006 Canadian Atlantic Swordfish and other tunas integrated management plan include:

- Quota allocation: the plan states the annual national TAC, as defined by ICCAT, and then states the total available annual quota, after making adjustments for overage and underage from the previous year. The offshore tuna license then receives a 5t by-catch allocation for swordfish from the top of the adjusted global quota and is not permitted to roll-over any underages of quota. The remaining Canadian quota is then allocated between the harpoon and longline sectors based on the sectors historic catch of swordfish, this resulted in the longline fleet receiving 90% of the available quota and harpoon attaining 10% of the Canadian quota. The longline quota is then allocated to active harvesters in the fleet based on ITQ sharing formula.
- Conservation harvest plans (CHP): CHPs are required by all associations, groups of harvesters or individual license holders wishing to participate in the fishery. The plans

outline how the harvest will be conducted within the requirements of the fleet sector plan, at a minimum they must include specifics on the arrangements for at-sea monitoring, dockside monitoring of all landings, and how those covered by the CHP will contribute to the enhanced scientific assessment of the stock, co-management initiatives where applicable and quota management.

- Area of operation and seasons: The Atlantic swordfish and other tuna fishery season is open from April 1 until March 31 of the following year. These dates were adopted over the calendar dates used prior to 2002, in order to coincide better with the domestic consultative process. In addition to the season, the Plan outlines the area in which the fishery can operate, including waters outside Canada's 200 mile exclusive economic zone (EEZ).
- Vessel Monitoring Systems (VMS): As of 2005, it became a requirement that all pelagic longline vessels in the fleet have a vessel monitoring system (VMS). Prior to 2005, VMS was only mandatory on vessels that exceeded 24 m in length. There is no requirement for VMS on vessels involved in the troll and/or harpoon fishery for swordfish.
- Time/Area closures: In addition to the legislated closure of Zone 1 of the Gully marine protected area (MPA; Figure 4), there are several closed areas that restrict swordfish and other tuna harvest in order to reduce potential gear conflicts with other fisheries, to protect swordfish brood stock, and/or to minimize the catch of bluefin tuna (Figure 3)

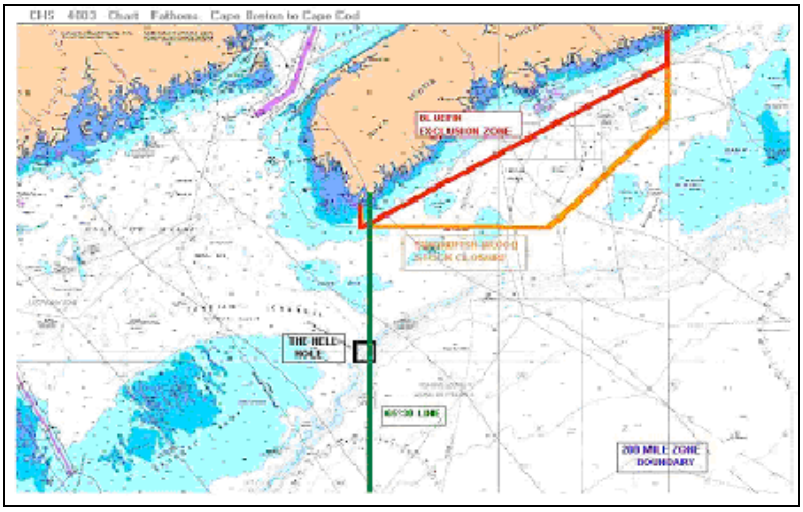


**Figure 3: Swordfish and Other Tunas Time/Area Closures: BEZ closed to longline gear Aug. 1 - Dec. 31; Swordfish Broodstock Closure to harpoon gear Sept. 1 - Dec. 31; Hell Hole closure to longline gear July 1 - Nov. 31. The pre-August 1 west of 65°30'W line closure, in place from 1995 to 2003, was lifted in 2004.**

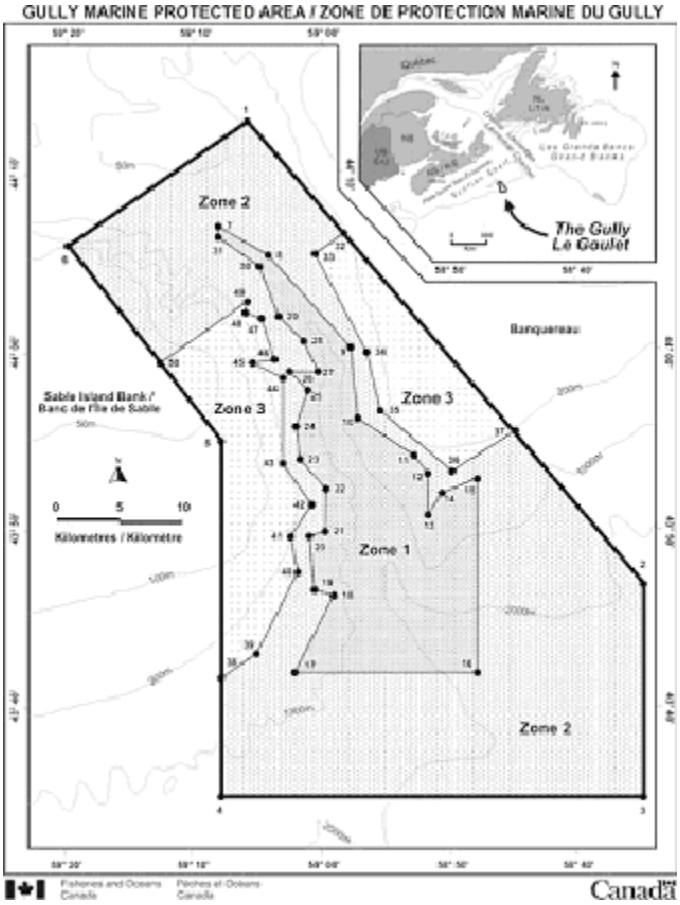


**Figure 4: Gully MPA Zone 1 Closure Map**

The IFMP outlines the monitoring required in the harvest of swordfish and other tuna. These requirements include: 100% vessel monitoring system coverage, 100% dockside monitoring, hail in and hail out requirement and variable rate at-sea observer coverage. Table 4 presents the % of at-sea observer coverage of the fleet during 2001 - 2010.

**Table 4: Percentage At-Sea Observer Coverage, 2001 – 2010.**

| Year | % Observer Coverage (by sea days) |
|---|---|
| 2001 | 15 |
| 2002 | 19 |
| 2003 | 6.7 |
| 2004 | 4.8 |
| 2005 | 4.8 |
| 2006 | 4 |
| 2007 | 3.7 |
| 2008 | 4.4 |
| 2009 | 8 |
| 2010 | 6 |

Source: DFO C&P

The plan includes conditions for a performance review to evaluate management performance for the fishery. Management, science and enforcement performance indicators may be reviewed annually, upon conclusion of the 3 year plan, or upon conclusion of the ICCAT swordfish assessment cycle, as appropriate. In addition there are annual post-season review results, providing a number of measurable criteria against which performance can be monitored on an annual basis.

Details outlining the harvest control rules and tools specific to the Canadian swordfish longline fishery are outlined in Appendix IV (B) Nova Scotia Swordfishermen's Association – Conservation Harvesting Plan (CHP), of the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan. The CHP outlines fleet quotas, individual quotas, time / area closures, observer coverage requirements, VMS requirements, dock side monitoring requirements, hail in / hail out requirements, logbook requirements, season, transfer processes, by-catch reduction measures, and other control measures associated with the fishery.

The Nova Scotia Swordfishermen's Association has developed a code of conduct for the responsible sea turtle handling and mitigative measures (NSSA, 2002). The code outlines principles and standards of behaviour for dealing with the incidental by-catch of sea turtles by pelagic longline fishermen, harvesting swordfish and other tunas under the auspices of the NSSA. The document was developed in response to the fleets concerns for reducing sea turtle interactions and enhancing post release survivability. The basis for the document was results from two years of studies which examined the interaction of sea turtles with longline gear. Mitigation measures implemented through the code of conduct to minimize interactions include the use of circle hooks and the use of de-hooking gear when sea turtles are entangled.

### 3.6. Catch

Large pelagic longline fishing, primarily for swordfish, began in Canadian waters in the early 1960s, as Canadian vessels adopted methods developed by the Japanese and Americans in fishing for tuna and swordfish. Since its beginning, several changes have occurred within the operation of the fishery as a result of improvements in fishing and navigational equipment. Readily available oceanographic charts provide detailed information used to located optimal water temperatures, and the use of monofilament line allows the vessel to set gear at a quicker rate (Smith, 2001).

During the early years of the large pelagic longline fishery, vessels targeted mainly swordfish. However since 1999, there has been a noted shift toward retaining "other tuna" (bigeye, yellowfin and albacore). This was possibly driven by dramatic reductions in swordfish quota, combined with an increase in the market price for tuna (Smith, 2001). In 2006, other tuna landings made up 18% of the total large pelagic landings (ICCAT, 2008b). These shifts in target species, not only influences where and how the fishery is conducted but also composition of the by-catch (Smith, 2001).

Entry to the swordfish fishery has been limited to the current 77 longline licenses for both swordfish and other tunas since 1992. Licenses have been fixed at this number, but may be reissued, within certain policy restrictions, from one fisher to another. In recent years,

Fisheries and Oceans Canada (DFO) has intervened in the transfer process to obtain both harpoon and longline licenses for subsequent transfer to Aboriginal persons and communities under the Department's Aboriginal Fisheries Strategy. These transfers do not result in an increase in the overall capacity within the fishery (DFO, 2004a). As mentioned previously the license for swordfish and other tuna are not separable.

Of the 77 swordfish/other longline license holders, 75 are currently based in the Maritime Region. The remaining 2 licenses are held in the Newfoundland and Labrador Region (DFO 2004a); however they all fish out of Nova Scotia ports. All longline license holders in the fleet are represented by the Nova Scotia Swordfishermen's Association (T. Atkinson, pers. comm.).

In addition to the licenses holders that are members of NSSA, there is a unique offshore tuna licence based in the Maritimes Region, also authorized to operate a longline fishing operation Atlantic-wide. The offshore tuna longline license is not represented by NSSA, but by its owner/mangers directly (DFO, 2004a), since it is not a member of the client group, the operation is not considered a part of the unit of certification, and therefore product from that vessel will not be able to bear the MSC logo.

Since the inception of the ITQ management system, only 40-50 vessels are active in the fishery in any given year. Vessels range in length from 45-99 feet, with only seven licenses for vessels greater than 65 feet in length, however these licenses may be used on smaller vessels. Only three large size class vessels have operated in recent years (T. Atkinson, pers. comm.). Principle ports of landing in the Atlantic Region include Shelburne, Sambro, Wood's Harbour and Clark's Harbour in Nova Scotia, and St. John's and Fermeuse in Newfoundland & Labrador (DFO, 2004a).

Prior to the inception of ITQ's, pelagic longliners targeted "tunas" early and late in the season, before and after the swordfish quota was caught. Under the ITQ system, longliners either target swordfish or use it for by-catch to target the tunas. This has resulted in a longer fishing season for swordfish than in previous years, ending in November, rather than September (ICCAT 2008b).

For the past decade, estimated catches (Table 5) including landings plus discards of swordfish from the North Atlantic stock have averaged about 14,200t per year, although the 2001 reported landings and discards were reduced to 10,011t due to ICCAT regulatory recommendations for rebuilding purposes. In response to ICCAT recommendations, the 2005 reported catches, including discards, represented a 40% decrease from the 1987 peak in North Atlantic landings (20,236 t). In addition, changes in landings can be attributed to changes in fleet operations and economics. Some fleets, including the United States, EC-Spain, EC-Portugal and Canada, have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates of these species previously considered as by-catch in some fleets (ICCAT, 2006a).

Canada's national report to ICCAT (2007b) reported that the Canadian nominal landings in 2006 were 1403.6t, 29.5t under the adjusted quota of 1433t. The 2006 landings are slightly lower than the 2005 landings of 1,558t. Of the 1403.6t, 86% was harvested by the longline fleet, totaling 1200t (ICCAT 2008b).

**Table 5: Landings of Atlantic Swordfish by the Canadian pelagic longline fleet, 1987-2008. Source: Data from 1987 - 2003 inclusive (DFO2004), 2003-2008 inclusive (ICCAT 2010a), 2009 (T. Atkinson, pers. comm.) and Estimated Catcher (t) of North Atlantic Swordfish (ICCAT 2010b).**

| Year | North Atlantic Total Catch (t) | Canadian Pelagic Longline Landings (t) |
|---|---|---|
| 1987 | 26266 | 868 |
| 1988 | 32685 | 887 |
| 1989 | 34305 | 1097 |
| 1990 | 32976 | 819 |
| 1991 | 28826 | 953 |
| 1992 | 29207 | 1486 |
| 1993 | 32868 | 2206 |
| 1994 | 34459 | 1654 |
| 1995 | 38803 | 1421 |
| 1996 | 33511 | 646 |
| 1997 | 31567 | 1000 |
| 1998 | 26251 | 875 |
| 1999 | 27123 | 1101 |
| 2000 | 27180 | 874 |
| 2001 | 25139 | 964 |
| 2002 | 23758 | 922 |
| 2003 | 24075 | 1138 |
| 2004 | 25252 | 1116 |
| 2005 | 25643 | 1365 |
| 2006 | 25718 | 1200 |
| 2007 | 27997 | 998 |
| 2008 | 23551 | 1076 |
| 2009 | 25103 | 1061.4 |

Based on 2005 data from at-sea observers, an estimated 106 t were discarded dead from the longline fleet (ICCAT, 2006a). Only 48 of the 77 licensed longline vessels landed fish in 2005, a significant decrease relative to the mid-1990s when nearly all of the swordfish longline licenses were active. The reduced effort in recent years is a result of a combination of factors including reduced quota, increased costs, increased opportunities for fishing other species, relatively low market value, and the introduction of an Individual Transferable Quota (ITQ) management system in 2002.

### 3.7 Retained Species

Retained species addressed in Principle 2 are those species in the catch that are not covered under Principle 1 and are not included in the UOC. The retained catch can still be valuable, whether it is targeted or taken incidentally, and there is thus an economic incentive for capture. In assessing Principle 2 Retained Species, the 60 and 80 scoring guideposts focus on 'main retained species', where 'main is intended to allow for consideration of volume, value or vulnerability of the species caught. For example, a species that comprises less than 5% of the total catch by weight, and therefore otherwise considered 'minor', may still be considered a main species due to its particular vulnerability or value.

Within the pelagic longline fishery, the client identified bluefin tuna, bigeye tuna, yellowfin tuna, albacore tuna, mako shark, thresher shark, porbeagle shark, mahi mahi, escolar and wahoo as the retained species, as per the MSC definition of retained species component. Based on the information in Table 6, the assessment team determined that bluefin tuna, bigeye tuna, yellowfin tuna, albacore tuna, marlins, shortfin mako and porbeagle shark are to be considered 'main' retained species, as per the MSC definition of 'main' retained species. Although some of these species comprise less than 5% of the total catch, species such as shortfin mako, porbeagle, bluefin tuna and marlin were considered 'main' retained species given their value and vulnerability. Guidance 7.2.1 in the MSC FAM (v1), states "Main" in this context is intended to allow consideration of volume, value or vulnerability of the species caught.

Bluefin, bigeye, and northern albacore tuna are subject to capped total allowable catches (hard cap TACs). The catch of bigeye and albacore is restricted to 2,100 mt and 200mt respectively, as per ICCAT allocated quotas. Similarly, ICCAT sets an annual quota for bluefin tuna; the Canadian quota is 623 mt annually, with 33.739mt allocated to the longline swordfish sector. Blue and white marlins are subject to the management measures outline in ICCAT Recommendation 06-09 (Recommendation by ICCAT to Further Strengthen the Plan to Rebuild Blue Marlin and White Marlin Populations). The Recommendation limits the retention of blue marlin landed by pelagic longline and purse seine vessels to no more than 50% of the 1996 to 1999 landings, whichever year is greater. Similarly for white marlin, landings by pelagic longline and purse seine vessels is limited to no more than 33% of the 1996 or 1999 landings, whichever year is greater. In addition to limits on catch the Recommendation states that all marlin brought to the surface by pelagic longline and purse seine vessels alive shall be released in a manner that maximizes their survival.

There is a domestic quota of 185mt for porbeagle shark. While there is not a hard cap in place for the catch of shortfin mako, following the 2006 RAP for the species, it was recommended that Canadian harvesters not exceed 100t, as catch levels at or below this are unlikely to have a detectable or biologically significant effect on population recovery (DFO 2006a; 2006b). There are no quotas in place for yellowfin tuna or shortfin mako.

Management measures for the Atlantic Canada Large Pelagics Longline Fisheries which affect retained species include effort controls, weight quotas and time/area closures. Fishing effort is restricted by limiting the number of license holders in the fishery. Canada, as a member of ICCAT, annually contributes catch, catch-at-size and catch-per-unit-effort (CPUE) data to

ICCAT for stock assessments (DFO, 2004a). The Atlantic Canada Large Pelagics Longline Fisheries have had 100% dockside monitoring since 1996 and fisheries observer coverage has been approximately 5% since 2003. Observer coverage was 15% in 2001 and 19% in 2002. Vessel Monitoring Systems (VMS) were installed beginning in 2004, and by 2005 were on all vessels in the fleet (DFO, 2004a).

Species status assessments are based on peer-reviewed publications and ICCAT assessments (e.g., bigeye, yellowfin, and bluefin tunas).

**Table 6: Catch composition and weights of retained species from the longline large pelagic hauls, 2002 to 2009. Reported weights are total of retained and discarded (dead and alive) values. Source: Observer data provided by DFO. ["K" indicates species kept (retained); "R" indicates species released; "UTD" indicates the condition of individual was unable to be determined.]**

| | | | 2009 | | | | 2008 | | | | 2007 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| Swordfish | K | # | 553 | 79 | 798 | 1430 | 456 | 2 | 403 | 861 | 303 | 57 | 482 | 842 |
| | | kg | 42935 | 5960 | 57085 | 105980 | 33912 | 62 | 33260 | 67234 | 22578 | 3816 | 35093 | 61487 |
| | R | # | 71 | | 44 | 115 | 42 | | 58 | 100 | 58 | | 54 | 112 |
| | | kg | 1886 | | 1026 | 2912 | 649 | | 1407 | 2056 | 1104 | | 957 | 2061 |
| Bluefin Tuna | K | # | 13 | 4 | 15 | 32 | 6 | | 2 | 8 | 7 | | 4 | 11 |
| | | kg | 1513 | 622 | 2615 | 4750 | 646 | | 145 | 791 | 842 | | 423 | 1265 |
| | R | # | 64 | 8 | 26 | 98 | 1 | | 1 | 2 | 67 | 2 | 12 | 81 |
| | | kg | 4960 | 796 | 2886 | 8642 | 10 | | 102 | 112 | 4910 | 130 | 1024 | 6064 |
| Bigeye Tuna | K | # | 121 | 2 | 44 | 167 | 111 | | 20 | 131 | 24 | | 35 | 59 |
| | | kg | 4242 | 106 | 1703 | 6051 | 4830 | | 734 | 5564 | 1089 | | 1534 | 2623 |
| | R | # | 11 | | 7 | 18 | | | 11 | 11 | 1 | | 9 | 10 |
| | | kg | 140 | | 143 | 283 | | | 555 | 555 | 2 | | 137 | 139 |
| Yellowfin Tuna | K | # | 164 | 7 | 41 | 212 | 67 | | 15 | 82 | 61 | | 61 | 122 |
| | | kg | 5316 | 214 | 1470 | 7000 | 2363 | | 570 | 2933 | 2330 | | 2416 | 4746 |
| | R | # | 2 | | 8 | 10 | | | 4 | 4 | | | 12 | 12 |
| | | kg | 86 | | 149 | 235 | | | 150 | 150 | | | 118 | 118 |
| Albacore Tuna | K | # | 6 | | 28 | 34 | 79 | | 57 | 136 | 1 | | 8 | 9 |
| | | kg | 97 | | 387 | 484 | 1434 | | 751 | 2185 | 8 | | 130 | 138 |
| | R | # | | | 7 | 7 | | 1 | 3 | 4 | 1 | | | 1 |
| | | kg | | | 58 | 58 | | 8 | 32 | 40 | 32 | | | 32 |
| Shortfin Mako | K | # | 52 | 1 | 19 | 72 | 37 | | 11 | 48 | 44 | | 11 | 55 |
| | | kg | 2060 | 87 | 681 | 2828 | 1445 | | 711 | 2156 | 1648 | | 558 | 2206 |
| | R | # | 45 | 14 | 3 | 62 | 15 | 1 | 3 | 19 | 50 | | 16 | 66 |
| | | kg | 1074 | 220 | 38 | 1332 | 387 | 34 | 15 | 436 | 1267 | | 238 | 1505 |
| Longfin Mako Shark | K | # | 1 | | | 1 | | | | | | | | |
| | | kg | 45 | | | 45 | | | | | | | | |
| | R | # | 1 | | 1 | 2 | | | | | | | | |
| | | kg | 91 | | 300 | 391 | | | | | | | | |
| Blue Marlin | K | # | | | 2 | 2 | | | 1 | 1 | 4 | | | 4 |
| | | kg | | | 42 | 42 | | | 45 | 45 | 218 | | | 218 |
| | R | # | 5 | | | 5 | 1 | | 7 | 8 | 2 | | 1 | 3 |
| | | kg | 121 | | | 121 | 35 | | 218 | 253 | 192 | | 270 | 462 |
| White Marlin | K | # | 5 | | | 5 | | | | | | | 2 | 2 |
| | | kg | 193 | | | 193 | | | | | | | 70 | 70 |
| | R | # | 1 | 1 | 6 | 8 | | | | | 6 | | 16 | 22 |
| | | kg | 30 | 6 | 203 | 239 | | | | | 206 | | 506 | 712 |
| Black Marlin | R | # | 1 | | | 1 | | | | | | | | |
| | | kg | 40 | | | 40 | | | | | | | | |

**Table 6 continued...**

| | | | 2009 | | | | 2008 | | | | 2007 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Porbeagle Shark** | K | # | 3 | | 1 | 4 | 42 | | 3 | 45 | | | 1 | 1 |
| | | kg | 182 | | 40 | 222 | 1686 | | 135 | 1821 | | | 47 | 47 |
| | R | # | 74 | 2 | 9 | 85 | 27 | | 17 | 44 | 56 | | 21 | 77 |
| | | kg | 1235 | 70 | 55 | 1360 | 364 | | 258 | 622 | 1293 | | 838 | 2131 |
| **Common Dolphin Fish (Mahi Mahi)** | K | # | 771 | 10 | 72 | 853 | 17 | 2 | 4 | 23 | 114 | 7 | 45 | 166 |
| | | kg | 5438 | 126 | 491 | 6055 | 80 | 5 | 6 | 91 | 795 | 96 | 182 | 1073 |
| | R | # | 27 | | 3 | 30 | 5 | 1 | 1 | 7 | 1 | | 2 | 3 |
| | | kg | 210 | | 20 | 230 | 13 | 3 | 5 | 21 | 5 | | 18 | 23 |
| **Escolar** | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | | | | | | | | | 1 | | | 1 |
| | | kg | | | | | | | | | 38 | | | 38 |
| **Wahoo** | K | # | | | | | | | 1 | 1 | | | | |
| | | kg | | | | | | | 18 | 18 | | | | |
| | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |

| | | | 2006 | | | | 2005 | | | | 2004 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Swordfish** | K | # | 269 | 18 | 639 | 926 | 227 | 4 | 537 | 768 | 210 | | 545 | 755 |
| | | kg | 17192 | 719 | 45062 | 62973 | 14054 | 195 | 31360 | 45609 | 12580 | | 29811 | 42391 |
| | R | # | 58 | 7 | 98 | 163 | 82 | 7 | 120 | 209 | 50 | 1 | 42 | 93 |
| | | kg | 949 | 151 | 1963 | 3063 | 1355 | 102 | 2285 | 3742 | 708 | 23 | 570 | 1301 |
| **Bluefin Tuna** | K | # | | 2 | 2 | 4 | | | 3 | 3 | 4 | | 6 | 10 |
| | | kg | | 236 | 774 | 1010 | | | 593 | 593 | 388 | | 6 | 394 |
| | R | # | 3 | | 1 | 4 | 1 | | | 1 | 4 | | 3 | 7 |
| | | kg | 144 | | 25 | 169 | 60 | | | 60 | 672 | | 412 | 1084 |
| **Bigeye Tuna** | K | # | 289 | 3 | 48 | 340 | 177 | | 110 | 287 | 52 | 8 | 81 | 141 |
| | | kg | 8691 | 149 | 1702 | 10542 | 5263 | | 2799 | 8062 | 975 | 509 | 510 | 1994 |
| | R | # | 3 | | 1 | 4 | 28 | | 14 | 42 | 1 | | 1 | 2 |
| | | kg | 126 | | 43 | 169 | 176 | | 163 | 339 | 34 | | 25 | 59 |
| **Yellowfin Tuna** | K | # | 208 | | 31 | 239 | 208 | | 149 | 357 | 79 | | 45 | 124 |
| | | kg | 5722 | | 905 | 6627 | 9402 | | 5598 | 15000 | 247 | | 169 | 416 |
| | R | # | 2 | | | 2 | 16 | | 6 | 22 | | | 2 | 2 |
| | | kg | 62 | | | 62 | 105 | | 181 | 286 | | | 41 | 41 |
| **Albacore Tuna** | K | # | 7 | | 59 | 66 | 4 | | 70 | 74 | | 14 | 10 | 24 |
| | | kg | 100 | | 669 | 769 | 72 | | 1257 | 1329 | | 317 | 117 | 434 |
| | R | # | 2 | | 1 | 3 | 10 | | 8 | 18 | | | 2 | 2 |
| | | kg | 33 | | 10 | 43 | 78 | | 60 | 138 | | | 7 | 7 |
| **Shortfin Mako** | K | # | 76 | 8 | 22 | 106 | | | | | 42 | | 15 | 57 |
| | | kg | 2774 | 234 | 867 | 3875 | | | | | 1123 | | 401 | 1524 |
| | R | # | 80 | 1 | 37 | 118 | | | | | 56 | | 7 | 63 |
| | | kg | 1060 | 45 | 256 | 1361 | | | | | 601 | | 57 | 658 |
| **Mako Shark** | K | # | | | | | 48 | 1 | 13 | 62 | | | | |
| | | kg | | | | | 2259 | 10 | 629 | 2898 | | | | |
| | R | # | | | | | 62 | 9 | 11 | 82 | | | | |
| | | kg | | | | | 803 | 70 | 95 | 968 | | | | |

**Table 6 continued...**

| | | | 2006 | | | | 2005 | | | | 2004 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Blue Marlin** | K | # | 5 | | 9 | 14 | 5 | | | 5 | | | | |
| | | kg | 119 | | 205 | 324 | 150 | | | 150 | | | | |
| | R | # | 22 | 4 | 37 | 63 | 33 | 1 | 27 | 61 | | | | |
| | | kg | 641 | 72 | 985 | 1698 | 1040 | 15 | 549 | 1604 | | | | |
| **White Marlin** | K | # | | | | | | | | | | | 2 | 2 |
| | | kg | | | | | | | | | | | 48 | 48 |
| | R | # | | | 1 | 1 | 4 | | 3 | 7 | 2 | | | 2 |
| | | kg | | | 36 | 36 | 135 | | 86 | 221 | 68 | | | 68 |
| **Black Marlin** | R | # | | | | | | | 6 | 6 | | | | |
| | | kg | | | | | | | 355 | 355 | | | | |
| **Porbeagle Shark** | K | # | 1 | | | 1 | | | | | 22 | | 15 | 37 |
| | | kg | 59 | | | 59 | | | | | 693 | | 548 | 1241 |
| | R | # | 111 | | 10 | 121 | 110 | 9 | 24 | 143 | 54 | 7 | 63 | 124 |
| | | kg | 1926 | | 171 | 2097 | 687 | 60 | 205 | 952 | 530 | 135 | 480 | 1145 |
| **Common Dolphin Fish (Mahi Mahi)** | K | # | 66 | | 1 | 67 | 347 | 5 | 45 | 397 | 9 | | 3 | 12 |
| | | kg | 455 | | 7 | 462 | 2213 | 42 | 232 | 2487 | 64 | | 17 | 81 |
| | R | # | 2 | | | 2 | 4 | | | 4 | | | | |
| | | kg | 12 | | | 12 | 11 | | | 11 | | | | |
| **Escolar** | K | # | | | | 0 | | | | | | | | |
| | | kg | | | | 0 | | | | | | | | |
| | R | # | 3 | | | 3 | | | 4 | 4 | | | | |
| | | kg | 61 | | | 61 | | | 84 | 84 | | | | |
| **Wahoo** | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | | | | | 1 | | | 1 | | | | |
| | | kg | | | | | 35 | | | 35 | | | | |

| | | | 2003 | | | | 2002 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Swordfish** | K | # | 334 | 3 | 164 | 501 | 586 | 4 | 1104 | 1694 |
| | | kg | 21388 | 164 | 50477 | 72029 | 44076 | 340 | 90482 | 134898 |
| | R | # | 119 | 2 | 278 | 399 | 212 | 3 | 328 | 543 |
| | | kg | 1443 | 27 | 3507 | 4977 | 2866 | 45 | 4654 | 7565 |
| **Bluefin Tuna** | K | # | | | 2 | 2 | 1 | | | 1 |
| | | kg | | | 370 | 370 | 135 | | | 135 |
| | R | # | 28 | 1 | 10 | 39 | 46 | | 45 | 91 |
| | | kg | 3308 | 214 | 884 | 4406 | 4728 | | 5526 | 10254 |
| **Bigeye Tuna** | K | # | 354 | 17 | 86 | 457 | 527 | 3 | 233 | 763 |
| | | kg | 12288 | 574 | 2780 | 15642 | 21427 | 68 | 9850 | 31345 |
| | R | # | 4 | | 3 | 7 | 16 | | 35 | 51 |
| | | kg | 60 | | 107 | 167 | 272 | | 951 | 1223 |
| **Yellowfin Tuna** | K | # | 38 | | 22 | 60 | 486 | 344 | | 830 |
| | | kg | 1081 | | 562 | 1643 | 12089 | 8274 | | 20363 |
| | R | # | 2 | | 2 | 4 | 11 | | 12 | 23 |
| | | kg | 25 | | 100 | 125 | 115 | | 286 | 401 |
| **Albacore Tuna** | K | # | 169 | 3 | 59 | 231 | 365 | 8 | 739 | 1112 |
| | | kg | 2330 | 33 | 528 | 2891 | 6554 | 119 | 12869 | 19542 |
| | R | # | 52 | | 8 | 60 | 4 | | 36 | 40 |
| | | kg | 295 | | 40 | 335 | 48 | | 527 | 575 |

**Table 6 continued...**

| | | | 2003 | | | | 2002 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Shortfin Mako** | K | # | | | | | 229 | 12 | 51 | 292 |
| | | kg | | | | | 7916 | 490 | 1638 | 10044 |
| | R | # | | | | | 115 | 1 | 36 | 152 |
| | | kg | | | | | 934 | 4 | 212 | 1150 |
| **Mako Shark** | K | # | 78 | | 739 | 817 | | | | |
| | | kg | 1921 | | 14 | 1935 | | | | |
| | R | # | 40 | 1 | 8 | 49 | | | | |
| | | kg | 620 | 20 | 86 | 726 | | | | |
| **Blue Marlin** | K | # | | | | | 1 | | 2 | 3 |
| | | kg | | | | | 18 | | 27 | 45 |
| | R | # | | | 1 | 0 | | | 2 | 2 |
| | | kg | | | 15 | 0 | | | 50 | 50 |
| **Marlin (Unknown)** | K | # | | | | | | | | |
| | | kg | | | | | | | | |
| | R | # | | | | | | | | |
| | | kg | | | | | | | | |
| **White Marlin** | K | # | 3 | | 9 | 12 | 2 | | 5 | 7 |
| | | kg | 90 | | 288 | 378 | 31 | | 152 | 183 |
| | R | # | 9 | | 11 | 20 | 16 | | 19 | 35 |
| | | kg | 260 | | 332 | 592 | 448 | | 525 | 973 |
| **Black Marlin** | R | # | 1 | | | | 2 | | 2 | 4 |
| | | kg | 180 | | | | 724 | | 545 | 1269 |
| **Porbeagle Shark** | K | # | 14 | | 10 | 24 | 61 | 17 | 38 | 116 |
| | | kg | 667 | | 467 | 1134 | 1377 | 443 | 1277 | 3097 |
| | R | # | 119 | 3 | 88 | 210 | 148 | | 28 | 176 |
| | | kg | 1355 | 32 | 968 | 2355 | 1566 | | 311 | 1877 |
| **Common Dolphin Fish (Mahi Mahi)** | K | # | 41 | 3 | 15 | 59 | 1548 | 20 | 211 | 1779 |
| | | kg | 209 | 23 | 63 | 295 | 9449 | 142 | 1264 | 10855 |
| | R | # | 5 | | 1 | 6 | 22 | | 11 | 33 |
| | | kg | 50 | | 3 | 53 | 140 | | 61 | 201 |
| **Escolar** | K | # | | | | | | | | |
| | | kg | | | | | | | | |
| | R | # | | | | | 2 | | 20 | 22 |
| | | kg | | | | | 45 | | | 45 |

**Note: During the assessment, the reports of black marlin showing up in the catch was questioned. Following a request of the industry for DFO to review the information, DFO confirmed that it is not likely that this Indo-Pacific species occurs in the Atlantic. Therefore confirming that the occurrences of black marlin are likely mis-identifications.**

## 3.8 Bycatch Species

Bycatch species, defined by the MSC as organisms that have been taken incidentally and are not retained, usually because they have no commercial value, were identified by the assessment team based on the information provided by the client. Species considered bycatch within the large pelagic fishery included blue shark, blackback gull, greater shearwater, gannet and herring gulls. However, of the species classified as bycatch, blue shark (*Prionace glauca*) was the only species considered a 'main bycatch' species, and therefore the only bycatch species scored within the large pelagic UOC. These species were addressed as 'main bycatch' given the MSC definition of main bycatch based on volume or vulnerability of the species. Other bycatch species of the large pelagic UOC, which were considered 'minor bycatch' can be found in Table 7.

The main species of by-catch in the large pelagic UOC is blue shark (*Prionace glauca*). Blue shark are caught, but are not retained, as they spoil the catch when they are stored prior to landing. Blue shark meat has also been difficult to market, owing to its tendency for rapid spoilage and low prices. In 2006, COSEWIC designated the Atlantic population of blue shark as 'Special Concern' (COSEWIC, 2006b)

While there are concerns surrounding the catches of seabirds in other longline fleets, the conclusion of a workshop hosted to discuss incidental catch of seabirds waters of Arctic countries was that seabird by-catch is not an issue in the Canadian Atlantic pelagic longline fisheries. This has been confirmed by incidental by-catch analyses of observer data in 2000 and subsequent years (DFO, 2004a). The avoidance of seabird interactions may be explained by the fact that the fleet tends to set the gear in the night, it is possible that seabirds cannot see the bait and therefore do not become hooked (Smith, 2001).

The recreational fishery is the primary directed fishery for blue shark. Analyses of blue shark status in Canada indicated that catches in the recreational fishery are a minor component of mortality with bycatch from the pelagic longline fisheries contributing most to harvest mortality (ICCAT, 2008b). Blue sharks are discarded in great numbers by the commercial pelagic fisheries. Life table analyses indicated that blue shark populations are both productive and resilient compared to other shark species, which may explain their persistence in the face of high overall catch mortality and a decline in relative abundance (Campana et al., 2004).

There are non-restrictive catch guidelines for the directed blue shark fishery in Canada. The guideline was set at 250mt in 1992, and was not based on an estimate of stock abundance. No catch restrictions have been implemented on shark caught as bycatch in the large pelagic fishery (Campana et al., 2004). In 1994, as an initiative to decrease mortality, fining became prohibited (DFO 2002a) [wrong reference?]

**Table 7: Catch composition and weights of observed bycatch from the longline large pelagic hauls, 2002 to 2009. Reported weights are total of retained and discarded (dead and alive) values. Source: Observer data provided by DFO. ["K" indicates species kept (retained); "R" indicates species released]**

| | | | 2009 | | | | 2008 | | | | 2007 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| Blue Shark | K | # | | | | | | | | | 1 | 1 | | 2 |
| | | kg | | | | | | | | | 50 | 75 | | 125 |
| | R | # | 2098 | 69 | 231 | 2398 | 1957 | 1 | 409 | 2367 | 1154 | 21 | 90 | 1265 |
| | | kg | 99762 | 1711 | 11291 | 112764 | 70911 | 12 | 7738 | 78661 | 27905 | 237 | 2492 | 30634 |
| Tiger Shark | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | 5 | | | 5 | 7 | | | 7 | 2 | | | 2 |
| | | kg | 576 | | | 576 | 2080 | | | 2080 | 130 | | | 130 |
| Sand Shark | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| Greenland Shark | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| Hammerhead Shark | R | # | 1 | | | 1 | | | | | | | | |
| | | kg | 15 | | | 15 | | | | | | | | |
| Thresher Shark | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | | | 1 | 1 | 2 | | | 2 | 4 | | | 4 |
| | | kg | | | 90 | 90 | 350 | | | 350 | 266 | | | 266 |
| Striped Bonito/Skipjack Tuna | R | # | | | 1 | 1 | | | | | | | 1 | 1 |
| | | kg | | | 8 | 8 | | | | | | | 5 | 5 |
| Blackfin Tuna | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Pelagic Stingray | K | # | 52 | 2 | | 54 | | | | | | | | |
| | | kg | 290 | 6 | | 296 | | | | | | | | |
| | R | # | | | | | 16 | 1 | | 17 | 148 | | | 148 |
| | | kg | | | | | 40 | 1 | | 41 | 437 | | | 437 |
| Rays Unspecified | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| Longnose Lancetfish | R | # | 3 | | 6 | 9 | 2 | 2 | 4 | 8 | 3 | | 8 | 11 |
| | | kg | 17 | | 29 | 46 | 5 | 6 | 8 | 19 | 10 | | 36 | 46 |
| Shortnose Lancetfish | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| Ocean Sunfish | R | # | 1 | 1 | | 2 | | | | | 3 | | | 3 |
| | | kg | 180 | 80 | | 260 | | | | | 1120 | | | 1120 |
| Oilfish | K | # | | | | | | | | | 1 | | | 1 |
| | | kg | | | | | | | | | 5 | | | 5 |
| | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |

**Table 7 continued...**

| | | | 2009 | | | | 2008 | | | | 2007 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Monkfish** | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | | | | | 4 | | | 4 | | | | |
| | | kg | | | | | 13 | | | 13 | | | | |
| **Sea Lamprey** | R | # | | | | | 13 | 1 | | 14 | | | | |
| | | kg | | | | | 13 | 1 | | 14 | | | | |
| **Atlantic Manta Ray** | R | # | 2 | 1 | | 3 | | | | | | | | |
| | | kg | 225 | 230 | | 455 | | | | | | | | |
| **Manta Ray** | R | # | | | | | 1 | | | 1 | | | | |
| | | kg | | | | | 200 | | | 200 | | | | |
| **Remora** | R | # | 2 | | | 2 | 9 | | | 9 | | | | |
| | | kg | 5 | | | 5 | 9 | | | 9 | | | | |
| | | | | | | 0 | | | | | | | | |
| **Great Black Backed Gull** | R | # | | | 1 | 1 | | | | | | | | |
| | | kg | | | 2 | 2 | | | | | | | | |
| **Greater Shearwater** | R | # | 2 | | 1 | 3 | 1 | | | 1 | | | | |
| | | kg | 3 | | 1 | 4 | 1 | | | 1 | | | | |

| | | | 2006 | | | | 2005 | | | | 2004 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Blue Shark** | K | # | 1 | | | 1 | | | | | | | | |
| | | kg | 5 | | | 5 | | | | | | | | |
| | R | # | 1564 | 24 | 103 | 1691 | 749 | | 87 | 836 | 1037 | 24 | 77 | 1138 |
| | | kg | 62815 | 559 | 3888 | 67262 | 31488 | | 3720 | 35208 | 39777 | 1020 | 3348 | 44145 |
| **Tiger Shark** | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | 2 | | | 2 | 6 | | 1 | 7 | 1 | | | 1 |
| | | kg | 450 | | | 450 | 336 | | 20 | 356 | 100 | | | 100 |
| **Sand Shark** | R | # | | | | | 1 | | | 1 | | | | |
| | | kg | | | | | 75 | | | 75 | | | | |
| **Thresher Shark** | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | 1 | 1 | | 2 | 2 | | 1 | 3 | | | 1 | 1 |
| | | kg | 227 | 455 | | 682 | 120 | | 75 | 195 | | | 200 | 200 |
| **Blackfin Tuna** | R | # | | | | | 1 | | | | | | | |
| | | kg | | | | | 20 | | | | | | | |
| | | | | | | | | | | | | | | |

**Table 7 continued...**

| | | | 2006 | | | | 2005 | | | | 2004 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Pelagic Stingray** | K | # | 1 | | | 1 | | | | | | | | |
| | | kg | 5 | | | 5 | | | | | | | | |
| | R | # | 92 | 5 | | 97 | 110 | 2 | 1 | 113 | 4 | | | 4 |
| | | kg | 248 | 13 | | 261 | 299 | 6 | 1 | 306 | 8 | | | 8 |
| **Rays Unspecified** | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| **Longnose Lancetfish** | R | # | 4 | 4 | 18 | 26 | 3 | | 7 | 10 | 4 | | | 4 |
| | | kg | 24 | 13 | 63 | 100 | 24 | | 36 | 60 | 19 | | | 19 |
| **Shortnose Lancetfish** | R | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| **Ocean Sunfish** | R | # | 3 | | | 3 | 1 | | | 1 | 1 | | | 1 |
| | | kg | 495 | | | 495 | 200 | | | 200 | 80 | | | 80 |
| **Oilfish** | K | # | 1 | | | 1 | | | | | | | | |
| | | kg | 23 | | | 23 | | | | | | | | |
| | R | # | 2 | | 1 | 3 | | | | | | | | |
| | | kg | 62 | | 29 | 91 | | | | | | | | |
| **Monkfish** | K | # | | | | | | | | | | | | |
| | | kg | | | | | | | | | | | | |
| | R | # | 1 | | | 1 | | | | | | | | |
| | | kg | 3 | | | 3 | | | | | | | | |
| **Cutless Fishes** | R | # | | | | | | | 7 | 7 | | | | |
| | | kg | | | | | | | 16 | 16 | | | | |
| **Opah** | R | # | 4 | | 3 | 7 | | | | | | | | |
| | | kg | 32 | | 84 | 116 | | | | | | | | |
| **Atlantic Manta Ray** | R | # | | 1 | | 1 | | | | | | | | |
| | | kg | | 500 | | 500 | | | | | | | | |
| **Great Black Backed Gull** | R | # | | | | | | | | | 1 | | 1 | 2 |
| | | kg | | | | | | | | | 2 | | 2 | 4 |
| **Greater Shearwater** | R | # | | | | | | | | | | | 2 | 2 |
| | | kg | | | | | | | | | | | 2 | 2 |
| **Seal (Nonspecified)** | R | # | | | | | | | | | | | 1 | 1 |
| | | kg | | | | | | | | | | | 135 | 135 |

**Table 7 continued...**

| | | | 2003 | | | | 2002 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Blue Shark** | K | # | | | | | | | | |
| | | kg | | | | | | | | |
| | R | # | 31 | | 4 | 35 | 3748 | 69 | 357 | 4174 |
| | | kg | 1805 | | 245 | 2050 | 131454 | 2653 | 15172 | 149279 |
| **Tiger Shark** | K | # | | | | | | | | |
| | | kg | | | | | | | | |
| | R | # | 6 | | | 6 | 9 | | | 9 |
| | | kg | 431 | | | 431 | 904 | | | 904 |
| **Thresher Shark** | K | # | 1 | | | 1 | | | | |
| | | kg | 150 | | | 150 | | | | |
| | R | # | | | | | 6 | | | 6 |
| | | kg | | | | | 526 | | | 526 |

| | | | 2003 | | | | 2002 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| **Striped Bonito/Skipjack Tuna** | R | # | | | 1 | 1 | 1 | | 1 | 2 |
| | | kg | | | 2 | 2 | 3 | | 1 | 4 |
| | | kg | | | | | | | | |
| **Blackfin Tuna** | R | # | | | | | 2 | | | 2 |
| | | kg | | | | | 50 | | | 50 |
| | | | | | | | | | | |
| **Pelagic Stingray** | K | # | | | | | | | | |
| | | kg | | | | | | | | |
| | R | # | 28 | 1 | | 29 | 317 | | 2 | 319 |
| | | kg | 113 | 6 | | 119 | 906 | | 8 | 914 |
| **Rays Unspecified** | R | # | | | | | 1 | | | 1 |
| | | kg | | | | | 70 | | | 70 |
| **Longnose Lancetfish** | R | # | 9 | 4 | 14 | 27 | 21 | 1 | 64 | 86 |
| | | kg | 41 | 15 | 48 | 104 | 89 | 6 | 267 | 362 |
| **Shortnose Lancetfish** | R | # | | | | | | | 1 | 1 |
| | | kg | | | | | | | 1 | 1 |
| **Ocean Sunfish** | R | # | 4 | | | 4 | 11 | | | 11 |
| | | kg | 666 | | | 666 | 1538 | | | 1538 |
| **Oilfish** | K | # | 6 | | 1 | 7 | | | | |
| | | kg | 149 | | 12 | 161 | | | | |
| | R | # | | | 1 | 1 | 1 | | 1 | 2 |
| | | kg | | | 8 | 8 | 18 | | 6 | 24 |
| **Monkfish** | K | # | | | | | | | | |
| | | kg | | | | | | | | |
| | R | # | 2 | | | 2 | | | 1 | 1 |
| | | kg | 6 | | | 6 | | | 3 | 3 |
| **Sea Lamprey** | R | # | 1 | 3 | | 4 | | | | |
| | | kg | 1 | 3 | | 4 | | | | |
| **Atlantic Manta Ray** | R | # | | | | | 1 | | 1 | 2 |
| | | kg | | | | | 160 | | 80 | 240 |
| **Remora** | R | # | 3 | | | 3 | | | | |
| | | kg | 2 | | | 2 | | | | |
| | | | | | | | | | | |
| **Great Black Backed Gull** | R | # | | | | | 13 | 1 | 8 | 22 |
| | | kg | | | | | 33 | 6 | 19 | 58 |
| **Greater Shearwater** | R | # | | | 1 | 1 | 1 | | | 1 |
| | | kg | | | 2 | 2 | 1 | | | 1 |
| **Gannet** | R | # | | | | | 21 | | 2 | 23 |
| | | kg | | | | | 64 | | 6 | 70 |
| **Seal (Nonspecified)** | R | # | 1 | | | 1 | | | | |
| | | kg | 135 | | | 135 | | | | |

## 3.9 Interactions with Endangered, Threatened and Protected (ETP) Species

The MSC has defined ETP (endangered, threatened or protected) species as those that are recognized by national legislation and/or binding international agreements (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party. ETP species identified in the large pelagic fishery include leatherback turtle, loggerhead turtle, Green sea turtle, Kempt/Ridley's Turtle, Northern Bottlenose Whale (Scotian Shelf population listed under SARA, other populations under CITES). Catch listed in Table 8 as either unspecified hard shell turtle or whale species were considered within the ETP component.

All sea turtles are warranted protection on an international level through provisions of the Convention for International Trade in Endangered Species of Wild Flora and Fauna (CITES). Listed in Appendix I, which includes those species that are considered at risk of extinction, turtles are afforded protection from the international trade of products derived from wild animals and plants that are considered in danger. Permits for trade are only issued under exceptional circumstances (CITES, 2008).

At a national level, the leatherback turtle and the northern bottlenose (Gulley population) whale are listed as endangered under the Species at Risk Act (SARA). SARA prohibits persons from killing, harming, harassing, capturing or taking an individual of a wildlife species that is listed as extirpated, endangered or threatened. In addition, it is illegal under the Act to possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated, endangered, or threatened, or any part or derivative of such an individual (Species at Risk Act (2002) Sec 32). In addition to the provisions of protection under SARA, SARA listed species, are offered legal protection under the Fisheries Act, which has the provision to protect fish and fish habitat, and the *Oceans Act* which gives DFO the authority to create Marine Protected Areas to protect endangered and threatened species (Atlantic Leatherback Turtle Recovery Team, 2006).

Under SARA, there are provisions which exempt persons engaging in certain activities from general prohibitions. Such is the case with the swordfish and other tuna longline fleet. Following the listing of the leatherback turtle, DFO hosted a Regional Advisory Process (RAP) review at which participants (including scientists and fishery managers, academia, scientists from the US National Marine Fisheries Services and representatives from the industry) produced an allowable harm document for the species (Atlantic Leatherback Turtle Team 2006). Assuming current fishing effort, the review committee concluded that there was scope for human-induced mortality without jeopardizing the survival of the recovery of the species. Despite this, the review committee still urged that feasible measures be taken to minimize the impact human activist on the species (DFO, 2004a).

Following the approval of the recovery plan in 2006, an Action Plan which outlines how the recovery strategies will be implemented is to be developed within three years. However, in the interim, many of the strategies in this document can be acted upon; therefore recovery implementation will be an ongoing activity that can occur in the absence of any formal action plan (Atlantic Leatherback Turtle Team, 2006).

There have been several initiatives taken by the Atlantic large pelagic longline fleet, in order to reduce the impact of harvest on sea turtles, in particular leatherback turtle. Through participation in the Nova Scotia Leatherback Turtle Working Group, volunteer commercial fishermen have been involved in increasing public awareness of turtle biology and conservation issues, collecting sightings data, and remain committed to conservation of the leatherback at sea through their efforts to disentangle accidentally entrapped turtles (Atlantic Leatherback Turtle Team, 2006). Furthermore, in cooperation with the Atlantic Shark Association, and IVY Fisheries Ltd., the NSSA, through funding from the Habitat Stewardship Program, has been investigating the potential for and nature of interactions between longline pelagic gear and leatherback turtles, leading to not only a better understanding of distribution but also the nature of interactions, and release methods in practice.

Since 1995, a large proportion of the swordfish longline fleet has used circle hooks, which reduce bycatch and maximize the chances of fatally hooking leatherback turtle. In addition, gear is configured to allow turtles to stay at the surface until they are reached. In 2007, members of the industry attended a workshop, hosted by DFO in conjunction with NMFS, aimed at promoting the safe handling and release practices of leatherback turtles. Since 2003, NSSA has provided de-hooking gear to active members of the fleet to ensure harvesters have the tools to release turtles with minimal impact.

The Nova Scotia Swordfishermen's Association has developed a code of conduct (NSSA, 2002) for the responsible sea turtle handling and mitigative measures. The code outlines principles and standards of behavior for dealing with the incidental by-catch of sea turtles by pelagic longline fishermen, harvesting swordfish and other tunas under the auspices of the NSSA. The document was developed in response to the fleets concerns for reducing sea turtle interactions and enhancing post release survivability. The basis for the document was two years of studies which examined the interaction of sea turtles with longline gear.

In 2010, a recovery potential assessment (RPA) for loggerhead turtles (*Caretta caretta*) in Atlantic Canada was conducted to provide information and advice on current status and trends, the impact of human activities on the species, possible alternatives and management measures to mitigate these impacts, and the potential for recover in anticipation of COSEWIC's assessment in 2010 (DFO 2010a). The RPA concluded that there was scope for recover if the total mortality is reduced, and that a reduction of mortality in Canadian waters alone is highly unlikely to be sufficient to achieve species recovery (DFO, 2010a).

In October of 2010, DFO released the Atlantic Canadian Loggerhead Turtle Conservation Action Plan. In response to the RPA, the Action Plan defines the steps that will be taken to achieve improved knowledge and management of turtle interactions in the Canadian Atlantic pelagic longline fisheries. Measures outlined in the action plan will be implemented under the Fisheries Act and through the Integrated Fisheries Management Plan (DFO 2010b).

Monitoring of interactions with ETP species during the swordfish and other tuna harvest is dependent upon data collected by at sea observers, and any interactions that are recorded in the vessel logbooks. Unfortunately, observer data collected prior to 1999 recorded turtle as "unspecified sea turtle", with no differentiation between species (Brazner and McMillan, 2008). While observer coverage on foreign vessels fishing in the Canadian EEZ is 100%,

domestic coverage has varied over time increasing from 0.8% in 1993 (Smith, 2001) to around 20% in years with increased coverage. The ICCAT recommendation is 5% at sea observer coverage for the swordfish fleet.

The Nova Scotia Swordfishermen's Association has initiated work contributing to examining the extent of the impact of the fishery on turtles. In 2001 and 2002, NSSA secured funding from Environment Canada's Habitat Stewardship Program (HSP), to increase observer coverage on actively fishing vessels in order to examine impacts further. Over the course of 2 years, approximately 20% observer coverage was attained in the fleet. Observers documented the incidental take of leatherback and other sea turtles, and monitored release requirements and technology. The objective of the program was to develop techniques and equipment for facilitating humane release and to develop mitigating measures to avoid sea turtle interactions where possible (Javitech, 2002).

There have been several studies and programs that have contributed to the increased knowledge of distribution and degree of interaction of sea turtles with the pelagic longline fleet in the past number of years. Dalhousie University, with the aid of funding from DFO, has been involved in using satellite linked time data recorders since 2000 to gain information on migration and feeding behavior. Marine disentanglement and stranding program has been established in Newfoundland to mitigate impacts of inshore fishermen on leatherback sea turtles, as well as to promote conservation through outreach and education. Cooperative research commenced in 2003 with studies underway to address issues of distribution and abundance through aerial surveys in 2002-2003, composition and distribution of food sources in the area, collation of historic and current sightings, investigation of sources of mortality, and increased public education.

In addition, the Commission for Environmental Cooperation, created by Canada, Mexico and the United States, recently selected the leatherback turtle as a pilot species for the development of a North America Conservation Acton Plan. The CEC was formed to address regional environmental concerns, help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law (Atlantic Leatherback Turtle Recovery Team 2006).

**Table 8: Catch composition and weights of ETP species from the longline large pelagic hauls, 2002 to 2009. Reported weights are total of retained and discarded (dead and alive) values. Source: Observer data provided by DFO. ["R" indicates released; "K" indicates Kept]**

| | | | 2009 | | | | 2008 | | | | 2007 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| Leatherback Sea Turtle | R | # | 8 | | | 8 | 1 | | | 1 | 4 | | | 4 |
| | | kg | 1569 | | | 1569 | 91 | | | 91 | 779 | | | 779 |
| Loggerhead Sea Turtle | R | # | 16 | | | 16 | 31 | | | 31 | 37 | | | 37 |
| | | kg | 482 | | | 482 | 958 | | | 958 | 1476 | | | 1476 |
| Hardshelled Sea Turtles | R | # | 8 | 4 | | 12 | | | | | | | | |
| | | kg | 255 | 239 | | 494 | | | | | | | | |

| | | | 2006 | | | | 2005 | | | | 2004 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| Leatherback Sea Turtle | R | # | 9 | 1 | | 10 | 11 | | | 11 | 9 | | | 9 |
| | | kg | 2764 | 120 | | 2884 | 2392 | | | 2392 | 1350 | | | 1350 |
| Loggerhead Sea Turtle | R | # | 77 | | | 77 | 88 | 2 | | 90 | 5 | | | 5 |
| | | kg | 3127 | | | 3127 | 2753 | 50 | | 2803 | 270 | | | 270 |
| Hardshelled Sea Turtles | R | # | | | | | 2 | | | 2 | 1 | | | 1 |
| | | kg | | | | | 58 | | | 58 | 30 | | | 30 |
| Green Sea Turtle | R | # | | | | | 22 | | | 22 | 1 | | | 1 |
| | | kg | | | | | 870 | | | 870 | 20 | | | 20 |
| Kemp's Ridley Sea Turtle | R | # | | | | | 1 | | | 1 | 2 | | | 2 |
| | | kg | | | | | 100 | | | 100 | 60 | | | 60 |

| | | | 2003 | | | | 2002 | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Alive | UTD | Dead | Total | Alive | UTD | Dead | Total |
| Leatherback Sea Turtle | R | # | 12 | | | 12 | 33 | | | 33 |
| | | kg | 3605 | | | 3605 | 9121 | | | 9121 |
| Loggerhead Sea Turtle | R | # | 32 | | | 32 | 138 | | | 138 |
| | | kg | 3040 | | | 3040 | 5292 | | | 5292 |
| Hardshelled Sea Turtles | R | # | | | | | 7 | | | 7 |
| | | kg | | | | | 465 | | | 465 |
| Green Sea Turtle | R | # | 3 | | | 3 | | | | |
| | | kg | 200 | | | 200 | | | | |
| Kemp's Ridley Sea Turtle | R | # | 1 | | | 1 | | | | |
| | | kg | 75 | | | 75 | | | | |
| Pilot Whale | R | # | | | | | 1 | | | 1 |
| | | kg | | | | | 300 | | | 300 |
| Dolphin | R | # | 1 | | | 1 | 3 | | | 3 |
| | | kg | 35 | | | 35 | 239 | | | 239 |

### 3.10. Categorization of species in MSC assessment

Based upon the percent composition of the catch, the vulnerability of individual species and ETP considerations, the categorization of the species in this assessment is provided in Table 9. There are 12 retained species (not counting Black Marlin which is likely a species misidentification), eight of these (Bluefin Tuna, Bigeye Tuna, Yellowfin Tuna, Albacore, Shortfin Mako, Blue and White Marlin, and Porbeagle) considered main for scoring purposes.

There is a large number of bycatch species, only one of which (Blue Shark) is considered main. As will be seen below, the assessment team decided not to score the minor retained and bycatch species due to a lack of information. In accordance with guidance issued in the MSC FAM version 1, section 7, not scoring minor species effectively capped scoring of Performance indicators 2.1.1 to 2.2.3 at 80. There are seven ETP species (Leatherback, Loggerhead, Hardshelled, Green and Kemp's Ridley turtles, Pilot Whale and Dolphin), all of which were scored.

**Table 9: Categorization of evaluated species for the large pelagic longline fishery for swordfish**

| Retained Species | | Bycatch Species | | | ETP Species |
|---|---|---|---|---|---|
| Main | Minor | Main | Minor | | |
| Bluefin Tuna | Longfin Mako | Blue Shark | Tiger Shark | Oilfish | Leatherback Sea Turtle |
| Bigeye Tuna | Black Marlin* | | Sand Shark | Monkfish | Loggerhead Sea Turtle |
| Yellowfin Tuna | Common Dolphin Fish (Mahi Mahi) | | Greenland Shark | Sea Lamprey | Hardshelled Sea Turtle |
| Albacore Tuna | Escolar | | Hammerhead shark | Atlantic Manta Ray | Green Sea Turtle |
| Shortfin Mako | Wahoo | | Thresher Shark | Manta Ray | Kemp's Ridley Sea Turtle |
| Blue Marlin | | | Striped Bonito/ Skipjack Tuna | Remora | Pilot Whale |
| White Marlin | | | Blackfin Tuna | Great Black Backed Gull | Dolphin |
| Porbeagle Shark | | | Pelagic Stingray | Greater Shearwater | |
| | | | Rays Unspecified | Cutless Fishes | |
| | | | Longnose Lancetfish | Opah | |
| | | | Shortnose Lancetfish | Seal (Non-Specified) | |
| | | | Ocean Sunfish | Gannet | |

*Note: During the assessment, the reports of black marlin showing up in the catch was questioned. Following a request of the industry for DFO to review the information, DFO confirmed that it is not likely that this Indo-Pacific species occurs in the Atlantic. Therefore confirming that the occurrences of black marlin are likely mis-identification.

# 4.0 MANAGEMENT SYSTEM

## 4.1 Management System and Objectives

Fishing for tuna, both on the high seas and in zones of national jurisdiction, is governed by the International Conventions on the Conservation of Atlantic Tuna of 1966. The Commission is established under the Convention and is tasked to co-ordinate scientific research and makes recommendations designed to maintain populations of tuna which will permit maximum sustainable yield. The Commission has adopted minimum permissible weight limits at which tuna may be caught and retained, overall catch limits for various species, gear regulations and schemes for international and port inspection (Churchill and Lowe 1999).

ICCAT defines harvest control rules (HCRs) primarily through the definition of TACs intended to maintain or rebuild stocks to the MSY biomass. ICCAT relies on its Contracting Party Countries (CPCs) to implement HCRs through suitable harvest control tools that will allow the stated objectives to be met by the organization and its membership. Conservation measures take many forms including overall TACs for each species, country specific TACs, CPC allocations by various fleet sectors, effort restrictions per CPC group, time/ area closures to protect spawning or nursery populations, minimum size restrictions to protect juvenile fish.

Canada supports the Precautionary Approach and assigns a high priority to its implementation in fisheries management domestically as well as in the context of ICCAT. Recognizing that ICCAT stocks are currently not information rich, Canada fully supports new research aimed at improving stock assessments. Furthermore, as the Precautionary Approach is not limited to the development of reference points, Canada also strongly promotes the use of appropriate fisheries management and compliance measures to ensure the rebuilding and safeguarding of the resource. Canada is also a member of ICCAT Ad Hoc Working Group on Precautionary Approaches (ICCAT 2008a).

Nationally, there are several legislative and legal documents which aid in the governance and policy implementation in the Atlantic swordfish and other tuna fishery in Canada. The Fishery Act of 1868 provided the legislative base for the implementation of principles, policies and regulations used to manage the fishery.

The 2003 Species at Risk Act provides the legal framework for the protection of species that are designated as endangered, threatened, or of special concern. SARA provides measures that must be taken when the species is list under schedule 1 of the Act. Measures may be implemented within the longline fleet to protect species that are known to have interactions with the fleet, as they are designated at risk under SARA.

There are also linkages between the management of the swordfish and other tuna fishery with the Canada's Ocean Act enacted in 1998. The Oceans Act outlines Canada's approach to the integrated management of ocean resources. In addition the designation of marine protected areas (MPAs) under the Ocean's Act, has already implemented change in the longline fleet, with the closure of Zone 1 of the Gully MPA.

In 1999, the Supreme Court released a decision in the Marshall case, which stated that Treaties signed in 1760 and 1761 by Mi'kmaq and Maliseet communities include a communal right to hunt, fish and gather in pursuit of a moderate livelihood (DFO 2007b). As such, several swordfish, harpoon and swordfish longline licences have been acquired and transferred to First Nations under the Marshall Response Initiative. These licences are subject to the same terms and conditions under this Plan as all other licences (DFO 2004).

In recent years, the Department has intervened in the transfer process to obtain both harpoon and longline licences for subsequent transfer to Aboriginal persons and communities under the Department's Aboriginal Fisheries Strategy. These transfers do not result in an increase in the overall capacity within the fishery (DFO 2004).

In Canada, the management of the fishery is the responsibility of Fisheries and Oceans Canada (DFO). Details of the harvest control rules and tools specific to the Canadian swordfish longline fishery are outlined in Appendix IV (B) Nova Scotia Swordfishermen's Association – Conservation Harvesting Plan (CHP), of the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan. The CHP outlines fleet quotas, individual quotas, time / area closures, observer coverage requirements, VMS requirements, dock side monitoring requirements, hail in / hail out requirements, logbook requirements, season, transfer processes, by-catch reduction measures, and other control measures associated with the fishery.

The current consultation bodies, the terms of reference are outlined in the 2004-2006 Swordfish and Other Tuna Integrated Management Plan. There are two primary consultation bodies: the Atlantic Large Pelagic Advisory Committee (ALPAC) and the Scotia Fundy Large Pelagics Advisory Committee (SFLPAC).

The Atlantic Large Pelagic Advisory Committee provides the link between regional committees and DFO, advising DFO on the management and development of the tuna, swordfish, porbeagle shark and other large pelagics in Atlantic Canada. The committee considers biological, marketing, and other relevant information when formulating advice. ALPAC membership includes representation from the federal, provincial government, fishers and processors. DFO holds consultations twice yearly with ALPAC. Late winter/early spring meetings focus on management recommendations for the upcoming fishing season, while the fall consultations provide advice to Canada's delegation to ICCAT.

The Scotia Fundy Large Pelagics Advisory Committee serves as the pre-eminent consultative forum for Scotia Fundy based large pelagic fishing industry and government (DFO 2004). Meeting at least once a year, the committee addressed issues and concerns regarding the management, conservation, protection and utilization of large pelagic fisheries on Canada's east coast, in greater detail than is sometimes possible at the large forum of ALPAC. These issues and concerns are then brought forward to ALPAC.

The Nova Scotia Swordfishermen's Association holds membership meetings at least twice annually to gather input from the individual participants in the fishery. One meeting is held prior to the spring meetings of SFLPAC and ALPAC to develop the Conservation / Harvesting Plan (CHP) for the fleet for presentation at these advisory committee meetings and a second

meeting is held following these advisory committee meetings to incorporate any required changes to the CHP before it is submitted to Fisheries and Oceans Canada for final approval.

## 4.2 Management Plan

The following description was taken primarily from the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan.

As noted previously, given the highly migratory nature of the target species, management is addressed at both the international and national level. At an international level, ICCAT has implemented several management measures including size restrictions catch limits, gear restrictions and schemes for international and port inspections in order to maintain swordfish catch at levels that will permit maximum sustainable yield.

As a Contracting Party of ICCAT, Canada is also obligated to abide by and foster, where it can, the implementation of all current ICCAT recommendations for conserving swordfish, bigeye tuna, yellowfin tuna, albacore tuna and all other large pelagic stocks that affect or pertain to the Canadian fishery. To that end, most objectives and strategies set in the Canadian swordfish and other tunas fisheries can be traced to specific ICCAT Recommendations. Other objectives stem from Canadian legislative and policy developments over the past few years such as the *Ocean's Act, SARA*, and the Atlantic Fisheries Policy Review (AFPR).

The "Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Fisheries Management Plan" (IFMP or the Plan) is designed to govern the exploitation of swordfish, bigeye tuna, yellowfin tuna and albacore tuna (the latter three collectively referred to as "Other Tunas") during the period 2004-2006. These fisheries were previously governed by separate plans - notably "The Canadian Atlantic Swordfish (*Xiphias gladius*) Fishery - 2000-2002 Integrated Management Plan" and the "Canadian Atlantic Integrated Fisheries Management Plan (IFMP) - Bigeye, Yellowfin, Albacore Tunas 1998-1999". During 2003, the swordfish and other tunas management plan decisions were issued by news release (Appendix IIIA). This new plan follows the IFMP process, but has broadened the scope somewhat to include aspects of objectives-based fisheries management (OBFM) in the planning process. These specifically include:

- Clearly stated long term objectives;
- A risk analysis of the management strategies and measures;
- A post season review of plan performance; and
- Development of indicators of success in plan implementation and in meeting objectives.

In addition the current management plan defines specific management objectives. These objectives are as follows:

Stock Conservation and Sustainability

- International Objectives: ICCAT objectives pertaining to swordfish and other tunas are essentially three-fold: (1) to protect undersized fish; (2) limit effort; and (3) maintain or, in the case of swordfish and bigeye tuna, restore biomass to a level that achieves

MSY. Strategies specific to these objectives are the focus of ICCAT recommendations pertaining to these species, as referenced in Table 2 above or Table 3A of the Swordfish and Other Tunas IFMP. The most significant recommendation is the establishment of a 10-year rebuilding program for north Atlantic swordfish in 1999, which took effect starting in 2000. By 2003, for the first time in over a decade of declining quotas, ICCAT recommended an increase in north Atlantic swordfish TAC. Collectively, these ICCAT recommendations provide the foundation for the Canadian swordfish and other tunas management plan.

- Domestic Objective: The overall conservation objective of the domestic swordfish and other tunas fishing plan is to ensure that Canada's role in supporting the conservation and sustainability objectives of the ICCAT international stock management regime is achieved.

In addition, complementary management measures for swordfish and other tunas are set in response to the Canadian situation, such as the need for a bluefin tuna dead discard reduction strategy that is compatible with the Canadian Bluefin Tuna Management Plan and bluefin tuna fleet allocations. The Plan also aims to provide for the collection and analysis of comprehensive, high quality data about each year's fishery to enable its accurate reporting within the ICCAT framework.

Finally, several objectives are dictated by the requirement to operate within the Canadian regulatory framework relevant to this fishery, including the Fisheries Act and the Atlantic Fishery (General) Regulations, the Ocean's Act, and SARA. Other legislation affecting marine safety and transportation, employment, etc. also exist and are binding on the licence holders, but are beyond the scope of this Plan to detail. Similarly, legal obligations upon the government with respect to fisheries in general terms may exist but are beyond the scope of this Plan to detail.

- Aboriginal Inclusion: It is the policy of DFO to encourage Aboriginal participation and integration into coastal commercial fisheries. As such, several swordfish, harpoon and swordfish longline licences have been acquired and transferred to First Nations (FN) under the Marshall Response Initiative. These licences are subject to the same terms and conditions under this Plan as all other licences.
- Commercial Viability: The management measures, while first striving to achieve the conservation and sustainability objective, will endeavor to provide a suitable foundation upon which the fleets can maintain, and where possible increase, the food supply and economic benefits for themselves and other Canadians that can be derived from these fisheries. It is recognized that the international market place will affect this viability, especially the prices, demand and import restrictions of the USA marketplace, which is the main market for Canadian swordfish and other tunas.
- Co-Management of the Fishery: another long term objective for this fishery is to enhance the scientific study of the swordfish resource wherever it is fished by Canadians, leading to ever-improving management of the fishery. Therefore, the Plan seeks to foster partnerships with all Canadian industry participants who fish the swordfish resource, to provide for additional financial and in-kind contributions, beyond what departmental sources can provide, where this is necessary to enhance the

scientific knowledge upon which the management is based. In this context, the NSSA, the SHA, and other smaller groups of license holders who wish to fish this stock are encouraged to enter into formal agreements with DFO to improve at-sea research.

During the period of this plan, and since 2000, the SHA as well as the Northside Fishermen's Association together with the North of Smokey Fishermen's Association continue to make annual financial contributions to DFO Science for swordfish biological research in lieu of observer coverage under their respective CHPs. Also during the period of this plan, the NSSA continues to work toward effective leatherback turtle by-catch mitigation measures. To that end, the NSSA has purchased, with matched funding under Environment Canada's Habitat Stewardship Program (HSP), 30 turtle de-hooking kits for its members and has developed and promulgated within the fleet a *Code of Conduct for Responsible Sea Turtle Handling and Mitigative Measures*. For the 2005 season, it is expected that every active member of the NSSA will have a turtle de-hooking kit on board their vessel.

- Experimental Fishing: Recognizing that even within a restrictive quota management regime, there must still be some latitude for changes and advancements in fishing operations, the Plan seeks to allow for experimental fishing within the conservation oriented regime, by the existing license holders and within the effort restrictions stipulated by ICCAT. A potential area for development remains the bigeye tuna fishery, whereby Canada is landing only a fraction of the 2,100t limit currently imposed.
- Recreational Fishing: For the period of this Plan, there are no recreational fishing objectives foreseen that would involve the issuance of licenses or permits to fish onboard a boat involved in the commercial fishery in either the harpoon sector or the longline sector. If this should change during the period of this Plan, the appropriate consultations would be held with the industry before the Plan would be amended.

Since the implementation of the 2004-2006 Plan, management measures have been altered and adjusted as necessary through the conservation harvest plans that are developed annually for each sector.

The Plan, which was developed as a result of allocations and other management measures set out by the International Commission for the Conservation of Atlantic Tunas (ICCAT), endeavours to ensure that Canada does not exceed its allocation in any given year. The ICCAT allocations endeavour to rebuild the north Atlantic swordfish stock to biomass that would support fishing equivalent to the maximum sustainable yield (MSY).

Prior to the 2000-2002 Plan, the Canadian swordfish fishery utilized the allocation recommended by ICCAT by operating on a competitive basis under a limited entry regime. While the total number of licences in each of the harpoon and longline sectors was limited, the harpoon fishing competed with longlining for a share of the quota within the national allocation. Although competitive, strict monitoring controls were in place including at-sea observers, hail out and hail in provisions, log books, at-sea Fishery Officer inspections and an industry-funded Dockside Monitoring Program (DMP) of all landings.

The 2000-2002 Plan ushered in a change to the strictly competitive fishery by introducing distinct gear sector allocations for the two different gear types, along with the 5t by-catch allocation for the offshore tuna licence. It also introduced self-administered trip limits in the longline fleet, daily hails once 65% of the fleet allocation was reached and a segregated swordfish by-catch quota within the longline fleet to support a fall other tunas fishery. Results of this approach were inconsistent in the first two years, hence by 2002, a new management strategy was deemed necessary and ITQs were introduced on a trial basis. This approach proved very successful in terms of quota management, increased length of season, fleet rationalization, and allowed for reorientation of effort toward other tunas, hence was approved on a permanent basis by DFO in 2003. The maximum concentration of quota through permanent transfers is limited to 5%.

Within the harpoon sector, the quota is still fished competitively. However it is subdivided into two quota groups; Group A comprises recently active licences while Group B includes all other licences. Recently active is defined as having at least one landed swordfish or hail out against the harpoon-only licence during any of the years 1996-1999 inclusive, documented with DFO.

These quotas are monitored by both the Department and by industry separately, by the two main fisheries Associations, the SHA and the NSSA, on behalf of their respective memberships.

# 5.0 STOCK HEALTH EVALUATION

## 5.1 Stock Health Monitoring

The Atlantic swordfish fishery is assessed by ICCAT. The most recent assessment of Atlantic swordfish took place 2009; the next assessment will take place in 2012 (ICCAT 2009). The 2009 ICCAT assessment was considered during scoring of the candidate fishery.

Stock assessments rely heavily on the commercial data, such as CPUE, submitted by member nations to the ICCAT Swordfish Species Group annually. The group prepares a full assessment every 3-4 years. The draft advice is peer reviewed by the ICCAT standing Committee on Research and Statistics (SCRS), which usually meets in October of every year. Once final, an executive summary is presented to the commission. Scientific advice is provided to Canada during the annual meeting between ALPAC and SCRS, which usually takes place late October or early November (DFO 2004). At that time, following the review of the advice from ICCAT, ALPAC has the opportunity to add to the changes, but is not able to set measures that are less restrictive than those proposed by ICCAT. Changes to management are implemented through the annual CHP and incorporated into the management plan when renewed.

Total Atlantic swordfish estimated catches, including reported discards, are outlined by country and gear type in the 2009 stock assessment. The 2009 stock assessment reports that Canadian landings, inclusive of harpoon and longline landings, in 2008 totaled 1,373t, representing a decline of about 17% since the peak in 2005 (ICCAT 2009)

The biomass index for the North Atlantic swordfish reflects the combined standardized CPUE from the longline fleets of the United States, Spain, Canada, Japan, and Portugal (ICCAT 2009). Moroccan data was examined during the assessment, however it was not used in the analysis.

The 2006 and 2009 ICCAT assessment reports indicated an inability to reliably age older male swordfish. There are also large year class effects in the age-based catch rate indices that require further examination. These issues create uncertainties with current age-based (i.e. virtual population analysis, VPA) assessment approaches, causing ICCAT to put more reliance on the age-aggregated (i.e. surplus production model, SPM) approaches. Having said this, ICCAT (2006 assessment report) has recommended the pursuit of assessment approaches (e.g. Bayesian) that better address these and other uncertainties.

While two models were utilized during the 2009 assessment of North Atlantic swordfish - a non-equilibrium Surplus Production model (ASPIC) and Virtual Population Analysis (VPA) – only the surplus production model was used as the basis of stock status and harvest projections. A Bayesian form of the Surplus Production Model was used for sensitivity analyses (ICCAT, 2009). The total North Atlantic reported catch from 1950-2008, including estimated dead discards was used for the modeling. The VPA used catch at age data derived from 1978-2008 catch-at-size information using the unisex Gompertz growth equation. Only the Canadian and United States indices were updated since the 2006 stock assessment and included values for 2006-2008; the Japanese and Spanish indices were carried over from the 2006 stock assessment. Details on the models, VPA and sensitivity analysis are outlined in (ICCAT 2009).

## 5.2 Current Stock Status

Atlantic swordfish has been one of the success stories of ICCAT management of stocks. Following a significant decline in biomass (down to 65% of its healthy stock size), ICCAT implemented a stock recovery plan to rebuild the stock of North Atlantic swordfish in 1999 (DFO 2007a). The program included the reduction of the international fishing quota to 10,400t (NOAA 2002). Based on the reduced quota, Canada's allocation was less than 1000t (DFO 2007a).

The successful implementation of the rebuilding plan is evident in the fact that in 2001, just four years into the ten year plan, biomass had rebuilt to 94% its healthy stock size. Further rebuilding was reported in the 2006 ICCAT stock assessment for swordfish, at which time it was estimated that biomass was at 99% of the biomass needed for MSY. The 2009 stock assessment states that biomass is at or above $B_{MSY}$ and the Commission's rebuilding objective has been achieved (ICCAT 2009).

Based on the production model analysis, the MSY was estimated at 13,730t, with a corresponding $B_{MSY}$ of 61,860. The 2009 assessment shows a consistent increase in relative biomass since 2000 (Figure 5). The 2008 biomass was estimated to be 64,840t, 4.8% higher than that required to produce MSY. There is greater than 50% probability that the stock is at or above $B_{MSY;}$ thus the Commission's rebuilding objective has been achieved (Figure 6). Fishing

mortality has been below $F_{MSY}$ since 2001 (Figure 7). It should be noted that rebuilding could have been compromised if recent catches had been higher than reported. The 2007 and 2008 catches were 10% and 22% below the estimated MSY respectively, thus allowing the stock to grow in biomass.

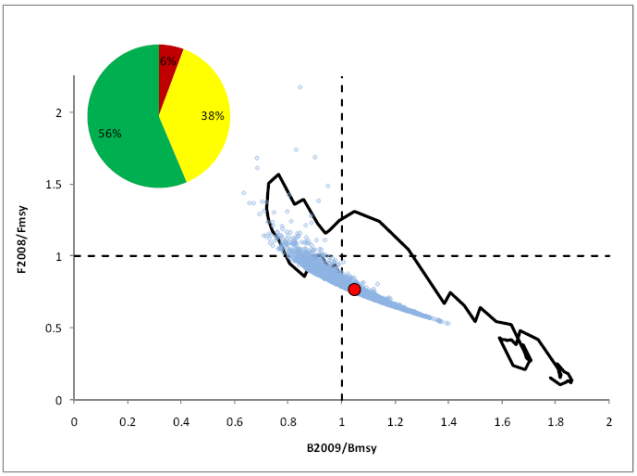


**Figure 5: Summary figure of the current northern Atlantic swordfish stock status the base ASPIC base model: percentage, phase-plots (red dot corresponds to the deterministic result) and stock status trajectories for the period 1950-2008 (ICCAT 2009)**

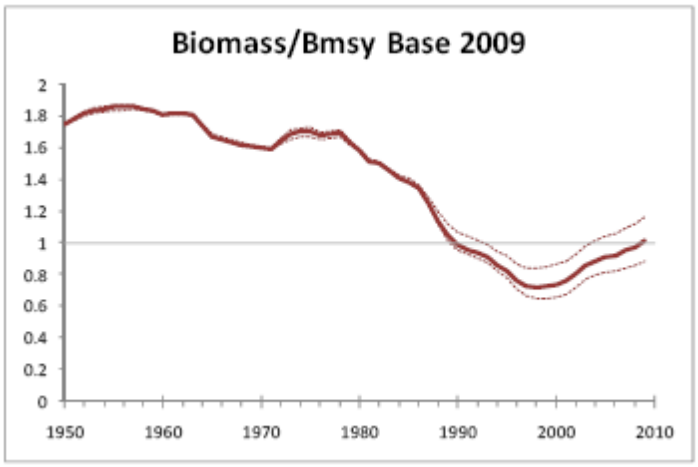


**Figure 6: North Atlantic swordfish biomass (relative to BMSY) estimated by ASPIC base case (ICCAT, 2009).**

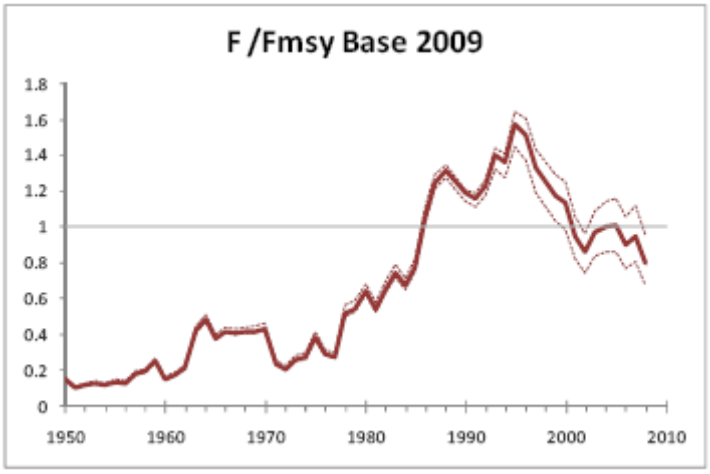


**Figure 7: North Atlantic swordfish fishing mortality (relative to FMSY) estimated by ASPIC base case (ICCAT 2009).**

The SCRS recommended that ICCAT reduce catch limits allowed by Recommendation [06-02] of 15,345t) to no more than 13,700t in order to remain consistent with the goals of the Commission's swordfish rebuilding plan, and to maintain the Northern Atlantic swordfish stock at a biomass that could produce MSY. It noted that a TAC of 13,000t would provide approximately a 75% probability of maintain the stock at a biomass consistent with the Convention Objective over the next decade and would also be consistent with a precautionary Fishery Management approach (ICCAT 2009).

# 6.0 MSC PRINCIPLES AND CRITERIA FOR SUSTAINABLE FISHING

At the centre of the MSC is a set of *Principles and Criteria for Sustainable Fishing* which is used as a standard in a third party, independent and voluntary certification programme. These were developed by means of an extensive, international consultative process through which the views of stakeholders in fisheries were gathered.

**PRINCIPLE 1**

**A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery [1]:**

Intent:

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

Criteria:

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

**PRINCIPLE 2:**

**Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.**

[1] The sequence in which the Principles and Criteria appear does not represent a ranking of their significance, but is rather intended to provide a logical guide to certifiers when assessing a fishery. The criteria by which the MSC Principles will be implemented will be reviewed and revised as appropriate in light of relevant new information, technologies and additional consultations

Intent:

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

Criteria:

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.

2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimizes mortality of, or injuries to endangered, threatened or protected species.

3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

**PRINCIPLE 3:**

**The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.**

Intent:

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

A. Management System Criteria:

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal, and fishing-dependent communities shall be addressed as part of this process;

3. be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings;

4. observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability;

5. incorporates an appropriate mechanism for the resolution of disputes arising within the system[2];

6. provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing;

7. act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty;

8. incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion;

9. require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted;

10. specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:

    a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
    b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
    c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;

    d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
    e) establishing no-take zones where appropriate;

11. contain appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

[2] Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

B. Operational Criteria

The fishing operation shall:

12. make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive;

13. implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;

14. not use destructive fishing practices such as fishing with poisons or explosives;

15. minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.;

16. be conducted in compliance with the fishery management system and all legal and administrative requirements; and

17. assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

# 7.0 FISHERY EVALUATION PROCESS

## 7.1 Certification Process

### Pre-Assessment

As required by the MSC program as the first step in the assessment process, TAVEL Certification Inc. conducted a pre-assessment evaluation of the Atlantic Canada large pelagic longline fishery, which included an examination of swordfish as a potential P1 candidate species in 2008. Concurrently a pre-assessment of the harpoon sector of the Canadian swordfish fishery was conducted. After review of the pre-assessment, the representatives of the harpoon and pelagic longline sectors decided to proceed into one full certification assessment process as two clients, with the understanding that there would be two separate units of certification, one for longline and one for harpoon fisheries. The full certification assessment of the Canadian swordfish harpoon and pelagic longline fisheries commenced in February 2009. All aspects of the assessment process were carried out under the management of TAVEL Certification Inc., an accredited MSC certification body, and in direct accordance with MSC requirements (MSC Fisheries Certification Methodology Version 6).

### Full Certification Process

In order to ensure a thorough and robust assessment process, and a process in which all interested stakeholders could participate, TAVEL used a number of different tactics to identify stakeholders and encourage their participation. This included circulation of all assessment announcements to self-identified stakeholders as well as discussions with both client groups to identify potential stakeholders.

As required by MSC methodology, TAVEL Certification provided opportunities for input at all mandated stages of the assessment process. The general steps followed were:

### Team Selection

At this first step of the assessment process, TAVEL issued advisories through direct email, listing on email list-servers, and posting on select web sites requesting comment on the nominations of persons capable of providing the expertise needed in the assessment. A final team of 3 scientists was chosen to serve as assessment team members. Team members included Mr. Robert O'Boyle, Mr. Jean-Jacques Maguire, and Dr. Michael Sissenwine.

### Performance Indicators and Scoring Guideposts

As required by the MSC Fisheries Assessment Methodology (FAM v1) evaluation process, one of the first tasks of the assessment team was to review the MSC default performance indicators and scoring guideposts (PISGs) and determine their applicability for the evaluation of the candidate fishery. The assessment team was provided with the standardized default assessment tree and responded in support of using the tree without modification in April 2009.

Notification of the intention to use the default assessment tree contained in the MSC FAM v1, in the evaluation of the North Atlantic Canadian swordfish longline and harpoon fisheries against the MSC Principles and Criteria was posted for the required 30 day comment period on April 24, 2009 to allow stakeholders to provide comments on the performance indicators. TAVEL specifically requested comments from the environmental and conservation stakeholder community as well as from the client and management agency. Comments were received from three groups during this period, a summary of which can be seen in Appendix 3.

PISGs for the North Atlantic Canadian swordfish harpoon and longline fisheries were finalized on June 30, 2009. Default weighting of each performance indicator is defined by the MSC and was not changed by the assessment team. The weighting of each level of the assessment tree (e.g. Principle, Component, or PI) is equal to 1, with equal weighting for all branches of the Assessment Tree that lie at the same level.

**Meetings with industry, managers, and stakeholders**

TAVEL Certification planned for and conducted meetings with stakeholders, industry, fishery managers, and fishery scientists as required. The meetings were held in Dartmouth, Nova Scotia on the dates of July 21-24, 2009.

**Scoring fishery**

The assessment team scored the fishery using the required MSC methodology and without input from the client group or stakeholders. The initial scoring session was conducted in Dartmouth, Nova Scotia, on July 24, 2009. There were subsequent scoring discussions held amongst the certification team members after the client provided additional information responding to questions from the Assessment team for some performance indicators.

The assessment team, TAVEL, and the client agreed that given the 2009 ICCAT stock assessment was due in October 2009, finalization of the scoring would be postponed until after the release of the assessment, so that scores would reflect the most recent information with respect to stock status. As such, scores for most indicators were finalized late October 2009, however, at the request of the client, after discussion with DFO, realized the agency was in the process of preparing and releasing a Recovery Potential Assessment (RPA) for loggerhead turtles, scoring of Principle 2 was completed after the RPA was publically available. The RPA was released in May 2010, resulting in the final scoring of the fishery by the assessment team in early June 2010.

**Classification of Principle 2 species**

The MSC FAM v1 requires that the status, management and information for non-target species be evaluated under Principle 2. As this fishery interacts with a number of different species, it is important that readers understand where evaluation of those species can be found in Main Scoring Tables in Section 11. Table 9, in Section 3.10 above, provides the division of the non-candidate catch species.

**Report Drafting**

The assessment team, in collaboration with the TAVEL lead auditor, drafted the report in accordance with MSC required process.

**Selection of peer reviewers**

As required, TAVEL released an announcement of potential peer reviewers soliciting comment from stakeholders on the merit of the selected reviewers. The nominated peer reviewers were Dr. Eric Gilman, Dr. Joseph Powers, Dr. John Musick, and Dr. Ross Shotton. Following the consideration of comments received from several stakeholder groups, and the client, the selected peer reviewers were Dr. Joseph Powers and Dr. John Musick.

**Condition Setting and Client Draft Report Review**

The Assessment Team and Moody Marine Ltd. reviewed potential certification conditions once scores have been finalized and those PIs receiving scores less than 80 are identified. Subsequently, the client was informed of the initial scores via the Client Draft Report. This process includes a review of any additional information submitted as clarification to points raised in the client draft report. The client has a minimum of 30 days in which to review the Client Draft Report and provide feedback.

**Public Comment Periods on Report**

The MSC requirements are that the draft report be made available for public comment for a period of no less than 30 days. Under the MSC Certification Methodology (version 6, September 2006) there is a formal requirement that the public comment period be held after the peer review process. The Public Draft Report was in the public domain for the period of March 9, 2011 to April 11, 2011.

## 7.2 Other Fisheries in the Area

There are several other commercial and recreational fisheries that occur on the Eastern Scotian Shelf and Grand Banks in the same area as the swordfish longline fishery under consideration. Commercial fisheries include those targeting crab, shrimp, scallop, herring, mackerel, silver hake, halibut and bluefin tuna. The ESSIM area is closed to cod and haddock fishing due to low stock biomass and slow growth rates (National Roundtable on the Environment and the Economy 2007). In addition, there is a directed commercial fishery for both the porbeagle shark and the spiny dogfish in the area. Swordfish license holders are also entitled to quotas to harvest bigeye, yellowfin and albacore tuna using longline gear.

First Nation license holders are integrated into the commercial swordfish and other tuna fishery, as well as into the bluefin fishery.

In addition to commercial fishing activities there are several recreational fisheries in the area of operation of the fishery. There is a directed recreational blue shark fishery in Atlantic Canada. A recreational hook, tag and release fishery may be permitted outside the commercial bluefin

tuna season, for existing license holders who have undertaken specialized training for the handling of tuna (DFO 2002).

# 8.0 FISHERY PERFORMANCE

## 8.1 Interpretation of the MSC Standard

The MSC Principles and Criteria provide the overall requirements necessary for certifying that a fishery meets the Marine Stewardship Council's environmental standard for being well-managed and sustainable.

The Fisheries Assessment Methodology adopted by the MSC involves the application and interpretation of the Principles and Criteria to the specific fishery undergoing assessment, based on the defined default assessment tree.

In 2008 the MSC implemented the use of a default assessment tree which included defined Performance Indicators and Scoring Guideposts (PISGs). Unless the Certification Body can demonstrate in writing why a variation from this default assessment tree should apply, and approval is sought and received from the MSC Fisheries Director, all fisheries entering full assessment are to be assessed using the default PISGs. Following the review of the default assessment tree, the assessment team confirmed the default PISGs as appropriate to conduct the assessment of the pelagic longline swordfish fishery under consideration against.

Within the default assessment tree there are 31 performance indicators. Performance indicators represent separate areas of important information (e.g. Indicator 1.1.1 requires evidence of the current stock status of the target species, etc…). These indicators therefore provide a detailed framework of performance attributes necessary to demonstrate that a candidate fishery meets the MSC Criteria in the same way as the Criteria provide the evidence necessary to demonstrate compliance to the MSC Principles.

Individual 'Scoring Guideposts' (60, 80 and 100) are identified for each performance indicator. It is at this level that the performance of the fishery is measured. It is important to note that the absolute numeric values assigned to each of these guideposts are not intended to reflect any type of percentile scoring system but were established by the MSC to help the assessment teams facilitate weighting and combining different performance indicators.

## 8.2 Scoring Methodology

For each Performance Indicator, the candidate fishery's management characteristics are compared with the requirements of the pre-specified attributes for each of three Scoring Guideposts (60, 80, 100) to establish a score. A performance score of at least 60 but less than 80 is intended to reflect 'a pass with condition', a score of 80 but less than 100 represents 'pass without condition', while a 100 score reflects 'perfect performance.' In order for a fishery to be certified it must accomplish three things:

- Achieve a score of 60 or greater for all 31 performance indicators;

- Each MSC Principle must achieve an aggregated score of 80, or pass without conditions.
- A contractual commitment to improve performance for each indicator that has a score less than 80 (i.e. certification condition).

In fisheries where any given indicator scores below 60, a fishery cannot pass the evaluation process and be awarded certification until the performance issue (s) identified can be corrected to the satisfaction of the certification body and its expert evaluation team and the performance indicator rescored to a score greater than 60.

The evaluation framework described above is referred to as the fishery assessment tree. It represents a hierarchical application of the Principles and Criteria. The 60, 80, 100 scoring guideposts used to evaluate a fishery's performance for an indicator are meant to be hierarchical in that to meet a particular score, the scoring guideposts of all lower scores should also have been met.

For any given MSC criterion, sub-criteria and performance indicators are identified as appropriate to the nature of the fishery. Weighting of each level of the Assessment Tree is defined by the MSC in the FAM (v.1). Each level of the Assessment Tree (e.g. Principle, Component or PI) sums to 1, with equal weighting given to each branch of the Assessment Tree that lies at the same level.

The fisheries certification methods are provided in great detail through documents that can be downloaded from the MSC website (www.msc.org). At present, the Fisheries Certification Methodology is in its 6th version, issued September 2006. The Fisheries Assessment Methodology and Guidance to Certification Bodies, Version 1, 21 July 2008, contains the default assessment tree by which this fishery was assessed.

In a recent Policy Advisory, issued in August 2010, the MSC clarified its intent in relation to scoring of repeated scoring issues which appear in different scoring guideposts. The Policy Advisory states:

In the PISG tables, where identical scoring issues are repeated at different SG levels (in PIs 1.1.2, 1.2.2, 3.1.1, 3.2.2, 3.2.3), the text at the higher SG level/s is hereby deleted, leaving the text to appear only once at the lowest current SG level.

In the scoring table below, we have noted the application of this policy in the appropriate performance indicators.

### 8.3 Submission of Data on the Fishery

The MSC certification process is similar to other certification schemes in that the client must provide objective evidence of their compliance with the standard. What is unique about the MSC certification process over a vast number of other certification schemes is the requirement of the independent certification assessors to analyze and evaluate the objective evidence and confirm that the evidence proves that the fishery performance merits a specific score.

Under the MSC program, it is the responsibility of certification applicants to provide the objective evidence required by the assessment team. It is also the responsibility of the applicants to ensure that the assessment team has access to any and all scientists, managers, and fishers that the assessment team identifies as necessary to interview in its effort to properly understand the functions associated with the management of the fishery. Last, it is the responsibility of the assessment team to make contact with stakeholders that are known to be interested, or actively engaged in issues associated with fisheries in the same geographic location.

With aid from Fisheries and Oceans Canada scientific and management personnel in the Maritimes Region, the swordfish fishery clients and their contractors provided a very detailed submission to support their application for certification. The document included responses and references applicable to each performance indicator. The client and DFO also assisted the assessment team in organizing the fishery assessment visit and arranging meetings with all necessary harvesters, processors, scientists, managers and enforcement officials. At the conclusion of the site visit additional information was requested by the assessment team.

## 8.4 Performance Evaluations

After completing information reviews and interviews, the assessment team is responsible to use all the information gathered to assess the performance of the fishery. This is done by assigning numerical scores between 0 and 100, using increments of 5 for each performance indicator. The team uses the scoring guideposts to benchmark the performance of the fishery. To practically accomplish the scoring process in a standardize manner between certification bodies, the MSC provides guidance to certification bodies on assigning scores to performance indicators in which the fishery may be above a particular SG but does not meet the subsequent SG (i.e. how to score a PI in which the fishery meets all of the SG80 and some, but not all points in the SG 100). In essence, the process requires that all team members work together to discuss and evaluate the information they have received for a given performance indicator and come to a consensus decision on weights and scores. Within the FAM (v.1) the MSC has defined weights that shall be assigned to each Component and PI within the Assessment Tree structure. Equal weighting is given to each branch of the Assessment Tree that lies at the same level.

# 9.0 TRACKING, TRACING FISH AND FISH PRODUCTS

**Target Eligibility Date**

Moody Marine Ltd. and the client for the North West Atlantic Canadian swordfish longline assessment have agreed that the eligibility date for this certification will be the date on which the fishery is certified.

**Traceability within the Fishery**

The specific scope of this full certification assessment is the commercial swordfish pelagic longline harvest conducted by licensed harvesters who are members of the client association within the Atlantic Canadian EEZ and in the international waters within the ICCAT Northern Swordfish Boundary Area (North of 5$^{o}$N and west of 30$^{o}$W). This client association represents all longline licenses in the longline fishery. The fishery overlaps with the Canadian harpoon swordfish fishery (already certified) and with high seas swordfish fisheries from other countries. Since the fishery is quota controlled at the point of landing, there is no risk of additional, non-certified fish being sold as certified.

Following certification, a list of license holders eligible to land certified product will be maintained and available from the certification body. Based upon information available from the NSSA membership list, details including the license holder and vessel name are available.

Product traceability was verified to the point of first landing within Atlantic Canadian waters, as such, this control and the ITQ system for the fishery ensures that overlap with other fisheries does not compromise the integrity of certified. Raw product is cleaned at sea, landed and enters the market as fresh headed and gutted product. Within the candidate fishery on-shore processing is limited to the production of portions and steaks.

In Canada, all swordfish landings must be verified by independent dockside monitoring contractors who confirm species, quantity and weight of product offloaded and verify completion of required fishing logs which identifies geographic harvest location. In addition, the longline sector is subject to a recommended minimum of 5% at-sea observer coverage. When on-board, observers verify the quantity and composition of catch, effort, and location data. These requirements are common for all licensed harvesters without exception.

The opinion of the certification body is that this system does not have any specific risks which inherently increase or decrease risk to traceability of certified fish products from a certified fishery.

Fish and fish products from the fishery may enter into further chains of custody, beyond the first point of landing, and be eligible to carry the MSC logo. In order for subsequent links in the distribution chain to be able to use the MSC logo, the swordfish products must enter into a separate chain of custody certification from the point of landing forward. The subsequent links must be able to prove that they can trace the swordfish longline product back to the permitted

vessels which landed the product or to the primary processing facility which initially received the product.

**At-Sea Processing**

There is no at-sea processing within the fishery under consideration. Swordfish is cleaned and iced at sea for delivery as headed and gutted product.

**Point of Landing**

Swordfish caught in the Canadian pelagic longline fishery must be offloaded at wharf facilities which have been authorized by DFO, primarily for the purpose of accessibility. All swordfish trip landings, even when no fish are landed, must be hailed into a dockside monitoring contractor for entry into the DFO electronic fisheries monitoring system. A list of DFO registered wharves in Atlantic Canadian provinces (Newfoundland and Labrador, Nova Scotia, Prince Edward Island, New Brunswick and Quebec can be found at: http://www.dfo-mpo.gc.ca/sch-ppb/list-liste-eng.htm.

**Eligibility to Enter Chain of Custody**

The scope of this certification ends at the first point of landing. Downstream certification of the product would require appropriate certification of storage and handling facilities at these locations.

# 10.0 CERTIFICATION RECOMMENDATION

The overall performance of the North Atlantic Canadian pelagic longline Swordfish fishery is identified in Table 10 below. The Assessment Team has recommended **that the fishery be certified with conditions** in accordance with MSC standard as the first three performance criteria below have not been met:

1. Each MSC Principle has an aggregated, weighted score higher than the required score of 80.
2. No individual performance indicator had a score below 60.
3. The client has agreed to improve the fishery performance for eleven performance indicators which had scores below 80 and above 60.

**Table 10: Final scores allotted to North Atlantic Canadian swordfish fishery and number of conditions issued.**

| | Pelagic Longline Fishery | |
|---|---|---|
| **MSC Principle** | **Fishery Performance** | **Number of Conditions Issued** |
| Principle 1 | 80.6 | 2 |
| Principle 2 | 82.0 | 6 |
| Principle 3 | 81.3 | 3 |

## 10.1 Conditions

The longline swordfish fishery attained scores below 80 for the following performance indicators.

## 10.2 Principle 1 Conditions

### Condition 1

| **Performance Indictor 1.1.2** | **Scoring Guidepost 80** |
|---|---|
| Limit and target reference points are appropriate for the stock | • Reference points are appropriate for the stock and can be estimated<br>• The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity<br>• The target reference point is such that the stock is maintained at a level consistent with $B_{MSY}$ or some measure or surrogate with similar intent or outcome<br>• For low trophic level species, the target |

| | |
|---|---|
| | reference point takes into account the ecological role of the stock |

**Condition**

By the first surveillance audit, evidence must be available to indicate that steps have been taken to develop an explicit Limit Reference Point (LRP) which is set above the level at which there is an appreciable risk of impairing reproductive capacity for the North Atlantic Swordfish stock.

Recognizing that ICCAT is the body responsible for the development and implementation of reference points, to address the condition the assessment team requires that the client is to work with DFO to strongly encourage ICCAT to develop an explicit Limit Reference Point for North Atlantic Swordfish stock. This LRP must be set above a stock biomass (t) at which there is an appreciable risk of recruitment being impaired. The client and DFO must submit a formal request to ICCAT to develop an explicit LRP for the stock within four years of certification. A copy of this letter must be provided at the first annual surveillance audit.

**Client Action Plan:**

The Canadian swordfish industry, working through DFO, at the 2009 ICCAT meeting, proposed that the SCRS develop an explicit LRP for the North Atlantic Swordfish stock, before the next North Atlantic Swordfish assessment. This proposal was adopted as part of ICCAT Recommendation # 2009-02 Supplemental Recommendation by ICCAT to Amend the Rebuilding Program for North Atlantic Swordfish, and can be found in paragraph 5 of this document. The next North Atlantic Swordfish stock assessment is scheduled for 2013.

The same wording appears in paragraph 6. of ICCAT Recommendation 10-2, entitled "Recommendation by ICCAT for the Conservation of North Atlantic Swordfish", adopted at the 2010 ICCAT meeting and is scheduled for completion in 2013.

**Consultation on Condition:**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan. DFO has provided proof that the LRP work is currently scheduled for the SCRS in 2013.

**Condition 2**

| **Performance Indictor 1.2.2** | **Scoring Guidepost 80** |
|---|---|
| There are well defined and effective harvest control rules in place | • Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are |

| | |
|---|---|
| | approached.<br>• The selection of the harvest control rules takes into account the main uncertainties<br>• Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules. |

**Condition**

By the third surveillance audit, evidence must be presented by the fishery client which shows that well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.

As defined by the first scoring issue of the 80 scoring guidepost, an explicit HCR which stipulates how fishing mortality is reduced as the limit reference point (see PI 1.1.2) is approached needs to be established for this stock by ICCAT when management decisions are discussed following the next stock assessment, proposed for 2012, or before if a stock assessment is completed earlier.

During the first and second surveillance audit the client must provide documented evidence that work is ongoing that will contribute to the achievement of the fourth year requirements.

**Client Action Plan:**

The Canadian swordfish industry, working through DFO, at the 2009 ICCAT meeting, proposed that the SCRS develop an explicit LRP for the North Atlantic Swordfish stock, before the next North Atlantic Swordfish assessment. This proposal was adopted as part of ICCAT Recommendation # 2009-02 Supplemental Recommendation by ICCAT to Amend the Rebuilding Program for North Atlantic Swordfish, and can be found in paragraph 5 of this document. The next North Atlantic Swordfish stock assessment is scheduled for 2013.

Following the development of this LRP, by the SCRS, as outlined in ICCAT Resolution # 2009-02, "Future decisions on the management of this stock shall include a measure that would trigger a rebuilding plan, should the biomass decrease to a level approaching the defined LRP as established by the SCRS." (see paragraph 5 of ICCAT Recommendation 2009-02). The Canadian longline swordfish industry, working through DFO, will work to initiate within this rebuilding plan specific rules to establish appropriate harvest levels, should biomass levels begin to approach the LRP developed by the SCRS.

The same wording appears in paragraph 6. of ICCAT Recommendation 10-2, entitled “Recommendation by ICCAT for the Conservation of North Atlantic Swordfish”, adopted at the 2010 ICCAT meeting.

To address concerns about the over exploitation of North Atlantic Swordfish in a given year, ICCAT Recommendation # 2009-02, paragraph 1, bullet 2, states that, "If the total catch in 2010 exceeds 13,700 t, the excess amount shall be deducted from the quota / catch limit for

each CPC on a prorate basis in 2011." This was adopted to address concerns that if all countries fished their entire allocation and carry-forward that the total TAC might be exceeded in any given year.

The same wording appears in paragraph 4. of ICCAT Recommendation 10-2, entitled "Recommendation by ICCAT for the Conservation of North Atlantic Swordfish", adopted at the 2010 ICCAT meeting.

Since the mandate of ICCAT is to maintain or rebuild stock to MSY and since North Atlantic swordfish has just completed a successful rebuilding plan, it would be the position of the Canadian swordfish industry, working through DFO to adopt management measures that would maintain this stock at this level.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan. DFO has provided proof that the LRP work is currently scheduled for the SCRS in 2013.

## 10.3 Principle 2 Conditions

**Condition 3**

| **Performance Indictor 2.1.1** | **Scoring Guidepost 80** |
|---|---|
| The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species. | • Main retained species are highly likely to be within biologically based limits, or if outside the limits, there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. |

**Condition**

By the second surveillance audit, the client must define partial strategies for shortfin mako and porbeagle sharks, which implement demonstrably effective management measures to ensure that the candidate fishery does not hinder recovery and rebuilding of these species. In particular, the partial strategies for both species must consider and explicitly define how post capture mortality impacts rebuilding of the stocks. In addition, the strategy for porbeagle must incorporate a more precautionary TAC.

**Client Action Plan**

By the second surveillance audit, the Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada, through the Canadian Shark Integrated Fisheries Management Plan (IFMP) will outline management strategies and measures for porbeagle sharks that ensure that the swordfish longline fishery does not hinder recovery or rebuilding of these species. The final draft of the IFMP will be available for public review in the fall of 2011. Shortfin mako sharks will be managed through a Conservation Action Plan which will be completed before the 2013 fishing season. Both the IFMP and Conservation Action Plan will be reviewed through the Atlantic Large Pelagics Advisory Committee (ALPAC) and its sub-committee, the Ecosystem Working Group, so that stakeholder input can be considered.

As part of Fisheries and Oceans Canada's work plan for by-catch, methodologies for the calculation of discards and post release mortality estimates, for both species, will be reviewed in 2011 for incorporation in future assessments.

A satellite tagging study for shortfin mako sharks will begin in 2011, with a second year of tagging taking place in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

Similarly, a satellite tagging study for porbeagle sharks will be conducted in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

The Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada will, at the second surveillance audit, demonstrate how post capture mortalities for both species will be incorporated in future assessments and demonstrate the impacts on rebuilding.

ICCAT assessments for shortfin mako and porbeagle sharks are scheduled for 2012 and 2014, respectively. Management measures taken based on these stock assessments will be incorporated through the domestic management plans for these species.

While Canada is one of many member countries at ICCAT, Canada will continue to press for regular stock assessments of these species so that the results of management measures can be reviewed and adjusted, as needed, on a regular basis.

**Consultation on Condition**

The Department of Fisheries and Oceans has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 4**

| **Performance Indictor 2.1.2** | **Scoring Guidepost 80** |
|---|---|
| There is a strategy in place for managing retained species that are designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species. | • There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.<br>• There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.<br>• There is some evidence that the partial strategy is being implemented successfully. |

**Condition**

By the third surveillance audit, the client must provide evidence that there is a partial strategy for conservation of sharks (porbeagle and shortfin mako) that takes account of all sources of fishing related mortality (landings and discards by the assessed fishery, other Canadian fisheries), and international fisheries. There must be an objective scientific basis to conclude that the strategy will maintain these shark stocks within biological limits or ensure that the fishery does not hinder their recovery and rebuilding. The partial strategy must be in place for the assessed fishery so that it does at least its proportionate share to conserve sharks.

**Client Action Plan**

By the second surveillance audit, the Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada, through the Canadian Shark Integrated Fisheries Management Plan (IFMP) will outline management strategies and measures for porbeagle sharks that ensure that the swordfish longline fishery does not hinder recovery or rebuilding of these species. The final draft of the IFMP will be available for public review in the fall of 2011. Shortfin mako sharks will be managed through a Conservation Action Plan which will be completed before the 2013 fishing season. Both the IFMP and Conservation Action Plan will be reviewed through the ALPAC and its sub-committee, the Ecosystem Working Group, so that stakeholder input can be considered.

As part of Fisheries and Oceans Canada's work plan for by-catch, methodologies for the calculation of discards and post release mortality estimates, for both species, will be reviewed in 2011 for incorporation in future assessments.

A satellite tagging study for shortfin mako sharks will begin in 2011, with a second year of tagging taking place in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the

Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

Similarly, a satellite tagging study for porbeagle sharks will be conducted in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

The Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada will, at the second surveillance audit, demonstrate how post capture mortalities for both species will be incorporated in future assessments and demonstrate the impacts on rebuilding.

ICCAT assessments for shortfin mako and porbeagle sharks are tentatively scheduled for 2012 and 2014, respectively. Management measures recommended based on these stock assessments will be reviewed and incorporated through the domestic management plans for these species.

While Canada is one of many member countries at ICCAT, Canada will continue to press for regular stock assessments of these species so that the results of management measures can be reviewed and adjusted, as needed, on a regular basis.

**Consultation on Condition**

The Department of Fisheries and Oceans has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 5**

| **Performance Indictor 2.2.2** | **Scoring Guidepost 80** |
|---|---|
| There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations. | • There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.<br>• There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved.<br>• There is some evidence that the partial strategy is being implemented successfully. |

**Condition**

By the third surveillance audit, the client must provide evidence that there is partial strategy of demonstrable effective management measures in place to ensure that the Canadian Atlantic Swordfish fishery does not hinder recovery and rebuilding of blue shark. Additionally, there must be some objective basis of confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. As well, by the third surveillance audit there must be evidence that the partial strategy is being successfully implemented.

**Client Action Plan**

By the third surveillance audit, the Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada, through the Canadian Shark Conservation Action Plan, will outline management strategies and measures for blue sharks that ensure that the swordfish longline fishery does not hinder recovery of the species. The Conservation Plan will be reviewed through the ALPAC and its sub-committee, the Ecosystem Working Group, so that stakeholder input can be considered and will be in place for the 2013 fishing season.

As part of Fisheries and Oceans Canada's work plan for by-catch, observer coverage level and observer deployment schemes are being examined in 2011. The findings from this work will be reviewed by the ALPAC Ecosystem Working Group for consideration in the Conservation Plan for blue shark.

**Consultation on Condition**

The Department of Fisheries and Oceans has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 6**

| **Performance Indictor 2.3.1** | **Scoring Guidepost 80** |
|---|---|
| The fishery meets national and international requirements for protection of ETP species.<br><br>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species. | • The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species<br>• Direct effects are highly unlikely to create unacceptable impacts to ETP species |

| | |
|---|---|
| | • Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts |

**Condition**

Within four years of certification, the client must demonstrate that direct effects are highly unlikely to create unacceptable impacts to loggerhead turtles. The client should refer to Section 7 of the FAM for the specific performance requirements associated with the term "highly unlikely" as pertaining to this PI.

During the first, second and third surveillance audits, the client must provide documented evidence that work is being undertaken which will contribute to attaining the condition requirements by the fourth surveillance audit.

**Client Action Plan**

The Atlantic Canadian Loggerhead Turtle Conservation Action Plan (LCAP) will introduce regulatory and process / protocol changes aimed at reducing both the interaction and post release mortality of loggerhead turtles.

Some of the operational aspects of the LCAP will come into force immediately while others will not be implemented until year two of the plan.

An evaluation of the LCAP performance alone may not be sufficient to demonstrate a reduction in mortality estimates within such a short time period. Updated information on post-release survival is required. DFO Science, collaborating with the swordfish longline industry, is proposing to develop new estimates of post-release survival after being hooked in pelagic longline fishing gear by conducting work between 2011 and 2013; final results are expected to be available in 2014.

Other planned research that could lead to potential regulatory changes, proposed by the regulator is outlined in both the LCAP and the Loggerhead Turtle RPA. Details of this research and scheduling time lines are covered under the Client Action Plan for Condition 8, below.

While the introduction of gear changes and handling protocols outlined in the LCAP, may allow us to meet the condition, depending on the definition of "highly unlikely" and the actual performance requirements, it may be difficult to evaluate / measure the effectiveness of the gear / handling protocol changes, as these could be offset by other factors.

A RAP review was held on 11, 12 July 2011 to evaluate the precision and stratification of observer data and to recommend changes, if required, to improve monitoring, deployment strategies and schedules, including coverage.

Additional observer training and protocols are currently under development by the regulator and will be implemented for the 2011 fishing season. The aim of these changes is to use a data

collection and recording system consistent with that used in the U.S. to help better understand the life stages of loggerhead turtles that are encountered in the Canadian fishery.

A training and certification program, in the proper use of safe handling and release equipment, and data recording protocols was conducted in March of 2011. Training was mandatory for vessel operators and at-sea observers.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 7**

| **Performance Indictor 2.3.2** | **Scoring Guidepost 80** |
|---|---|
| The fishery has in place precautionary management strategies designed to:<br>- Meet national and international requirements;<br>- Ensure the fishery does not pose a risk of serious or irreversible harm to ETP species; and<br>- Minimize mortality of ETP species | • There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.<br>• There is an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved.<br>• There is evidence that the strategy is being implemented successfully. |

**Condition**

By the first surveillance audit, the client must provide evidence that the strategy (LCAP) is in place for managing the fishery's impact on ETP species, including measures to minimize mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species. Additionally by the fourth surveillance audit evidence must be presented to show that the strategy is being implemented successfully.

During the second and third surveillance audit the client must provide documented evidence that work is ongoing that will contribute to the achievement of the fourth year requirements.

**Client Action Plan**

The Atlantic Canadian Loggerhead Turtle Conservation Action Plan (LCAP) was finalized in October of 2010. Measures outlined in the LCAP are scheduled to be included in the 2011 Conditions of License for Swordfish and Other Tunas, the Swordfish Longline Conservation / Harvesting Plan (CHP) and the Swordfish / Other Tuna Integrated Fisheries Management Plan (IFMP). A copy of these documents will be available for review for the first surveillance audit to demonstrate that the measures have been implemented successfully.

Other planned research that could lead to potential regulatory changes, proposed by the regulator are outlined in both the LCAP and the Loggerhead Turtle RPA. Details of this research and scheduling time lines are covered under the Client Action Plan for Condition 8, below.

A RAP review was conducted on 11, 12 July 2011 to evaluate the precision and stratification of observer data and to recommend changes, if required, to improve monitoring, deployment strategies and schedules, including coverage.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 8**

| **Performance Indictor 2.3.3** | **Scoring Guidepost 80** |
|---|---|
| Relevant information is collected to support the management of fishery impacts on ETP species, including:<br>- Information for the development of the management strategy;<br>- Information to assess the effectiveness of the management strategy; and<br>- Information to determine the outcome status of ETP species. | • Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts<br>• Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species |

**Condition**

By the fourth surveillance audit, the client must present information considered sufficient to determine whether the fishery poses a threat to protection and recovery of the ETP species, specifically loggerhead turtle. Information must be sufficient to not only measure trends but also to support a full strategy to manage impacts.

During each of the first three surveillance audits, the client shall provide documented evidence

to demonstrate the steps being taken, and the progress that has been made to achieve the condition requirements by the fourth surveillance audit.

**Client Action Plan**

The swordfish longline industry, through the at-sea observer program and data collected in the SARA logbooks, will continue to collect information that will assist Fisheries and Oceans Canada to determine whether the fishery poses a threat to protection and recovery of loggerhead turtles.

As part of the LCAP adopted in October 2010, a RAP review was held on 11, 12 July 2011 to evaluate the precision and stratification of observer data and to recommend changes, if required, to improve monitoring, deployment strategies and schedules, including coverage.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

## 10.4 Principle 3 Conditions

**Condition 9**

| **Performance Indictor 3.1.3** | **Scoring Guidepost 80** |
|---|---|
| The management policy has clear long-term objectives to guide decision-making that are consistent with MSC principles and criteria, and incorporates the precautionary approach**.** | • Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. |

**Condition**

By the second surveillance audit, evidence that clear long-term objectives which guide decision-making, are consistent with MSC Principles and Criteria, and the precautionary approach, must be explicit within the management policy.

Canada, in consultation with ALPAC and SFLPAC, should adopt an explicit policy for application of the precautionary approach to management decisions for the longline swordfish fishery. The policy should address both MSC principles 1 and 2.

Likewise, by the third surveillance audit, there must be evidence that Canada has taken steps at ICCAT to encourage the adoption of a policy by ICCAT for application of the precautionary approach to fishery management decisions within its competency.

By the first surveillance audit, the client must provide documented evidence that the

appropriate actions are being taken to lead to the achievement of the deliverables defined by the second and third surveillance audit.

**Client Action Plan**

The swordfish longline industry will raise this issue at the first meeting of both ALPAC and SFLPAC following certification. The industry will recommend that Canada adopt an explicit policy consistent with MSC Principles 1 and 2 and the precautionary approach within the Canadian Swordfish IFMP. While the recommendation will be made by industry within the time period suggested by this condition, the adoption within the Canadian Swordfish IFMP will be dependent upon the timing of final certification of the fishery. It is anticipated that the new Canadian Swordfish IFMP will be completed in 2011.

Canada has been a leader in putting forward the use of the precautionary approach at the ICCAT level in recent years and will continue to do so in future. Canada has hosted an ICCAT precautionary approach workshop and continues to work within the ICCAT precautionary approach working group to work towards the adoption of the precautionary approach to management of ICCAT species. A meeting of this working group was held in April 2010 with Canadian participation and Canada will continue to participate in future working group meetings to forward the adoption of the precautionary approach by ICCAT.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 10**

| **Performance Indictor 3.2.2** | **Scoring Guidepost 80** |
|---|---|
| The fishery-specific management system includes effective decision making processes that result in measures and strategies to achieve the objectives. | • There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.<br>• Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.<br>• Decision-making processes use the precautionary approach and are based on best available information.<br>• Explanations are provided for any actions or lack of action associated with findings |

| | |
|---|---|
| | and relevant recommendations emerging from research, monitoring, evaluation and review activity. |

**Condition**

Condition same as one defined in 3.1.3:

By the second surveillance audit, evidence that clear long-term objectives which guide decision-making, are consistent with MSC Principles and Criteria, and the precautionary approach, must be explicit within the management policy.

Canada, in consultation with ALPAC and SFLPAC, should adopt an explicit policy for application of the precautionary approach to management decisions for the longline swordfish fishery. The policy should address both MSC principles 1 and 2.

Likewise, by the third surveillance audit, there must be evidence that Canada has taken steps at ICCAT to encourage the adoption of a policy at the ICCAT level for application of the precautionary approach to fishery management decisions within its competency.

By the first surveillance audit, the client must provide documented evidence that the appropriate actions are being taken to lead to the achievement of the deliverables defined by the second and third surveillance audit.

**Client Action Plan**

The swordfish longline industry will raise this issue at the first meeting of both ALPAC and SFLPAC following certification. The industry will recommend that Canada adopt an explicit policy consistent with MSC Principles 1 and 2 and the precautionary approach within the Canadian Swordfish IFMP. While the recommendation will be made by industry within the time period suggested by this condition, the adoption within the Canadian Swordfish IFMP will be dependent upon the timing of final certification of the fishery. It is anticipated that the new Canadian Swordfish IFMP will be completed in 2011.

Canada has been a leader in putting forward the use of the precautionary approach at the ICCAT level in recent years and will continue to do so in future. Canada has hosted an ICCAT precautionary approach workshop and continues to work within the ICCAT precautionary approach working group to work towards the adoption of the precautionary approach to management of ICCAT species. A meeting of this working group was held in April, 2010 with Canadian participation and Canada will continue to participate in future working group meetings to forward the adoption of the precautionary approach by ICCAT.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

**Condition 11**

| **Performance Indictor 3.2.4** | **Scoring Guidepost 80** |
|---|---|
| The fishery has a research plan that addresses the information needs of management. | • A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.<br>• Research results are disseminated to all interested parties in a timely fashion. |

**Condition**

By the second surveillance audit the client, in cooperation with the management body, must have in place a research plan which provides a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC Principles 1 and 2, in particular with respect to the fisheries interaction and impact on ETP species. While there is a research plan in place, it is focused on Principle 1 related issues, and there is minimal research on methods for reducing longline interactions with endangered, threatened and protected species. As such, to meet the 80SG, a research plan to reduce longline interactions with endangered, threatened and protected species shall be designed and implement by the fishing industry in cooperation with DFO.

During the first surveillance audit the client must provide documented evidence that work is ongoing that will contribute to the achievement of the second year requirements.

**Client Action Plan**

Through consultations with industry and other stakeholders, the management body is currently in the process of developing a comprehensive short-term and long-term research plan with respect to retained species, by-catch species, and ETP species encountered in the fishery that will provide information sufficient to achieve the objectives consistent with MSC Principles 1 and 2. This plan will incorporate the research outlined in both the LCAP and the Loggerhead Turtle RPA, but will also contain further research on species considered in this assessment under the Retained and By-Catch headings.

The purpose of the plan is to assist in better quantifying interaction levels and determine possible measures to reduce both interaction levels and harm levels where appropriate. It is anticipated that this plan will be finalized and underway in 2011 and a copy of the research plan will be available for the review during the second surveillance audit.

The research plan will include, but not be limited to the following actions:

Research Work Currently Underway

1. Investigate the effects of gear deployment (e.g. set time, set duration) on the frequency of encounters.
    a. Analysis of the 2011 / 2002 interaction data to propose improved fishing practices to mitigate turtle interactions (Tech report 2011)

2. Analysis of data from enhanced Observer coverage undertaken in 2001 and 2002 to improve monitoring, if improvements are required.
    a. Years with enhanced observer coverage of large pelagic fleet (Evaluate the utility of higher observer coverage conducted in 2001/2002) with respect to quantifying an improvement in precision. (RAP July 11-12, 2011)

3. Use improved data collection identified in the Monitoring section above to enhance estimation of post-release mortality of bycaught turtles.
    a. Enhanced data collection protocols for recording the type of information required to understand the condition of release. (2011)
    b. Improve handling practices to mitigate post release mortality
4. Best practices for bycatch estimation.
    a. Work with U.S. counterparts on a consistent approach to bycatch estimation (this is ongoing work using existing data)

Proposed and Long Term

1 Documentation of current fishing practices and literature review.
    a. Analysis of current fishing practices

2 Keep abreast of international studies investigating post-release survival of loggerhead sea turtles.
    a. Improve knowledge of loggerhead turtle post release mortality in the Canadian pelagic longline fishery using satellite pop up tags (IGS proposal 2011-2014)

3 Develop spatial/temporal models of loggerhead sea turtle habitat in Canadian waters, and compare habitat location(s) to sea surface temperature and spatial distribution of the Canadian pelagic longline fishery.
    a Predicting loggerhead sea turtle distributions in Atlantic Canadian waters (IGS proposal 2011-2014)
    b. Feasibility of using the information to reduce turtles interaction (2011-2014)

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

# 11 ASSESSMENT RESULTS

Tables 11, 12, and 13 provide the scoring summary for each MSC Principle. Table 14 is a tabular explanation of the assessment team's evaluation of the information it received and the team's interpretation of the information as it pertains to the fishery's compliance with the MSC Principles and Criteria.

Each individual performance indicator is presented in a table. The performance indicator and the MSC defined 60, 80 and 100 scoring guideposts are presented. The weighting of that performance indicator within the specific level of the assessment tree, as defined by the MSC FAMv1, is noted. The numerical score in the last cell of the second row is the score that has been awarded by the assessment team. The lower cell of each performance indicator table provides two types of information. The first paragraph(s) are denoted as "Client" information. This is a direct copy of information that the client has provided as evidence to demonstrate their compliance to that specific performance indicator. Neither the Certification Body, nor the assessment team, modified that information. The second category of information in the lower portion of that cell is denoted as "Scoring rationale". This is information provided by the assessment team to demonstrate the rationale and the supporting evidence used to award the score for that performance indicator.

**Table 11: MSC Principle 1 Scoring Summary – Canadian Pelagic Longline Fishery**

| MSC Principle | MSC Component | PI Number | Performance Indicator | Weight component/ Weight in | Longline Fishery |
|---|---|---|---|---|---|
| 1 | | | A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery. | | |
| | 1.1 | | **Outcome** | 0.5 | |
| | | 1.1.1 | The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing. | | 80 |
| | | 1.1.2 | Limit and target reference points are appropriate for the stock. | | 75 |
| | | 1.1.3 | Where the stock is depleted, there is evidence of stock rebuilding. | | N/A |
| | 1.2 | | **Harvest Strategy** | 0.5 | |
| | | 1.2.1 | There is a robust and precautionary harvest strategy in place. | 0.25/0.125 | 90 |
| | | 1.2.2 | There are well defined and effective harvest control rules in | 0.25/0.125 | 75 |
| | | 1.2.3 | Relevant information is collected to support the harvest strategy. | 0.25/0.125 | 80 |
| | | 1.2.4 | There is an adequate assessment of the stock status. | 0.25/0.125 | 90 |

**Table 12: MSC Principle 2 Scoring Summary- Canadian Pelagic Longline Fishery**

| MSC Principle | MSC Component | PI Number | Performance Indicator | Weight in component/ Weight in PI | Longline Fishery |
|---|---|---|---|---|---|
| 2 | | | Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends. | | |
| | 2.1 | | **Retained Species** | 0.2 | |
| | | 2.1.1 | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species. | 0.333/0.0667 | 75 |
| | | 2.1.2 | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species. | 0.333/0.0667 | 75 |
| | | 2.1.3 | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species. | 0.333/0.0667 | 80 |
| | 2.2 | | **Bycatch Species** | 0.2 | |
| | | 2.2.1 | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups. | 0.333/0.0667 | 80 |
| | | 2.2.2 | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations. | 0.333/0.0667 | 60 |
| | | 2.2.3 | Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch. | 0.333/0.0667 | 80 |

| MSC Principle | MSC Component | PI Number | Performance Indicator | Weight in component/ Weight in PI | Longline Fishery |
|---|---|---|---|---|---|
| | 2.3 | | **ETP Species** | 0.2 | |
| | | 2.3.1 | The fishery meets national and international requirements for protection of ETP species; The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species. | 0.333/0.0667 | 75 |
| | | 2.3.2 | The fishery has in place precautionary management strategies designed to: meet national and international requirements, ensure the fishery does not pose a risk of serious or irreversible harm to ETP species, ensure the fishery does not hinder recovery of ETP species, and minimise mortality of ETP species. | 0.333/0.0667 | 75 |
| | | 2.3.3 | Relevant information is collected to support the management of fishery impacts on ETP species, including: information for the development of the management strategy, information to assess the effectiveness of the management strategy, and information to determine the outcome status of ETP species. | 0.333/0.0667 | 70 |
| | 2.4 | | **Habitats** | 0.2 | |
| | | 2.4.1 | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis and function. | 0.333/0.0667 | 100 |
| | | 2.4.2 | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types. | 0.333/0.0667 | 100 |
| | | 2.4.3 | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types. | 0.333/0.0667 | 95 |
| | 2.5 | | **Ecosystem** | 0.2 | |
| | | 2.5.1 | The fishery does not cause serious or irreversiable harm to the key elements of ecosystem structure and function. | 0.333/0.0667 | 90 |
| | | 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function. | 0.333/0.0667 | 90 |
| | | 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem. | 0.333/0.0667 | 85 |

**Table 13: MSC Principle 3 Scoring Summary – Canadian Pelagic Longline Fishery**

| MSC Principle | MSC Component | PI Number | Performance Indicator | Weight in component/ Weight in PI (Same for both fisheries) | Longline Fishery |
|---|---|---|---|---|---|
| 3 | | | The fishery is subject to an effective management system that respects local, national and interjurisdictional laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable. | | |
| | 3.1 | | **Governance and Policy** | 0.5 | |
| | | 3.1.1 | The management system exists within an appropriate and effective legal and/or customary framework which ensures that it: is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; Observers the legal rights created explicitly or established by custom of people dependent on fishing for food or livilihood; and Incorporates an appropriate dispute resolution framework. | 0.25/0.125 | 85 |
| | | 3.1.2 | The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties. | 0.25/0.125 | 80 |
| | | 3.1.3 | The management policy has clear long-term objectives to guide decision - making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach. | 0.25/0.125 | 75 |
| | | 3.1.4 | The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unstainable fishing. | 0.25/0.125 | 90 |

| MSC Principle | MSC Component | PI Number | Performance Indicator | Weight in component/ Weight in PI (Same for both fisheries) | Longline Fishery |
|---|---|---|---|---|---|
| 3 | 3.2 | | **Fishery Specific Management System** | 0.5 | |
| | | 3.2.1 | The fishery has clear, specific obejctives designed to achieve the outcomes expressed by MSC's Principles 1 and 2. | 0.2/0.1 | 80 |
| | | 3.2.2 | The fishery - specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives. | 0.2/0.1 | 75 |
| | | 3.2.3 | Monitoring, control, and surveillance mechanisms ensure the fishery's management measures are enforeced and complied with. | 0.2/0.1 | 90 |
| | | 3.2.4 | The fishrey has a research plan that addresses the information needs of management. | 0.2/0.1 | 70 |
| | | 3.2.5 | There is a system for monitoring and evaluating the performance of the fishery - specific management system against its objectives. There is effective and timely review of the fishery-specific management system. | 0.2/0.1 | 80 |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

**Table 14: Detailed Assessment Results**

| **MSC Principle 1** | **A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.** |
|---|---|

| *Intent* | *The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favor of short-term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.* |
|---|---|

| **Weight** | | **Score** | **80.6** |
|---|---|---|---|

| **1.1** | **Management Outcomes** |
|---|---|

| 1.1.1 | The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing. | • It is likely that the stock is above the point where recruitment would be impaired. | • It is highly likely that the stock is above the point where recruitment would be impaired.<br>• The stock is at or fluctuating around its target reference point. | • There is a high degree of certainty that the stock is above the point where recruitment would be impaired.<br>• There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years. |
|---|---|---|---|---|
| **Weight** | | **0.5** | **Score** | **80** |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

**Client**:

In order to evaluate and manage swordfish stocks, the ICCAT considers three distinct units of management: North Atlantic, South Atlantic and the Mediterranean. The last ICCAT assessment for swordfish was conducted in 2009, with the next assessment for swordfish scheduled for 2012 (ICCAT 2009).

Atlantic swordfish has been one of the success stories of ICCAT management of stocks. Following a significant decline in biomass, down to 65% of its healthy stock size, ICCAT implemented a stock recovery plan to rebuild the stock of North Atlantic swordfish in 1999 (DFO 2007 (a)). The program included the reduction of the international fishing quota to 10,400t (NOAA 2002). Based on the reduced quota, Canada's allocation was less than 1000t (DFO 2007 (a)).

The successful implementation of the rebuilding plan is evident in the fact that in 2001, just four years into the ten year plan, biomass had rebuilt to 94% its healthy stock size. Further rebuilding was reported in the most recent 2006 ICCAT stock assessment for swordfish, at which time it was estimated that biomass was at 99% of the biomass needed for MSY. The 2009 stock assessment states that biomass is at or above $B_{MSY}$ and the Commission's rebuilding objective has been achieved (ICCAT 2009).

The 2009 stock assessment estimated biomass for swordfish was 4.8% above the biomass needed for MSY. Stock status analysis indicated that biomass is at or above $B_{MSY}$, and thus the Commission's rebuilding objective has been achieved (ICCAT 2009). Based on production model analysis, the MSY was estimated at 13,730t, the biomass beginning in 2008 was estimated at 1.048% of the biomass needed to produce MSY. Additionally, fishing mortality has been below $F_{MSY}$ since 2005. The stock assessment summary states that the estimate of stock status in 2009 is relatively similar to the estimated status from the 2006 assessment, and suggest that there is a greater than 50% probability that the stock is at or above $B_{MSY,}$ and thus the Commission's rebuilding objective has been achieved. Figure 5 provides a graphical summary of the current northern Atlantic swordfish status.

In addition, relative trends in fishing mortality (Figure 7) shows that the level of has continued to decline, and mortality from fishing has been consistently below Fmsy since 2001 (ICCAT 2009). It is important to note that catches since 2003 have been below the TAC's, therefore increasing the chances for a fast recovery.

Based on the 2009 assessment, the Committee recommended reducing catch limits allowed by Rec. [06-02] of 15,345t) to no more than 13,700t in order to remain consistent with the goals of the Commissions swordfish rebuilding plan, and to maintain the northern Atlantic swordfish stock at a level that could produce MSY. A TAC of 13,000t would provide approximately a 75% probability of maintain the stock at a level consistent

with the Convention Objective over the next decade and would also be consistent with a precautionary Fishery Management approach (ICCAT 2009).

Production models were projected to the year 2018, with varying TAC scenarios ranging from 10,000t to 15,000t. Results of the 2009 assessment indicated that there is a greater than 50% probability that the northern swordfish stock has rebuilt to or above BMSY. The 2007 and 2008 catches were 10% and 22% below the estimated MSY level, respectively, thus allowing the stock to grow in biomass. It was determined that a TAC of 13,000t would provide approximately a 75% probability of maintain the stock at a level consistent with the Convention Objectives over the next decade (ICCAT 2009).

**Scoring Rationale**

To score this PI, it is necessary to determine the probability that the stock biomass is above the point at which recruitment would be impaired. As there is no explicit limit reference point (LRP) for this stock, a default of $B_{25\%}$ was identified as per the MSC FAM guidelines (PI 1.1.2). The 2009 assessment (ICCAT, 2009) indicates that current biomass is at or slightly above the $B_{MSY}$ target reference point. Under two surplus production model scenarios (ASPIC and BSP), there is a low probability (less than 5%) that the 2009 stock biomass was at or below the default $B_{25\%}$ limit reference point. It is therefore highly likely that the stock is above the point where recruitment would be impaired. However, the $B_{25\%}$ may not be an appropriate default LRP. $F_{MSY}$ (0.28) from the Surplus Production Model is high compared to generally recognized $F_{MSY}$ proxies (e.g. $F_{30\%} = 0.15$ and $F_{40\%} = 0.11$). This indicates that the implied stock – recruitment relationship is domed, which appears to be the case from DFO 2009b. A higher biomass LRP than $B_{25\%}$ may be warranted. Thus, it is not possible to state where or not stock biomass is above the LRP with a high degree of certainty, as required in the 100 SG.

The second element of the 80 scoring guidepost of this PI is whether or not stock biomass is at or fluctuating around the target $B_{MSY}$ reference point. ICCAT (2009) indicates that stock biomass is at or slight above to the target $B_{MSY}$.

The assessment thus meets both issues of the 80SG associated with this PI and is scored 80.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 1.1.2 | Limit and target reference points are appropriate for the stock. | • Generic limit and target reference points are based on justifiable and reasonable practice appropriate for species category. | • Reference points are appropriate for the stock and can be estimated.<br>• The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.<br>• The target reference point is such that the stock is maintained at a level consistent with $B_{MSY}$ or some measure or surrogate with similar intent or outcome.<br>• For low trophic level species, the target reference point takes into account the ecological role of the stock. | • Reference points are appropriate for stock and can be estimated.<br>• The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.<br>• The target reference point is such that the stock is maintained at level consistent with $B_{MSY}$ or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty. |
| **Weight** | **0.5** | **Score** | **75** |

**Client**

Harvest strategies are often specified using references for fishing mortality (F) and biomass (B). Article VIII of the ICCAT Convention states that the objective is to maintain populations at levels which will permit the maximum sustainable catch (MSY). It is generally accepted that the prevailing interpretation of the Precautionary Approach considers $F_{MSY}$ and $B_{MSY}$ as limits.

The ICCAT Glossary of Fishery Terms (ICCAT, 2000) defines $B_{MSY}$ or biomass at MSY as a biological reference point. It is the long-term

average biomass value expected if fishing at FMSY. The text of the International Convention for the Conservation of Atlantic Tunas states that ICCAT is responsible for "*studying and appraising information concerning measures and methods to ensure maintenance of the populations of tuna and tuna-like fishes in the Convention area at levels which will permit the maximum sustainable catch and which will ensure the effective exploitation of these fishes in a manner consistent with this catch*" (Article IV, paragraph 2.*b*) (Caddy and Mahon1995).

The glossary defines fishing mortality at maximum sustainable yield ($F_{MSY}$) as a biological reference point. It is the fishing mortality rate which, if applied constantly, would result in Maximum Sustainable Yield (MSY). $F_{MSY}$ is the implicit fishing mortality target of the International Convention for the Conservation of Atlantic Tunas (see BMSY). FMSY can be estimated in two ways: (1) From simple (biomass-aggregated) production models (e.g., ASPIC, PRODFIT); (2) from age-structured models that include a stock-recruitment relationship (e.g., ASPM). ICCAT does not explicitly define limit reference points for its management, however $F_{MSY}$ is the implied target (Caddy and Mahon 1995).

Reference points are produced for the various species using the stock assessment tools for each of the species.

Limit and target reference points are appropriate for the stock. The target reference point is such that the stock is maintained at a level consistent with Bmsy and the limit reference point does not pose a risk of impairing reproductive capacity (ICCAT-SCRS 2006. SCI-040/2006).

**Scoring Rationale**

Issues on 6 September 2010, in Section 4 of Policy Advisory 18 the MSC clarified that: *" In the PISG tables, where identical scoring issues are repeated at different SG levels (in PIs 1.1.2, 1.2.2, 3.1.1, 3.2.2, 3.2.3), the text at the higher SG level/s is hereby deleted, leaving the text to appear only once at the lowest current SG level."* This new guidance removes the first scoring issue at the 100SG of this PI, thus removing the impact of this issue on the final score.

In relation to generic target and limit reference points (RP) under SG60, stock rebuilding was initiated in 1999 when the biomass was 65 percent of $B_{MSY}$ or about 33 % of virgin biomass. This is taken as evidence of an implied generic limit RP. Target RPs developed for the stock are based upon a Schaefer Production Model (ICCAT, 2009), are generally considered appropriate for the stock and can be estimated. $B_{MSY}$ (61.9 kt) and $F_{MSY}$ (0.22), the target RPs, are provided in ICCAT (2009). A variety of age-based RPs are also available, although these are not used in management. Thus, this PI is scored at least 60.

In relation to the first scoring issue, (appropriateness of RPs), under SG80, the assessment team was concerned with the low (13%) Spawner per Recruit (SPR) associated with target fishing mortality, $F_{MSY}$. Commonly used $F_{MSY}$ proxies are associated with SPR in the order of 40%. The low

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

SPR is likely a consequence of the domed stock / recruitment relationship. Such relationships are due to cannibalism, crowding in preferred habitat or some other density-dependent process. It is not apparent what process would cause domed stock / recruitment relationships in swordfish. Although the team had concern about the low SPR, the team concluded the first scoring issue was met.

In relation to the (the second scoring issue, limit RP), under SG80, MSC Fishery Assessment Methodology (FAM) scoring guidance Section 6.2.19 states that when there is no explicitly defined LRP, a default can be used in the scoring of PI 1.1.1, this dependent on whether or not $B_{MSY}$ is smaller or larger than 40% of virgin biomass ($B_{40\%}$ or 49.5 kt). Since $B_{MSY}$ is greater than $B_{40\%}$, the default LRP is $B_{25\%}$ or 31.0 kt which is lower than the biomass when the stock rebuilding action was taken in 1999. The default LRP is likely above the level at which there is an appreciable risk of impairing reproductive capacity although this is uncertain. The team considered that this scoring issue was not met, therefore a condition was imposed.

As noted above, a target RP is defined which is consistent with $B_{MSY}$. Thus, the third scoring element of SG80 is met.

As swordfish occupies a higher trophic level, the fourth scoring element is not applicable to the scoring of this PI.

The first and third scoring issues were met, the second was not and the fourth was not applicable. A score of 75 was awarded.

**Condition**

By the first surveillance audit, evidence must be available to indicate that steps have been taken to develop an explicit Limit Reference Point (LRP) which is set above the level at which there is an appreciable risk of impairing reproductive capacity for the North Atlantic Swordfish stock.

Recognizing that ICCAT is the body responsible for the development and implementation of reference points, to address the condition the assessment team requires that the client is to work with DFO to strongly encourage ICCAT to develop an explicit Limit Reference Point for North Atlantic Swordfish stock. This LRP must be set above a stock biomass (t) at which there is an appreciable risk of recruitment being impaired. The client and DFO must submit a formal request to ICCAT to develop an explicit LRP for the stock within four years of certification. A copy of this letter must be provided at the first annual surveillance audit.

**Client Action Plan**

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

The Canadian swordfish industry, working through DFO, at the 2009 ICCAT meeting, proposed that the SCRS develop an explicit LRP for the North Atlantic Swordfish stock, before the next North Atlantic Swordfish assessment. This proposal was adopted as part of ICCAT Recommendation # 2009-02 Supplemental Recommendation by ICCAT to Amend the Rebuilding Program for North Atlantic Swordfish, and can be found in paragraph 5 of this document. The next North Atlantic Swordfish stock assessment is scheduled for 2013.

The same wording appears in paragraph 6. of ICCAT Recommendation 10-2, entitled "Recommendation by ICCAT for the Conservation of North Atlantic Swordfish", adopted at the 2010 ICCAT meeting and is scheduled for completion in 2013.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan. DFO has provided proof that the LRP work is currently scheduled for the SCRS in 2013.

| | | | | |
|---|---|---|---|---|
| 1.1.3 | Where the stock is depleted, there is evidence of stock rebuilding. | • Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.<br>• Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe. | • Where stocks are depleted, rebuilding strategies are in place.<br>• There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modeling or previous performance that they will be able to rebuild the stock within a specified timeframe. | • Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the shortest practicable timeframe. |
| **Weight** | | N/A | **Score** | N/A |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

**Client**

ICCAT has implemented rebuilding plans for a number of different species within the ICCAT purview including north Atlantic swordfish, western Atlantic bluefin tuna, blue marlin and white marlin populations. The plans are explicit with recovery objectives and timelines as well as recommended harvest control rules to achieve the rebuilding measures.

Following significant declines in Atlantic swordfish populations, ICCAT implemented a 10 year recovery plan in 1999 to rebuild the North Atlantic swordfish stock. The plan reduced the international fishing quota for the species to 10,400mt that was divided among all nations fishing the stock, including the United States, Canada, European Community, Japan and several minor harvesters, significantly reducing effort. This plan was updated in 2004 (ICCAT 2004-02), following the assessment of swordfish stocks in the North Atlantic. The plan was updated again in 2006 (ICCAT 2006-02) based on the 2006 North Atlantic swordfish assessment. The reduction in fishing effort was a success, and in 2006, just 7 years into the plan the biomass of the North Atlantic Swordfish was estimated to be 99% of what was needed to produce MSY (ICCAT 2008). Furthermore, results of the 2009 stock assessment indicate that biomass is at or above $B_{MSY}$ and the Commission has been successful in achieving the objectives of rebuilding plan (ICCAT 2009).

The rebuilding strategy put in place in 1999 for the species have demonstrated continuous stock rebuilding and based on the most recent stock assessment the rebuilding target has been reached. The rebuilding plan was updated in 2004 (ICCAT 2004-02) and again in 2006 (ICCAT 2006-02) consistent with the updated stock assessments in each of those years.

**Scoring Rationale**

This PI is only scored when PI 1.1.1 reveals that a stock is depleted. A stock is considered depleted when it is consistently below the target reference point. Stocks scoring less than 80 on PI 1.1.1 would normally fall into this category (MSC FAM guideline 6.2.39a). ICCAT (2009) indicates that current stock biomass is at or slightly above the target $B_{MSY}$ and has been so since 2008. Thus the stock is considered rebuilt. PI 1.1.1 was scored 80. For this reason, this PI is not being scored.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

| 1.2 | Harvest Strategy (Management) | | | |
|---|---|---|---|---|
| 1.2.1 | There is a robust and precautionary harvest strategy in place. | • The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.<br>• The harvest strategy is likely to work based on prior experience or plausible argument.<br>• Monitoring is in place that is expected to determine whether the harvest strategy is working. | • The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.<br>• The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives. | • The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.<br>• The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.<br>• The Harvest strategy is periodically reviewed and improved as necessary. |
| **Weight** | | **0.25** | **Score** | 90 |

**Client**

Stock assessments based on scientific data stemming from both fisheries dependent and fisheries independent work is analyzed by ICCAT. TACs are set and outlined in stock assessments. The management objective of ICCAT is to attain MSY. Each ICCAT assessment, conducted by the SCRS, evaluates previous management measures in place and recommends changes as required to meet the management objectives.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

Based on this there is a robust and precautionary harvest strategy in place for the assessed fishery that is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. The harvest strategy is periodically reviewed, typically on a 2-3 year cycle as part of the stock assessment produced by the SCRS, and changed as required to be consistent with the current stock assessment advise during the following ICCAT meeting. The performance of the strategy has been evaluated, again as part of the SCRS stock assessment process and has demonstrated that it has been achieving its objectives.

**Scoring Rationale**

This PI evaluates the harvest strategy in relation to robustness (probability of success under different sources of uncertainty) and precaution (capacity to achieve targets and avoid limits). While an explicit limit reference point is not defined (see PI 1.1.2), the strategy of setting quotas to achieve the target $B_{MSY}$ over the long-term is expected to maintain the stock above a default limit reference point (B25%). It is also likely to work based upon prior experience, and monitoring is in place to determine whether or not the harvest strategy is working. Thus, this PI meets the scoring requirements of the SG 60.

A key element of the strategy is its responsiveness to the annual SCRS advice. During 1999 – 2009, the ICCAT Commission consistently set annual quotas according to the SCRS recommendation (DFO 2009a). The strategy has been periodically reviewed and resolutions made (in 1999, 2001, 2002, 2003, 2004, 2006, and 2008) to amend the rebuilding plan. The SCRS has conducted simulations to evaluate the impact of a range of harvest rates on stock status but this does not include the complete range of sources of uncertainty (e.g. observation, process and model error). Notwithstanding this, the annual assessment process through SCRS indicates that the harvest strategy is achieving its objectives. Thus, this PI attains both requirements of the SG 80 scoring issues.

While the strategy is responsive to the resource, it makes no explicit mention of a limit reference point (see PI 1.1.2) and while the strategy is designed to achieve the target $B_{MSY}$, it is not possible to state with certainty whether or not the strategy will maintain the stock above the default LRP. As such, the first scoring issue of the 100SG is met.

However, the strategy has undergone some testing and evidence exists that it is achieving its objectives particularly in regard to the target $B_{MSY}$. In addition the strategy is periodically reviewed and improved as necessary.

Thus, all three issues of the SG 100 are considered partially met. Therefore, this PI is given a score of SG 90.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 1.2.2 | There are well defined and effective harvest control rules in place. | • Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached.<br>• There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation. | • Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.<br>• The selection of the harvest control rules takes into account the main uncertainties.<br>• Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules. | • Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.<br>• The design of the harvest control rules take into account a wide range of uncertainties.<br>• Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules. |
| **Weight** | **0.25** | **Score** | 75 |

**Client**

ICCAT defines HCRs primarily through the definition of TACs which attempt to maintain or rebuild stocks to the MSY biomass. ICCAT relies on its Contracting Party Countries (CPCs) to implement harvest control rules through suitable harvest control tools that will allow the stated objectives to be met by the organization and its membership. Conservation measures (harvest rules) take many forms including overall TACs for each species, country specific TACs, CPC allocations by various fleet sectors, effort restrictions per CPC group, time/ area closures to protect spawning or nursery populations, minimum size restrictions to protect juvenile fish. For example, swordfish is subject to country specific quotas, and minimum size options (125cm LJFL with 15% tolerance, or 119 with zero tolerance and evaluation of the discards) (ICCAT, 2008).

Additional harvest control rules set by ICCAT and adopted by Canada in 2003 include the introduction of an annual bycatch allocation of 15 tonnes of bluefin tuna for Canadian pelagic longline vessels operating in the central-north Atlantic.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

Details outlining the harvest control rules and tools specific to the Canadian swordfish longline fishery are outlined in Appendix IV (B) Nova Scotia Swordfishermen's Association – Conservation Harvesting Plan (CHP), of the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan. The CHP outlines fleet quotas, individual quotas, time / area closures, observer coverage requirements, VMS requirements, dock side monitoring requirements, hail in / hail out requirements, logbook requirements, season, transfer processes, by-catch reduction measures, and other control measures associated with the fishery.

In summary, there are well defined harvest control rules in place for the assessed fishery that take into account a wide range of uncertainty. There are harvest control rules and tools at both the international level (ICCAT 2006-02) and the domestic level (DFO Fisheries and Aquatic Management, 2004a) and uncertainty are accounted for within the stock assessment advise that are used to produce the harvest control rules and tools.

**Scoring Rationale**

Issues on 6 September 2010, in Section 4 of Policy Advisory 18 the MSC clarified that: *" In the PISG tables, where identical scoring issues are repeated at different SG levels (in PIs 1.1.2, 1.2.2, 3.1.1, 3.2.2, 3.2.3), the text at the higher SG level/s is hereby deleted, leaving the text to appear only once at the lowest current SG level."* This new guidance removes the first scoring issue at the 100SG of this PI, thus removing the impact of this issue on the final score.

The focus of this PI is how fishing mortality and associated management actions (e.g. quotas) are established in order to ensure that limit reference points (e.g. default B25%) are avoided. The harvest control rule (HCR) stated in the rebuilding plan focuses on attainment of the $B_{MSY}$ target rather than avoidance of a biomass limit (ICCAT, 1999). While reference is made in the rebuilding plan to the stock being over-exploited at $F > F_{MSY}$, there is no explicit HCR which reduces fishing mortality as the default limit reference point is approached. ICCAT did reduce fishing mortality when biomass was 65% of $B_{MSY}$ or B33%, which implies that ICCAT has a generally understood HCR which acts to limit exploitation as the limit biomass is approached. However, it is not obvious what ICCAT would do if the resource once again declined towards B33%.

The assessment incorporates some of the main observation, process and model uncertainties.

The main management tool is an annual TAC and there is some evidence (ICCAT, 2009) this is effective at achieving reduced fishing mortality. However, the TAC has not been caught since 2001. ICCAT (2009) considers that if the realized catches had reached the catch limits allowed by

the recommendations to the ICCAT Commission, the stock biomass would have declined.

Thus, all scoring issues of SG 60 are met. The team considered that the second and third scoring issues of the 80 SG were met. The selection of the control rules takes into account the major uncertainties and there is available evidence that the harvest control rules used were appropriate to achieve the rebuilding goal for the stock. The team concluded that there was no clear evidence or definition of how exploitation rate would be reduced as limit reference points are approached. Thus, the first scoring element under the 80SG was not met and this PI is scored at 75.

**Condition**

By the third surveillance audit, evidence must be presented by the fishery client which shows that well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.

As defined by the first scoring issue of the 80 scoring guidepost, an explicit HCR which stipulates how fishing mortality is reduced as the limit reference point (see PI 1.1.2) is approached needs to be established for this stock by ICCAT when management decisions are discussed following the next stock assessment, proposed for 2012, or before if a stock assessment is completed earlier.

During the first and second surveillance audit the client must provide documented evidence that work is ongoing that will contribute to the achievement of the forth year requirements.

**Client Action Plan**

The Canadian swordfish industry, working through DFO, at the 2009 ICCAT meeting, proposed that the SCRS develop an explicit LRP for the North Atlantic Swordfish stock, before the next North Atlantic Swordfish assessment. This proposal was adopted as part of ICCAT Recommendation # 2009-02 Supplemental Recommendation by ICCAT to Amend the Rebuilding Program for North Atlantic Swordfish, and can be found in paragraph 5 of this document. The next North Atlantic Swordfish stock assessment is scheduled for 2013.

Following the development of this LRP, by the SCRS, as outlined in ICCAT Resolution # 2009-02, "Future decisions on the management of this stock shall include a measure that would trigger a rebuilding plan, should the biomass decrease to a level approaching the defined LRP as established by the SCRS." (see paragraph 5 of ICCAT Recommendation 2009-02). The Canadian longline swordfish industry, working through DFO, will work to initiate within this rebuilding plan specific rules to establishing appropriate harvest levels, should biomass levels begin to approach the LRP developed by the SCRS.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

The same wording appears in paragraph 6. of ICCAT Recommendation 10-2, entitled "Recommendation by ICCAT for the Conservation of North Atlantic Swordfish", adopted at the 2010 ICCAT meeting.

To address concerns about the over exploitation of North Atlantic Swordfish in a given year, ICCAT Recommendation # 2009-02, paragraph 1, bullet 2, states that, "If the total catch in 2010 exceeds 13,700 t, the excess amount shall be deducted from the quota / catch limit for each CPC on a prorate basis in 2011." This was adopted to address concerns that if all countries fished their entire allocation and carry-forward that the total TAC might be exceeded in any given year.

The same wording appears in paragraph 4. of ICCAT Recommendation 10-2, entitled "Recommendation by ICCAT for the Conservation of North Atlantic Swordfish", adopted at the 2010 ICCAT meeting.

Since the mandate of ICCAT is to maintain or rebuild stock to MSY and since North Atlantic swordfish has just completed a successful rebuilding plan, it would be the position of the Canadian swordfish industry, working through DFO to adopt management measures that would maintain this stock at this level.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan. DFO has provided proof that the LRP work is currently scheduled for the SCRS in 2013.

| | | | | |
|---|---|---|---|---|
| 1.2.3 | Relevant information is collected to support the harvest strategy. | • Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.<br>• Stock abundance and | • Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.<br>• Stock abundance and | • A Comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| | | fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule. | fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.<br>• There is good information on all other fishery removals from the stock. | including some that may not be directly relevant to the current harvest strategy, is available.<br>• All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty. |
| **Weight** | | **0.25** | **Score** | 80 |

**Client**

There are several measures in place aimed at increasing information and monitoring within the swordfish fishery. The Canadian Atlantic Swordfish and Other Tuna 2004-2006 Integrated Management Plan outlines measures in place including, but not limited to, dockside monitoring, at sea observer coverage, and vessel monitoring.

The management plan states that there is a required 5% baseline at sea observer coverage deployed for a maximum spatial and temporal representation of the fishery. The requirement of the use of at sea observers on domestic vessels has been in place since 1997 (ICCAT 2008 (a)). Prior to 1997 there was the requirement for 100% observer coverage on foreign vessels fishing in the Canadian EEZ (Smith 2001). Coverage was initially directed at specific management issues; however since 1999 it is better stratified in time and space for broader based monitoring of catch and fishery trends (Smith 2001). While the requirement of at sea observer coverage is only 5%, as defined by ICCAT, and carried through Canada's legislation, there have been years in which there has been increased coverage, as high as 20%. Observer coverage of the domestic pelagic longline fleet has varied but has gradually increased from 0.8% in 1993, to nearly 10% in 2000 (Smith 2001).

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

To supplement monitoring of at sea observers, an industry funded dockside monitoring program was established in 1994 for fleets in Atlantic Canada including the swordfish longline fleet and the majority of the bluefin tuna landings. Since 1996, dockside monitoring has been applied to all fleets and includes 100% monitoring of all trips, even when no fish is landed. At the completion of each trip a vessel is required to have an independent and certified dockside monitor present for offloading, and logged data including catch, effort, environmental conditions, and incidental catches of all sets must be submitted by harvesters. In addition to DMP, 100% hail in and hail outs are required.

As of 2005, it became a requirement that all pelagic longline vessels in the fleet have a vessel monitoring system (VMS). Prior to 2005, VMS was only mandatory on vessels that exceeded 24 m in length. There is no requirement for VMS on vessels involved in the troll and harpoon fishery for swordfish.

In addition to mandatory at sea observers, 100% DMV and 100% VMS, the pelagic longline fleet, has been required to maintain accurate DFO issued logbooks recording information on environmental conditions, effort, and catch of both retained and discarded species since 1994 (Smith 2001). The fleet is also subject to routine monitoring by DFO fishery officers, including both at sea boardings and dockside checks. To monitor the fleets at sea, DFO conducts both aerial and vessel surveillance to monitor the catch and fishing location (ICCAT 2008 (a)).

A comprehensive range of relevant information is collected to support the harvest strategy. Required information is monitored frequently and uncertainties are well understood.

Detailed information on stock structure, stock productivity, fleet composition, stock abundance, fisheries removals, and other relevant information are contained in the latest ICCAT swordfish assessment (ICCAT-SCRS 2006).

**Scoring Rationale**

There is sufficient information on stock structure and stock productivity (e.g. maturity, growth) on which to base a harvest strategy. The composition of the longline fleet and its operations is relatively well understood. Stock abundance is regularly monitored through fishery catch rate indices from a number of harvesting nations (ICCAT, 2009). Landings are 100% dockside monitored and information on removals from the other fleets (harpoon and international) exploiting the stock is considered adequate to inform the HCR. ICCAT (2009) reported that IUU is not considered to be a significant concern.

An issue is the adequacy of at-sea observer coverage, which for the longline fleet has ranged 3.7 – 4.8% (by sea days) during 2004 – 2008 (DFO, 2009). These data provide the basis of Canadian CPUE indices used in the stock assessment as well as the age/size composition data used in the

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

VPA. There is no analysis of the adequacy of this sampling coverage although based upon experience elsewhere, it is likely too low to provide more than general trends on age groups in the fishery. DFO plans to undertake a review of observer coverage in 2010.

Other data consist of environmental information on swordfish distributions in relation to SST (DFO Large Pelagics Program, 2009).

Overall, while the information and monitoring is sufficient to support the implied HCR, a comprehensive range of information to support management (e.g. age / size data) is lacking. Thus, this PI scores 80.

| | | | | |
|---|---|---|---|---|
| 1.2.4 | There is an adequate assessment of the stock status. | • The assessment estimates stock status relative to reference points.<br>• The major sources of uncertainty are identified. | • The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.<br>• The assessment takes into account uncertainty<br>• The stock assessment is subject to peer review. | • The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.<br>• The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.<br>• The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.<br>• The assessment has been internally and externally peer reviewed. |
| **Weight** | | **0.25** | **Score** | **90** |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

**Client**

The fishery considered for this assessment; swordfish is assessed by ICCAT. The last assessment conducted on the stock by ICCAT was completed in 2009, with the next scheduled assessment to be conducted in September of 2012.

Due to the highly migratory nature of the species involved stock assessments rely heavily on the commercial data, such as CPUE, submitted by member nations to the ICCAT Swordfish Species Group annually. The group prepares a full assessment every 3-4 years. The advice is peer reviewed by the ICCAT standing Committee on Research and Statistics, which usually meets in October of every year. Once final, an executive summary is presented to the Commission. Scientific advice is provide to Canada during the annually meeting between ALPAC and SCRS, which usually takes place late October or early November (DFO 2004). At that time, following the review of the advice from ICCAT, ALPAC has the opportunity to add to the changes, but will not have less than those suggested. Changes are implemented in the CHP and incorporated into the management plan when renewed.

The biomass index for the North Atlantic swordfish reflects the combined standardized CPUE from the longline fleets of the United States, Spain, Canada, Japan, Morocco and Portugal (ICCAT 2009).

Two production models were utilized during the last assessment of North Atlantic swordfish, a non-equilibrium model (ASPIC v 5.05), and the Bayesian statistical approach for stock assessment with a surplus production function described in SCRS 1999/085. The total North Atlantic reported catch from 1950-2008, including estimated dead discards was used for modeling. In addition to production models, virtual population analysis were conducted for the North Atlantic Stock using VPA-2BOX, with catch at age data derived for 1978-2008 catch-at-size using the unisex Gompertz growth equation. Only the Canadian and United States indices were updated since the 2006 stock assessment and included values for 2006-2008; the Japanese and Spanish indices were carried over from the 2006 stock assessment. Details on the models, VPA and sensitivity analysis are outlined in the 2009 Swordfish Stock Assessment (ICCAT 2009).

The assessment is appropriate for the stock, harvest control rules, and takes into account the biology of the species and the nature of the fishery. The assessment takes into account possible sources of uncertainty. Alternate assessment methodologies are used and assessments are subject to both internal and external peer reviews. Full details are contained in the latest ICCAT swordfish assessment. (ICCAT 2009).

**Scoring Rationale**

While two assessment models (SPM and VPA) are considered by the SCRS, only the SPM is used as the primary basis for advice (ICCAT,

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

2009). It is considered appropriate for this purpose.

The assessment estimates stock status relative to the target $B_{MSY}$ and $F_{MSY}$ RPs in a probabilistic way. Regarding major sources of uncertainty, observation uncertainty is incorporated through the use of a number of CPUE indices. There is however, no consideration of error in the catch. Process uncertainty is incorporated through consideration of Schaefer and Fox SPM formulations and use of a Bayesian SPM to explore variance in the model's parameters (e.g. r and K). It is less clear how model uncertainty has been incorporated. An age-structured (VPA) approach is explored and the results compared to those of the age-aggregated (SPM) approach although differences between the two and their implications for the HCR do not appear to be taken into account.

While the assessment is appropriate and is subject to peer review (internal to ICCAT but not external), it does not explore the major features relevant to the biology of the stock in that age-based processes are not considered. It does however take into account major uncertainties and evaluates stock status relative to $B_{MSY}$ in a probabilistic way. Alternative hypotheses have been explored but not yet rigorously. SCRS made a research recommendation (ICCAT, 2006) to investigate a statistical catch at age formulation to better address issues of uncertainty.

As all scoring issues of SG80 and the second scoring element of SG100 are fully met and the remaining scoring issues at the 100SG have been partially met this PI scores 90.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

| **MSC Principle 2** | **Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.** |
|---|---|

| *Intent* | *The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.* |
|---|---|

| **Weight** | | **Score** | **82.0** |
|---|---|---|---|

| **2.1** | **Retained Species** |
|---|---|

| | | | | |
|---|---|---|---|---|
| 2.1.1 | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species. | • Main retained species are likely to be within biologically based limits or if outside the limits, there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.<br>• If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be | • Main retained species are highly likely to be within biologically based limits, or if outside the limits, there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. | • There is a high degree of certainty that retained species are within biologically based limits.<br>• Target reference points are defined and retained species are at or fluctuating around their target reference points. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | outside biologically based limits or hindering recovery. | | |
| **Weight** | | **0.333** | **Score** | **75** |

**Client**

Table 6 in Section 3.6 above includes catch composition and weights of observed longline large pelagic hauls from 2000 – 2006. Based on the landings from this fishery in Table 6, main Retained Species are bigeye (*Thunnus obesus*) and yellowfin (*Thunnus albacares*) tunas. The Assessment Methodology does, however, include provisions for considering high-value species and for considering landed species which are vulnerable. Under these provisions albacore tuna (*Thunnus alalunga*), bluefin tuna (*Thunnus thynnus*), porbeagle shark (*Lamna nasus*) and shortfin mako (*Isurus oxyrinchus*), could be considered Retained Species.

Species status assessments are based on peer-reviewed publications and ICCAT assessments (e.g., bigeye, yellowfin, and bluefin tunas). Where COSEWIC status reports and recovery plans were available (e.g., porbeagle, shortfin mako), these reports were used in addition to ICCAT assessments.

***Bigeye tuna***

Current Maximum Sustainable Yield (MSY) estimated range between 90,000t to 93,000t depending on the population model used. At the beginning of 2006 bigeye tuna biomass was estimated to 92% of biomass needed to support MSY (80% Confidence Interval: 0.85-1.07) (ICCAT 2008a). Projections suggest that the biomass of the stock would decline with annual catches greater than 90,000t. Some increases are expected if annual catch is less than 85,000t. The TAC for major countries was set for 90,000t. Other countries, of which Canada is one, are limited to annual catch less than 2,100t (DFO 2004). The 2008 ICCAT assessment noted that if major countries caught the TAC, and other countries were to maintain recent catch levels, total catch could exceed 100,000t. However, estimated landed catch in 2005 was 20,000t below the TAC. Preliminary estimates for total landed catch in 2006 were 71,000t (ICCAT 2008a).

Canada's landings are well below the 2,100t catch guideline with landings less than 400t for each of the 2000-2008 fishing seasons (Table 6 in Section 3.7 above).

Reference points are produced for the various species using the stock assessment tools for each of the species. The most recently available reference points are presented below for Bigeye. (ICCAT-2007d.)

| | Bigeye Tuna |
|---|---|
| **MSY** | 90,000 – 93,000t |
| **Replacement Yield (2006)** | Slightly below Msy |
| **B2006/Bmsy** | 0.92 (0.85-1.07) |
| **Relative Fishing Mortality** | |
| **F2005/Fmsy** | 0.87 (0.71-1.05) |

***Yellowfin tuna***

The yellowfin tuna stock assessment conducted in 2008, using catch data up to 2006 and assuming a single stock for the entire Atlantic, showed biomass estimates near those expected to support MSY (ICCAT 2008a). This assessment showed an improvement in stock biomass since the last assessment in 2003, which they suggest is not surprising because catch levels and fishing effort have generally declined, and a few longline catch rate series show small increases (ICCAT 2008a). Catches in the North Atlantic have declined 34% since 2001.

Catches in 2006 were well below MSY levels, and stock biomass is estimates to be near MSY. However, uncertainty in the models and in the various catch indices in such that there is still a 60% chance that the stock is not at $B_{MSY}$. Relative biomass is 2006 compared to estimated biomass as MSY was $B_{2006}/B_{MSY} = 0.96$. The $25^{th}$ and $75^{th}$ percentile around that median estimate were 0.72 and 1.22 (ICCAT 2008a).

North Atlantic landings were 103,908t (ICCAT 2008a) and Canadian landings were 293t in 2006 (Lester et al. 2008).

Reference points are produced for the various species using the stock assessment tools for each of the species. The most recently available reference points are presented below for yellowfin. (ICCAT-2008e.)

| | Yellowfin Tuna |
|---|---|
| **MSY** | 130,600t (124,000-136,500t) |
| **Replacement Yield (2006)** | 130,000t |
| **B2006/Bmsy** | 0.96 (0.72-1.22) |
| **Relative Fishing Mortality** | |
| **Fcurrent/Fmsy** | 0.86 (0.71-1.05) |
| **Fcurrent/F0.1** | 1.26 |
| **Fcurrent/F30%spr** | 1.12 |

***Albacore tuna***

Stock status was assessed in 2007 (ICCAT 2008a). The current assessment shows spawning stock size is about one quarter of peak levels estimated for the 1940s, and may be 20% below the MSY level. Current fishing mortality in the North Atlantic is estimated to be 50% larger than $F_{MSY}$. Most albacore caught in the North Atlantic are landed by the Taipei longline fisheries and the European Community fisheries, especially Spanish vessels. The TAC for the northern albacore is 34,500t, but reported catches for 2005 and 2006 were above this catch limit. Estimated landings in 2006 were 36,077t. Projections show the northern albacore will not recover unless catches are less than 30,000t.

The majority of North Atlantic albacore tuna landings are from the east, particularly the Bay of Biscay (Hurry et al. 2008). Canada fishes under a 200t cap for this species, which was not exceeded between 2000 and 2008 (average landings 33t per year).

Reference points are produced for the various species using the stock assessment tools for each of the species. The most recently available reference points are presented below for Northern Albacore. (ICCAT-2007e.)

| | Northern Albacore |
|---|---|
| **MSY** | 30,300t (26,800-34,100) |
| **Replacement Yield (2006)** | 32,000t |
| **B2005/Bmsy** | 0.81 (0.68-0.97) |
| **Relative Fishing Mortality** | |
| **F2005/Fmsy** | 1.5 (1.30-1.70) |
| **F2005/Fmax** | 2.6 |
| **F2005/F0.1** | 5.5 |

***Bluefin tuna***

Bluefin tuna landings by the Atlantic Canadian Large Pelagics Fisheries were 3% or less of the catch landed by that fishery between 2004 and 2008 (Table 6). Landing regulations for the fleet were changed in 2004 to allow landing of bluefin tuna, provided the longline license holders carried a concurrent bluefin license to retain dead bluefin tuna caught on longline gear and to allow transfer of quota to the longline sector from other fisheries (DFO 2004). These changes were intended to reduce dead discards of bluefin tuna caught on longline gear which had previously been calculated from observer data and taken from the overall Canadian quota for bluefin. Canada's annual landings have been between 500t and 800t since 1998 (Lester et al. 2008). Catch from the assessed fishery has ranged from 20t to 49t between 2004 and 2008 (Table 6).

Bluefin tuna are managed as two stocks in the North Atlantic with the 45ºW longitude separating the stocks, but tagging, microchemistry and genetic studies, indicate that the stock structure is more complex (Rooker et al. 2007). This amount of mixing between the two putative stocks affects population estimates. The eastern Atlantic and Mediterranean stock is overfished; fishing mortality is estimated to be over 3 times what would result in MSY (Hurry et al. 2008). The western stock has not recovered despite 20 years of strict regulations (Rooker et al. 2007). There is considerable uncertainty in the stock status estimates for the western Atlantic. Catch rates from the Canadian Gulf of St. Lawrence rod and reel fishery have increased 2 to 3 times since 1996 (Paul et al. 2008) but the Gulf of Mexico longline CPUE series shows a strong decline (McAllister and Carruthers 2008). Thus, trends based on different CPUE indices and/or the larval survey produce modeled biomass estimates ranging from 10% to 41% of $B_{MSY}$, depending on the series used or on the weighting assigned to each (McAllister and Carruthers 2008).

The 2006 assessment estimated that in 2004 the SSB, for the western Atlantic stock, 19% of the 1975 level (ICCAT 2006). In 2006, ICCAT

recommended a reduction in TAC from 2,700t in 2003 to 2,100t for the following year 2007. In the most recent, 2008, assessment TAC was set at 1,900t for 2009 and 1,800t for 2010. Including transfers from other countries, the Canadian TAC for 2009 and 2010 was set at 480t per year (ICCAT 2008b). This TAC is consistent with the most recent ICCAT science advice and should allow a higher probability of rebuilding than the previously adopted plan.

The Canadian management plan for swordfish and tuna fisheries includes landings caps, gear restrictions, limited entry and time/area closures to limit catches of bluefin tunas. The permanent closure of the Hell Hole (from July 1- November 30) and the bluefin tuna exclusion zone along the coast of Nova Scotia (August 1 – December 31) were intended to decrease bluefin bycatch caught on longline gear. Landing regulations changed in 2004 which meant the longline fleet were no longer required to discard bluefin bycatch. Dead discards were previously taken from the overall Canadian quota in excess of the 5.6t discard allowance, which occurred every year from 1998 until 2003 (DFO 2004).

Reference points are produced for the various species using the stock assessment tools for each of the species. The most recently available reference points are presented below for Western Atlantic Bluefin. (ICCAT-2006)

| | **Western Bluefin Tuna** |
|---|---|
| **MSY** | 2,852t (2680-3032) |
| **B2007/Bmsy** | 0.57 (0.46-0.70) |
| **Relative Fishing Mortality** | |
| **F2006/Fmsy** | 1.27 (1.04-1.53) |
| **F2006/Fmax** | 1.27 |
| **F2006/F0.1** | 2.23 |

***Shortfin mako***

Shortfin mako landings account for 3-4% of the landed catch for the assessed fishery. However, they are considered Retained Species because recent stock assessments suggest that the North Atlantic population is vulnerable. In the most recent ICCAT shortfin mako stock assessments (ICCAT 2008c), the modeled estimates were quite variable. Some indicating the stock is at 50% of 1950 levels and levels of fishing mortality higher than those that would result in MSY, other models showed no overfishing. Because of the lower productivity of shortfin mako (relative to

blue shark and tunas), the ICCAT assessment (2008c) stated there is a 'non-negligible probability that the stock could be below MSY biomass' and overfished.

COSEWIC (2006a) designated shortfin mako as Threatened based on catch rate declines of 40% between 1986 and 2003 (Baum et al. 2003) and 50% between 1971 and 2003 (ICCAT 2005) using US and Japanese logbook data from the North Atlantic. There was no consistent trend in standardized catch rates based on catches in Canadian waters or from Canadian vessels (Fowler and Campana 2008). There was, however, a decline in catches of large shortfin mako in Canadian landings. Shortfin mako are at the northern edge of their range in Canadian waters and landings from Canadian waters typically account for <2% of landings from the North Atlantic (Campana et al. 2005). Thus, in the recovery plan for this species, Campana et al. (2006a) that catches in Canadian waters were likely not having "an appreciable impact", however, they recommended 100t landings limit and live release where possible.

Canada currently fishes under a non-restrictive catch guideline of 250t (Fowler and Campana 2008), which was set prior to any assessment of population estimates or assessment of catch trends. Campana et al. (2006a) suggested that Canadian catches be limited to 100t. Landings of shortfin mako are caught as bycatch in the Atlantic Canada Large Pelagic Longline Fisheries, and other Canadian fisheries, as bycatch. Canadian landings did not exceed 100t between 1998 and 2005 (Table 6, derived from Table 2 in Campana et al. 2006a). Canadian landings were 54t, 50t and 32t by the assessed fishery in 2006-2008 (Table 6, data provided by DFO, K. Graham pers. comm.). Because of the high value of shortfin mako, most captured are landed (Campana et al. 2005). Over the past 3 years, landings from the assessed fishery have been less than 70t (Table 6). Further, Canadian pelagic longline effort has declined since the mid-1990's, unlike other longline fisheries in the North Atlantic (Campana et al. 2006a). This has decreased fishing pressure on shortfin mako. Using fisheries observer data (Carruthers et al. *in press*), reported 67% of shortfin mako observed between 2000 and 2004 were retained and 27% were released alive. Likelihood of severe hooking injuries (i.e., gut-hooking) was lower for shortfin mako caught on circle hooks (Carruthers et al. *in press*).

**Table 15: Landings of mako shark by Canadian fisheries (Campana et al. 2006)**

| Year | Porbeagle fishery | Swordfish fishery | Tuna fishery | Unspecified pelagic | Groundfish bycatch | Not recorded | Mako Total |
|---|---|---|---|---|---|---|---|
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1992 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1993 | 0 | 0 | 0 | 0 | 3 | 0 | 3 |
| 1994 | 0 | 63 | 5 | 49 | 14 | 11 | 141 |
| 1995 | 0 | 56 | 9 | 23 | 20 | 3 | 112 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1996 | 1 | 33 | 7 | 13 | 10 | 3 | 67 |
| 1997 | 2 | 53 | 14 | 21 | 15 | 4 | 109 |
| 1998 | 0 | 40 | 5 | 7 | 18 | 0 | 70 |
| 1999 | 1 | 34 | 7 | 8 | 23 | 0 | 71 |
| 2000 | 0 | 30 | 15 | 10 | 24 | 0 | 79 |
| 2001 | 0 | 33 | 15 | 7 | 15 | 0 | 70 |
| 2002 | 0 | 32 | 13 | 11 | 22 | 0 | 78 |
| 2003 | 0 | 49 | 8 | 2 | 15 | 0 | 74 |
| 2004 | 1 | 45 | 18 | 0 | 18 | 0 | 81 |
| 2005 | 0 | 56 | 13 | 1 | 25 | 0 | 96 |

‡These shortfin landings differ from those provided by DFO for the purposes of the MSC assessment (Table 6). Differences may be due to the distinction of swordfish and tuna fishery.

**Table 16: Landed weights and percent of landed catch for target and retained species.**

| Year | Swordfish | | Bigeye tuna | | Yellowfin tuna | | Albacore tuna | | Bluefin tuna | | Porbeagle shark | | Mako shark | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (mt) | % | (mt) | % | (mt) | % | (mt) | % | (mt) | % | (mt) | % | (mt) | % | (mt) |
| 2000 | 644 | 63 | 146 | 14 | 104 | 10 | 78 | 8 | 0 | 0 | 6 | 1 | 42 | 4 | 1025 |
| 2001 | 778 | 68 | 149 | 13 | 125 | 11 | 35 | 3 | 1 | 0 | 10 | 1 | 47 | 4 | 1149 |
| 2002 | 840 | 69 | 189 | 15 | 68 | 6 | 59 | 5 | 0 | 0 | 22 | 2 | 47 | 4 | 1227 |
| 2003 | 1040 | 80 | 89 | 7 | 73 | 6 | 18 | 1 | 1 | 0 | 34 | 3 | 50 | 4 | 1305 |
| 2004 | 1070 | 67 | 112 | 7 | 298 | 19 | 19 | 1 | 23 | 1 | 28 | 2 | 56 | 3 | 1605 |
| 2005 | 1276 | 70 | 161 | 9 | 239 | 13 | 39 | 2 | 30 | 2 | 20 | 1 | 57 | 3 | 1819 |
| 2006 | 1133 | 66 | 159 | 9 | 287 | 17 | 11 | 1 | 35 | 2 | 39 | 2 | 54 | 3 | 1698 |
| 2007 | 997 | 65 | 131 | 9 | 267 | 17 | 18 | 1 | 49 | 3 | 20 | 1 | 50 | 3 | 1527 |
| 2008 | 998 | 74 | 105 | 8 | 159 | 12 | 22 | 2 | 20 | 1 | 15 | 1 | 32 | 2 | 1349 |

Note: Total landings do not include other minor landed species, such as mahi-mahi (*Coryphaena hippurus*) and marlins (*Makaira nigricans* and *Tetrapturus albidus*).

While North Atlantic shortfin mako may be outside biologically based limits, it is unlikely that Canadian fisheries, including the Canadian

Atlantic Pelagic Longline Fisheries, are either causing the population to be outside biologically based limits or are hindering recovery because Canadian fisheries landings are approximately 2% of total landings (Campana et al. 2005). There is no directed fishery for shortfin mako. Measures limiting overall fishing effort by the assessed fishery (limited entry and swordfish quotas), limit fishing pressure on shortfin mako. As well, catches are limited by the distribution of shortfin mako; the assessed fishery only overlaps with the northern extent of their range.

Reference points are produced for the various species using the stock assessment tools for each of the species. The most recently available reference points are presented below for North Atlantic Shortfin Mako. (ICCAT-2008c.)

| | **N. Atlantic Shortfin** |
|---|---|
| **Current Yeild** | 5,996t |
| **B2007/Bmsy** | 0.95 – 1.65 |
| **B2007/Bo** | 0.47 – 0.73 |
| **Relative Fishing Mortality** | |
| **Fmsy** | 0.007-0.05 |
| **F2007/Fmsy** | 0.48 – 3.77 |

**Porbeagle shark**

Porbeagle shark was assessed by COSEWIC in 2004 and designated Endangered. It was not, however, listed under SARA legislation. Based on modeled porbeagle population dynamics, using catch-at-length and CPUE in age- and sex-structured life history models, Gibson and Campana (2005) estimated abundance in 2004 was between 12% and 24% of the 1961 population size before there was a directed fishery for the species (Gibson and Campana 2005).

The first shark management plan was produced in 1995 and included a ban on finning, limits on the number of licenses and set a non-restrictive catch of 1,500t. The TAC was reduced to 1000t in 1997, and there was an in season closure in 2001 limiting catch to 515t. The 2002 management plan set the annual directed quota at 200t for next 5 years. Since bycatch, in swordfish, tuna and Japanese tuna fisheries, rarely exceeded 40t, the total directed catch and bycatch was set for 250t (DFO 2002). Further, fishing grounds off Newfoundland (NAFO Divisions 4Vn and 3LNOP) were closed in 2002 to protect mature porbeagle which had previously been fished there (COSEWIC 2004). Recently, the TAC

was reduced to 185t (ASA 2007), approximately 4% of the vulnerable biomass. Carruthers et al. (in press) reported 43% of porbeagle sharks were retained by the assessed fishery and the offshore pelagic fishery, and 16% were discarded dead based on fisheries observer data (2000-2004). Likelihood of severe hooking injuries was lower for porbeagle caught on circle hooks (Carruthers et al. in press).

Gibson and Campana (2005) estimated that porbeagle shark recovery is possible if fishing mortality limited to 1-4% of the vulnerable biomass which was estimated at 4,500t. If human induced mortality was 4% of vulnerable biomass then landings and discarded catch mortalities would have to be below 185t (the current TAC). In 2006, while under a TAC of 250t, landings in round weight were 192.9t from all Canadian fisheries (ICCAT 2008c), approximately 39t were landed by the fishery being assessed (Table 6). Thus, the marginal contribution of the Large Pelagic Longline Fishery is less than the catch recommended for rebuilding porbeagle shark populations, but overall Canadian catches were higher than recommended for rebuilding. The TAC was reduced to 185t in 2007, in line with the upper end of the range of the scientific advice (Gibson and Campana 2005). The 2007-2009 shark fishery Conservation Harvesting Plan specifies that 'the needs of traditional by-catch fisheries be considered first' (ASA 2007).

Among the 6 species considered under the Retained Species Component, bigeye tuna and yellowfin tuna – accounting for the largest portion of retained catch (Table 6) - are near MSY. Albacore tuna population estimates are below MSY but it is unlikely that the assessed fishery is hindering recovery. Catch from the assessed fishery accounts for <0.1% of catch in the North Atlantic. Similarly, shortfin mako may be below MSY. The assessed fishery lands less than the 100t landings limit recommended for conservation (Campana et al. 2006). Porbeagle shark landings from the assessed fishery were less than the lowest (or strictest) catch limits recommended for rebuilding. Landings from the assessed fishery account for approximately 1% of the vulnerable biomass (45t) and account for ¼ of the landings of the species. Population estimates for western bluefin tuna, though variable, show the population is below biomass needed to support MSY. Recent reductions in TAC are intended to allow rebuilding. Measures to limit overall effort (swordfish quotas and limited entry) and to decrease hooking injuries (e.g., circle hook use) limits landings and harm to these retained species. Additional measures, such as the bluefin tuna exclusion zone, are intended to decrease interaction rates with one of the retained species. In summary, bigeye and yellowfin are within biologically based limits, landings from the assessed fishery are below recovery fishing limits for porbeagle and bluefin, and landings from the assessed fishery account for <2% of shortfin mako and 0.1% of albacore landings in the North Atlantic.

**Scoring Rationale**

As noted in Section 3.7, the MSC defines main retained species as those that a) are >5% of overall catch volume, b) are commercially valuable or c) because they are required to be retained by management rules. Based on this definition, the main retained species in the fishery under assessment are, bluefin tuna, bigeye tuna, yellowfin tuna, albacore tuna, blue and white marlins, shortfin mako shark and porbeagle shark.

Longfin Mako, Mahi mahi, escolar, and wahoo are retained. However, they constitute less than 5% of the overall catch volume and are not required to be retained by management rules. Similarly, these species are also not considered either valuable or vulnerable, and therefore do not require scoring as 'main' retained species.

Many of the Principle 2 performance indicators in the MSC FAM (ver.1) default tree seek to evaluate the management strategy in place for the candidate fishery impacts on P2 components. In order to score PIs referring to management strategy concepts for each scoring element, the assessment team needed to consider the management strategy components being implemented by the fishery. As per FAM , version 1, guidance 7.1.20 – 7.1.26, a strategy is considered to be composed of linked monitoring, analyses, measures and responses. The team interpreted these components as being analogous to the monitoring (e.g. dockside or at-sea observation of landings or catch), assessment (e.g. evaluation of stock status by ICCAT or DFO), tools (e.g. quotas, closed areas, etc.) and harvest control rules (e.g. change in harvest rate in response to stock status) used in Principle 1. The team noted that whereas measures (i.e. tools) can exist in the absence of a strategy, as per FAM 7.1.21, a strategy (partial or comprehensive) requires that all components exist. Monitoring informs analyses which lead to measures based upon a management response.

In PI 2.1.2 below, the team has identified the various management strategy components for all the main species considered in the scoring of the retained species PIs. The scoring rationale provided for the status outcome makes reference to Table 17 in PI 2.1.2. Development of the table of management strategy components is in response to concerns identified by a number of stakeholders.

***Main Species***

Tuna (Bluefin Tuna, Bigeye Tuna, Yellowfin Tuna, Albacore Tuna)

ICCAT is responsible for the conservation of tuna and tuna-like species in the Atlantic Ocean and its adjacent seas. Each of the tuna species identified as main retained species, has been subject to an ICCAT assessment, which was used to assess the outcome PI for each species.

**Bluefin Tuna**

ICCAT (2010a) assessed status against $B_{MSY}$ proxy reference points (RPs) estimated using low and high recruitment scenarios. As well, sensitivity runs were conducted through removal of influential indicators (i.e. Canadian GSL and US RR > 177 cm indices) to bracket uncertainty in spawning stock biomass (SSB) and fishing mortality (F). As ICCAT does not recognize limit RPs, to be consistent with the guidelines on PI 1.1.2, the assessment team interpreted biological limits ($B_{LIM}$) as being 50% of $B_{MSY}$ for each recruitment scenario. Using the low recruitment RP, SSB is 20% - 60% above $B_{MSY}$, implying that SSB is well above $B_{LIM}$. Under the high recruitment scenario, SSB is 60% to 80% below $B_{MSY}$

or 30 – 40% below $B_{LIM.}$ Further, ICCAT (2010) noted that the assessment did not capture the full degree of uncertainty. An important factor contributing to this is mixing between fish of eastern and western origin. Limited analyses were conducted of the two stocks with mixing in 2008, but little new information was available in 2010. Based on earlier work, the estimates of stock status can be expected to vary considerably depending on the type of data used to estimate mixing (conventional tagging or isotope signature samples) and modeling assumptions made. Another important source of uncertainty is recruitment, both in terms of recent levels (which are estimated with low precision in the assessment), and potential future levels (the "low" vs "high" recruitment hypotheses which affect management benchmarks). Therefore, the weight of evidence suggests that it is thus not likely (at 60% probability level) that Bluefin tuna is above biologically based limits. Notwithstanding this, the Bluefin strategy laid out in the Canadian Atlantic swordfish and other tunas integrated fishery management plan (herein referred to the SWO management plan) is interpreted as measures to ensure that the NS swordfish longline fishery does not hinder recovery and rebuilding, and are expected to result in the fishery not causing Bluefin to be outside biologically based limits. As such, the SG60 is met for this species. The strategy outlined in the SWO management plan (See PI 2.1.2 rationale) is also interpreted as a partial strategy of demonstrably effective measures (e.g. time/ area closures (BEZ and Hell Hole), daily catch notification for BFT, reduction of dead BFT discards and the letter notifying ALPAC members of the ministers approach to bluefin management as presented in the SWO management plan Appendix IIIB letter to ALPAC members, ICCAT assessment, and HRCs used to inform the management response. Therefore, SG80 is met.

**Bigeye Tuna**

The Atlantic stocks were last assessed by ICCAT (2010). Based upon a variety of models, biomass at the beginning of 2010 was estimated to be nearly 100% of $B_{MSY}$ and by inference likely to be within biologically based limits. Also, there are measures defined in the SWO management plan, outlined in Table 17 in PI 2.1.2, expected to result in the fishery not causing bigeye to be outside biologically based limits. Based upon this, the SG 60 is met, as well the SG80 is also met given that the stock is highly likely (P> 70%) to be above 50% of $B_{MSY,}$ resulting in a score of 80 for bigeye tuna.

**Yellowfin Tuna**

ICCAT (2008) applied both an age-structured (VPA) model and a non-equilibrium production (ASPIC) model to the available data through 2006. Status was assessed against SSB expected when fishing at $F_{MAX}$ rather than $F_{MSY}$. The assessment team interpreted these as being close enough to allow inference of the biological limit (50% of $B_{MAX}$). Both VPA and a range of ASPIC models suggest that $SSB_{2006}$ is close to $B_{MAX}$ and by inference likely to be within biologically based limits. Further, recent trends indicate declining effective effort and some recovery of the stock. Also, there are measures in the SWO management plan, see PI 2.1.2, expected to result in the fishery not causing yellowfin tuna to be outside biologically based limits. SG 60 is met. SG80 is also met given that the stock is highly likely (P> 70%) to be above 50% of $B_{MAX}$, therefore this

species scores 80.

**Albacore Tuna**

ICCAT (2009) indicated that the North Atlantic stock has been below $B_{MSY}$ (current $SSB_{2007}$ is approximately 62% of SSB at MSY) since the late 1960s but has generally not dropped below 50% of $B_{MSY}$. While northern albacore tuna is below its target reference point, it is likely within biologically based limits. Also, there are measures in the SWO management plan, see PI 2.1.2, that are expected to result in the fishery not causing albacore tuna to be outside biologically based limits. As such, the SG 60 is met. The assessment team considers that the hard TACs on northern albacore tunas constitute a partial strategy to maintain those species within biologically based limits. The strategy is mainly based on information directly from the longline fishery and/or species involved, there is clear evidence that the strategy is being implemented successfully, and intended changes are occurring and there is some evidence that the strategy is achieving its overall objective for those species. Therefore, while albacore may not be considered to be highly likely to be within biologically based limits, there is a partial strategy in place of demonstrably effective management measures such that the fishery under consideration does not hinder recovery and rebuilding. This species scores 80.

Sharks (Shortfin Mako and Porbeagle Shark)

**Shortfin Mako**

Multiple assessment models (ICCAT, 2008) indicated that North Atlantic stock depletion by 2008 to about 50% of virgin biomass (1950s levels) whereas other models estimated considerably lower levels of depletion. In light of biological information that places the point at which $B_{MSY}$ is reached with respect to the carrying capacity at levels higher than for blue sharks and many teleost stocks, there is some non-negligible probability that the stock could be below $B_{MSY}$. On the other hand, SSB is likely to be above 50% of $B_{MSY}$. Measures, through a 100t TAC are in place so as not to allow the fishery to result in hindering recovery. SG60 is met.

It is not possible to state that the North Atlantic stock is highly likely (P>70%) to be above biologically based limits, as required in the first part of the SG80. However, while there is a partial strategy (see PI 2.1.2), the assessment team is concerned with its effectiveness. Recognizing that landings are within the bounds of the suggested 100t, and in fact landings have been significantly less than this in most years (See Table 14 of ICCAT, 2008), the catch limit in place is not a hard TAC. Further, there are no estimates of post-capture mortality, so the fate of the significant portion of shortfin mako released alive (based on observer reports) is unknown. Notwithstanding this, Campana et al. (2005) states that while the fishery under assessment accounts for the main source of mako landings from Canadian fisheries, annual catches average 60-80t which is about 4% of that reported for the North Atlantic population (ICCAT, 2004). Campana et al (2005) concluded that it appears unlikely that current

exploitation rates in Canada are having an appreciable impact on the population. Furthermore, the shortfin mako shark RPA (DFO 2006a) states that "bycatch by foreign fleets in the North Atlantic are the most significant source of mortality for the population. While it is unlikely that a reduction in bycatch of shortfin makos by the Canadian pelagic longline fishery would have any detectable or biologically significant influence on the population, it would be prudent not to exceed 100 t annually" in the Canadian fisheries.

On balance, the assessment team considered that while the partial strategy was considered appropriate, it was not fully effective; given the unknown impact of post capture mortality. The partial score of 70 is assigned.

**Porbeagle Shark**

ICCAT (2010) indicates that the 2009 biomass of the Northwest Atlantic stock is below $B_{MSY}$ and that recent fishing mortality is near or above $F_{MSY}$. Furthermore, ICCAT (2010) reiterates the findings of the Canadian assessment of the Northwest Atlantic porbeagle stock which found that biomass is depleted to well below $B_{MSY}$. However, the latter indicated that recent fishing mortality is below $F_{MSY}$ and recent biomass appears to be increasing. It is not possible to state that the stock is within biologically based limit. There are measures, through annual TACs, to ensure that the fishery does not hinder recovery. SG60 is met.

While there is a partial strategy for porbeagle shark (see PI 2.1.2), the team is not convinced that it is demonstrably effective as required by the 80 SG. There are two issues in this regard. Firstly, porbeagle shark was assessed by COSEWIC in 2004 as endangered. The Canadian landings of porbeagle shark (192.9t in 2006 under a TAC of 250t) were above that subsequently considered necessary for rebuilding (185t) in 2007 (the candidate fishery being assessed contributes approximately 39t to the Canadian TAC). While the TAC was reduced to 185t in 2007, it was set at the upper range of the scientific advice (Gibson and Campana 2005). Assuming that mid-range of the confidence interval for the proposed TAC is risk neutral, setting the TAC at the upper end of the range, without taking account of discards and mortality caused by non-Canadian fleets, implies that there is more than 50% probability that TAC will hinder recovery. The assessment team considers that a lower, more precautionary TAC for this endangered species would have been prudent.

Secondly, the TAC is based on landings. Based on catch data available (see Table 6), a significant number of porbeagle are released from the candidate fishery, some of which experienced post capture mortality (PCM). There are no estimates of PCM for this fishery, which is a significant source of uncertainty in the management of the fishery's impact on this species. It is acknowledged that there is a high percentage use of circle hooks in the fishery, which implies high survivorship of released porbeagle (Carruthers, 2009). Notwithstanding this, there is concern for unobserved post capture mortality. Given that there is monitoring of the fishery's interactions with the species, assessment of stock status and management decisions based on HCR outlined in the recovery potential assessment (Campana et al., 2006), the assessment team considers that

there is a partial strategy, see PI 2.1.2, in place for the species such that the fishery does not hinder recovery and rebuilding. However, it does not consider that the strategy is demonstrably effective. Thus, while all the scoring issues of the SG60 are met, the team considers that SG80 is only partially met. PI 2.1.1 for this species scores 70.

Marlins (Blue Marline and White Marlin)

**Blue Marlin**

ICCAT (2006) stated that biomass of the Atlantic stock was below 50% of $B_{MSY}$ . Analysis of several abundance indicators suggests that the decline of this species had partially arrested, however, there were other indicators that suggest that abundance continued to decline. It is not possible to state that the stock is likely within biologically based limits. There are measures in place which are expected to ensure that the fishery does not hinder recovery and does not cause it to result in the stock declining further below biologically based limits. These measures are outlined in ICCAT Recommendation 06-09 and include the release of all live marlins which are caught by longline or purse seine vessels as well as limiting the amount of blue marlin which can be harvested and retained for landing by pelagic longline and purse seine vessels to not exceed 50% and 33% respectively of landings in 1996 or 1999 whichever is greater. At-sea observer data for the fishery has confirmed that live release of marlin is occurring. Additionally, ICCAT (2006) indicated that measures invoked by ICCAT to address declining status were being implemented, and the catch of both species were declining. The assessment team notes that in the past there has been low observer coverage in the assessed fishery, therefore making it difficult to evaluate the effectiveness of the rule requiring that live marlins be released. However the assessment team recognizes that the fishery under consideration has been subject to increased observer coverage in recent years. Additional monitoring (e.g. through on-board video surveillance) would provide greater confidence that measures are being effectively applied. Other measures, such as closed areas, could be used if it could be demonstrated that marlins occur more frequently in some areas. SG60 is met. These measures are considered a partial strategy of demonstrably effective management to not to hinder recovery, see Table 17 in PI 2.1.2, in that management measures are reviewed and implemented based upon ICCAT assessments of the species. Given that the measures comprising the strategy in place both nationally and internationally are effective, and the 'marginal contribution' of the candidate fishery on blue marlin, the assessment team has considered the SG80 as met.

White Marlin: same as for Blue Marlin, SG80 met.

***Minor Species***

The assessment team did not score any of the minor species.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

***Summary***

The assessment team followed guidance provided in the FAM related to scoring performance indicators with multiple scoring components (in this case multiple species) in order to score this PI. Each species was assessed against the scoring guideposts individually, and an overall PI score was derived to reflect how each element scored, rather than an average of all scores. As such, the assessment team scores this performance indicator at 75 since most scoring elements meet the 80SG requirements and some partially meet the requirements of the 80 SG. None of the minor species were scored.

**Condition**

By the second surveillance audit, the client must define partial strategies for shortfin mako and porbeagle sharks, which implement demonstrably effective management measures to ensure that the candidate fishery does not hinder recovery and rebuilding of these species. In particular, the partial strategies for both species must consider and explicitly define how post capture mortality impacts rebuilding of the stocks. In addition, the strategy for porbeagle must incorporate a more precautionary TAC.

**Client Action Plan**

By the second surveillance audit, the Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada, through the Canadian Shark Integrated Fisheries Management Plan (IFMP) will outline management strategies and measures for porbeagle sharks that ensure that the swordfish longline fishery does not hinder recovery or rebuilding of these species. The final draft of the IFMP will be available for public review in the fall of 2011. Shortfin mako sharks will be managed through a Conservation Action Plan which will be completed before the 2013 fishing season. Both the IFMP and Conservation Action Plan will be reviewed through the Atlantic Large Pelagics Advisory Committee (ALPAC) and its sub-committee, the Ecosystem Working Group, so that stakeholder input can be considered.

As part of Fisheries and Oceans Canada work plan for by-catch, methodologies for the calculation of discards and post release mortality estimates, for both species, will be reviewed in 2011 for incorporation in future assessments.

A satellite tagging study for shortfin mako sharks will begin in 2011, with a second year to tagging taking place in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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inputs in future stock assessments for the species when taking into account removals from the stock.

Similarly, a satellite tagging study for porbeagle sharks will be conducted in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

The Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada will, at the second surveillance audit, demonstrate how post capture mortalities for both species will be incorporated in future assessments and demonstrate the impacts on rebuilding.

ICCAT assessments for shortfin mako and porbeagle sharks are scheduled for 2012 and 2014, respectively. Management measures taken based on these stock assessments will be incorporated through the domestic management plans for these species.

While Canada is one of many member countries at ICCAT, Canada will continue to press for regular stock assessments of these species so that the results of management measures can be reviewed and adjusted, as needed, on a regular basis.

**Consultation on Condition**

The Department of Fisheries and Oceans has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

| | | | | |
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| 2.1.2 | There is a strategy in place for managing retained species that are designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species. | • There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their | • There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | • There is a strategy in place for managing retained species.<br>• The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| | | recovery and rebuilding.<br>• The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | • There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.<br>• There is some evidence that the partial strategy is being implemented successfully. | • There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring.<br>• There is some evidence that the strategy is achieving its overall objective. |
| **Weight** | | **0.333** | **Score** | **75** |

**Client**

Management measures for the Atlantic Canada Large Pelagics Longline Fisheries which affect retained species include effort controls, weight quotas and time/area closures. Fishing effort is restricted by limiting the number of license holders in the fishery. Canada, as a member of International Commission for the Conservation of Atlantic Tunas (ICCAT), annually contributes catch, catch-at-size and catch-per-unit-effort (CPUE) data to ICCAT for stock assessments (DFO 2004). The Atlantic Canada Large Pelagics Longline Fisheries have had 100% dockside monitoring since 1996 and fisheries observer coverage has been approximately 5% since 2003. Observer coverage was 15% in 2001 and 19% in 2002. Vessel Monitoring Systems (VMS) were installed beginning in 2004, and by 2005 were expected on all vessels in the fleet (DFO 2004).

There are TAC's and other management measures to limit fishing effort. All retained species are subject to 100% dockside monitoring and logbook reporting. Bycatch landing caps for mako are not restrictive, in part because landings from the directed shark fishery make up the difference between landings from previously established fisheries and landings caps. Landings from the directed shark fishery were not supposed to impact landings of fisheries established before the directed fishery and with a history of landing shark bycatches. The porbeagle and bluefin management strategies include time area closures. In addition, the TAC's for each species have been lowered when species status and management strategies were re-evaluated. Management strategies are based on quantitative data collected from the assessed fishery. Detailed landings data continue to be collected (100% DMP) and observer coverage requirements for the assessed fishery remain at 5% of sea days.

**Scoring Rationale**

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Throughout Principle 2 outcome and management strategy performance indicators, the MSC FAM default tree seeks to evaluate the management strategy in place for the candidate fishery impacts on non-target species. In order to score PIs 2.1.1 to 2.2.3 for each scoring element, the assessment team needed to consider the management strategy being implemented by the fishery. As per FAM version 1 guidance 7.1.20 – 7.1.26, a strategy is considered to be composed of linked monitoring, analyses, measures and responses. The team interpreted these components as being analogous to the monitoring (e.g. dockside or at-sea observation of landings or catch), assessment (e.g. evaluation of stock status by ICCAT or DFO), tools (e.g. quotas, closed areas, etc.) and harvest control rules (e.g. change in harvest rate in response to stock status) used in Principle 1. The team noted that whereas measures (i.e. tools) can exist in the absence of a strategy, as per FAM 7.1.21, a strategy (partial or comprehensive) requires that all components exist. Monitoring informs analyses which lead to measures based upon a management response.

To clarify the team's interpretation of currently implemented management strategy components, the team has identified the relevant components as follows:

**Table 17: Components of the management strategy for each main retained species within the Canadian North West Atlantic swordfish longline fishery.**

| Main Retained Species | Monitoring | Analysis (Assessment) | Measures (Tools) | Response (HCR)/ (feedback loop) |
|---|---|---|---|---|
| All Species | -100% dockside monitoring<br>-100% VMS<br>-100% fishing log submission with 100% hail in / out<br>-5% at-sea observer coverage<br>-Aerial surveillance over flight<br>-annual review of compliance through ALPAC advisory process | | Catch<br>-Mandatory reporting of SARA species interactions<br>Effort<br>-"Hell Hole" closure to long lining<br>-"Bluefin Exclusion Area" closure off eastern Nova Scotia<br>-Gully MPA closure<br>-Mandatory dehooking equipment on-board<br>-Mandatory reporting of SARA species interactions<br>-Bay of Fundy and Gulf of St. | |

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| | -age / size sampling by species | | Lawrence permanent closures | |
| Bluefin Tuna | -Daily hail of bluefin retention | 2010 ICCAT Assessment | Western Bluefin Tuna bycatch allowance for long line fishery<br>Bluefin bycatch allowance | Canadian Quota set based on ICCAT Recommendation as per HCR (ICCAT Rec 08-04) |
| Bigeye Tuna | As per All species above | 2010 ICCAT Assessment | As per All species above<br>Restricted catch of 2,100t | Canadian Quota set based on ICCAT Recommendation as per HCR (ICCAT Rec 04-01) |
| Yellowfin Tuna | As per All species above | 2008 ICCAT Assessment | As per All species above | Effort reduction (ICCAT Rec 93-4) and |
| Albacore Tuna | As per All species above | 2009 ICCAT Assessment | As per All species above<br>Restricted catch of 200t | Canadian Quota set based on ICCAT Recommendation as per HCR (ICCAT Rec 09-05) |
| Blue Marlin; White Marlin | As per All species above | 2006 ICCAT Assessment | Live release of marlins where feasible | Release of live marlin, based on ICCAT assessment |
| Shortfin Mako Shark | As per All species above | 2008 ICCAT Assessment | 5% Fin to carcass ratio<br>100t soft landing cap | 100t landing cap consistent with RPA (Campana et al., 2006) |
| Porbeagle Shark | As per All species above | 2009 ICCAT Assessment | 185t domestic landings quota<br>5% fin to carcass ratio | Quota set as per domestic HCR |

***Main Species***

Tuna (Bluefin Tuna, Bigeye Tuna, Yellowfin Tuna, Albacore Tuna)

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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**Bluefin Tuna**

The 2004 – 2006 Canadian Atlantic Swordfish and Other Tunas Integrated Management Plan (still in force) describes measures for minimizing impacts of the swordfish longline fishery on bluefin tuna. These are expected to ensure that the fishery does not hinder recovery. These measures are likely to work based upon general experience, therefore SG60 is met. The measures outlined in the SWO management plan, see table above, are also interpreted as at least a partial strategy of demonstrably effective measures (e.g. time/ area closures (BEZ and Hell Hole), daily catch notification for BFT, reduction of dead BFT discards and SWO management plan Appendix IIIB letter to ALPAC members, linked with ICCAT assessment which informs the HCR used to set quotas. The strategy is mainly based on information directly from the longline fishery and/or species involved with some evidence that it is being implemented successfully. As a result, the SG80 is met in relation to bluefin tuna.

**Bigeye Tuna**

Same as Bluefin; scores 80

**Yellowfin Tuna**

As part of the 2010 yellowfin stock assessment report, the SCRS provided a review of effects of current regulation and management recommendations. This report did not lead to a specific Management Committee recommendation as the indications were that stock status had showed improvement, there was no current perceived requirement to change the effort controls already established. The strategy is mainly based on information directly from the longline fishery and/or species involved, there is clear evidence that the strategy is being implemented successfully, and intended changes are occurring and there is some evidence that the strategy is achieving its overall objective for those main retained species, therefore, the 80SG is attained for yellowfin tuna.

**Albacore Tuna**

Same as bluefin tuna; scores 80

Sharks (Shortfin Mako and Porbeagle Shark)

**Shortfin Mako**

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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The shortfin mako shark RPA (DFO 2006a) states that "bycatch by foreign fleets in the North Atlantic are the most significant source of mortality for the population. While it is unlikely that a reduction in bycatch of shortfin makos by the Canadian pelagic longline fishery would have any detectable or biologically significant influence on the population, it would be prudent not to exceed 100 t annually" in the Canadian fisheries. The Canadian fisheries have not exceeded 100 t in recent years and there is observer evidence that a significant portion of shortfin mako is being released alive. The measures that are in place in relation to this species, as outlined above, are considered to meet the requirements of a partial strategy, and there is some evidence that the strategy has been implemented successfully (though the observer and dockside monitoring data available), therefore meeting 2 of the 3 scoring issues of the SG80. However, the assessment team is not confident that there is an objective basis for confidence that the partial strategy will work. Observer coverage is low and there is little information available or consideration of post capture mortality in the management strategy. In order to meet the second scoring issue of the SG80, information regarding the total mortality on the species would be required. As such the second scoring issue is not met and the species scores 75.

**Porbeagle Shark**

Based on the same rationale as provided for shortfin mako, this species scores 75. With respect to porbeagle shark, the assessment team notes that the TAC in place has been set at the upper limit of the advice, despite what is known about species abundance, which contributes to the concerns on whether or not the strategy in place will work. As well, there is little information available on or consideration of post capture mortality in the management strategy. Based on a similar rationale as provided for shortfin mako, this species scores 75.

Marlins (Blue Marline and White Marlin)

**Blue Marlin and White Marlin**

As outlined in the table above, with respect to blue and white marlin, there is monitoring is in place, an ICCAT assessment was conducted in 2006 and generic and mandatory measures have been implemented. Based upon the assessment of 2006, ICCAT in Rec 2006-09 stated that "all contracting parties and non-contracting parties, entities or fishing entities shall promote the voluntary release of live blue marlin and white marlin". Taking this as evidence that there is a response provide upon the review of the assessment, the assessment team considers that there is a partial strategy in place. As such, blue and white marlin both attain the SG80, as there is a partial strategy in place that is considered likely to work based on the available at-sea observer information.

***Minor Species***

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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The assessment team did not score any of the minor species.

**Summary**

Six of the eight main retained species scored 80; while porbeagle and shortfin mako shark scored 75. None of the minor species were scored. Therefore, the overall score for PI 2.1.2 is 75.

**Condition**

By the second surveillance audit, the client must provide evidence that there is a partial strategy for conservation of sharks (porbeagle and shortfin mako) that takes account of all sources of fishing related mortality (landings and discards by the assessed fishery, other Canadian fisheries), and international fisheries. There must be an objective scientific basis to conclude that the strategy will maintain these shark stocks within biological limits or ensure that the fishery does not hinder their recover and rebuilding. The partial strategy must be in place for the assessed fishery so that it does at least its proportionate share to conserve sharks.

**Client Action Plan**

By the second surveillance audit, the Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada, through the Canadian Shark Integrated Fisheries Management Plan (IFMP) will outline management strategies and measures for porbeagle sharks that ensure that the swordfish longline fishery does not hinder recovery or rebuilding of these species. The final draft of the IFMP will be available for public review in the fall of 2011. Shortfin mako sharks will be managed through a Conservation Action Plan which will be completed before the 2013 fishing season. Both the IFMP and Conservation Action Plan will be reviewed through the ALPAC and its sub-committee, the Ecosystem Working Group, so that stakeholder input can be considered.

As part of Fisheries and Oceans Canada's work plan for by-catch, methodologies for the calculation of discards and post release mortality estimates, for both species, will be reviewed in 2011 for incorporation in future assessments.

A satellite tagging study for shortfin mako sharks will begin in 2011, with a second year of tagging taking place in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Similarly, a satellite tagging study for porbeagle sharks will be conducted in 2013, to determine post release mortality for the species. A final report is expected to be completed by 2015. Results from this study will be incorporated in the Canadian inputs in future stock assessments for the species when taking into account removals from the stock.

The Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada will, at the second surveillance audit, demonstrate how post capture mortalities for both species will be incorporated in future assessments and demonstrate the impacts on rebuilding.

ICCAT assessments for shortfin mako and porbeagle sharks are tentatively scheduled for 2012 and 2014, respectively. Management measures recommended based on these stock assessments will be reviewed and incorporated through the domestic management plans for these species.

While Canada is one of many member countries at ICCAT, Canada will continue to press for regular stock assessments of these species so that the results of management measures can be reviewed and adjusted, as needed, on a regular basis.

**Consultation on Condition**

The Department of Fisheries and Oceans has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

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| 2.1.3 | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species. | • Qualitative information is available on the amount of main retained species taken by the fishery.<br>• Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | • Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.<br>• Information is sufficient to estimate outcome status with respect to biologically based limits. | • Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.<br>• Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| | | • Information is adequate to support measures to manage main retained species. | • Information is adequate to support a partial strategy to manage main retained species.<br>• Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). | • Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.<br>• Monitoring of retained species conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| **Weight** | | **0.333** | **Score** | **80** |

**Client**

Management strategies are based on quantitative data collected from the assessed fishery. Detailed landings data continue to be collected (100% DMP) and observer coverage requirements for the assessed fishery remain at 5% of sea days.

**Scoring Rationale**

Qualitative information is available on all main retained species that allows qualitative assessment with respect to biologically based limited and adequate to support management measures of the main species, as such the SG60 is met for all species.

All landings from the candidate fishery are verified by independent, certified dockside monitoring companies. Dockside monitors are required to identify and weigh all species being offloaded from all vessels participating in the fishery. Therefore, the assessment team considers that when used in tandem with the information from the at-sea observer coverage, qualitative and quantitative information is available on the amount of main retained species taken by the fishery.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

With the 100% dockside monitoring and variable rate observer coverage (see Table 4, Section 3.5 above), available information is sufficient to estimate outcome status with respect to biologically based limits (second scoring issue, SG 80), and the information is adequate to support the existing partial strategies in place to manage main retained species (third scoring issue SG 80). However, the information is not available to provide a high degree of certainty with regards to quantitatively estimating outcome status or to support a comprehensive strategy to manage all retained species, as required by the SG100.

Qualitative and quantitative information is sufficient to estimate outcome status with respect to biologically based limits, the information is adequate to support a partial strategy to manage main retained species and sufficient to detect any increased risk to main retained species, the SG80 is met. However, as is the case with PI2.1.1 and PI 2.1.2, the SG100 refers to information available on all retained species, as opposed to just main retained species.

All main retained species score SG80.

***Minor Species***

The assessment team did not score any of the minor species.

***Summary***

All main retained species scored 80. None of the minor species were scored. Therefore, the overall score for PI 2.1.3 is 80.

| 2.2 | **Bycatch Species** |
|---|---|

| | | | | |
|---|---|---|---|---|
| 2.2.1 | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted | • Main bycatch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are | • Main bycatch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective | • There is a high degree of certainty that bycatch species are within biologically based limits. |

| | | | | |
|---|---|---|---|---|
| | bycatch species or species groups. | expected to ensure that the fishery does not hinder recovery and rebuilding.<br>• If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery. | mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| **Weight** | | **0.333** | **Score** | **80** |

**Client**

Blue shark (*Prionace glauca*) is the main bycatch species in the Atlantic Canada Large Pelagic Longline Fisheries (Table 7). Blue shark accounted for 64% and 90% of estimated weight discarded from observed trips in 2007 and 2008, respectively.

Tagging returns indicate that blue shark in Canadian waters are part of a North Atlantic population. Blue shark are not distributed evenly throughout the North Atlantic, but show size- and age-related distribution and migration patterns. Population estimates (or simple indicators of population trends) for the North Atlantic or smaller regions (such as the northwest Atlantic or Canadian waters) are contradictory. Estimates range from no change in population levels since 1973 (ICCAT 2005), 30% decline in catch rate since 1950 (Aires da Silva et al. 2008) in the Northwest Atlantic, to a 53% decline in Canadian waters since 1995 (Campana et. al. 2006), or a 60% decline in the Northwest Atlantic (Baum et al. 2003).

These assessments differ in large part because of the different data sets used, including records from logbooks, fisheries observers or scientific surveys. Ideally data sets would be long time series covering much of the species' distribution, either be a survey or be standardized to account for differences in fishing practices over time and, finally, have animals consistently identified to species throughout the time series. These data do not exist. For example, Burgess et al. (2005) criticized the Baum et al. (2003) estimate for being based on a single data set which covers only part of the species range. Whereas, the authors of the COSEWIC status report for blue shark (2006b) considered 60% decline estimate (Baum et. al

2003) more reliable than the ICCAT (2005) assessment of little population change. Both assessments used logbook data from the US longline fleet. The ICCAT assessment (2005), however, also included logbook data from the Japanese longline fleet which has wider geographical coverage. In the 2008 shark assessment, the report authors state that the stock status assessment remain uncertain, data used in assessment models did not provide a consistent signal (ICCAT 2008).Where catch rates were used to indicate population trends, data sets were edited to account for under-reporting of bycatch species, decisions made to account for misidentified species, and models standardized to account for differences in targeting and fleet distribution patterns.

Aires da Silva et al. (2008) compiled an index data set from historical fisheries survey data (1957-1994) and more recent observer data (1978-2000) for the Northwest Atlantic. Their objective was to build a data set that could be used to estimate blue shark biomass at the start of pelagic longlining in the North Atlantic – which began in the 1950's – to use as a base line for understanding of current population levels. Aires da Silva et al. (2008) concluded that blue shark catch rates, as an estimate of blue shark abundance, have declined 30% since 1987. The most recent ICCAT (2008c) blue shark assessment used this historical dataset as well as the US and Japanese logbook datasets described above.

The 2008 ICCAT assessment models showed that blue shark population levels were close to carrying capacity. This assessment used data from the US longline logbook, Japanese longline, Ireland's recreational catch, historical fisheries index (Aires da Silva et al. 2008), Spanish longline and Venezuela longline series. The area covered and relative catch proportions were used to weight the different series in each year (ICCAT 2008c). Aires da Silva and Gallucci (2007) used demographic models to identify key stages for population growth; these models were intended to be used in management and conservation while population estimates remain uncertain. They identified juveniles (<6 years of age) blue shark as a vulnerable stage and suggested conservation and management efforts should focus on this stage.

COSEWIC (2006b) designated blue shark as Special Concern in Canada, meaning 'a wildlife species that may become threatened or endangered based on biological characteristics and identified threats'. In this case the identified threat was bycatch mortality. Further, COSEWIC (2006b) identified lack of information of post-release survival as a key piece of missing information needed to assess the impact of bycatch of blue shark populations. These data are now available. Campana et al. (*in press*) recently examined the status of blue shark caught on commercial longline vessels and used satellite pop-up tags to determine post-release mortalities. Their assessment of blue shark hooking mortality rates differed from those reported by the onboard observer program. Based on assessment of 902 shark caught on five fishing trips, they considered 20% dead, 44% released alive but injured and 36% released in healthy condition (Campana et al., *in press*). Post-release mortality rates were 38% for sharks which had swallowed hooks, 32% for sharks hooked in the mouth but also injured, and none of the sharks released in healthy condition died post-release (Campana et al., *in press*). Thus, 33% of blue shark which were badly injured or gut-hooked died post-release.

In contrast, fisheries observers reported ~9% blue shark bycatch weight was discarded dead (combined UTD, dead and shark bit, (Table 18).

Multiplying fisheries observers' mortality estimates by post-release mortality rates determined by Campana et al.'s (*in press*) satellite tags yields overall mortality levels of 15% (Table 18). The post-release survival rates determined by satellite tagging were related to injury assessment by Campana et al. (in press). Methods of assessing injury status by scientific staff and by fisheries observers should be determined prior to using post-release survival rates for the fleet. This would help resolve differences in overall mortality rates (e,g,. 15 vs. 35%).

**Table 18: Blue shark release condition reported by fisheries observers (2001-2008)**

| Year | Released Alive / Uninjured (kg) | Released Alive / Injured (kg) | UTD (kg) | Discarded Dead (kg) | Shark Bit (kg) | Total (kg) |
|---|---|---|---|---|---|---|
| 2001 | 102619 | 26536 | 3709 | 13307 | 0 | 146171 |
| 2002 | 82708 | 48527 | 2653 | 14997 | 175 | 149060 |
| 2003 | 69589 | 3265 | 2047 | 7422 | 0 | 82323 |
| 2004 | 40458 | 6364 | 1020 | 4253 | 0 | 52095 |
| 2005 | 30760 | 728 | 0 | 3720 | 0 | 35208 |
| 2006 | 37993 | 24882 | 559 | 3888 | 0 | 67322 |
| 2007 | 26989 | 916 | 237 | 2480 | 12 | 30634 |
| 2008 | 54423 | 16488 | 12 | 7738 | 0 | 78661 |
| Total | 260212 | 52643 | 3875 | 29501 | 12 | 346243 |
| % Blue Shark Catch | 75.2% | 15.2% | 1.1% | 8.5% | 0.0% | 1 |
| Mortality Rate | 0 | 0.33 | 1 | 1 | 1 | |
| Total Mortality | 0 | 17372.19 | 3875 | 29501 | 12 | |
| % Mortality | 0.0% | 5.0% | 1.1% | 8.5% | 0.0% | 14.7% |

Before survival rates determined from PAT tags are applied to the entire fishery, differences between the 9% (observer data) and 20% (observed by science staff) hooking mortality estimates need to be resolved. These estimates affect overall mortality estimates from the pelagic longline fishery. Blue shark condition may have been more carefully detailed by science staff, but the 5 trips used may not be representative of the fleet. Three of 5 trips were swordfish directed, one was blue shark directed and the fifth trip was categorized as a swordfish/tuna trip. The

swordfish/tuna trip was a Canadian vessel fishing under a French charter arrangement and French license, therefore, had different landing regulations than much of the Canadian fleet (T. Atkinson, pers. comm.). All 5 trips were concentrated in a single month (September) to provide the best opportunity to tag blue sharks, when they are most likely to be encountered as bycatch in the assessed fishery. By contrast, Brazner and McMillan (2008) also reporting on the pelagic longline fishery for swordfish and tuna, showed that less than half of the observed sets (1999-2006) were swordfish directed and that many trips in the fleet targeted bigeye, yellowfin or some combination of swordfish and tunas. It needs to be determined if these trips have different blue shark catch and mortality rates.

Based on logistic regression of the fisheries observer data (2001-2007), Campana et al. (*in press*) found a strong vessel effect for whether blue shark were released live or dead. This result, as well as their onboard observations, suggest careful handling practices could increase hooking survival. Using the same fisheries observer data (2002-2004), Carruthers et al. (*in press*) found blue shark were twice as likely to survive the hooking process when caught on circle hooks. The likelihood of hooking survival (of being alive when released) increased for blue shark caught on J-hooks, to the levels reported for circle hooks, during the more recent time period (2005-2006). Carruthers et al. (*in press*) suggested that the difference in hooking survival rates between the two time periods could be related to a change in handling practices, such as possible use of line cutters and de-hookers contained in the turtle release kits (Watson et al. 2005). Carruthers et al. (*in press*) also found blue shark twice as likely to be mouth-hooked instead of gut-hooked when caught on circle hooks.

Circle hook use has increased in recent years. Brazner and McMillan (2008) reported that 69.5% of the hooks used by the Canadian pelagic longline fleet were circle hooks between 1999 and 2006. The Swordfish and Tunas IFMP reported that circle hooks were used on 75% of all trips; almost all trips targeting tunas fished this hook type (DFO 2004), and as noted previously it is estimated that in fact 90% of the hooks deployed in the candidate fishery are circle hooks (T. Atkinson, pers. comm.). These statistics differ based on differences in sample size, location and activity. However, the Atlantic Canada Loggerhead Turtle Conservation Action Plan developed in October 2010 states that the use of circle hooks will be mandated for all harvesters by December 2011. It should be noted however, that circle hook use may not decrease catch rates of unwanted catch and may decrease catches of target species (Watson et al. 2005, Mejuto et al. 2008). These recent reports, based on fisheries observer data and post-release survival research from the assessed fishery, suggest that within the Atlantic Canada Large Pelagic Longline Fisheries, increased use of circle hooks has decreased blue shark hooking mortalities, and has likely increased post-release survival.

Fowler and Campana (2008) reported annual catch mortality from all Canadian fisheries of 1000t since 2002; their estimates were based on 40% mortality rate and estimated bycatch from pelagic longline fisheries of 2000t (Campana et al. 2006). The 2008 ICCAT assessment estimated blue shark catches based on a ratio of shark catch to tuna catch, and came up with rough estimates for the North Atlantic averaging 46,000t since 2002; estimates based on data from the sharkfin trade were higher.

Reference points are produced for the various species using the stock assessment tools for each of the species. The most recently available reference points are presented below for North Atlantic Blue Shark. (ICCAT-2008c.)

| | **N. Atlantic Blue Shark** |
|---|---|
| **Current Yield** | 61,845t |
| **B2007/Bmsy** | 1.87 – 2.74 |
| **B2007/Bo** | 0.67 – 0.93 |
| **Relative Fishing Mortality** | |
| **Fmsy** | 0.15 |
| **F2007/Fmsy** | 0.13 – 0.17 |

Blue shark population assessments show the population is above $B_{MSY}$ (ICCAT 2008). This assessment used data which showed the largest population decline (Baum et al 2003) but also data series with wider geographic scope, and an historical index. Because the fishery likely accounts for <2% of catch mortality in the North Atlantic (Campana et al. 2006), limits to population growth are likely similarly small. However, immature sharks are caught in the bycatch of the assessed fishery, and juveniles have been identified as a vulnerable stage (Campana et al. 2004; Aires da Silva and Gallucci 2007). Canada contributes to international assessments, through the provision of data to ICCAT, and to international research efforts (e.g., Aires da Silva et al. 2008).

**Scoring Rationale**

The MSC defines by-catch as organisms as those that are taken incidentally and are not retained (usually because they have no commercial value) and are discarded, as well as those that die as a result of unobserved fishing mortality. Main by-catch species generally comprise more than 5% of the catch by weight unless it is of particular vulnerability or if the total volume of the fishery is large. A species that normally comprises 20% or more of the catch by volume would almost always be considered a 'main' by-catch species (MSC 2009). Based on this the only main by-catch species for the assessed fishery is blue shark. Other species of bycatch identified in Table 7, while caught by the candidate fishery are caught in quantities less than 5% and have not been identified as vulnerable. Species considered when classifying bycatch as 'minor' include sharks (tiger, sand, Greenland, hammerhead), striped Bonito/Skipjack tuna, blackfin tuna, pelagic stingray, rays (unid.), longnose and shortnose lancetfish, ocean sunfish, monkfish, king mackerel, cod, sea raven, parrotfish, sea lamprey, cutless fish, opah, atlantic manta ray, manta

ray and remora.

Blackback gulls, greater shearwaters, gannets, and herring gulls have also been reported as being caught in small quantities but neither of these bird species are identified as vulnerable. The Canadian National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries, page 26, on the Atlantic pelagic longline fishery states that "the number of seabirds taken by this fishery appears to be very low, possibly because the gear is most often set and hauled in low light conditions and baits are heavy enough to sink quickly. Results obtained from questionnaires suggested that there is not a substantial seabird by-catch problem in this fishery". Information on by-catch species is available from observers but the quality and reliability of the at-sea observer information is unknown (there are no confidence limits on by-catch estimates) mostly because the observers are not deployed according to a statistically designed plan.

**Main Species**

**Blue Shark**

ICCAT (2008c) states

> 'For both North and South Atlantic blue shark, the biomass is estimated to be above the biomass that would support MSY. As was the case in the 2004 stock assessment, in many model runs (using surplus production models, age-structured models and catch-free models), stock status appeared to be close to unfished biomass levels and fishing mortality rates well below those corresponding to the level at which MSY is reached. While results from all models used were conditional on the assumptions made (e.g., estimates of historical catches and effort, the relationship between catch rates and abundance, the initial state of the stock in the 1950s, and various life-history parameters), most models consistently predicted that blue shark stocks in the Atlantic are not overfished and that overfishing is not occurring. A full evaluation of the sensitivity of results to these assumptions was not possible at the meeting using all the modeling approaches.'

ICCAT (2008c) does not state a biomass limit reference point (LRP). Consistent with MSC FAM, Ver 1, paragraph 6.2.16, the assessment team considers 0.5 $B_{MSY}$ (or 0.25 $B_0$) as the LRP. There is no indication in ICCAT (2008c) that $B_{MSY}$ is less than 0.4 $B_0$.and thus 0.5 $B_{MSY}$ is appropriate as an LRP (see FAM 6.2.16). All surplus production models estimated 2007 biomass as 1.5 – 1.95 of $B_{MSY}$. The age structured models provided a wide range of current status with one set of models indicating that it is 0.3 $B_0$ (0.6 $B_{MSY}$) and another set 0.95 $B_0$ (1.9$B_{MSY}$) with the latter being the higher probability. Thus, it is likely (P>60%), that the species is within biologically based limits. Given the number and

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

variety of assessment models indicating this, it cannot be said that the status is poorly known. SG 60 is met. Further, it is highly likely (P>70%) that the status is within biologically based limits. SG 80 is met. This PI scores 80.

**Minor Species**

The assessment team did not score any of the minor species.

**Summary**

The one main species, Blue Shark, scored 80 and none of the minor species were scored. Therefore, PI 2.2.1 scores 80.

| | | | | |
|---|---|---|---|---|
| 2.2.2 | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations. | • There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.<br>• The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | • There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.<br>• There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved.<br>• There is some evidence that | • There is a strategy in place for managing and minimizing bycatch.<br>• The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.<br>• There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | | the partial strategy is being implemented successfully. | |
| **Weight** | | **0.333** | **Score** | **60** |

**Client**

Current management measures include a ban on shark finning, which refers to removing fins and discarding the carcass, for both fishing within Canadian waters and for Canadian vessels fishing in international waters. Canadian longline license regulations require that fins and carcasses of all retained sharks must be offloaded concurrently and the weight of dressed fins not exceed 5% of dressed carcasses (DFO 2004). The 1994 prohibition against finning likely benefits blue shark populations more than other North Atlantic sharks. Blue shark meat (other than fins) does not attain a high price and tends to spoil other catch in the hold. The directed fishery has a non-restrictive landings guideline of 250t. There are few other DFO management measures specific to blue shark, however, general management measures and fishing practices affect catch rates and mortality levels of blue sharks. As mentioned previously, an effort cap on the number of vessels and the size of those vessels (GRT) limits the swordfish and tuna fishery to 78 vessels (DFO 2004). Swordfish quotas limit fishing effort for this fishery. All vessels in the assessed fishery carry VMS, are subject to 100% dockside monitoring, and complete logbooks. Data used in the Campana et al. (*in press*) and the Carruthers et al. (*in press*) are based on data collected by onboard fisheries observers.

Measures limiting overall fishing effort (limits on GRT, number of vessels and swordfish quota) limit overall fishing pressure on blue shark. The 1994 ban on finning, in Canadian waters and by Canadian vessels, increased hooking survival among blue shark bycatch. Increased use of circle hooks, and possible use of de-hooking kits, improved the condition of released blue shark.

**Scoring Rationale**

Using the same approach as applied in PI 2.1.2, the assessment team has identified the applicable management strategy components for the main bycatch species, blue shark in Table 19. Those are as follows:

**Table 19: Components of the management strategy for main bycatch species within the Canadian North West Atlantic swordfish longline fishery.**

| Bycatch Species | Monitoring | Analysis | Measures (Tools) | Response (HCR)/ |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | (Assessment) | | (feedback loop) |
| All Species | -100% dockside monitoring<br>-100% VMS<br>-100% fishing log submission with 100% hail in / out<br>-5% at-sea observer coverage<br>-Aerial surveillance overflight<br>-At-sea patrols and boardings | | -"Hell Hole" closure to long lining<br>-"Bluefin Exclusion Area" closure off eastern Nova Scotia<br>-Gully MPA closure<br>-No finning provision for sharks<br>-Mandatory dehooking equipment on-board<br>-Mandatory reporting of SARA species interactions<br>-Bay of Fundy and Gulf of St. Lawrence permanent closures | - |
| Blue Shark | As per All species above annual review of compliance through ALPAC advisory process age / size sampling by species | ICCAT Assessment (2008) | 5% Fin to carcass ratio | No HCR or feedback |

**Main Bycatch Species**

**Blue Shark**

Canada has management measures in place that is expected to maintain main bycatch species within biologically based limits or to ensure that the fishery does not hinder their recovery. The strategy includes observers at sea and dockside monitoring of the landings and the requirement to land fins and carcasses at the same time (equivalent to a no-finning regulation), in addition as per the licence conditions, no person shall under any circumstances return, release or discard a shark carcass to the water (without fins). These measures are believed to work, but implementation

issues, such as the percentage of observer coverage and the basis for observer deployment need improvement. These issues are covered by a condition under outcome for ETP species and will at the same time improve information for by-catch species. The requirement to land fins and carcasses at the same time provides evidence that the measures are being implemented successfully. While there are measures in place, meeting the requirements of the SG60, the lack of an explicit response from management based on a HCR it cannot be stated that the management in place qualifies as a partial strategy exists. As a result, this species scores 60.

**Minor Species**

The assessment team did not score any of the minor species.

**Summary**

The one main species, blue shark, scored 60 and none of the minor species were scored, thus PI 2.2.2 scores 60.

**Condition**

By the third surveillance audit, the client must provide evidence that there is partial strategy of demonstrable effective management measures in place to ensure that the Canadian Atlantic Swordfish fishery does not hinder recovery and rebuilding of blue shark. Additionally, there must be some objective basis of confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved. As well, by the third surveillance audit there must be evidence that the partial strategy is being successfully implemented.

**Client Action Plan**

By the third surveillance audit, the Nova Scotia Swordfishermen's Association, working with Fisheries and Oceans Canada, through the Canadian Shark Conservation Action Plan, will outline management strategies and measures for blue sharks that ensure that the swordfish longline fishery does not hinder recovery of the species. The Conservation Plan will be reviewed through the ALPAC and its sub-committee, the Ecosystem Working Group, so that stakeholder input can be considered and will be in place for the 2013 fishing season.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

As part of Fisheries and Oceans Canada's work plan for by-catch, observer coverage level and observer deployment schemes will be examined in 2011. The findings from this work will be reviewed by the ALPAC Ecosystem Working Group for consideration in the Conservation Plan for blue shark.

**Consultation on Condition**

The Department of Fisheries and Oceans has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

| | | | | |
|---|---|---|---|---|
| 2.2.3 | Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch. | • Qualitative information is available on the amount of main bycatch species affected by the fishery.<br>• Information is adequate to broadly understand outcome status with respect to biologically based limits.<br>• Information is adequate to support measures to manage bycatch. | • Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery.<br>• Information is sufficient to estimate outcome status with respect to biologically based limits.<br>• Information is adequate to support a partial strategy to manage main bycatch species.<br>• Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome | • Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations.<br>• Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.<br>• Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective.<br>• Monitoring of bycatch data is conducted in sufficient detail |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | | | indicator scores or the operation of the fishery or the effectiveness of the strategy). | to assess ongoing mortalities to all bycatch species. |
| **Weight** | | **0.333** | **Score** | **80** |

**Client**

Quantitative data collected from the assessed fishery (by fisheries observers, science staff, and through tagging programs) was used in this evaluation. Clearly, there is a need to resolve differences in the estimation of blue shark survival and health at release to determine the efficacy of some of the management measures, such as careful release. Further, there is a need for DFO science, fisheries observer companies and the assessed fishery to come to an agreement on how to resolve these issues. For example, simple measures such as detailing protocols used to determine hooking survival and bycatch health should be agreed upon and documented. Second, observers' notes could be examined for information on handling practice and protocols developed for the collection of this information. Finally, assessments should be based on data representative of the fishing practices of the whole fleet, which necessitates examination of the quality and breadth of data reported by the fisheries observer program and of the types of fishing trips sampled by individual research programs.

**Scoring Rationale**

**Main Species**

Blue Shark: Qualitative information is available on the amount of bycatch in the fishery and is adequate to broadly understand outcome status. This information is adequate to support the management measures for Blue Shark; SG60 is met.

At-sea observer coverage ranging from a low of 3.7% in 2007 and 19% in 2002, with an average coverage of 7,6% over 10 years provides the team with justification to state that the first 80SG scoring issue is met. That information, the existing stock assessment for North Atlantic blue shark, survival rate information from Campana *et al* (in press) and Carruthers *et al* (in press) provide sufficient information to estimate the outcome status with respect to biological limits, thus the second scoring issue under 80SG is met. This information would be sufficient to support the partial strategy for management of main bycatch species, as such, the third scoring issue is met. Sufficient data continues to be collected through the at-sea observer program to detect increases in risk to blue shark status species (e.g. due to changes in the outcome indicator

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

scores or the operation of the fishery or the effectiveness of the strategy). The fourth scoring issue is met. The assessment team considered that none of the SG100 scoring issues were met. As a result, this species scores 80.

**Minor Species**

The assessment team did not score any of the minor species.

**Summary**

The one main species, Blue Shark, scored 80 and none of the minor species were scored. PI 2.2.3 scores 80.

| 2.3 | Endangered, Threatened, Protected (ETP) Species | | | |
|---|---|---|---|---|
| 2.3.1 | The fishery meets national and international requirements for protection of ETP species.<br><br>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species. | • Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.<br>• Known direct effects are unlikely to create unacceptable impacts to ETP species. | • The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.<br>• Direct effects are highly unlikely to create unacceptable impacts to ETP species.<br>• Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. | • There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.<br>• There is a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

| Weight | 0.333 | Score | 75 |
|---|---|---|---|

**Client**

Leatherback (*Dermochlyes coriacea*) and loggerhead turtles (*Caretta caretta*) were assessed under the Endangered, Threatened, and Protected (ETP) Species Component of Principle 2. The MSC Assessment Methodology defines ETP species as those recognized by national legislation and/or binding international agreements (MSC 2008). Leatherback turtles were assessed listed as Endangered under Canada's Species at Risk Act (SARA) in 2003 (ALTRT 2006). International trade of both leatherback and loggerhead turtles is restricted under the Convention for International Trade in Endangered Species of Wild Flora and Fauna (CITES). Both are listed in Appendix I of CITES, loggerhead turtles as part of the family *Cheloniidae*. Loggerhead turtles have been assessed and were classified as 'endangered' by COSEWIC in April of 2010, however have not been listed under SARA to date.

The Scotian Shelf population of Northern Bottlenose whale (*Hyperoodan ampullatus*) is listed as Endangered under SARA legislation in 2006. The Gully, primary habitat for the northern bottlenose whale, was designated a Marine Protected Area in 2004. Both mating and calving occur in the Gully (DFO 2007a). Most whale sightings are within Zone 1 of the MPA (shown in red), the assessed fishery and groundfish longline have limited access to Zones 2 & 3 (Figure 8). In addition, all vessels in the assessed fishery carry VMS, therefore, data are available to monitor the spatial extent, time and location of fishing. One of five fishing entanglements documented by fisheries observers over the past 25 years was associated with longline (DFO 2007a) and this one interaction occurred on the Grand Banks.

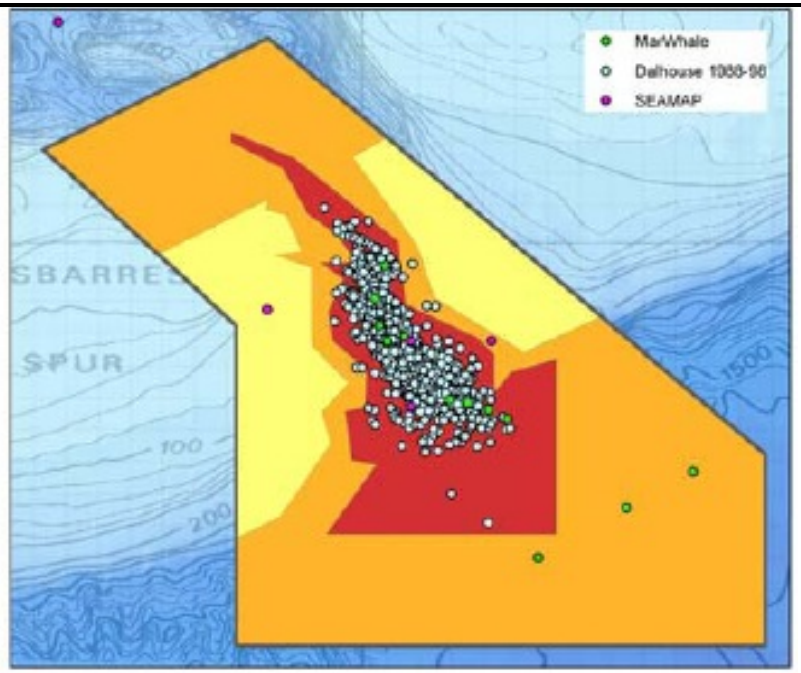


**Figure 8: Locations of northern bottlenose whale sightings within Zone 1 of the Gully MPA near Sable Island (DFO 2007a).**

***Leatherback turtles***

Leatherback turtle conservation listings, both nationally and internationally, are based on global population declines. Estimates of number of nesting female leatherback turtles in the Atlantic were 18,800 in 1996 and 15,000 in 2000 (ALTRT 2006). Estimates for the adult leatherback turtles in the Atlantic population range from 34,000 to 94,000 – wide 95% confidence intervals reflect uncertainty in the number of nests and uncertainty in extrapolating those numbers to the adult population (TEWG 2007). It is not known what portion of the Atlantic population migrates into Canadian waters or is impacted by Canadian fishing activities. Lewison et al. (2004) estimated between 30,000 and 60,000 leatherbacks hooked or entangled in pelagic longline gear throughout the Atlantic. These estimates were based on fishing effort in 2000 and observer data from 12% of pelagic longline trips in that year. Lewison and Crowder (2007) later noted that whole ocean basin estimates, such as

these, do not reflect distribution patterns, catch rates and mortality levels of particular longline fisheries. Both James et al. (2005) and Lewison and Crowder (2007) note that information on turtle interactions are more readily available from pelagic longline fisheries compared with other fisheries that affect sea turtles.

None of the 61 leatherbacks observed in 2001 and 2002 were discarded dead (ALRT 2006). Most of the leatherback observed between 2003 and 2008 (45 out of 48) were considered uninjured when released. Post-release survival is, however, unknown. Epperly and Boggs (2004), estimated post-release mortality rates of entangled leatherbacks to be 0.6 and disentangled leatherbacks (i.e., all gear removed) to be 0.1, with overall mortality rates of 0.14. These estimates are based on expert opinion, not post-release survival studies. A recovery Action Plan is currently being drafted for the species, with a target release date of February 2010 (M.C. James, pers. comm., 2009). This action plan will build on the recovery strategy released in 2006, and will list the measures to be taken over the next 5 years (ALRT 2006).

The swordfish and other tunas IFMP states that the pelagic longline fisheries practice live release of all non-target sensitive species (DFO 2004). Also, following the listing of leatherback turtles under SARA legislation, pelagic longline vessels must carry Incidental Harm Permits (DFO2004a). Model simulations summarized in the 2004 Allowable Harm Assessment suggest that human-induced mortality of >1% of adults would result in population declines (DFO 2004b). Given catch and likely mortality levels from the assessed fishery, the review committee concluded human induced mortality (in Canadian waters or by Canadian vessels) did not jeopardize survival or recovery of this species but that all feasible measures to minimize harm be undertaken for this species (DFO 2004b).

***Loggerhead turtles***

There are few estimates of overall loggerhead abundance. Population estimates are based on nesting beach counts. For example, the recent US Recovery Plan did not estimate overall population levels but instead reported trends from nesting surveys at five groups of nesting beaches. Trends ranged from no change (or unable to determine) to declines of 1.6% and 4.7% annually (NMFS & USFWS 2008). Brazner and McMillan (2008) suggest that loggerheads capture in Canadian waters or by Canadian vessels outside the EEZ, may be from Florida and Carolina beaches (population declines of 1.3% to 1.9% annually). Loggerhead turtles captured from adjacent US waters are from the Florida and Carolina waters. However, there are no tagging data or genetic samples to link loggerhead turtles caught in Canadian waters to particular nesting regions. Epperly et al. (2001) used a range of matrix population models and projected population trends based on management changes and expected survival levels. They found that increasing survival during the juvenile pelagic stage was key, and increasing survival by 10% during this stage could reverse annual population declines of 5%.

Loggerhead turtles captured by pelagic longline fisheries in the Northwest Atlantic, including the assessed fishery, range in size from 32-68 cm

SCL (Watson et al. 2005) or from 42-87 cm SCL (Brazner and Macmillan 2008). Brazner and McMillan (2008) reported most measured loggerhead turtles were <60 cm in length. Based on current understanding of loggerhead turtle life stages, these turtles would be predominantly large juveniles and possibly some adults re-entering pelagic environments from the breeding/coastal shelf stage (NMFS 2008 & USFWS 2008). Survival of large juveniles is key in models of population recovery.

Loggerhead turtles become captured by pelagic longline fisheries when attempting to feed on baited hooks. There have been 701 observed captures between 1999 and 2006, in Canadian large pelagics fisheries including the assessed fishery (Brazner and McMillan 2008). Over this time period, fisheries observers have reported from 3% to 20% of days fished per year. Based on the two years with high observer coverage (2001 & 2002), approximately 75% were released alive and uninjured, approximately 20% were released alive and injured, and 2% were released dead or observers were unable to determine their release status (Javitech 2003).

Post-release lethal or sub-lethal effects are unknown. Epperly and Boggs (2004) estimated 10% of mouth-hooked loggerheads released with all gear removed would die post-release as a result of the interaction. Estimated mortality ratios for deeply hooked loggerheads, released with hook and line attached, were 0.6 (Epperly and Boggs 2004). Post-release mortality may be 10% or 30% for lightly and deeply hooked loggerheads based on satellite telemetry (Chaloupka et al. 2004). These authors considered 19% and 30% to be maximum mortality levels because they did not distinguish between equipment failures and loggerhead mortalities (Chaloupka et al. 2004). Chaloupka et al. (2004) estimates were based on satellite telemetry of 40 loggerheads released from the Hawaiian pelagic longline fishery (13 lightly hooked and 27 deeply hooked). Epperly and Boggs (2004) do not detail *how* different mortality rates were estimated or derived, simply state that the draft criteria were developed at a post-hooking mortality workshop (January 15-16, 2004). Such differences in post-release mortality rates among deeply hooked loggerheads would have to be resolved to determine impacts of the assessed fishery on loggerhead populations.

The assessed fishery began fishing circle hooks in 1996 (DFO 2004a). Circle hooks are generally thought to decrease the severity of hooking injuries and, therefore, increase post-release survival (e.g., Watson et al. 2005; Brazner and McMillan 2008). However, Mejuto et al. (2008) and Carruthers et al. (*in press*) found no change in hook location (injury type) between circle hooks and straight-shank J-hooks. Based on fisheries observer data from the assessed fishery, Caruthers et al. (*in press*) found no difference in hooking location, whereas Brazner and McMillan (2008) found more severe hooking injuries on loggerheads caught on J-hooks. The difference is largely due to how unknown hook locations were treated. Carruthers et al. (*in press*) compared the ratio of the different mouth-hooking to gut-hooking injuries for each hook type, whereas Brazner and McMillan considered the percent mouth-hooked and the percent gut-hooked separately (relative to all loggerhead turtles). Mejuto et al. (2008) argued that bait type has a much higher affect on catch rates than hook type.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

The status of loggerhead turtle populations, and of the impact of Canadian bycatch levels, are difficult to assess and it is unclear if catches in Canadian waters are affecting overall population growth. Unfortunately, current population estimates and the relationship between Canadian catches and different loggerhead nesting beaches makes it difficult to assess population impacts. The guideline provided by NMFS and US Fish and Wildlife, to decrease mortality by 10% during the juvenile stage, is a more tangible goal. Known direct effects – mortalities – from the assessed fishery are few. Carruthers et al. (*in press*) reported 404 out of 407 observed loggerhead captures (between 2001 and 2004) were released alive.

**Scoring Rationale**

The MSC Fisheries Assessment Methodology, Version 1, July 2008 provides the following guidance in relation to categorization of endangered, threatened and protected (ETP) species.

> ETP (endangered, threatened or protected) species are those that are recognized by national legislation and/or binding international agreements (e.g. CITES) to which the jurisdictions controlling the fishery under assessment are party. The SGs refer to 'national and international requirements' and 'unacceptable impacts'. These terms relate to the requirements or impacts specified in relevant national legislation or binding international agreements.

Noting this MSC guidance, it is important to identify which national and international requirements have triggered species evaluations within the ETP performance indicators. Canada's international requirements stem from its signatory status to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Within Canada, the implementation and administration of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are shared among federal and provincial/territorial agencies to make the best use of existing organizational structures. (CITES in Canada web site, http://www.cites.ec.gc.ca/ (March 29, 2010)).

As the representative of Canada, the Canadian Wildlife Service is responsible for managing CITES species in Canada vis à vis the international community. Fisheries and Oceans Canada (DFO) is responsible for CITES activities in Canada that relate to species managed under the Fisheries Act.

DFO advises on matters regarding marine and freshwater species. In addition, regional DFO officers issue CITES Export Permits for marine and freshwater species. DFO's responsibilities are divided within the department between the Science and Fisheries Management sectors. Their respective responsibilities can be summarized as follows:

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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**The science sector** assumes the role of the Scientific Authority for CITES marine and freshwater species.

1. it participates in biennial Conferences of Parties where proposal to list species in the Appendices and policy matters are debated,
2. it formulates Canada's positions and policies on listing of CITES marine and freshwater species in the Appendices,
3. it contributes to CITES debate on criteria for listing species that are at risk due to commercial trade in the Appendices,
4. it assesses status of stocks and, when appropriate, issues non-detriment findings for exports of Appendix I and II species.

**The Fisheries Management Sector** assumes the role of Management Authority for CITES marine and freshwater species,

- it issues export permits,
- it maintains a permit-issuing service across the country (and recruits and trains a network of individuals in major population centers),
- it compiles and maintains a database of CITES export permit issuance,
- it reports annually to the CITES Management Authority at the Canadian Wildlife Service on permit issuance and related activities, monitors trade to ensure compliance with Canada's obligations to CITES,
- it circulates information on CITES requirements to potential exporters, and responds to public inquiries on import and export matters.

[Information above cited (CITES in Canada web site, http://www.cites.ec.gc.ca/ (March 29, 2010)].

Nationally, Canada proclaimed the Species at Risk Act (SARA) in 2003. The purpose of SARA is to protect wildlife species at risk in Canada. Within the Act, COSEWIC (Committee on the Status of Endangered Wildlife in Canada) was established as an independent body of experts responsible for identifying and assessing wildlife species considered to be at risk. This is the first step towards protecting wildlife species at risk. Subsequent steps include COSEWIC reporting its results to the Canadian government and the public, and the Minister of the Environment's official response to the assessment results. Wildlife species that have been designated by COSEWIC may then qualify for legal protection and recovery under SARA.

It is up to government to legally protect wildlife species designated by COSEWIC. COSEWIC assessments do not take into account political, social or economic factors. The potential impacts of legal listing are for Government to analyze, and the Act applies only to wildlife species on the SARA legal list. (see COSEWIC and the Species At Risk Act. (http://www.cosewic.gc.ca/eng/sct6/sct6_6_e.cfm, March 29, 2010).

Endangered, Threatened and Protected (ETP) species identified in the course of this fishery evaluation and the international or national requirements which triggered the ETP categorization are as follows:

| Species | International/ National Requirement |
|---|---|
| leatherback turtles (*Dermochelys coriacea)* | CITES/ SARA |
| loggerhead turtle (*Caretta caretta)* | CITES |
| green turtle (*Chelonia mydas)* | CITES |
| Kemp's Ridley turtle (*Lepidochelys kempii)* | CITES |
| pilot whale (*Globicephala melas, long finned)* | CITES |
| northern bottle nose whale (*Hyperoodon ampullatus*) | CITES (Grand Banks population)/ SARA (Scotian Shelf population) |

All marine turtle and whale species identified here are listed under CITES, either in Appendix I (Species threatened with extinction; trade in specimens of these species is permitted only in exceptional circumstances) or Appendix II (species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival).

The leatherback turtle and the northern bottlenose whale Scotian Shelf population are listed under the SARA. Loggerhead sea turtles were assessed as Endangered by COSEWIC in April 2010. DFO is currently considering whether or not to list it under SARA. It has implemented a Loggerhead Conservation Action Plan (LCAP) with the following objective:

> *"Ensure that human-induced harm in Canadian waters does not exceed levels that would impede population recovery and encourage increases in abundance toward what might be considered to be historical levels, through implementation of practical solutions, with industry cooperation, for monitoring and mitigating incidental capture and post-release mortality of sea turtles by Canadian commercial fleets"*.

Kemp's Ridley sea turtle are currently identified as a low priority candidate for COSEWIC evaluation and are not scheduled to be evaluated.

Following guidance from FAM Version 1, the assessment team scored each species individually and the final scores were determined in accordance with the scoring guidance identified in Section 4 of the FAM.

**Leatherback Turtle**

Leatherback turtles were assessed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2001 and are

listed on under SARA Schedule 1. The species is also listed under CITES. An allowable harm assessment was completed in 2004. Leatherback turtles are not retained or landed from the fishery, the team considered that the requirements of CITES were met.

The recovery strategy defined for Atlantic leatherback sea turtles states:

> The Canadian contribution to incidental captures is largely unknown, but available data from the Canadian offshore pelagic longline fleet indicates about 170 incidental captures per year. As outlined in the Recovery Strategy for Leatherback Turtles in Atlantic Canadian Waters (DFO, 2006), under '*2.8.1 Threats in the Marine Environment*', quantitative data on incidental capture exists only for this fleet and on-board observers reported no mortalities in this fishery during the 2001-2003 fishery. However, based on estimated encounter rates from DFO observer data and post-encounter mortality estimates drawn from studies in the US, a small number of leatherback turtle mortalities may have occurred each year in the Canadian fishery.

The Allowable Harm Assessment for Leatherback Turtle in Atlantic Canadian Waters (DFO, 2004) concluded that:

> The size of Atlantic leatherback turtle population is unknown, but likely exceeds several hundred thousand animals. The geographic extent of the population has not changed suggesting that suitable habitat is available to permit population growth.
>
> The Canadian contribution to incidental captures is largely unknown. Available quantitative data from the offshore pelagic long-line fleet indicate that about 170 incidental captures occur per year. Sightings data indicate that incidental captures occur in Canadian fixed gear fisheries, but estimates of the level of harm are unknown. Nevertheless, only a small fraction of Atlantic wide incidental captures are likely to occur in Canadian waters. Given that Canadian activities contributing to incidental mortality of the entire Atlantic population are small, Canadian conservation efforts alone will not be sufficient to achieve the interim recovery target.
>
> Assuming current levels of fishing effort within Canadian jurisdiction, the review committee concluded that there was scope for human induced mortality without jeopardizing survival or recovery of this species.
>
> However, the review committee urges that all feasible measures to minimize the impact of human activities on this species be undertaken.

The Moody assessment team concludes that the effects of the pelagic longline fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species, that the direct effects of the fishery are highly unlikely to create unacceptable impacts to leatherback species and that indirect effects have been considered and are thought to be unlikely to create unacceptable

impacts. However, the team could not determine these with a high degree of certainty. The assessment team assigns a score of 80 for leatherback turtles.

**Loggerhead Turtle**

The assessed fishery satisfies the CITES requirements as loggerhead turtle are not permitted to be retained or landed by the fishery. Canada does not allow trade of turtle products, internationally or domestically. Thus the international requirement stated in the first scoring issue is met at the 100 SG. There are no current national protection requirements for loggerhead turtle so the national protection requirement for the first scoring issue under the 100 SG is not applicable to loggerhead. Therefore the team considers the first scoring issue under all SGs to be met.

The second scoring issue of PI 2.3.1, ETP outcome status, requires a determination of whether or not the direct effects of the candidate fishery are considered to be unlikely (SG60) or highly unlikely (SG80) to create unacceptable impacts to ETP species.

According to the DFO RPA, the assessed fishery interacted with an estimated average of 1,200 loggerhead turtles between 2002 and 2008. While there is mandatory release, post hooking mortality does occur, and is estimated to range between 20 and 45%. This results in 200-500 loggerhead deaths annually in the Canadian longline fishery (DFO, 2010). While the Atlantic adult population (females) has been demonstrated to be declining since 1998, it is highly unlikely that the assessed candidate fishery is the cause of the endangered status of the species, and Atlantic pelagic longline fisheries is one of several current threats (based on the analyses in the US Recovery Plan for the species. In this regard, the US Recovery Plan provides mortality estimates in units of "adult equivalencies", wherein mortalities at each life stage are adjusted for expected lifetime reproductive contribution, given the individual's age, probability of reaching maturity and expected life span. Conversion of the life stages caught in the Canadian tuna and swordfish longline fisheries (oceanic and neritic juveniles) to adult equivalents using survivorship rates provided in the US Recovery Plan results in an estimate of 5-15 adult equivalent mortalities annually for 2002-2008. For comparison, estimates of total annual mortalities in adult equivalents for the North Atlantic overall are 9,417 individuals for trawl fisheries and 872 individuals for pelagic longline fisheries.

The 2009 US assessment of loggerhead turtles indicates that individuals taken in pelagic longline fisheries are primarily juveniles, not breeding age adults or even large sub-adults. Mortality of juveniles is higher and only a fraction of pelagic juveniles are expected to contribute to the population through reproduction; thus pelagic juveniles were not deemed as important to the population as breeding age adults in the US assessment. The loss of a certain number of pelagic juveniles, therefore, is less of a threat to the species' survival and recovery compared to an equal loss of sexually-mature adults. The growth of the population, however, would be expected to be sensitive to changes in the mortality rates of juveniles.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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In addition, according to the Canadian RPA:

- Published population modeling studies suggest that the Northwest Atlantic loggerhead sea turtle population is likely to continue to decline given current estimates of population growth rates and the effects of human-induced mortality. However, these studies also indicate scope for recovery if total mortality is reduced.

- Reduction or elimination of mortality in Canadian waters alone is highly unlikely to be sufficient to achieve recovery. In addition to minimizing threats to loggerhead sea turtles in Canadian waters, international cooperation to reduce threats to the population as a whole is needed to achieve recovery of this species.

Based on the fact that current mortality from the candidate fishery is only a fraction of a percent of the total mortality on the Atlantic population, it is recognized that the candidate fishery is neither the sole cause of the endangered status of the species nor the primary threat. The assessment team concludes that impacts are marginal such that reduction of mortality by this fleet alone would not significantly change recovery prospects of the species. Thus, the assessment team considers that the second scoring issue of the SG60 has been met. It is 'unlikely' that the direct effects of the fishery are creating unacceptable impacts to loggerhead turtles.

The RPA is clear that reducing or eliminating mortality in Canadian waters is not enough to recover the species. However, the RPA does not state whether the species can recover without reducing bycatch by the Canadian swordfish longline fishery or how much bycatch by this fishery would delay loggerhead recovery if all other sources of mortality were eliminated. While the marginal impact of the Canadian fishery is small, the LCAP outlines a set of regulations designed to reduce Canadian impact. Based on the fact that there is no national statement of acceptable impact, the assessment team does not consider the second scoring issue of the 80SG to be met – that is, it is not 'highly likely' that direct effects of the candidate fishery are considered to create unacceptable impacts.

Measures for Atlantic wide reduction of turtle bycatch by pelagic longliners are being considered by ICCAT. The assessment team does not consider the need for international cooperation as rationale to postpone additional Canadian regulations to further reduce bycatch in the Canadian swordfish longline fishery.

The assessment team considered the indirect effects of the candidate fishery due to the loggerhead bycatch, such as disruption of the food chain, habitat alternation and trophic interactions are unlikely to create unacceptable impacts. The species spends only a portion of its life cycle in the

area of the candidate fishery.

In summary, the assessment team concludes that the effects of the candidate fishery on loggerhead turtles are highly likely to be within limits of national and international requirements for protection of ETP species, as required by the first scoring issue under the SG 80. Similarly, the assessment team agrees that the third scoring issue of the SG80 has been met, in that the indirect effects of the fishery are considered unlikely to create unacceptable impacts on loggerhead sea turtles. However, it has been concluded that the second scoring issue has not been met under the SG80. Therefore, a score of 75 has been assigned to this scoring element of ETP outcome status.

**Green Turtles**

Green turtles are listed under CITES. Turtles are not permitted to be retained or landed, hence the international requirement of the first scoring issue under SG100 is met.

There are no national requirements for protection of green sea turtle. COSEWIC currently considers green sea turtles in the Pacific Ocean as a low priority candidate species for assessment, and there is no priority for listing Atlantic green sea turtle. The national requirement of the first scoring issue under SG100 is met.

It is unlikely or quite infrequent that there would be green turtles in Atlantic Canadian waters, and those reported by at-sea observers are likely to be misidentification of juvenile loggerheads due to similar shell patterns (Chris Sasso, NMFS, pers. comm.). Interactions with green turtles are believed to be rare.

The assessment team concludes that all scoring issues of SG80 are met or exceeded (the effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species, direct effects are highly unlikely to create unacceptable impacts to ETP species and, indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.

The team did not conclude that the second scoring issue of SG100 was met. The assessment team therefore assigns a score of 90 to green turtle.

**Kemp Ridley Turtles**

Kemp's Ridley turtles are listed under CITES. Turtles are not permitted to be retained or landed in Canada, hence the international requirement

of the first scoring issue under SG100 is met.

There are no national requirements for protection of Kemp's Ridley sea turtle. COSEWIC currently considers Kemp's Ridley sea turtles in the Atlantic as a low priority candidate species for assessment. The national requirement of the first scoring issue under SG100 is met.

Interactions with Kemp's Ridley turtles are believed to be rare, with a total of four observed between 2000 to 2008. The assessment team concludes that all scoring issues of SG80 are met or exceeded (the effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species, direct effects are highly unlikely to create unacceptable impacts to ETP species and, indirect effects have been considered and are thought to be unlikely to create unacceptable impacts).

The second scoring issue under the SG100, that there is high of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species, is not considered to be met. The assessment team therefore assigns a score of 90 to Kemp's Ridley turtle.

**Pilot Whales**

Pilot whales are listed under CITES. Whales are not permitted to be retained or landed, hence the international requirement of the first scoring issue under SG100 is met as the species is not available for sale. Pilot whales are not currently listed under SARA. There was a COSEWIC evaluation of the Atlantic population status in 1994 which concluded that there were no immediate threats to the population. The fishery meets both the national and international requirements of the first SG100 scoring issue.

Interactions with pilot whales are rare, approximately five have been observed between 2001 and 2008, with at least one clearly released with no visible injury. The assessment team concludes that the second and third scoring issues of SG80 are met or exceeded - direct effects are highly unlikely to create unacceptable impacts to ETP species and indirect effects have been considered and are thought to be unlikely to create unacceptable impacts) The second scoring issue of the SG100 is not met as it is not possible to state that there is high of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species. The assessment team therefore assigns a score of 90 to pilot whales for this PI.

**Northern Bottle Nose Whale**

The northern bottle nose whale are listed under CITES and the Scotian Shelf population is also listed under SARA (assessed by COSEWIC in

2002 as endangered and listed under SARA schedule 1). Figure 8 of the client's narrative above suggest that the Gully MPA established in 2004 provides full protection for the listed species. Only one interaction was documented by observers in the past 25 years, and it was off Newfoundland on the Grand Banks, not in the area commonly occupied by the listed population. No interaction between bottlenose whale and longlines have been observed or reported on the Scotian Shelf. Swordfish is not a prey of bottle nose whale and the assessment team is not aware of a plausible indirect effect likely to have a negative impact.

The assessment team concludes that all scoring issues of SG80 are met and exceeded (the effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species, direct effects are highly unlikely to create unacceptable impacts to ETP species and, indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. The assessment team has high certainty that that the effects of the fishery are within limits of national and international requirements for protection of ETP species, and it has high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on the Scotian Shelf bottlenose whale population. The assessment team assigns a score of 95 to northern bottle nose whales.

***Summary***

The majority of the scoring elements (species) within this performance indicator scored 80 or more in relation to outcome status with the exception of loggerhead turtles which scored 75. Overall, the fishery is scored at 75 under this PI.

**Condition**

Within four years of certification, the client must demonstrate that direct effects are highly unlikely to create unacceptable impacts to loggerhead turtles. The client should refer to Section 7 of the FAM for the specific performance requirements associated with the term "highly unlikely" as pertaining to this PI.

During the first, second and third surveillance audits, the client must provide documented evidence that work is being undertaken which will contribute to attaining the condition requirements by the fourth surveillance audit.

**Client Action Plan**

The Atlantic Canadian Loggerhead Turtle Conservation Action Plan (LCAP) will introduce regulatory and process / protocol changes aimed at reducing both the interaction and post release mortality of loggerhead turtles.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Some of the operational aspects of the LCAP will come into force immediately while others will not be implemented until year two of the plan.

An evaluation of the LCAP performance alone may not be sufficient to demonstrate a reduction in mortality estimates within such a short time period. Updated information on post-release survival is required. DFO Science, collaborating with the swordfish longline industry, is proposing to develop new estimates of post-release survival after being hooked in pelagic longline fishing gear by conducting work between 2011 and 2013; final results are expected to be available in 2014.

Other planned research that could lead to potential regulatory changes, proposed by the regulator is outlined in both the LCAP and the Loggerhead Turtle RPA. Details of this research and scheduling time lines are covered under the Client Action Plan for Condition 8, below.

While the introduction of gear changes and handling protocols outlined in the LCAP, may allow us to meet the condition, depending on the definition of "highly unlikely" and the actual performance requirements, it may be difficult to evaluate / measure the effectiveness of the gear / handling protocol changes, as these could be offset by other factors.

A RAP review is scheduled for July 2011 to evaluate the precision and stratification of observer data and to recommend changes, if required, to improve monitoring, deployment strategies and schedules, including coverage.

Additional observer training and protocols are currently under development by the regulator and will be implemented for the 2011 fishing season. The aim of these changes is to use a data collection and recording system consistent with that used in the U.S. to help better understand the life stages of loggerhead turtles that are encountered in the Canadian fishery.

A training and certification program, in the proper use of safe handling and release equipment, and data recording protocols is scheduled for March of 2011. Training will be mandatory for vessel operators and at-sea observers.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 2.3.2 | The fishery has in place precautionary management strategies designed to:<br>- Meet national and international requirements;<br>- Ensure the fishery does not pose a risk of serious or irreversible harm to ETP species;<br>- Ensure the fishery does not hinder recovery of ETP species; and<br>- Minimize mortality of ETP species. | • There are measures in place that minimize mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.<br>• The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | • There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimize mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.<br>• There is an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved.<br>• There is evidence that the strategy is being implemented successfully. | • There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimize mortality, that is designed to achieve above national and international requirements for the protection of ETP species.<br>• The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.<br>• There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective. |
| **Weight** | **0.333** | **Score** | **75** |

**Client**

***Leatherback***

Measures voluntarily undertaken by Canadian pelagic longline fisheries include:

1) increasing observer coverage with funding from the Habitat Stewardship Fund at Environment Canada to determine extent and possible mitigation of sea turtle bycatch (2001, 2002),
2) developing a Code of Conduct for Responsible Sea Turtle Handling and Mitigative Measures in 2003, which was added to the Conservation Harvesting plan in 2004 (DFO 2004a),
3) purchased 30 turtle de-hooking and line cutting kits in 2003 and 15 kits in 2004, which is enough for all active vessels in the fishery, and
4) approximately 72 individuals, representing all license holders in the assessed fishery attended the 'Protected Species Safe Handling, Release, and Identification Workshop' on April 3, 2008, and were certified (T. Atkinson, pers. comm. 2009).

Other measures not directed at reducing leatherback turtle catch rates or harm, but which may do so, include limits on fishing effort, increased use of circle hooks (thought to decrease foul hooking), and fishing with leader lengths greater than buoy drop lengths, allowing turtles to reach the surface (NSSA 2003). These measures, as well as sea turtle handling practices also benefit loggerhead turtles.

***Loggerhead Turtle***

In Canada the loggerhead turtle population status was designated as 'endangered' by COSEWIC in April 2010 (COSEWIC 2009). While the COSEWIC assessment is required prior to consideration of a SARA listing, which evokes national limits or guidelines (e.g., bycatch limits, permitted incidental harm, or handling protocols). As mentioned previously, the NSSA developed a Code of Conduct for Sea Turtle Handling. Dehooking and line cutting equipment are carried by all active licenses in the fleet. Representatives from all active licenses in the assessed fishery were certified in safe handling techniques.

Brazner and McMillan (2008) estimated over 9000 loggerheads were caught by pelagic longline vessels based on the relationship between the number of loggerhead observed and the landed weight of swordfish from observed trips (1999 to 2006). These estimates would have differed if estimates were based on either proportion of sea days observed or proportion of hooks observed. Measures to decrease harm to sea turtle outlined above, i.e., safe handling training, change in hook type, and use of line cutting and dehooking kits should increase loggerhead survival. These changes, however, occurred at the time of increased tuna targeting – and increased loggerhead catch rates are associated with tuna catches (Brazner and McMillan 2008) – therefore, it is not known what the overall change in loggerhead survival is from these measures. Almost all observed loggerhead turtles released between 2001 and 2006 were released without removing hooks (~95%). Observer data from 2008 and from subsequent fishing seasons is needed to determine if there is an increase in gear removal practices since the 'Protected Species Safe Handling, Release, and Identification Workshop' on April 3, 2008.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Measures adopted voluntarily include careful release of captured turtles, gear was removed from 1/3 to 3/4 of the observed leatherback releases between 2001 and 2006. The recovery strategy (ALTRT 2006) and allowable harm assessment (DFO 2004b) include bycatch limits, identified research needs and a timeline for re-evaluating impacts.

Management measures expected to reduce hooking injuries, based on extensive research in other fisheries such as circle hook use, did not have the intended effect in the assessed fishery. There was no change in the odds of severe hooking injuries for this species. Voluntary measures such as use of dehooking kits, and training in careful release will likely decrease mortalities among juvenile loggerheads captured by the fishery. In this case management measures are following voluntary measures.

In October 2010, DFO released the Atlantic Canada Loggerhead Turtle Conservation Action Plan (LCAP). This Conservation Plan lays out the steps that need to be undertaken to advance toward the goal of improved knowledge and management of turtle interactions in Canadian Atlantic pelagic longline fisheries. These steps can be implemented under the Fisheries Act and through the Integrated Fisheries Management Plan (IFMP) as interim measures while the SARA process proceeds. Should the species be listed under SARA this Conservation Plan will form the basis of the recovery approach and subsequent action plan requirements under SARA (DFO, 2010a). The plan defined the objective and strategies to be used in subsequent Atlantic Canadian pelagic longline fisheries. The following information is quoted directly from the LCAP.

**Objective:**

*"Ensure that human-induced harm in Canadian waters does not exceed levels that would impede population recovery and encourage increases in abundance toward what might be considered to be historical levels, through implementation of practical solutions, with industry cooperation, for monitoring and mitigating incidental capture and post-release mortality of sea turtles by Canadian commercial fleets".*

## Strategies

**1.Enhance monitoring and data collection for loggerhead turtles**

Actions underway 2010/11:

1.1. Maintain and/or increase observer coverage to ensure statistically robust estimation of bycatch levels.

1.2. Share best practices from others (e.g. USA) and adopt or develop protocols for boarding sea turtles to further improve disentanglement and de-hooking, and thus enhance post-capture survival.

1.3. Use the Maritimes Region bycatch project as a means to conduct enhanced industry outreach.
1.4. Review the Observer contract requirements and identify necessary amendments or additions to institute improved data collection requirements.
1.5. Review logbook data collection for potential improvements.
1.6. Provide data on incidental catch of sea turtles to ICCAT as requested in ICCAT circular 413/10.

Actions planned for 2011/12:
1.7. Work with the Canadian Pelagic Longline fishery and Observer program staff to transfer and implement practices for handling and boarding of sea turtles.
1.8. Obtain data on life-stage of loggerhead sea turtles foraging in Canadian waters. Boarding turtles will provide access to the bycaught animals and enable accurate measurements of individuals, along with other research opportunities.

**2.Continued International Cooperation and Capacity Building**

Actions 2010/2011:
2.1. Review methodologies currently in place to estimate loggerhead sea turtle encounters with a view of harmonization with the US. Currently Canadian statistical methodology (ratio approach) results in higher estimates.
2.2. Bilateral work with US (best practices for mitigation of sea turtle bycatch and safe handling and release).
2.3. Participation in the Kobe bycatch workshop on improving cooperation and coordination among RFMO's.

Actions long term:
2.4. Coordination with other parties to support the adoption of consistent sea turtle conservation and management measures within all RFMO's.
2.5. Continued participation as an observer in the inter-American Convention for the protection and Conservation of turtles (IAC).
2.6. Possible development of catch reduction proposals pending the outcome of the Kobe Bycatch workshop and associated recommendations.

**3.Introduce fishery management measures to mitigate bycatch**

Actions 2010/2011:

3.1. Develop more stringent protocols related to implementation of the Code of Conduct beyond those currently in use.

Actions 2011/12:

3.2. Move to mandatory use of non-corrodible 16/0 circle hooks by December 2011 to reduce mortality of released loggerhead sea turtles.

3.3. Require the mandatory use of safe handling and release equipment and protocols beyond those currently in the voluntary code of conduct by May 2011.

3.4. Assess feasibility and potential effectiveness dynamic/temporary, time/area, temperature-based closures to minimize loggerhead sea turtle interactions.

Longer term:

3.5. Possible changes to gear configuration and fishing practices based on results of research.

**4.Research in support of Strategies**

Actions 2010/2011:

4.1. Determine if stable spatial/temporal hotspots for loggerhead sea turtle bycatch exist in Canadian waters.

4.2. Investigate effects of gear deployment (e.g. set time, set duration) on the frequency of encounters.

4.3. Activities identified in the DFO Maritimes sea turtle research plan:

4.3.1 Analysis of data from enhanced Observer coverage undertaken in 2001 and 2002 to improve monitoring, if improvements are required.

4.3.2 Documentation of current fishing practices and literature review.

4.4. Use improved data collection identified in the Monitoring section above to enhance estimation of post-release mortality of bycaught turtles.

Long-term:

4.5. Keep abreast of international studies investigating post-release survival of bycaught loggerhead sea turtles.

4.6. Develop spatial/temporal models of loggerhead sea turtle habitat in Canadian waters, and compare habitat location(s) to sea surface temperature and spatial distribution of the Canadian pelagic longline fishery.

The various measures presented above are anticipated to lead to a reduction in loggerhead sea turtle encounters in pelagic longline fisheries.

As an example NOAA Fisheries has estimated both the anticipated reduction in bycatch that would result from US longline fleets switching from J to circle hooks, and increased post release survival when all gear is removed from bycaught individuals (e.g. National Marine Fisheries Service 2004), as is required under the measures presented above.

Items identified in this Conservation Plan constitute current Canadian efforts to protect loggerhead sea turtles. The Plan will be updated in the future as new knowledge leads to improved assessment of population status in the Northwest Atlantic and identification of potentially effective measures for management of incidental catch in Atlantic Canadian fisheries. Canadian efforts to monitor, conserve, and protect sea turtles will continue; this includes identification of collaborative work with the US and international efforts aimed at effective coordination and joint contribution to the overall conservation and recovery of sea turtles. The highly migratory behaviour of the loggerhead sea turtle necessitates that responsibility for conservation of this species is shared among many countries. Given the broad scope of the threats outside of Canadian waters the conservation efforts presented in this Plan, while not sufficient to ensure the recovery of the species, demonstrates Canada's commitment to assist the international community in their recovery efforts.

**Scoring Rationale**

The assessed Endangered, Threatened and Protected (ETP) species are leatherback turtles, loggerhead turtle, green turtle, Kemp's Ridley turtle, pilot whale and northern bottle nose whale. The leatherback turtle and the northern bottlenose whale Scotian Shelf population are listed under the Canadian Species at Risk Act (SARA), the loggerhead, green, Kemp's Ridley turtles and the pilot whale are listed under CITES.

This performance indicator was evaluated for each individual ETP species to ascertain if a strategy is indeed in place. This evaluation, however, need not be as detailed as for PI 2.3.1. As indicated above under 2.3.1, interactions of the assessed fishery with green turtle, Kemp's Ridley turtle, pilot whales and northern bottlenose whales are rare to very rare. Canada does not permit any domestic or international trade of these species and therefore the assessed fishery meets the CITES requirements.

Recovery potential assessments have been done for leatherback turtles and northern bottle nose whales (Scotian Shelf sub-population) and allowable harm assessments through the SARA legislation process have been done for leatherback turtles and bottle nose whales. Recovery plans have been developed and specific management measures (e.g. the Gully MPA to protect bottle nose whales) have been put in place in accordance with SARA requirements.

Loggerhead turtles have been assessed by COSEWIC and determined to be Endangered. Loggerhead is awaiting evaluation in the SARA

process. DFO has also conducted a recovery potential assessment for loggerhead turtle in Canadian waters and has developed a Conservation Action Plan for loggerhead turtles which include appropriate management measures cited above. The assessed fishery has demonstrated its willingness to comply with national management measures and international requirements to protect ETP species.

Of their own volition, the client association (NSSA) had developed a code of conduct for responsible sea turtle handling and mitigative measures which was previously added to the Conservation and Harvesting Plan. The fishing vessels are equipped with de-hooking kits and representatives of all vessels attended a NOAA compliant workshop on the safe handling and release of ETP species and were certified. The assessed fishery has also adopted other voluntary measures to decrease interactions with turtles (larger circle hooks) or decrease the effect of the interactions (longer leaders allowing the turtle to reach the surface).

The assessment team concludes that there is a strategy in place for managing the fishery's impact on certain ETP species (leatherback turtles, loggerhead turtles, northern bottle nose whales), including measures to minimize mortality, that is designed to be highly likely to achieve national requirements for species listed under SARA and international requirements for the protection of ETP species. Canada does not allow domestic or international trade of ETP species listed under CITES and recovery plans have been adopted for those species listed under SARA. There is an objective basis for confidence that the strategy will work, e.g. the Gully MPA has been implemented and vessel activity is monitored through VMS. Information is available for the assessed fishery and for the species involved. There is evidence that the strategy is being implemented successfully for leatherback turtles and northern bottlenose whales, therefore, a score of 80 is assigned to these species. Similarly, a score of 80 is assigned to the other ETP species for which there is rare interaction as it is the team's opinion that specific strategies would further reduce the interactions with green turtle, Kemp's Ridley turtle and pilot whales. However, as the Loggerhead Turtle Conservation Action Plan is newly developed, and is due to be fully implemented for the 2011 season, with respect to loggerhead turtles the final scoring issue of the 80SG is not met; there is not yet evidence that the strategy is being implemented successfully.

The majority of the scoring elements (species) within this performance indicator scored 80 in relation to outcome status with the exception of loggerhead turtles which scored 65. The LCAP defines the strategy for managing the fishery`s impact on ETP, however, as required in the first scoring issue of the 80SG, it will not be clear that the measures defined will minimize mortality of loggerheads. The first scoring issue was not considered to be met. In accordance with MSC scoring methodology, the fishery is scored at 75. As noted above, the Loggerhead Conservation Action Plan will not be implemented until in 2011, and while there is confidence the strategy will work, the first and final SG80 scoring issues were not met.

**Condition**

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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By the first surveillance audit, the client must provide evidence that the strategy (LCAP) is in place for managing the fishery's impact on ETP species, including measures to minimize mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species. Additionally by the fourth surveillance audit evidence must be presented to show that the strategy is being implemented successfully.

During the second and third surveillance audit the client must provide documented evidence that work is ongoing that will contribute to the achievement of the forth year requirements.

**Client Action Plan**

The Atlantic Canadian Loggerhead Turtle Conservation Action Plan (LCAP) was finalized in October of 2010. Measures outlined in the LCAP are scheduled to be included in the 2011 Conditions of License for Swordfish and Other Tunas, the Swordfish Longline Conservation / Harvesting Plan (CHP) and the Swordfish / Other Tuna Integrated Fisheries Management Plan (IFMP). A copy of these documents will be available for review for the first surveillance audit to demonstrate that the measures have been implemented successfully.

Other planned research that could lead to potential regulatory changes, proposed by the regulator are outlined in both the LCAP and the Loggerhead Turtle RPA. Details of this research and scheduling time lines are covered under the Client Action Plan for Condition 8, below.

A RAP review is scheduled for July 2011 to evaluate the precision and stratification of observer data and to recommend changes, if required, to improve monitoring, deployment strategies and schedules, including coverage.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

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| 2.3.3 | Relevant information is collected to support the | • Information is adequate to broadly understand the | • Information is sufficient to determine whether the | • Information is sufficient to quantitatively estimate |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| | management of fishery impacts on ETP species, including:<br>- Information for the development of the management strategy;<br>- Information to assess the effectiveness of the management strategy; and<br>- Information to determine the outcome status of ETP species. | impact of the fishery on ETP species.<br>• Information is adequate to support measures to manage the impacts on ETP species.<br>• Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts.<br>• Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species | outcome status with a high degree of certainty.<br>• Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.<br>• Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| **Weight** | **0.333** | **Score** | **70** |

**Client**

***Leatherback***

Information on leatherback entanglements and other interactions in Canadian waters, or by Canadian vessels are based on sightings reported to a volunteer network and on fisheries observer data. The assessed fishery, with support from the Habitat Stewardship Fund, increased observer coverage to determine extent of sea turtle interactions and evaluate possible mitigation strategies. During 2001 and 2002, when fisheries observers reported from ~20% of large pelagics trips, 28 and 33 leatherback turtle captures were reported. Based on these numbers, it's estimated that the Atlantic Canadian Pelagic Longline Fisheries have about 170 interactions per year (ALRT 2006). The Recovery Strategy includes a commitment to scientific review of leatherback turtle mortality every 5 years to ensure survival and recovery is not jeopardized (ALRT 2006).

***Loggerhead Turtle***

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Information and monitoring from the assessed fishery was used to quantitatively estimate mortality levels. The longline fleet is required to carry and fill out SARA logbooks, in which they are required to document any interactions with SARA listed species. Interactions with other ETP species not listed under SARA are documented through the at-sea observer program. The at-sea observer program documents interaction type, estimated weights, condition upon release, date and location of interaction, as well as gear configuration. Continued observer coverage is expected to determine if the Code of Conduct and Safe Handling workshop improve release conditions of captured leatherbacks.

In terms of information availability, impacts were quantitatively estimated from fisheries observer data collected from the assessed fishery. There is however, little understanding of post-release survival.

**Scoring Rationale**

Qualitative and some quantitative information is available on the amount of ETP species affected by the fishery. This information is sufficient to estimate outcome status with respect to biologically based limits for some but not all main ETP species. The information is adequate to support a partial strategy to manage the fishery, but the assessment team considers that there is insufficient data collected to detect any increase in risk to ETP species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). The team considers that all the 60 scoring guideposts are met.

The assessment team is concerned that there may be insufficient observer coverage, particularly when the numbers of animals sampled go down and that the robustness of the sampling design for the observer coverage has not been evaluated. The team considered that the first requirement of the first scoring issue under the 80SG, (i.e. information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species), was not fully met. The team's assessment was that the current information is not sufficient to determine whether the fishery may be a threat to the recovery of loggerhead turtle. The assessment team assigns a score of 70 for this PI.

**Condition**

By the fourth surveillance audit, the client must present information considered sufficient to determine whether the fishery poses a threat to protection and recovery of the ETP species, specifically loggerhead turtle. Information must be sufficient to not only measure trends but also to support a full strategy to manage impacts.

During each of the first three surveillance audits, the client shall provide documented evidence to demonstrate the steps being taken, and the progress that has been made to achieve the condition requirements by the fourth surveillance audit.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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**Client Action Plan**

The swordfish longline industry, through the at-sea observer program and data collected in the SARA logbooks, will continue to collect information that will assist Fisheries and Oceans Canada to determine whether the fishery poses a threat to protection and recovery of loggerhead turtles.

As part of the LCAP adopted in October 2010, a RAP review was completed in July 2011 to evaluate the precision and stratification of observer data and to recommend changes, if required, to improve monitoring, deployment strategies and schedules, including coverage.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

| 2.4 | Habitat |
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| 2.4.1 | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function. | • The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | • The fishery is highly unlikely to reduce habitat structure and function to point where there would be serious or irreversible harm. | • There is evidence that the fishery is highly unlikely to reduce habitat structure and function to point where there would be serious or irreversible harm. |
| **Weight** | | **0.333** | **Score** | **100** |

**Client**

Atlantic Canada Large Pelagic Longline harvesters set gear to fish in the upper 100m, with mean depth fished from 11 m to 26 m for different targeting strategies (Brazner and McMillan 2008). There is very little disturbance of bottom habitat and, more generally, of habitat damage

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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associated with this gear type (Fuller et al. 2008). Pelagic longline gear is well marked with radio buoys and high flyers, therefore even when it is cut off or when it parts, most gear is recovered either by the vessel or by other vessels (T. Atkinson, pers. comm. 2009).

**Scoring Rationale**

The assessed fishery sets its gear to fish in the upper 100m, with mean depth fished from 11 m to 26 m for different targeting strategies (Brazner and McMillan 2008). The gear rarely touches the bottom and therefore there is very little interaction with bottom habitat. Habitat damage associated with this gear type (Fuller et al. 2008) is considered minimal. The gear is marked with radio buoys and high flyers to facilitate recovery when it is cut off or when it parts.

There is evidence from observer data and scientific studies which describes the fishing patterns of the fleet, in particular the depth of water fished and total water depth. The assessment team considers that it is highly unlikely that the assessed fishery could reduce habitat structure and function to point where there would be serious or irreversible harm and scores the fishery at 100. The score of 100 is supported by guidance from the MSC published in the FAM, which states that if it can be shown that the fishery has no impact on habitats than it would meet the SG100.

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| 2.4.2 | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types. | • There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.<br>• The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | • There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.<br>• There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved.<br>• There is some evidence that the partial strategy is being | • There is a strategy in place for managing the impact of the fishery on habitat types.<br>• The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.<br>• There is clear evidence that the strategy is being implemented successfully, and intended changes are |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| | | | implemented successfully. | occurring. There is some evidence that the strategy is achieving its objective. |
| **Weight** | | **0.33** | **Score** | **100** |

**Client**

The Gully MPA (see Figure 4) was established to protect sensitive habitats. As well, the Gully MPA protects primary habitat for northern bottlenose whales. Most whale sightings are within Zone 1 of the MPA (shown in red). The assessed fishery and groundfish longline have limited access to Zones 2 & 3. In addition, all vessels in the assessed fishery carry VMS, therefore, data are available to monitor the spatial extent, time and location of fishing.

**Scoring Rationale**

Section 7.1.26 in the FAM, v.1, states that "if it can be shown that the fishery has no impact on a particular Component and has therefore scored 100 under the Outcome PI, it should still be scored under the Management Strategy PI. But to meet the requirement at the SG1000 this may simply comprise a statement of intent about continuing to have no impact and ongoing monitoring to ensure that no impact occurs".

Given the nature and characteristics of the pelagic gear used in the candidate fishery there is minimal contact with the bottom, and due to the lack of interaction with benthic habitat structure, a management strategy is not been deemed necessary by the management authority. Coupled with the understanding of the distribution of habitats within the area of the operation of the fishery, a strategy implied through the gear characteristics can be considered.

The strategy used to manage the impact of the fishery on habitat is to set the gear pelagically with minimal contact with the bottom. The strategy is based on first hand observer data and scientific information from the assessed fishery and the habitats it fishes. It is clear that the strategy is being implemented successfully. The assessment team considers that fishing pelagic longlines results in no or negligible impacts on habitat, therefore, there is no management strategy required to minimize habitat impacts, hence the fishery scores 100 for this PI.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 2.4.3 | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types. | • There is a basic understanding of the types and distribution of main habitats in area of fishery.<br>• Information is adequate to broadly understand the main impacts of gear use on the main habitats, including spatial extent of interaction. | • The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery.<br>• Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear.<br>• Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | • The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.<br>• Changes in habitat distributions over time are measured.<br>• The physical impacts of the gear on habitat types have been quantified fully. |
| **Weight** | | **0.33** | **Score** | **95** |

**Client**

All vessels in the assessed fishery carry VMS, therefore, data are available to monitor the spatial extent, time and location of fishing.

**Scoring Rationale**

As seen in Figure 2, above in Section 3.4, the majority of swordfish longlining occurs on the Scotian Shelf, along the continental shelf and in

deep waters east of the Scotian shelf. Distribution of habitat types, is known over the range (Kotelev and Hannah, 2007) of the shelf and slope, as required in the first scoring issue of SG100. Habitats sensitive to longline interactions, primarily coral and sponge structures have been identified (Campbell and Simms, 2009). Coral and sponge habitat identification projects started in 1998 and continue today. Fisheries and Ocean's Coral Conservation Plan – Maritimes Region (2006 – 2010) identified current and future research requirements, including the understanding and assessing impacts of human activities on corals, distribution of corals and evaluating current and proposed management measures to conserve corals (DFO 2006c).

Fisheries and Oceans (2010c) published a report on non-trawl gear impacts in which concludes that impact of pelagic longline fisheries on marine habitats are expected to be minimal, except in cases where gear is lost. Given the nature of the gear and the way it is fished, the assessment team considers that the assessed fishery has minimal impact on habitat. In addition to this, there is an understanding of the distribution of habitat types within the area of operation, and there is monitoring in place pertaining to habitat change. The first two scoring issues of SG100 are met. Physical impacts of active fishing gear on habitat have been quantified as minimal, impact of lost gear on habitat has not been quantified. Most scoring issues meet the 100SG and none are below 80, therefore a score of 95 has been awarded.

| 2.5 | Ecosystem |
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| 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function. | • The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | • The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | • There is evidence that fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| **Weight** | | **0.333** | **Score** | **90** |

**Client**

Recent high profile research papers have highlighted declines in predatory fish, and have pointed to ecosystem effects of changes in the

abundance of species at this trophic level. During the pre-assessment process for the Atlantic Canadian Large Pelagics Longline Fishery, stakeholder concerns included ecosystem effects of removing top predators. To address these concerns and to evaluate the Atlantic Canadian Large Pelagics Longline Fishery and against the MSC Scoring Guideposts for Principle 2 Component 5, research papers detailing catch trends of apex predators and ecosystem effects are briefly reviewed. The purpose of reviewing these papers is, first to determine if Northwest Atlantic large pelagics were included in the analyses and, more importantly, to identify methodologies and/or types of evidence used. Then, comparable data are considered from the assessed fishery and from the ecosystem of which it is a part.

Myers and Worm's (2005) paper used research vessel survey data from three shelf ecosystems and Japanese pelagic longline catch rate data to show rapid declines in predator abundance in shelf and pelagic ecosystems following the onset of industrialized fishing. Japanese pelagic longline data (1952-1999) from equatorial and southern oceans were used to model declining catch rates. They chose these data sets because the data sets covered the period when industrialized longlining began. Japanese pelagic longline catch rates from the Northwest Atlantic are shown in the supplementary material. Catch rates shown were higher in 1964 (first year shown for Canadian Atlantic waters) and appear steady thereafter (Myers and Worm 2005).

The question then becomes, would top predator catch rate trends show similar large declines in Northwest Atlantic based on pelagic longline data? Baum et al. (2003) used data from US longline logbooks and found a 60% decline in CPUE for blue shark in the Northwest Atlantic. However, as mentioned earlier, other time series for blue shark in the Northwest Atlantic show either a shallower decline or no decline in blue shark biomass (e.g., ICCAT 2008). Baum et al. (2003) reported a 40% decline in shortfin mako catch rates. ICCAT's assessment, using US, Japanese and Spanish longline data from 1978 onwards, showed considerable uncertainty but stated the shortfin mako population could be near MSY or could be overfished (ICCAT 2008). Swordfish, bigeye and yellowfin tuna appear to be near MSY, whereas albacore and bluefin tuna are considered overfished. This series of trends showed declines not as steep as those Myers and Worm (2005) reported for multiple top predators. Status of individual species' biomass levels and associated management strategies are detailed in the ETP and Bycatch Species components.

The MSC Assessment Methodology (2008) suggested changes in trophic structure as an indicator of ecosystem level effects. A key research paper here is by Pauly et al. (1998), which showed worldwide declines in mean trophic level of landed catch reported to FAO declined over the period (1950-1994). Assumptions in this analysis are that top predators or 'table fish' are the preferred catch (Christensen et al. 2003), and that declines in landed catch trophic levels are driven by declining abundance or availability of large predatory fish (Essington et al. 2006).

Pauly et al. (p.61, 2001) provided guidelines for evaluating which changes in mean trophic level signal ecosystem collapse, which were declines in average "trophic level combined with declining catches (including discards) in the absence of change in fishing area or gear deployment". To this, de Mutsert et al. (2008) would also add in the absence of regulations mandating decreased catches. Both Pauly et al. (2001) and, later

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Essington et al. (2006) point out changes in mean trophic level of landing depend on trophic levels of new target species. They differ in explanations why. Pauly et al. (1998) argue this is because high trophic level biomasses are depleted. Essington et al. (2006) argue that the addition of new (lower trophic level) species drives the decline in average trophic level –the decline in trophic level indicates an increase in overall fishing pressure.

Northwest Atlantic catches of tuna and billfish showed very little trend in trophic levels landed (Christensen et al. 2003). When building trophic level models for multiple regions in the North Atlantic, Christensen et al. (2003) found that tunas and billfish catches showed very little trend over the period from 1950-1999. However, it should be noted that these trophic level models do not include data from the past 8 years when there have been large changes to management and fishing practices in Canada's pelagic longline fleets. These catch trends were not included in models of predatory fish declines for the North Atlantic. Christensen et al. (2003) suggested shifts in catches of tunas and billfishes is better examined at the species level than within the broad category (tunas and billfishes). Thus, this work also directs MSC assessors back to species' catch trends.

To evaluate trophic levels changes for this pelagic ecosystem where many of the tunas, swordfish and sharks are caught, would have to include landings levels from other fisheries in the North or Northeast Atlantic. Following the advice of Pauly and Essington, such an analysis would best account for changes in location, targeting practices, fishing technology as well as landings regulations or quotas. For example, Canadian catch levels of swordfish and bluefin have remained steady since 1996 – limited by quota levels (Lester et. al. 2008).

Another measure of ecosystem effects of fishing is change in the size structure of affected populations or communities. We are unaware of research detailing changes in size structure of this community. There are, however, reports on the change in size structure of swordfish, bluefin tuna, shortfin mako, and blue sharks. Paul and Neilson (2007) found no change in median size of swordfish landed by the assessed fishery (Figure 9) Minimum size regulations limit landing of small fish from this fishery. Trends in bluefin size (from the tended line and rod and reel fisheries) are not consistent throughout the time series (Neilson et al. 2008). Campana et al. (2005) reported a decline in median size of shortfin mako and in mean fork length of blue shark (Campana et al. 2006) but this was, at least in part, due to different fishing strategies of the Japanese and Canadian fleets (e.g., Figure 10). There was a 30% decline in median size of porbeagle caught in the fall fishery on the Newfoundland- Gulf of St. Lawrence fishing grounds (Figure 11, from Campana et al. 2001 in COSEWIC 2004).

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

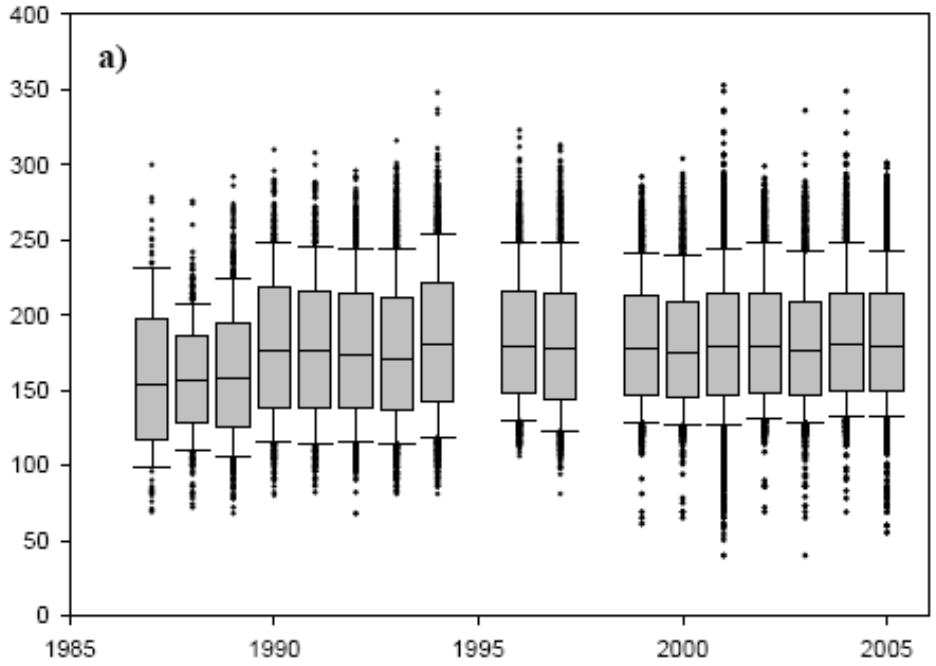


**Figure 9: Median size of swordfish caught in the pelagic longline fishery (Paul and Neilson 2007).**

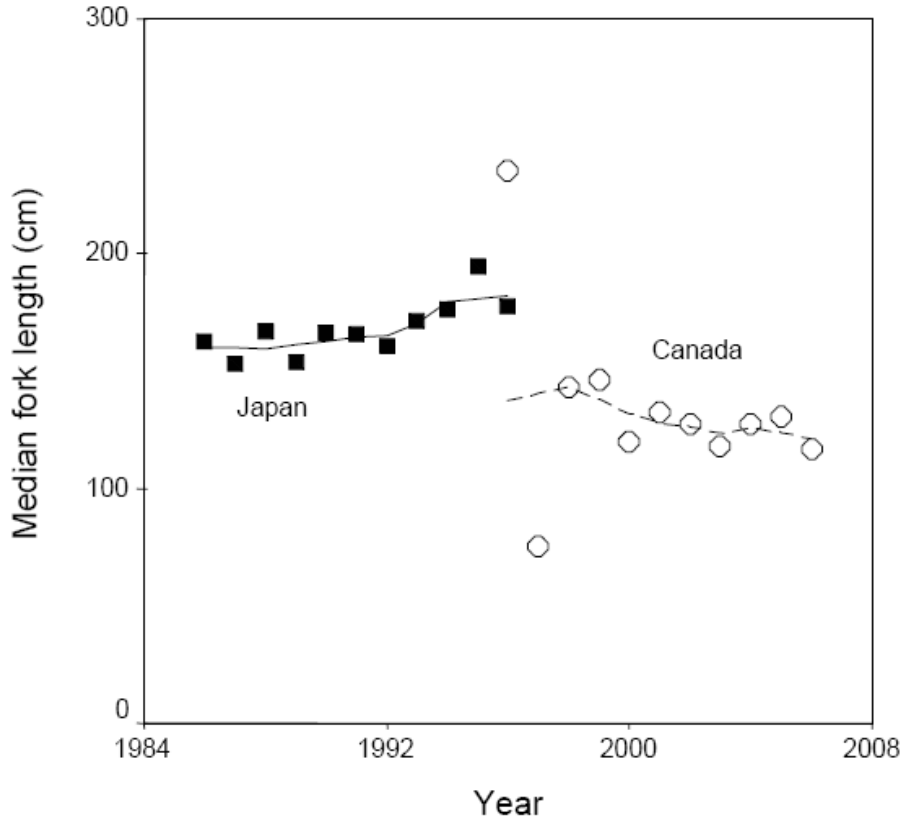


**Figure 10: Median fork length of shortfin mako from Japanese and Canadian pelagic longliners (Source: Campana et al. 2005).**

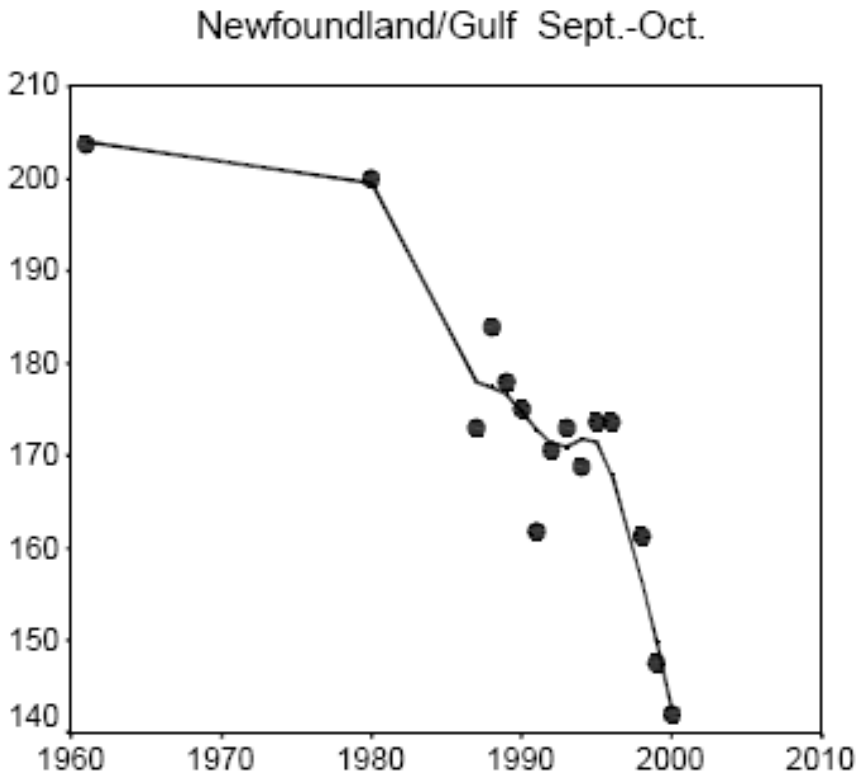


**Figure 11: Decline in median size of porbeagle fall fishery (COSEWIC 2004, from Campana et al. 2001).**

In summary, four measures of ecosystem impacts were considered. If overall change in longline catch rates (# per 1000 hooks fished), are used a proximate measure of ecosystem biomass (Myers and Worm 2005), Japanese catch rates in the Northwest Atlantic did not show as steep declines as those shown for shelf ecosystems or for tropical pelagic ecosystems (Myers and Worm 2005). Second, Baum et al. (2003) used the consistency in catch rate declines to illustrate severe declines among sharks. While there was not consistent declines shown among all top predators discussed here, there were, however, drastic population level declines among *some* top predators in the Northwest Atlantic (e.g., bluefin tuna, porbeagle shark). These declining trends are discussed in the Retained Species Component. Third, declines in the trophic levels of landed catch may

indicate declines among top predators. However, when Christensen et al. (2003) considered billfish and tuna catches from the Northwest Atlantic, these data did not show a declining trend in trophic level up to 1999. Evaluation criteria for the Ecosystems component listed in the Marine Stewardship Council Methodology signal that the level of expected information, detailed management or understanding of outcome status is less than for other components. Suggested kinds of evidence include 'plausible argument, analogy from other ecosystems, or expert judgment' (MSC 2008). If evaluation were solely based on analogy or expert judgment, the assessed fishery scores would be likely be lower. Here, indicators of ecosystem effects suggested by Myers and Worm (2005), Baum et al. (2003) and Christensen et al. (2003) are not evident for the Northwest Atlantic pelagic ecosystems.

Existing analyses did not show drastic declines among Japanese pelagic longline catch rates (used as an approximate measure of community biomass; Myers and Worm 2005) nor did tuna and billfish catches show declines in trophic levels (Christensen et al. 2003). Given the assessed fishery accounts for a low proportion of pelagic effort and landings in the North Atlantic, which likely limits impacts which would undermine ecosystem structure and function 'to a point where there would be a serious or irreversible harm'.

**Scoring Rationale**

There are no direct studies of the fishery being assessed to be able to evaluate and score this performance indicator. However, catch rates for the area (available in the supplemental material in Myers and Worms 2005) were higher in 1964 (first year shown for Canadian Atlantic waters) and appear relatively stable thereafter and Northwest Atlantic catches of tuna and billfish showed very little trend in trophic levels landed (Christensen et al. 2003). These trophic models do not include data from the past 8 years when there have been large changes to management and fishing practices in Canada's pelagic longline fleets. Reports on the change in size structure of swordfish, bluefin tuna, shortfin mako, and blue sharks. Paul and Neilson (2007) found no change in median size of swordfish landed by the assessed fishery. Trends in bluefin size (from the tended line and rod and reel fisheries) are not consistent throughout the time series (Neilson et al. 2008). Campana et al. (2005) reported a decline in median size of shortfin mako and in mean fork length of blue shark (Campana et al. 2006) but this was, at least in part, due to different fishing strategies of the Japanese and Canadian fleets. There was a 30% decline in median size of porbeagle caught in the fall fishery on the Newfoundland- Gulf of St. Lawrence fishing grounds (Figure 11, from Campana et al. 2001 in COSEWIC 2004).

While there is some evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm (SG 100), it is the professional judgment of the assessment team that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm and this PI is scored at 90. The fishery does not score 100 because of insufficient catch and discard information on by-catch and ETP species.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function. | • There are measures in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem.<br>• The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems). | • There is a partial strategy in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.<br>• The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).<br>• There is some evidence that the measures comprising the partial strategy are being implemented successfully. | • There is a strategy that consists of a plan, containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.<br>• The plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.<br>• The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.<br>• There is evidence that the measures are being implemented successfully. |
| **Weight** | **0.333** | **Score** | **90** |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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**Client**

The swordfish and tuna management plan (DFO 2004a) includes the general objective of maintaining trophic structure but does not include specific strategies because of "insufficient knowledge at this time". The IFMP does, however, detail strategies to maintain community diversity (e.g., Gully MPA), and maintain species diversity (e.g., by limiting fishing mortality and bycatch harm). Other management measures which limit ecosystem effects include swordfish quotas, and limits on number of vessels and fishing capacity. Both measures limit overall fishing pressure. Any measures that support rebuilding of populations which are currently at low levels (e.g., porbeagle, albacore and bluefin tunas) could help conserve biodiversity and, possibly, trophic structure. Management measures limiting overall fishing effort limit impacts on ecosystem structure and function. The Canadian swordfish quota is 10.5% of the North Atlantic quota [ICCAT Rec. 08-02], which limits the marginal contribution of this fishery to ecosystem impacts.

Management measures and strategies in place include limits on effort. Time and area closures (e.g., Gully MPA, bluefin tuna exclusion zone, Hell Hole) are intended to protect habitats or vulnerable species, or to reduce gear interactions. Further, there is 100% VMS monitoring to record locations of all vessels in the accessed fishery. Management strategies are based on these data from the fishery as well as 100% DMP monitoring of landings. Landings data and fisheries observer data have been used to assess recovery potential of blue shark, porbeagle, shortfin mako and leatherback and loggerhead turtles. Use of circle hooks and careful release protocols is likely increasing post-release survival among species assessed under the Retained, ETP and Bycatch Species components. As mentioned previously, however, landings caps may not yet correspond to recovery targets for some species (e.g. shortfin mako sharks). Landings or fishing mortality caps linked to population assessments are preferable to non-restrictive catch guidelines.

**Scoring Rationale**

While there is no explicit plan or strategy in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function, the gears used in the assessed fishery and other associated measures are such that the ecosystem impacts are likely negligible. Associated measures including limits on fishing effort, time and area closures (e.g., Gully MPA, bluefin tuna exclusion zone, Hell Hole) are intended to protect habitats or vulnerable species, or to reduce gear interactions, and can be considered a partial strategy, as required under the SG80. 100% VMS and 100% dockside monitoring of landings also contribute to the strategy in place to manage ecosystem impacts. Within the candidate fishery, through the data available on VMS coverage and at sea observer deployment rates, it is evident that measures are being successfully implemented. As such, this PI is given a score of 90 as the last two scoring issues of the SG100 are met and all scoring issues under the SG80 have been met.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem. | • Information is adequate to identify the key elements of the ecosystem (e.g. trophic structure and function, community composition, productive patter and biodiversity).<br>• Main impacts of fishery on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail. | • Information is adequate to broadly understand the functions of the key elements of the ecosystem.<br>• Main impacts of fishery on these key ecosystem elements can be inferred from existing information, but may not have been investigated in detail.<br>• The main functions of the components (i.e. target, bycatch, retained, ETP, habitats) in the ecosystem are known.<br>• Sufficient information is available on the impacts of fishery on these components to allow some of main consequences for the ecosystem to be inferred.<br>• Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | • Information is adequate to broadly understand the key elements of the ecosystem.<br>• Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.<br>• The impacts of the fishery on target, Bycatch, Retained, ETP and Habitats are identified and the main functions of these Components in the ecosystem are understood.<br>• Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.<br>• Information is sufficient to support the development of strategies to manage ecosystem impacts. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| Weight | 0.333 | Score | 85 |
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**Client**

Data comparable to that used in ecosystem models of pelagic ecosystems (e.g., Cox et al. 2002), are available for the Northwest Atlantic. However, Cox et al. (2002) cautioned that determining links among ecosystem components was difficult because of data quality and because of model complexity. Similar difficulties are likely for ecosystem models of Northwest Atlantic pelagic ecosystems. A shortcoming for the assessment most Atlantic large pelagic fisheries is the lack of a fishery independent index or survey (Hurry et al. 2008).

Data from the assessed fishery is comparable to that used for ecosystem models evaluating other pelagic fisheries. These models have been used to infer ecosystem effects. But there is debate in the fisheries ecology literature as to whether data used in different ecosystem models have been sufficient. For the purposes of this assessment, it is noted that information available from the assessed fishery are comparable. Fisheries observer coverage levels should be sufficient to detect an increase in risk to species or to aggregate (ecosystem) indices.

**Scoring Rationale**

The assessment team considers that there is adequate information to broadly understand the functions of the key elements of the ecosystem, that the main interactions of the assessed fishery on these key ecosystem elements can be inferred from existing information, but it has not been investigated in detail. The main functions of the components (i.e. target, bycatch, retained, ETP, habitats) in the ecosystem are known and there is sufficient information available on the impacts of fishery on these components to allow some of main consequences for the ecosystem to be inferred. Sufficient data continues to be collected to detect any increase in risk (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). This PI is given a score of 85.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| *MSC Principle 3* | **The fishery is subject to an effective management system that respects local, national and interjurisdictional laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.** | | |
|---|---|---|---|
| **Weight** | | **Score** | **81.3** |

| *Intent* | *The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.* |
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| **3.1** | **Governance and Policy** |
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| 3.1.1 | The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:<br>- Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2;<br>- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and<br>- Incorporates an | • The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.<br>• The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.<br>• Although the management authority or fishery may | • The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.<br>• The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. | • The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.<br>• The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| | appropriate dispute resolution framework. | be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.<br>• The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. | • The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges.<br>• The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. | • The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.<br>• The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2. |
| **Weight** | | **0.25** | **Score** | **85** |

**Client**

Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the International Conventions on the Conservation of Atlantic Tuna of 1966. The Commission is established under the Convention and is tasked to co-ordinate scientific research and make recommendations designed to maintain populations of tuna at levels which will permit maximum sustainable yield. The Commission has adopted minimum permissible weight limits at which tuna may be caught and retained, overall catch limits for various species, gear regulations and schemes for international and port inspection (Churchill and Lowe 1999).

Canada supports the Precautionary Approach and assigns a high priority to its implementation in fisheries management domestically as well as in

the context of ICCAT. Recognizing that ICCAT stocks are currently not information rich, Canada fully supports new research aimed at improving stock assessments. Furthermore, as the Precautionary Approach is not limited to the development of reference points, Canada also strongly promotes the use of appropriate fisheries management and compliance measures to ensure the rebuilding and safeguarding of the resource. Canada is also a member of ICCAT Ad Hoc Working Group on Precautionary Approaches (ICCAT 2008 (a)).

On a national level there are several legislative and legal documents which aid in the governance and policy implementation in the Atlantic swordfish and other tuna fishery in Canada. The Fishery Act of 1868 provided the legislative base for the implementation of principles, policies and regulations used to manage the fishery.

In addition to the Fisheries Act, the Species at Risk Act, enacted in 2003, provided the legal framework for the protection of species that are designated as endangered, threatened, or of special concern. SARA provides measures that must be taken when the specie is list under schedule 1 of the Act. Measures may be implemented within the longline fleet to protect species that are known to have interactions with the fleet, as they are designated at risk under SARA

There are also linkages between the management of the swordfish and other tuna fishery with the Canada's Ocean Act enacted in 1998. The Oceans Act outlines Canada's approach to the integrated management of ocean resources. In addition the designation of marine protected areas (MPAs) under the Ocean's Act, has already, implemented change in the longline fleet, with the closure of Zone 1 of the Gully MPA.

In 1999 the Supreme Court released a decision in the Marshall case, which in essence stated that Treaties signed in 1760 and 1761 by Mi'kmaq and Maliseet communities include a communal right to hunt, fish and gather in pursuit of a moderate livelihood (DFO 2007 (b)). As such, several swordfish, harpoon and swordfish longline licences have been acquired and transferred to First Nations under the Marshall Response Initiative. These licences are subject to the same terms and conditions under this Plan as all other licences (DFO 2004).

In recent years, the Department has intervened in the transfer process to obtain both harpoon and longline licences for subsequent transfer to Aboriginal persons and communities under the Department's Aboriginal Fisheries Strategy. These transfers do not result in an increase in the overall capacity within the fishery (DFO 2004).

The management system exists within an appropriate and effective legal and/or customary framework that: 1) is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; 2) observes the legal rights created explicitly or by custom of people dependant on fishing for food and livelihood, and 3) incorporates an appropriate dispute resolution framework.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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**Scoring Rationale**

The legal and/or customary framework for management of Canadian Atlantic longline and harpoon swordfish fisheries is capable of delivering sustainable fisheries in accordance with Principles 1 and 2. The fisheries are managed within the framework of the International Commission for Conservation of Atlantic Tunas (ICCAT) and Canadian law and policies (Fisheries Act, Atlantic Fishery [General] Regulation). At the international level, ICCAT's objective is to manage fisheries in a manner that will produce the maximum sustainable yield, which is consistent with MSC Principle 1. Canadian fisheries are also managed to achieve a high sustainable yield. In addition, ICCAT is one of the Regional Fisheries Organizations that plays a prominent role in implementing the 1995 UN Fish Stocks Agreement (UNFSA, an amendment to the 1982 Law of the Sea Agreement). The UNFSA places fisheries management in an ecosystem context, and specifies the precautionary approach. In Canada, the Species at Risk Act and the Oceans Act, provide the framework for implementing domestic management in a manner consistent with Principle 2.

A Canadian court ruling to protect the historical access to fisheries by Canada's First Nation demonstrate that the fisheries management exists within system that is committed to the legal and customary rights of people dependent on fisheries for food and livelihood (which include cultural values). Canada also has an Aboriginal Fisheries Strategy. As a result, several fishing licenses for swordfish have been transferred to aboriginal people of Canada's First Nation.

One aspect of the management system that could be improved is dispute resolution. ICCAT lacks a formal dispute resolution mechanism. Any member country that disagrees with an ICCAT decision can "opt out" by objection. Also, ICCAT's tradition of making decisions by consensus has meant that one or a few member countries can effectively block necessary conservation measures. There is the authority to make decisions by vote (either majority or super-majority depending on the situation), but voting is rare.

ICCAT has a Compliance Committee that monitors compliance with ICCAT recommendations. This Committee has the potential to address disputes over implementation of ICCAT recommendations, but to date it has been generally ineffective. While exceeding TAC allocations for North Atlantic swordfish has not generally been a problem, there are numerous examples of catches in excess of TACs for other stocks without punitive action or mitigation.

Domestically, the Minister of Fisheries and DFO have strong decision making authority, and thus they can settling disputes. However, this is not the same thing as a transparent dispute resolution process where the evidence and all points of view are put before a decision making body. Ultimately, the courts serve this role in Canada. The legal system in Canada also assures that laws are respected. Respect for the law in Canada leads to proactive avoidance of legal disputes and it should lead rapid implementation of binding judicial decisions arising from legal challenges,

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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should they occur.

All the requirements of the 80SG are met and the first and third scoring issues of the 100SG, with regards to consistency with local, national and internationals laws and the formal commitment to the legal rights of people dependent on fishing for food and livelihood are also met. However, in Section 4.i of Policy Advisory 18, issued on 6, September 2010, the MSC clarified that:

> " In the PISG tables, where identical scoring issues are repeated at different SG levels (in PIs 1.1.2, 1.2.2, 3.1.1, 3.2.2, 3.2.3), the text at the higher SG level/s is hereby deleted, leaving the text to appear only once at the lowest current SG level."

This policy directive effectively removes the impact of the first scoring issue at the 80 and 100 SGs, thus removing the impact of this scoring issue on the final score. Therefore for the 100SG, the first scoring issue does not count, the third scoring issue was met and the second and fourth scoring issues were not met. The candidate fishery scores 85 in this performance indicator.

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| 3.1.2 | The management system has effective consultation processes that are open to interested and affected parties.<br><br>The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties. | • Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.<br>• The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system. | • Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.<br>• The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. | • Organizations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.<br>• The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used. |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| | | • The consultation process provides opportunity for all interested and affected parties to be involved. | • The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement. |
| **Weight** | **0.25** | **Score** | **80** |

**Client**

The current consultation bodies, the terms of reference are outlined in the 2004-2006 Swordfish and Other Tuna Integrated Management Plan. There are two primary consultation bodies: the Atlantic Large Pelagic Advisory Committee (ALPAC) and the Scotia Fundy Large Pelagics Advisory Committee (SFLPAC).

The Atlantic Large Pelagic Advisory Committee provides the link between regional committees and DFO, advising DFO on the management and development of the tuna, swordfish, porbeagle shark and other large pelagics in Atlantic Canada. The committee considers biological, marketing, and other relevant information when formulating advice. ALPAC membership includes representation from the federal, provincial government, fishers and processors. DFO holds consultations twice yearly with ALPAC. Late winter/early spring meeting focuses on management recommendations for the upcoming fishing season, while the fall consultations provide advice to Canada's delegation to ICCAT.

The Scotia Fundy Large Pelagics Advisory Committee serves as the pre-eminent consultative forum for Scotia Fundy based large pelagic fishing industry and government (DFO 2004). Meeting at least once a year, the committee addressed issues and concerns regarding the management, conservation, protection and utilization of large pelagic fisheries on Canada's east coast, in greater detail than is sometimes possible at the large forum of ALPAC. These issues and concerns are then brought forward to ALPAC.

The Nova Scotia Swordfishermen's Association holds membership meetings at least twice annually to gather input from the individual participants in the fishery. One meeting is held prior to the spring meetings of SFLPAC and ALPAC to develop the Conservation / Harvesting Plan (CHP) for the fleet for presentation at these advisory committee meetings and a second meeting is held following these advisory committee meetings to incorporate any required changes to the CHP before it is submitted to Fisheries and Oceans Canada for final approval.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organizations and individuals who are involved in the management process are clear and understood by all relevant parties.

Information from the public would be mainly provided through the two advisory committees (SFLPAC and ALPAC). Members from industry, ENGOs, and other groups participate in these advisory processes. Input from participants at these meetings would be recorded in the minutes, as well as decisions that were made and rationale. Public input is also sometimes received in the form of letters to the RDG, or the Minister, etc. Responses to these inquiries are always provided by the Department. Public notification of management decisions occurs via the DFO website - see http://www.dfo-mpo.gc.ca/decisions/index-eng.htm. Also the IFMP is online. There is also much information on management decisions, scientific assessment, etc available on the ICCAT website. All members of SFLPAC and ALPAC are notified by DFO when there are meetings coming up, and all relevant information for those meetings including minutes, background documents, etc it sent to them as well. Participation is sought by DFO from a number of groups including industry, the Province, ENGOs, Aboriginal groups, etc. It is possible for new people to become members of SFLPAC or ALPAC by making a request to DFO and getting approval from the Committee to participate. It is also possible for people to attend SFLPAC/ALPAC as observers.

**Scoring Rationale**

Canada has formal mechanisms for obtaining stakeholder input on positions at ICCAT and domestic implementation of management of the Canadian long line and harpoon fisheries for swordfish. The key mechanisms are the Atlantic Large Pelagic Advisory Committee (ALPAC) and the Scotia Fundy Large Pelagics Advisory Committee (SFLPAC). In addition, fishing stakeholders are represented on the Canadian delegation to ICCAT. However, the membership of ALPAC and SFLPAC is dominated by fishing industry interests. The ALPAC membership list provided by DFO lists only one environmental NGO with the caveat that "… there is a debate as to whether they are full members or not …" Environmental NGOs and the public are allowed to observe and contribute to ALPAC and SFLPAC meetings.

Another issue is that the linkage between views expressed at advisory committees and decisions made by the Minister of Fisheries. The MSC Assessment Methodology Guidelines (paragraph 8.2.16) indicates that for a score of 80 or above, it should be demonstrated "… that whatever information is gathered, it is considered and that there is transparency about its use or lack of use." Discussions with DFO officials and participants in advisory processes confirm views expressed by the latter influence decisions by the former, but feedback on how stakeholder views are used could be improved.

While the measures in place in the candidate fishery meet the requirements of the 80SG, the assessment team suggests that changes can be made to improve the system. It is recommended that the client works to formalize the membership of the advisory committee, which should be

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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expanded to include a broader representation of non-commercial fishing interests. Additionally, advisory committees and DFO should adopt and apply operational guidelines that formalize stakeholder recommendations. DFO should acknowledge these recommendations in decision making and explain the rationale for deviations. Such changes would improve the consultation process within the candidate fishery.

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| 3.1.3 | The management policy has clear long-term objectives to guide decision-making that are consistent with MSC principles and criteria, and incorporates the precautionary approach. | • Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy. | • Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. | • Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy. |
| **Weight** | | **0.25** | **Score** | **75** |

**Client**:

Stock conservation and sustainability objectives for most large pelagic species in Atlantic waters are set by ICCAT. As a Contracting Party of ICCAT, Canada is also obligated itself to abide by and foster, where it can, the implementation of all current ICCAT recommendations for conserving swordfish, bigeye tuna, yellowfin tuna, albacore tuna and all other large pelagic stocks that affect or pertain to the Canadian fishery. To that end, most objectives and strategies set in the Canadian swordfish and other tunas fisheries can be traced to specific ICCAT Recommendations and Resolutions. Other objectives stem from Canadian legislative and policy developments over the past few years such as the *Ocean's Act, SARA*, and the Atlantic Fisheries Policy Review (AFPR). As such, this management plan is composed of a hierarchy of objectives from general overall objectives to more specific sub-objectives. The way these objectives are achieved is termed strategies and the implementation of these strategies is through the management measures or tactics. (Swordfish and other tuna management Plan – see Table 3A and 3B for further elaborates on management measures in place to achieve those strategies).

The management policy has clear long-term objectives to guide the decision-making process that are consistent with MSC Principles and Criteria, and incorporate the precautionary approach.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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**Scoring Rationale**

A key difference between indicator 3.1.1 and indicator 3.1.3 is the latter's implicit or explicit application of the precautionary approach within the management policy. As noted for 3.1.1, ICCAT and Canadian fishery management objectives are generally consistent with MSC principles. However, this does not necessarily mean that decision making applies the precautionary approach.

It is the judgment of the Assessment Team that Canada implicitly applies the precautionary approach as a high level policy guiding domestic management and in the policy positions it advocates at ICCAT. Canada was one of "forces" behind the UN Fish Stocks Agreement, which formalizes the precautionary approach for Highly Migratory Species and Straddling Stocks. It took the initiative to convene an ICCAT workshop on the application of the precautionary approach to Atlantic bluefin tuna. The precautionary approach is stated as one of the guiding principles and approaches of the Eastern Scotian Shelf Integrated Ocean Management Plan (ESSIM). However, the area of the Canadian longline and harpoon swordfish fisheries extend beyond the boundaries of the ESSIM.

The explicit application of the precautionary approach as a matter of high level policies required for a score of 80 or more is lacking for ICCAT. Furthermore, the precautionary approach should be applied to decisions associated with both principles 1 and 2. ICCAT has been slow to respond to uncertainty information on the status of some stocks under its jurisdiction. In the candidate fishery, there is little evidence of the application of the precautionary approach in the face of uncertain scientific information on the potential threat to vulnerable species (e.g., sea turtles, sharks) posed by longline bycatch. The fishery scores 75 for this PI, there are long term objectives within both ICCAT and Canada which are consistent with MSC P1. Canada implicitly applies the precautionary approach in its management decisions. A score of 80 was not achieved because there are not clear long term objectives which are applied in relation to P2 species for which there is still high uncertainty.

**Condition**

By the second surveillance audit, evidence that clear long-term objectives which guide decision-making, are consistent with MSC Principles and Criteria, and the precautionary approach, must be explicit within the management policy.

Canada, in consultation with ALPAC and SFLPAC, should adopt an explicit policy for application of the precautionary approach to management decisions for the longline swordfish fishery. The policy should address both MSC principles 1 and 2.

Likewise, by the third surveillance audit, there must be evidence that Canada has taken steps at ICCAT to encourage the adoption of a policy at

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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the ICCAT level for application of the precautionary approach to fishery management decisions within its competency.

By the first surveillance audit, the client must provide documented evidence that the appropriate actions are being taken to lead to the achievement of the deliverables defined by the second and third surveillance audit.

**Client Action Plan**

The swordfish longline industry will raise this issue at the first meeting of both ALPAC and SFLPAC following certification. The industry will recommend that Canada adopt an explicit policy consistent with MSC Principles 1 and 2 and the precautionary approach within the Canadian Swordfish IFMP. While the recommendation will be made by industry within the time period suggested by this condition, the adoption within the Canadian Swordfish IFMP will be dependent upon the timing of final certification of the fishery. It is anticipated that the new Canadian Swordfish IFMP will be completed in 2011.

Canada has been a leader in putting forward the use of the precautionary approach at the ICCAT level in recent years and will continue to do so in future. Canada has hosted an ICCAT precautionary approach workshop and continues to work within the ICCAT precautionary approach working group to work towards the adoption of the precautionary approach to management of ICCAT species. A meeting of this working group was held in April 2010 with Canadian participation and Canada will continue to participate in future working group meetings to forward the adoption of the precautionary approach by ICCAT.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

| | | | | |
|---|---|---|---|---|
| 3.1.4 | The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies | • The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC | • The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and | • The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| | that contribute to unsustainable fishing. | Principles 1 and 2. | seeks to ensure that negative incentives do not arise. | explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices. |
| **Weight** | **0.25** | **Score** | **90** |

**Client**

There are several incentives within the management regime of the Atlantic pelagic longline fishery that contribute to the sustainable fishing of the resource. These include the use of a multi-year management approach, ITQ allocations, and stakeholder involvement in contributing to the information base of the fishery.

The ITQ system implemented in the fleet removes the competitive drive among harvesters that may lead to unsustainable fishing habits. Under the ITQ system harvesters can better plan for the fishing season, as they know their quota and can plan for the most opportune time to harvest it. Further contributing to the stability of the fishery is the use of a multi-year integrated management plan. The multi-year plan allows the industry, harvesters and processors better prepare for the longer term.

In addition to increased stability in the fishery the involvement of stakeholders in management promotes sustainable fishing practices. All stakeholders involved either directly or indirectly in the longline large pelagic fishery have the opportunity to have input into the management of the fishery through either SFLPAC and/or ALPAC. Being involved in management discussions and decisions instills a sense of stewardship and ownership of the resource, leading to more sustainable habits to protect the resource.

Individual license holders are also bound by legal contract by the Nova Scotia Swordfishermen's Association to abide by the Conservation / Harvesting Plan that is submitted to Fisheries and Oceans Canada annually and which outlines the operational guidelines for the fishery. The contract clearly outlines all operational aspects for the fishery, including time/area closures, hailing protocols, observer coverage levels, quotas for both the fleet and the individual harvester, quota transfer processes, and penalties for exceeding individual quotas.

**Scoring Rationale**

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

The primary incentives for sustainable fishing are (1) Individual Transferrable Quotas (ITQs) which give fishers an incentive to protect the future value of their quota, (2) participation of the fishing industry in the management process (as described for 3.1.2) which improves understanding of, and respect for, management, and (3) a strong industry organization (Nova Scotia Swordfishermen's Association, NSSA) that exercises peer pressure for sustainable fishing practices according to a Conservation Harvest Plan (CHP). All longline license holders are members of the NSSA. The NSSA has adopted a "Code of Conduct for Responsible Sea Turtle Handling and Mitigation Measures. The Code has resulted in voluntary use of circle hooks to reduce sea turtle bycatch mortality. Most of the NSSA harvesters have received training on safe handling and release of sea turtles. The Assessment Team heard testimony that safe handling and release kits are distributed by the NSSA to all vessels and they are widely used. The kits were observed on vessels visited by the Assessment Team.

The Assessment Team is unaware of subsidies for the longline swordfish fishery. In fact, the industry pays for observer coverage and dock side monitoring of their catch.

While not perfect, DFO enforcement of fishery regulations seems to be effective relative to the standard of enforcement of developed countries. Effective enforcement is another incentive for sustainable fishing. Finally, the industry is well aware of public concerns about the sustainability of fisheries, especially long line fisheries for charismatic species like swordfish, which is another incentive for responsible fisheries.

One incentive for sustainable fishing that is lacking is an explicit policy to apply the precautionary approach. The precautionary approach provides an incentive to collect more information (e.g., more observer coverage to better assess the impact of sea turtle bycatch) to avoid un-necessary restrictions on fisheries.

The fishery is currently managed according to the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan. The Plan has been rolled over since 2006, although a new Plan is under preparation. The Plan called for performance review, although the Assessment Team is not aware that such a review has been conducted. It did see the results of an annual post-season review, but this is not deemed sufficient to justify a higher score, since there is no documentation that an annual post-season review "… explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices" (see criteria for SG 100).

ICCAT has a Compliance Committee that annually reviews member country's adherence with ICCAT recommendations. Such reviews provide a positive incentive for sustainable fishing, particularly since management plans usually call for quote overages to be repaid (deducted from future quotas). However, the ineffectiveness of the Compliance Committee in holding member countries accountable (not generally a problem

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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for swordfish, but it has been for other species) undermines the incentive value of the Compliance Committee.

ICCAT recently conducted an organizational performance review. It has established a committee on the future of ICCAT to respond to the results of the review.

The candidate fishery attained a score of 90 on this PI. There are a number of specific incentives in place in the long line fishery which are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. There has also been explicit review of the measures in place in the Canadian fishery. ICCAT`s ineffectiveness of holding member countries accountable is a disincentive at the RFMO level, hence the 100 score was not awarded.

| 3.2 | **Fishery Specific Management** | | | |
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| 3.2.1 | The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's principles 1 and 2. | • Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system. | • Short and long term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system. | • Well defined and measurable short and long term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system. |
| **Weight** | | **0.2** | **Score** | **80** |

**Client**

Conservation objective of the domestic swordfish and other tuna fishing plan is to ensure that Canada's role in supporting the conservation and sustainability objectives of ICCAT international stock management regime is achieved. In addition, complementary management measures for swordfish and other tunas are set in response issues that are of concern in Canada, such as the need for a bluefin tuna dead discard reduction strategy that is compatible with the Canadian Bluefin Tuna Management Plan and bluefin tuna fleet allocations. Measures and procedures

outlined in the swordfish and other tuna plan aims to provide for the collection and analysis of comprehensive, high quality data for the fishery to enable accurate reporting within the ICCAT framework (DFO 2004).

Several of the objectives of the management plan are dictated by Canadian regulatory framework relevant to the fishery, including the Fisheries Act and Atlantic Fishery (General) Regulations, the Ocean's Act and SARA (DFO 2004).

Co-management of the fishery is also a long term objective. The Plan seeks to foster partnerships with industry participants, to provide for additional financial and in-kind contributions, beyond what departmental sources can provide, where this is necessary to enhance the scientific knowledge upon which the management is based. NSSA and SHA and other smaller groups of license holders are encouraged to enter into formal agreements with DFO to improve at sea research (DFO 2004). NSSA continues working toward effective leatherback turtle bycatch mitigation measures, since 2003 the Association has provided to their members turtle safe handling and release kits, developed and promulgated within the fleet a code of Conduct for Responsible Sea Turtle Handling and Mitigative Measures and has received certification in the use of the safe handling and release equipment through a joint DFO / NMFS workshop.

Fisheries specific objectives are outline in Sections 5 and Section 6 of the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan (DFO Fisheries and Aquatic Management, 2004a).

The fishery has clear, specific objectives designed to achieve outcomes consistent with MSC Principles 1 and 2 and these objectives are outline within the Integrated Fisheries Management Plan, both as long term objectives for the fishery and management specific objectives (DFO Fisheries and Aquatic Management, 2004a). A performance review of these objectives was most recently carried out in 2008 and was provided as a handout at the 2009 ALPAC Meeting (Atlantic Swordfish Performance Review – 2008).

**Scoring Rationale**

The ICCAT Rebuilding Plan for North Atlantic Swordfish has the objective of rebuilding the spawning biomass of the population to the level that will produce MSY. This is consistent with MSC Principle 1. The short term objective is an annual TAC that is consistent with achieving the rebuilding objective with at least a probability of 50%. Regularly schedule ICCAT stock assessments provide an operational way that performance against the objective can be measured. The Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan has several operational objectives. With respect to Principle 1, the fishery management system fulfills the requirements for SG 100.

The Canadian Species at Risk Act and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) implicitly provides

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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objectives that are consistent with Principle 2 for potentially vulnerable bycatch species such as sea turtles and sharks. For a few species, there are guidelines for the amount of bycatch that can be taken without jeopardizing the species, but these are not the same as explicit measurable objectives within the fishery management system that correspond to sustaining vulnerable species.

The Assessment Team believes that adverse impact on habitat is unlikely for the swordfish longline fishery. The trophic impact of the fishery on the ecosystem should not be a serious concern so long as the swordfish population is maintained a biomass level corresponding to MSY. Therefore, the lack of explicit habitat and trophic impact objectives should not be a concern. The Canadian Atlantic Swordfish and Other Tunas IFMP explicitly states short and long term fishery objectives which are consistent with MSC P1 and P2. A score of 80 has been awarded because the performance of these objectives is not explicitly measurable.

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| 3.2.2 | The fishery-specific management system includes effective decision making processes that result in measures and strategies to achieve the objectives. | • There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.<br>• Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions. | • There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.<br>• Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.<br>• Decision-making processes use the precautionary approach and are based on best available information.<br>• Explanations are provided | • There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.<br>• Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.<br>• Decision-making processes use the precautionary approach and are based on best available information.<br>• Formal reporting to all interested stakeholders |

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| | | | for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. | describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. |
| **Weight** | | **0.2** | **Score** | **75** |

**Client**

The decision making process is well defined both internationally and domestically. At the ICCAT level, this is outlined in the ICCAT Basic Texts, Rules of Procedure. Domestically, DFO is guided by the newly drafted fishery decision-making framework incorporating the precautionary approach. TAC and other regulatory and data collection and reporting decisions from ICCAT are discussed at ALPAC and SFLPAC, this includes NSSA, other industry stakeholders, as well as other government and non-government organizations with an interest in the fishery. The decision making process incorporates both international and domestic obligations with respect to the fishery. Minutes of the two advisory processes are provided to all participants and are available to other interested parties. Ultimately DFO makes the final decision to implement existing or new harvest control tools in order to achieve the stated biological objective issued by ICCAT as well as incorporating other international obligations and domestic regulations and legislation pertaining to the fishery.

The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives. The decision-making processes are carried out in an open and transparent manner through both public and industry consultations and take into account research and monitoring of the fishery. A formal reporting process is carried out through established advisory committees.

Public input would be mainly provided through the two advisory committees (SFLPAC and ALPAC). Members from industry, ENGOs, and other groups participate in these advisory processes. Input from participants at these meetings would be recorded in the minutes, as well as decisions that were made and rationale. Public input is also sometimes received in the form of letters to the RDG, or the Minister, etc. Responses to these inquiries are always provided by the Department. Public notification of management decisions occurs via the DFO website - see http://www.dfo-mpo.gc.ca/decisions/index-eng.htm. Also the IFMP is online. There is also much information on management decisions, scientific assessment, etc available on the ICCAT website. All members of SFLPAC and ALPAC are notified by DFO when there are meetings coming up, and all relevant information for those meetings including minutes, background documents, etc it sent to them as well. Participation is

sought by DFO from a number of groups including industry, the Province, ENGOs, Aboriginal groups, etc. It is possible for new people to become members of SFLPAC or ALPAC by making a request to DFO and getting approval from the Committee to participate. It is also possible for people to attend SFLPAC/ALPAC as observers.

**Scoring Rationale**

Issues on 6 September 2010, in Section 4 of Policy Advisory 18 the MSC clarified that: *" In the PISG tables, where identical scoring issues are repeated at different SG levels (in PIs 1.1.2, 1.2.2, 3.1.1, 3.2.2, 3.2.3), the text at the higher SG level/s is hereby deleted, leaving the text to appear only once at the lowest current SG level."* This new guidance removes the first and third scoring issue at the 100SG of this PI, thus removing the impact of this issue on the final score.

ICCAT is responsible for management decisions associated with Principle 1. It responded to scientific evidence that the North Atlantic Swordfish population was overfished and needed to be rebuilt. ICCAT management decisions have a degree of transparency as the organization allows its formal meetings to be observed, although negotiations typically take place in private, and there is no formal process for explaining decisions. The Atlantic Large Pelagic Advisory Committee (ALPAC) and the Scotia Fundy Large Pelagics Advisory Committee (SFLPAC) are the voice of stakeholders in the management process. However, the membership of ALPAC and SFLPAC is dominated by fishing industry interests and the relationship between their advice and DFO decisions is not always clear.

There is no implicit or explicit evidence that ICCAT decision processes use the precautionary approach.

The Canadian Species at Risk Act is the management framework that is most relevant to Principle 2. SARA listing determinations are informed by scientific analyses conducted by Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Information on the impact of the longline swordfish fishery on potentially vulnerable species such as sea turtles and sharks is inherently uncertain. The allowable catch of porbeagle sharks (all fisheries including longliners) was set at the upper end of the range that would have allowed for the recovery of the population according to COSEWIC. Leatherback sea turtles have been listed under SARA for several years, but a Recovery Action Plan has not been released. Loggerhead turtles have been listed as Endangered by COSEWIC, however, to date have not been legally protected through listing on Schedule 1 of SARA. A Recovery Potential Assessment was conducted by DFO in response to the designation by COSEWIC of loggerhead turtles. In 2004, DFO recommended that all feasible measures to minimize harm to leatherbacks should be taken.

Similar to 3.1.2, there is a recommendation under this PI that the client works to formalize the membership of the advisory committee, which should be expanded to include a broader representation of non-commercial fishing interests. Additionally, advisory committees and DFO should

adopt and apply operational guidelines that formalize stakeholder recommendations. DFO should acknowledge these recommendations in decision making and explain the rationale for deviations. Such changes would improve the consultation process within the candidate fishery

A score of 75 was awarded for this PI. The team was satisfied that the first scoring element of the 80 SG was met. There was concern that at the broader level, some ICCAT decision making processes were not always timely (i.e. second 80SG scoring issue) however the team considered that for matters concerning swordfish, ICCAT has been timely. The team concluded that ICCAT did not explicitly or implicitly employ the precautionary approach (i.e. third 80SG scoring issue). ICCAT recommendations and resolutions typically provide rationales which explain recommended actions for its members. As three scoring issues were met and one was not, the team awarded a score of 75.

**Condition**

Condition same as one defined in 3.1.3:

By the second surveillance audit, evidence that clear long-term objectives which guide decision-making, are consistent with MSC Principles and Criteria, and the precautionary approach, must be explicit within the management policy.

Canada, in consultation with ALPAC and SFLPAC, should adopt an explicit policy for application of the precautionary approach to management decisions for the longline swordfish fishery. The policy should address both MSC principles 1 and 2.

Likewise, by the third surveillance audit, there must be evidence that Canada has taken steps at ICCAT to encourage the adoption of a policy at the ICCAT level for application of the precautionary approach to fishery management decisions within its competency.

By the first surveillance audit, the client must provide documented evidence that the appropriate actions are being taken to lead to the achievement of the deliverables defined by the second and third surveillance audit.

**Client Action Plan**

The swordfish longline industry will raise this issue at the first meeting of both ALPAC and SFLPAC following certification. The industry will recommend that Canada adopt an explicit policy consistent with MSC Principles 1 and 2 and the precautionary approach within the Canadian Swordfish IFMP. While the recommendation will be made by industry within the time period suggested by this condition, the adoption within the Canadian Swordfish IFMP will be dependent upon the timing of final certification of the fishery. It is anticipated that the new Canadian

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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Swordfish IFMP will be completed in 2011.

Canada has been a leader in putting forward the use of the precautionary approach at the ICCAT level in recent years and will continue to do so in future. Canada has hosted an ICCAT precautionary approach workshop and continues to work within the ICCAT precautionary approach working group to work towards the adoption of the precautionary approach to management of ICCAT species. A meeting of this working group was held in April, 2010 with Canadian participation and Canada will continue to participate in future working group meetings to forward the adoption of the precautionary approach by ICCAT.

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

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| 3.2.3 | Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with. | • Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is reasonable expectation that they are effective.<br>• Sanctions to deal with non-compliance exist and there is some evidence that they are applied.<br>• Fishers are generally thought to comply with the management system for the fishery under assessment, including, | • A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.<br>• Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.<br>• Some evidence exists to demonstrate fishers comply with the management system | • A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.<br>• Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.<br>• There is a high degree of confidence that fishers |

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
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| | | when required, providing information of importance to the effective management of fishery. | under assessment, including, when required, providing information of importance to the effective management of fishery.<br>• There is no evidence of systematic non-compliance. | comply with the management system under assessment, including, providing information of importance to the effective management of fishery.<br>• There is no evidence of systematic non-compliance. |
| **Weight** | | **0.2** | **Score** | **95** |

**Client**

DFO's Conservation and Protection Division (C&P) is the responsible body that supports conservation and sustainability of the swordfish and other tuna fisheries. Through the delivery of their surveillance, inspection and enforcement program C&P ensures compliance with measures in place to control the fishery.

One of the unique challenges faced by C&P with the swordfish fishery is that of the area in which it covers, fishing can occur over an expanse of water of 1,000,000km$^2$ or more (DFO 2004). While traditional measures including the use of surveillance platforms such as patrol vessels are used, aerial surveillance, electronic VMS, and at sea observers take on greater roles in the delivery of the C&P of this fleet.

The scientific data related to catch and effort, and any biological sampling that is conducted at sea is utilized by the C&P Division to monitor compliance with respect to incidental catch and juvenile swordfish. The advantage of the use of at sea observers is that they are able to provide information on what the fleet is catching, this is key to this fishery, as it has concerns with the composition and amount of incidental species (Bryan Wood, pers. comm.). Fisheries Officers also work with dockside monitors to ensure the integrity of species identification and reported catch weights.

More traditional methods of ensuring compliance within the fleet include the use of aerial surveillance and vessel patrol. Vessel patrols are used to monitor boundary lines and closed area, as well as provide a platform from which C&P Fishery Officers can conduct at sea boarding to inspect catch records, monitor fishing activity, assess species composition and check weights. Due to the large area covered by the fleet, at sea vessel monitoring (i.e. boardings) coverage is low. Fleet movement can be observed through the monitoring of VMS installed on fishing vessels. Monitoring the signals from these systems aids in ensuring that vessels are operating in open areas.

Aerial surveillance is useful in determining where fishing is concentrated in order to know where to concentrate surveillance platforms, such as patrol vessels. Aerial surveillance is conducted by DFO and also through cooperation with the Department of National Defense. This is DFO prime means of compliance with ICCAT recommendations with respect to Illegal, Unlicensed, Unreported vessels (IUU) (DFO 2004).

Tables 20 to 24 provide a summary of violations, actions taken, penalties, and a summary of enforcement time for the fishery.

**Table 20: Swordfish Violations by Legislation**

**SWORDFISH VIOLATIONS BY LEGISLATION**

| LEGISLATION | DESCRIPTION | SEVERITY | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFR 14(1)(A) | No personal registration | low | | | | | | 1 | | | | 3 | | |
| AFR 14(1)(B) | No licence | high | | | | | | | | 1 | | | | |
| AFR 50(1) | Closed time or area | high | | | | | | | | | | | | 1 |
| AFR 105 | Possess Untagged Bluefin | high | | 1 | | | | | | | | | | |
| FGR 11 | Failure to produce document | low | | | | | | | | | | 1 | | |
| FGR 22(7) | Condition of licence (see below)* | varied | 1 | 4 | 5 | 2 | 4 | 8 | 1 | 3 | 2 | 1 | 3 | 2 |
| FGR 26(1)(A) | Vessel marking problem | low | | 1 | | | | | | 1 | | | | |
| FGR 26(2)(E) | Vessel marking too small | low | | | | | | | | | 1 | | | |
| FGR 27(1)(A) | Gear marking problem | medium | | | | | | | 1 | | | | 3 | |
| FGR 33(2)(A) | Illegal retention | high | | | | 1 | | | | | | | | |
| FGR 33(2)(B) | Released in harmful manner | high | | | | | | 1 | | | | | | |
| FGR 34(2) | Dumping/wasting fish | high | | | | | | 4 | | | | | 1 | |
| TOTAL | | | 1 | 6 | 5 | 3 | 4 | 14 | 2 | 5 | 3 | 5 | 7 | 3 |

NOTE: Two of the above cases were related to harpoon gear. The others involved longlines

**Table 21: Detailed Breakdown of License Condition Offences**

| MORE DETAILED BREAKDOWN FOR THE LICENCE CONDITION OFFENCES IN THE ABOVE TABLE | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VIOLATION TYPE | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| AREA / TIME | | | | | | 1 | | | | | | |
| GEAR - ILLEGAL/ USED ILLEGALLY | | | | | | 1 | | | | | | |
| ILLEGAL BUY/SELL/POSSESS | | | | | | | | | | | | 1 |
| REGISTRATION / LICENCE | 1 | | | | | | | | 1 | | | 1 |
| REPORTING | | 3 | 4 | 2 | 4 | 6 | | 3 | 1 | 1 | 3 | |
| SPECIES / SIZE LIMIT | | 1 | 1 | | | | 1 | | | | | |
| TOTAL | 1 | 4 | 5 | 2 | 4 | 8 | 1 | 3 | 2 | 1 | 3 | 2 |

**Note: The majority of cases listed as "reporting involved failure to hail or insufficient hail time. Also, the rules for retention of small swordfish have changed over the years**

**Table 22: Breakdown of Swordfish Cases by Action Taken**

| BREAKDOWN OF SWORDFISH CASES BY ACTION TAKEN | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DISPOSITION | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| CHARGES LAID | | 4 | 1 | | 2 | 7 | 1 | 3 | 1 | 4 | | 1 |
| CHARGES NOT APPROVED OR LAID | | | 4 | 2 | | 3 | | 1 | | | 2 | |
| SEIZURE(S) - PERSONS UNKNOWN | | 1 | | | | | | | | | | |
| WARNING ISSUED | 1 | 1 | | 1 | 2 | 4 | 1 | 1 | 2 | 1 | 5 | 2 |
| TOTAL | 1 | 6 | 5 | 3 | 4 | 14 | 2 | 5 | 3 | 5 | 7 | 3 |

**Table 23: Breakdown of Swordfish Cases by Outcome**

| BREAKDOWN OF SWORDFISH CASES BY OUTCOME | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FINE RANGE | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| NO CONVICTION | 1 | 4 | 4 | 3 | 2 | 11 | 1 | 5 | 2 | 2 | 7 | 3 |
| $100 to $499 | | | | | | | | | | 3 | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $500 to $999 | | 1 | 1 | | 1 | | | | | | | |
| $1K to $2.499K | | | | | 1 | 1 | 1 | | 1 | | | |
| $2.5K to $4.999K | | | | | | 1 | | | | | | |
| $5K to $9.999K | | | | | | 1 | | | | | | |
| $10K to $24.999K | | 1 | | | | | | | | | | |
| TOTAL | 1 | 6 | 5 | 3 | 4 | 14 | 2 | 5 | 3 | 5 | 7 | 3 |
| Note: Some cases where charges were laid were later withdrawn in plea bargains. Still awaiting the result for one 2008 case | | | | | | | | | | | | |

**Table 24: Swordfish Enforcement Hours**

| SWORDFISH ENFORCEMENT HOURS AND % OF OVERALL EFFORT | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subelement | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | TOTAL |
| SWORDFISH | 204 | 508 | 746.25 | 465.5 | 226.75 | 552 | 186.5 | 701 | 457.5 | 4047.5 |
| % OF OVERALL ENFORCEMENT EFFORT | 0.19% | 0.40% | 0.60% | 0.41% | 0.23% | 0.49% | 0.18% | 0.66% | 0.38% | 0.40% |

A comprehensive monitoring, control and surveillance scheme ensures the fishery's management measures are enforced and complied with. Sanctions to deal with non-compliance are in place and are consistently applied and provide effective deterrence. No evidence exists of systematic non-compliance and there is a high degree of confidence that fishers comply with the management system.

**Scoring Rationale**

It is the judgment of the Assessment Team that monitoring, control and surveillance of Canadian fisheries in general achieves a high standard relative to fisheries worldwide. For the longline fishery, enforcement relies on dock side monitoring to enforce the TAC, which is the primary conservation measure that applies to the fishery. The dockside monitoring system specifies allowed landing points, and requires advance calling to arrange for monitoring of offloading of the catch. Time/area restrictions on fishing are primarily enforced by a satellite based mandatory vessel monitoring system (VMS). Aerial surveillance and patrol vessels are also used for enforcement at sea, but area of the fishery is so large that the effectiveness of at sea enforcement by vessels and planes is questionable.

The observer program provides another vehicle for monitoring, control and surveillance. However, the number of trips observed is low. Without

adequate observer coverage, it is difficult to verify the accuracy of mandatory logbooks which contain information used to monitor the fishery. Shortcomings of the observer program are addressed under Principle 2 since the observer program is deemed more important for monitoring bycatch and interactions with endangered, threatened and protected species, but the low level of observer coverage also detract from the score for P3.2.3.

Fishery management violations are prosecuted according to Canadian law and administrative procedures. About 50 cases against alleged violators have been prosecuted in the last 10 years, although most of the cases were dismissed without convictions. Some fines of several thousand Canadian dollars were levied. There is no quantitative information on the effectiveness of enforcement (e.g., likelihood of violators being prosecuted and convicted) or the deterrent value of the fine schedule. However, there is no systematic evidence of non-compliance.

Sustainability of the Atlantic swordfish fishery depends on monitoring, control and surveillance by other countries participating in the fishery, such as the USA, Japan, and European Union. Some of these countries have well develop enforcement capability comparable to Canada's (e.g., the USA), but this may not be the case for all of the countries involved in the fishery. Lack of confidence in the ability of all countries participating in the fishery to enforce effectively detracts from the score for this indicator.

There is a comprehensive MCS system in place for this fishery which responds to the first scoring element for the 100 SG. There is clearly application of sanctions in the fishery which provide deterrence, although effectiveness of the sanctions was not verified, therefore the second 100SG scoring issue was not considered to be met. There is a high degree of confidence that fisheries comply with the requirement of the management system and of the NSSA CHP. The final scoring issue for both the 80 and 100SGs is the same,

However, in Section 4.i of Policy Advisory 18, issued on 6, September 2010, the MSC clarified that:

> " In the PISG tables, where identical scoring issues are repeated at different SG levels (in PIs 1.1.2, 1.2.2, 3.1.1, 3.2.2, 3.2.3), the text at the higher SG level/s is hereby deleted, leaving the text to appear only once at the lowest current SG level."

This policy directive effectively removes the impact of the fourth scoring issue at the 100 SGs, thus removing the contribution of this scoring issue at the 100SG on the final score. Therefore the score is 95 as most 100SG scoring issues are met and a few are not.

The candidate fishery received a score of 95 for this PI.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|
| 3.2.4 | The fishery has a research plan that addresses the information needs of management. | • Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.<br>• Research results are available to interested parties. | • A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.<br>• Research results are disseminated to all interested parties in a timely fashion. | • A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2, and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.<br>• Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available. |
| **Weight** | | **0.2** | **Score** | **70** |

**Client**

Stock assessments for the fishery under consideration are conducted by ICCAT. The frequency of the assessment varies, but usually every 3-5 years. For stock with a lot of interest/concern assessments may be as frequent as every 2 years (John Neilson, pers. comm.).

In addition to regulatory monitoring of the Atlantic swordfish and other tuna fishery, Canada's 2007 National Report to ICCAT (ICCAT 2008(a)) outlines several research activities that Canada is involved in to further understanding of the stocks and their population status. With respect to swordfish, Canada contributes to ICCAT research through the provision of estimates of dead swordfish and bluefin discards based on observer coverage. Canada has also been involved in swordfish tagging studies, tagging results from 2005 and 2006 were encouraging, providing information on habitat utilization, diel vertical movements, and seasonal horizontal movements. The 2007 national plan outlines that tagging work will continue for another two years. In addition, Canada has been involved in the initiation of a study to develop satellite archival tags to measure fish survival after capture and release, has examined the foraging of swordfish in Canadian waters and is supporting research on examining the patterns of by catch in the Canadian pelagic longline fishery. The NSSA, partnering financially with Environment Canada, has

conducted sea turtle by catch research in 2001-2002 and has provide research platforms to DFO to conduct a post release survival study of blue sharks caught in the Canadian pelagic longline fishery.

The fishery has a well-planned research plan that addresses the information needs of both science and management. The research plan and the results are publicly available and are disseminated to interested parties in a timely fashion. The design of the research plan takes into account input from interested parties. DFO Science first generates a research plan internally. The nature of the research plan is determined from examination of research recommendations from the previous assessment, and taking into account research recommendations from clients such as the fishing industry and ENGOs. The plans for research are communicated annually to clients during ALPAC consultations, typically in February. Research results are communicated to clients either through ALPAC or specially-arranged meetings. Additionally, research priorities are sometimes generated outside of this process by line managers (J. Neilson, pers. comm.).

**Scoring Rationale**

Fisheries and Oceans Canada (DFO) prepares an annual research plan for large pelagic species. The research plan is reviewed with ALPAC. Canada also participates in research and scientific assessments coordinated by the Standing Committee on Research and Statistics (SCRS) of ICCAT. Canada collects catch and effort data and reports it to ICCAT as required as the basis for scientific assessments. It also conducts research on some demographic (e.g., age and growth) and behavioral (migratory patterns) aspects of the North Atlantic swordfish population. Canadian scientists play a prominent role in the activity of SCRS (e.g., one currently chairs the swordfish assessment group).

The research plan generally provides reliable and timely information on the status of the North Atlantic swordfish population (SG 80 for Principle 1). The Plan would be deemed more comprehensive (and therefore qualify for a higher score according to the scoring guideline) if it allowed for more sophisticated assessment methodology based on reliable information on catch at age.

While there is ongoing research conducted by various groups, including academic organizations and the industry pertaining to the impact of the fishery on Principle 2 components, the assessment team does not consider the research plan itself sufficiently achieves the objectives consistent with MSC's Principle 2 components. As such, while the research plan in place, is considered sufficient to achieve the objectives consistent with MSC's Principle 1, a weakness of the Canadian longline swordfish research program is that there is minimal research on methods for reducing longline interactions with endangered, threatened and protected species. In 2001 and 2002 a, observer coverage was increased to a level that might have been sufficient to better document the nature of these interactions, but in recent years the number of observed trips has probably been insufficient to reliably estimate the number of interactions, or to support research to reduce interactions.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

Scientific information and advice resulting from Canadian research is widely distributed through scientific publications, DFO reports and ICCAT reports. Research planning, updates and results are discussed in several forums including between DFO and the industry and at both ALPAC and ASLPAC. Discussion and dissemination of results at these forums allows for interested stakeholders to provide input. As such the second scoring issue of the 80SG is considered met.

Given that the candidate fishery meets all requirements of the 60SG, as well as meets the second scoring issue under the 80SG, this fishery is scored at 70.

**Condition**

By the second surveillance audit the client, in cooperation with the management body, must have in place a research plan which provides a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC Principles 1 and 2, in particular with respect to the fisheries interaction and impact on ETP species. While there is a research plan in place, it is focused on Principle 1 related issues, and there is minimal research on methods for reducing longline interactions with endangered, threatened and protected species. As such, to meet the 80SG, a research plan to reduce longline interactions with endangered, threatened and protected species shall be designed and implement by the fishing industry in cooperation with DFO.

During the first surveillance audit the client must provide documented evidence that work is ongoing that will contribute to the achievement of the second year requirements.

**Client Action Plan**

Through consultations with industry and other stakeholders, the management body is currently in the process of developing a comprehensive short-term and long-term research plan with respect to retained species, by-catch species, and ETP species encountered in the fishery that will provide information sufficient to achieve the objectives consistent with MSC Principles 1 and 2. This plan will incorporate the research outlined in both the LCAP and the Loggerhead Turtle RPA, but will also contain further research on species considered in this assessment under the Retained and By-Catch headings.

The purpose of the plan is to assist in better quantify interaction levels and determine possible measures to reduce both interaction levels and harm levels were appropriate. It is anticipated that this plan will be finalized and underway in 2011 and a copy of the research plan will be available for the review during the second surveillance audit.

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

The research plan will include, but not be limited to the following actions:

Research Work Currently Underway

1. Investigate the effects of gear deployment (e.g. set time, set duration) on the frequency of encounters.
    b. Analysis of the 2011 / 2002 interaction data to propose improved fishing practices to mitigate turtle interactions (Tech report 2011)

2 Analysis of data from enhanced Observer coverage undertaken in 2001 and 2002 to improve monitoring, if improvements are required.

    a. Years with enhanced observer coverage of large pelagic fleet (Evaluate the utility of higher observer coverage conducted in 2001/2002) with respect to quantifying an improvement in precision. (RAP July 11-12, 2011)

3 Use improved data collection identified in the Monitoring section above to enhance estimation of post-release mortality of bycaught turtles.
    a. Enhanced data collection protocols for recording the type of information required to understand the condition of release. (2011)
    b. Improve handling practices to mitigate post release mortality

4 Best practices for bycatch estimation.
    a. Work with U.S. counterparts on a consistent approach to bycatch estimation (this is ongoing work using existing data)

Proposed and Long Term

1 Documentation of current fishing practices and literature review.
    b. Analysis of current fishing practices

2 Keep abreast of international studies investigating post-release survival of loggerhead sea turtles.
    c. Improve knowledge of loggerhead turtle post release mortality in the Canadian pelagic longline fishery using satellite pop up tags (IGS proposal 2011-2014)

3 Develop spatial/temporal models of loggerhead sea turtle habitat in Canadian waters, and compare habitat location(s) to sea surface

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

temperature and spatial distribution of the Canadian pelagic longline fishery.

a Predicting loggerhead sea turtle distributions in Atlantic Canadian waters (IGS proposal 2011-2014)

d. Feasibility of using the information to reduce turtles interaction (2011-2014)

**Consultation on Condition**

Fisheries and Oceans Canada has been consulted by the client regarding their role in fulfilling the defined condition requirements. DFO has provided a letter committing their participation in assisting the fishery with undertaking the actions specified in the action plan.

| | | | | |
|---|---|---|---|---|
| 3.2.5 | There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.<br><br>There is effective and timely review of the fishery-specific management system. | • The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review. | • The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review. | • The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review. |
| **Weight** | | **0.2** | **Score** | **80** |

**Client**

Swordfish and other tuna management plan has identified management, science and enforcement performance indicators (below) that may be reviewed annually, upon conclusion of the 3-year plan or upon conclusion of the ICCAT swordfish assessment cycle, as appropriate, in order to determine if the Management Plan meets its goals.

- Canadian swordfish quota not exceeded in any one year.
- Small swordfish dead discards reduced or eliminated from pre-2004 levels.
- Bluefin tuna dead discards reduced from pre-2004 levels.

- Mitigation of non-target species bycatch achieved (data collection improved, bycatch rates reduced, rate of de-hooking achieved, probability of post-release mortality improved).
- BMSY restored for swordfish by 2010 under the 10-year ICCAT rebuilding program.
- MSY achieved in the swordfish fishery by 2010 under the 10-year ICCAT rebuilding program.
- No increase in licences or in overall authorized vessel capacity (per ICCAT effort controls).
- 100% VMS implementation achieved on the domestic longline fleet by 2005.
- Minimum observer coverage targets met annually.
- 100% logbook and pelagic receiving tally document collection.
- Quality of logbook data.
- Standardized swordfish CPUE submitted to ICCAT in assessment years.
- Task I and Task II data submitted annually to ICCAT.
- High level of domestic fleet compliance achieved.
- All foreign IUU vessels detected reported to ICCAT.

In addition the 2004-2006 marked the first time that an objective based management format was applied, providing a number of criteria against which performance can be gauged on an annual basis (DFO 2004). The plan states that SFLPAC and ALPAC would provide suitable for conducting the annual reviews in subsequent years. Reviews of the performance evaluation are conducted internally, within DFO, as part of annual meetings of DFO's Small and Large Pelagics Working Group and the results are recorded as part of the minutes of this working group. External reviews are done as part of the ALPAC and SFLPAC meetings and results are contained as part of the minutes of these meetings. Science is peer reviewed through the Canadian Science Advisory Secretariat (CSAS) and the Auditor General of Canada has the authority to review management of fisheries on an ad-hoc basis. In addition, an external review of ICCAT was conducted for the first time in 2008. This review process covered all aspects of ICCAT included, but not limited to, science, management, and enforcement.

The fishery has in place mechanisms to evaluate all parts of the management system is subject to continuous internal review. Internal reviews (DFO) are conducted during the Small and Large Pelagics Working Group. External review is carried out with all interested parties on an annual basis through regional advisory committees including the Scotia Fundy Large Pelagic Advisory Committee, the Atlantic Large Pelagic Advisory Committee, as well as various working groups struck under these committees.

**Scoring Rationale**

ICCAT has recently conducted a comprehensive review of all aspects of its performance (e.g., science, governance, management performance

| PERFORMANCE INDICATOR | SCORING GUIDEPOST 60 | SCORING GUIDEPOST 80 | SCORING GUIDEPOST 100 |
|---|---|---|---|

relative to the Commission's objective). The review was conducted by external reviewers. A working group on the future of ICCAT is preparing a response to the review recommendations.

SCRS annually reports on the status of stocks relative to management objectives, although new assessments are only conducted every 2-4 years. The Compliance Committee regularly reports on the implementation of ICCAT recommendations by member countries.

The domestic fishery is currently managed according to the Canadian Atlantic Swordfish and Other Tunas 2004-2006 Integrated Management Plan. The Plan has been rolled over since 2006, although a new Plan is under preparation. The Plan called for a performance review, although the Assessment Team is not aware that such a review has been conducted. It did see the results of an annual post-season review, but this is not deemed sufficient to justify a higher score, since there is no documentation or evidence indicating that the entire management system has been, or will be, subjected to regular internal and external review (see criteria for SG 100).

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## Personal Communications

Troy Atkinson, Nova Scotia Swordfishermen's Association
Laura Hussey, Department of Fisheries and Oceans
Linda Hunt, Department of Fisheries and Oceans
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Chris Sasso, National Marine Fisheries Service, National Oceanographic and Atmospheric Association

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