

Canada's Swordfish Fishery Management Plan: 2022

ICCAT Recommendation 17-02 requires each Contracting Party, and Cooperating non-Contracting Party, Entity or Fishing Entity to submit its swordfish development or fishing/management plan annually to the Secretariat by September 15. This document describes the history, management, socio-economic and future aspirations of the Canadian North Atlantic Swordfish fishery.

1. Overview of the fishery

Canada has a strong management regime, which ensures its fisheries are sustainable, strictly monitored and controlled. As of 2012, in recognition of the Canadian Swordfish fishery's strong management regime, the entire Canadian swordfish fishery was Marine Stewardship Council certified. Canada is the first ICCAT member to obtain this certification for its entire swordfish fleet.

Key management elements include:

- Effort controls that match availability of fish;
- Limitations in the number of authorized licenses;
- Gear restrictions;
- Targeted time and area closures;
- Minimum size limits to protect juvenile fish;
- Stringent reporting requirements;
- Effective quota management regime; and,
- Fisheries observer requirements exceeding international standards.

1.1 History – *Description of the catch history and socio-economic importance of the Swordfish fishery, participation in science, etc.*

Canada's Atlantic swordfish fishery began in the late 1880s as harpoon vessels fished throughout Atlantic Canada, and eventually expanded their fishery along the annual migration patterns of the eastern seaboard of North America. In the early 1960s, the fishery shifted from harpoon to a primarily longline fishery, and landings increased to a high of approximately 7,000t. Recorded landings decreased sharply in the 1970s because of import measures, which affected the ability of Canadian harvesters to market their product. Since 1981, Canada's annual landings have been increasing; with a maximum landings of 2,234t in 1993. Since 2020, rod and reel and tended-buoy gears have been tested in the commercial fishery.

The importance of the fishery to Canada is highlighted in **Figure 1**, which shows Canada's landings dating back to 1909.

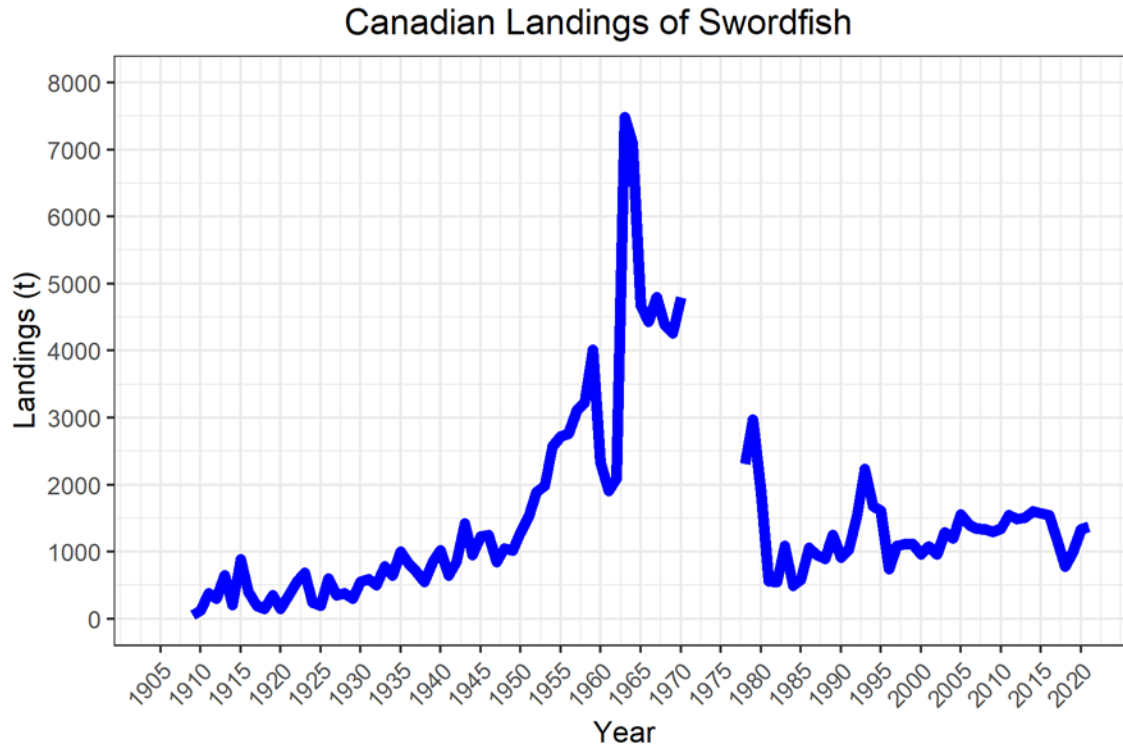


Figure 1. Canadian historic North Atlantic Swordfish landings (tonnes) between 1905 and 2021.

The first ICCAT measures were put in place for the North Atlantic swordfish stock in 1991. Minimum sizes were also put in place at that time. In response, Canada implemented domestic measures to limit the harvesting of undersized swordfish, and introduced a limited-entry fishery in 1992.

Between 1995 and 2000, further reductions in the Canadian quota on an annual basis resulted in the need for significant changes to the domestic swordfish management strategy, including fleet allocations to each of the harpoon and swordfish longline fleets. These measures were further refined in 2002 with the introduction of individual transferable quotas (ITQs) in the longline fleet and in the harpoon fleet in 2011, which has eliminated the competitive nature of the fishery and provided the fleet with a mechanism to self-rationalize.

1.2 Current fishery - *general information on where, when, how, and socio-economic considerations (e.g., high operating costs, etc.).*

Currently, Canada's fishery is exclusively commercial, and conducted by harvesters mostly from Nova Scotia, and one licence holder from Newfoundland and Labrador. There is no recreational or sportfish component to this fishery. In 2020 however, Canada conducted initial research to determine the viability of a charter rod and reel swordfish fishery. All species captured during this testing were released. In 2021, a rod and reel fishery was tested again, with an allowance for retention of swordfish catch. In addition, in 2021 tended buoy gear was tested by a limited number of vessels.

From 2011 to 2016, Canada consistently demonstrated its ability to fully utilize its ICCAT quota with average annual landings of 115 per cent of its initial annual allocations (before quota transfers) during that six year period, as demonstrated in **Figure 2**. Canadian utilization of its allocations since 2000, the year the rebuilding plan was introduced, is approximately 102 per cent of its allocation during that time. While harvests in some years exceed initial quota, they are in line with adjusted quota.

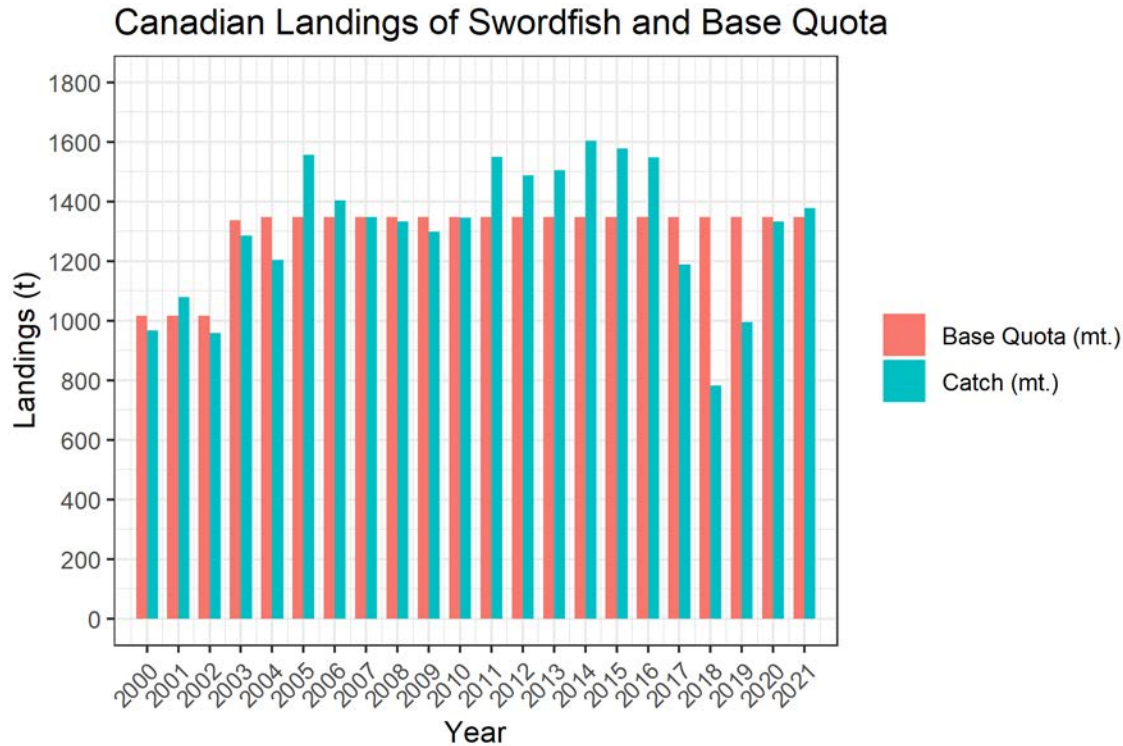


Figure 2. Canadian North Atlantic Swordfish annual catch relative to annual Canadian base quota.

Since 2004, Canada has been allocated 1,348 t of the ICCAT quota allocations (or 10.5 per cent of the catch limits based on the 2006 Supplemental Recommendation by ICCAT to Amend the Rebuilding Program for North Atlantic Swordfish [Rec. 06-02]). Canada has landed approximately 12 per cent of the overall catch for North Atlantic swordfish annually over the past nine years due to quota transfers (an average total catch of 1,399 t). Total landings (including dead discards) for the entire Canadian fleet peaked at 1,604 t in 2014. However, from 2017 to 2019, the Canada’s Swordfish fleet did not reach its base quota (catching on average 988 t), which the fleet has attributed to environmental conditions making the fishing extremely challenging and the added task of avoiding excessive Bluefin tuna by-catch as that species population has increased. Canada exceeded its base quota in 2021, landing 102 per cent of the base quota.

The current fishery is conducted by harpoon (10 per cent of national quota) and longline (90 per cent of national quota annually) from Georges Bank to east of the Grand Banks of Newfoundland from April through December. Landings by harpoon gear by all fleets over the ten years have ranged from three to 18 per cent annually of the overall Canadian catch (longline licence holders are also permitted to use harpoon gear).

Economic Value

This fishery is socially and economically important to many coastal and Indigenous communities throughout Atlantic Canada. Harvesters from close to 50 different ports, primarily in Nova Scotia, participate in the fishery.

Swordfish landings are an important source of revenue for many vessels and ports in Atlantic Canada with a landed value in 2016 of over \$17 million (CAD). Principal ports include Gunning Cove, Sambro, Woods Harbour and Clark’s Harbour in Nova Scotia.

Duration of season

Canada's commercial fishery follows the seasonal migration of swordfish through Canadian waters, in accordance with the limitations of the gear types used, weather, and the availability of quota. Canada's large pelagic longline fisheries which direct for, or incidentally catch swordfish, currently operate from April through December. ICCAT Task 1 data from earlier years when quotas were not restrictive indicate that catches could however occur in any month. Prior to the introduction of ITQs, the swordfish fishing season was concentrated primarily in the summer months due to the quick exhaustion of the Canadian quota under a competitive fishery. Due to uncondusive ocean conditions and the task of avoiding excessive Bluefin tuna by-catch, from 2017 to 2020, the Canadian fleet harvested 73 per cent of its North Atlantic swordfish base quota during a seven-month period from May to November. In 2021, the Swordfish fleet landed significantly more swordfish, reaching 99 per cent of their quota between June and December. That said, difficult ocean conditions and the avoidance of excessive Bluefin tuna by-catch may still remain obstacles in future years.

Geographic distribution

Harpooning for swordfish currently occurs primarily: along the edges of Georges and Browns Banks and in the Georges and Emerald Basins, targeting large swordfish swimming or "basking" in surface waters during the day.

The Canadian large pelagic longline fishery extends from Georges Bank south of Nova Scotia to beyond the Flemish Cap east of Newfoundland when swordfish, the main species targeted, migrate into and adjacent to Canada's exclusive economic zone (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 Canada's 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.

Until recently, the geographic distribution of the pelagic longline fishery tended to be quite similar from one year to the next. However, since 1998, there has been an increase in fishing activity east of the Grand Banks (beyond Canada's EEZ) out to and beyond the Flemish Cap where catch rates have tended to be higher than other areas. This is also an area where longline fleets from other nations, such as Japan and the United States, target large pelagic species. In recent years the fishing activity has been focused in areas closer to port, namely along the Scotian Shelf edge from the Hell Hole to the Laurentian Channel and Emerald Basin.

Indigenous Peoples' Participation

Since 2000, Fisheries and Oceans Canada has facilitated an internal Canadian transfer process to provide increased access to this fishery for Indigenous participants. Currently, nine of the 77 swordfish longline licences are held by Indigenous groups in Newfoundland, Nova Scotia and New Brunswick. The revenue generated from this fishery is important to these small communities, which face significant economic hardships.

2. Existing management

Overview

Limitations on the number of licenses

Since 1992, entry to the swordfish fishery, regardless of fleet sector, is limited to current licences. Licences have been fixed at this number, but may be reissued, within certain policy restrictions, from one harvester to another.

Rigorous monitoring, control, and surveillance of the fishery

Canada takes a comprehensive approach to enforcement that includes sophisticated vessel monitoring systems on all longline vessels, aerial surveillance, dockside monitoring, and at-sea observers.

Strong legislative and regulatory framework

In addition to the requirement for fleets to annually submit a conservation harvesting plan specific to Swordfish and other tuna fleets and a fully integrated fisheries management plan, the Canadian swordfish fishery is governed by a suite of legislation, policy and regulations:

- International Commission for the Conservation of Atlantic Tuna (ICCAT);
- *Fisheries Act*, 2019;
- *Species at Risk Act*, 2002;
- *Oceans Act*, 1996;
- *Department of Fisheries and Oceans Act*, 1985;
- *Coastal Fisheries Protection Act*, 1985;
- *Atlantic Fisheries Restructuring Act*, 1985;
- Coastal Fisheries Protection Regulations, 2019
- Fishery (General) Regulations, 1993;
- Aboriginal Communal Fishing Licences Regulations, 1993;
- Atlantic Fishery Regulations (AFR), 1985;
- Commercial Fisheries Licensing Policy for Eastern Canada 1996; and,
- International Plan of Action (IPOA) and Canada's National Plan of Action (NPOA) for reducing incidental catch of seabirds in longline fisheries; 2007
- IPOA for Shark Conservation; 2007

Sustainable Fisheries Framework - Conservation and sustainable use elements:

- Precautionary approach policy;
- Foraging species policy;
- Sensitive benthic areas policy; and
- By-catch policy.

2.1 Fleet structure

The current Canadian fleet can be characterized as small-scale, with only a few vessels greater than 20 metres. The implementation of quota reductions in ICCAT resulted in significant economic hardship to the Canadian fleet, and led to extensive changes to Canada's domestic management framework, including significant reductions in access for Canadian swordfish harvesters.

Harpoon-only

There are 1,157 swordfish harpoon-only licences in Atlantic Canada. Of this total, current allocations in combination with recent environmental conditions have restricted participation and as such, only approximately 45 harpoon licensed fishers have been active each year (the last five years), only 21 participated in 2020 and 9 in 2021. Approximately half of these fishers made dedicated trips for swordfish while the remaining licence holders have a licence which allows for the harpooning of a swordfish should they have the opportunity while harvesting another species.

Longline

There are a total of 77 pelagic longline licences, as well as a unique offshore tuna licence, in Atlantic Canada. The pelagic longline licence holders are also permitted to harvest using harpoon gear.

The introduction of quota reductions as a result of the 10-year rebuilding plan agreed to in ICCAT has meant that not all Canadian licence holders can participate in an economically feasible swordfish fishery. Canada's introduction of an ITQ system in 2002 facilitated fleet self-rationalization to allow the fleet to better match fishing capacity with quota available to Canada and the longline fleet. Nevertheless, approximately one third of the 77 commercial swordfish licence holders remain inactive as it is not possible to prosecute an economically viable fishery for all licence holders with current quotas. The approximately 44-54 licence holders participating in the fishery each year are subject to strict fishing, monitoring and reporting requirements.

A unique offshore tuna licence, introduced in 2000, allows the license holder to conduct longline fishing operations Atlantic-wide.

Area Closures

Area closures to protect sensitive species or life-stages and marine protected areas are utilized in this fishery, and have resulted in the displacement of approximately 10 per cent of the active fleet from traditional fishing grounds.

In addition, the Minister of Fisheries and Oceans may, in any year, close any area to fishing for a specified time should any grave environmental or conservation concerns arise.

2.2 Quota management

In 2000, Canada implemented a change to the strictly competitive fishery by introducing distinct gear sector allocations for the two different gear types, along with the five tonne by-catch allocation of swordfish for the offshore tuna licence. It also introduced self-administered trip limits in the longline fleet, daily hauls once 65 per cent of the fleet allocation was reached and a segregated swordfish by-catch quota within the competitive fleet. In 2002, further measures were introduced to the longline fleet and the Department of Fisheries and Oceans (DFO) introduced ITQs 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. This program was approved on a permanent basis in 2003. The maximum concentration of quota through permanent transfers is limited to five per cent.

Within the harpoon sector, the quota is assigned competitively and through an individual quota system.

The first step in determining the annual fishable quota for any year is to adjust the national allocation for any over-runs or roll-over amounts from the previous year. Adjustments are credited to or deducted from the gear sector that incurred them, with the exception of the unique offshore tuna licence. That licence receives a five tonne by-catch limit annually 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 to the harpoon sector (10 per cent) and to the longline sector (90 per cent).

Canada's 2018 to 2022 initial allocation of North Atlantic Swordfish is 1,348 metric tonnes; from which five tonnes was allocated to Canada's offshore tuna fleet for swordfish bycatch.

In consultation with industry, Canada incorporates measures into each fleets' annual harvesting plan to ensure that Canada does not exceed its annual adjusted quota of North Atlantic swordfish while permitting fleets to harvest close to their assigned quota. Individual fleet quotas are monitored by the Department, as well as independently by the two main industry associations.

2.3 Monitoring, Control and Surveillance

Monitoring and enforcement of Canada's swordfish management measures are key parts of ensuring the sustainability of the swordfish species. Fisheries and Oceans Canada fishery officers utilize a variety of methods to monitor swordfish fishing activity to ensure compliance with swordfish fisheries management measures, including aerial surveillance, at-sea and port inspections, at-sea observers, and vessel monitoring systems. In addition to at-sea and in port inspections, fishery officers inspect swordfish buying/processing facilities and conduct audits of the dock-side monitoring program in this fishery. In 2021, a total of 141.50 fishery officer enforcement hours were expended on the swordfish fishery. At-sea observers are targeted for deployment on 10 per cent of swordfish fishing trips, despite no ICCAT requirements for at-sea observers onboard swordfish vessels less than 20 metres. In 2021, 73 vessels were observed and recorded for engaging in swordfish /tuna fishery throughout the year. Of note, this number includes vessels that have been observed on multiple occasions.

License holders who fail to comply with the domestic regulations and conditions of license are liable for prosecution that may include fines and suspension of license privileges. Both the dockside monitoring and at-sea observer programs are fully funded by industry. All fishing activities must be recorded in approved logbooks and Species at Risk logs in the manner prescribed by DFO. This includes the provision of information on all discards of protected species, dead or alive. Swordfish harvesters must also abide by strict licence conditions, which include:

- Areas closed to fishing to protect swordfish broodstock, to prevent by-catch of bluefin tuna, and to protect sensitive marine protected areas;
- Minimum fish size restrictions;
- Requirements to hail out and hail in for all fishing trips;
- Dockside monitoring of all landings, in which every ton of fish is recorded by an independent third party;
- Requirements for proper handling and release of identified species at risk, including leatherback turtles and white shark.
- Requirements for proper handling and release of sensitive shark species identified by ICCAT including: bigeye thresher, hammerhead, oceanic whitetip, silky and basking sharks; and,
- Requirements for proper handling and release of all live interactions with Porbeagle and Shortfin Mako shark species. Additionally, starting in 2020, no retention will be permitted of Shortfin Mako sharks.

Canada also has in place strict port access requirements for all ICCAT members landing swordfish in Canadian ports that go beyond the existing ICCAT port state measures.

2.4 Mitigation of non-target species bycatch

Due to the nature of this fishery, reducing by-catch and dead discards is important. To that end, industry has implemented a number of mitigating measures, such as:

- Mandatory use of circle hooks, which aim to reduce non-target species by-catch rates and to increase the probability of post release survival;
- Live release recommended, to the extent possible, of all sensitive species; and,
- Collaborating with DFO in a research program examining patterns of by-catch in the pelagic longline fishery, with a view to mitigating catches of sharks and turtles.

As a licence condition, pelagic longline licence holders must follow a code of conduct for the handling and release of marine turtles. All active vessels must carry safe handling and release equipment to mitigate harm as much as possible when handling and releasing marine turtles. Active participants in this fishery are trained by the Canadian Sea Turtle Network and certified on the use of this equipment. A copy of the valid certificate must be on board the vessel and be provided to a fishery officer upon request.

There are requirements for the proper handling and release of sensitive shark species identified by ICCAT. There are requirements for the proper handling and release of all live interactions with Porbeagle and Shortfin Mako shark species. Additionally, since 2020, no retention has been permitted for Shortfin Mako sharks.

3. Scientific Work

3.1 Data and Information Collection in Support of Scientific Work

Canada's management of the swordfish fishery relies first and foremost on the best available science advice.

As the foundation for reliable research and stock assessments, Canada's statistical systems provide real time monitoring of catch and effort for all fishing trips. In 1994, an industry-funded DMP was established in Atlantic Canada, according to DFO standards, for the swordfish longline fleet.

Overview of Atlantic Canada's statistical system and Dockside Monitoring Program:

- In place since 1996, this system has applied to all fleets and included monitoring of all trips, even when no fish were caught;
- At the completion of each fishing trip, independent and certified dockside monitors must be present for off-loading, and log record data must be submitted by each harvester to the monitoring company that inputs the data into a central computer system;
- Log records contain information on catch, effort, environmental conditions (e.g., water temperature) and bycatch; and,
- Log records from trips with catch must be received from harvester before they can proceed with their next fishing trip (log records from zero catch trips can be mailed in at a later time). This ensures Canada has 100 per cent coverage of properly completed log records and individual fish weights.

3.2 Research

Canada has been a leader in supporting ICCAT's scientific investigations of the swordfish resources in the Atlantic for the past several decades. Canada has a tradition of contributing a scientific leader to the Coordinator role for the Species Group and the three stock assessments conducted by the SCRS (North Atlantic, South Atlantic, and Mediterranean); Drs. J. Beckett, J. Porter, J. Neilson, and K. Gillespie have contributed to this important role. Currently, the leadership role extends to ecosystem related issues and to the SCRS itself, with assessment support for Bluefin tuna, North Atlantic swordfish, Porbeagle shark.

As a result of Canada's well-recognized ability to collect and maintain fisheries statistics of importance to the stock assessment, Canada contributes the longest series of catch rate information to the North Atlantic stock assessment, commencing in 1963. Canada also initiated ground-breaking research on satellite archival tagging studies of swordfish that attracted international recognition. In 2020, Canada resumed electronic tagging of Swordfish with Pop-up Satellite Archival Tags (PSAT) and acoustic tags (4 PSAT and 18 acoustic tags deployed in 2020). The tagging program tracks habitat usage and movement patterns in Canadian/North Atlantic waters, which could be used to standardize the CPUE input in the assessment model. Canada continues to participate in international efforts to learn more about sea turtle migration and participated in investigating incidental mortality. These efforts are supported by Canadian swordfish harvesters who understand the importance of marine stewardship.

Similarly, a 3-year research project established by the DFO in collaboration with the Atlantic Canadian swordfish and other tunas longline fishery to deploy short-term PSATs on live released Shortfin mako and

Porbeagle sharks caught in the longline fishery concluded in 2019. Results found the post-release mortality for Porbeagle sharks may be lower than previously estimated at 15 per cent overall (6 per cent when healthy and 40 per cent when injured). Estimates for Shortfin mako were 28 per cent overall (27 per cent when healthy and 33 per cent when injured). DFO has also collaborated with the fishing industry for a fixed station Porbeagle survey to produce a fishery-independent index, with surveys occurring in 2007, 2009 and 2017. The results from both of these projects were presented to the shark working group in 2020.

Recent Canadian-led publications on shark distribution patterns and diving behaviour used data derived from pop-up archival satellite tag deployments completed in collaboration with the Atlantic Canadian Swordfish and Other Tunas Longline Fishery and/or at-sea observer data collected from this fleet. These research efforts led to new understanding of post-release behaviour and mortality as well as natural mortality for shortfin mako and porbeagle sharks in the Atlantic (Bowlby et al. 2021; <https://doi.org/10.3389/fmars.2021.619190>).

Data on interactions with thresher sharks contributed to updated spatial distribution information throughout the Northwest Atlantic (Kneebone et al. 2020; doi: 10.7755/FB.118.4.8).

Reproductive parameters and spatial distribution information were updated for North Atlantic shortfin mako to validate productivity parameters used in stock assessment (Natanson et al. 2020; doi: 10.7755/FB.118.1.3).

Lastly, a re-analysis of a historical tag deployment on porbeagle shark demonstrated strong relationships between diving behaviour and oceanographic characteristics that may become useful for future bycatch mitigation (Wang et al. 2020; <https://doi.org/10.3354/meps13503>). Work is ongoing with the European Commission on spatial distribution patterns and habitat use for blue shark in the North Atlantic.

Beginning in 2018, Canada led the creation of an ICCAT/European Commission funded international research program for Swordfish in the Atlantic Ocean and Mediterranean Sea. This program aims to improve knowledge of the stock distribution, age and sex of the catch, growth rate, age at maturation, maturation rate, spawning season and location and diet for each of the three ICCAT swordfish stocks—data important for addressing uncertainties important in assessment and MSE. This undertaking has benefited from samples contributed by Algeria, Brazil, Cyprus, Chinese Taipei, Egypt, France, Greece, Italy, Malta, Morocco, Namibia, Portugal, South Africa, Spain, Taiwan, Tunisia, Turkey, United States, Uruguay, Venezuela, and Canada. Since 2018, over 4000 fish have been sampled for age, genetics, size and reproductive maturity. These samples represent all three swordfish stocks. Data and analyses from this program will contribute to more robust assessment of swordfish status by permitting the development of more spatially and biologically realistic population models used in both assessment and ICCAT MSE contexts.

Through these international and domestic research programs, Canada will develop capacity and infrastructure to continue collection and analysis of swordfish biological samples into future years. Beginning in 2020, the international research program shifted its emphasis to analysis and of standardizing of methods (ageing, genetic analysis and maturity readings) among partner labs and generating early results (Otolith differences by geographic area, genome mapping and new maturity standards). Canada will also continue to collaborate with industry for the continuation of the collection of biological sampling (Anal fin, tissue and otoliths).

Building off of these new data as well as Canada's historical fisheries data, the planning and analysis stages of a species distribution model took place in 2021 and is continuing to be developed into 2022. This work is particularly relevant given changing ocean conditions and the impacts these changes have on fleet ability to find swordfish migration routes in Canadian waters. These models will support spatially and environmentally explicit Catch Per Unit Effort (CPUE) index standardization which will contribute to enhanced ability to detect changes in swordfish abundance in the Northwest Atlantic. This work is being completed in collaboration with the United States of America's National Oceanic and Atmospheric Administration's (NOAA) Southeast Fisheries Science Centre.

To develop indicators of swordfish stock status in non-assessment years, DFO is testing the use of length frequency and animal growth models. These emerging methods will be applied to swordfish data to estimate size at maturity and the spawning potential ratio of the stock for each of the three stocks.

3.3 Industry/Environmental Non-Government Organization collaboration

Industry is fully engaged in the conservation and management efforts for this species to ensure its sustainability, including participation in scientific research, funding of independent at-sea observers to monitor the fishery and funding independent third party monitors who observe and record all landings at dockside. The harpoon fleet provides funds or in-kind vessel support for scientific research in lieu of at-sea observer coverage.

Harvesters and environmental non-governmental organizations (ENGOS) offer their expertise and experience in the development of Canada's Integrated Fisheries Management Plans, and are encouraged to provide additional financial or technical contributions for at-sea research related to this stock.

For example, the Canadian harpoon and longline fleets collaborated with DFO in an archival tagging project to track migratory patterns of the swordfish stock to get a better understanding of its movements and migrations throughout the North Atlantic. The data from this project is currently being used in new analysis, such as the construction of a swordfish habitat preference model. This work is supported through Canada's electronic Swordfish tagging program which resumed in 2020. Electronic tagging of swordfish will continue in 2023, using both PSATs and Acoustic tags.

Canada's Sustainable Fisheries Framework forms a foundation for implementing an Ecosystem Based Management approach in the management of its fisheries. Of particular note for the ICCAT managed fisheries is the advancement of ecosystem objectives and policies related to biodiversity through a by-catch management project, and a work plan specifically aimed at addressing bycatch and discarding in Canadian large pelagic fisheries. The work plan includes projects aimed to both manage discards as well as control incidental mortality in large pelagics fisheries. For example, the longline fleet supported the archival tagging of sea turtles to better understand their movements and migration as well as estimate post release mortality. DFO and the Atlantic Canadian swordfish and other tunas longline fishery conducted several collaborative projects to inform national or international management efforts for large pelagic sharks. Notably among these was a pelagic longline survey, designed to provide a fishery-independent index of abundance for Porbeagle shark, as well as satellite tagging of Shortfin Mako and Porbeagle sharks to refine post-release mortality estimates following recent changes in capture and handling practices by the fleet.

4. Eco-certification

Canada's swordfish fisheries are acknowledged to be well-managed and through the efforts of the SCRS and ICCAT they are shown to be sustainable as well. Consequently, Canada's entire North Atlantic swordfish fishery has received Marine Stewardship Council (MSC) certification. The harpoon portion of Canada's Northwest Atlantic swordfish fishery earned sustainable seafood certification in June 2010, following a comprehensive fishery assessment process carried out by an independent, accredited certifier and the longline fishery was awarded MSC certification in April 2012. Maintaining the certification will largely depend on ICCAT's progress on issues such as harvest control rules whose resolution depend on a coordinated effort by scientists and managers from all CPCs.

5. Interests/aspirations

Despite unconducive ocean conditions and the task of avoiding excessive Bluefin tuna by-catch causing the Canadian Swordfish fleet land below its base quota in the last three years, Canada continues to seek increased access to this resource. Canada has a demonstrated historical participation in the fishery, dating back to the late 1800s, and has a consistent record of compliance with ICCAT measures. Canada has also, on an ongoing basis, contributed significantly to the collection and provision of accurate data, and scientific research in order to enhance the work of the Commission.

Canada played an instrumental role in the development and implementation of the successful ICCAT rebuilding plan and has a need for an increased quota to ensure the viability of the Canadian swordfish fishery for the coastal communities across Atlantic Canada which depend on fishing opportunities for North Atlantic swordfish. While Canada, like other ICCAT members, accepted significantly lower quotas during the rebuilding period of the fishery; Canada has consistently demonstrated its ability to fully utilize its quota.

From 2011 to 2016, Canada consistently demonstrated its ability to fully utilize its ICCAT quota with average annual landings of 115 per cent of its initial annual allocations (before quota transfers) during that six year period. In addition, Canada utilized its full quota in 2021. Since 2004, Canada has been allocated 1,348t of the ICCAT quota allocations (or 10.5 per cent of the catch limits). Nevertheless, Canada has landed approximately 12 per cent of the overall catch for North Atlantic swordfish annually over the past nine years due to receiving quota transfers.

ICCAT members should recognize the aspirations of coastal and developing nations, while remedying the current situation of over-allocation.

U.S. Swordfish Fishery: Updated Fishing/Management Plan
Prepared Pursuant to ICCAT Rec. 17-02, as amended by Rec. 21-02

September 15, 2022

I. Executive Summary

The United States first began managing its Atlantic swordfish fishery in 1985 – five years before active management by ICCAT. The conservation and management of this fishery is defined by a comprehensive suite of ecosystem-based measures that have been taken in line with domestic requirements and that go well beyond the requirements of ICCAT recommendations. A range of tools are used to manage the U.S. North Atlantic swordfish fishery, including licensing and reporting requirements, size limits, retention limits, and gear restrictions. U.S. requirements for logbooks, scientific observers, and electronic monitoring support the collection of reliable fishery data for management and stock assessment purposes. In addition, U.S. scientists actively engage in the stock assessment process and conduct innovative research on swordfish biology, life history, stock structure, fishing techniques, and bycatch mitigation technology. U.S. contributions to North Atlantic swordfish research have provided substantial support for efforts by the SCRS to understand the status of the stock and develop scientific advice for its long-term sustainability in accordance with the objective of the Convention.

While remaining in compliance with ICCAT recommendations, the United States has implemented even more far-reaching measures designed to support effective conservation and management of the North Atlantic swordfish stock. For example, when the stock was overfished, the United States took the initiative to reduce fishing effort to protect immature swordfish in the Florida Straits nursery grounds, successfully reducing fishing mortality on immature swordfish. This unilateral conservation action directly contributed to the rebuilding of North Atlantic swordfish and this has benefitted all ICCAT members that rely on this stock. The recovery of the North Atlantic swordfish stock is one of ICCAT's greatest success stories.

Consistent with ICCAT's growing emphasis on the importance of an ecosystem approach, the United States has comprehensive measures in place to support the health of the broader pelagic ecosystem. Several U.S. time/area closures for pelagic longline gear are in place to help minimize bycatch mortality of other highly migratory and protected species, such as sea turtles and some overfished billfish stocks. Additional bycatch mitigation measures include gear restrictions such as circle hooks and gangion length requirements; mandatory use of dipnets, line cutters, and other equipment; and workshops/written materials that provide guidance on accurate species identification and techniques for careful handling and release of sea turtles, cetaceans, marlins, sailfish, and protected shark species. In addition, monofilament rather than wire leaders are almost exclusively used in Atlantic U.S. longline fisheries. This is not a regulatory requirement. U.S. fishermen use monofilament by choice. This practice has the added benefit of decreasing shark bycatch and mitigating shark mortality.

Some of these domestic measures have affected the ability of the U.S. fleet to harvest its allocation of North Atlantic swordfish in recent years, which has been difficult for coastal communities who depend on this important resource. Recognizing this, the United States has taken steps to restructure its fisheries and adjust regulatory constraints on its swordfish fishery in light of the rebuilt status of the stock. For example, the United States has relaxed vessel upgrade restrictions in the fishery, revised requirements in the Individual Bluefin Quota (IBQ) system to increase flexibility for fishing for swordfish, increased swordfish trip limits for open access handgear permit holders, eliminated a pelagic longline gear restricted area, allowed closely-monitored access into two pelagic longline gear restricted or closed areas which has recently resulted in the areas remaining open to fishing, changed the year-round weak hook requirement on pelagic longline vessels in the Gulf of Mexico to a 6-month requirement, and initiated a process to consider options for collecting data within existing closed areas to determine if catch rates of target and bycatch species have changed, including publishing a scientific paper on a new predictive spatial modeling tool. The results of this data collection process may inform future management decisions. We continue to investigate ways to provide additional opportunities for U.S. fishermen to increase swordfish harvests in a responsible way, ensuring that the fishery operates in accordance with both international obligations and more stringent U.S. laws and regulations.

In addition to abiding by strong conservation and management measures, the U.S. fleet fishing for swordfish and other highly migratory species (HMS) has faced unexpected and significant challenges over the past decade, including severe hurricanes, the Deepwater Horizon/BP oil spill and subsequent restoration efforts, and the global COVID-19 pandemic. In 2020, 12 hurricanes and tropical storms caused extensive damage in U.S. coastal communities. In 2020 and 2021, the COVID-19 pandemic severely impacted U.S. fishing operations as well as domestic demand for swordfish product by restaurants. However, we remain committed to active U.S. participation in the North Atlantic swordfish fishery, which continues to hold significant social and economic importance in numerous coastal communities.

In summary, the United States has chosen to pursue a prudent and deliberate strategy that reflects a balance of maintaining conservation objectives while encouraging full utilization of the quota. This document describes the interests, fishing patterns, and fishing practices of the U.S. Atlantic swordfish fleet – past, present, and future.

II. Brief History of the U.S. Swordfish Fishery

Early History (1800s - 1960s)

The U.S. commercial North Atlantic swordfish fishery began in the early 1800s as a harpoon fishery off New England. For more than 150 years, up until the 1960s, most U.S. commercial swordfish were caught using harpoons or handlines. A small U.S. recreational swordfish fishery developed in the 1920s using rod and reel and handline, primarily from Massachusetts to New York. As diesel engines came to replace sail, pelagic longlines eventually replaced harpoons as the primary commercial swordfish gear during the 1960s.

1985 U.S. Swordfish Fishery Management Plan (1970s – 2000s)

The U.S. pelagic longline fishery grew steadily during the 1960s and 1970s. At the same time, a recreational rod and reel fishery developed in Florida during the 1970s, and many towns along the Mid-Atlantic coast developed a tradition of holding annual swordfish tournaments, which contributed to tourism and the strengthening of local economies. As overall Atlantic swordfish fishing effort increased in the 1980s, the commercial U.S. pelagic longline fishery also expanded into the Grand Banks, Florida Keys, and Gulf of Mexico. In 1985, the first U.S. Atlantic Swordfish Fishery Management Plan (FMP) was implemented, which included reductions in the harvest of small swordfish, permitting and monitoring requirements, and scientific research.

In 1990, ICCAT required reductions in the harvest of undersized swordfish (Rec. 90-02). In 1994, ICCAT began to set total allowable catches (TACs) and country specific quotas for North Atlantic swordfish. ICCAT also encouraged countries to protect small swordfish, including through the establishment of time and area closures. TACs and quotas were revised over the next few years. In particular, the TAC for North Atlantic swordfish declined through 1999 in an effort to address overfishing.

In 1999, the United States implemented a new FMP for Atlantic Tunas, Swordfish and Sharks that, in addition to quota management, established several important management measures to rebuild the swordfish stock, including limited access swordfish vessel permits and vessel upgrading restrictions; a 1-month pelagic longline closed area to reduce bluefin tuna dead discards; observer coverage and logbook reporting; vessel monitoring systems (VMS) for pelagic longline vessels; and tournament registration and tournament reporting requirements for tunas.

Later that same year, the SCRS indicated that North Atlantic swordfish biomass had dropped to approximately 65 percent of B_{MSY} and that current levels of catch would lead to continued stock decline. In response, ICCAT established a 10-year rebuilding program (Rec. 99-02), beginning in 2000 that reduced the TAC in line with scientific advice and specified a goal for the stock to be rebuilt by 2010, among other things. One component of the program was to protect small fish.

Taking into account the provisions in the rebuilding program concerning small swordfish together with the conservation needs of other species, the United States took strong actions in 2000 and 2001 to reduce the bycatch of juvenile swordfish and of billfish, sharks, and protected species by implementing several large

time/area closures for pelagic longline vessels. These time/area closures closed a total of 132,670 square nautical miles (343,610 square kilometers) to pelagic longline gear. These closures included the DeSoto Canyon year-round closure (Gulf of Mexico), the Florida East Coast year-round closure, and the Charleston Bump seasonal closure (mid-Atlantic coast).

In 2000-2001, to reduce sea turtle bycatch, the United States closed 2,631,000 square nautical miles (9,035,617 square kilometers) of the Northeast Distant Statistical Area (NED) to fishing by the U.S. pelagic longline fleet. The closed area included portions of the high seas where the vessels of many nations operated, although only the operations of U.S. flag vessels were affected by the NED closure. The United States also implemented regulations during this period to require: (1) dipnets and line clippers to be used to safely release sea turtles; (2) gangion lengths to be 110 percent of the length of the floatline in sets of 100 meters or less in depth; (3) sea turtle guidelines for safe handling and release to be posted inside the wheelhouse; and (4) the use of corrodible hooks on all pelagic longline vessels.

From 2001-2003, the United States conducted a research experiment with the pelagic longline fishing industry in the NED to determine if gear modifications and other techniques could reduce sea turtle bycatch and bycatch mortality. The results of the experiment showed that large circle hooks with finfish bait reduced sea turtle bycatch rates. Based upon the results of this experiment and consistent with domestic requirements to protect certain sea turtle species, the United States reopened the NED to pelagic longline fishing in 2004, but required the use of large circle hooks 18/0 gauge or larger only with whole Atlantic mackerel and/or squid bait, the use of release tools, and adherence to careful sea turtle handling and release techniques. The United States also distributed revised sea turtle handling and release placards, protocols, and videos to all pelagic longline vessels. The placards, protocols, and videos were made available in English, Spanish, and Vietnamese.

Sea turtle bycatch mitigation technology has been shared with many other nations fishing in the Atlantic including Spain, Canada, Morocco, Mexico, Italy, and Uruguay. Cooperative research has been conducted with the Dominican Republic, Turkey, Spain, Canary Islands, Brazil, Uruguay, Italy, and South Korea, and the United States engaged in a joint research project with Chinese Taipei to test the use of circle hooks in their deep set pelagic longline fishery. In 2006, new U.S. regulations established mandatory workshops for all pelagic longline fishermen to train them in the careful release and handling of sea turtles and other protected species. U.S. pelagic longline vessel owners and operators must renew this certification every three years. The time/area closures discussed above resulted in reduced U.S. North Atlantic swordfish landings and contributed to the North Atlantic swordfish stock being rebuilt ($B/B_{MSY} = 0.99$) in 2006, four years ahead of schedule.

Since 2006, the U.S. buoy gear fishery has grown to over 60 active vessels based primarily in southeastern Florida. The gear is relatively simple and inexpensive, and it consists of a single section of heavy monofilament or braided nylon to which one or two hooks or gangions and one or more floatation devices (i.e., buoys) are attached. Approximately 10-15 units of this free-floating gear are deployed 35-50 meters apart at night, when swordfish are feeding close to the surface. When a swordfish strikes the bait, the attached buoys are dragged away alerting the fisherman that a swordfish has been hooked. The fisherman can quickly land the fish ensuring a high quality product (and price) and allowing for immediate re-deployment of the gear. Research on the use of buoy gear resulted in increased swordfish catch rates and low bycatch as compared to longline gear.

III. Challenges and Measures to Promote the Long-term Sustainability of the U.S. Swordfish Fishery

Decreased swordfish stock abundance, natural and man-made disasters, market conditions, management regulations, and increased operating costs contributed to a generally declining trend in U.S. swordfish landings starting in 1990 with the lowest catches in this time period (through 2013) reported in 2006 (2,057 mt). The United States took several important steps (described below) to address this issue as the North Atlantic swordfish stock continued to rebuild. In 2009, the SCRS indicated that overfishing was not occurring ($F_{2009}/F_{MSY} = 0.76$) and the stock was not overfished ($B_{2009}/B_{MSY} = 1.05$).

The impacts of both Hurricane Katrina and Hurricane Rita in 2005 had a devastating effect on many Gulf of Mexico communities. Economic losses to the commercial fishing industry in Louisiana and Mississippi from

Hurricane Katrina are estimated to be \$13 billion and \$484 million dollars, respectively (Impact Assessment Inc., 2007). The U.S. pelagic longline fishery was significantly impacted by these hurricanes primarily because many Gulf of Mexico fishermen were displaced from their homes. Some estimates indicate that in the wake of these hurricanes, approximately half of the Gulf of Mexico pelagic longline fleet was not operational (National Fisherman, 2006). This certainly contributed to the decline in U.S. swordfish landings in 2006. Hurricanes Gustav and Ike also caused damage to Gulf of Mexico coastal communities in 2008, with damage to the fishing industry in Louisiana estimated to be \$300 million dollars (Times-Picayune, 2008). In recent years, natural disasters have continued to cause damage and negatively impact U.S. Atlantic fisheries. In 2020, 12 Atlantic hurricanes and tropical storms caused an estimated cumulative \$41.9 billion in damages in U.S. coastal communities (National Marine Fisheries Service (NMFS) 2021).

In response to the 2010 Deepwater Horizon/BP oil spill, the United States issued a series of emergency rules that closed portions of the Gulf of Mexico EEZ to all fishing activities. The closures ranged in size from 6,817 sq. mi. (<4 percent of the U.S. Gulf of Mexico) on May 2, 2010, to 88,522 sq. mi. (approx. 37 percent of the U.S. Gulf of Mexico) on June 2, 2010. As a result of these closures, a significant part of the U.S. Gulf of Mexico pelagic longline fleet was inactive for a significant period of time, which impacted harvests.

Management changes implemented to benefit the bluefin tuna stock also presented challenges to the U.S. swordfish fishery. In 2015, the United States implemented Amendment 7 to the FMP. The measures in this rule dealt mainly with the bluefin tuna fishery and some measures were applicable to the pelagic longline fishery for swordfish, such as IBQ (a type of catch share), two new pelagic longline gear restricted areas, closure of the pelagic longline fishery when annual bluefin tuna quota is reached, mandatory retention of legal-sized bluefin tuna caught as bycatch on pelagic longline, and electronic monitoring (cameras) on pelagic longline vessels, and bluefin tuna catch reporting via VMS. We are currently revising these measures from Amendment 7 and some revisions under development could provide benefits to the U.S. pelagic longline vessels that target swordfish.

In light of these and other challenges, the United States has taken or will be taking proactive steps to revitalize the U.S. swordfish fleet, as summarized below:

- The United States re-opened NED closed area to pelagic longline vessels in 2004, requiring 18/0 circle hooks and specific baits to reduce sea turtle bycatch.
- The United States authorized 'buoy gear' to fish for swordfish in 2006, which maximizes target catch and minimizes bycatch.
- Pelagic longline vessel upgrading restrictions were relaxed in 2007, removing barriers to larger and more powerful vessels participating in the swordfish fishery.
- The United States increased commercial and recreational swordfish retention limits in 2007.
- In 2008, the United States relaxed some permit conditions, allowing certain pelagic longline permits that had previously been expired to be renewed. This has allowed dozens of previously expired commercial swordfish permits to be utilized again.
- In 2011, the United States modified incidental retention limits for *Illex* squid trawl vessels to reduce regulatory dead discards of swordfish.
- In 2012, the United States implemented an alternative swordfish minimum size measurement pursuant to ICCAT Recommendation 11-02, which will allow U.S. vessels to land legal-sized fish that would previously have had to be discarded.
- In 2013, the United States implemented a new open access commercial vessel permit to retain and sell a limited number of swordfish caught on rod and reel, handline, harpoon, greenstick, and bandit gear. The intent of the

new open access swordfish permit is to provide additional opportunities for U.S. fishermen to commercially harvest swordfish using selective gears that are low in bycatch.

- In 2016, the United States removed vessel upgrade regulations for vessels issued swordfish directed and Atlantic tunas Longline category limited access permits, to ease a barrier to entry in the pelagic longline fishery, facilitate limited access permit transfers, provide increased business flexibility, and help vessel owners address safety issues.
- In 2018, the United States adjusted accounting deadlines under the IBQ catch share program to provide increased flexibility for the pelagic longline fishery for swordfish to determine when to depart on fishing trips.
- In 2020, the United States eliminated one pelagic longline gear restricted area, and we allowed closely-monitored access by pelagic longline vessels into two gear restricted or closed areas, in part to provide increased access to areas for targeted swordfish fishing, which has recently resulted in the areas remaining open to fishing. The United States also changed the previous year-round weak hook requirement on pelagic longline vessels operating in the Gulf of Mexico to a 6-month requirement.
- In 2021, the United States increased open access commercial handgear swordfish retention limits.
- Beginning in 2023, the United States will implement updated IBQ catch share eligibility and distribution regulations, which will provide increased and dynamic access to IBQ shares for pelagic longline vessels active in the swordfish fishery, including potential facilitated access for new entrants into the fishery.

The relatively recent emergence (or re-emergence) of and growth in alternative fishing gears used to fish commercially for swordfish, including buoy gear, harpoon gear, and rod and reel, is notable. These gears are considered “handgear” and have the benefit of low bycatch and bycatch mortality rates compared to pelagic longline gear. As the swordfish stock has rebuilt, the abundance of swordfish in the larger size classes has also increased. In light of that, these gears have once again become more economically viable. The United States believes this is a positive development that will continue to produce a high-quality product for consumption.

To support domestic demand, the United States is providing consumers with factual information to inform their purchasing decisions. Information regarding swordfish stock status, management, and nutritional data is provided on federal websites and distributed using other media.

IV. Swordfish Science and Research

The United States makes a significant contribution to the conservation and management of stocks through the collection and provision of scientific data to ICCAT, active participation in stock assessments, joint research activities, and capacity building initiatives. U.S. research on Atlantic swordfish has focused on stock distribution and migration patterns in the Northwest Atlantic Ocean. The U.S. cooperative tagging program provides valuable data for validation of longevity, stock spatial structure, and growth estimates. Scientists from Canada and the United States have collaborated to synthesize and publish data from electronic satellite tagging of swordfish released across a broad geographic range, from the Straits of Florida to Newfoundland. The resulting database represents the most comprehensive information available on swordfish migrations. The United States also conducts research to reduce bycatch and bycatch mortality in the pelagic longline and other HMS fisheries and seeks ways to transfer newly developed technology and techniques internationally. U.S. fisheries scientists and scientific programs continue to be invested in learning about and helping to maintain healthy ecosystems that support healthy swordfish stocks.

In 2021, the United States published a scientific paper describing the HMS Predictive Spatial Modeling Tool (PRISM) and its application in assessing the performance of closed areas (Crear *et al.* 2021), including those areas that impact access to swordfish fishing grounds. There are a number of HMS closed areas that have not been assessed since their implementation in the early 2000s. Since then, ocean conditions, species distributions, and stock statuses have changed, and additional regulations have been implemented. The

scientific article shows that the PRiSM model could be used to provide additional information to fishery managers when there is a lack of fishery-dependent data available. Managers can use PRiSM, in conjunction with other information, to help inform HMS spatial management decisions. The United States is currently considering ways to use PRiSM to modify and/or collect information from current U.S. closed areas.

In addition to the foregoing information, a synopsis of U.S. management measures for the North Atlantic swordfish fishery is provided in Appendix I and social and economic considerations regarding the fishery are provided in Appendix II.

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Appendix I: Synopsis of U.S. Swordfish Management Measures

Atlantic swordfish management actions in the United States are developed, coordinated, and implemented through a single FMP, the 2006 Consolidated Atlantic HMS FMP, which is issued under the jurisdiction of NMFS. Recommendations adopted by ICCAT, including annual quota allocations to the United States, are implemented in the United States by regulation under the authority of the Atlantic Tunas Convention Act (ATCA). The annual U.S. swordfish quota allocation is divided into equal semi-annual directed fishery quotas (all commercial landings), an annual incidental catch quota for fishermen targeting other species or taking swordfish recreationally (300 mt dressed weight), and a reserve category. Domestic legislation, including the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act, and the Marine Mammal Protection Act, also result in requirements for conservation and management measures for both recreational and commercial sectors.

Permitting and Effort Controls

- The U.S. swordfish fishery is quota-managed and the pelagic longline fishery is operated under a limited access permit program. No new permits are issued for pelagic longline vessels. Limited access permits can be transferred between vessels.
- Six types of commercial swordfish permits are available to fishermen: directed swordfish; swordfish handgear; incidental swordfish; swordfish general commercial; commercial Caribbean small boat; and incidental HMS squid trawl. Swordfish may be harvested only with gears authorized under each permit type.
- Swordfish vessel permit holders may only sell to permitted swordfish dealers. Atlantic swordfish dealers must obtain an Atlantic swordfish dealer permit to receive, purchase, trade for, or barter for Atlantic swordfish from a vessel. Dealers importing and/or exporting swordfish must obtain an International Fisheries Trade Permit.

Minimum Size and Landing Requirements

The minimum size of swordfish that can be landed under any HMS permit is 119 cm (47 in.) lower jaw fork length (LJFL) or 63cm (25 in.) from the cleithrum to caudal keel (CK). Swordfish must be kept whole or in dressed form (a headed/gutted fish with some or all fins removed). A swordfish may not be filleted or cut into pieces at sea. Dressed swordfish are measured using CK and whole swordfish are measured using LJFL.

Gear Authorization

Specific primary fishing gears are authorized for use under different permits.

Swordfish Directed – longline and handgear

Swordfish Handgear - handline, buoy gear, rod and reel, harpoon, and bandit gear

Swordfish Incidental – longline and handgear (except buoy gear)

Swordfish General Commercial - handline, rod and reel, harpoon, bandit gear, and greenstick

Incidental HMS Squid Trawl - trawl gear (75 percent of the overall catch must be squid)

HMS Angling and Charter Headboat permits - rod and reel, handline

Retention Limits

Specific retention limits apply for different permits.

Swordfish Directed and Swordfish Handgear permits – no limit when fishery is open; 15, 2, and 0 swordfish per trip for pelagic longline, handgear, and harpoon fisheries, respectively, when fishery is closed.

Swordfish Incidental – 30 per trip

Swordfish General Commercial – default of 18 per trip depending on region

HMS Charter/Headboat on commercial, non-for-hire trip – default of 18 per trip depending on region

Commercial Caribbean Small Boat – default of 18 per trip

Incidental HMS Squid Trawl - 15 per trip

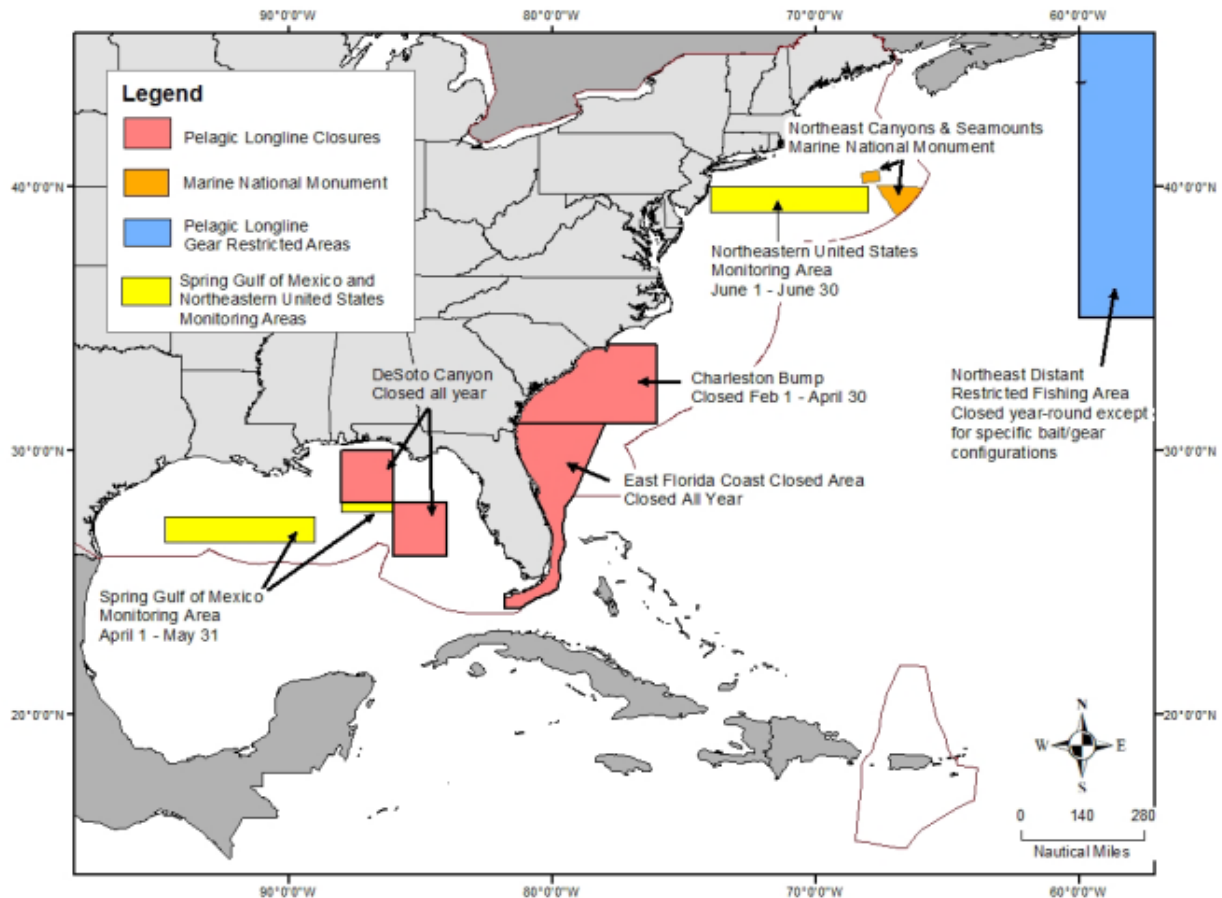
HMS Angling - 1 per person up to 4 per trip

HMS Charter/Headboat - 1 per paying passenger up to 6 (charter) and 15 (headboat) per trip

Time & Area Closures/Gear Restricted Areas

Three areas in the Gulf of Mexico are closed to all HMS gear to protect spawning aggregations of gag grouper (*Mycteroperca microlepis*) (Madison-Swanson and Steamboat Lumps closed areas, and the Edges 40 Fathom Contour closed area). Several time/area closures pertain specifically to pelagic longline gear to protect undersized swordfish and to minimize the bycatch of other HMS and protected species. These include the Florida East Coast closed area, the Charleston Bump closed area, and the DeSoto Canyon closed area. Only 18/0 gauge circle hooks and specified baits may be deployed by pelagic longline vessels in the NED Gear Restricted Area. Two pelagic longline gear restricted areas were implemented in 2015 to reduce interactions with bluefin tuna: the Cape Hatteras Gear Restricted Area and the Spring Gulf of Mexico Gear Restricted Areas; subsequently, in 2020, the Cape Hatteras Gear Restricted Area was eliminated and the Spring Gulf of Mexico area was converted to a monitoring area. In 2020, the former Northeastern United States closed area was also converted to a monitoring area. Recently, the monitoring period for these two areas has concluded and the areas remain open to fishing. Please see Figure 1 below for a chart of the major HMS closed areas.

Figure 1. Time/area closures, gear restricted areas, and monitoring areas that limit use of pelagic longline gear in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea



In addition to closures implemented under fishery management authorities, the United States also designates marine national monuments. In 2021, commercial fishing for HMS was prohibited in the Northeast Canyons and Seamounts Marine National Monument (shown in Figure 1).

Reporting Requirements

Logbook reporting is mandatory for all limited access swordfish permit holders. A selected number of fishermen must also complete a cost-earnings section of the HMS logbooks to provide socio-economic information.

Swordfish dealer permit holders must submit weekly electronic dealer reports on all HMS they purchase. “Negative reports” are required when no purchases are made. This program includes additional “first receiver” rules, which require that the first individuals to receive product from fishermen have a dealer permit and report in the electronic dealer system.

A combination of generalized surveys covering all species and more specialized census data collection programs focused specifically on HMS are required of recreational permit holders. All non-tournament recreational landings of swordfish and billfish must be reported within 24 hours by telephone, online, or catch card in some states by the permitted owner of the vessel landing the fish. Tournament operators are required to report the results of their tournament to NMFS.

Monitoring & Reporting

U.S. Atlantic pelagic longline vessels are required to have type-approved VMS units installed and operating 24 hours a day, 7 days a week.

The U.S. observer coverage goal is eight percent of all sets in each area/quarter stratum. In recent years, coverage levels have been approximately 10-15 percent of vessels, based on the fishing effort of the fleet (NMFS 2021). If the U.S. Observer Program coordinator sends a letter to fishermen notifying them that they have been selected to carry an observer aboard their vessel, the fishermen must inform NMFS when they will be taking a trip and a NMFS observer must be onboard in order for that vessel to go fishing. For additional information, please refer to the report on domestic observer programs submitted by the United States pursuant to ICCAT Recommendation 16-14.

An owner or operator of a commercial vessel permitted or required to be permitted in the Atlantic Tunas Longline category and that has pelagic longline gear on board that vessel is required to have installed, operate, and maintain an electronic monitoring system (EMS) on the vessel. The United States submitted an information paper to ICCAT on its EMS, most recently at the EMS Working Group meeting in February 2022. See document EMS-03/2022 from that meeting for more information.

Bycatch Reduction

The United States has taken numerous actions since 1999 designed to reduce interactions with non-target species, undersized fish, and protected species such as sea turtles and marine mammals. Some of these actions include time/area closures, gear restrictions (including hooks, baits, gangion length, and a maximum length for longlines in certain areas), and requiring that all swordfish directed or incidental permit holders using longline gear attend Protected Species Safe Handling, Release and Identification Workshops. At least one operator onboard these vessels, if different from the permit holder, must also attend the workshop.

Enforcement of Swordfish Regulations

U.S. Atlantic enforcement for ICCAT-managed species is undertaken by the NOAA Office of Law Enforcement (OLE), the U.S. Coast Guard, and, pursuant to cooperative enforcement agreements, by States and territories with maritime boundaries in the Atlantic Ocean, Gulf of Mexico, and/or Caribbean Sea. At-sea boarding and inspection activities monitor for compliance with gear requirements, bycatch, and size restrictions. Enforcement activities also include monitoring and inspecting offloads at landing facilities and marinas in conjunction with dealer record checks and significant recordkeeping and reporting requirements. Enforcement of pelagic longline time/area closures is accomplished by monitoring VMS signals as well as at-sea enforcement patrols.

NOAA administers or is developing several monitoring programs to ensure that fisheries products entering the U.S. marketplace are harvested in a manner consistent with international agreements and domestic standards and requirements for sustainable fishing and protected species conservation (e.g., permitting of importers and admissibility determination, implementation of the ICCAT statistical document program for swordfish and other import monitoring requirements, including the International Trade Data System). As needed in cases of targeted enforcement, NOAA OLE special agents work in partnership with Customs and Border Protection officials to address importation violations concerning swordfish.

NOAA OLE has implemented enhanced procedures for handling referrals of International Fisheries Trade Permit violations by the NMFS trade monitoring program for swordfish. NMFS swordfish trade monitoring staff perform routine monitoring for dealer compliance regarding permitting and required reporting. NOAA OLE works closely with trade monitoring staff and the NOAA Office of General Counsel to take appropriate enforcement action, as needed, to ensure compliance.

Appendix II: Social and Economic Considerations

The U.S. commercial swordfish fishery supports a high-value processing and trade (domestic and international) sector worth millions of dollars. Valuable tuna species are also caught in conjunction with swordfish, thereby increasing the value of these important multispecies fisheries. The U.S. swordfish fishery provides significant social and economic benefits to coastal communities by supporting both commercial and recreational fishermen, dealers, and shore-based businesses (e.g., mechanics, marinas, boat builders, gear manufacturers, electricians, bait and tackle shops, fuel suppliers, hotels, and restaurants). An Atlantic HMS recreational angler expenditure survey conducted in 2016 found that anglers took over 68,000 fishing trips and spent \$46.7 million (Hutt and Silva 2019). These expenditures generated approximately \$103 million in economic output, \$30.5 million in household income, and \$54.8 million in value-added impacts. These expenditures also supported 577 full-time jobs from Maine to Texas in 2016. At the national level, anglers took approximately 188.1 million saltwater fishing trips across the United States in 2019 (NMFS 2022). Recreational fishing activities supported 553,499 jobs across the United States in 2019 and generated about \$89.3 billion in sales impacts, \$30.0 billion in income impacts, and \$50.1 billion in value-added impacts. Expenditures for fishing trips and durable goods equipment in the United States totaled \$45 billion.

In 2019, the U.S. seafood industry (Atlantic and Pacific, including harvesters, processors, dealers, wholesalers and distributors, importers, and retailers) supported approximately 1.2 million full- and part-time jobs and generated \$165.5 billion in sales impacts, \$43.4 billion in income impacts, and \$67.6 billion in value-added impacts (NMFS 2022). Commercial fishermen in the United States harvested 9.4 billion pounds of finfish and shellfish in 2019, earning \$5.6 billion for their catch.

The commercial U.S. swordfish fleet is composed of both distant water ships that follow the swordfish through its migration, and ships that target swordfish as they become seasonally available in specific regions. As of August 2022, there are 210 pelagic longline vessels that are licensed to fish for Atlantic swordfish. For various reasons, not all licensed vessels are authorized to fish in the fishery each year. The U.S. Atlantic distant water fleet, which is based out of ports from Puerto Rico to Maine, covers the western North Atlantic. Some large vessels fishing in distant waters operate out of Mid-Atlantic and New England ports during the summer and fall months targeting swordfish and tunas, and then move to Caribbean ports during the winter and spring months. Some of the current distant water vessels were among the early participants in the U.S. directed Atlantic commercial swordfish fishery. These large vessels, with greater ranges and capacities than coastal fishing vessels, enabled the United States to become a significant participant in the North Atlantic swordfish fishery.

Landings of swordfish tend to vary regionally but have increased in southern communities. These time/area closures resulted in reduced U.S. North Atlantic swordfish landings and contributed to the North Atlantic swordfish stock being rebuilt ($B/B_{MSY} = 0.99$) in 2006, four years ahead of schedule. U.S. communities with the highest commercial landings of swordfish have included: Dulac, LA; Wanchese, NC; Beaufort, NC; Barnegat Light, NJ; New Bedford, MA; Ft. Pierce, FL; Wadmalaw Island, SC; and San Juan, PR. Significant commercial and recreational swordfish fisheries also occur along the east coast of Florida including Pompano Beach and Islamorada (MRAG Americas Inc., 2008).

Many coastal communities are invested in recreational fishing through the charter/headboat industry and supporting businesses. In addition, recreational swordfish tournaments provide a significant economic benefit and marketing device to many coastal communities, especially in southeastern Florida, and have increased in popularity as the stock has recovered. From 2016 through 2021, between 68 and 81 tournaments targeting swordfish in the United States were registered for each year (NMFS 2021). These tournaments can generate a substantial amount of money for surrounding communities and local businesses, including through related tourism. An Atlantic HMS tournament economic study found that 2016 tournament fishing trips generated \$37.5 million in expenditures, minus registration fees (Hutt and Silva 2019). Those expenditures in turn generated economic contributions of \$84.7 million in total output, \$46 million in value-added impacts, \$30.5 million in income, and 532 jobs.