KEEPING A CENTURY-OLD FISHERY ALIVE

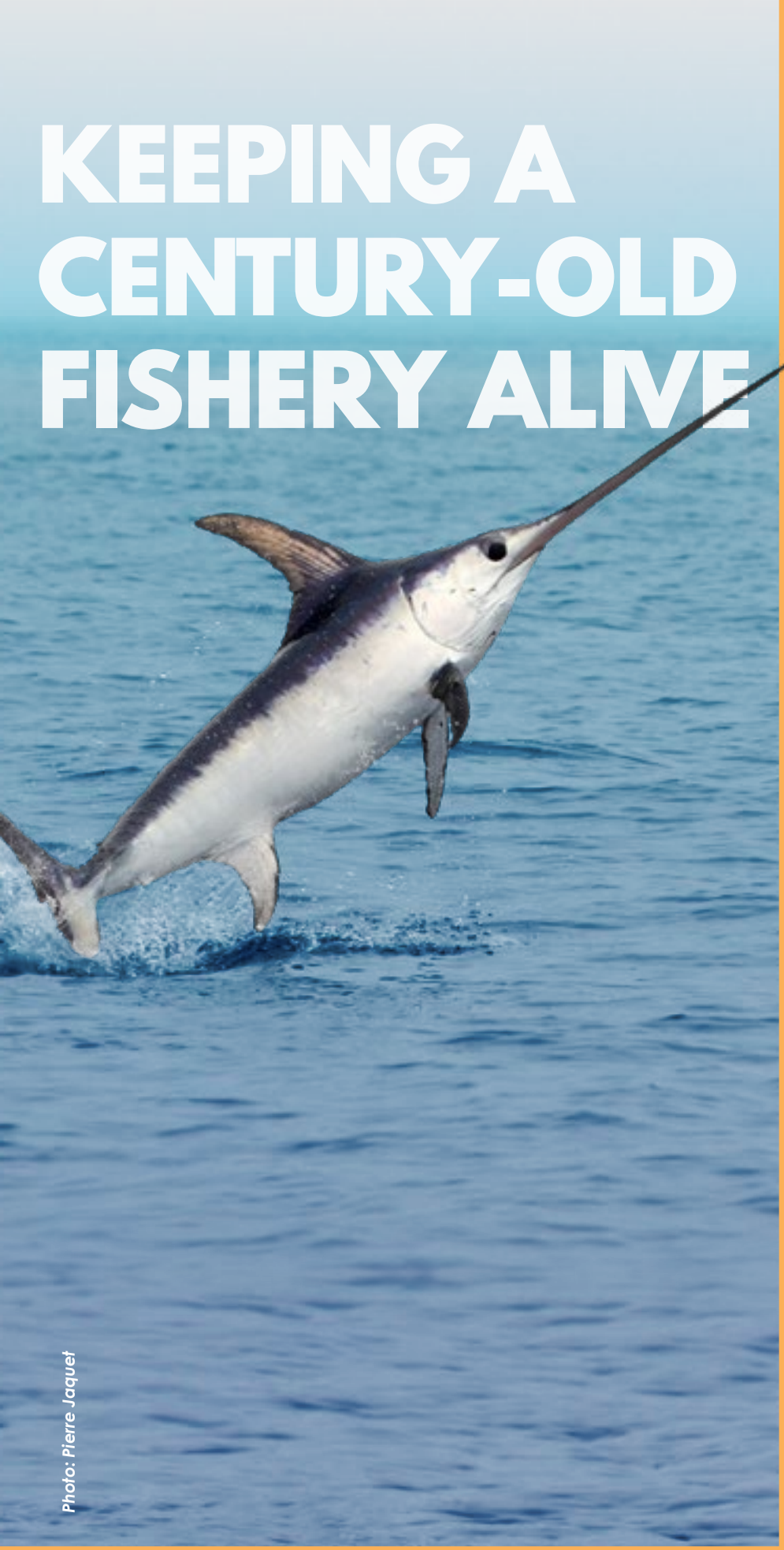


Photo: Pierre Jaquet

The swordfish harpoon fleet is one of the oldest, most storied, and sustainable fisheries in Atlantic Canada. It was once a highly successful fishery. However, changing ocean conditions have made swordfish basking at the surface where they can be seen and harpooned, increasingly hard to find. Fishers are leaving much of their small quota in the water, making it harder for this sustainable fishing method to be a viable economic endeavor.

To adapt to these unpredictable conditions, this proactive fleet has proposed the addition of a new gear type to their licence, rod and reel gear, which uses a single deep-water hook and line and is a selective and low-impact gear method. This helps them access fish when harpooning is not possible and could enable some fishers to offer charter trips in the future.

A charter operation would allow fishers to increase revenue, value-add to their catches and stay in business while remaining within their quota. Swordfish fishing charters, led by licenced commercial fishers would provide tourists from around the world a thrilling, once-in-a-lifetime experience, fishing for one of the most unique species in our region.

Decision makers need to prioritise approval of rod and reel gear for this fleet and enabling policy for new charter fishing business opportunities. Flexibility to adapt and innovate in face of changing oceans will help maintain sustainable, local seafood jobs and food sources and provide wider economic benefits for coastal communities in the blue economy of the future.

The EAC is working to support this storied and clean fishery create value-adding options and adapt to changing ocean conditions and low catches. Together, the fleet and EAC are undertaking rod and reel gear trials, community surveys to better understand the support for sportfishing charters, and economic analysis on value-add options as well as investigating the regulatory landscape and improvements needed.

Key findings

Due to the high cost of operation, low catches, reduced market prices and travel time of this fishery, value-adding opportunities can help ensure that this fishery once again thrives and helps to support our rural coastal communities across Nova Scotia. The addition of a charter component of this fishery would enable licenced commercial swordfish fishers to offer sportfishing trips, in addition to their commercial operation without increasing their quota. Two years of rod and reel gear trials shows promise for increasing catch and maintaining the low rates of bycatch in the fishery.

- **Community survey results show clear support (89%) for the development of a charter fishery for swordfish across the province.**
- **If a commercial fisher were to host just three five-day trips in a season for two passengers at a time, they could generate $61,000 (45000 USD) in additional revenue to their commercial operations.**
- **Community survey results show that 89% of respondents would expect to see benefits from a swordfish charter fishery.**
- **Regulatory barriers specifically licensing under the Department of Fisheries and Oceans Canada (DFO) and Transport Canada requirements, present a challenge to get this venture up and running.**

Recommendations

To support this historic and sustainable fishery in adapting to low catches and changing ocean conditions DFO and Transport Canada should:

1. **Add the option to fish with rod and reel gear to all 184 'A' licence holders in the harpoon fishery.**
2. **Create enabling policy and regulations to allow swordfish charter licences for interested harpoon fleet members.**
3. **Create a fit for purpose program under Transport Canada to help support and guide fishers through the process of meeting requirements for vessels of the harpoon fleet size class to carry passengers for charter operations. This could be similar to the 'blue decal' program which exists for smaller charter vessels.**
4. **Create a joint DFO and Transport Canada working group tasked with drafting enabling policies and regulations to accelerate the creation of harpoon/rod and reel swordfish charter fishing opportunities. The working group should include all interested Rightsholders, and stakeholders, including NGOs and researchers with expertise.**

Photo: Sebastián Pardo

Swordfish fishing in Canada

The first records of the swordfish Harpoon fishery are from 1903, with the first landings recorded in 1909. At that time, handheld harpoons were the dominant way to catch swordfish. It was mostly small boats fishing off Cape Breton Island. Large fish were abundant, catches were high, and many fishers were able to make a good living off the fishery. Records indicate that from 1909-1959 more than half of Canadian landings of swordfish were in Cape Breton, with vessels from other communities like Yarmouth and Sambro travelling to Cape Breton to participate in the fishery along with locals. Today, most swordfish fishing occurs offshore near the continental shelf.

A pivotal moment in the fishery came with the introduction of pelagic longlining in 1962. This high-impact and very efficient fishing method quickly became Atlantic Canada's dominant swordfish fishing gear. With this shift came increased catches including of female and juvenile fish. Fishers became concerned about the trajectory of the harpoon fishery and about the population.[1] In the early 1990s, population assessments showed that the swordfish population was overfished, believed to be largely a result of longlining efforts, prompting both federal and international management decisions to support recovery. By 2006 the population was no longer overfished.[2]

Another important moment for swordfish fishing in Atlantic Canada came in 2000, when DFO split the total allowable catch (TAC) of the species between the swordfish harpoon fleet and the longline fleet. Despite representing many more licence holders, the harpoon fleet was allocated only 10% of the overall quota while the longline fleet captured 90% of the quota cementing their dominance in the fishery. This division of Canadian catches remains today.[3]

The Ecology Action Centre (EAC) works to keep low-impact, small-scale fisheries, like the swordfish harpoon fleet, that are the heart of rural, coastal communities on the water. The EAC has worked with this fleet since the early 2000's and voiced our support at decision making tables over the years. Our report 'Decline of the Cape Breton swordfish fishery' gathered stories and perspectives on the decline of this once abundant fishery. Comments from several respondents made it clear that this transition into longlining did not sit well with them and took away from the culture of the fishery. One even said, 'longlining took the good out of swordfishing' and over 20 years later the longline fishery continues to dominate the Canadian fishery.

MARKET ACCESS AND CHALLENGES

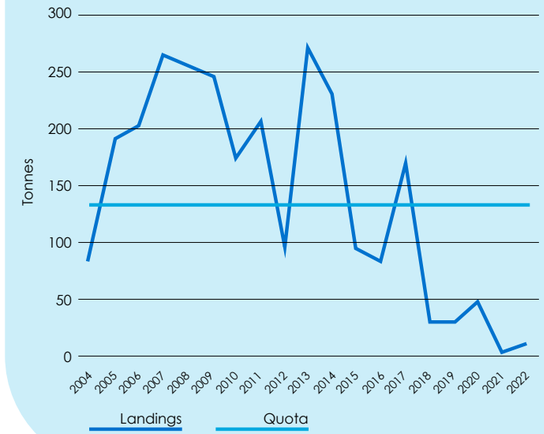
In 2010, the fleet became the first swordfish fleet to gain certification under the Marine Stewardship Council (MSC) ecolabel, which gave the fleet an advantage in the marketplace. Through our SeaChoice program, the EAC was pivotal in gaining recognition for this unique fleet in the marketplace and securing a deal for the fleet as the sole supplier of swordfish to Whole Foods. Unfortunately, despite objections from stakeholders the MSC also certified the pelagic longline swordfish fleet a couple years later, thus the harpoon fleet lost their market advantage as the sole ecolabled swordfish from Canada.

Market challenges combined with changing ocean conditions and low catches have resulted in the fleet struggling to stay economically viable for the last several years.

The EAC and the fleet continue to work together to meet these challenges, to adapt and to find new opportunities for this unique, sustainable, and storied fleet.

FIGURE 1

Canadian base quota and landings of swordfish by handheld harpoon from 2004 to 2022



[1] *Fitzgerald. 2000. The Decline of the Cape Breton swordfish fishery: An Exploration of the Past and Recommendations for the Future of the Nova Scotia Fishery.*
[2] *J. Franceschini. 2021. How Decision-Making in Fisheries Management Contributes to Changes in the Fishery: A case Study of North Atlantic swordfish.*
[3] *Department of Fisheries and Oceans Canada. 2016. Canadian Atlantic swordfish and other tunas. https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/swordfish-espadon/NEW-swordfish-2013-espado-eng.html*

Swordfish *(Xiphias gladius) is a large pelagic species. They can* ***weigh up to 1,165 pounds and live around 9 years,*** *with females reproducing around the age of 4-5 years.*

Swordfish are found ***in Canadian waters from spring to fall,*** *mainly near the edge of the Scotian Shelf and Grand Banks of Newfoundland.*

Swordfish ***consume a wide variety of fish, invertebrates, and cephalopods,*** *such as squid, and often follow a daily migration pattern in the water column,* ***hunting in deeper water and basking near the surface*** *to regulate their body temperatures.*[4]

The daily migration pattern of swordfish in the water column makes the ***combination of harpoon and deep-water rod and reel ideal*** *to capture swordfish around the clock.*[5]

Swordfish management

Swordfish in the North Atlantic are managed internationally and domestically as they are considered a highly migratory population, shared by many countries.

At the international level, the International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for assessing the populations and for making management decisions, such as the total allowable catch (TAC) for all countries, and how that catch will be allocated to each fishing nation. The current TAC for the population is 13,200 tonnes, with Canada being allocated 1348 tonnes.[6]

Domestically, DFO is responsible for licensing commercial fishers, and for allocating the Canadian quota to different fleets that directly target swordfish or that encounter them as bycatch while fishing for other fish. For the swordfish harpoon fleet licences are divided into A and B licences. The harpoon fleet is allocated 10%, or 138.4 tonnes of Canada swordfish catches per year.[7]

What is harpooning?

Harpooners hand "stick" the swordfish after they are spotted at the surface, typically in the summer months. Harpooning is considered the most sustainable way to catch swordfish as there is no bycatch of other animals and little ecosystem impact.

What is pelagic longline?

Pelagic longline fishing suspends a line with thousands of baited hooks that stretches 30-50 kilometers across the water and drifts for 6-8 hours before being hauled in. This method is not as selective because it catches not only swordfish but many other species some of which are kept and others thrown back injured or dead, including endangered sharks and sea turtles.

What is rod and reel?

Rod and reel fishing uses a single hook and single line on a fishing rod with either an electric or manual reel. In the Canadian fishery, hooks are set deep (~200 fathoms) in the water column where the swordfish are hunting. The gear is very selective with few catches of other species.

[4] NOAA Fisheries. 2023. North Atlantic swordfish. https://www.fisheries.noaa.gov/species/north-atlantic-swordfish#:~:text=Swordfish%20live%20about%209%20years,tropical%20and%20sub%2Dtropical%20waters.
[5] Department of Fisheries and Oceans Canada. 2016. Canadian Atlantic swordfish and other tunas. https://www.dfo-mpo.gc.ca/fisheries-peches/ifmp-gmp/swordfish-espadon/NEW-swordfish-2013-espado-eng.html
[6] ICCAT. 2023. Report for the biennial period, 2022-2023, Part 1 (2022), Vol.1
[7] ICCAT. 2022. Canada's Swordfish Fishery Management Plan: 2022. PA4_801_ANN_1/2022.

Adapting a fleet for changing oceans: testing new low-impact gear

The first step toward future proofing this fishery is to assess the feasibility of using deep-water, single hook and line, rod and reel gear in addition to harpoon gear onboard the harpoon fleet boats. Rod and reel gear allows fishers access to deep waters where swordfish are often found and to fish during conditions which are not suitable for harpooning like during turbulent seas or poor visibility. Given how far offshore this fishery takes place and the cost involved in getting to the fishing grounds, adding another low-impact gear option to fish with will help ensure the fleet can catch their allotted quota and increase the economic viability of the fleet.

Permitting the use of rod and reel gear also means the fleet could build sportfishing charter business opportunities. Sportfishing is popular in Atlantic Canada, and there are many successful sportfishing businesses in the region like the charters for bluefin tuna that have successfully increased their revenue by bringing tourists aboard. The addition of a charter component of this fishery would enable licenced commercial swordfish fishers to offer sportfishing trips in addition to their commercial operation without increasing their quota.

Photo: Sebastián Pardo

ROD AND REEL GEAR TRIALS

The EAC and the harpoon fleet have collaborated on a multiyear trial of deep-water rod and reel gear. Successful trials were completed in 2022 and 2023 and continue in 2024. The trials aim to:

- Demonstrate successful catch of swordfish with rod and reel gear using the harpoon vessels and crew.
- Document any other species caught unintentionally.
- If needed, identify means of avoiding and ensuring survival of any bycatch that may occur.

The first two years of gear trials show promise. Swordfish were successfully caught by rod and reel during times when harpooning was not possible due to poor visibility, sea state, or no swordfish basking at the surface. The only bycatch of other species was four white hake, which were released. **This offers early indications that there is little concern of unintended catch of other commercially valuable large pelagic species, like tunas.**

There is a learning curve to using a new gear type and targeting a species effectively. The first two seasons gave fishers the opportunity to learn how to properly set up and use the gear on their vessels and troubleshoot challenges. Fishing technique and success improved over time. Season three of the gear trial will gather more data and continue to evaluate the feasibility of this gear type for the harpoon fleet.

VIDEO MONITORING

Another great aspect of this collaborative work is the use of video monitoring technology on all rod and reel trial trips. Video monitoring has been central to the discussion on improving our fisheries monitoring in Canada and internationally. This technology, when used in combination with existing monitoring tools enables the capture of verifiable fisheries catch data, could supplement at-sea observers and help improve consistency of fisher logbook data.

To date, 100% of trial trips have been fully equipped with video monitoring allowing us to collaboratively verify all trial data and share the data with DFO Science and Management staff. Existing on-board security cameras which are already set-up to capture high-quality video recordings of the area where fishing takes place are being used for recording the catch data. EAC has reviewed all recordings to compare them with the logbook data and to evaluate image quality and angle. The fleet owns all the data and agrees to share with DFO for the science trial. **This is a great example of a simple, cost-efficient set-up that could be implemented more widely.**

Community survey: perceptions, benefits, and challenges for swordfish charters

The EAC conducted surveys in Nova Scotian coastal communities where harpooning is still active along the South Shore, Cape Breton, and Halifax Region to gain insight from local fishers, business owners, tourism operators, and community members on the potential for and challenges of establishing charter fishing for swordfish.

Pursuing charter fishing as an additional income source is of interest to harpoon swordfish vessel owners and other business people in their communities who see potential tourism income for their regions.

The surveys included 7 demographic questions and 9 questions on swordfish charters. The surveys were conducted in-person, over the phone or online through a Microsoft form from July to September 2023. There were 19 surveys completed.

The results show a clear interest from industry in exploring opportunities for charter fishing and reinforce the need to address the regulatory barriers that currently limit the ability to establish charter fishing for these vessels. There is the potential for benefits not only to the fishing industry directly through this value-adding option for their catch, but also for their rural coastal communities.

WHAT IS CHARTER FISHING?

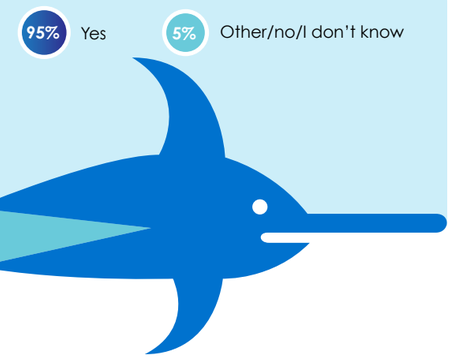
For the purposes of this report, we consider charter fishing as a paid guided fishing trip, with a commercial fisher and where catches can be sold commercially. While some charter fishing operations are catch and release, a swordfish charter would retain catches.

SUPPORT FOR SWORDFISH FISHING CHARTERS

When asked about their support for commercial fishers offering swordfish fishing charters, 95% (18) of respondents said that they would support having swordfish charters operating in their community and across Nova Scotia (Figure 2).

FIGURE 2

Would you support having swordfish fishing charter business operating in your community and more widely in Nova Scotia?



*"[I] don't think there would be barriers, [fishers] can take anyone out on the boat, but **it becomes an issue when you are accepting payment from the person."***

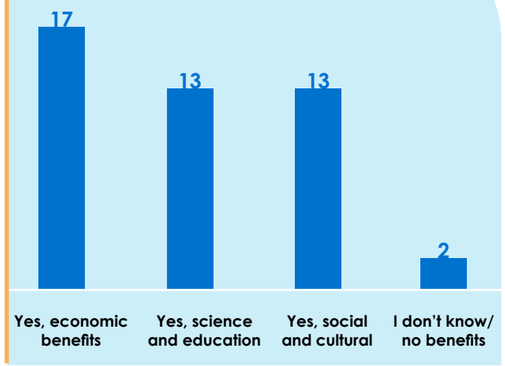
— ANONYMOUS RESPONDENT

POTENTIAL BENEFITS OF SWORDFISH CHARTER OPERATIONS IN NOVA SCOTIA

We asked respondents if they see swordfish charter fishing having benefits to their community or their industry. Seventeen respondents (89%) said they would expect to see benefits. Of those, all 17 (100%) respondents expect economic benefits, 13 (76%) expect both science/education and social/cultural benefits while the remaining 2 (11%) respondents were not sure or did not expect benefits (Figure 3).

FIGURE 3

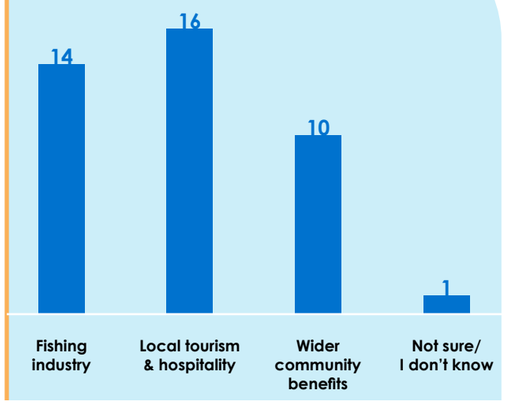
Do you see a swordfish charter fishery having benefits to your community/industry?



When asked where benefits would be expected, 16 (94%) respondents expect the local tourism industry to benefit, 14 (82%) expect benefits to the fishing industry and 10 (59%) expect wider community benefits (Figure 4).

FIGURE 4

Which areas/industries do you think swordfish charter businesses would have benefits to?



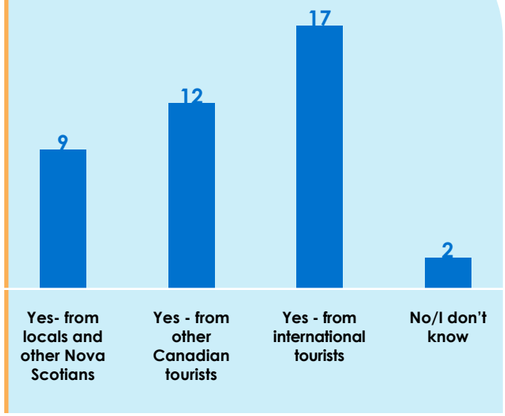
PERCEPTIONS OF DEMAND FOR SWORDFISH CHARTERS

Charter fishing for swordfish in Nova Scotia would most likely be multi-day trips onboard a vessel since the swordfish are typically found offshore. While these types of charter and sportfishing trips are popular in the eastern U.S., charter fishing in Nova Scotia for tuna, shark, and other fish are typically day trips. To operate a successful charter business, a market interest must be exist or be built for such multi-day fishing experiences.

When asked if they believe that there could be a market for this type of experience, 17 (89%) respondents said they think there would be demand. Of those, all 17 (100%) thought international tourists would be interested, with 12 (71%) respondents thinking Canadian and 9 (53%) local or Nova Scotian customers would be interested (Figure 5). **This shows that it will likely be important for fishers interested in starting a charter fishing business to have a strong business plan and marketing that can cater to international sport fishers. It also means that any licensing options must permit international tourists to access what could be the primary market for these trips.**

FIGURE 5

Do you think there is or would be demand for a swordfish fishing charter operation in your community?



"Sky is the limit. It really depends on how much you are going to be catching. International people account for a lot of folks that visit the [National] park and ***there will be interest as long as it is promoted,*** *and we get the ball rolling'*

— ANONYMOUS RESPONDENT

BARRIERS TO DEVELOPING SWORDFISH CHARTERS

Respondents were asked which barriers they think are preventing the development of a swordfish charter fishery, specifically economic, regulatory, market and/or logistical barriers. Fifteen respondents (79%) indicated that there are regulatory barriers that are preventing charter fishing development. Twelve (63%) cited logistical barriers, 6 (32%) identified economic barriers and 3 (16%) thought there could be market barriers (Figure 6).

There were several additional barriers discussed including weather, liability insurance costs, additional safety courses required, potential processing and selling catches to tourists.

The regulatory barriers of most concern for those in the fishery were identified as licensing requirements under DFO and Transport Canada vessel requirements for carrying passengers. One respondent suggested that information sessions to help fishers navigate the process would be of use.

FIGURE 6

What barriers do you think are preventing the development of a swordfish charter operation and/or what changes need to happen to move the operation forward?

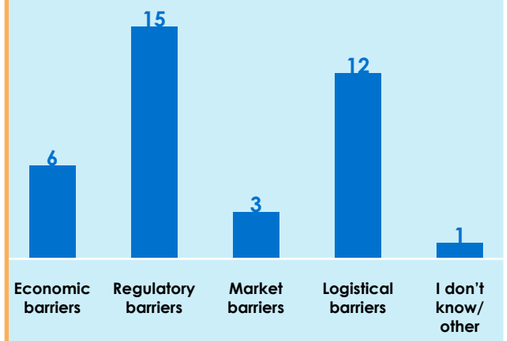


Photo: Sebastian Pardo

Potential economic benefits and revenue of charter fishing

The EAC assessed the potential returns to the current Nova Scotia swordfish harpoon fishery from adding a charter fishery using both harpoon and rod and reel gears. These potential returns are compared to the current landed value of swordfish in the fishery.

The analysis utilised a list of similar charter businesses in North America, and their pricing information. To estimate potential revenue captured from charter trips, a total of 57 businesses operating in the USA who offer either swordfish or large pelagic species charters were researched in addition to 12 tuna charter companies operating in Nova Scotia and Prince Edward Island, Canada.[8]

Based on this extensive research on charter pricing and businesses, the average daily rate per paying customer used in our analysis was $2048 CAD (1492 USD). This average daily rate per person was applied to the parameters of an example trip structure for the swordfish fishery. Because Nova Scotia's swordfish harpoon fishery operates along the continental shelf, several hours of travel offshore, these trips would be a unique offering, and likely be multi-day. **The rate charged for a five-day trip Nova Scotia swordfish chart trip, per paying customer could be up to $10000 (7500 USD), with most vessels able to accommodate 2-6 passengers per trip.**

In 2021, the 9[9] active licence holders in the swordfish harpoon fishery caught just 7.4 tonnes of their 134.8 tonne quota (Figure 1) of swordfish, with a landed value of $9.82/kg[10] and overall landed value of $72, 668.[11] If just those 9 licence holders participated, they could generate an additional $550,000, increasing their revenue eight-fold.

If a commercial fisher hosted just three five-day trips in a season for two passengers at a time, they could generate $61,000 (45000 USD) in additional revenue to their commercial operations.

There are currently 184 Harpoon A licence holders in Maritimes region of DFO, although many have not participated in the fishery in recent years. **If just 25% of those (46) licence holders chose to operate charter operations, that could generate over $2.5 million (2.0 million USD) in additional revenue across the fleet.[12]**

BENEFITS TO COMMUNITIES

Wider economic benefits to the community may be possible in addition to the revenue generated directly for the vessel owner through charters. Spending by charter fishing customers in the wider community would include accommodations, transportation to and from the airport and fishing port, dining in local restaurants, and purchase of merchandise before and after fishing trips, for example.

Additionally, tapping into tourism provides the opportunity to increase visibility and education for these communities and for the fishery.

CASE STUDY

POTENTIAL PROFIT FOR A 5-DAY CHARTER TRIP

For a five-day trip, having just one charter passenger aboard has the potential to cover operating costs, and make a profit, even with low catches.

Table 1. Example of costs and profit for to host a 2-person, 5-day swordfish charter trip. *

Item	Cost (CAD)
Ice (4 tonnes)	-500.00
Fuel	-1200.00
Food and provisions – 3 crew	-800.00
Food and provisions – 2 charter passengers	-800.00
Monitoring	-140.00
Total expenses	**-3440.00**
Potential revenue from 2 charter passengers	20,000
Estimated revenue for two 70kg swordfish with 2021 landed value	1375
Total profit	**17935**

*This case study utilises cost estimates from one vessel owner participating in the gear trial and harpoon commercial fishing, insurance is not included. Note, typically crew are paid via percentage-based profit sharing which can vary by crew and trip and are not included in this example.

[8] All pricing information used for this analysis are from 2022 and 2023.
[9] ICCAT. 2022. Canada's Swordfish Fishery Management Plan: 2022. PA4_801_ANN_1/2022.
[10] Data used for this calculation from - https://www.dfo-mpo.gc.ca/stats/commercial/land-debarq/sea-maritimes/s2021pq-eng.htm.
[11] Data used for this calculation from - https://www.dfo-mpo.gc.ca/stats/commercial/land-debarq/sea-maritimes/s2021pv-eng.htm.
[12] This does not account for cost to operate and is therefore reflective of revenue only and not overall profits.
[13] All quotes in this section are from surveys completed in 2023.

Overcoming regulatory barriers

Two primary regulatory barriers for swordfish charter fishing are; complicated management and licencing approvals under DFO and onerous vessel requirements for carrying passengers under Transport Canada.

There is little clarity on the details of how this fleet, or even an individual fisher would navigate the regulatory process to establish charters and information is not easily accessible. Despite stated support for charter endeavours as an economic opportunity, there appears to be a lack of communication between DFO and Transport Canada and little agreement on how to navigate a path forward that harmonises and simplifies processes and paperwork.

Under the current regulatory framework, there are two main avenues that would permit paying passengers to participate in a charter fishing trip, under the supervision of a commercial licence holder, and would facilitate catch and retain charters for commercial fishers. However, both would have different requirements under current Transport Canada regulations and neither provide a straightforward option for fishers.

Some available options would limit international tourists from being able to take part in these trips, while others would require costly and time-consuming upgrades to their vessels under Transport Canada's requirements which group these vessels under the same category as a large passenger ferry, despite having only a handful of passengers onboard.

Unclear requirements, and lack of resources dedicated to a solution have meant repeated conversations at decision-making tables for years with no progress. The fleet and EAC are now proactively working hard to fulfill science and research requirements and plot right-sized, safety conscious policy options for consideration. All the while, this fleet continues to struggle to make harpooning economically viable, and the number of active licence holders continues to dwindle. **Addressing regulatory and licensing barriers under DFO and Transport Canada requirements, should be priority for a government that has committed to a thriving blue economy and new options for coastal communities.**

Photo: Sebastián Pardo

Conclusion

It is critically important to create alternatives and options to adapt for those in the fishing industry when facing challenges like reduced catches due to changing conditions.

Keeping fishers in business through the addition of rod and reel and charters provides not only immediate economic benefits, but keeps a sustainable food source on the market, and has wider benefits to our rural communities.

Although there is interest in these initiatives from this fleet and many stakeholders, there are barriers which will need to be addressed and will take work from relevant federal departments, the fleet, and stakeholders to overcome.

Our vision is to see this skilled and clean swordfish fishery continue and thrive in our province for another century.

Acknowledgements: Thank you to all our survey participants, especially those fishers who welcomed us into their homes and shared stories and memories of swordfish fishing. A massive thank you to Dale Richardson, Wally Lawrence, Kyle Gillespie, Carl MacDonald, Sebastiàn Pardo and Ella Headrick. Your support on this project has been invaluable.

Isnor, H. Callegari, C. and Arnold, S. Keeping a century-old fishery alive. Ecology Action centre, August 2024.

Photo: Sebastian Pardo

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