



# COLLATERAL DAMAGE:

HOW TO REDUCE BYCATCH IN  
CANADA'S COMMERCIAL FISHERIES

 **OCEANA** Protecting the  
World's Oceans

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## TABLE OF CONTENTS

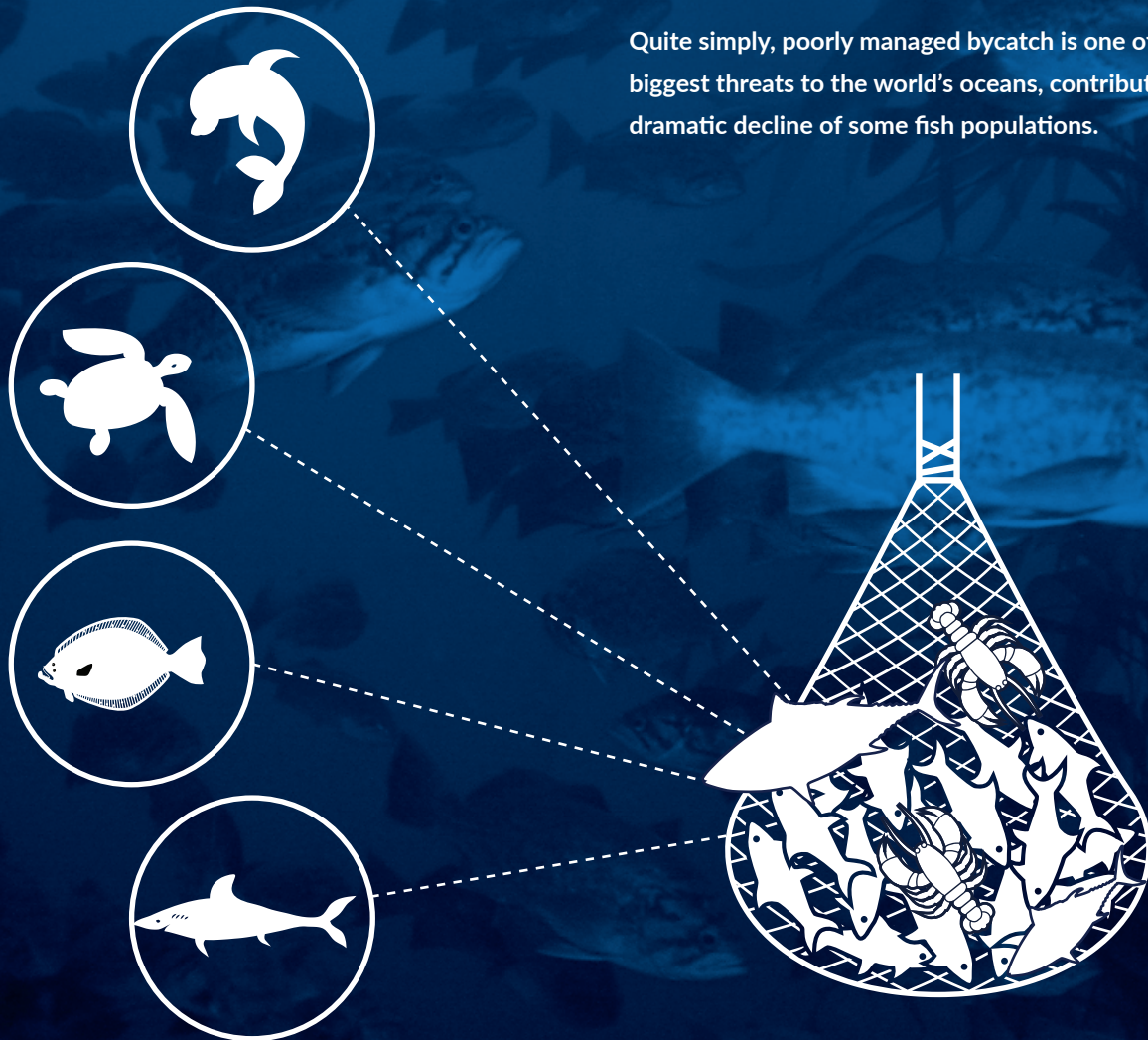
- 01 Executive summary
- 04 Glossary and acronyms
- 05 Bycatch is a global issue
- 06 Harmful gear
- 08 Assessing Canada's bycatch problem
- 10 Key finding: Hundreds of species end up as bycatch
- 13 Key finding: There are big holes in the data
- 16 Key finding: Canada's regulatory approach to reducing bycatch is inadequate
- 17 Methods for monitoring bycatch
- 18 MSC-certified fisheries with the most discards
- 24 What's the solution?
- 25 Recommendations for Fisheries and Oceans Canada
- 27 Conclusions
- 28 Oceana Canada: Saving the oceans to feed the world

# WHAT IS BYCATCH?

Bycatch is collateral damage created by fishing: the non-target fish and ocean wildlife that are captured in nets, lines and other gear set for other targeted species. It may be discarded at sea or brought to port.

Globally, this includes the dolphins that are ensnared to bring you canned tuna, the sea turtles caught to bring you shrimp and the flounder thrown overboard to put seared scallops on the menu. It also includes targeted fish that are too small to harvest and non-target fish with little commercial value.

Quite simply, poorly managed bycatch is one of the biggest threats to the world's oceans, contributing to the dramatic decline of some fish populations.



# EXECUTIVE SUMMARY

Bycatch is one of the biggest threats to ocean health. That's why Oceana Canada set out to assess the scope of the problem – and what Fisheries and Oceans Canada can do to help solve it.

Every year, fisheries around the world unintentionally catch and throw away more than 10.3 million tonnes of sea life: creatures that include fish, shellfish, corals, sponges, marine mammals, seabirds, sharks and sea turtles.<sup>1</sup> It's called bycatch, and it's a problem both ecologically and economically.

The issue is that many commercial fishing methods are not selective, causing species other than those targeted end up in the nets or on the hooks.

Our oceans can't afford this, nor can the people who rely on our fisheries for a living. Globally, bycatch is one of the biggest threats to fish populations and marine ecosystems. Here in Canada, fewer than 25 per cent of Canada's fisheries are currently considered healthy – putting coastal communities and our seafood industry at risk. Meanwhile, many marine species are severely depleted, and some are even facing extinction.<sup>2</sup>

Although no federal laws specifically mention bycatch, Canada has made several international and domestic commitments to sustainable fishing, including the need to address bycatch. The federal government has developed non-binding policies and frameworks intended to address bycatch in Canada's fisheries. To date, however, these policies have been implemented inconsistently, limiting the effectiveness of current approaches.

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<sup>1</sup> Pauly, D. and Zeller, D. (2016). Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. *Nature Communications*, doi: 10.1038/ncomms10244

<sup>2</sup> Baum, J.K. & Fuller, S.D. (2016). *Canada's Marine Fisheries: status, recovery potential and pathways to success*. Toronto, Ontario. Oceana Canada, 154 pp. [www.oceana.ca](http://www.oceana.ca)

On top of this, Canada doesn't collect enough information to understand the full extent of the problem. Fisheries and Oceans Canada does not consistently monitor or report bycatch data, nor has it published any nationwide estimates. And because different fisheries don't track or report bycatch data the same way, it's impossible to assess just how much occurs on a national level or the cumulative impacts of bycatch on marine ecosystems or fish populations.

To understand the big picture and help protect livelihoods in coastal communities, Fisheries and Oceans Canada must develop a robust national catch monitoring policy. This policy should ensure all commercial fisheries use standardized methods to collect and report the non-target species they catch — both what they keep and what they throw back in the ocean.

Oceana Canada set out to estimate the level of bycatch in Canada, based on the only reliable, publically available sources: the assessment reports of fisheries certified by the Marine Stewardship Council (MSC). Because MSC-certified fisheries often represent better-managed fisheries, these figures almost certainly underestimate how much bycatch actually occurs in Canadian fisheries.

# 10.3 M

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**GLOBAL DISCARDED BYCATCH ESTIMATES  
TOTAL MORE THAN 10.3 MILLION TONNES —  
OR 22.7 BILLION POUNDS — PER YEAR.**

And that's worrying, because the data Oceana Canada analyzed revealed that bycatch is significant in Canada, even for MSC-certified fisheries. On average, only 51.6 per cent of what is caught in MSC-certified fisheries is the landed target species, with the rest of the catch made up of other species for which they have quota, or bycatch. Some of the bycatch is kept and some is returned safely to the water, but much is thrown overboard, dead or dying. Indeed, some fisheries throw away almost as much marine life as they keep.

This report highlights six Canadian MSC-certified fisheries that discard large proportions of fish, including species that are endangered, threatened or of special concern.

Given limited data availability and poor catch monitoring, it was impossible for Ocean Canada researchers to accurately assess the full extent of the problem. In many cases, it was only possible to calculate the percentage of the catch in each fishery that is discarded bycatch, making it possible to compare discard rates across different fishing fleets. However, these numbers do not reflect the volume of discarded bycatch, which can bias the interpretation of the results.

Oceana Canada also recognizes that by focusing on MSC-certified fisheries — because these fisheries are the only ones for which data are readily available — this report puts more scrutiny on Canada's better-performing fisheries.

Despite the limitations of this research, one conclusion was clear: with hundreds of species captured — many across multiple fisheries — the cumulative effects of bycatch is a significant problem in Canada that must be addressed.

Research shows that effective monitoring, putting science-based limits on bycatch and using more selective gear can drastically reduce the problem. However, this requires collecting adequate data on bycatch both to determine what limits to set and to evaluate the success of management measures. Specifically, the government of Canada needs to set clear, consistent and transparent standards to monitor and measure bycatch, developed in concert with fishers.

To accomplish this, Oceana Canada is calling on Fisheries and Oceans Canada to release a national plan that:

1. Counts everything that is caught in a fishery, including bycatch species;
2. Caps the amount of bycatch in each fishery using science-based limits;
3. Reduces bycatch with more selective fishing gear, closures and other tools; and
4. Protects overfished populations and species at risk so they can recover.

Bycatch harms ocean wildlife, wastes important food resources and undercuts the long-term economic success of Canada's fisheries. With improved monitoring, consistent reporting and effective management, we can reduce bycatch, contribute to the prosperity of our fisheries, and sustain the health of our oceans.



**“REDUCING BYCATCH  
CREATES HEALTHIER  
OCEANS – AND THAT’S  
GOOD FOR BOTH THE  
PEOPLE WHO RELY  
ON FISHING AND FOR  
CONSERVATION.”**

**– JOSH LAUGHREN, EXECUTIVE DIRECTOR,  
OCEANA CANADA**

# GLOSSARY

**BYCATCH:** All unintentional catch of non-target fish and ocean wildlife.

**CATCH:** All fish that are caught, including targeted fish that are kept, non-targeted fish that are discarded and non-target catch that fishers bring to port.

**DISCARD:** The portion of the catch returned to sea for economic, conservation or legal reasons.

**DISCARD RATE:** A common metric to evaluate bycatch, calculated as the fishery's total discards divided by its total catch. (For example, if a fisher catches a total of five tonnes and discards one of those tonnes, the discard rate is 1/5 or 20 per cent.)

**FISHERY:** A group of fishers or vessels targeting a given species or group of fish using specific types of fishing gear in a specific area.

**GHOST FISHING:** The unintended capture of marine species by fishing gear that has been lost or discarded at sea.

**INTERACTION** When a non-target species gets caught or entangled in fishing gear, but not necessarily landed.

**LANDINGS:** All fish that are brought to port.

**RETAINED BYCATCH:** Non-target fish caught unintentionally but kept rather than discarded.

## ACRONYMS

**CHP – CONSERVATION HARVESTING PLAN:** A harvesting plan, often linked to an IFMP (see below), that specifies management measures to minimize bycatch, such as minimum fish size, catch limits and gear restrictions.

**COSEWIC – COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA:** An independent body of scientific experts from across Canada that assess whether species are at risk, based on the best scientific evidence.

**IFMP – INTEGRATED FISHERIES MANAGEMENT PLAN:** Fisheries and Oceans Canada's primary tool for managing the fishery of a particular species or group of species in a given region.

**SARA – SPECIES AT RISK ACT:** The key piece of federal legislation protecting species in Canada that are endangered, threatened or of special concern.

# BYCATCH IS A GLOBAL ISSUE

## KEEP OR TOSS?

*Using more selective fishing gear can significantly reduce the volume of bycatch. However, commercial fisheries will always catch some non-target species.*

*In some cases, they are allowed to keep these. Commercially valuable non-target species are often weighed and recorded as fisheries landings.<sup>5</sup> Some species are kept as bait for the fishery, although this catch is not always recorded.<sup>6</sup>*

*In other cases, fishers are required to toss bycatch back in the water. Although survival rates for discarded bycatch and the impacts on the ecosystem vary,<sup>7</sup> the ecological impacts can be substantial.<sup>8</sup>*

Around the world, commercial fisheries discard more than 10.3 million tonnes of catch every year.<sup>3</sup>

Discarding large quantities of fish contributes to overfishing and disrupts marine ecosystems. It also prevents populations from recovering after decades of overexploitation. Fisheries managers set quotas to prevent overfishing and rebuild depleted stocks. But when the target of one fishery is discarded as bycatch in a different fishery, the success of these efforts can be compromised. If bycatch levels stay high year after year, overfished populations will not recover and the health of marine ecosystems will continue to decline.

Bycatch doesn't just damage ecosystems — it also hurts economies. In the U.S., \$4.2 billion in marketable seafood is discarded each year because it wasn't the target species. That foregone yield represents 64,021 jobs.<sup>4</sup>

**IF BYCATCH LEVELS STAY HIGH YEAR AFTER YEAR, OVERFISHED POPULATIONS WILL NOT RECOVER AND THE HEALTH OF MARINE ECOSYSTEMS WILL CONTINUE TO DECLINE.**

<sup>3</sup> Pauly, D. and Zeller, D. (2016). Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. *Nature Communications* 7, doi: 10.1038/ncomms10244

<sup>4</sup> Patrick, W.S. and Benaka, L.R. (2013). Estimating the economic impacts of bycatch in U.S. commercial fisheries. *Marine Policy*, 38: 470-475. <http://www.sciencedirect.com/science/article/pii/S0308597X12001674>

<sup>5</sup> Gavaris, S., Clark, K.J., Hanke, A.R., Purchase, C.F., and Gale, J. (2010). *Overview of Discards from Canadian Commercial Fisheries in NAFO Divisions 4V, 4W, 4X, 5Y, and 5Z for 2002-2006*. Canadian Technical Report of Fisheries and Aquatic Sciences 2873: vi + 112 p

<sup>6</sup> Pezzack, D.S., Denton, C.M., and Tremblay, M. J. (2014). Overview of By-catch and Discards in the Maritimes Region Lobster Fishing Areas (LFAs) 27-33 based on Species at Risk Act (SARA) At-sea Sampling 2009-2010. *DFO Can. Sci. Advis. Sec. Res. Doc.* 2014/040. v + 27 p.

<sup>7</sup> Hall, M.A., Alverson, D.L., Metzalas, K.I. (2000). By-catch: Problems and Solutions. *Marine Pollution Bulletin* 41, pp 204-219.

<sup>8</sup> Kelleher, K. (2005). *Discards in the world's marine fisheries: an update*. FAO fisheries technical paper 470. Rome: Food and Agriculture Organization of the United Nations.

# THE THREE MOST HARMFUL GEARS IDENTIFIED IN THIS ANALYSIS

## **TRAWL FISHERIES: DRAGGING THE OCEAN FLOOR**

Bottom trawling is one of the most destructive and least selective methods of fishing. It involves dragging weighted nets across the seafloor. These nets are often enormous and capture almost everything in their path. In the process, they may damage vulnerable habitat. Trawls can also be used above the seafloor — a process that also scoops up bycatch. Modifications can minimize some of these impacts. For example, the Nordmore grate is a sorting device used in the Northern shrimp fishery to separate bycatch.

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*Many commercial species that are targeted by trawls can be fished using other, more selective methods.*

## **LONG LINE FISHERIES: THOUSANDS OF HOOKS**

Long line fishers use lines that can extend more than 80 kilometres, with thousands of baited hooks branching off from the main line. Long lines can be used along the seafloor to catch cod, rockfish and flatfish. They can also be used near the surface to catch larger fish such as tuna, swordfish and sharks. Unfortunately, the baited hooks — which are sometimes left to “soak” for several hours — attract many species that are not targeted by fishers, including diving birds. If a bird or another animal becomes hooked, it is often seriously injured or dead by the time the gear is retrieved. Using circle hooks can reduce bycatch of turtles, while attaching streamers to lines can reduce bird bycatch.

.....  
*Using harpoons, handlines, greenstick or buoy gear instead of long lines is proven to reduce bycatch.*

## **HYDRAULIC DREDGES: BLASTING THE SEA FLOOR**

Hydraulic dredges used to harvest clams are essentially large steel cages on skis, towed behind the fishing vessel. Nozzles on the front of the dredge shoot high-powered jets of water into the sediment to expose the clams. A blade then scoops the clams up.<sup>9</sup> This process of dredging causes short-term and long-term changes to the sediment and associated marine life.

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*In shallow water, diving or using rakes, shovels, clam tubes, and tongs can reduce seafloor damage. Because there are no economically viable alternatives in deeper water, habitat protection measures are important.*

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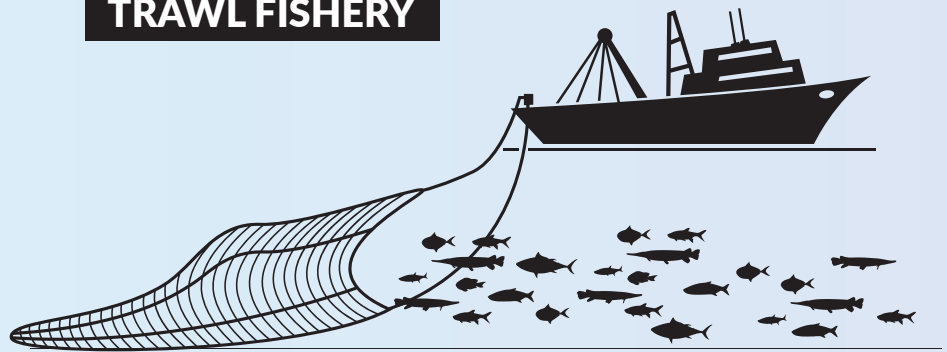
<sup>9</sup> Brand, A., Blyth-Skyrme, R., Angel, J. (2012). Version 5 Public Certification Report for Grand Bank Arctic Surfclam Fishery, Client: Clearwater Seafoods Limited Partnership. MSC Assessment Report.



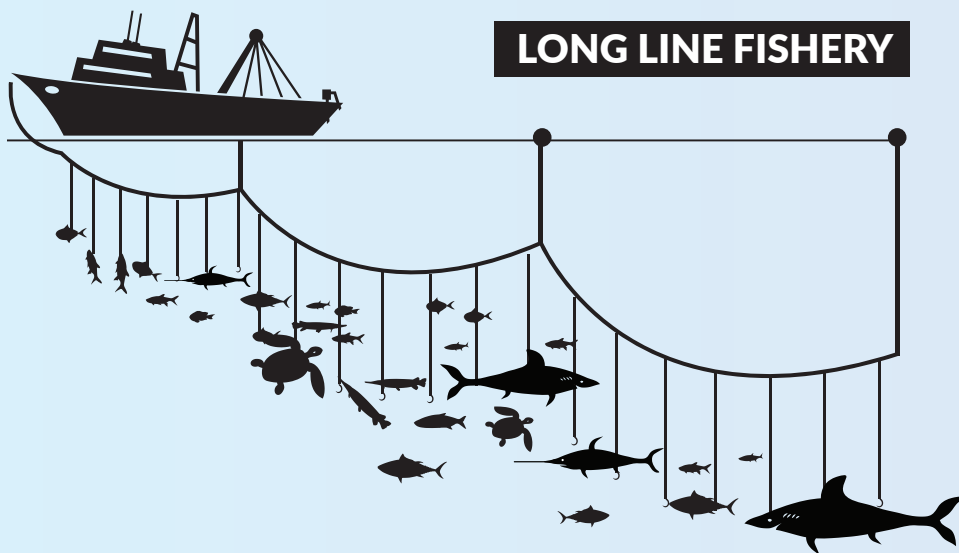
# HARMFUL

TRAWLING IS ONE OF THE MOST DESTRUCTIVE AND LEAST SELECTIVE METHODS OF FISHING.

## TRAWL FISHERY



## LONG LINE FISHERY



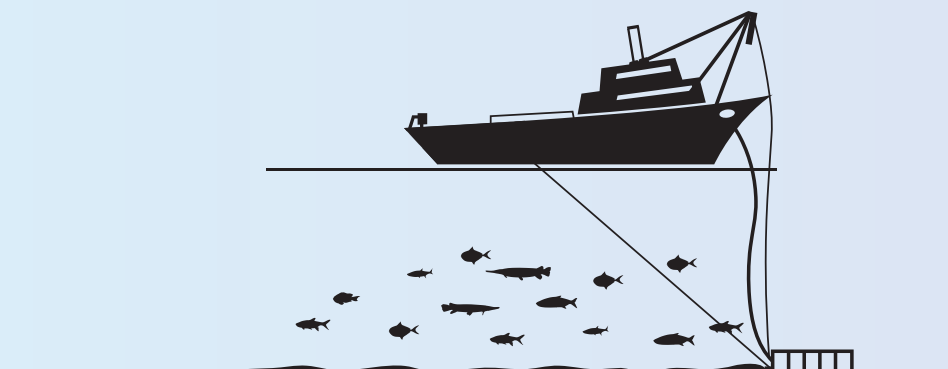
# 80 km

LONG LINE FISHERS USE LINES THAT CAN EXTEND MORE THAN 80 KILOMETRES, WITH THOUSANDS OF BAITED HOOKS BRANCHING OFF FROM THE MAIN LINE.

## HYDRAULIC DREDGES

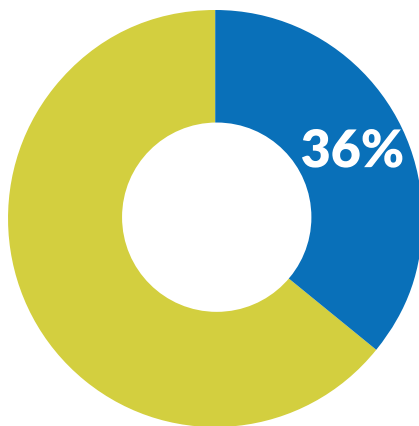
# STEEL CAGE

HYDRAULIC DREDGES ARE LARGE STEEL CAGES ON SKIS THAT BLAST HIGH-POWERED WATER JETS INTO THE SEDIMENT TO UNCOVER CLAMS.



# ASSESSING CANADA'S BYCATCH PROBLEM

No one knows the full extent of bycatch in Canada's fisheries: not Fisheries and Oceans Canada, not the fishing industry and not scientists.



**MORE THAN A THIRD OF CANADIAN FISHERIES AREN'T GUIDED BY AN INTEGRATED FISHERIES MANAGEMENT PLAN.**

Oceana Canada reviewed all information that was publicly available, including Canada's Integrated Fisheries Management Plans (IFMPs) and their associated conservation harvesting plans (CHPs) to assess what measures are in place to control bycatch. Although this provides a valuable snapshot of how Canada currently approaches the problem, more than a third of fisheries in this country aren't guided by an IFMP.<sup>10</sup>

The most reliable and detailed data publicly available are found in the reports for fisheries certified by the Marine Stewardship Council (MSC). These reports draw on data supplied by Fisheries and Oceans Canada and the fishing industry. This data was used to

calculate the percentage of catch that is discarded in each fishery. However, there are a few caveats to note.

Firstly, because MSC-certified fisheries usually represent Canada's most sustainably managed fisheries, the numbers calculated in all likelihood underestimate the real extent of bycatch in Canada.

Secondly, even within MSC-certified fisheries, complete bycatch data is not always readily accessible, and the data that is available is not standardized. Collection methods are inconsistent, and different fisheries use different units of measurement. Meanwhile, the data reported varies from observations made on individual fishing trips to

# CANADA'S MSC-CERTIFIED FISHERIES

Oceana Canada estimated the scope of Canada's bycatch problem based on data from MSC-certified fisheries. Established in 1997, the Marine Stewardship Council represents one of the most rigorous and widely recognized certification programs in the world for wild-capture fisheries. To achieve MSC certification, a fishery must be independently assessed to meet specific criteria set by MSC that confirm it is being effectively managed and minimizes its environmental impact. MSC-certified fisheries account for 66 per cent of the volume and 80 per cent of the value of fish harvested in Canada.

estimates for the entire fishery. As a result, it was only possible to calculate what percentage of catch was discarded in 20 of Canada's 32 MSC-certified fisheries. These are broken down into 54 fleets, categorized by fishery, gear type and fishing area.

Finally, while calculating the percentage of catch discarded makes it possible to compare bycatch across different fisheries, it does not reflect the actual volume of biomass discarded, since different gear types can capture more marine life than others. As a result, these numbers don't tell the full story of how bycatch affects Canada's fisheries and marine ecosystems.



Photo: Jeff Rotman

**BYCATCH DATA IS INCONSISTENTLY COLLECTED AND REPORTED, MAKING COMPARISONS AND ASSESSMENTS OF CUMULATIVE IMPACTS VIRTUALLY IMPOSSIBLE.**

<sup>10</sup> Baum, J.K., & Fuller, S.D. (2016). *Canada's Marine Fisheries: status, recovery potential and pathways to success*. Toronto, Ontario: Oceana Canada, 154 pp. [www.oceana.ca/reports](http://www.oceana.ca/reports)

# KEY FINDING: HUNDREDS OF SPECIES END UP AS BYCATCH

According to the MSC reports, a wide range of species end up as bycatch in Canadian fisheries: everything from sand dollars to dolphins. Many of these are listed as vulnerable by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or protected under the *Species at Risk Act (SARA)*.<sup>11</sup>

The Canadian fleets examined catch more than 270 species. On average, only 51.6 per cent of total catch is the certified target species, with the rest of the catch made up of other species for which they have quota, or bycatch.

Canada-wide, the species groups at greatest risk of cumulative impacts from bycatch are groundfish (caught in 93 per cent of the 54 fleets examined), flatfish (83 per cent of fleets), rockfish (70 per cent of fleets) and skates and rays (55 per cent of fleets).

In the Atlantic, redfish species, haddock, pollock, unidentified cod-like species, white hake and Atlantic

halibut were all caught in more than 50 per cent of the fleets examined (Table 1).

In the Pacific, six species were caught as bycatch in every fleet analyzed: sablefish, Pacific halibut, spiny dogfish, lingcod, shortraker rockfish and arrowtooth flounder (Table 1).

Meanwhile, Arctic shrimp fisheries have few discards but catch five species at risk: American plaice, Atlantic cod, Atlantic wolffish, spotted wolffish and redfish.

# 51.6%

ON AVERAGE, ONLY 51.6 PER CENT OF THE ASSESSED FISHERIES' TOTAL CATCH IS THE CERTIFIED TARGET SPECIES, WITH THE REST OF THE CATCH MADE UP OF OTHER SPECIES FOR WHICH THEY HAVE QUOTA, OR BYCATCH.

11 McDevitt-Irwin, J.M., Fuller, S.D., Grant, C., and Baum, J.K. (2015). Missing the safety net: evidence for inconsistent and insufficient management of at-risk marine fishes in Canada. *Canadian Journal of Fisheries and Aquatic Sciences*, 72: 1596-1608. Baum, J.K., & Fuller, S.D. (2016). *Canada's Marine Fisheries: status, recovery potential and pathways to success*. Toronto, Ontario: Oceana Canada, 154 pp. [www.oceana.ca](http://www.oceana.ca)

**TABLE 1: SPECIES AT GREATEST RISK OF CUMULATIVE FISHING IMPACTS**

SPECIES	NUMBER OF FLEETS* THAT CATCH THIS SPECIES	% OF FLEETS* THAT CATCH THIS SPECIES
<b>Atlantic species</b>		
redfish species	32	66%
haddock	28	61%
pollock	28	61%
unidentified cod-like species	25	54%
white hake	25	54%
Atlantic halibut	24	52%
<b>Pacific species</b>		
sablefish	6	100%
arrowtooth flounder	6	100%
lingcod	6	100%
Pacific halibut	6	100%
shortraker rockfish	6	100%
spiny dogfish	6	100%

\* Complete bycatch data was available for 20 MSC-certified fisheries, comprised of 54 fleets: 46 Atlantic, six Pacific and two Arctic. Each fleet is a unique combination of fishery, gear and fishing area.

**TABLE 2: FLEETS THAT DISCARD THE HIGHEST PERCENTAGE OF TOTAL CATCH**


FLEET	TYPE OF GEAR	PERCENTAGE OF CATCH DISCARDED
<b>Atlantic</b>		
North Atlantic swordfish	pelagic long line	44.8%
Grand Bank Arctic surfclam	dredge	35.4%
Eastern Canada offshore lobster	baited trap	22.0%
<b>Pacific</b>		
Canada Pacific halibut	bottom long line, troll and hand-line	44.7%
Canadian Pacific sablefish	bottom long line	40.8%
	Korean trap long line	32.0%
British Columbia spiny dogfish	inside directed, bottom long line	29.2%
	outside directed, bottom long line	14.3%

270

.....

**THE CANADIAN FISHERIES EXAMINED BY OCEANA CANADA CATCH MORE THAN 270 DIFFERENT SPECIES, INCLUDING SPECIES AT RISK.**

In the Atlantic, the MSC-certified fisheries that discarded the highest percentage of catch were: Canadian North Atlantic swordfish pelagic long line, Grand Bank Arctic surfclam and Eastern Canada offshore lobster (Table 2). In the Pacific, they were: Canada Pacific halibut hook-and-line, Canadian Pacific sablefish bottom long line and Korean trap long line and British Columbia spiny dogfish (Table 2).



**THERE ARE CURRENTLY  
NO NATIONAL STANDARDS  
FOR THE LEVEL OF  
AT-SEA MONITORING,  
LEAVING MOST FLEETS  
UNDER-SAMPLED AND  
UNDER-REPRESENTED  
IN DATABASES.**

Photo: Jeff Rotman

# KEY FINDING: THERE ARE BIG HOLES IN THE DATA

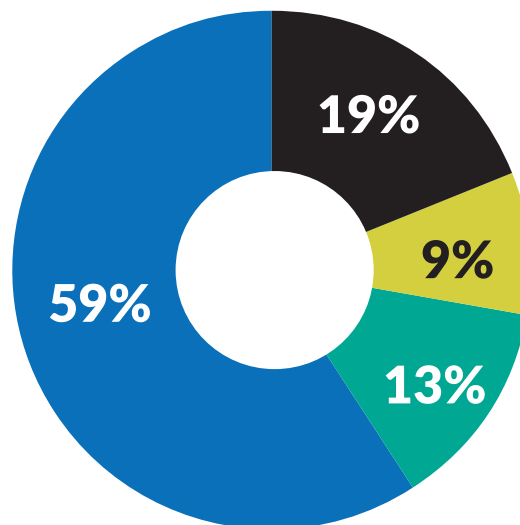
## CURRENT MONITORING AND DATA COLLECTION ARE INADEQUATE

Good data provides the foundation for good management. However, a 2016 Auditor General's report on sustaining Canada's major fish stocks found that Fisheries and Oceans Canada does not require a clear rationale for the level of at-sea monitoring needed to

provide information for managing fish stocks.<sup>12</sup> There are currently no national standards for the level of at-sea monitoring required, leaving most fleets under-sampled and under-represented in databases. Ocean Canada's findings back that up. In the 32 MSC-certified fisheries analyzed, at-sea monitoring ranged from none to 100 per cent (see Figure 1).

**FIGURE 1: DEGREE OF AT-SEA MONITORING IN 32 MSC-CERTIFIED FISHERIES**

- no monitoring
- unknown
- completely monitored
- varying levels of monitoring



<sup>12</sup> Office of the Auditor General (OAG). (2016). *Report 2 – Sustaining Canada's Major Fish Stocks*. Fisheries and Oceans Canada. [http://www.oag-bvg.gc.ca/internet/English/parl\\_cesd\\_201610\\_02\\_e\\_41672.html#p19](http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201610_02_e_41672.html#p19)



One hundred per cent at-sea coverage can be logistically and financially difficult to achieve and isn't necessary for all fisheries. Researchers suggest that it's possible to get reasonably accurate estimates of bycatch with coverage levels of at least 20 per cent for common species and 50 per cent for rare species.<sup>13</sup>

However, the data provided must be accurate. Although Canada's Pacific groundfish program has had 100 per cent at-sea video monitoring since 2006,<sup>14</sup> there are problems with coverage, reporting and missing or unreliable bycatch data.<sup>15</sup> Data must also be shared in a timely way. Relying on outdated information leads to inaccurate catch estimates, poor catch projections and flawed decision-making.

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*Fisheries and Oceans Canada must make it mandatory for all commercial fisheries to have sufficient monitoring to ensure accurate estimates of all retained and discarded bycatch.*

### **STANDARDIZED REPORTING IS ESSENTIAL**

Differing regional approaches to bycatch management and reporting make it impossible to assess the full extent of the issue on a national level. As a result, the fishing mortality of many species remains unknown or incomplete.

To assess the full extent of bycatch, Fisheries and Oceans Canada must implement standardized bycatch reporting methodologies across all Canadian fisheries. These can then be used to publish an annual national bycatch report that reports publicly on fisheries monitoring, progress toward policy implementation, compliance and cumulative impacts.

.....  
*Fisheries and Oceans Canada must release consistent, comprehensive national bycatch estimates so that management and conservation decisions can be based on accurate and up-to-date information about environmental conditions, the number of fish in a population and the overall impacts of fishing-related mortality.*

**“IN SEVERAL REGIONS, DEPARTMENTAL OFFICIALS DID NOT HAVE TIMELY ACCESS TO THIRD-PARTY DATA ON BYCATCH AND DISCARDED FISH. THIS MEANT [FISHERIES AND OCEANS CANADA] DID NOT HAVE A COMPLETE RECORD OF TOTAL CATCH FOR THE YEAR, WHICH COMPROMISED ITS ABILITY TO MAKE TIMELY FISHERIES MANAGEMENT DECISIONS.”**

**– JULIE GELFAND, COMMISSIONER OF THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT, OFFICE OF THE AUDITOR GENERAL OF CANADA**



## RARE SPECIES NEED MORE MONITORING

Marine wildlife of all kinds become hooked, entangled or injured during the course of commercial fishing. For example, turtles are often captured by long lines and fixed gear and whales can get entangled in gillnets. That's unfortunate — especially when it involves a rare species.

Accurately estimating the magnitude of these entanglements and deaths is even more difficult than estimating the rate of fish discards, because higher levels of observer coverage are needed to get the full picture for rare species.

In many fisheries, observers cover only five to 10 per cent of fishing trips. The rarer the species, the less likely it is that an observer will be on hand to witness any interaction. But for rare species, any individual death or entanglement can be a big deal.

For example, the death of even one endangered Northern right whale could have serious repercussions on the population.<sup>16</sup> If fisheries operate in areas that are home to rare species, the level of monitoring should be higher.

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*Enhanced monitoring for rare species is required to ensure accurate estimates of their bycatch numbers — estimates that can be used to develop effective management strategies.*

<sup>13</sup> Babcock, E.A., & Pikitch, E.K. (2004). *How much observer coverage is enough to adequately estimate bycatch?* Washington, DC: Oceana.

<sup>14</sup> DFO (2012). *The Future of Canada's Commercial Fisheries: A Discussion Document*. Available at: [http://www.curra.ca/future\\_of\\_the\\_fishery.htm](http://www.curra.ca/future_of_the_fishery.htm)

<sup>15</sup> Ibid.

<sup>16</sup> Lewison, Rebecca L., Larry B. Crowder, Andrew J. Read, and Sloan A. Freeman. "Understanding impacts of fisheries bycatch on marine megafauna." *Trends in Ecology & Evolution* 19, no. 11 (2004): 598-604.



**THE DEATH OF EVEN ONE ENDANGERED NORTHERN RIGHT WHALE COULD HAVE SERIOUS REPERCUSSIONS ON THE POPULATION.**

# KEY FINDING: CANADA'S REGULATORY APPROACH TO REDUCING BYCATCH IS INADEQUATE

The Canadian government has made international commitments to sustainable fisheries. These include addressing fisheries bycatch under Aichi Target 6 of the *Convention on Biological Diversity* and implementing the Food and Agriculture Organization's *Bycatch Guidelines*.<sup>17</sup> However, the Canadian laws that govern fisheries do not directly reference bycatch.

Currently, the main document guiding federal fisheries policies is Canada's Sustainable Fisheries Framework. Although it is not prescriptive, it was developed to support the conservation and sustainable use of Canada's commercial fisheries. In 2013, a *Policy on Managing Bycatch* was developed under this Framework.<sup>18</sup> The Bycatch Policy is intended to be implemented through Integrated Fisheries Management Plans (IFMPs), which guide the management of individual fisheries.

Although the policy commitment is clear, the IFMPs are not legally binding or enforceable, unless the guidance in the IFMPs is included in licensing conditions for fishers. It is difficult to determine where this guidance has been put into licensing conditions and where it has not. Moreover, many fisheries lack IFMPs, and where they do exist, there are regional differences (see Table 3). As a result, assessing the effectiveness and degree of implementation of the Policy remains a challenge.

*Legislative and policy frameworks should be consistently applied in all IFMPs and implemented through licensing conditions to provide transparent and consistent measures for bycatch and monitoring, and to support Canada's international commitment to sustainable fisheries.*

**TABLE 3: SUMMARY OF BYCATCH MEASURES IN INTEGRATED FISHERIES MANAGEMENT PLANS (IFMPs) AND ASSOCIATED CONSERVATION HARVESTING PLANS (CHPS) ACROSS CANADA**

REGION	NUMBER OF IFMP/CHPS	% OF IFMP/CHPS WITH:							
		At-sea monitoring*	Logbooks/fish slips	Gear restrictions (general)	Gear modifications (to reduce bycatch)	Temporal closures	Spatial closures	Bycatch quotas/caps	Move-on rules
Central and Arctic	3	67%	100%	100%	33%	33%	67%	67%	67%
Maritime	7	71%	86%	100%	57%	71%	100%	43%	29%
Newfoundland and Labrador	19	89%	100%	84%	21%	68%	32%	5%	26%
Pacific	33	61%	97%	100%	55%	97%	100%	70%	12%
Quebec and Gulf	36	61%	97%	100%	19%	39%	53%	36%	14%
<b>COMBINED</b>	<b>98</b>	<b>67%</b>	<b>97%</b>	<b>97%</b>	<b>35%</b>	<b>66%</b>	<b>68%</b>	<b>43%</b>	<b>18%</b>

\*Either with at-sea observers or electronic monitoring

<sup>17</sup> 1992 *Convention on Biological Diversity*, [1993] ATS 32 / 1760 UNTS 79 / 31 ILM 818 (1992)

<sup>18</sup> DFO (2013). *Guidance on Implementation of the Policy on Managing Bycatch: Sustainable Fisheries Framework*. Department of Fisheries and Oceans Canada. [http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/bycatch-guide-prise-access-eng.htm#toc\\_annex\\_1](http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/bycatch-guide-prise-access-eng.htm#toc_annex_1); DFO (2013). *Policy on Managing Bycatch*. Department of Fisheries and Oceans Canada. <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/bycatch-policy-prise-access-eng.htm>

# METHODS FOR MONITORING BYCATCH

## DOCKSIDE MONITORING

A land-based program that monitors the weight and type of fish landed from a commercial fishing vessel when it returns to port. It often does not record species discarded at sea, but it does provide information about retained bycatch.

## AT-SEA OBSERVERS

An officially recognized third-party observer on a vessel who verifies the amount of fish caught, the area in which it was caught and the method by which it was caught, and collects other scientific data. At-sea observers record both retained and discarded catch. However, in many cases they are only required to report on discarded species of commercial value or of conservation concern. In 2013, Fisheries and Oceans Canada reduced its oversight of the At-Sea Observer Program, giving industry the responsibility to contract directly with the service provider and to pay for the costs. It can be difficult to obtain adequate observer coverage to accurately determine catch levels, due to challenges associated with logistics and cost. Nonetheless, at-sea observers are an important component of monitoring an entire catch.

## VESSEL MONITORING SYSTEMS

Satellite-based tracking systems that monitor the location of vessels. While this tool is unable to directly monitor catch, it can be used to make inferences about fishing activity occurring in protected areas or at specific times.

## LOGBOOKS

According to the *Fisheries Act*, all licensed fish harvesters must record information about their fishing catch and activities in specific logbooks or forms. However, fishers that report on bycatch using identification guides may not report accurately, and without effective monitoring there is the potential for misreporting.

## ELECTRONIC MONITORING

Cameras or other electronic equipment that can be mounted on a fishing vessel to monitor catches. Video footage can be analyzed to assess catch rates for both retained and discarded species. Groundfish fisheries on Canada's West Coast have used at-sea video monitoring since 2006, and electronic sensors and camera monitoring are used in the crab-by-trap fishery. Although this can be a cost-effective solution, there can still be problems with coverage, reporting and missing or unreliable bycatch data.

## MEASURES TO REDUCE BYCATCH

### Gear restrictions

Restrictions on what type of fishing gear can be used.

### Gear modifications

Adaptations to fishing gear designed to reduce bycatch.

### Temporal closures

Bans on fishing at specific times of year.

### Spatial closures

Bans on fishing in specific geographic areas.

### Quotas or caps

Limits set on how much bycatch a fishery is allowed to catch.

### Move-on rules

The temporary closure of part of a fishery when a bycatch hotspot is encountered, requiring a fishing vessel to move a minimum distance away.

# MSC-CERTIFIED FISHERIES WITH THE MOST DISCARDS

## BRITISH COLUMBIA SPINY DOGFISH

**29%  
DISCARDED**

**BYCATCH:** spiny dogfish themselves, with small amounts of halibut and skates

.....

## CANADIAN PACIFIC HALIBUT

**45%  
DISCARDED**

**BYCATCH:** undersized Pacific halibut, spiny dogfish, sablefish, arrowtooth flounder and longnose skate

.....

## CANADIAN PACIFIC SABLEFISH

**41%  
DISCARDED**

**BYCATCH:** bluntnose sixgill shark, black-footed albatross, rockfish, spiny dogfish, juvenile or other non-quota Pacific halibut, juvenile sablefish, arrowtooth flounder and longnose skate

.....





## GRAND BANK ARCTIC SURFCLAM

**35%**  
**DISCARDED**

BYCATCH: sand dollars

.....

## NORTH ATLANTIC SWORDFISH

**45%**  
**DISCARDED**

BYCATCH: blue sharks, eight other shark species, including the threatened short-fin mako and endangered porbeagle. All four species of sea turtle found in Canadian waters

.....

## EASTERN CANADA OFFSHORE LOBSTER

**22%**  
**DISCARDED**

BYCATCH: under or oversized lobsters, as well as reproductively active female lobsters, Jonah crab, threatened northern wolffish and endangered cusk and Atlantic cod

.....

Even among Canada's best-managed fisheries there are significant levels of bycatch.



**EVERY YEAR, FISHERIES  
AROUND THE WORLD  
UNINTENTIONALLY CATCH  
AND THROW AWAY MORE  
THAN 10.3 MILLION  
TONNES OF SEA LIFE**

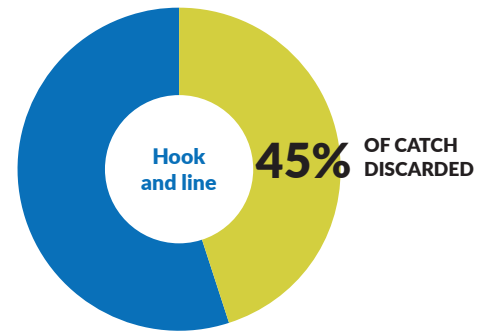
## MSC-CERTIFIED FISHERIES WITH THE MOST DISCARDS

### CANADIAN PACIFIC HALIBUT

HOOK AND LINE (BOTTOM LONG LINE, TROLL AND HAND LINE) —  
45% OF CATCH DISCARDED

Each year, fishers up and down the coast of British Columbia harvest thousands of tonnes of halibut — the largest flatfish in the world, weighing up to 300 kg. But in addition to Pacific halibut, they also haul 50 other species out of the ocean. As a result, this fishery discards approximately 45 per cent of what it captures. The MSC report for this fishery doesn't break out the data for the different forms of hook-and-line gear, making it impossible to calculate the specific bycatch rates for troll, bottom long line and for hand line.

This fishery catches several species of COSEWIC-designated rockfish and sharks listed under the *Species at Risk Act*, including endangered basking sharks. The majority of discards are spiny dogfish, sablefish, arrowtooth flounder, longnose skate and undersized Pacific halibut, which is discarded by regulation to keep small fish in the water.



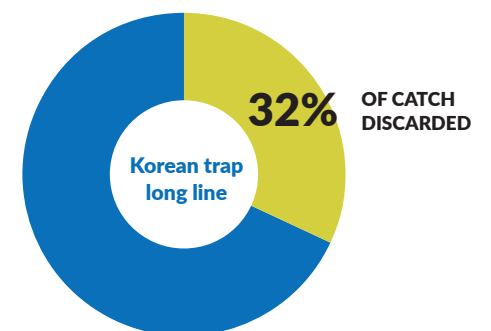
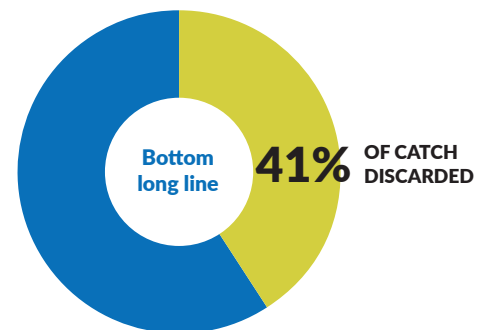
### CANADIAN PACIFIC SABLEFISH

BOTTOM LONG LINE — 41% OF CATCH DISCARDED  
KOREAN TRAP LONG LINE — 32% OF CATCH DISCARDED

Canadian fishers use long lines and traps to harvest sablefish — a groundfish that lives on the muddy bottom along British Columbia's continental shelf and slope. This fishery also catches up to 29 other species and discards about one-third or more of its total catch each year.

Several species of COSEWIC-designated rockfish are caught as bycatch, as well as many spiny dogfish, arrowtooth flounder and longnose skate.

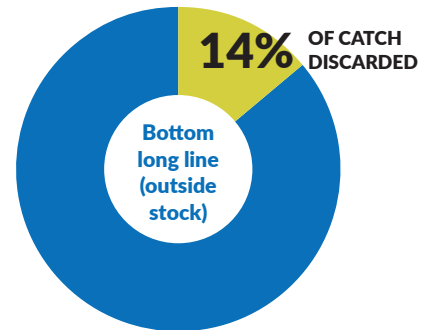
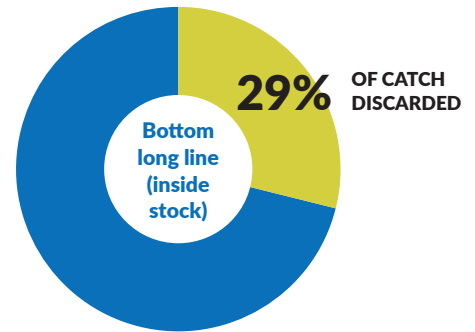
Discards include a number of species listed as a special concern under Canada's *Species at Risk Act*. For two of those species — the bluntnose sixgill shark and the black-footed albatross — fisheries are considered the most significant concern to their future populations.<sup>19</sup> Many juvenile sablefish and juvenile Pacific halibut are also discarded — by regulation — to keep small fish in the water.



<sup>19</sup> Anon. (2017) Species at Risk Public Registry: Species Profiles. Retrieved 25 January 2017 from [http://sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=991](http://sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=991)

## BRITISH COLUMBIA SPINY DOGFISH

BOTTOM LONG LINE (INSIDE STOCK) – 29% OF CATCH DISCARDED  
BOTTOM LONG LINE (OUTSIDE STOCK) – 14% OF CATCH DISCARDED



Although spiny dogfish were initially caught for their liver and body oil, fishers along British Columbia's Strait of Georgia and off the west coast of Vancouver Island now catch them for exports to Asian and European food markets.<sup>19</sup> Although very few vessels actively target dogfish today, concerns remain, especially because COSEWIC designates Pacific spiny dogfish as a

species of special concern. In addition to Pacific spiny dogfish, this fishery also catches up to 72 other species, and discards 14-29 per cent of its total catch. Like other Pacific groundfish fisheries, this hook-and-line fishery includes bycatch of at-risk rockfish species and at-risk sharks, including the bluntnose sixgill and tope sharks.

## NORTH ATLANTIC SWORDFISH

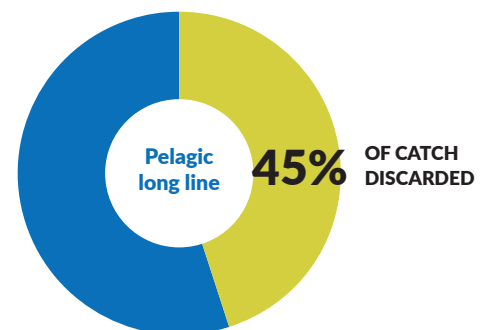
PELAGIC LONG LINE – 45% OF CATCH DISCARDED

Each spring, the surface water temperatures of Canada's North Atlantic warm enough to entice swordfish to come foraging.<sup>21</sup> When this happens, two fishing fleets targeting swordfish leap into action, using harpoons and pelagic long lines to harvest an average of more than 1,000 tonnes each year. However, the pelagic long line fleet discards nearly 45 per cent of its total catch – the highest among all fisheries that Oceana Canada examined – and catches at least 44 species in addition to swordfish.

This fishery is responsible for roughly 99 per cent of blue shark discards in Canada. Eight other types of shark are also caught, including the threatened shortfin mako<sup>22</sup> and endangered porbeagle.<sup>23</sup>

The MSC report also noted interactions in which six endangered, threatened or protected species became entangled in fishing gear. These included dolphins and a pilot whale. However, sea turtle bycatch is the most serious issue. It's estimated that this fishery hooks

or entangles approximately 1,200 endangered loggerhead turtles each year.<sup>24, 25</sup>



<sup>20</sup> Vincent, A., Jagielo, MS., Turris, B. (2012). *British Columbia Spiny Dogfish 2012 MSC First Surveillance Audit Report*. Emeryville, CA: SCS Global Services, 44pp.

<sup>21</sup> DFO (2013). *Integrated Fisheries Management Plan: Canadian Atlantic swordfish and other tunas*. Department of Fisheries and Oceans Canada. <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/swordfish-espardon/NEW-swordfish-2013-espado-eng.htm>

<sup>22</sup> COSEWIC (2006). COSEWIC assessment and status report on the shortfin mako *Isurus oxyrinchus* (Atlantic population) in Canada. *Committee on the Status of Endangered Wildlife in Canada*. Ottawa. vi + 24 pp. [www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm), [http://www.registrelp-sararegistry.gc.ca/virtual\\_sara/files/cosewic/sr\\_shortfin\\_mako\\_e.pdf](http://www.registrelp-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_shortfin_mako_e.pdf)



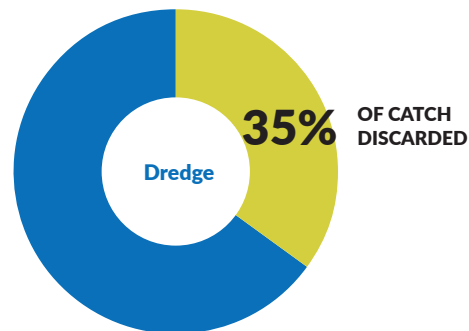
## GRAND BANK ARCTIC SURFLAM

DREDGE – 35% OF CATCH DISCARDED

To harvest these large clams, ships drag hydraulic dredges across the sandy seafloor. The fleet does not catch any species with a COSEWIC conservation status, and the MSC report did not note any interactions with endangered, threatened or protected species. However, there is a high percentage of total catch discarded and the fishery

catches 15 species in addition to surfclams.

The sand dollar represents the majority of discards. Although this is not a species at risk, it represents an important part of the ecosystem as food for many other species.



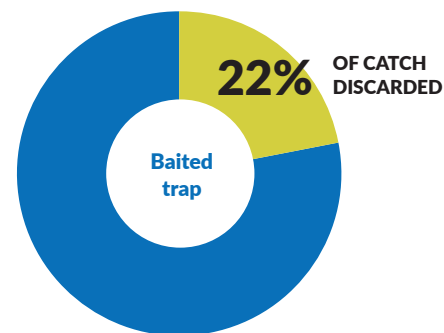
## EASTERN CANADA OFFSHORE LOBSTER

BAITED TRAP – 22% OF CATCH DISCARDED

This MSC-certified lobster fishery operates about 100 kilometres off the coast of Nova Scotia. This fishery catches at least a dozen species in addition to lobster and discards 22 per cent of its total catch. The majority of these discards are lobsters or crabs released due to size limits or reproductive status. However, the fishery also discards several species

with a COSEWIC conservation status. Two of these – cusk and Atlantic cod – are designated as endangered.

Another discard is northern wolffish, a species listed as threatened under Canada's *Species at Risk Act*.



<sup>23</sup> COSEWIC (2014). COSEWIC assessment and status report on the Porbeagle *Lamna nasus* in Canada. *Committee on the Status of Endangered Wildlife in Canada*. Ottawa. xi + 40 pp. [www.registrelep-sararegistry.gc.ca/default\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/default_e.cfm), [http://www.registrelep-sararegistry.gc.ca/virtual\\_sara/files/cosewic/sr\\_Porbeagle\\_2014\\_e.pdf](http://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Porbeagle_2014_e.pdf)

<sup>24</sup> COSEWIC (2010). COSEWIC assessment and status report on the Loggerhead Sea Turtle *Caretta caretta* in Canada. *Committee on the Status of Endangered Wildlife in Canada*. Ottawa. viii + 75 pp.

<sup>25</sup> Brazner J.C., and McMillan, J. (2008). Loggerhead turtle (*Caretta caretta*) bycatch in Canadian pelagic long line fisheries: Relative importance in the western North Atlantic and opportunities for mitigation. *Fisheries Research*, 9: 310-324.

# WHAT'S THE SOLUTION?

Bycatch poses a threat to the economic health of Canada's fisheries and the ecological health of our oceans. The federal government has a responsibility to manage this issue. Although tackling it is no small undertaking, solutions already exist. By implementing the following actions, we can dramatically reduce and mitigate the cumulative impacts of bycatch.


## A FOUR-STEP APPROACH TO REDUCING BYCATCH

- 1 Count: All catch must be accounted for.** Everything that is caught in a fishery, including bycatch, should be counted. This means *all* species, including those species that currently fall outside the scope of the Bycatch Policy or other related policies. It also means requiring sufficient monitoring and reporting in all fisheries to ensure managers have reasonable and timely information for decision-making. Without accurate estimates of how much of each species are caught and discarded, fisheries managers have no way to account for the negative consequences of bycatch.
- 2 Cap: Establish bycatch limits for all protected and depleted species.** Bycatch limits for non-target fish, sea turtles, marine mammals, seabirds and shark populations must be based on scientific evidence. Once these limits are reached, fishing should be shut down for the remainder of the season. Priority should be given to COSEWIC-designated and SARA-listed species and stocks within Fisheries and Oceans Canada's critical or cautious zones.
- 3 Control: Avoid bycatch and minimize mortality.** To reduce bycatch and ensure that fishers do not exceed bycatch limits, federal fisheries managers must enforce existing regulations and provide incentives for responsible fishing. This includes taking measures such as modifying destructive gear or transitioning to selective gear types and avoiding hotspots for bycatch with move-on rules or time and area closures. These measures should be outlined in a comprehensive bycatch assessment in every Integrated Fisheries Management Plan (IFMP), implemented through licensing conditions, and be used to ensure bycatch levels do not exceed the stated target.
- 4 Protect key species: Certain species require special consideration.** These species include those that are at-risk, overfished, ecologically important, long-lived or require additional conservation and management measures. To minimize and mitigate the higher impact bycatch has on these species, fisheries managers must consider additional options, including precautionary mortality limits and enhanced catch monitoring.

# RECOMMENDATIONS FOR FISHERIES AND OCEANS CANADA

To effectively reduce bycatch in Canada's fisheries, Fisheries and Oceans Canada must implement the following measures, backed by adequate funding and resources:

- 1** Make it mandatory for all commercial fisheries to have sufficient monitoring to ensure accurate estimates of all retained and discarded bycatch. To do this, Fisheries and Oceans Canada should develop a national catch monitoring policy that requires:
  - a) Standardized data collection methods for the entire catch;
  - b) Observer coverage levels that are statistically meaningful and allow determination of bycatch impacts within fisheries and cumulative impacts across fisheries; and
  - c) Vessel logbooks that track all bycatch.
- 2** Require a comprehensive bycatch assessment in every Integrated Fisheries Management Plan (IFMP). These assessments should specify the management measures that should be used to ensure bycatch levels do not exceed the stated target. Moreover, these measures should be enforceable – for example, through license conditions.
- 3** Strengthen Canada's policies related to bycatch to ensure that:
  - a) Canada follows international best practices, such as those outlined by the United Nations' Food and Agriculture Organization;
  - b) The policies are enforceable; and
  - c) All bycatch is accounted for, including pre-catch losses, "ghost fishing" and any species that currently fall outside the scope of the Bycatch Policy or other related policies.
- 4** Increase transparency through a public national bycatch status report that includes:
  - a) Annual estimates of bycatch;
  - b) The results of bycatch monitoring, broken down by fishery and management area;
  - c) Progress on implementing policies and management plans;
  - d) Compliance rates for bycatch mitigation measures; and
  - e) A review of the cumulative impact of bycatch.



**EVEN FISHERIES  
CERTIFIED BY THE MARINE  
STEWARDSHIP COUNCIL  
STRUGGLE TO MINIMIZE  
THE AMOUNT OF NON-  
TARGET SPECIES THEY  
HARM OR KILL.**



# CONCLUSION

The cumulative impact of bycatch is a significant problem in Canada that continues to undermine successful fisheries management, prevent the recovery of depleted stocks and waste living marine resources. Although many fisheries have made positive changes to address the problem, even fisheries certified by the Marine Stewardship Council struggle to minimize the amount of non-target species they harm or kill.

With less than a quarter of our fisheries known to be healthy today, we can't afford to continue with business as usual.

Improvements must be made in accurately reporting bycatch and reducing the amount of fish and other species that are discarded at sea. Fortunately, Fisheries and Oceans Canada can take concrete steps to make those improvements happen.

Those steps include implementing key measures such as counting everything that is caught, establishing bycatch limits and using innovative management measures to avoid and reduce bycatch. Together, these solutions will improve the resilience and economic viability of Canadian fisheries – and the resilience of marine ecosystems – for generations to come.



# OCEANA CANADA: SAVING THE OCEANS TO FEED THE WORLD.

Oceana Canada was established in 2015 as an independent charity and is part of the largest international group focused solely on ocean conservation.

Canada has the longest coastline in the world, with an ocean surface area of 7.1 million square kilometres, or 70 per cent of its land mass. Oceana Canada believes that we have an obligation to our country, and the world, to manage our natural resources responsibly and provide a sustainable source of protein for a growing global population.

Oceana Canada works with civil society, academics, fishers and government to return Canada's formerly vibrant oceans to health and abundance. By restoring Canada's oceans, we can strengthen our communities, reap greater economic and nutritional benefits and protect our future.

## PLEDGE YOUR SUPPORT

It's time to do a better job of managing and protecting our fisheries. Add your voice to Oceana Canada's call for national policies that rebuild Canada's fish populations and return Canada's oceans to vibrant health.

Sign up as a *Wavemaker* today, and follow us on Facebook, Twitter and Instagram.

Join us at [oceana.ca](http://oceana.ca).



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