



# The Jig is Up:

**Millions at stake in DFO's failed actions  
to rebuild the depleted Atlantic  
mackerel stock**

November 2020



# Summary

Fisheries and Oceans Canada (DFO) has continually failed to take necessary action to rebuild Canada's mackerel stock from a critically depleted state. This failure is reducing the long-term value of the fishery by more than \$50 million, according to a new cost-benefit analysis.

Mackerel are an important forage fish throughout Atlantic Canada and Quebec, supporting both natural ecosystems and coastal livelihoods. Fishermen catch mackerel for commercial sale and also use them as bait for the region's most lucrative fisheries, including lobster, crab, bluefin tuna and cod. Additionally, mackerel are often fished recreationally, providing a source of food and a connection to the ocean for everyday people.

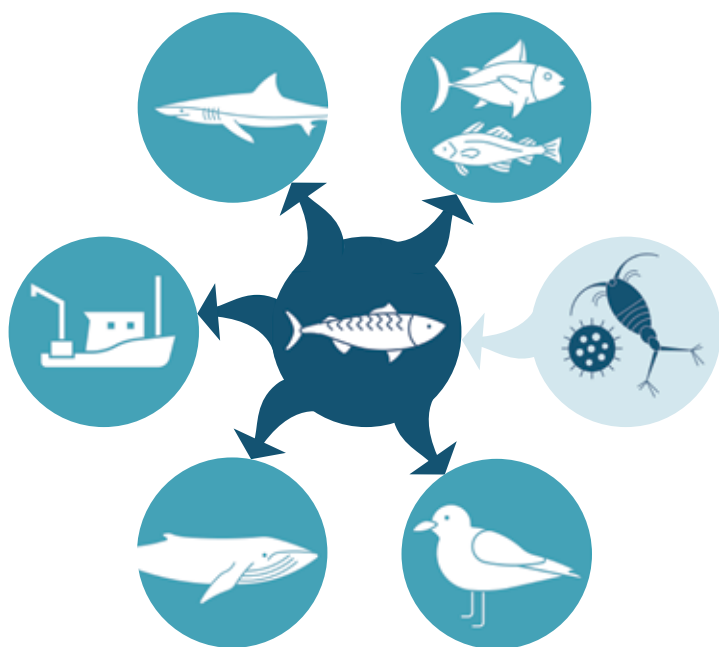


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However, the region's mackerel stocks have been critically depleted since 2011, following a decades-long decline in abundance. The best available science as of 2019 indicates that current catch levels are not sustainable and are more likely than not to lead to further declines.<sup>1</sup> Only low-to-no catch levels can begin rebuilding the stock out of the critical zone.

A recent study<sup>2</sup> shows that lowering catch levels makes sense not only for the health of the stock, but also for the long-term health of the fishery. Current quotas are aimed at maximizing fishing, which could lead to a collapse of the stock and the closure of various fisheries—an experience with which Atlantic Canada is all too familiar. On the other hand, the cost-benefit analysis shows that minimizing fishing could lead to benefits estimated at over \$54 million, with a 12.9% return on the “investment” in stock rebuilding.

DFO has a mandate to rebuild fish populations. In the past, it has put off tough decisions due to the potential socio-economic impacts. However, it is clear that DFO's recent management decisions have neither prioritized rebuilding stocks nor done what's best for the long-term future of the fishery.



<sup>1</sup> ATLANTIC MACKEREL REBUILDING WORKING GROUP MEETING MSE Final Results – Trade-offs Elisabeth Van Beveren, Julie R. Marentette, Andrew Smith, Martin Castonguay, Daniel E. Duplisea November 5, 2019

<sup>2</sup> MacAskill, G. (2020). *Value of Atlantic Mackerel and Stock Rebuilding in Canada*. Gardner Pinfold Consultants Inc.

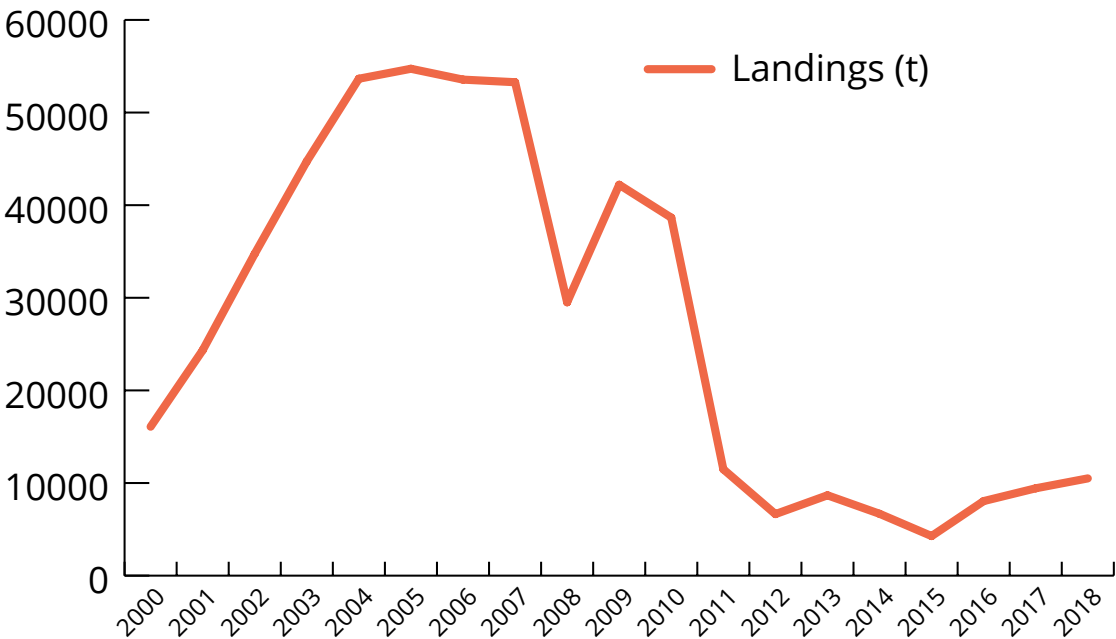
# Mackerel stock status

The mackerel stock has been declining sharply since 1994. The 2015 landings were the lowest on record since 1960 and far below those from 2001-2010. The main index used to assess the health of the stock remains well below the levels observed in the 1980s.<sup>3</sup>

Further, the most recent assessment from 2019 indicates that recruitment—the number of fish predicted to survive to spawn in the future—is at an all-time low, among other signs of deteriorating stock health.<sup>4</sup>

The best available science produced by DFO is clear that current fishing effort—with a total allowable catch (TAC) of 8,000 tonnes—will not rebuild the stock out of the critical zone within a reasonable time frame.<sup>5</sup> A reasonable time frame for mackerel was defined as 5-10 years, in line with DFO Rebuilding Guidance. The results from an externally peer-reviewed evaluation of rebuilding strategies showed that catches of 6,000 to 10,000 tonnes were predicted to be unsustainable without improvements in recruitment. Furthermore, catch levels above 2,000 tonnes had greater than 50% probabilities of population declines over the next 5-10 years.

Figure 1. Annual Atlantic mackerel landings (t) by Canadian vessels



<sup>3</sup> DFO. 2017. *Assessment of the Atlantic Mackerel Stock for the Northwest Atlantic (Subareas 3 and 4) in 2016*. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/034.

<sup>4</sup> *ibid.*

<sup>5</sup> Van Beveren, E., J.R. Marentette, A. Smith, M. Castonguay, D.E. Duplisea. 2019. *Evaluation of Rebuilding Strategies for Northwestern Atlantic Mackerel (NAFO Subareas 3 and 4)*. DFO Can. Sci. Advis. Sec. Res. Doc. 2019. "Minimize fishing" is HCR 4 in the report and "maximize fishing" is HCR 10.



# The Economic Analysis



Gardner-Pinfold Consulting conducted an economic analysis for Oceans North to assess the trade-offs between short-term and long-term fishing under different management scenarios to help rebuild the mackerel stock.<sup>6</sup> To understand both the volume of catch and its value, a cost-benefit analysis was conducted. Cost-benefit analysis is used by the Treasury Board of Canada to help resolve complex economic trade-offs involved in resource management decisions. DFO policy also recommends these analyses as a way to “articulate the socioeconomic trade-offs of management decisions in a transparent manner and may prove essential in gaining support from fishery participants, co-management bodies under land claims agreements and others with an interest in the fishery.”<sup>7</sup>

<sup>6</sup> MacAskill, G. (2020). *Value of Atlantic Mackerel and Stock Rebuilding in Canada*. Gardner Pinfold Consultants Inc.

<sup>7</sup> Guidance for the Development of Rebuilding Plans under the Precautionary Approach Framework: Growing Stocks out of the Critical Zone



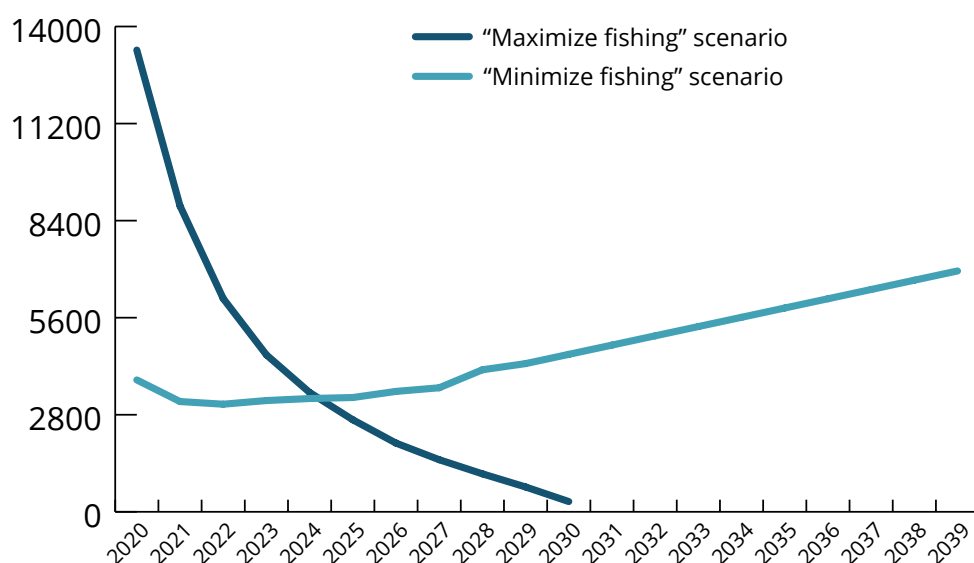
## Methodology

Two rebuilding options were evaluated in this report. These were selected out of 11 harvest control rules (HCRs)<sup>8</sup> that were analyzed as part of the DFO rebuilding process.<sup>9</sup> The first—the “minimize fishing” scenario—is closest to achieving the objective of rebuilding the stock out of the critical zone within 10 years without eliminating all fishing removals during the time period. This scenario has an initial TAC of zero, followed by a linear ramp up of the TAC due to recovery and increased biomass. The second, the “maximize fishing” scenario, begins with current fishing effort and is followed by declines because catches at that level further drive the stock down (Figure 2).

The difference between the two scenarios (minimize fishing vs. maximize fishing) was assessed over a twenty-year period (2020 to 2039) using a cost-benefit framework. A linear regression was used to extend DFO’s analysis by an additional 10 years. This was to show what happens under the catch scenarios in the longer term as trade-offs between rebuilding and stock depletion are more clear.

The analysis assumes that the current estimated annual bait catch (2,500 tonnes) is fixed for the entire time period at a value of \$1.10 per pound to reflect the cost of imported frozen alternative (as the true value of bait is not possible to quantify). The commercial fishing values are set for the whole Atlantic Canada region at current average levels at \$0.68 per pound, regulated by a total allowable catch. No per pound value was assigned to the recreational catch.

Figure 2. Median catches for minimize and maximize fishing scenarios projected catches over a 19 year time period. Both assume a bait catch of 25000 tonnes and 425 of recreational catch above the TAC so starting points are higher than TAC. Sources: Van Beveren et. Al. 2018, and Gardner Pinfold (estimates after 2028).



<sup>8</sup> Harvest control rules (HCRs) are the operational component of a harvest strategy, essentially pre-agreed guidelines that determine how much fishing can take place, based on indicators of the targeted stock’s status. <https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2016/07/harvest-control-rules>

<sup>9</sup> Van Beveren, E., J.R. Marentette, A. Smith, M. Castonguay, D.E. Duplisea. 2019. *Evaluation of Rebuilding Strategies for Northwestern Atlantic Mackerel (NAFO Subareas 3 and 4)*. DFO Can. Sci. Advis. Sec. Res. Doc. 2019.



## Results



From a cost-benefit analysis over a 19-year period, minimizing fishing now and rebuilding the stock is favourable compared to maximizing fishing. The “maximizing fishing” scenario drives the stock to zero while the “minimizing fishing” scenario allows for slow rebuilding (Figure 2).

The overall benefits of minimizing fishing are an estimated **\$54 million** and provide a **12.9% return on “investment”** in stock rebuilding over two decades.<sup>10</sup>

While it may seem attractive to fish now and deal with consequences later, the analysis shows that the best decision is to fish less now and rebuild the stock. The value of fishing more now—with a strong likelihood that this short-term benefit will collapse the fishery—is heavily outweighed by the prospect of little or no fishing in the future and possibly a longer rebuilding period, as has been the experience with collapsed fish populations where fishing effort was not sufficiently reduced.

<sup>10</sup> MacAskill, G. (2020). Value of Atlantic Mackerel and Stock Rebuilding in Canada. Gardner Pinfold Consultants Inc.



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## Conclusions & Recommendations

This analysis looked beyond the scientific assessment of rebuilding to consider longer-term economic benefits. The results present a clear case for the economic benefit of reducing fishing now and rebuilding Atlantic mackerel, counter to the current approach.

To ensure the future of the mackerel population, it is recommended that DFO take the following actions immediately (and ideally within the 2021-2022 year):

- Reduce the total allowable catch of mackerel to maximize the economic benefits of rebuilding.
- Follow the rebuilding provisions of the *Fisheries Act* and associated policies, including the Policy of New Fisheries for Forage Species, to rebuild the mackerel stock to a healthy level.
- Conduct cost-benefit analyses and make them publicly available when using socio-economic reasons to justify decisions.
- Improve bait reporting to ensure compliance with quotas and support options for alternative bait.
- Implement measures to monitor the recreational fishery.
- Consider the requirements under Section 35 of the Canadian Constitution and Supreme Court decisions that give priority access to Indigenous harvesters for food.
- Complete an assessment of the value of mackerel to other species in the marine food web (e.g. fish, whales, birds) to better understand the impact of its population decline on the ecosystem as a whole.
- Integrate findings of this assessment into fisheries management decision making.





# What are the other benefits and values of mackerel?

Although this economic study focused on the commercial fishery, mackerel are worth more to people and the environment than what they sell for per pound. There are social and cultural values attached to all mackerel fisheries. In many cases, however, these values must be considered qualitatively. The economic analysis also does not include the potential ecosystem benefits of maintaining or rebuilding the mackerel population, since they are a critical component of the food web.

## Ecosystem

Mackerel are a “forage fish”: marine predators like bluefin tuna, sharks, whales and seabirds all rely on them for food. In turn, mackerel act as predators for smaller organisms like zooplankton. This link in this food web is critically important to ecosystem health, and breaks in this link could have catastrophic impacts on the broader ecosystem.

## First Nations

First Nations have been harvesting from their lands and seas since time immemorial. First Nations mackerel fisheries generally fall into two categories. The first is a Food, Social and Ceremonial (FSC) fishery used to catch mackerel for food or as bait. First Nations may also operate in a commercial communal fishery, where the community gets economic benefits from the fishery that are used for community-based projects.

## Bait

The total volume and true value of the bait fishery are difficult to quantify due to insufficient reporting and data collection. However, we do know that the value fluctuates due to the lobster and crab fisheries: as shellfish prices rise and there are strong landings, demand for bait strengthens, pushing prices higher. The price is also often connected to the relationship between buyers and fishers of shellfish because buyers sometimes bundle bait costs into their arrangements. Furthermore, fishermen have cultural and historical preferences for mackerel as bait.

## Recreational

Recreational fishing for mackerel is a popular pastime, but data on the catch is sparse. DFO does not collect annual recreational catch statistics. However, using information from a 2010 DFO survey, it is possible to get a rough estimate of the volume of mackerel caught and to quantify the value of the recreational fishery. The volume estimate is based on fish kept (removed from the stock) and an estimated average weight of fish (500g), corresponding to a 30 cm (15 inch) 4-to-5 year-old mackerel.<sup>11</sup> This analysis estimates that the amount spent in Atlantic Canada on recreational mackerel fishing could be close to \$20 million dollars.<sup>12</sup>

Table 1. Recreational mackerel fishing volumes and values, by province. Source: DFO, 2010. Survey of Recreational Fishing in Canada.

	Kept	Volume (t)	Spent (\$2018) <sup>13</sup>
NS	441,406	221	10,562,019
PEI	68,899	34	741,678
NL	339,548	170	8,390,289
<b>Total</b>	<b>849,853</b>	<b>425</b>	<b>19,693,986</b>

<sup>11</sup> Fisheries and Oceans Canada (DFO), 2000. Atlantic Mackerel of the Northwest Atlantic: Stock Status Report.  
<sup>12</sup> MacAskill, G. (2020). Value of Atlantic Mackerel and Stock Rebuilding in Canada. Gardner Pinfold Consultants Inc.  
<sup>13</sup> Conversion of 2010 to 2018 dollars based on StatCan CPI (all items).