

# Canada's submission to the seventeenth round of Informal Consultations of State Parties to the United Nations Fish Stock Agreement (ICSP-17)

## Sustainable fisheries management in the face of climate change

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Climate change and biodiversity loss are altering Canada's oceans and freshwater resources, posing a serious risk to aquatic ecosystems with significant social, cultural, and economic implications for fisheries, marine resource industries, as well as coastal and Indigenous communities.

Canada's climate is warming at twice the rate of the global average, with the Arctic warming at four times the global average rate. Canada's oceans have been increasingly acidic and less oxygenated for at least three decades. Canadian portions of the Arctic and Atlantic have experienced longer and more widespread sea-ice-free conditions. Baffin Bay and the Beaufort Sea are likely to be largely ice free by 2050. Freshwater ecosystems are experiencing summer droughts, flooding, and heat waves or unprecedented levels of mid-winter precipitation. Last year was a historic wildfire season in Canada. Our climate is changing and with every passing year, we are experiencing an increase in extreme weather events. Climate change is causing extreme temperatures at a greater frequency than in the past, increasing the severity of heat waves and contributing to dry conditions, wildfires, and heavy precipitation risks.

The frequency and intensity of climate change impacts are expected to continue to increase at an accelerating rate, with coastal communities and infrastructure being particularly vulnerable. Climate-induced hazards, including more frequent and severe extreme weather events, have already contributed to infrastructure damage, loss of services and economic activity, damage to cultural heritage, safety concerns and disrupted livelihoods in Canada's coastal communities.

### **1. Understanding the impacts of climate change on fisheries**

The current approach to Canada's fisheries management regime is grounded on the predictability of stock locations, which allows for the establishment of stable fishing areas. However, climate-driven changes in variables such as temperature, ocean chemistry, sea ice, water cycles, and extreme weather events are directly impacting the abundance, size, distribution, life cycles and survival of species, potentially negating the rationale for some existing fishing area boundaries.

Climate change is projected to shift suitability ranges for many North American fisheries while simultaneously contributing to unanticipated changes in overall species abundances. Key implications of these shifts include increased competition between species at higher latitudes, the introduction or expansion of emergent or invasive species, the departure of key species from traditional areas, as well as increased predation on native species by invasive or transient species. In some cases, the rate of change due to climate impacts may be outpacing species' ability to adapt.

Canada's fish stocks and fisheries have historically fluctuated from year to year, however the current changes fall outside this variability and are occurring at an unprecedented rate. Canada expects these impacts to accelerate and intensify moving forward. The potential losses and gains for harvesters and coastal communities are expected to be variable across all regions, however, climate related declines in animal biomass will likely be the most significant in areas that currently support the largest Canadian fishery landings. Further, many traditional stock assessment estimates are based on an assumption that populations are in a state of environmental 'equilibrium', which will be increasingly hard to rationalize under many climate change scenarios and will require increasingly more complex analytical solutions to address adequately. In some cases, socio-economic impacts of climate change are expected to intensify. While these impacts are being felt differently across Canada's three coasts, Canadians are already experiencing disruptions to their livelihoods, and loss of revenue caused by extreme weather and fishery closures.

The implications of climate change have, and will, continue to challenge the ability of our current fisheries management regime to adapt quickly and nimbly to the instability and uncertainty of these changes. The ability of both the harvesting sector and governments to adapt to the challenges brought on by climate change will play a considerable role in the future of sustainable fisheries in Canada.

## **2. Legislative and regulatory tools to sustainably manage Canadian fisheries in the face of climate change**

Canada's *Fisheries Act* (the Act) provides a framework for the proper management and control of fisheries and the conservation and protection of fish and fish habitat. Under the authority of the Act, the Minister of Fisheries and Oceans can adjust harvest levels of fish stocks to account for the uncertainty associated with the effects of climate change on those stocks.

Recommendations to the Minister on harvest levels are guided by the precautionary approach, which is outlined in Canadian policy. Thus, if there is uncertainty about the status of a fish stock, or the environment's effects on the stock, the Minister may implement a more risk-averse harvest level.

In 2019, the Act was amended to strengthen Canada's fisheries management framework, including the introduction of the Fish Stocks provisions. These provisions require the Minister to implement management measures to maintain major stocks prescribed in regulation at levels necessary to promote their sustainability, and to develop and implement rebuilding plans if they become depleted. Notably, the provisions require the Minister to consider the environmental conditions affecting the stock when developing management measures and rebuilding plans. The supporting guidelines clarify that "environmental conditions" are to be broadly interpreted and include climate change. The provisions currently apply to 30 major fish stocks and Canada is working to prescribe additional major fish stocks under the regulations.

The Act and associated regulations give the Minister the authority to monitor fishing activity and request reports on catches. For example, licence holders can be required to: (a) keep log books on their catches and have their log book data verified by a third party, or (b) have a certain percentage of their trips accompanied by an at sea observer, or (c) ensure that all landings are offloaded in the presence of a dockside monitor.

Monitoring requirements differ from one fishery to the next. The specific monitoring requirements for a fishery are set out in the Conditions of Licence for each fishery and enforced via delivery of enforcement programs. Canada's department of Fisheries and Oceans is in the early stage of implementing a national Fishery Monitoring Policy (FMP) that requires the Department to assess the fishery monitoring program in each fishery to ensure that the data from the fishery's catch monitoring programs is sufficiently precise and accurate to be used to manage the fishery. In the future, as the policy is implemented, Canada may need to make improvements to some fishery monitoring programs to align with the policy objectives.

### **3. Actions taken to sustainably manage fisheries in the face of climate change**

Canada has outlined an aggressive climate change agenda that includes science-based policy and regulatory actions, both domestically and abroad. Canada is advancing an ecosystem approach to fisheries management (EAFM), which represents a critical step along the ecosystem approach continuum. EAFM enhances the current single-stock approach to fisheries management by incorporating ecosystem variables into stock assessments, science advice and fisheries management recommendations, enabling more explicit consideration of trade-offs that are already inherent in the management of fisheries resources, e.g., tradeoffs between stock and ecosystem conservation, social, economic and cultural considerations. Improved understanding of ecosystem influences on fish stocks and fisheries gained through implementing EAFM will form the basis for a more comprehensive ecosystem approach in the longer term.

Canada's 2009 Sustainable Fisheries Framework (SFF) suite of policies set out procedures to manage Canadian wild-capture fisheries to support conservation and the sustainable use of aquatic resources. The SFF sets the foundation for EAFM in Canada and includes policies on the precautionary approach (PA), bycatch, sensitive benthic areas, and catch monitoring. The PA Policy is a key policy which describes how Canada will apply a precautionary approach when setting and managing harvest levels on a stock.

EAFM strengthens Canada's fisheries management framework by explicitly considering fish stock and ecosystem dynamics to better account for multiple pressures such as changing ocean ecosystems, climate change, and loss of biodiversity in the provision of science advice and management recommendations.

Canada's rich endowment of marine and fisheries resources is important for sustaining our economy, holding the keys to economic growth, employment, and innovation. Marine Protected Areas (MPA) and other effective area-based conservation measures (OECMs) contribute to a healthy marine environment and may mitigate the impacts of climate change and biodiversity loss by protecting important species, their habitats, and support the recovery of depleted fishing stocks. In 2021, Canada invested \$976.8 million in funding over five years to manage existing sites and to conserve 30 per cent of our oceans by 2030, through MPAs and OECMs, such as marine refuges. Canada's marine conservation processes are informed by science, Indigenous knowledge, and local perspectives through all phases of site establishment and ongoing management. In partnership with provinces, territories, Indigenous peoples, marine industry stakeholders, ENGOs, academia, and local communities – we have moved from approximately one per cent of protected ocean space in 2015 to today's current total of 14.66 per cent.

Biodiversity is a fundamental pillar to healthy oceans and resilient ecosystems, and resilient ecosystems help support abundant fish stocks. Thus, actions towards mitigating biodiversity loss and restoring ecosystems are actions towards sustainably managing fisheries in the face of climate change. While climate change is recognized as one of the leading threats to biodiversity, ecosystems have complex responses to climate change which are incompletely understood and context specific. There is, however, a growing body of evidence to suggest that the conservation and sustainable use of marine biodiversity, domestically as well as in areas beyond national jurisdiction, may enhance the resilience of marine ecosystems, help ecosystems recover from disturbances, and enable more effective adaptation to changes over time.

Domestically, Canada has made strides in conserving its oceans. By working with provinces, territories, Indigenous Peoples, marine industry stakeholders, ENGOs, academia and local communities, Canada has protected and conserved more than 14 per cent of its marine and coastal areas to date. Canada is committed to conserving 30 per cent of Canada's oceans by 2030 through the establishment and effective management of marine protected areas (MPAs) and recognition of other effective area-based conservation measures (OECMs).

Canada is also investing in climate resiliency for small craft harbour infrastructure to drive economic growth by supporting the capacity of Canada's commercial fisheries, as well as other marine users such as fish processing, transportation, aquaculture, and tourism. Since 2016, the Government of Canada has announced more than \$1.3 billion in new funding to support small craft harbours, where 90 per cent of catches by Canadian commercial harvesters are landed.

Fisheries and Ocean Canada works to ensure that modifications to small craft harbour assets, such as wharves and breakwaters, appropriately take into consideration the impacts of climate change and are designed and built using the best climate-resilience information available. This work leverages tools such as the Canadian Extreme Water Level Adaptation Tool and the

Coastal Infrastructure Vulnerability Index. The impact of climate change and significant weather events was clearly demonstrated during Hurricane Fiona in 2022, when 142 small craft harbours in Atlantic Canada and Eastern Quebec were damaged, of which 83 required significant interventions to ensure they were safe and operational.

In light of this destruction, the Hurricane Fiona Recovery Fund (HFRF) was announced on October 4, 2022 by Prime Minister Justin Trudeau to fund losses not covered under other Government and private sector measures. As part of HFRF, \$70 million was earmarked for Canada's small craft harbour program to support the immediate and urgent work of repairing harbours damaged by Hurricane Fiona. More recently, Budget 2024 proposes to provide \$463.3 million over three years, to repair and maintain small craft harbours, including those damaged by Hurricane Fiona. Work continues to repair Fiona-impacted harbours, as well as many other harbours that are in need of repair, both because of regular wear and tear, and due to the extreme weather events that are becoming more frequent and severe with climate change.

Canada's Department of Fisheries and Oceans will continue to investigate the use of artificial intelligence (AI) to detect anomalies in conductivity, temperature, and depth (CTD) data. Changes in CTD data can indicate shifts in oceanic conditions, which may have implications for marine life. The scientific information obtained from analyzing CTD data can guide resource management decisions. It can help identify areas needing protection, monitor the effects of climate change, track pollution, or manage fisheries sustainably.

International collaboration is another key component of the climate change adaptation journey in fisheries management, as a changing climate is expected to shift species distributions, potentially leading to conflicts related to fishing access and allocation. Recognizing the dynamic and interconnected nature of ocean systems, Canada's international efforts to deliver effective ocean protection and sustainable use of marine biodiversity in the high seas offer opportunities to support its vision where restored ocean health ensures long-term livelihoods of coastal communities and Indigenous peoples and supports resiliency of Canada's marine sectors. Efforts to advance the effective protection of marine ecosystems and sustainable management of economic activities in areas beyond national jurisdiction, include Canada's participation in multilateral fora such as the Convention on Biological Diversity (CBD) as well as the Agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ Agreement).

In 2022, Canada committed to the Kunming-Montreal Global Biodiversity Framework, a new strategy to guide actions worldwide through 2030 to halt and reverse biodiversity loss, with targets that include the adoption of the ecosystem approach to help ensure the sustainable harvest of wild stocks and provide social, economic and environmental benefits to people. Canada supports of the United Nations Decade of Ocean Science for Sustainable Development

and will continue working with the Canadian ocean community and other partners to advance efforts to stimulate ocean science and knowledge generation to reverse the decline of the state of the ocean system through projects that contribute to advancing solution-oriented ocean science.

International fisheries management fora are increasingly turning their attention to better understanding the impacts of climate change on fish populations and the ecosystems that support them, and to ways of managing fisheries to account for these impacts. Canada is taking a leadership role in advocating for and advancing this work. For example, Canada has successfully advocated to begin work in several regional fisheries management organizations in the Atlantic and Pacific Oceans to examine the impacts of climate change on fish stocks and to consider effects on fisheries and their management, and how management might account for these effects. In addition, under the Central Arctic Ocean Fisheries Agreement, Canada and nine other Parties are taking a proactive and precautionary approach to future fishing activities in the high seas portion of the central Arctic Ocean which is being so strongly affected by climate change. In this context, all Parties are committed to implementing a joint program of scientific research and monitoring to enhance our knowledge of the Arctic Ocean ecosystem and improve our understanding of Arctic fish stocks.

### *3.1 Adaptive management of the sustainable snow crab and lobster fisheries to mitigate impacts on North Atlantic right whale (NARW)*

Canada's lobster and crab fisheries are vitally important to our fisheries sector. These fisheries are also closely managed to ensure sustainable usage of resources. However, with a changing climate come new challenges. Climate change has caused significant northwards shift in summer feeding habitat of North Atlantic Right Whale (NARW) along Canada's eastern seaboard, from the Bay of Fundy and Scotian Shelf into the Gulf of St. Lawrence, overlapping with traditional snow crab and lobster fishing grounds. The NARW is a critically endangered population with only 356 individuals remaining. Following an unprecedented NARW mortality event in the Gulf of St. Lawrence in 2017, Fisheries and Oceans Canada worked closely with harvesters, Indigenous peoples, Environmental Non-Government Organizations (ENGOS), and scientists to swiftly implement robust and adaptive management measures, based on science, to both protect NARW and support the ongoing sustainable management of the fisheries impacted.

Fisheries management measures include a suite of closure protocols supported by a world class surveillance and monitoring regime to aid in the prevention of NARW entanglements in fishing gear. Adaptive management is a crucial approach to address the complex challenges posed by changing environmental conditions and the need for species conservation. Additionally, Canadian harvesters are also leading the way in developing and testing innovative fishing gear that is more "whale-safe", including using "on-demand" fishing gear to harvest snow crab and lobster in areas closed to traditional fishing due to NARW presence. Canada continues to work

with fish harvesters to identify how whale-safe technology and practices can be incorporated safely and effectively into their operations. For example, in 2023, Canada amended the Fishery (General) Regulations of the Fisheries Act to provide new flexibility to change the way harvesters mark their fishing gear on the water surface, creating new opportunities to support harvesters' use of innovative fishing gear in commercial fisheries. Harvesters will play a central role in developing a Whale-safe Gear Strategy for Canada, to guide our long-term efforts to protect whales while supporting sustainable and prosperous fisheries.

### *3.2 The use of Marine Protected Areas to protect important subsistence species*

The Anguniaqvia niqiqyuam marine protected area (ANMPA) in the Western Arctic was the first marine protected area in Canada to have a conservation objective solely based on traditional knowledge. This conservation objective serves to protect important subsistence species: qilalugaq (beluga), iqalukpik (Char), and natchiq and ugyuk (ringed and bearded seals), as well as their key habitat. The first monitoring plan for the ANMPA is being developed so that community priorities are the backbone of the plan. Collaboration with partners will lead to monitoring of the important ecological features of the MPA as well as the priorities and concerns of communities in the Inuvialuit Settlement Region.

### *3.3 Use of management strategy evaluation (MSE) to develop management strategies*

Where data and resources permit, Canada is increasingly using management strategy evaluation (MSE) as a tool to develop harvest strategies and rebuilding plans. Unlike stock assessments that rely on a single model to assess stock status and/or provide projections of future stock states, MSE tests whether potential harvest strategies can achieve pre-agreed management objectives across a range of plausible modelled scenarios. This enables Canada to identify management strategies that are likely to perform well, despite uncertainty in how environmental conditions may change or how the stock may react to those changes, as well as balance trade-offs among competing management objectives. For example, MSE was recently used to develop a rebuilding plan required under the Fish Stocks provisions of the *Fisheries Act*: Pacific herring – Haida Gwaii. This harvest strategy and rebuilding plan is intended to be reviewed periodically, to ensure they are accomplishing the pre-agreed management objectives, and if not, to allow for adjustments as more information is gathered.

### *3.4 Adaptive in-season management of anadromous fish stocks*

For some fish stocks, such as Pacific sockeye salmon, Canada has longstanding management practices to respond to in-season changes in environmental conditions. In British Columbia, Fisheries and Oceans Canada monitors water levels and temperatures of the Fraser River in advance of sockeye stocks returns to spawn. Management of these stocks is based on escapement targets – that is, the number of adult fish that are not captured in the ocean salmon fisheries and thus are able to return to spawn in the Fraser River system. In years when the water conditions are less favourable and are likely to result in higher mortality as the adults

migrate upstream to their spawning grounds, the permitted harvest level is reduced in the oceanic fishery to ensure greater numbers of these salmon to return to the Fraser in order to offset the expected natural mortality.

### *3.5 Adaptive management of Newfoundland snow crab in a changing world*

From the perspective of EAFM, Newfoundland snow crab demonstrates how environmental variables can help to provide improved understanding of stock performance and contribute to an improved capacity to make predictions about that performance. Incorporating several environmental variables into the stock assessment, including water temperature as a primary environmental variable, the North Atlantic Oscillation index (fluctuations in atmospheric pressure at sea level), biological structure and trends, and available knowledge of ecological interactions (e.g., predator-prey) and stressors (e.g., anthropogenic impacts), demonstrate how climate systems can directly impact fishery dynamics and productivity. The resulting science advice for Newfoundland snow crab specifically noted that several ecosystem drivers may be encouraging both short and long-term growth of the stock, including the influence of cooler bottom water temperatures and a slight decline in predation in most areas. Ultimately, the scientific information helped to inform the decision for an increase in the overall total allowable catch. For the sustainable management of fisheries, the use of environmental variables points to increased confidence that may be available for decisions that do not compromise the future health of stocks and can provide resource users with longer-term certainty about likely stock trends, associated economic opportunity and fishery stability.

### *3.6 Warm water protocols for adaptive management of recreational fisheries*

Due to the warming of waters and the trends of declining returns of Atlantic salmon in the rivers of Eastern Canada, a number of measures have been put in place to limit fishing activity and to reduce fish mortality. The most significant measure is the use of warm water protocols to reduce stress on salmon during summer months. Warm water protocols for wild Atlantic recreational fisheries have been developed for some jurisdictions in eastern Canada (rivers of Gulf Region and all rivers in Newfoundland and Labrador) and are expected to be developed for other rivers (e.g., rivers with documented problems in Quebec), where they can be proven to function as a useful tool in supporting decisions to promote sustainability of the stocks.

## **4. Challenges and opportunities for strengthening sustainable fisheries management in the face of climate change**

The scale of the challenges climate change presents in Canada makes it difficult to determine where to focus energy and resources, particularly given the vastness of Canada and the variety of impacts felt on all three coasts. Examples of possible challenges include:

- Resource abundance, diversity and availability in aquatic ecosystems is becoming increasingly uncertain as formerly healthy ecosystems become less resilient, particularly with respect to the impacts associated with climate change. Some of these changes take



place gradually over time while others may be more rapid and difficult to predict, such as sudden marine heat waves or cold spells, all of which can affect stocks differently. The magnitude and specific impacts of such changes vary across aquatic ecosystems; nonetheless, point to the need for action to manage fisheries in ways that anticipate and are responsive to these changes.

- More data is required to support sustainable fisheries management. Environmental conditions are expected to be more variable and change more rapidly due to climate change. As a result, understanding how stocks are responding to these environmental changes requires more frequent stock assessments, and sometimes additional data collection (e.g., of environmental factors). There is a need for assessment and monitoring of cumulative impacts of climate change impacts in combination of various types of pollution and other anthropogenic impacts and stressors of marine and coastal biodiversity, as well as socio-economic analysis of the cumulative impacts on fisheries, food security and livelihoods of coastal communities.

Despite the severity of climate change impacts, there are potential opportunities that can contribute to strengthening sustainable fisheries management.

- Climate change impacts could accelerate the implementation of EAFM.
- Climate change impacts may lead to possible new or expanded access to fish (particularly in the North), including through increases in biomass of certain species and northward migration patterns.
- Climate change has prompted the exploration of different and innovative solutions that could support a shift from reactive to proactive and forward-looking policy and decision-making.
- Climate change has prompted the exploration of means to increase the flexibility of the current fisheries management regime to respond quickly to changes.
- Increased collaboration with domestic and international partners could be an opportunity to strengthen relationships.

Canada looks forward to participating in the seventeenth United Nations Informal Consultation of State Parties to exchange information on sustainable fisheries management in the face of climate change and build on our approach in the future.