



INTERNATIONAL ALLIANCE TO
COMBAT OCEAN ACIDIFICATION



Case Study: How is British Columbia Addressing Ocean Acidification?

Region: British Columbia (B.C.), Canada

Kilometers of Coastline: 27,200 km

Regionally Significant Marine Resources: Top seafood commodities in terms of sales (2018) are: Atlantic salmon, wild salmon, crabs, wild geoducks, halibut, prawns, wild sablefish, hake, rockfish and herring.

Status of Action Plan: In Progress

Key statistics on ocean economy: British Columbia's (B.C.'s) aquaculture industry employs close to 4,505 people. In 2018, there were \$1.29 billion in seafood sales and aquaculture sales of \$814.6 million. There are 276 shellfish companies in B.C. Total estimated GDP for seafood was \$347 million. In 2018, B.C. exported \$1.4 billion in seafood products to 78 markets, an increase of 8 percent in value from 2017. The aquaculture industry in B.C. represents more than half the total aquaculture production in Canada. Wild capture fisheries and tourism are also significant contributors to B.C.'s economy.

What Is at Stake in Your Region?

- There are over 40,000 islands in B.C. and numerous coastal communities. The oceans are a source of economic and food security for Indigenous and non-Indigenous coastal communities.
- B.C. is home to over 200 First Nations communities. Since time immemorial, Indigenous peoples have had reciprocal relationships to the land, water and species of this region. Each Nation has a unique connection to the land through language, traditions, and law. The culture and food sources of First Nation communities along the coast are intrinsically linked to ocean species. Almost all First Nations in B.C. have active salmon-bearing streams in their territories.
- Commercial fisheries are a significant contributor to the provincial economy and the social fabric of numerous coastal communities. This industry includes the commercial harvesting of more than 80 different species of finfish, shellfish, and marine plants from both freshwater and marine environments.
- In 2018, B.C.'s commercial fisheries generated a landed value of \$476.4 million representing 36.9 per cent of the total landed value of all BC seafood.
- Oysters are the main shellfish species farmed in B.C., with sales of \$16.6 million in 2018.
- The natural beauty of B.C., including the diversity, wildlife and beauty of our coasts, are a driving factor in the province's tourism industry and the international *Super, Natural British Columbia* brand.



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Policy Vehicle, Enabling or Authorizing Conditions for Action on Ocean Acidification

- Aquaculture in Canada is a shared responsibility. Fisheries and Oceans Canada works closely with other federal government departments, the provinces and territories, local governments, First Nations, and the aquaculture industry to support sustainability in Canada's farmed fish and shellfish sectors. B.C. provides regulation and oversight while working with a network of provincial agencies, partners in the federal government, local government, First Nations, academic institutions, non-governmental organizations and research institutes to monitor ocean species, conditions and chemistry.
- Jurisdiction over the ocean lies primarily with the federal government of Canada. B.C. works closely with the Department of Fisheries and Oceans (DFO) to monitor and protect the waterways and coast of B.C.
- **CleanBC lays out the Province's pathway to secure a stronger, cleaner future.** It outlines programs, policies and incentives to reduce greenhouse gas emissions across sectors while furthering the shift to a clean economy.
- CleanBC also commits to developing a provincial climate preparedness and adaptation strategy by the end of 2020 in collaboration with Indigenous peoples. In 2019, B.C. completed a [Preliminary Strategic Climate Risk Assessment](#). The risk assessment is a key step to better understand climate-related risks in B.C. and help government develop appropriate measures to address those risks. Ocean acidification was ranked as one of the greatest risks to the province, along with severe wildfire season, seasonal water shortage, heat wave, glacier loss, and long-term water shortage. The assessment will help inform the development of actions included in the climate preparedness and adaptation strategy.
- Ocean health and the protection of keystone species such as the resident orcas and wild salmon are drivers in provincial environmental and conservation policies. Healthy wild fish and shellfish stocks are vital to the economic prosperity and social fabric of B.C.'s coastal communities, and are fundamental to the identity of many Indigenous communities.
- B.C.'s focus on habitat restoration projects and research science is part of a broader approach to addressing declines in salmon stocks that include restoring lost protections for fish and fish habitat in the modernized Canadian federal *Fisheries Act*, science-based fisheries management measures, reviewing concerns regarding predation and implementing a plan to fight climate change.
- The British Columbia Salmon Restoration and Innovation Fund (BCSRIF) is a 70 percent federal, 30 percent provincial cost-shared program. The Government of Canada is investing \$100 million over five years through the BCSRIF and has provided a one-time investment of \$5 million for the Pacific Salmon Endowment Fund. The Government of British Columbia is investing \$42.85 million over five years through BCSRIF and has provided a one-time grant of \$5 million for the Pacific Salmon Foundation. Investments through the BCSRIF will help ensure British Columbia's wild fisheries are environmentally and economically sustainable for the long-term, and that



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employment in the fishery is resilient to the challenges of climate change, as well as evolving economic conditions. For example, a project by the Pacific Climate Impacts Consortium (University of Victoria) will conduct research to improve our understanding of potential threats to Pacific salmonids and their habitats posed by climate change (including ocean acidification) and develop risk assessment tools to support adaptive regional management approaches.

- In addition, there is active collaboration between government agencies, industry, academia and non-governmental organisations to monitor ocean acidification and better understand oyster genetics to inform climate change research, and in particular ocean acidification, and the development of adaptation strategies.
- B.C. was a founding member of the International Alliance on Ocean Acidification and works closely with our West Coast partners on monitoring networks through the Pacific Coast Collaborative because we know the importance of partnerships and working together to combat challenges related to climate change.

“British Columbians know the impacts of climate change and are deeply concerned about the health of our oceans. By collaborating with Indigenous nations, marine researchers, all levels of government and other partners we are taking action to understand and address ocean acidification and its impact on our world. Our CleanBC plan, backed by the transparency of our Climate Change Accountability Act, sets out comprehensive actions to achieve our targeted emission reductions while making sure B.C. continues to prepare for a changing climate. In addition, we are coordinating with coastal communities to address the harmful impacts of marine debris on our ocean environment.” -George Heyman, B.C. Minister of Environment and Climate Change Strategy

Priority Areas or Actions

- B.C. is focused on implementing CleanBC; the actions and commitments in CleanBC will reduce the causes of ocean acidification and help to build adaptation and resiliency of coastal communities. Progress on implementation can be found in the [Building a cleaner, stronger BC 2019 Climate Change Accountability Report](#) and at [CleanBC in action](#).
- B.C.’s Ministry of Agriculture is working with partners (BC Shellfish Growers Association, Vancouver Island University, and the Hakai Institute) to monitor ocean chemistry and to develop a selective breeding program for oysters through the Ocean Acidification Shellfish Industry Seed Supply (OASISS) project. The Ministry funded the acquisition of instrumentation to monitor ocean acidification in Baynes Sound, where the majority of B.C.’s farmed oysters are grown. The Hakai Institute also provides in-kind support to operate and maintain the equipment. The instrumentation measures several chemical parameters including ocean temperature, pH, and calcium saturation.



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- The Baynes Sound Environmental Intelligence Collaboration (BaSEIC) project collects ocean chemistry data in near-shore environments off the B.C coast. This information is made publicly available to allow shellfish farmers to make informed decisions on stocking young, highly vulnerable oyster seed to avoid periods when low calcium saturation levels may impact survival. The information obtained from BaSEIC will be used to inform OASISS, which is a multi-stakeholder partnership with funding from the Ministry of Agriculture. OASISS will maintain a repository of Pacific oyster broodstock selected for optimal growth under regionally relevant ocean acidification conditions.
- The research chair for the OASISS project is currently working with the industry to establish a selective breeding/applied research program to better understand impact, adaption, and survival, at the genomic level, of Pacific oysters to climate change. Seed developed by the program is sold to the industry, at market price, via the BC Shellfish Growers Association (BCSGA), to off-set the cost of running the hatchery and breeding program. The funding model was developed to sustain the long-term economic viability of the program while maintaining industry competitiveness.
- The Province is also co-managing/funding a program with the federal Department of Fisheries & Oceans to promote the adoption of clean technology for the Aquaculture, Marine Fisheries and Seafood Processing sectors (Fisheries and Aquaculture Clean Technology Adaptation Program -FACTAP). Many of the projects use the reduction of greenhouse gasses as a performance metric.
- The Marine Plan Partnership for the North Pacific Coast (MaPP) initiative is a partnership between the Province of British Columbia and 16 member First Nations that developed and are implementing marine-use plans for B.C.'s North Pacific Coast. The initiative used the best available science and local and traditional knowledge to develop four sub-regional plans and a regional action framework. Actions related to ocean acidification include:
 - Monitoring kelp forests, eelgrass beds, and estuaries (in collaboration with Hakai Institute and The Nature Trust, and with support from DFO) to identify management actions to promote resilient nearshore ecosystems, including monitoring climate variables, such as pH and sea surface temperature, and water quality, including dissolved oxygen.
 - Supporting shellfish and kelp aquaculture pilot projects to test the viability of those industries on North Vancouver Island, also recognizing marine plant aquaculture as a potential buffer for OA in nearshore ecosystems.
 - Addressing the cumulative effects of human development to identify management actions that support resilient nearshore ecosystems and healthy communities in partnership with B.C.'s Environmental Stewardship Initiative on B.C.'s North Coast.
 - Identifying and prioritizing key actions for coastal communities to address impacts of climate change, including OA.
 - Working with the federal government and First Nations to develop networks of marine protected areas that may provide resilience for marine ecosystems in the face of climate change.



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Measures of Success, Challenges, and Lessons Learned

- CleanBC has been recognized as an ambitious and forward-thinking approach that equally considers economic growth and emission reductions. To date, B.C. has committed \$1.3 billion dollars over four years for implementation.
- Success in five years will look like:
 - Emissions reductions across all sectors of the province, to contribute to the global effort to limit global warming and address the causes of ocean acidification.
 - Active collaborations with federal, Indigenous and academic partners to monitor the impacts of ocean acidification.
 - Communities and industry are preparing for and addressing the impacts of climate change.
 - B.C.'s aquaculture industry has a strong baseline dataset and understanding of near-shore ocean chemistry related to ocean acidification and has locally available, resilient oyster seed.
 - Effective collaboration between B.C. fisheries, aquaculture, coastal and Indigenous communities together with provincial and federal governments to ensure needs are assessed, monitoring networks are effective, modelling is in place to map future climate effects, and research is underway to support coastal communities, fisheries and aquaculture to innovate and adapt to changing conditions.
 - Stronger understanding and research of practices that create economic opportunity, buffer nearshore ecosystems from OA, support community resilience and sequester carbon, such as marine plant aquaculture.

How Do Domestic Climate Commitments support OA Action?

- CleanBC, the provincial climate preparedness and adaptation strategy, marine planning efforts and programs to support aquaculture all contribute to the goals of the OA Alliance.
- The Province of B.C. works closely with the Government of Canada to meet the Sustainable Development Goals and the commitments made under the UNFCCC and Paris Agreement.



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