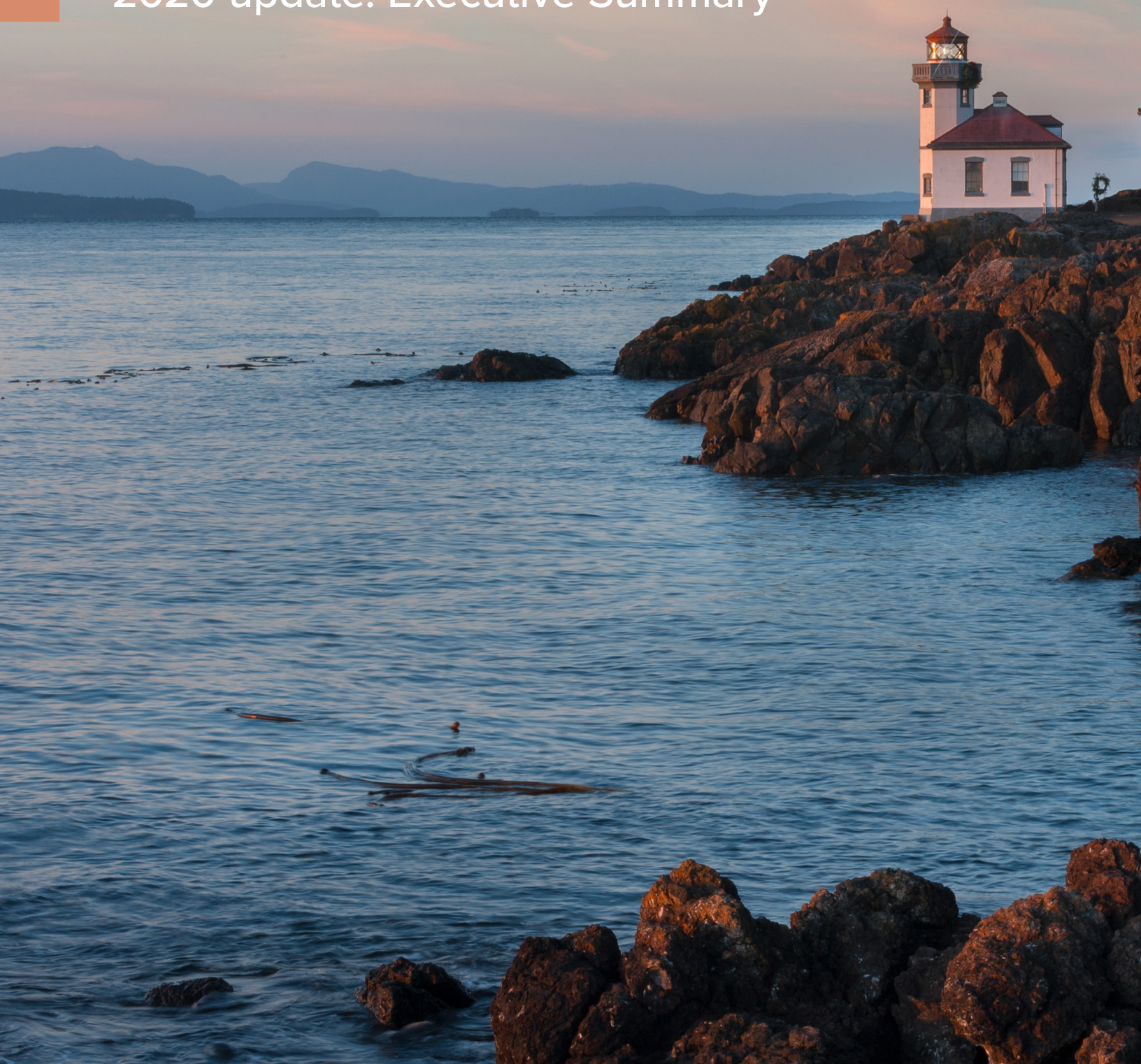


# The Salish Sea

Transboundary ecosystem indicators  
2020 update: Executive Summary



Government  
of Canada

Gouvernement  
du Canada



United States  
Environmental Protection  
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# Overview

The Health of the Salish Sea Report is a joint initiative between the United States (U.S.) Environmental Protection Agency (EPA) and Environment and Climate Change Canada (ECCC). This report is “evergreen” and describes trends across 10 indicators that help us to identify areas of progress in environmental management and priorities for further action across the transboundary Salish Sea ecosystem, which includes Puget Sound, the Strait of Georgia, and the Strait of Juan de Fuca.

Indigenous peoples have lived in balance within the Salish Sea ecosystem since time immemorial. Today, about 8.7 million people live in the areas around the Salish Sea and benefit from the resources that the ecosystem provides. By the year 2040, we can expect the population in the Salish Sea ecosystem to expand to over 10.5 million people. Sustainable stewardship of the Salish Sea ecosystem is critical to our continued use and enjoyment of this place.

In 2000, the EPA and Environment Canada (now Environment and Climate Change Canada) signed a Joint Statement of Cooperation (SoC) to facilitate cross-border understanding, dialogue, and collaboration on issues affecting the Salish Sea. Under this partnership and advice from our advisory groups and other program partners, we selected a set of indicators to help show where we are seeing progress in sustainably managing the Salish Sea ecosystem and its valuable resources, and where conditions are declining and course corrections are needed.

The ten indicators address the following questions:

- What’s happening?
- Why is it important?
- Why is it happening?
- What’s being done about it?

For most indicators, we also present highlights of Indigenous or regional knowledge from Salish Sea region First Peoples under the section called “sustainable perspectives.” Indigenous knowledge, sometimes also called Traditional Ecological Knowledge, together with western science, broadens the context and extends the timeline for the indicators, and draws important connections among the indicators.

EPA and ECCC work with many partners to collect or source data, analyze data, and to interpret the indicator results and trends. Contributing organizations and individuals are listed within the acknowledgement section of this report, and include the Puget Sound Partnership, Fisheries and Oceans Canada, U.S. National Oceanic and Atmospheric Administration, the Coast Salish Gathering, Washington State agencies, British Columbia agencies, Metro Vancouver, Western Washington University’s Salish Sea Institute, and many others. This report draws on existing publicly-available information, including agency technical reports, scientific sampling from Canadian and U.S. sources, and scientific work by non-governmental organizations.



## Ecosystem Trends

There are positive trends for one indicator, Shellfish Beaches. Many indicators, such as Air Quality, Swimming Beaches, and Freshwater Quality are displaying neutral trends, indicating no notable positive or negative changes in recent years. Other indicators, such as Marine Water Quality, Streamflow, and Marine Species at Risk are displaying declining trends.

Below are summaries of the ten indicators that we report on. To learn more about the status of each indicator, follow the links provided to the full reports.

### Air Indicators

#### Air Quality (Fine Particulates) – Neutral

Air quality can affect human health, the environment and the economy. Although the Salish Sea airshed has relatively good air quality compared to other urban regions, further decreasing the levels of fine particulates in the air in the Salish Sea basin will benefit human health.

Air quality has been generally improving over the years due to new actions in Washington and British Columbia that control sources of air pollution. The increasing severity of summer wildfires threatens to offset the beneficial impacts of these other pollution control actions. Looking at 13 select air quality stations in the Salish Sea airshed, only two stations failed to meet their own country's 24-hour standards due to wildfire smoke in 2018.

# Species Indicators

## Marine Species at Risk - Declining

The loss of species points to declining ecosystem conditions that affects the economic, social and cultural well-being of our communities. Without stronger efforts to protect and improve water quality and habitats and to conserve broader food-webs, the number and populations of local species may continue to decline.

Between 2011 and 2015, 17 new marine species were either designated as at-risk, or were identified as candidates for a status assessment in the Salish Sea. During this same time period, 14 marine species that were previously designated as at-risk, or that were candidates for a status assessment were declared as not currently being at-risk. Also, the increase in new marine species at risk documented between 2011 and 2015 was smaller than the increase documented between 2008 and 2011.

Despite these improvements, the total number of marine species at risk in the Salish Sea has doubled from 2002 to 2015.

## Chinook Salmon – Declining

Salmon provide food and support broader food-webs for a variety of wildlife, from bald eagles to killer whales to bears, and are a culturally invaluable food source for Tribes, First Nations, and our community as a whole. Chinook salmon in particular are the primary food source of the endangered Southern Resident Killer Whales (SRKWs). During their life cycle, salmon transfer energy and nutrients between the Pacific Ocean and freshwater and land habitats.

Salish Sea Chinook salmon populations are down 60% since the Pacific Salmon Commission began tracking salmon abundance in 1984. Between 2000 and 2018, the total number of Chinook returning to the Salish Sea has shown a relatively stable trend. However, during this time period, we also see a modest increase in catch and a modest decrease in fish returning to spawn, particularly over the last few reporting years.





## Southern Resident Killer Whales - Declining

Killer whales are viewed as an indicator species for the Salish Sea. The decline in local killer whale populations may indicate stressors that eventually will affect the whole ecosystem.

Since 2006, the population has generally declined and has not shown signs of recovery, with only 74 individuals as of December 2020. This trend, along with the biological condition and health of the current Southern Resident Killer Whale (SRKW) population; acoustic stressors; vessel impacts; the consistently low availability of Chinook salmon; and exposure to contaminants, indicate that this population is facing increasing threats to its recovery and even survival.

## Toxics in the Food Web – Neutral

Increased understanding of the interactions of contaminants is needed to support the protection of species in the Salish Sea ecosystem – including humans. While the effects of many contaminants are known, emerging contaminants require further study to understand impacts due to their release and ongoing presence within the Salish Sea ecosystem, and to inform management measures.

Concentrations of harmful legacy metals and persistent organic pollutants such as polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) have been decreasing in biota over time in many locations. However, their persistence in some habitats and species, such as English Sole in some urban bays and the SRKWs, remains a cause for concern.

Plastics, especially microplastics, are an emerging threat to the environment due to their prevalence, persistence and ability to transport and release other pollutants. More research is needed to fully understand the impact of plastics and other emerging chemical groups.

# Water Indicators

## Freshwater Quality – Neutral

Clean water from streams and rivers that flow into the Salish Sea is essential for maintaining a healthy ecosystem. Poor stream water quality, for example due to contaminants, pathogens, or excess nutrients, can impact downstream rivers and marine water quality. Contaminants can directly affect species through both acute and longer-term food-web based responses. Adding nutrients to marine waters can result in algal blooms that may lower oxygen levels and affect many species and uses of these waters. Pathogens directly affect recreation and shellfish harvests. Further, freshwater stream habitats and biological communities are impacted by a variety of stressors that are associated with land use conversion and urbanization, including but not limited to excessive fine sediment, loss of riparian and wetland vegetation and scouring high flows due to accelerated stormwater run-off.

Of the twenty rivers assessed since 2010, two rivers showed decreasing water quality. In particular, the Fraser River score declined from our Good classification to the Fair/Marginal classification. Though another ten of the rivers occasionally exceeded water quality guidelines, improving water quality scores were observed in three rivers (Cedar, Elwha and Snohomish).

## Marine Water Quality - Declining

As dissolved oxygen levels in marine waters decrease, animals in these habitats respond by changing their behavior to maintain their oxygen intake, such as moving to areas with greater oxygen levels, feeding less, and swimming less. Increased nutrient loads are impacting the water quality and habitats in many inlets and bays where forage fish and juvenile salmon spawn and rear, and where reproductive adult salmon gather before moving into watersheds to spawn.

Marine dissolved oxygen levels continued to display a declining trend in the waters of Puget Sound and the Strait of Georgia from 2010-2019. Marine Water Condition Index scores have also been in general decline over the past ten years for many areas in the Salish Sea including waters in boundary areas.

## Stream Flow - Declining

Changes in stream flow are associated with shifts in water availability, salmon habitat, water temperature increases, nutrient availability, and changes in sediment levels and transport. These changes can impact both human uses and the life cycles of salmon and other aquatic life.

Since 1975, eight of the 17 rivers that were monitored and studied by programs on both sides of the international border showed significant decreasing summer flow trends. Another eight of the remaining nine rivers showed only minor increases or decreases in flow, with only one gaining flow and likely due to increasing snowmelt.



# Human Well-Being Indicators

## Shellfish Harvesting – Improving

The Salish Sea region is one of the largest producers of shellfish in North America. Areas that are closed to shellfish harvesting can impact the livelihood of growers, workers, supermarkets, restaurants, hotels, and sales of recreational equipment, among other economic losses. Shellfish closures also impact First Nation and tribal shellfish harvesting rights, which have been part of traditions and economies for thousands of years.

Between 2007 and 2019, over 6,400 acres of previously closed shellfish beds in Puget Sound have been upgraded or re-opened due to improvements in water quality in local harvest areas, despite increasing population growth and urbanization across the region. In the Georgia Basin between 2007 and 2019, there was an increase in closed shellfish beds.

## Swimming Beaches - Neutral

Clean swimming beaches are an important part of the quality of life in the Salish Sea region. This indicator is closely linked to local practices and management actions.

Between 2004 and 2018, nearly three-quarters of all swimming beaches in the Salish Sea consistently met water quality guidelines over each season. These beaches were almost always available for public use during the monitoring periods, with the possible exception of during shorter intervals following local rain events. Localized management actions need to be directed to areas not meeting health guidelines.







## Collaboration for the Health of the Salish Sea

Under the SoC, the United States and Canadian federal governments commit to work collaboratively to achieve shared goals for the health of the Salish Sea ecosystem. The United States and Canada collaborate with many Salish Sea partners, including Washington State, British Columbia, Tribes, First Nations, local governments, universities, and stakeholders to support research, monitoring, ecosystem protection, and restoration.

The United States government funds a number of programs that contribute to the protection and recovery of Puget Sound, including EPA's [Puget Sound National Estuary Program](#) which is led by the Puget Sound Partnership and works in close coordination with other state and local agencies, Tribes, and other partners to further needed recovery efforts. Many of the projects funded under the National Estuary Program have implemented habitat protection and restoration efforts supporting key species; tackled the protection of shellfish beds from pollution; funded stormwater-related research and remediation projects, and advanced the science needed to design future recovery efforts in Puget Sound. In addition to the National Estuary Program, thirteen U.S. federal departments agreed to form the Puget Sound Federal Task Force to coordinate and align programs and resources for Puget Sound Recovery at the federal level and created the first five year action plan with over 100 actions supporting science and ecosystem recovery.

In 2016, Canada invested in enhanced protection of the Georgia Basin and the Strait of Juan de Fuca along with its other coasts through the [Oceans Protection Plan](#) (OPP). The OPP brings together four federal government ministries, Pacific First Nations, other levels of government and stakeholders to address several themes, including preserving and restoring marine ecosystems. In 2018, Canada established the Whales Initiative (2018-2023), to work with partners to enhance protection and support recovery for three species of endangered whales in Canada's oceans, with additional specific funding allocated to act on imminent threats to the Southern Resident Killer Whale population. In 2019, Canada committed to advancing knowledge to support cumulative effects assessment and management in the northern portion of the Salish Sea, through the [Salish Sea Initiative](#), to support Indigenous groups in monitoring and evaluating the impacts of human activities on local marine

ecosystems. Other measures introduced in 2019 focus on building capacity and long-term relationships, marine safety, spill prevention, response capacity, and quieter vessels.

Partnerships in the Salish Sea are critical to make progress. The work of the Puget Sound Partnership is an example of bringing together many partners to restore and protect the ecosystem. Many efforts that are led by non-governmental organizations, for example the Salish Sea Marine Survival Project, the Salish Sea Ecosystem Conference, and the monitoring of the Strait of Georgia and Juan de Fuca Strait by Ocean Networks Canada, provide opportunities for researchers from Canada and the United States to share information and develop potential answers to the ecological issues in the Salish Sea.

Future indicator updates will reflect data and findings from these government and non-government programs, including cumulative effects initiatives, monitoring programs, Indigenous-led studies, and remediation efforts.

## Inspire Action

We all have a common interest and a responsibility to protect and restore the Salish Sea. Government action alone cannot address these issues.

Citizens, community groups, non-profits, First Nation organizations, tribal governments, counties, cities, municipalities, educational organizations and many others are all delivering forms of protection and restoration work that's showing results. Important examples of this work can be found at:

- Puget Sound Info (an interactive atlas of Puget Sound recovery activities hosted by the Puget Sound Partnership) <https://www.pugetsoundinfo.wa.gov/>
- Environment and Climate Change Canada's EcoAction Community Funding Program (<https://www.canada.ca/en/environment-climate-change/services/environmental-funding/ecoaction-community-program.html>)
- Fisheries and Oceans Canada's Coastal Restoration Fund (<https://www.dfo-mpo.gc.ca/oceans/crf-frc/bc-cb-eng.html>)

Continued action is needed. You can use the ecosystem indicators and the many other links and references presented in this report to encourage conversation, identify partners in collaboration, and inspire action to improve ecosystem health.

Health of the Salish Sea Ecosystem website (<https://www.epa.gov/salish-sea>)

