



**PACIFIC
SALMON**
FOUNDATION



RESILIENT COASTS FOR SALMON

Nature-based solutions for climate change

MARINE SCIENCE PROGRAM





THE PROJECT

The Pacific Salmon Foundation, in partnership with the Stewardship Centre for British Columbia (SCBC), has secured funding from the Climate Action and Awareness Fund (Environment and Climate Change Canada) to implement a five-year project to build public awareness and community capacity to adopt nature-based alternatives and avoid hard armouring in response to sea level rise (SLR). This will benefit both humans and marine ecosystems, including Pacific salmon. The project team will be working with communities, community stewardship groups, and coastal First Nations along the southern and eastern coasts of Vancouver Island (ECVI) to deliver this project.

Educational outreach events and Green Shores training will be provided free of charge to promote increased understanding of climate change impacts and how to implement nature-based solutions on ECVI shorelines. Community members will also be engaged in local shoreline mapping work along their local coastlines. The maps created will highlight key ecological shoreline features, as well as the extent of human shoreline modification such as hard armouring. Finally, several “Green Shores” demonstration sites will be created in Courtenay and Greater Victoria, providing hands-on platforms to train volunteers and shoreline practitioners. They will also demonstrate the benefits and beauty of nature-based approaches to the public.

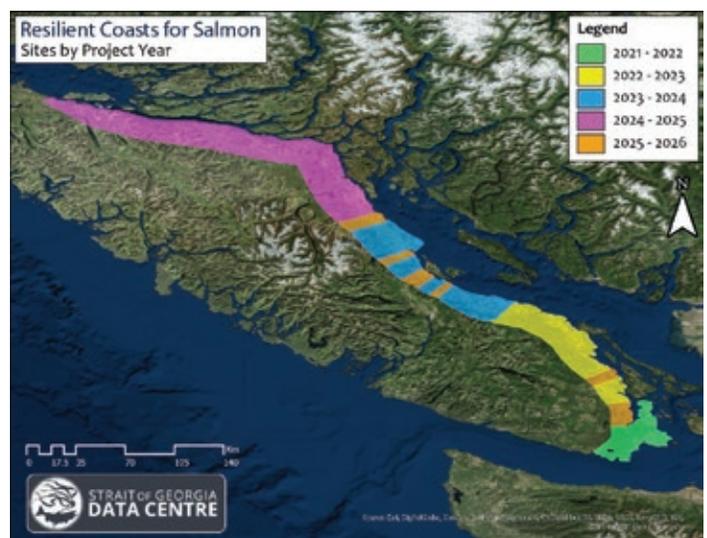
The intent of the project is to support more informed planning decisions required for successful adaptation to climate change. This will be the first large-scale outreach and training initiative in BC for promoting nature-based solutions on coastal shorelines!



GEOGRAPHIC SCOPE AND TIMEFRAME

Throughout the project, we will be implementing our Resilient Coasts for Salmon engagement events, shoreline mapping, and training initiatives up the east coast of Vancouver Island, commencing in Victoria and moving up the coast to Port McNeill.

- ▶ **YEAR 1:** South Coast (Victoria and South Vancouver Island communities — Saanich Peninsula, Sooke)
- ▶ **YEAR 2:** Mid Vancouver Island communities (Cowichan, Ladysmith, Nanaimo)
- ▶ **YEAR 3:** Mid Vancouver Island communities (Qualicum, Courtenay, Comox)
- ▶ **YEAR 4:** North Vancouver Island communities (Campbell River, Port McNeill)
- ▶ **YEAR 5:** Small/Rural communities (Black Creek, Fanny Bay, Bowser, Royston, Mill Bay and Crofton)



PROJECT BACKGROUND

Canada has, by far, the longest coastlines in the world. These coastlines are where people love to live, work and play. Yet, these shores are at risk. Climate change-driven increases in sea level, as well as intensity of heavy precipitation and ocean storm surge events, increase the risk of coastline flooding and storm damage. In British Columbia (BC), sea level rise is projected to be greatest on the north coast, the Fraser lowland and southern Vancouver Island. By 2050, extreme sea level events are projected to increase in frequency, occurring at least once a year in many low-lying regions. The financial impacts of climate change and extreme weather events are also increasing, with an estimated loss of \$1.8 billion for Canadian communities and homeowners between 2009 and 2017. These issues highlight the urgent need to mitigate against future coastal flood and erosion risk.

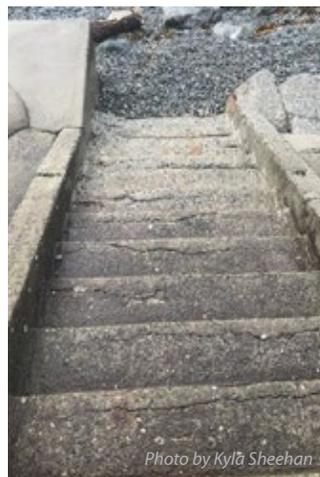
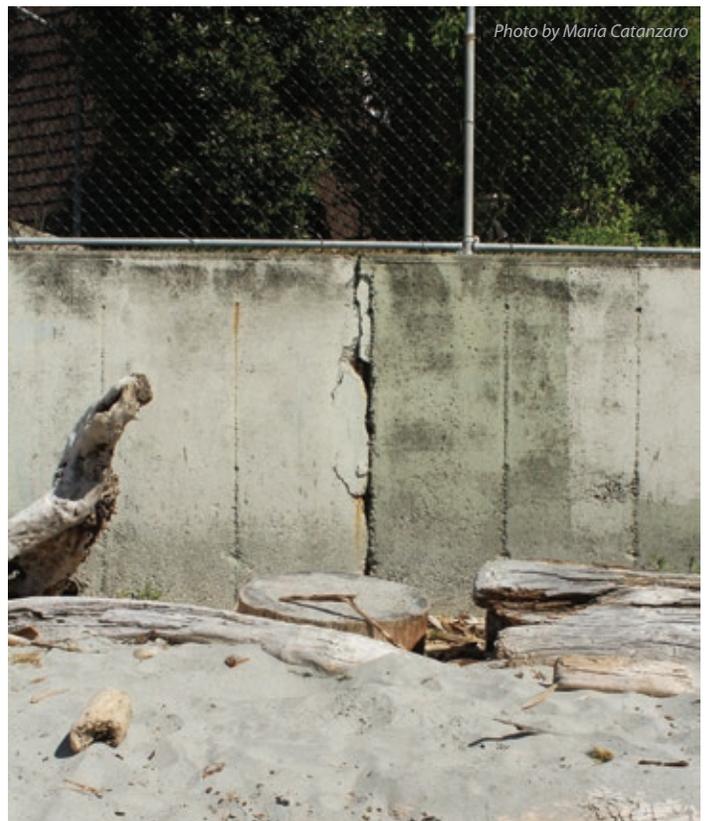
Coastal Modification

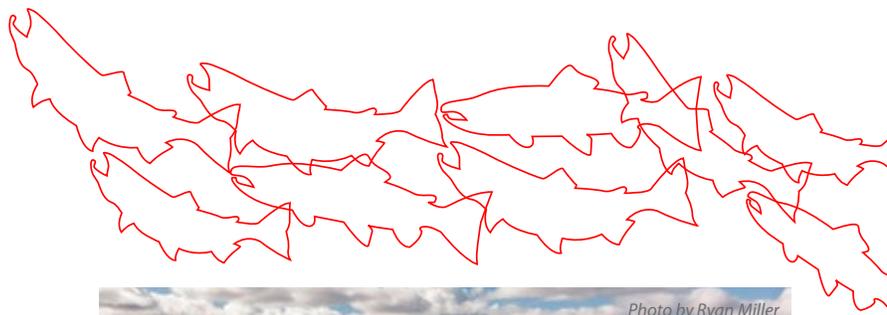
Traditional measures to protect coastal communities resulted in increased engineered shore protection and “hard armouring” of shorelines with structures such as seawalls, groins, and rip-rap. In many urban locations this “hardening” accounts for alteration of more than 50% of the shoreline. However, these structures interfere with the ecological processes that create and maintain shorelines.

Shoreline armouring is expensive to install and can cause scour and erosion at the toe of the structure which can lower the beach elevation and biodiversity along with it. When waves crash into hardened shorelines, the energy of the water is accentuated resulting in higher wave heights that can overtop the seawall during storm events. The force of incoming waves on these structures weakens them over time, resulting in cracks and eventually failure of the structures themselves. Wave energy can also be deflected along the shore blocking the natural movement of sediment, and increasing erosion elsewhere. This leads to loss of beach material that is critical for forage fish spawning habitat, as well as the unintended diversion of waves onto other properties, potentially resulting in flooding. Additionally, the construction of shoreline armour has led to the creation of a false sense of security and an associated rise in populations in flood prone areas.

Hard armouring worsens a phenomenon known as coastal squeeze in which intertidal habitat is lost. As sea levels rise, the zone above the high-water line is constrained by hard modifications along the shoreline and habitats cannot shift landward to adapt to changing sea levels. This effectively shrinks the intertidal area that is key to many shoreline organisms.

There is a growing awareness that such structural solutions may cause more problems than they solve. Reducing the amount of armoured shoreline or prevention of future armouring is critical to the ecological resilience of BC’s coasts. The fact remains that sea levels are rising, and protecting our communities is a priority. The good news is that there are sustainable approaches for coastal protection that can protect our homes from climate change related damage, while minimizing our impacts on valuable shoreline ecosystems!





Importance of Natural Shorelines

As environmentally important areas, coastal shorelines are critically important for forage fish such as Pacific herring, surf smelt and Pacific sand lance that rely on pebble and sand beaches as their spawning grounds. As part of the food web, these incredible fish support the life cycle of Pacific salmon, shorebirds, as well as resident killer whales. Forage fish require suitable substrate to spawn in, and healthy overhanging vegetation along the high tide line to shade their eggs and provide an input of nutrients. Unfortunately, these diverse ecosystems are at risk due to rising sea levels, removal of shoreline riparian vegetation and the extensive hardening and development along shorelines.

What is a Nature-Based Solution?

There is increasing recognition of the benefits of nature-based solutions for shoreline protection, away from traditional 'hard' engineering solutions that exclusively involve structural features.

The Stewardship Centre of BC's Green Shores® approach employs a suite of techniques that restore coastal processes, minimize erosion and enhance habitat for a diverse array of organisms. These techniques can include restoring the foreshore, adding beach nourishment with materials naturally occurring on the shoreline, placement of large woody debris, and planting of native vegetation. Unlike engineered hard structures, natural shorelines are dynamic and are able to absorb and dissipate storm energy, which allows them to persist in situations where engineered hard structures cannot. Appropriately designed, nature-based solutions can provide protection from coastal flooding and erosion associated with a 1m rise in sea level, and thus provide increased resiliency to climate change.

Nature-based approaches also provide other ecosystem services such as carbon sequestration, and have a smaller carbon footprint than engineered hard infrastructure. Native riparian plantings used in nature-based projects improve water quality by stabilizing soils and thus reducing sediment movement, and by filtering upland pollution. Using a nature-based approach leads to a greater abundance and diversity of aquatic species and strengthens the linkage between aquatic and upland habitats that is so important for the survival of many aquatic species.



Photo by Ryan Miller



Photo by Kelly Loch

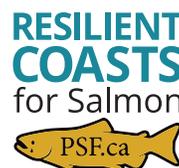
Want to Learn More?

- ▶ Follow the Resilient Coasts for Salmon project as we develop educational resources, host outreach and training events, and map the shorelines in your community. Go to www.resilientcoasts.ca the PSF website www.psf.ca and [PSF Facebook page](#) and the SCBC website www.stewardshipcentrebc.ca for more information.
- ▶ Spread the Word! Please share this newsletter with your colleagues and friends!
- ▶ We will be looking for your feedback and volunteer help soon. In the meantime, please get in touch with Kyla Sheehan (ksheehan@psf.ca) to sign up for our newsletters!

For further information, please contact the Resilient Coasts for Salmon Project Manager, Kyla Sheehan, at ksheehan@psf.ca



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This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

This project was undertaken with the financial support
of the Government of Canada.
Ce projet a été réalisé avec l'appui financier
du gouvernement du Canada.

