



Saving Orcas by Protecting Fish Spawning Beaches

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Executive Summary

Southern Resident orcas are critically endangered, and current laws and policies have failed to protect them. Clearly, we must do more than just protect these animals from the obvious direct threats from intrusive boats, noise and pollution. We must also recognize that orca survival depends upon ecosystem-based management that recognizes the complexity of the marine web of life. For one thing, it is essential that we protect the sand and gravel beaches where forage fish spawn. Such forage fish are indispensable food for the salmon that these orcas must have. As the Washington State *Southern Resident Orca Task Force* recently emphasized, maintaining forage fish populations is absolutely crucial if we want to sustain the Southern Resident orcas.

One of the main threats to forage fish on the coast of British Columbia is destruction of their beach spawning habitat – a limited habitat that comprises only about 12% of the Salish Sea coastline.¹ Yet that habitat is being steadily lost to shoreline modifications. Modifications such as armoring (*e.g.*, seawalls, riprap, bulkheads) and dredging are needlessly destroying spawning beaches, and such destruction will increase as climate change progresses.

Laws and policies need to change. Federal, provincial, local and First Nation governments have overlapping jurisdiction in coast regions – and law and policy changes to better regulate shoreline modifications must involve multiple agencies with different mandates. This report focuses on the Province of British Columbia and the powers and authority delegated to local governments. It draws on lessons from legislation adopted within the State of Washington to regulate shoreline development.

First, we recommend that the Province of British Columbia take immediate steps to identify and map forage fish beach spawning habitat, and classify these areas as sensitive ecosystems.

Second, we recommend the adoption of a provincial *Shoreline Protection Act*, premised on a Governing Principle of no net loss of marine shoreline ecological function. Among other things, the *Shoreline Protection Act* should:

- Require local governments to adopt standardized marine shoreline protection measures into their local planning, land use and other bylaws;
- Require municipalities and regional districts to adopt Official Community Plans and Regional Growth Strategies which recognize forage fish beach spawning habitat as environmentally sensitive areas, discourage hard armoring structures in these areas, and promote green shoreline protection strategies which are set back from forage fish spawning beaches;
- Require that local governments set out Development Permit Areas for “Forage Fish Beach Spawning Habitat,” with permits only available for construction of soft shoreline armoring set back from important habitat;
- Mandate that local government zoning bylaws either: create a zone 30 metres from the natural boundary which can only be used for ecological preservation purposes; or require building

¹ In April 2018, a GIS intern from the Advanced Diploma group at Vancouver Island University utilized the modelling tool from Coastal and Ocean Resources Inc. to generate predictive mapping. The resulting map indicated that approximately 12.3% of the Salish Sea contained suitable spawning habitat. Email: Jacklyn Barrs – Specialist, Forage Fish & Marine Conservation, WWF Canada “Received by” Andrea Lesperance, Articled Student, Environmental Law Centre (2019 May 30) (Victoria, British Columbia).

setbacks at least 30 metres from the high water line – to prevent the need for future shoreline armoring to protect building structures;² and

- Amend the *Local Government Act* and other laws to rescind the over-broad common law right of private property owners to protect property from erosion, at the expense of forage fish beach protection and the environment.

As many single-family residences are located along the shoreline, they likely have a cumulative impact on forage fish spawning beaches and should not be exempt from the provincial or local government requirements.

Finally, the *Shoreline Protection Act* should create incentives for shoreline naturalization through the promotion of the existing Green Shores Program and adoption of a tax exemption program similar to the existing Islands Trust Area – Natural Area Protection Tax Exemption Program.

² Section 488(1) of the *Local Government Act* already allows for similar protection by authorizing Community Plans to include Environmental Development Permit Areas (EDPA). *Local Government Act*, RSBC 2015 c 1; EDPAs currently function by identifying the natural environment, its ecosystems and biodiversity, and regulating development within these areas. However, currently it is left to local government discretion whether or not it chooses to identify the areas, define what constitutes “development,” and place restrictions on such development. Andie Britton-Foster *et al.*, “Environmental Development Permit Areas: In Practice and in Caselaw” (Environmental Law Centre, March 2016) pdf online: <http://www.elc.uvic.ca/wordpress/wp-content/uploads/2016/04/2016_01_02_EDPA_FINAL_March31_2016.pdf>. For this reason, we recommend a province-wide *Act* for shore protection, as opposed to leaving the choice to multiple local governments.

Introduction

The plight of the Southern Residents highlights the need for holistic environmental management if we hope to protect the health of marine ecosystems. Who would have thought that the survival of orcas may depend on protection of beach sand on the BC Coast?

The most important food source for the Southern Resident orcas is Chinook salmon. In turn, these Chinook rely on forage fish – such as surf smelt and Pacific sand lance – that require a particular type of beach habitat in order to spawn. The problem is that much of this beach habitat on the southern coast of British Columbia has been damaged by human activities. Human activities that are negatively impacting forage fish beach spawning habitat include shoreline armoring, dredging, construction of overwater structures, vegetation removal, and pollution from stormwater and other sources. The effects of these activities are exacerbated by climate change – particularly the erosion of beaches due to shoreline armoring.

Experts are concerned that high population growth along the coast will increasingly drive development that threatens beaches and other shoreline habitats.³ The solution is to replace traditional shoreline armoring management with a “living shoreline” approach – an approach that protects property by using nature-based approaches that can sustain healthy beaches as forage fish spawning habitat.⁴ Guidance on design and construction of ecologically sound “living shorelines” is widely available to government agencies and property owners.⁵ For example, the Washington Department of Fish and Wildlife developed both American and Canadian versions of the guidance document *Your Marine Waterfront: A Guide to Protecting Your Property While Promoting Healthy Shorelines*.⁶ In Washington, Island County⁷

³ Raissa Philibert & Karin Bodtker, “Coastal Development: Patterns of Population Growth, Major Projects, and Coastal Tenures,” (Ocean Watch – B. C. Coast Edition) online: <<http://oceanwatch.ca/bccoast/wp-content/uploads/sites/4/2018/10/OceanWatch-BC-Coast-coastal-development.pdf>>.

⁴ Megan N. Dethier, Jason D. Toft & Hugh Shipman, “Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation” (2017) 10 Conservation Letters 5 626-633 at p. 630 [*Shoreline Armoring in an Inland Sea: Science-Based Recommendations for Policy Implementation*] citing K. Hill, “Coastal Infrastructure: A Typology for the Next Century of Adaptation to Sea-Level Rise” (2015) Front. Ecol. Environ. 13 468-476; G. Popkin, “Breaking the Waves,” (2015) Science 350 756-759; A. E. Sutton-Grier, K. Wowk & H. Bamford, “Future of our Coasts: The Potential for Natural and Hybrid Infrastructure to Enhance the Resilience of our Coastal Communities, Economies, and Ecosystems” (2015) Environ. Sci. Policy 51 137-148; and R. K. Gittman, C. H. Peterson, C. A. Currin, F. J. Fodrie, M. F. Piehler & J. F. Bruno, “Living Shorelines can Enhance the Nursery Role of Threatened Estuarine Habitats” (2016) Ecol. Appl., 26 249-263.

⁵ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 630 citing J. Johannessen, A. MacLennan, A. Blue et al. *Marine Shoreline Design Guidelines*, (Olympia, Washington: Washington Department of Fish and Wildlife, 2014).

⁶ Washington Department of Fish and Wildlife, “Your Marine Waterfront: A Guide to Protecting your Property While Promoting Healthy Shorelines” (2016) online: <<https://wdfw.wa.gov/sites/default/files/publications/01791/wdfw01791.pdf>>; Washington Department of Fish and Wildlife, “Your Marine Waterfront: A Guide to Protecting Your Property While Promoting Healthy Shorelines” (2016) Canadian Edition, online: <<http://www.islandstrust.bc.ca/media/341720/your-marine-waterfront-canadian-edition-final-web-version.pdf>> [*Your Marine Waterfront: A Guide to Protecting your Property While Promoting Healthy Shorelines*].

⁷ The Island County Shore Friendly project aims to “promote alternative strategies for shoreline residential properties that provide both the use and enjoyment of the property while promoting and maintaining the nearshore ecosystems for the support of fish and wildlife.” As part of the project, Island County has developed materials to help residents learn about natural beach and soft shore options for protecting their shoreline. Jessica Cote, “Benefit Cost Analysis of Shore Friendly Practices in Island County,” (February 14, 2019) Island County Department of Natural Resources, online: <<https://www.islandcountywa.gov/Health/DNR/Shore-Friendly/Documents/Benefit%20Cost%20Analysis%20of%20Shore%20Friendly%20Practices%20in%20Island%20County%20FINAL.pdf>>; Shore Friendly, “Protect your Property, Protect our Sound,” online: <<https://www.islandcountywa.gov/Health/DNR/Shore-Friendly/Documents/Shore%20Friendly%20flowchart.pdf>>; Shore Friendly, “Soft Shore Protection Permitting,” online: <<https://www.islandcountywa.gov/Health/DNR/Shore-Friendly/Documents/Shore%20Friendly%20Permitting%20final.pdf>>; Shore Friendly, “Shore Friendly FAQs,” online: <<https://www.islandcountywa.gov/Health/DNR/Shore-Friendly/Pages/FAQ.aspx>>.

Note: The project is funded by the United States Environmental Protection Agency under assistance agreement PC-00J90701 through the Washington Department of Fish and Wildlife. Island County, “Shore Friendly,” (2019) online: <<https://www.islandcountywa.gov/Health/DNR/Shore-Friendly/Pages/Home.aspx>>.

and Friends of San Juan⁸ have also undertaken initiatives aimed at educating the public on the problems associated with shoreline armoring and promoting living shorelines. In BC, Islands Trust has created the *Landowners Guide to Protecting Shoreline Ecosystems* to introduce landowners to shoreline protection measures that promote habitat protection.⁹

Unfortunately, current laws on the BC coast do not consistently protect forage fish spawning beaches from harmful developments along the shore – currently most shoreline protection in British Columbia’s coastal regions is discretionary and under local government control.¹⁰

To rectify this situation, this report draws on the State of Washington’s *Shoreline Management Act* and advocates for the adoption of an analogous provincial *Shoreline Protection Act*. To preserve and restore key shoreline characteristics and forage fish spawning habitat, the *Shoreline Protection Act* should:

- Require that local governments’ Official Community Plans, Regional Growth Strategies and other bylaws are designed to achieve no net loss of forage fish beach spawning habitat;
- Prohibit harmful new seawalls and armor near forage fish spawning habitat;
- Discourage replacement or expansion of armoring; and
- Incentivize removal of armor.¹¹

Details are outlined in the final section of this report, entitled “[Recommendations](#).”

⁸ Friends of the San Juan is a citizen group which works with interested private and public landowners to restore shoreline properties impacted by unnecessary shoreline modifications in order to improve nearshore habitat conditions for fish, wildlife and people. The group removes barriers (fill tide gates or culverts) to restore the connectivity between upland wetlands and the sea to improve water quality, fish passage, the transfer of nutrients and sediments, and reduce the risk of flooding. The group also nourishes beach profiles to add appropriately sized sands and gravels to beaches to restore the natural slope and substrate. Further, the group removes derelict structures and debris, which is a known source of toxic materials into water and sediment in order to recover beach habitat. Friends of the San Juans, “Natural Shorelines, Shoreline Restoration” online: <<https://sanjuans.org/shoreline-restoration/>>.

⁹ Kris Nichols & Aleksandra Brzozowski, “A Landowner’s Guide to Protecting Shoreline Ecosystems” (Draft Version: August 2014) online: <<http://www.islandstrust.bc.ca/media/282417/Landowners-Guide-September-draft-revised.pdf>>.

¹⁰ Province of British Columbia, “Coastal Shore Stewardship: A Guide for Planners, Builders and Developers on Canada’s Pacific Coast” (2004) at p. 34-35, online: <http://stewardshipcentrebc.ca/PDF_docs/StewardshipSeries/Coastal.pdf> [*Coastal Shore Stewardship*]. See also Andie Britton-Foster et al., “Environmental Development Permit Areas: In Practice and in Caselaw” (Environmental Law Centre, March 2016) online: <http://www.elc.uvic.ca/wordpress/wp-content/uploads/2016/04/2016_01_02_EDPA_FINAL_March31_2016.pdf>.

¹¹ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, supra note 4 at p. 629 citing P. Ruggiero, “Impacts of Shoreline Armoring on Sediment Dynamics” (2010) p. 179-186 in H. Shipman, M. N. Deither, G. Gelfenbaum, K. L. Fresh, R. S. Dinicola, eds, *Puget Sound Shorelines and the Impacts of Armoring – Proceedings of a State of the Science Workshop*, May 2009: U.S. Geological Survey Scientific Investigations Report 2010-5254.

The Critical Link Between Sand/Gravel Beaches and Healthy Orcas

Forage fish are small fish¹² which play an important role¹³ in the ecosystem that sustains the Southern Resident orca.¹⁴ Forage fish are important food sources for Coho salmon¹⁵ and Chinook salmon,¹⁶ which are important food sources for Southern Resident orcas.¹⁷ The ability of Coho and Chinook salmon to consume high-caloric fish prey in the summer increases their chances to survive over the winter, when prey resources are low.¹⁸ High-calorie forage fish are a source of energy for salmon, which they store and utilize to swim up-river to spawn.¹⁹ Thus, the lack of forage fish can limit salmon populations – and the number of orca that those salmon can support.²⁰

Key forage fish populations spawn in the intertidal beach habitats of sand and gravel beaches.²¹ Surf smelt and Pacific sand lance spawn by depositing adhesive eggs on the upper intertidal areas of

¹² The term “forage fish” is a general description of small to medium size marine species found in the lower trophic levels of the food web that play a significant role in the marine ecosystem as prey species for larger fish, marine mammals and seabirds. World Wildlife Fund, “Forage Fish” (accessed 10 Sept 2019) online: <<http://www.wwf.ca/conservation/oceans/foragefish/>>.

¹³ Forage fish comprise a crucial intermediate trophic level in a “wasp-waist ecosystem,” characterized by many species at the bottom of the food web, many species at the top of the food web, but only a few dominant species at the mid-level, because they transfer energy between planktonic production and higher trophic level predators such as Southern Resident orcas. A. Bakun, “Patterns in the Ocean, Ocean Processes and Marine Protection Dynamics” (1996) California Sea Grant 323 and J. Rice, “Food Web Theory, Marine Food Webs and What Climate Change may do to Northern Fish Populations” (1995) 561-568 in R. Beamish, *Climate Change and Northern Fish Populations* (Can. Sp. Publications Fisheries Aquatic Sciences 121); S. Guenette, G. Melvin & A. Bundy, “A Review of the Ecological Role of Forage Fish and Management Strategies” (Dartmouth, NS: Science Branch, Maritimes Region, Ocean and Ecosystem Sciences Division, Fisheries and Oceans Canada, 2014) at p. 1 citing Government of Canada, DFO, “Policy on new fisheries for forage species,” (2010) online: <<http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/forage-eng.htm>>.

¹⁴ Southern Resident Orcas are sustained by the California Current Ecosystem, which extends 1,900 miles from the northern end of Vancouver Island to Baja California Sur. Ben Enticknap, Ashley Blacow, Geoff Shester, Whit Sheard, Jon Warrenchuk, Mike LeVine & Susan Murray, “Forage Fish: Feeding the California Current Large Marine Ecosystem” (Oceana, October 2011) at p. 6, online: <https://oceana.org/sites/default/files/reports/Forage_Fish_OCEANA_2011_final.pdf>.

¹⁵ Fishes made up 72% of the diet of adult Coho salmon; the fish prey was dominated by anchovies, sand lance, and juvenile rock fish. In the Strait of Georgia, fish are an unimportant part of Coho salmon diet until summer when herring and sand lance made up 29-35% of the diet of Coho salmon. Greg Bargmann, “Forage Fish Management Plan: A Plan for Managing the Forage Fish Resources and Fisheries of Washington” (Olympia, Washington: Washington Fish and Wildlife Commission, 1998) at p. 8 [*Washington Forage Fish Management Plan*].

¹⁶ A 1994 study of adult Chinook salmon found that their diet was dominated by herring and, to a lesser extent, smelt. P. Gearin et al., “Harbour Porpoise Interactions with a Chinook Salmon Set-Net Fishery in Washington State” (1994) Rept. Int. Whal. Comm. Special Issue 15 427-438 cited by *Washington Forage Fish Management Plan*, *supra* note 15 at p. 8. One study found that in the Strait of Georgia, forage fish comprised up to 65% of the diet of Chinook salmon - this was dominated by herring. M. Healey, “The Ecology of Juvenile Salmon in Georgia Strait, British Columbia” (1980) 203-219 in W. McNeil & D. Himsworth, eds, *Salmon Ecosystems of the North Pacific* (Oregon University Press). Another study determined that “35% of juvenile salmon diets are composed of sand lance, while juvenile Chinook salmon depend on sand lance for up to 60% of their diet.” *Forage Fish: Feeding the California Current Large Marine Ecosystem*, *supra* note 14 at p. 31. Chinook on the west side of Vancouver Island are larger than the same-aged chinook on the east side of the island - the difference in growth rates has been attributed to a lack of food on the east side, primarily forage fish. A. Prakash, “Seasonal Changes in Feeding of Coho and Chinook (Spring) Salmon in Southern British Columbia Waters,” (1962) 19 J. Fish Res. Bd Canada 851-866 cited by *Washington Forage Fish Management Plan*, *supra* note 15 at p. 9.

¹⁷ See: John K. B. Ford, Graeme M. Ellis, Peter F. Olesiuk, “Linking Killer Whale Survival and Prey Abundance: Food Limitation in the Oceans’ Apex Predator?” (2009) 6 Biology Letters 1, online: <<https://royalsocietypublishing.org/doi/full/10.1098/rsbl.2009.0468>>. The Province of British Columbia has recognised the importance of protecting salmon and salmon habitat for protecting resident killer whale populations. *Coastal Shore Stewardship*, *supra* note 10 at p. 16.

¹⁸ Elizabeth A. Daly, Richard Brodeur & Laurie Weitkamp, “Ontogenetic Shifts in Diets of Juvenile and Subadult Coho and Chinook Salmon in Coastal Marine Waters: Important for Marine Survival?” (2009) 138 *Transactions of the American Fisheries Society* 1420 at 1434 citing RJ Beamish, & C. Mahnken, “Taking the next step in fisheries management” (1999) in R. Cook, *Ecosystem approaches for fisheries management*, Alaska Sea Grant, Report AK-SG-99-01 at 1-21.

¹⁹ S. J. Cooke, G. T. Crossin & S. G. Hinch, “Pacific Salmon Migration: Completing the Cycle,” in A. P. Farrell, ed, *Encyclopedia of Fish Physiology: From Genome to Environment*, Vol 3, p. 1945-1952 (San Diego: Academic Press, 2011).

²⁰ G. H. Engelhard et al., “Forage Fish, their fisheries, and their predators: who drives whom?” (2014) 71 *ICES Journal of Marine Science* 1 90-104 citing A. D. Smith et al., “Impacts of fishing low-trophic level species on marine ecosystems” (2011) 333 *Science* 1147-1150.

²¹ See below for the role of sand and gravel beaches for spawning forage fish. In contrast, note that Pacific herring spawn by depositing adhesive eggs on marine vegetation, such as kelp and eelgrass in the shallow sub-tidal zone of beaches. Each spring, herring spawn on nearshore marine

beaches.²² **For successful spawning, sand lance generally need medium-sized sand grains, and smelt generally require a coarse sand to fine pebble mix.**²³ **Forage fishes' spawning success is critically reduced when such suitable beach material is not available.**²⁴ Forage fish spawning success may also be limited by lack of shoreline shade trees, water clarity,²⁵ and aquatic vegetation.²⁶ For the reasons discussed below, forage fish spawning success can be dramatically impacted when physical changes – such as seawalls, bulkheads and riprap – are made to the shoreline.²⁷

plants such as kelp and eelgrass. Thus, an essential element of herring spawning habitat appears to be the presence of perennial marine vegetation beds at rather specific locations. *Coastal Shore Stewardship*, *supra* note 10 at p. 19. Dan Penttila, "Marine Forage Fishes in Puget Sound" Washington Department of Fish and Wildlife Technical Report 2007-03 at 6 [*Marine Forage Fishes in Puget Sound*]. *Washington Forage Fish Management Plan*, *supra* note 15 at p. 18 citing M. Sinclair and M. Tremblay, "Timing of Spawning of Atlantic Herring (*Clupea harengus* harengus) Population and the Math-Mismatch Theory" (1984) Can. J. Fish. Aquatic Sci. 41 1055-1065.

²² *Washington Forage Fish Management Plan*, *supra* note 15 at p. 31.

²³ *Washington Forage Fish Management Plan*, *supra* note 15 at p. 29&31.

²⁴ "The critical element of surf smelt spawning habitat is the availability of a suitable amount of appropriately textured spawning substrate at a certain tidal elevation along the shoreline." *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 8 citing M. B. Schaefer, "Contribution to the Life History of the Surf Smelt *Hypomesus pretiosus* in Puget Sound" (1936) Washington Department of Fisheries, Olympia, Washington, Biol. Rep. 35 B; and D. Penttila, "Studies of the Surf Smelt (*Hypomesus pretiosus*) in Puget Sound" (1978) Washington Department of Fisheries, Olympia, WA, Tech. Rep. 42.

²⁵ "Within herring spawning areas, the depth zone of spawn deposition is largely controlled by the perennial clarity of the water, which in turn controls the amount of ambient light and the maximum depths at which vegetation will grow." *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 6 citing L. Druehl, "Pacific Seaweeds, A Guide to Common Seaweeds of the West Coast," (2000).

²⁶ "Areas that are shielded from direct sunlight by over-hanging vegetation are more suitable for spawning, due to lower desiccation risk, than areas where vegetation has been removed, especially during the summer spawning period...A significant attribute of surf smelt spawning habitat may be the overhead shading provided by the canopies of mature trees rooted in the backshore zone bordering the spawning beaches." *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 16.

²⁷ As discussed below, spawning success is linked to nearshore geophysical processes that influence the physical characteristics of a shoreline. When changes are made (e.g., when a seawall cuts off a beach from its ongoing source of sediment), that can impact spawning. "The thickness of the spawn-bearing substrate layer on the upper beach will vary with local wave-action and sediment-supply regimes." *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 8 citing M. B. Schaefer, "Contribution to the Life History of the Surf Smelt *Hypomesus pretiosus* in Puget Sound" (1936) Washington Department of Fisheries, Olympia, Washington, Biol. Rep. 35 B. Sediment drift cells are sections of coastline that exhibit a sediment source, a zone of net directional sediment transport, and an area of sediment deposition. Beaches at the distal (depositional) ends of sediment drift cells, where accretionary shore forms occur (e.g. sandy spits), commonly support both surf smelt and Pacific sand lance spawning habitat. *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 10. Surf smelt spawning beaches can also be found in coarser substrate at the erosional start of a sediment drift cell. *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 8.

The Natural Processes that Shape Spawning Beaches

Key forage fish such as Pacific sand lance and surf smelt spawn primarily in the intertidal zone of sediment (sand and gravel) shores.²⁸

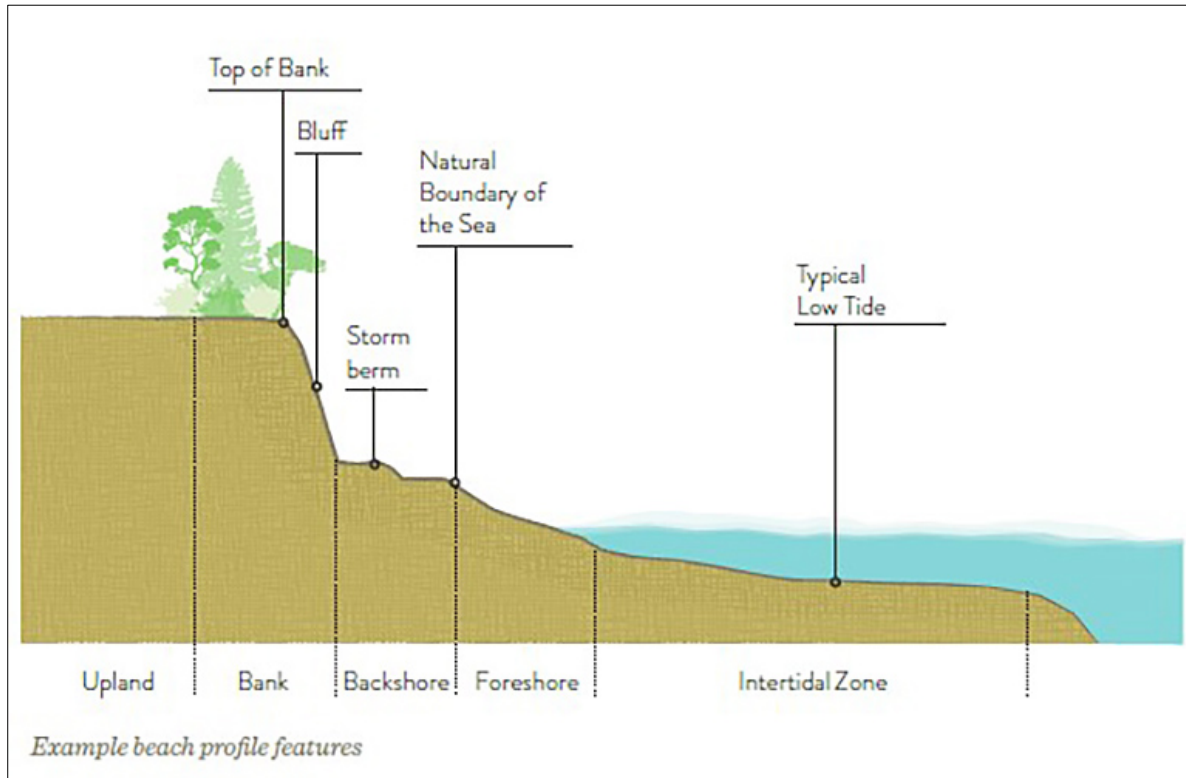


Figure 1: Example of Beach Profile Features²⁹

In the marine riparian area – the shoreline upland of high water – complicated dynamics exist between water, sand/soil, and vegetation. These dynamics create and shape the sand and gravel beaches that many forage fish need in order to successfully reproduce.³⁰

Three natural processes shape the physical characteristics of sediment shorelines: waves, sediment movements, and water levels.³¹ Wind waves are the primary force in the coastal zone, creating most of the erosion, sediment transport and deposition that form beaches and other coastal shore features.³² Sediment near or on the shore is constantly moving with the waves and currents towards, away from,

²⁸ The Province of British Columbia has classified its shoreline into five shore types: rocky shores; rock and large sediment (boulder/cobble) shores; sediment (sand and gravel) shores; estuaries and mudflats; and altered shore. Sediment (sand and gravel) shores have a large supply of easily eroded loose sediment and are very dynamic with large sediment transport rates. *Coastal Shore Stewardship*, *supra* note 10 at p. 23.

²⁹ This image is sourced from *Your Marine Waterfront: A Guide to Protecting your Property While Promoting Healthy Shorelines (Canadian Edition)*, *supra* note 6 at p. 11. Permission to use the image granted September 10, 2019 by Theresa Mitchell – Environmental Planner at the Washington Department of Fish and Wildlife.

³⁰ Province of British Columbia, “Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development,” at Section 4 p. 8, online: <<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/laws-policies-standards-guidance/best-management-practices/develop-with-care>> [Develop with Care].

³¹ *Coastal Shore Stewardship*, *supra* note 10 at p. 8.

³² *Coastal Shore Stewardship*, *supra* note 10 at p. 8.

and along the coast.³³ Water levels vary according to tides and storm surges. Sea levels and other global events will also impact water levels.³⁴

To maintain suitable forage fish spawning habitat, the shoreline needs:

- ongoing natural erosion of the upland, and deposition and drift of sediment -- which replenishes the beaches;
- natural vegetation along the backshore for bank stability, shelter and shade; and
- drift logs, rocks, vegetation and other natural components washed up by the tides and deposited by streams.³⁵

³³ *Coastal Shore Stewardship*, *supra* note 10 at p. 8.

³⁴ *Coastal Shore Stewardship*, *supra* note 10 at p. 8.

³⁵ *Develop with Care*, *supra* note 30 at Section 4 p. 9.

Threats to Forage Fish Spawning Habitat

When natural shorelines are modified, sediment movement changes along the shores, and habitat is damaged or lost.³⁶ Forage fish spawning habitats can be damaged or destroyed by shoreline modification – including armoring and dredging, construction of overwater structures,³⁷ vegetation removal,³⁸ seaweed harvesting,³⁹ and pollution from stormwater and other sources.⁴⁰ Indeed, shoreline modifications are the most severe threat to forage fish spawning habitat. These modifications can damage or destroy forage fish spawning habitat in a number of ways – including alteration of the normal supply and movement of beach sediments, burial of habitat under structures, reducing shading of the beach, and increasing pollution.⁴¹

³⁶ *Coastal Shore Stewardship*, *supra* note 10 at p. 5.

³⁷ *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 15:

Surf smelt and sand lance spawning habitats may persist beneath overwater structures if the structures span the spawning habitat zone, and pilings have minimal displacement of beach area, so that upper tidal sediment distribution and movement are not affected. Herring spawning habitat, however, may be impacted by shading from overwater structures, grounding of floats, and accumulation of shell fragments that fall from the structure. There are few species of marine macro-vegetation that can tolerate the reduction in ambient light within the direct footprint of a typical overwater dock or pier, including plant species used by spawning herring. Introduction of fixed overwater structures invariably results in a die-off of vegetation directly beneath and may also show negative impacts on either side.

In addition, herring eggs deposited on wooden pilings associated with overwater structures may be impacted from uptake of contaminants, especially polycyclic aromatic hydrocarbons (PAH) from creosote [citations omitted].

³⁸ Removal of overhanging vegetation can reduce shade coverage and increase the beach temperature, particularly in summer months during spawning season. L. L. Moulton & D. Penttilä, “Field Manuals for Sampling Forage Fish Spawn in Intertidal Shore Regions” (2001) San Juan County Forage Fish Assessment Project, 23.

³⁹ Seaweed harvesting negatively impacts forage fish eggs and larvae because seaweed harvesting takes place during the winter months, when forage fish embryos are present in beach spawning habitats. *Seaweed Harvesting on Vancouver Island: A New Industry That Requires Better Regulation* (Victoria, British Columbia: Environmental Law Centre, Nov 2013). Removal of seaweed is particularly damaging to Pacific herring because these forage fish spawn and incubate in the seaweed. Further, tracked vehicles (such as ATVs) used to harvest seaweed on beaches kill Surf smelt and Pacific sand lance eggs and damage their spawning grounds. I. K. Birthwell, R. C. de Graaf, D. E. Hay & G. R. Peterson, “Seaweed Harvesting on the East Coast of Vancouver Island, BC: A Biological Review” (2013) at p. 27.

⁴⁰ Chemical pollution released or deposited onto beaches where forage fish spawn or into the nearshore environment likely has a negative impact on forage fish spawning. Further, high velocity stormwater destroys fish spawning grounds and causes sedimentation that can kill fish. Many toxic chemicals entering local waterways and making their way into marine habitats come from stormwater runoff. Stormwater runoff is rain that falls on streets, parking areas, sports fields, gravel lots, rooftops or other land developed with impermeable surfaces and flows through engineered storm sewer systems directly into nearby streams, rivers, lakes and oceans. The flowing stormwater picks up and mixes with chemicals and pollutants (such as heavy metals, PCBs, oils, grease, antifreeze, solvents, pesticides, herbicides, fertilizers, paint chips, PAHs, road salt and detergents) and quickly washes them into the waterbodies, resulting in erosion and contamination of marine habitat. Notably, “stormwater runoff is the chief source of the PCBs that directly threaten the survival of local orcas.” Gordon McGuire, Neil Wyper, Michelle Chan, Adam Campbell, Scott Bernstein & Jill Vivian, *Re-Inventing Rainwater Management: A Strategy to Protect Health and Restore Nature in the Capital Region* (Victoria, British Columbia: Environmental Law Centre, 2019) at p. 16-18, online: <http://www.elc.uvic.ca/wordpress/wp-content/uploads/2014/12/Re-Inventing-Rainwater-Management_2010Feb.pdf> [*Re-Inventing Rainwater Management: A Strategy to Protect Health and Restore Nature in the Capital Region*].

⁴¹ “The Pacific sand lance’s habit of depositing and incubating eggs in the upper intertidal zone makes it vulnerable to nearshore habitat alterations of the type commonly being undertaken along the local shorelines. Sand lance spawning habitats can be damaged or destroyed by physical burial under bulk-head fill structures intruding into the intertidal zone from adjacent uplands, by alteration of the normal supply and movement of beach sediments, and by oiling.” *Washington Forage Fish Management Plan*, *supra* note 15 at p. 30. R. M. Thom *et al.*, “Shoreline Armoring Effects on Coastal Ecology and Biological Resources in Puget Sound, WA,” (Olympia, Washington: Coastal erosion Management Studies, Col. 7 Shorelands and Coastal Zone Management Program, WA Dept. of Ecology, 1994); *Forage Fish: Feeding the California Current Large Marine Ecosystem*, *supra* note 14 at p. 9; *Marine Forage Fishes in Puget Sound*, *supra* note 21 at V; Peninsula Streams Society, PowerPoint Presentation presented at PROW SLR Workshop Jan 23.18 at 7. See above for the impact of removal of shade.

Shoreline Modification

Many activities may be considered shoreline modifications: shoreline armoring, dredging, construction of overwater structures, vegetation removal, and pollution from stormwater and other sources.⁴² These activities will cause varying amounts of harm to forage fish spawning habitat. Due to the potential for severe harm to forage fish spawning habitat, this report will focus on shoreline armoring and dredging.

Armoring

Armoring may be the primary threat to forage fish spawning habitat.⁴³ Armoring involves stabilization of the shoreline (erosion prevention) through the construction of man-made structures referred to as seawalls,⁴⁴ riprap, bulkheads,⁴⁵ revetments,⁴⁶ etc.⁴⁷ These modifications alter geophysical processes and impact:

- beach shape and sediment composition;⁴⁸
- accumulation of beach wrack (seaweed);⁴⁹ and
- biodiversity.⁵⁰

One of the key problems is that waves reflect off of seawalls and other armoring structures and erode away beach sediment⁵¹ – resulting in shortened beaches and coarsened substrate.⁵² The critical issue is

⁴² Capital Regional District, “What are altered shorelines?” (accessed 9 Sept 2019), online: <<https://www.crd.bc.ca/education/our-environment/ecosystems/coastal-marine/altered-shorelines>>.

⁴³ *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 15 citing R. M. Thom, D. K. Shreffler & K. Macdonald, “Shoreline Armoring Effects on Coastal Ecology and Biological Resources in Puget Sound, Washington” (1994) Coastal Erosion Management Studies, Vol 7. Shoreland and Coastal Zone Management Program, Washington Department of Ecology, Olympia, WA 95.

⁴⁴ Seawalls are free-standing structures made typically of concrete or rock. *Coastal Shore Stewardship*, *supra* note 10 at p. 62.

⁴⁵ A bulkhead is “a small low seawall designed to keep land from eroding behind it.” *Coastal Shore Stewardship*, *supra* note 10 at p. 88.

⁴⁶ Revetments are hard, smooth surfaces that are built to protect a bank or bluff from erosion by wave action and currents. *Coastal Shore Stewardship*, *supra* note 10 at p. 62.

⁴⁷ *Shoreline Armoring in an Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 626.

⁴⁸ *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 15:

Although beaches may appear to be stable, their sediment is in constant motion, driven by prevailing wind and waves. The sand and gravel making up forage fish spawning substrate moves along the shoreline and eventually off into deep water, and must be replaced by new material entering the shoreline sediment transport system. A lack of a constant supply of new sand and gravel, primarily derived from eroding shoreline bluffs, may lead to coarsening, lowering of the beach elevation, and thus long-term degradation of spawning habitat.

“[B]luff erosion is a significant source of beach sediment [] and armoring prevents the replacement of fine sediment that is naturally winnowed from beaches by waves over time.” *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at 628-629.

⁴⁹ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 627 citing J. E. Dugan, L. Airoldi, M. G. Chapman, S. J. Walker & T. Schlacher, “Estuarine and Coastal Structures: Environmental Effects, A Focus on Shore and Nearshore Structures” (2011) 17-41 in E. Wolanski & D. S. McLusky (eds) *Treaties on Estuarine and Coastal Science* Vol. 8 (Waltham: Academic Press).

⁵⁰ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 627 citing M. G. Chapman & A. J. Underwood, “Evaluation of Ecological Engineering of ‘Armoured’ Shorelines to Improve their Value as Habitat” (2011) *J. Exp. Mar. Biol. Ecol.* 400 p. 302-313; R. K. Gittman, F. J. Fodrie, A. M. Popowich et al. “Engineering Away our Natural Defenses: An Analysis of Shoreline Hardening in the US,” *Front. Ecol. Environ.*, 13 301-307.

⁵¹ Reflection is the echoing of waves off a solid object. When a wave hits a steeply sloping bank, cliff or seawall, the wave energy is reflected back rather than being dissipated on the shore. Reflected waves can be as high as the incoming wave itself. The two waves interact and combine with each other, producing even larger waves. The bigger waves then create strong bottom currents close to the shore, creating increased seabed erosion close to these reflecting “structures.” *Coastal Shore Stewardship*, *supra* note 10 at p. 9.

⁵² *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 627 citing P. Ruggiero, “Impacts of Shoreline Armoring on Sediment Dynamics” (2010) p. 179-186 in H. Shipman, M. N.; M. N. Deither, W. W. Raymond, A. N. McBride et al. “Multiscale Impacts of Armoring on Salish Sea Shorelines: Evidence for Threshold and Cumulative Effects” (2016) *Estuar. Coast. Shelf Sci* 175 106-117.

that the remaining substrate may not support spawning. These impacts to forage fish spawning habitat occur slowly over time and have been termed “slow disasters.”⁵³

Climate change may make things far worse. Climate change will impact British Columbia’s coasts through sea level rise⁵⁴ – and intense winter storms with bigger waves and higher storm surges.⁵⁵ The negative impacts of shoreline modifications on forage fish spawning habitat is likely to be exacerbated.⁵⁶ Higher sea levels will shorten beach area, and stronger waves will increase sediment erosion in the foreshore/intertidal zone.⁵⁷ Meanwhile, shoreline armoring can halt the natural process of the uplands eroding and “feeding” replacement sediment to the beach. In this way, much forage fish beach spawning habitat may be lost entirely.⁵⁸ Experts describe this phenomenon as the “coastal squeeze.”⁵⁹

Where shoreline armoring does not already exist, climate change may prompt additional property owners to decide to build new structures to prevent erosion – to the detriment of forage fish spawning habitat.⁶⁰ It is important to note that such armoring may be counterproductive, because it often reflects waves that damage neighbouring properties as well. “Human efforts to slow erosion in one location may result in increased erosion nearby, as shoreline hardening increases the wave energy and diverts it to neighbouring locations.”⁶¹

However, proper design and siting of armoring structures can mitigate negative impacts on spawning beaches.⁶² Designs incorporating soft shoreline protections⁶³ have been found to be:

“equally effective as hard armoring approaches in addressing up to 1 metre of sea level rise, while costing 30-70% less and protecting or enhancing the ecological resilience of the shoreline.”⁶⁴

In addition, when absolutely necessary, seawalls and other armoring structures can be set back from the foreshore/intertidal zone, in order to minimize damage. As a stewardship guide points out: “A minimum

⁵³ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, supra note 4 at p. 627 citing M A. Moritz & S. G. Knowles, “Coexisting with Wildfire” (2016) Am. Sci, 104 220-227.

⁵⁴ The sea level along the BC coast is expected to rise up to 120 cm by 2100. *Develop with Care*, supra note 30 at Section 2 p. 38.

⁵⁵ *Coastal Shore Stewardship*, supra note 10 at p. 5.

⁵⁶ Southern Resident Orca Task Force, *Report and Recommendations*, (November 2018) at p. 35-36, online:

<https://www.governor.wa.gov/sites/default/files/OrcaTaskForce_reportandrecommendations_11.16.18.pdf> [*Southern Resident Orca Task Force Report and Recommendations*].

⁵⁷ Climate change, including the effects of rising sea level and increasing storminess will change “rates of cliff retreat, wave regimes, refraction and diffraction patterns, and longshore sediment transport” which will “trigger modifications to beach occurrence, volume and grain size.” Alan S. Trenhaile, “Modelling the Effect of Rising Sea Level on Beaches with Resistant Foundations” (2018) *Marine Geology* 395 1-13 at p.1.

⁵⁸ *Shoreline Armoring in an Inland Sea: Science-Based Recommendations for Policy Implementation*, supra note 4.

⁵⁹ *Develop with Care*, supra note 30 at Section 2 p. 38 and Section 4 at p. 10.

⁶⁰ *Marine Forage Fishes in Puget Sound*, supra note 21 at p. 18 citing J. Johannessen, “Beaches and Bluffs on Puget Sound” Puget Sound Nearshore Partnership Report No. 2007-04 (Seattle, Washington, U. S. Army Corp of Engineers, 2007):

Public perception of a rapid sea-level rise may also promote a heightened societal concern for erosion rates, negative impacts to the economy, land values, and other threats to public safety and institutions that could result in a promotion of hard-armouring practices, to the continued detriment of forage fish spawning habitats.

⁶¹ *Develop with Care*, supra note 30 at Section 4 p. 10.

⁶² *Coastal Shore Stewardship*, supra note 10 at p. 20.

⁶³ There is a range of shoreline protection measures varying from soft to hard that include, listed from softest to hardest: vegetation enhancement; upland drainage control; biotechnical measures; beach enhancement; anchor trees; gravel placement; rock (rip rap) revetments; gabions; concrete groins; retaining walls or bulkheads; and seawalls. Green Shores, “Policy and Regulatory Tools for Local Governments: A Survey of Shoreline Management in Bylaws, Plans and Policies” (May 2016) Stewardship Centre for British Columbia, at p. 23 online: <http://stewardshipcentrebc.ca/PDF_docs/greenshores/reports/GSPolicyandRegulatoryToolsLocalGovtsReport2016.pdf>. [*Green Shores Policy and Regulatory Tools for Local Governments*].

⁶⁴ *Green Shores Policy and Regulatory Tools for Local Governments*, supra note 63.

vegetated buffer of 15-30 m back from the [high water line] is generally recommended for private waterfront property in developed areas.”⁶⁵

Dredging

Dredging is the act of removing substrate from the nearshore area, often done to accommodate boat traffic. When dredging occurs near the foreshore/intertidal zone, it alters nearshore topography and marine vegetation, resulting in a loss of forage fish spawning habitat.⁶⁶

⁶⁵ *Coastal Shore Stewardship*, *supra* note 10 at p. 54.

⁶⁶ *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 15. See also *Coastal Shore Stewardship*, *supra* note 10 at p. 73.



Figure 2: Beach at Patricia Bay (1920) near the Victoria airport. Image H-00620 courtesy of the Royal BC Museum and Archives.



Figure 3: Beach at Patricia Bay (1920) near the Victoria airport. Image H-00665 courtesy of the Royal BC Museum and Archives.

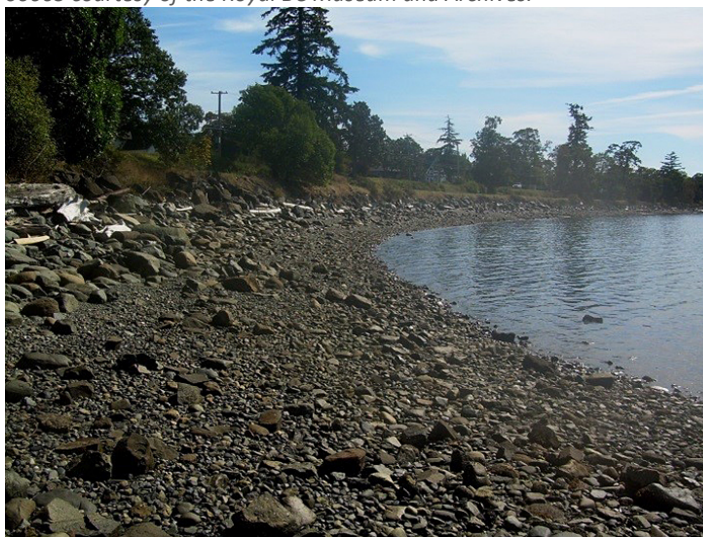


Figure 4: The same Pat Bay Beach in 2005. Image courtesy of John Harper.

Case Study: The Harm Caused by Hard Armouring Structures

In the first two photos from the 1920s, beachgoers can be seen playing barefoot games on a sandy beach. Also visible in the photos is the process of active erosion occurring along sections of the 4 metre high cliff in the background.

The third photo, taken in 2005 of the same location, shows a coarse beach with very little fine sand, hard to walk on even with shoes. Although the installation of riprap along the high-water line halted the active cliff erosion and protected the road, it also stopped the supply of sand to the beach. Over time this has caused the beach to become much coarser.

Unfortunately for forage fish, this is highly detrimental because many types of forage fish require healthy intertidal beach habitats for successful spawning. For example, as discussed above, sandlance generally need medium-sized sand grains for successful spawning habitat. Additionally, forage fish spawning success may also be limited by lack of aquatic vegetation.

As highlighted throughout the report, there are many alternative shoreline protection methods that encourage healthy intertidal areas, while also protecting infrastructure and preventing erosion.

Jurisdiction to Protect Forage Fish Spawning Habitat

[NOTE: It is important to note that while the following section refers to Canadian or settler law – federal/provincial/local government ownership and jurisdiction – the Province of British Columbia has recognized that its entire coast is subject to Indigenous laws and Aboriginal rights claims based on traditional use by First Nations.^{67]}

Federal, provincial, local and First Nation governments' jurisdiction overlap in complex ways in coastal regions. Therefore, proper regulation of developments that impact shorelines will require law and policy changes involving multiple agencies with different mandates.⁶⁸

Federal Jurisdiction

Canada owns the seabed from the low water mark⁶⁹ out to the outer limit of the territorial sea (12 nautical miles), with two exceptions: 1) waters located *inter fauces terrae* (between the jaws of the land) are within provincial territory;⁷⁰ and 2) submerged lands between Vancouver Island and the mainland of British Columbia are owned by the Province of British Columbia.⁷¹ Further, the federal government owns some areas of foreshore in major harbours,⁷² which are managed by independent Port Authorities.⁷³

The federal government has jurisdiction over “Sea Coast and Inland Fisheries.”⁷⁴ Through administration of the *Fisheries Act*, the Department of Fisheries and Oceans (DFO) protects fish that are a) part of a fishery, or b) sustain fisheries fish, from “serious harm.”⁷⁵ Serious harm is defined as “the death of fish or any permanent alteration to, or destruction of, fish habitat.”⁷⁶ Pacific pelagic fisheries include surf smelt,⁷⁷ and sand lance support fisheries species; therefore, protection against “serious harm” is afforded to these important forage fish and their habitats under the *Fisheries Act*.

DFO may review and authorize or reject projects which would occur below the high water mark and may impact forage fish spawning beaches. However, as of August 2019 the DFO does not require project

⁶⁷ *Coastal Shore Stewardship*, *supra* note 10 at p. 36.

⁶⁸ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 627 citing J. Zaucha, A. Condes, D. Klaoudatos & K. Noren, “Can the Ecosystem Services Concept Help in Enhancing the Resilience of Land-Sea Social-Ecological Systems?” (2016) *Ocean Coast. Manag.* 124 33-41.

⁶⁹ Peter Hogg, *Constitutional Law of Canada*, 4th Student Edition (Toronto: Carswell, 1996) at s. 13.3(b) citing *R v. Keyn* (1876) 2 Ex. D. 63 and *Re Offshore Mineral Rights of B.C.* [1967] SCR 792 [Hogg, *Constitutional Law of Canada*].

⁷⁰ The outer extent of the territorial sea is 12 nautical miles from established baselines. These baselines can (but do not always) correspond to the low water mark. *Oceans Act*, S.C. 1996, c. 31 at s. 4&5.

⁷¹ *Reference re: Ownership of the Bed of the Strait of Georgia and Related Areas*, [1984] 1 SCR 388 at p. 389 online: <<https://scc-csc.lexum.com/scc-csc/scc-csc/en/5267/1/document.do>>; Hogg, *Constitutional Law of Canada*, *supra* note 69.

⁷² The Ports of Vancouver, Victoria, Fraser River, Nanaimo, Port Alberni, Prince Rupert and the North Fraser. *Coastal Shore Stewardship*, *supra* note 10 at p. 37.

⁷³ *Canada Marine Act*, SC 1998, c. 10; *Port Authorities Operations Regulations*, SOR/2000-55.

⁷⁴ *Constitution Act, 1867* (UK), 30 & 31 Vict, c 3, reprinted in RSC 1985, App II, No 5 at s. 91(12) [*Constitution Act, 1867*].

⁷⁵ *Fisheries Act*, RSC 1985, c. F-14 at s. 35(1). See also *Seaweed Harvesting on Vancouver Island: A New Industry That Requires Better Regulation*, *supra* note 39 at p. 13. Note that prior to 2012, Fisheries and Oceans Canada (DFO) had strong authority to prevent harmful impacts on fish and their habitat. At that time, the *Fisheries Act* provided the legislative basis for DFO's Policy for the Management of Fish Habitat (1986) and the principle of no net loss of the productive capacity (i.e. the maximum natural capacity) of fish habitat. Note that on June 21, 2019 Bill C-68, *An Act to amend the Fisheries Act and other Acts in consequence*, received Royal Assent. These amendments (new section 34.4(1) and amended section 35(1)) restore full habitat protection by reintroducing a prohibition on works, undertakings, or activities that result in the “harmful alteration, disruption or destruction of fish habitat” (HADD). Bill C-68, *An Act to amend the Fisheries Act and other Acts in consequence*, 1st Sess, 42nd Parl at s. 21&22 online: <<https://lop.parl.ca/staticfiles/PublicWebsite/Home/ResearchPublications/LegislativeSummaries/PDF/42-1/c68-e.pdf>>.

⁷⁶ *Fisheries Act*, RSC 1985, c. F-14 at s. 2(2).

⁷⁷ Fisheries and Oceans Canada, “Surf smelt” <<http://www.dfo-mpo.gc.ca/species-especes/profiles-profilis/smelt-eperlan-eng.html>>.

reviews or authorization for many activities which may harm forage fish spawning habitat. The following is a table outlining dredging and shoreline stabilizing activities that are not reviewed or authorized by DFO, as of that date:⁷⁸

Sector	Activity	Requirements
Cottage, boating and recreation	Dredging for private boat access	Area being dredged is less than 4 m in width (including the side sloping) and 10 m in length.
	Marine routine maintenance dredging	No temporary or permanent increase in existing footprint below the high water mark. Dredging material is deposited and stabilized on land (no open water disposal). Dredging has occurred in the last 10 years. Time work in water to respect timing windows. Relevant measures to avoid harm are followed.
	Shoreline/bank stabilization such as rock protection, plantings and bioengineering	No temporary or permanent increase in existing footprint below the high water mark. No new temporary or permanent fill placed below the high water mark.
Harbours and marine commercial activities	Dredging and disposal of dredged material	Maintenance dredging for commercial marinas, shipping access and ports. No temporary or permanent increase in existing footprint of dredged and disposal area. Dredged material is deposited and stabilized on land or at an approved marine disposal and dumping site that have been used in the past 10 years. Dredging has occurred in the last 10 years. Time work in water to respect timing windows. Relevant measures to avoid harm are followed.

⁷⁸ Fisheries and Oceans Canada, “Project activities and waterbodies where review isn’t required” online: ARCHIVED VERSION: <<https://web.archive.org/web/20190709233925/http://www.dfo-mpo.gc.ca/pnw-ppe/activities-activites-eng.html>>. See Appendix A. Note: Due to Bill C-38 receiving Royal Assent, the above information may have changed or will change. Currently, the webpage this information was obtained from can only be accessed in archive. The newest relevant information can be found as follows: Department of Fisheries and Oceans, “Projects Near Water” (29 August 2019), online: <<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>>. See also Department of Fisheries and Oceans, “Measures to Protect Fish and Fish Habitat” (29 August 2019), online: <<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html>>; Department of Fisheries and Oceans, “Standards and Codes of Practice” (29 August 2019), online: <<http://www.dfo-mpo.gc.ca/pnw-ppe/practice-pratique-eng.html>>.

Where DFO reviews and approves a project, the permit may impose “timing windows” which are intended to allow development to proceed when the impacts on local plants and animals will be minimized.⁷⁹

Provincial Jurisdiction

The Province owns and controls the foreshore/intertidal zone where forage fish spawn.⁸⁰ There are a few exceptions to this rule: fee simple property rights historically granted⁸¹ and major harbours.⁸²

The Province of British Columbia has the constitutional authority to legislate regarding the “Management and Sale of Public Lands belonging to the Province,”⁸³ which includes the foreshore/ intertidal zone. In addition, under the *Land Act*, aquatic provincial Crown land cannot be sold, except by order of provincial cabinet.⁸⁴ However, the minister can lease or licence rights to use the foreshore/intertidal zone under the *Land Act*.⁸⁵

Local Governments

Local Governments – municipalities, regional districts⁸⁶ and the Islands Trust – have the authority to regulate shoreline modifications⁸⁷ through planning, zoning bylaws, and permitting processes.⁸⁸ Municipalities and regional districts (comprised of municipalities and unincorporated electoral areas) are corporations with powers delegated from the Province that are exercised by elected representatives.⁸⁹

⁷⁹ Fisheries and Oceans Canada, “Project activities and waterbodies where review isn’t required” online: [ARCHIVED VERSION: <https://web.archive.org/web/20190709233925/http://www.dfo-mpo.gc.ca/pnw-ppe/activities-activites-eng.html>](https://web.archive.org/web/20190709233925/http://www.dfo-mpo.gc.ca/pnw-ppe/activities-activites-eng.html). See Appendix A.

⁸⁰ *Coastal Shore Stewardship*, *supra* note 10 at p. 36.

⁸¹ Small areas of foreshore are privately owned (through historical Crown grants). Some of the E&N Railway grants granted foreshore rights. Note however, that landowners have historically had a common law right to build structures to protect their property from sea erosion. This common law right is outlined in the old English case of *The King v. Commissioners of Sewers for Pagham, Sussex* (1828), 8 B. & C. 355 (K. B.). Commentary from the Lord Chancellor in *Menzies v. Breadalbane* at 419 illuminates the reasoning behind the riparian right and shows that the riparian right is grounded in Roman and, subsequently, English law that allowed landowners to protect their property. *Menzies v. Breadalbane* (1828), 2 Bligh N.S. 414 (Scot. Ct. Sess.) cited by *Tottrup v. Alberta* (1979), 102 D.L.R. (3d) 41 (Alta. S. C. (A. D.)) and *Johnson v. Dundas (Municipality)*, [1945] 4 D.L.R. 624 (Ont. H. Ct. J.) affirmed in *Fonseca v Gabriola Island Trust Committee*, 2018 BCSC 1684, online: <http://canlii.ca/t/hvc02>.

⁸² Areas of foreshore can be owned by the federal government in major harbours through port authorities established under federal legislation. *Coastal Shore Stewardship*, *supra* note 10 at p. 37. See also Green Shores, *Coastal Shore Jurisdiction in British Columbia* (October 2009), at p. 1 online: https://www.salisheasea.ca/resources/Riparianrights/Greenshores%20JurisdictionIssueSheet_finalVer4.pdf [*Coastal Shore Jurisdiction in British Columbia*].

⁸³ *Constitution Act, 1867*, *supra* note 74 at s. 92(5).

⁸⁴ Rule established in *R v. Keyn*, (1876), 2 Ex. D. 63 by Wilson J (in dissent) and applied in *Reference re: Ownership of the Bed of the Strait of Georgia and Related Areas*, *supra* note 71; *Hogg, Constitutional Law of Canada*, *supra* note 69. *Land Act*, RSBC 1996, c 245 at s. 18:

Except by order of the Lieutenant Governor in Council, on the terms the Lieutenant Governor in Council may specify, unfilled Crown land below the natural boundary of a body of water must not be disposed of by Crown grant under this Act.

Except by order of the minister, on the terms the minister may specify, filled Crown land below the natural boundary of a body of water must not be disposed of by Crown grant under this Act.

⁸⁵ *Land Act*, RSBC 1996, c 245 at s. 38:

The minister may issue a lease of Crown land subject to the terms and reservations the minister considers advisable, including an option to purchase the land.

⁸⁶ For more information on Regional Districts’ history, structure, function etc., see British Columbia Ministry of Community Services, “Primer on Regional Districts in British Columbia” (2006) online:

https://www.regionaldistrict.com/media/28095/Primer_on_Regional_Districts_in_BC.pdf.

⁸⁷ The *Municipal Act* of British Columbia defines land to include “the surface of water.” *Municipal Act*, RSBC 1979, c290. Further, the *Local Government Act* states that municipal boundaries can include “the whole or part of adjoining foreshore and any area below low water mark.” *Local Government Act*, RSBC 2015 c 1 at s.16. “This implies that the power to plan, zone and permit land uses covers freshwater bodies and marine foreshore and nearshore areas.” *Coastal Shore Stewardship*, *supra* note 10 at p. 43.

⁸⁸ *Local Government Act*, RSBC 2015 c 1 at Part 14 – Planning and Land Use Management.

⁸⁹ The *Local Government Act*, RSBC 2015 c 1 at Part 2 – Incorporation of Municipalities and regional Districts, and the *Community Charter*, SBC 2003 c 26 at Part 2 – Municipal Purposes and Powers grant power to local governments. Municipalities are granted more extensive powers than

In addition, the Islands Trust is a federated body responsible for protecting 13 major islands⁹⁰ and more than 450 smaller islands and the surrounding waters of the southern Strait of Georgia and Howe Sound.⁹¹

Among other municipal powers, the *Community Charter* allows municipalities to create a property tax exemption for private property owners that protect riparian areas from development with a conservation covenant to which the local government is a party.⁹² Similarly, the *Islands Trust Act* empowered a Natural Area Protection Tax Exemption program.⁹³

In addition to regulatory powers, local government bodies may actually own shoreline infrastructure, such as dikes, seawalls, and other armoring structures.⁹⁴ For example, the Vancouver Board of Parks and Recreation has possession, jurisdiction and control over the Stanley Park Seawall, and the City of Victoria owns the Ross Bay Seawall.⁹⁵ [See [Appendix D](#) for pictures showing how the Ross Bay Seawall destroyed its beach.]

Planning

Local governments may adopt Official Community Plans (OCP), which are statements of objectives and policies to guide decisions about long-term planning and land use.⁹⁶ An OCP may include restrictions on the use of land that is environmentally sensitive to development⁹⁷ – through the designation of Development Permits Areas⁹⁸ (DPAs) where no construction or subdivision/alteration of land may occur without a permit.⁹⁹ For example, the City of Nanaimo currently has an Environmentally Sensitive Development Permit Area identified in its Official Community Plan, which includes marine foreshore and nearshore areas.¹⁰⁰ Development Permit Area designations must be accompanied by guidelines¹⁰¹ that can set out management objectives for shoreline modification.¹⁰² Permits required to alter land or

regional districts - they can make by-laws relating to issues such as trees and public places and have concurrent jurisdiction with the Province in areas such as buildings and environmental protection.

⁹⁰ Ballenas-Winchelsea, Denman, Gabriola, Galiano, Gambier, Hornby, Lasqueti, Mayne, North Pender, Salt Spring, Saturna, South Pender, and Thetis.

⁹¹ Established in 1974 under the *Islands Trust Act* *Islands Trust Act*, RSBC 1996 c 239.

⁹² *Community Charter*, SBC 2003 c 26 at s. 225. Note: the *Vancouver Charter* makes this provision of the Community Charter also apply to the City of Vancouver. *Vancouver Charter*, SBC 1953 c 55 at s. 396C.

⁹³ For more information, see the section of this report entitled “Islands Trust Area Natural Area Protection Tax Exemption Program.” See: *Islands Trust Act*, RSBC 1996 c 239 at Part 7.1; Islands Trust Natural Area Protection Tax Exemption Regulation BC Reg. 117/2018.

⁹⁴ Asset Management BC, “Asset Management for Sustainable Service Delivery: A BC Framework” (2015), at p. 10 online: https://www.assetmanagementbc.ca/wp-content/uploads/Asset_Management_for_Sustainable_Service_Delivery_-_A_BC_Framework-Asset_Management_BC-September_16_2015.pdf.

⁹⁵ Tiffany Crawford, “Work Begins on \$4.5-million Stanley Park Seawall Restoration,” *Vancouver Sun* (updated: 12 April 2018) online: <https://vancouversun.com/news/local-news/work-begins-on-4-5-million-stanley-park-seawall-restoration>.

⁹⁶ *Local Government Act*, RSBC 2015 c 1 at s. 471. Note: “Once an OCP is adopted as a bylaw, the municipal council or regional district board is not obliged to act on each and every element of the OCP, but all future land use decisions made by the council or board or delegated authority within the local government must be generally consistent with the objectives and policies outlined in the OCP.” *Green Shores Policy and Regulatory Tools for Local Governments*, *supra* note 64 at p. 11.

⁹⁷ *Local Government Act*, RSBC 2015 c 1 at s. 473(1)(d).

⁹⁸ *Local Government Act*, RSBC 2015 c 1 at s. 488.

⁹⁹ *Local Government Act*, RSBC 2015 c 1 at s. 489; *Green Shores Policy and Regulatory Tools for Local Governments*, *supra* note 64 at p. 16.

¹⁰⁰ City of Nanaimo, “Environmentally Sensitive Areas” (June 6, 2017) online: <https://www.nanaimo.ca/recreation-parks/parks-trails/natural-areas/environmentally-sensitive-areas>; City of Nanaimo, *planNanaimo Official Community Plan*, (2008) at p. 84 online: <https://www.nanaimo.ca/docs/property-development/community-planning-and-zoning/officialcommunityplan.pdf>.

¹⁰¹ *Local Government Act*, RSBC 2015 c 1 at s. 488(2)(b).

¹⁰² *Green Shores Policy and Regulatory Tools for Local Governments*, *supra* note 64 at p. 21:

Guidelines for shoreline modifications in general could address the following management objectives:

Criteria for allowing shoreline modifications; these may be related to the type of use (e.g. must be water-dependent uses) or the type of shoreline (e.g. developed versus natural);

Limits on the number, size or density of modifications;

Avoidance and mitigation for impacts on ecological and physical shoreline processes;

shoreline within a DPA may impose site-specific development requirements intended to protect environmentally sensitive areas from harm.¹⁰³

Note that currently the enforcement of Development Permit Area is costly and inefficient, as they must be enforced in court. The Union of BC Municipalities (UBCM) has requested that the provincial government rectify this, and “improve the enforceability of Development Permit Area requirements by enabling local governments to enforce violations by way of prosecution, ticket or bylaw notices.”¹⁰⁴ Deterrence of lawbreaking depends on certainty of discipline, and certainty would be enhanced by such long-needed reform.

Regional Districts may adopt a Regional Growth Strategy (RGS) which “promotes development that is socially, economically and environmentally healthy and that makes efficient use of public services, land and other resources,”¹⁰⁵ and may be aimed at protecting “environmentally sensitive areas.”¹⁰⁶ Any bylaws passed by a Regional District board with an RGS must conform to the direction of the RGS,¹⁰⁷ and all regional district and municipal OCPs must conform with a RGS.¹⁰⁸

The Islands Trust has land use authority similar to a regional district board, carried out primarily through 12 Local Trust Committees. The Local Trust Committees¹⁰⁹ plan and regulate land use through OCPs, zoning bylaws and development permits.¹¹⁰

[NOTE: Some local governments have also developed shoreline management or protection plans (*e.g.*, District of West Vancouver Shoreline Protection Plan¹¹¹) that set out goals and priorities for their communities. These plans are not legally binding but they act as a reference point and guide for decision making and budget planning.¹¹²]

Setbacks or buffer zones can be specified where natural vegetation must be retained

See also *Local Government Act*, RSBC 2015 c 1 at s. 488(2)(a)&(b).

¹⁰³ *Local Government Act*, RSBC 2015 c 1 at s. 491(1)(a)-(e). Note: For environmental DPAs, the *Local Government Act* allows the following requirements relevant to shorelines in development permits:

Specifying areas that must remain free of development except in accordance with any conditions contained in the permit;

Requiring specified natural features or areas to be preserved, protected, restored or enhanced in accordance with the permit;

Requiring works to be constructed to preserve, protect, restore or enhance specific natural features;

Requiring protection measures, including that vegetation or trees be planted or retained in order to preserve, protect, restore, or enhance fish habitat or riparian areas, control drainage, control erosion or protect banks.

Green Shores Policy and Regulatory Tools for Local Governments, *supra* note 64 at p. 16; *Re-Inventing Rainwater Management: A Strategy to Protect Health and Restore Nature in the Capital Region*, *supra* note 40 at p. 104; *Coastal Shore Stewardship*, *supra* note 10 at p. 46.

¹⁰⁴ Union of BC Municipalities, “Resolutions to be Considered at the 2019 UBCM Convention” (2019) at p. 133 online:

<<https://www.ubcm.ca/assets/Resolutions~and~Policy/Resolutions/2019%20UBCM%20Resolutions%20Book.pdf>>. We support the UBCM recommendation to create simpler enforcement mechanisms, because the proposed change would strengthen the protection that a DPA can provide for fish spawning habitat.

¹⁰⁵ *Local Government Act*, RSBC 2015 c 1 s. 428; *Coastal Shore Stewardship*, *supra* note 10 at p. 43.

¹⁰⁶ *Local Government Act*, RSBC 2015 c 1 at s. 428(1)(d).

¹⁰⁷ *Local Government Act*, RSBC 2015 c 1 at s. 445.

¹⁰⁸ *Local Government Act*, RSBC 2015 c 1 at s. 446&447.

¹⁰⁹ Twelve local trust committees (LTCs), which are each responsible for developing, administering and enforcing land use bylaws for Local Trust Areas comprising one major island (Denman, Gabriola, Galiano, Gambier, Hornby, Lasqueti, Mayne, North Pender, Salt Spring, Saturna, South Pender, and Thetis) and several smaller islands. Island Trust, “Local Trust Areas” (accessed 10 Sept 2019) online:

<<http://www.islandstrust.bc.ca/islands/local-trust-areas/>>.

¹¹⁰ *Islands Trust Act*, RSBC 1996 c 239 at s. 31-34; “To ensure compatibility with provincial interests, approval of the Minister of Municipal Affairs and Housing is required before adoption for bylaws that establish or amend official community plans, and some zoning bylaws, within the Islands Trust area.” Government of British Columbia, “Islands Trust” (accessed 10 Sept 2019) online:

<<https://www2.gov.bc.ca/gov/content/governments/local-governments/improvement-districts-governance-bodies/islands-trust>>.

¹¹¹ District of West Vancouver, *Shoreline Protection Plan 2012-2015*, (June 2012) online: <<https://westvancouver.ca/sites/default/files/shoreline-protection-plan.2012-2015.pdf>>.

¹¹² *Green Shores Policy and Regulatory Tools for Local Governments*, *supra* note 63 at p. 15.

Zoning

Zoning bylaws are used to regulate the type, location and density of development by “zoning” lands for particular land uses.¹¹³ Zoning bylaws can designate the area from the high water mark 30 metres upland for the purpose of ecological preservation and prohibit any other uses of this area. Zoning bylaws are currently used to establish building setbacks along or around environmentally sensitive areas.¹¹⁴ A review of existing bylaw language suggests that most building setbacks for shore areas are in the range of 15 to 30 metres from the natural boundary.¹¹⁵ A drawback of defining building setbacks in a zoning bylaw – compared to a setback defined in a DPA – is that they are limited to buildings or structures and cannot be applied to regulate landscaping, vegetation removal, paving, or grading.¹¹⁶ A further weakness of zoning bylaws is that setbacks can be varied by a Board of Variance,¹¹⁷ or may be varied by a council through development variance permits.¹¹⁸

First Nations

As noted above, the Province of British Columbia has recognized that its entire coast is subject to Indigenous laws. With respect to Canadian and British Columbian law, First Nations’ jurisdiction and interest in the foreshore/intertidal zone has been recognised through various legal mechanisms.

First Nations have control over reserve lands (“Indian lands” set apart by the Crown for the use and benefit of “Indians”) where they have opted out of 34 provisions of the *Indian Act* and replaced them with powers under the *First Nations Land Management Act*.¹¹⁹ There are First Nations and Tribal Councils whose traditional territories encompass coastal areas and which have signed or are currently negotiating agreements.¹²⁰ Importantly, there are credible arguments to be made that First Nations may hold Aboriginal title (an ownership interest giving an Aboriginal group the right to use and control lands and enjoy its benefits) to foreshore areas within lands they have historically occupied, although this issue is yet to be resolved by the courts.

It is important to note that the federal and provincial governments have a duty to consult with First Nations on any shoreline tenure applications to ensure that they do not affect Aboriginal or treaty rights.¹²¹ Some First Nations have Treaty rights to “fish as formerly,” which they have been able to use to obtain injunctions against construction of structures which would impact fishing.¹²²

¹¹³ *Coastal Shore Stewardship*, *supra* note 10 at p. 46; See also *Local Government Act*, RSBC 2015 c 1 at s. 479.

¹¹⁴ *Coastal Shore Sustainability*, *supra* note 10 at p. 46.

¹¹⁵ *Green Shores Policy and Regulatory Tools for Local Governments*, *supra* note 63 at p. 37.

¹¹⁶ *Green Shores Policy and Regulatory Tools for Local Governments*, *supra* note 63 at p. 37.

¹¹⁷ *Local Government Act*, RSBC 2015 c 1 at s. 536-544 – Division 15 – Board of Variance.

¹¹⁸ *Local Government Act*, RSBC 2015 c 1 at s. 498-499 – Division 9 – Development Variance Permits.

¹¹⁹ *Indian Act*, R.S.C. 1985, c. 17 at s. 2(1); *First Nations Land Management Act*, SC 1999 c24.

¹²⁰ Council of Haida Nation; Tsimshian First Nations; Haisla Nation; Heiltsuk Nation; Wuikinuxv (Oweekeno) Nation; Xwemalhkwxw (Homalco) Indian Band; Klahoose Indian Band; Sliammon First Nation; Sechelt Indian Band; Squamish Nation; Musqueam Nation; Katzie Indian Band; Tsawwassen First Nation; Hul’q umi’num Treaty Group; Snuneymuxw First Nation (formerly Nanaimo First Nation); Ditidaht First Nation/Pacheedaht First Nation; Nuu-chah-nulth Tribal Council; Hamatla Treaty Society (Formerly Kwakiutl Laich-Kwil-Tach K’ómoks Nations Treaty Society); Kwakiutl Nation (negotiations suspended); Te’Mewx Treaty Association; Klahoose Indian Band; Maa-nulth First Nations; Namgis Nation; Winalagalis Treaty Group; Hupacasath First Nation; Tlowitsis Nation. Department of Fisheries and Oceans, “The Role of the Provincial and Territorial Governments in the Ocean Sector” at p. 2, online: <<https://waves-vagues.dfo-mpo.gc.ca/Library/337906.pdf>>.

¹²¹ *Coastal Shore Jurisdiction in British Columbia*, *supra* note 82 at p. 2.

¹²² The Douglas Treaties and interpretation focused on fishing guarantees are particularly relevant to coastal shoreline management and regulation in the Salish Sea. The Douglas Treaties recognise First Nations’ rights to “carry on fisheries as formerly.” British Columbia, “Papers Connected with the Indian Land Question,” 1850-1875 (Victoria: Wolfenden, Government Printer, 1876) at 10 online: <<https://open.library.ubc.ca/collections/bcsessional/items/1.0060734>>.

The Key Problem: Local Government Mechanisms Provide Inconsistent and Insufficient Protections for Forage Fish Beach Spawning Habitat

Currently, protection of forage fish beach spawning habitat along the BC coast is largely subject to the discretion of individual local governments. This leads to a patchwork of inconsistent protections provided by countless different local OCPs, DPAs and zoning bylaws (see [Appendix B](#)).¹²³ This patchwork of local laws fail to consistently protect the forage fish ecosystem along the coast.

Worse, under the current regime, even when local governments legislate protection, the local government may be challenged by landowners seeking to shield their individual property from erosion. Citing outmoded common law principles developed before the age of environmental awareness, property owners may be able to challenge shoreline rules that restrict shoreline armor – even if the individual’s new armor may damage the beach, the environment, and the shoreline of neighbouring properties.

For example, the Mudge Island Land Use Bylaw attempted to protect the environment by requiring that armoring structures be set back 30 metres from high water mark.¹²⁴ However, under an old common law principle, property owners can claim the right to protect their property from erosion caused by the ocean.¹²⁵ In 2018, BC Supreme Court ruled that local government could not prohibit landowners from building retaining walls on their property to stop erosion – because of the ancient common law right.¹²⁶ The Local Trust Committee of the Islands Trust was powerless to stop such construction for environmental reasons.

Note that Islands Trust has indicated they will appeal this case.¹²⁷ However, there is a legislative fix that should be implemented. The court made clear that the province has the ability to restrict the outdated

In *R v. White and Bob*, one of the Douglas Treaties was recognised as a treaty for the purpose of section 88 of the federal *Indian Act*, which states: Subject to the terms of any treaty...all laws of general application from time to time in force in any province are applicable to and in respect of Indians in the province... *R v. White and Bob* (1964) 50 DLR (2d) 613 (BCCA) aff’d (1966), 52 DLR (2d) 481 (SCC). In *Tsawout Indian Band v. Saanichton Marina Ltd.*, the Tsawout First Nation was able to use the right “to fish as formerly” guaranteed by a Douglas Treaty to obtain a permanent injunction preventing construction of a marina in Saanichton Bay. Since the marina would interfere with the exercise of the treaty right to fish as formerly in Saanichton Bay, section 88 of the *Indian Act* meant the licence of occupation granted by the province to allow for its construction was of no force and effect: “[t]he Province cannot act to contravene the rights of Indians, nor can it authorize others to do so.” *Tsawout Indian Band v. Saanichton Marina Ltd.* (1989) 57 DLR (4th) 161, 36 BCLR (2d) 79 (CA) at para 43.

¹²³ See the chart at Appendix B, which has been adapted from *Green Shores Policy and Regulatory Tools for Local Government*, *supra* note 63 at p. 42-67.

¹²⁴ *Mudge Island Land Use Bylaw No. 228*, 2007 at s. 3.3:

Siting and Setback Regulations

All siting measurements must be made on a horizontal plane from the natural boundary, lot line or other feature specified in this Bylaw to the nearest portion of the building, structure or use in question.

...

Despite all other provisions in this Bylaw, buildings and structures must be sited a minimum of 30 metres (98.4 feet) from and 1.5 metres (4.9 feet) above the natural boundary of wetland, watercourse, the sea or other body of water, except for barge/boat ramps, stairs and walkways with an average maximum elevated floor height of 0.3 metres (0.9 feet).

Mudge Island Land Use Bylaw, at s. 1.1:

“Structures” means “any construction and human made land alteration fixed to, supported by, or sunk into land or water; for clarity septic fields, septic tanks, absorption fields and related appurtenances, concrete and asphalt paving or similar surfacing of the land, and retaining structures are considered structures.”

¹²⁵ The common law right is outlined in the old English case of *The King v. Commissioners of Sewers for Pagham, Sussex* (1828), 8 B. & C. 355 (K. B.). Commentary from the Lord Chancellor in *Menzies v. Breadalbane* at 419 illuminates the reasoning behind the riparian right and shows that the riparian right is grounded in Roman and, subsequently, English law that allowed landowners to protect their property. *Menzies v. Breadalbane* (1828), 2 Bligh N.S. 414 (Scot. Ct. Sess.) cited by *Tottrup v. Alberta* (1979), 102 D.L.R. (3d) 41 (Alta. S. C. (A. D.)) and *Johnson v. Dundas (Municipality)*, [1945] 4 D.L.R. 624 (Ont. H. Ct. J.) affirmed in *Fonseca v Gabriola Island Trust Committee*, 2018 BCSC 1684, online: <http://canlii.ca/t/hvc02>.

¹²⁶ *Fonseca v Gabriola Island Trust Committee*, 2018 BCSC 1684, online: <http://canlii.ca/t/hvc02>.

¹²⁷ Islands Trust, “Court Appeal Planned for B.C. Supreme Court Decision in Favour of Owners’ Riparian Rights,” News Release (October 16, 2018), online: http://www.islandstrust.bc.ca/media/346610/2018-10-it-riparian-rights-appeal_final.pdf; Derek Kilbourn, “BC Supreme Court

common law right and to authorize local authorities to restrict the right – if the Province does so explicitly through amendment to the *Local Government Act* and other laws.¹²⁸

To protect forage fish spawning habitat and other environmental values, the Province of British Columbia must restrict the outdated common law right to protect property from erosion, when the unregulated exercise of the private right threatens beaches, fish populations, and neighbouring properties.¹²⁹ Fortunately, this can be done in a way that respects the interests of both property owners and the environment. The right to build seawalls and armor can be regulated in a way that allows the individual property owner to protect their land.

As demonstrated by Washington State's *Your Marine Waterfront: A Guide to Protecting Your Property While Promoting Healthy Shorelines*; British Columbia's publication *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development*; *Green Shores for Coastal Development* and other guides, it is possible to address shoreline erosion without constructing damaging armor.¹³⁰ These respected guidebooks point out that landowners can protect their properties with natural approaches – e.g., avoid building smooth, solid seawalls that reflect wave energy and exacerbate erosion of beaches and neighbouring properties; use natural features to break up wave energy; set back structures, and adopt timing windows for development construction to avoid forage fish spawning times.¹³¹ It has been amply demonstrated that soft-shore (green) erosion protection techniques can both protect private property and protect the environment. Many landowners have been successful doing so.¹³²

The *Local Government Act* needs to be amended to change the antiquated common law – to ensure that shoreline development avoids antiquated technologies that unnecessarily erode adjacent properties and beaches that fish and orca rely upon. We cannot leave the survival of forage fish beaches, salmon and orcas to the whims of careless or ignorant private landowners. The ecosystem requires consistent protection.

Decides in Favour of Mudge Islanders' Riparian Rights over Islands Trust Bylaw," Gabriola Sounder News (17 October 2018), online: <<http://www.soundernews.com/news/b.c.-supreme-court-decides-in-favour-of-mudge-islanders-riparian-rights-over-islands-trust-bylaw.html>>.

¹²⁹ Spawning habitat protection efforts may often run counter to human efforts to stabilise the naturally dynamic beach zone and stop erosion. R. M. Thom *et al.*, "Shoreline Armoring Effects on Coastal Ecology and Biological Resources in Puget Sound, WA," (Olympia, Washington: Coastal erosion Management Studies, Col. 7 Shorelands and Coastal Zone Management Program, WA Dept. of Ecology, 1994). "Forage fish habitat conservation will continue to depend on the application of regulations to private property" and "[a]dherence to "private property rights" must be balanced with a new attitude of meaningful stewardship and preservation of the public's forage fishes and their critical habitats." *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 20.

¹³⁰ See: Washington Department of Fish and Wildlife, "Your Marine Waterfront: A Guide to Protecting your Property While Promoting Healthy Shorelines" (2016) online: <<https://wdfw.wa.gov/sites/default/files/publications/01791/wdfw01791.pdf>>; Washington Department of Fish and Wildlife, "Your Marine Waterfront: A Guide to Protecting Your Property While Promoting Healthy Shorelines" (2016) Canadian Edition, online: <<http://www.islandstrust.bc.ca/media/341720/your-marine-waterfront-canadian-edition-final-web-version.pdf>>. Also see: *Develop with Care*, *supra* note 30 at Section 4 p. 22.

¹³¹ *Develop with Care*, *supra* note 30 at Section 4 p. 29-31.

¹³² *Develop with Care*, *supra* note 30 at Section 4 p. 22.

Soft Versus Hard Shoreline Protection



Figure 5: Traditional hard shoreline protection on private property. Image courtesy of The Watershed Company.



Figure 6: Natural, soft shoreline protection offers a practical and pleasing aesthetic for humans, as well as better habitat for marine life. Image courtesy of the Watershed Company.

The Need for a British Columbia *Shoreline Protection Act*

Currently, as indicated above, existing local government OCP and DPA designations rely upon the discretion of individual local governments – and create an inconsistent and piecemeal set of shoreline development rules. They inadequately protect forage fish beach spawning habitat from the growing threat of ever-more-intensive shoreline development. In light of the current critical threats to survival of salmon and orcas, the Province of British Columbia must act to better protect forage fish beach spawning habitat.

Therefore, this report recommends that the Province follow the Washington State precedent and implement a *Shoreline Protection Act* to regulate shoreline activities. The *Act* should set coast-wide standards that reflect current scientific understanding of how shoreline development can accommodate human needs without destroying natural systems. Among other things, the *Act* should specifically:

- Prohibit the construction of hard armoring structures in the foreshore/intertidal zone where forage fish spawn;
- Ensure soft (green) shoreline armoring set back from high water; and
- Require appropriate setbacks for buildings.

In designing this *Shoreline Protection Act*, the Province of British Columbia should look to Washington State, which has adopted strong laws to protect their shoreline – and forage fish spawning habitat specifically. Lessons from existing laws in Washington State should be supplemented by the important recent recommendations of the *Washington State Southern Resident Orca Task Force* – which has focused attention on the urgent necessity of saving both forage fish beaches and orcas.

Lessons for BC *Shoreline Protection Act* from Washington State Legal Mechanisms

In Washington State, shoreline protection occurs through the *Growth Management Act*,¹³³ *Shoreline Management Act*,¹³⁴ and the *Construction Projects in State Waters Chapter 77.55 RCW*,¹³⁵ implemented by the *Hydraulic Code Rules*.¹³⁶ These legal mechanisms restrict conditions and methods under which shoreline modifications, including armoring and dredging, can be constructed.¹³⁷

Legal Mechanism	Application	Important Characteristic(s)
<i>Growth Management Act</i>	Lands within the State	Mandates that local governments adopt Critical Area Ordinances (conservation regulations) that protect Priority Habitats and Species
<i>Shoreline Management Act</i>	All marine waters; land up to 200 ft landward of the Ordinary High Water Mark; large lakes and streams; river deltas and flood plains	Mandates that local governments develop Shoreline Master Programs (land use policies and regulation) that discourage hard shoreline armoring
		Mandate permits for shoreline development projects. Establish state/local partnerships for permitting shoreline development
<i>Construction Projects in State Waters</i>	State waters	Mandates Hydraulic Project Approval permits for projects that will affect the natural flow or bed of state waters

Lesson 1: Habitat Identification is Key – Where Are the Critical Beaches?

The Puget Sound Baitfish Project (launched in 1971) was the first dedication of resources from the Washington Department of Fish and Wildlife (WDFW) to the investigation and management of forage fish populations in Washington State. It is important to note that this project involved the mapping of spawning habitat.¹³⁸ WDFW's 1998 Forage Fish Management Policy and Plan adopted a plan of action which involved forage fish habitat surveys.¹³⁹ Recently, the Washington State Southern Resident Orca Task Force recommended that the governor and Legislature “continue to provide funding for forage fish surveys to identify and map the expansion or contraction of critical habitat used by three species of forage fish in Puget Sound: Pacific herring, Surf smelt and Pacific sand lance.”¹⁴⁰

¹³³ *Growth Management – Planning by Selected Counties and Cities*, RCW 36.70A, online:

<<https://app.leg.wa.gov/rcw/default.aspx?cite=36.70a>> [*Growth Management Act*].

¹³⁴ *Shoreline Management Act*, RCW 90.58, online: <<https://app.leg.wa.gov/RCW/default.aspx?cite=90.58>> [*Shoreline Management Act*].

¹³⁵ *Construction Projects in State Waters*, RCW 77.55, online: <<https://app.leg.wa.gov/RCW/default.aspx?cite=77.55>>.

¹³⁶ *Hydraulic Code Rules*, RCW 220-660, online: <<https://apps.leg.wa.gov/wac/default.aspx?cite=220-660>>.

¹³⁷ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, *supra* note 4 at p. 630.

¹³⁸ *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 12 citing A. Millikan & D. Penttila, “Puget Sound Baitfish Project” Washington Department of Fisheries Progress Report (July 1, 1971 – June 30 1972).

¹³⁹ *Washington Forage Fish Management Plan*, *supra* note 15 at vii.

¹⁴⁰ *Southern Resident Orca Task Force Report and Recommendations*, *supra* note 56 at p. 54.

Lesson 2: Habitat Classification Must Inform Local Government Conservation Regulations

Washington's *Growth Management Act* requires all cities and counties to adopt Critical Areas Ordinances – regulations that protect critical areas, including “fish and wildlife habitat conservation areas,” within the city or county.¹⁴¹ To guide cities and counties in their fulfillment of this planning requirement under the *Growth Management Act*, WDFW has established the Priority Habitats and Species (PHS) List.¹⁴² The PHS List identifies species¹⁴³ and habitats¹⁴⁴ considered to be priorities for conservation and management. Five species of forage fish and their spawning habitat are included on Washington's PHS List: Pacific herring, Eulachon, Longfin smelt, Surf smelt and Pacific sand lance.¹⁴⁵ Conservation of these species and habitats is expected during the drafting and updating of Critical Areas Ordinances by local governments.¹⁴⁶ Thus, under Washington State law, local governments' Critical Area Ordinances must address protection of the spawning habitat of these five forage fish.

Lesson 3: *Shoreline Management Act* Requires Local Governments to Adopt Land Use Policies/Regulation that Discourage Shoreline Armoring

Washington's *Shoreline Management Act* requires that local governments with coastal shoreline¹⁴⁷ develop and implement Shoreline Master Programs (SMPs), local land use policies and regulation that guide public and private use of shorelines,¹⁴⁸ designed to achieve no net loss of ecological functions.¹⁴⁹ The *Shoreline Management Act* recognises that shoreline armoring results in adverse impacts to shoreline ecological function and requires SMPs to do the same.¹⁵⁰ SMPs must require new developments to be designed to avoid future shoreline armoring¹⁵¹ and only allow new shoreline armoring when necessary in specific circumstances.¹⁵² In effect, the *Shoreline Management Act* requires

¹⁴¹ *Growth Management Act*, *supra* note 133 at 36.70A.060 - Natural resource lands and critical areas – Development regulations.

¹⁴² Washington Department of Fish and Wildlife, “Priority Habitats and Species (PHS)” (accessed 9 Sept, 2019), online: <<https://wdfw.wa.gov/species-habitats/at-risk/phs>>; Washington's *Growth Management Act*, *supra* note 133 at 36.70A.020, includes herring and surf smelt spawning areas as examples of priority fish and wildlife habitat conservation “critical areas,” for which there is an expectation of mapping and protective designations. *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 1.

¹⁴³ “Priority species” are those that fit one or more of the following criteria: state-listed and candidate species; vulnerable aggregations; and species of recreational, commercial and/or tribal importance. State candidate species are fish and wildlife species that will be reviewed by the WDFW for possible listing as Endangered, Threatened, or Sensitive according to the process and criteria defined in WAC-232-12-297. Vulnerable aggregations include species or groups of animals susceptible to significant population declines, within a specific area or statewide, by virtue of their inclination to aggregate. Native and non-native fish and wildlife species of recreational or commercial importance, and recognized species used for tribal ceremonial and subsistence purposes, whose biological or ecological characteristics make them vulnerable to decline in Washington or that are dependent on habitats that are highly vulnerable or are in limited availability. Washington Department of Fish and Wildlife, “Priority Habitats and Species List” (Olympia, Washington, 2008) (revised January 2019) [*WDFW Priority Habitats and Species List*].

¹⁴⁴ An area identified and mapped as priority habitat has one or more of the following attributes: comparatively high fish and wildlife density; comparatively high fish and wildlife species diversity; important fish and wildlife breeding habitat; important fish and wildlife seasonal ranges; important fish and wildlife movement corridors; limited availability; high vulnerability to habitat alteration; and unique or dependent species. *WDFW Priority Habitats and Species List*, *supra* note 143.

¹⁴⁵ *WDFW Priority Habitats and Species List*, *supra* note 143.

¹⁴⁶ Washington Administrative Code [WAC] 365-190-080: Critical Areas; *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p. 16 citing *WDFW Priority Habitats and Species List*, *supra* note 143.

¹⁴⁷ The *Shoreline Management Act* applies to all marine waters, segments of streams where the mean annual flow is more than 20 cubic feet per second, lakes and reservoirs 20 acres and greater in area, associated wetlands, and shorelines adjacent to these water bodies. *Shoreline Management Act*, *supra* note 134 at 90.58.030.

¹⁴⁸ Washington Department of Ecology, “Shoreline Master Programs,” online: <<https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-Master-Programs>>.

¹⁴⁹ WAC 173-26-186: Governing Principles of the Guidelines at (8); WAC 173-26-231: Shoreline Modifications. See Appendix C.

¹⁵⁰ WAC 173-26-231: Shoreline Modifications at s. 3(a)(2)(ii). See Appendix C.

¹⁵¹ WAC 173-26-231: Shoreline Modifications at s. 3(a)(2)(iii)(a). See Appendix C.

¹⁵² WAC 173-26-231: Shoreline Modifications at s. 3(a)(2)(iii). See Appendix C.

that property owners examine the feasibility of soft alternatives to shoreline armoring and only consider armoring as a last resort.¹⁵³

Lesson 4: State Laws Establish Permit Requirements for Development Projects That Could Impact Forage Fish Spawning Habitat

i. *Shoreline Management Act* Requires Permits for Shoreline Development

Washington's *Shoreline Management Act* establishes a local/state partnership in administering three types of permits for shoreline development:¹⁵⁴ substantial development permits,¹⁵⁵ conditional use permits,¹⁵⁶ and variance permits (which allow relaxation of environmental rules in defined hardship situations).¹⁵⁷ The local government reviews permit applications and prepares a written analysis of how the proposal complies with the *Shoreline Management Act*, Department of Ecology Rules and the local SMP.¹⁵⁸ In doing so, the local governments are required to consider cumulative impacts of a proposed project when they assess a permit proposal.¹⁵⁹ The Washington Department of Ecology ensures

¹⁵³ *Shoreline Armoring in Inland Sea: Science-Based Recommendations for Policy Implementation*, supra note 4 at p. 630 citing R. Carman, K. Taylor & P. Skowland, "Regulating Shoreline Armoring in Puget Sound" (2010) p. 49-54 in H. Shipman, M. N. Deither, G. Gelfenbaum, K. L. Fresh, R. S. Dinicola, eds, *Puget Sound Shorelines and the Impacts of Armoring – Proceedings of a State of the Science Workshop* (May 2009: U.S. Geological Survey Scientific Investigations Report 2010-5254).

¹⁵⁴ Washington Department of Ecology, "Shoreline Permitting Manual: Guidance for local governments" (December 2017) Publication No. 17-06-029 online: <<https://fortress.wa.gov/ecy/publications/documents/1706029.pdf>> [*Shoreline Permitting Manual*]:

Under the *Shoreline Management Act*, development means: construction or exterior alteration of structures; dredging; drilling; dumping; filling; removal of any sand, gravel, or minerals; bulkheading; driving of piling; placing of obstructions; any project of a permanent or temporary nature that interferes with the normal public use of the surface of waters overlying lands subject to the SMA at any stage of water level.

¹⁵⁵ Developments that meet a specific dollar amount threshold are considered substantial developments and require a substantial development permit (SDP):

any development of which the total cost or fair market value exceeds five thousand dollars, or any development which materially interferes with the normal public use of the water or shorelines of the state. The dollar threshold established in this subsection (3)(e) must be adjusted for inflation by the office of financial management every five years, beginning July 1, 2007, based upon changes in the consumer price index during that time period.

Shoreline Management Act, supra note 134 at 90.58.030(3)(e).

¹⁵⁶ A conditional use permit (CUP) is needed if a proposed use is listed as a conditional use in a shoreline environment designation, or if the SMP did not address the use. For example, if boat lifts were not listed in the SMP for a marina, a CUP would be required. *Shoreline Management Act*, supra note 134 at 90.58.140; *Shoreline Management Permit and Enforcement Procedures*, WAC 173-27 at 160, online: <<https://apps.leg.wa.gov/WAC/default.aspx?cite=173-27>>.

¹⁵⁷ Variance Permits are used to allow a project to deviate from an SMP's dimensional standards where there are "extraordinary circumstances relating to the physical character or configuration of property such that the strict implementation of the master program will impose unnecessary hardships on the applicant or thwart the policies set forth in RCW 90.58.020." WAC 173-27-170: Review Criteria for Variance Permits.

¹⁵⁸ WAC 173-27-150: Review Criteria for Substantial Development Permits; WAC 173-27-160: Review Criteria for Conditional Use Permits; WAC 173-27-170: Review Criteria for Variance Permits.

¹⁵⁹ Substantial Development Permit: Department of Ecology rules do not require an assessment of cumulative impacts for projects that require only SDPs but the Shorelines Hearings Board has held in several appeals decisions that a local government should have considered addressing cumulative impacts for an SDP. The Board set out the following factors to considering in weighting whether a cumulative impacts analysis is required for an SDP:

Whether a shoreline of statewide significance is involved;
Whether there is potential harm to habitat, loss of community use, or a significant degradation of views and aesthetic values;
Whether a project would be a "first of its kind" in the area;
Whether there is some indication of additional applications for similar activities in the area;
Whether the local SMP requires a cumulative impacts analysis be completed prior to the approval of an SDP; and
The type of use being proposed, and whether it is a favored or disfavored use.

Coalition to Protect Puget Sound Habitat v. Pierce County, SHB No. 13-016c (January 22, 2014); *Darrell de Tienne and Chelsea Farms, LCC v. Shorelines Hearings Board*, 197 Wn. App. 248, 290-91, 391 P.3d 458 (2016); *Baldwin, Simon and Taylor v. Pierce County*, SHB No. 17-0005c (September 1, 2017).

Conditional Use Permit: If comparable development proposals are likely and were to be permitted by CUP in the area where similar circumstances exist, the total of the conditional uses also must be consistent with the *Shoreline Management Act* and must not produce substantial adverse effects to the shoreline environment. WAC 173-27-160: Review Criteria for Conditional Use Permits at (2). This has been affirmed by at least one court decision, in which it was said "[l]ogic and common sense suggest that numerous projects, each having no

compliance with the policies and provisions of the *Shoreline Management Act* by reviewing and approving the permits.¹⁶⁰

ii. Hydraulic Code Rules Require Permits for Hydraulic Projects in State Waters

Washington's Hydraulic Code Rules further require a person or government agency planning hydraulic projects¹⁶¹ in or near state waters to obtain a Hydraulic Project Approval (HPA) permit from the WDFW.¹⁶² HPAs can only be denied or conditioned on the basis of protection of fish life.¹⁶³ The Hydraulic Code Rules list Surf smelt and sand lance spawning habitats as "saltwater habitats of special concern"¹⁶⁴ and so "the presence of saltwater habitats of special concern or adjacent areas with similar characteristic may restrict project type design, location and timing."¹⁶⁵

The Washington State Southern Resident Orca Task Force¹⁶⁶ recommended that the State "[d]irect WDFW to develop a plan with local governments for analysing cumulative impacts of projects permitted under the HPA program and ask the Legislature to rescind or amend appropriate portions of WDFW's HPA authority ... to enable the agency to require mitigation for cumulative impacts over time."¹⁶⁷

Lesson 5: Single-Family Residence Should not be Exempt from Permitting Requirements

Until its amendment in July 2019, the Hydraulic Code Rules exempted some single-family residences from certain permitting requirements for seawalls and bulkheads.¹⁶⁸ The Hydraulic Code Rules *required*

significant effect individually, may well have very significant effects when taken together." *Hayes v. Yount*, 87 Wn.2d 280, 287-88, 552 P.2d 1038 (1976).

Variance Permit: Local governments must also consider cumulative impacts over time for like actions; "if comparable developments were granted variances in the area where similar circumstances exist, the total of the developments must also be consistent with the SMA and must not produce substantial adverse effects to the shoreline environment." *Shoreline Permitting Manual*, *supra* note 154 at p. 14.

¹⁶⁰ Washington Department of Ecology reviews the locally approved variance permit and either approves, approves with conditions, or denies it within 30 days of receiving the permit package. *Shoreline Permitting Manual*, *supra* note 154 at p. 12.

¹⁶¹ A hydraulic project is construction or other work activities conducted in or near state waters that will "use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state." RCW 77.55.011: Definitions at (11). *Hydraulic Code Rules*, WAC Chapter 220-660:

The following are hydraulic projects and activities which require an individual HPA: Aquatic plant removal and control (outside of Aquatic Plants and Fish pamphlet rules); Beaver dam removal or modification; Boat ramps and launches; Culverts and bridges (new, repair, and replacement); Docks, piers, ramps, flats, and buoys; Dredging and sand/gravel removal; Log placement, repositioning, or removal; Mineral prospecting (outside of Gold and Fish pamphlet rules); Outfall and tide gate structures; Pond construction; Stream bank protection, bulkheads; Stream channel relocation and realignment; Utility crossings and test boring; and Water diversions and intakes.

¹⁶² RCW 77.55.021: Permit:

(1) Except as provided in RCW 77.55.031, 77.55.051, 77.55.041, and 77.55.361, in the event that any person or government agency desires to undertake a hydraulic project, the person or government agency shall, before commencing work thereon, secure the approval of the department in the form of a permit as to the adequacy of the means proposed for the protection of fish life.

¹⁶³ RCW 77.55.021: Permit at (7)(a).

¹⁶⁴ WAC 220-660-320: Saltwater Habitats of Special Concern at (3)(b)(i)-(ii).

¹⁶⁵ WAC 220-660-320: Saltwater Habitats of Special Concern at (1)(b) ; *Marine Forage Fishes in Puget Sound*, *supra* note 21 at p.1.

¹⁶⁶ On March 14, 2018, Gov. Jay Inslee signed Executive Order 18-02: Southern Resident Killer Whale Recovery and Task Force. Through this executive order, the governor directed state agencies to implement nine immediate actions to benefit Southern Resident killer whales (hereafter in this report "Southern Resident orcas"). He also established the Southern Resident Orca Task Force to identify, prioritize and support the implementation of a long-term action plan for the recovery of Southern Resident orcas to ensure a healthy and sustained population for the future. *Southern Resident Orca Task Force Report and Recommendations*, *supra* note 56.

¹⁶⁷ *Southern Resident Orca Task Force Report and Recommendations*, *supra* note 56 at p. 45. Note, however, that adequate funding for such cumulative impacts assessment is yet to be arranged.

¹⁶⁸ See original text at p. 8: *Marine Beach Front Protective Bulkheads or Rockwalls*, RCW 77.55.141, online:

<<https://www.energy.gov/sites/prod/files/2015/06/f22/77.55.pdf>>. [Repealed RCW 77.55.141]. Concerning the appeal, see: *Construction Projects in State Waters*, RCW Dispositions 77.55.141, online: <<https://app.leg.wa.gov/RCW/dispo.aspx?cite=77.55.141>>.

government to issue a permit (with or without conditions) for construction, replacement or repair of bulkhead or rockwall armoring structures for a single-family residence¹⁶⁹ if:

- the armoring was set six feet back from the high water line;¹⁷⁰ and
- the construction would not result in the “permanent loss of critical food fish or shellfish habitats.”¹⁷¹

However, concern for the plight of the orcas has now prompted Washington State to substantially strengthen the rules for single-family residences. Responding to a strong recommendation from the *Washington State Southern Resident Orca Task Force*,¹⁷² the State repealed the single-family exception. Now, project proponents for bulkheads and limited extensions at single-family residences are required to apply for a Substantial Development Permit.¹⁷³ Among other things, the new rules require proponents to demonstrate that the structure is *necessary* before getting a permit. Furthermore, if they can demonstrate the structure is necessary, they will face other requirements – including a requirement to compensate for unavoidable impacts to fish life.

Lesson 6: No-Net-Loss Policy in Action

Washington State mandates local governments to enact rules and policies to achieve “no net loss” of shoreline ecological function. The State requires local governments to develop comprehensive Shoreline Master Programs – and has issued State Guidelines (rules) to guide the mandatory local Shoreline Master Programs. A Governing Principle of the State Guidelines is:

*Local master programs shall include policies and regulations designed to achieve no net loss of ... ecological functions [of shorelines]*¹⁷⁴

As the Washington State Shoreline Master Program Handbook states:

*Over time, the existing condition of shoreline ecological functions should remain the same as the Shoreline Master Program is implemented. Simply stated, the no net loss standard is designed to halt the introduction of new impacts to shoreline ecological functions resulting from new development. Both protection and restoration are needed to achieve no net loss. Restoration activities also may result in improvements to shoreline ecological functions over time.*¹⁷⁵

¹⁶⁹ Repealed RCW 77.55.141, *supra* note 168 at (2).

¹⁷⁰ Repealed RCW 77.55.141, *supra* note 168 at (2)(a)&(b).

¹⁷¹ Repealed RCW 77.55.141, *supra* note 168 at (2)(c).

¹⁷² *Southern Resident Orca Task Force Report and Recommendations*, *supra* note 56 at p. 45 recommended: “[r]epeal the section of the HPA statute that requires the issuance of a permit (with or without conditions) for a single-family residential bulkhead, shoreline armor or rock wall to allow WDWF to consider the full impacts of these proposals consistent with its consideration of other aquatic projects.”

¹⁷³ *Development Permits*, RCW 90.58.140 at (1)-(2)&(11); *Special procedures for limited extensions and bulkheads*, WAC 173-27-120, online: <<https://apps.leg.wa.gov/WAC/default.aspx?cite=173-27&full=true#173-27-120>>.

¹⁷⁴ *Governing principles of the guidelines*, WAC 173-26 at 186(8)(b), online: <<https://apps.leg.wa.gov/wac/default.aspx?cite=173-26-186>>. See also: Washington Department of Ecology, “Shoreline Master Program Handbook” (revised November 2017) Publication No. 11-06-010 at 1 online: <<https://fortress.wa.gov/ecy/publications/parts/1106010part4.pdf>>.

¹⁷⁵ Washington Department of Ecology, “Shoreline Master Program Handbook” (revised November 2017) Publication No. 11-06-010 at 1 online: <<https://fortress.wa.gov/ecy/publications/parts/110610part4.pdf>>. See also WAC 173-26.

In applying a no-net-loss approach in BC, harmful hard shoreline armoring should only be allowed after consideration of the viability of all other beach protection measures that might be less harmful.¹⁷⁶ The full suite of alternative modern green development techniques should be canvassed first.

In those cases where unavoidable harm will be done to beaches, a no-net-loss policy will require ample compensatory restoration. Such beach restoration should be required in all areas where beaches have been or will be compromised by development.¹⁷⁷

A BC *Shoreline Protection Act* should facilitate beach restoration. It should encourage beach restoration that considers natural sediment recruitment – through backshore erosion or longshore transport and sediment import from elsewhere, where necessary. It should recognise that if beach restoration is needed, it will sometimes be necessary to bring trucks and equipment to the beach site. Thus, the *Shoreline Protection Act* should provide for and regulate access corridors and ‘rights of way’ to enable beach nourishment to occur in a manner that reduces unintended harms to the surrounding environment.¹⁷⁸

Finally, wherever the Province approves the unavoidable construction of hard armoring structures, they should require best practices,¹⁷⁹ including “timing windows” that prohibit construction or nourishment during forage fish spawning season(s) and only allow construction when forage fish are not spawning in the area.

¹⁷⁶ Due to the no-net-loss policy there should be an exception to the above rule for the exceptional situation where forage fish spawning habitat would be lost without hard shoreline armoring at or above the high water line or natural boundary. See: WAC: Shoreline Modifications 173-26-231 (3)(a)(iii)(B)(IV).

¹⁷⁷ Shoreline management plans throughout the State of Washington sometime require beach nourishment by restoration following development. For example, see City of Mukileto, *Municipal Code, Chapter 17B.52C: Fish and Wildlife Habitat Conservation Areas*, online: <<https://www.codepublishing.com/WA/Mukilteo/html/Mukilteo17B/Mukilteo17B52C.html>>.

¹⁷⁸ Email. “Re: The pond.” Ian Bruce, Fisheries Specialist, Peninsula Streams. “Received by” Calvin Sandborn (2019 June 11).

¹⁷⁹ Some recommended best practices include: use sand with a similar composition to the natural sand; place sand up coast and in the nearshore zone and allow waves to move it onto and along the beach; plough the sand immediately after nourishment to prevent it from becoming so compact that it is inhospitable to beach critters; execute the nourishment at a time of year when birds and other mobile organisms are less prevalent; perform several small nourishment projects rather than a single large project to allow come beach animals to survive; keep the project footprint as small as possible; allow enough time between nourishment projects for the slowest reproducing beach organism to recolonize and reproduce. J. Speybroeck *et al.*, “Beach Nourishment: An Ecologically Sound Coastal Defence Alternative? A Review” 16 *Aquatic Conservation: Marine Freshwater Ecosystems* 419-435.

Existing Tools to Use in Implementing the Proposed New *Shoreline Protection Act*

Washington's shoreline protection mechanisms rely on the identification and classifying of important habitat, including forage fish spawning habitat. The identification and classification of forage fish spawning habitat is important in the British Columbia context as well.¹⁸⁰ There are tools in existence which may be utilized in planning and administering a *Shoreline Protection Act* in British Columbia; these include the BC Coastal Resource Information Management System and the Sensitive Ecosystem Inventory.

1. Identification and Mapping

The BC Coastal Resource Information Management System (CRIMS) is an online, interactive map for viewing coastal and marine data.¹⁸¹ It contains information on shoreline classification and selected fisheries information, in addition to aquaculture and offshore oil and gas information.¹⁸² For example, CRIMS contains data on the distribution of eelgrasses along the coast, showing relative abundance and overall relative importance.¹⁸³ Data on forage fish spawning habitat should be collected and added to this interactive mapping platform.

2. Environmentally Sensitive Areas

Federal and provincial agencies have been classifying shores from a habitat sensitivity perspective in collaboration with harbour authorities, regional districts and municipalities as part of estuary management plans.¹⁸⁴ The Sensitive Ecosystem Inventory (SEI) is a joint endeavor of Environment and Climate Change Canada and the BC Ministry of Environment & Climate Change Strategy. The SEI identifies and maps remnants of rare and ecologically fragile terrestrial ecosystems in parts of the province that are experiencing heavy growth, to encourage land use decisions that support the survival of the ecosystems.¹⁸⁵ The same identification, classification and mapping processes should be undertaken for shoreline and marine areas. WWF is doing extensive work to identify forage fish habitat, and that information should also be utilized.

Once the information is available, shoreline classification systems should be used to inform Official Community Plans and designation of key Development Permit Areas. Municipalities and Regional Districts could use OCPs and RGSs to designate permit areas for the protection of the identified environmentally sensitive areas – to establish conditions for development.¹⁸⁶ Classification programs and

¹⁸⁰ Note that Peninsula Stream Society has conducted "forage fish egg beach surveys" in the following locations around the Capital Regional District, BC: Tsehum Harbour; Patricia Bay; Bazan Bay; Brentwood Bay; Island View Beach; Cordova Bay; Arbutus Cove Beach; Telegraph Cove Beach; Esquimalt Lagoon; Saxe Point; and Witty's Lagoon.

¹⁸¹ British Columbia, "Coastal Resource Information Management System (CRIMS)" online: <<https://www2.gov.bc.ca/gov/content/data/geographic-data-services/topographic-data/coast>>.

¹⁸² British Columbia, "Coastal Resource Information Management System (CRIMS)" online: <<https://www2.gov.bc.ca/gov/content/data/geographic-data-services/topographic-data/coast>>.

¹⁸³ British Columbia, Data Catalogue, Eelgrasses – Coastal Resource Information, online: <<https://catalogue.data.gov.bc.ca/dataset/eelgrasses-coastal-resource-information-management-system-crims/resource/be400f9c-0f8e-41c1-a88b-a8d2ef98e103>>.

¹⁸⁴ *Coastal Shore Stewardship*, *supra* note 10 at Part 2, p. 45.

¹⁸⁵ *Coastal Shore Stewardship*, *supra* note 10 at Part 2, p. 40; Note: The BC ministry of 'Sustainable Resource Management' and the BC Ministry of 'Water, Land and Air Protection' have been replaced by the BC Ministry of Environment & Climate Change Strategy.

¹⁸⁶ *Coastal Shore Stewardship*, *supra* note 10 at Part 2 p. 44.

subsequent local government planning and regulation should include a focus on shores that contain forage fish spawning habitat.

Incentivizing Natural Alternatives to Shoreline Armoring

As discussed above, the *Shoreline Protection Act* must amend the *Local Government Act* and other legislation to reverse property owners' archaic common law right to protect their property from erosion with ecologically harmful seawalls. The amendments should authorize local governments to adopt bylaws that protect natural shorelines.

In order to get property owners to buy-in to these changes it is important to educate them about less harmful effective ways to protect their properties – and to incentivize shoreline naturalization initiatives. For example, the Province of British Columbia could incentivize shoreline naturalization initiatives by promoting Stewardship Centre for British Columbia's Green Shores program and adopting a tax exemption, similar to the Islands Trust Area Natural Area Protection Tax Exemption Program, for property owners who protect the shore.

1. Green Shores: Certifying and Incentivizing Stewardship

Green Shores¹⁸⁷ is a program of the Stewardship Centre for British Columbia, designed to encourage sustainable use of shoreline ecosystems through planning and design that recognises the ecological features and functions of shoreline systems.¹⁸⁸ Green Shores has developed two different 'Credit and Rating Guide' programs:

- Green Shores for Coastal Development – for municipal parks, mixed use residential and institutional shoreline properties;¹⁸⁹ and
- Green Shores for Homes – for use by residential shoreline property owners, and the professionals and contractors that assist them, to complete shoreline projects.¹⁹⁰

Through the Green Shores programs, developments receive certification through a credits and rating system, similar to Canada Green Building Council's LEED¹⁹¹ or Built Green Canada¹⁹² programs. After project completion, an auditor verifies the ecological standard met, and offers either no certification, or Green Shores Certified, Silver Certified or Gold Certified.

¹⁸⁷ Stewardship Centre for BC, "Green Shores", (2019) online: <http://stewardshipcentrebc.ca/Green_shores/>.

¹⁸⁸ *Coastal Shore Jurisdiction in British Columbia*, *supra* note 82.

¹⁸⁹ Green Shores for Coastal Development, "Credits and Ratings Guide: A reference to help minimize the environmental impact of waterfront properties and development" (Updated January 2016) online: <http://stewardshipcentrebc.ca/PDF_docs/greenshores/Resources/GSCD_CreditsandRatingsGuide2016.pdf>.

¹⁹⁰ Green Shores for Homes, "Credits and Ratings Guide: A reference for homeowners, designers, and construction professional to help minimize the environmental impact of waterfront properties and development" (December 2015) online: <http://greenshoresforhomes.org/wp-content/uploads/2017/06/GreenShores_Credits-Ratings_Guide-COMPLETE.pdf> [Green Shores for Homes Credits and Ratings Guide].

¹⁹¹ LEED certification provides independent, third-party verification that a building, home or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: location and transportation, sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Canada Green Building Council, "LEED Certification Process" online: <https://www.cagbc.org/CAGBC/LEED/Certification_Process/CAGBC/Programs/LEED/LEED_Certification_Process.aspx?hkey=1ccc60d7-7815-428d-a7e3-cf78786a1902>.

¹⁹² Built Green Canada is a non-profit organization that administers a third-party green building certification program for residential builders. Built Green Canada, (2017) online: <<http://www.builtgreencanada.ca/>>.

2. Islands Trust Area Natural Area Protection Tax Exemption Program

A conservation covenant is a voluntary agreement between a landowner and another party, in which the owner promises to protect the land.¹⁹³ Conservation covenants are registered on the title of the land¹⁹⁴ and thus bind subsequent owners.¹⁹⁵ Typically, NGOs such as “land trusts” hold and manage conservation covenants;¹⁹⁶ the landowner retains title to the land but the trust obtains the right to prohibit certain activities or require conservation measures.¹⁹⁷ Local governments should work with local land trust organizations to encourage the use of conservation covenants to protect key foreshore and marine riparian area above the high water line at forage fish spawning beaches.

Property taxation may encourage conservation of natural areas by giving taxation exemptions to landowners who have granted a conservation covenant to a land trust.¹⁹⁸ The Natural Area Protection Tax Exemption¹⁹⁹ Program (NAPTEP) provides owners of eligible Islands Trust Area private property with an annual reduction on the property taxes for the portions of their land protected by the NAPTEP covenant.²⁰⁰ Eligible natural features include “areas that are critical habitat for native animal species in relation to breeding, rearing, feeding or staging.”²⁰¹ The Islands Trust Council may designate, by bylaw, lands within a local trust area or municipality that contain eligible features as an area for which tax exemptions may be provided.²⁰²

The BC Government and the Islands Trust should consider ways of providing tax incentives to owners of land who go to extraordinary lengths to protect particularly sensitive shorelines in an ecologically responsible manner. For example, the *Natural Area Protection Tax Exemption Regulation* could be amended in order to designate foreshore and marine riparian areas above the high water line at forage fish spawning beaches as areas especially eligible for the tax exemption. The Islands Trust Conservancy Board could consider promoting conservation covenants and providing special tax exemption in appropriate cases – since this could incentivize forage fish spawning habitat conservation and increase public buy-in for the regime.

¹⁹³ The landowner retains title and use of the land but the trust obtains the right to prohibit specified types of development or to require conservation measures. *Coastal Shore Stewardship*, *supra* note 10 at p. 49.

¹⁹⁴ *Land Title Act*, RSBC 1996 c 250 at s. 219.

¹⁹⁵ *Land Title Act*, RSBC 1996 c 250 at s. 219(7). See also Calvin Sandborn, “Green Space and Growth: Conserving Natural Areas in B.C. Communities” (March 1996) at p. 14.

¹⁹⁶ “Land trusts are private, non-profit organizations that protect areas for environmental, scientific, historical, cultural, scenic, or compatible recreational values.” *Coastal Shore Stewardship*, *supra* note 10 at p. 49.

¹⁹⁷ Calvin Sandborn, “Green Space and Growth: Conserving Natural Areas in B.C. Communities” (March 1996) at p. 14.

¹⁹⁸ Calvin Sandborn, “Green Space and Growth: Conserving Natural Areas in B.C. Communities” (March 1996) at p. 30.

¹⁹⁹ *Islands Trust Act*, RSBC 1996 c 239 at s. 49.1 - 49.8.

²⁰⁰ Calvin Sandborn, “Green Space and Growth: Conserving Natural Areas in B.C. Communities” (March 1996) p. 30.

²⁰¹ *Islands Trust Natural Area Protection Tax Exemption Regulation* BC Reg. 117/2018; Islands Trust Conservancy Board Policy 2.5 “Natural Area Protection Tax Exemption Covenants” online: <<http://www.islandstrustconservancy.ca/media/84837/25-natural-area-protection-tax-exemption-covenants-policy.pdf>>.

Eligible features include: relatively undisturbed sensitive ecosystems; habitat for rare native plant species or plant communities; habitat critical to native animal species’ breeding, rearing, feeding or staging; and special geological features. Islands Trust Conservancy, “Ways to Protect you Land: Register a NAPTEP Covenant” online: <<http://www.islandstrustconservancy.ca/initiatives/privateconservation/naptep.aspx>>.

²⁰² *Islands Trust Act*, RSBC 1996 c 239 at s. 49.2(1).

Recommendations

1. The Province of British Columbia should take immediate further steps to identify, map and classify forage fish spawning habitat, utilizing existing tools such as the BC Coastal Resource Information Management System and Sensitive Ecosystem Inventory.
2. The Province of British Columbia should adopt a *Shoreline Protection Act* that requires that shoreline protection developments employ best practices for ecologically-sensitive shoreline protection. Hard shoreline armoring at sensitive beaches should only be allowed as a last resort, after consideration of other shoreline protection alternatives that might be less harmful.
3. To protect key forage fish spawning beaches, the *Shoreline Protection Act* should also:
 - Require local governments to adopt standardized shoreline protection measures into their local planning, land use and other bylaws. All such bylaws must reflect the Governing Principle of achieving no net loss of shoreline ecological function;
 - Require local governments to:
 - adopt Official Community Plans that recognize forage fish spawning habitat and the corresponding marine riparian area as environmentally sensitive areas; and
 - set out Development Permit Areas for “Forage Fish Spawning Habitat,” which require permits for any development in such areas. Permits should generally only be available for ecologically sensitive shoreline protection measures which are set back from forage fish spawning beaches;
 - Require regional districts to adopt Regional Growth Strategies that recognize forage fish spawning habitat and the corresponding marine riparian area as environmentally sensitive areas – and that discourage hard shoreline armoring such as seawalls and riprap and encourage *Green Shores* strategies for shoreline development;
 - Mandate that local governments’ zoning bylaws:
 - create a zone 30 m from the natural boundary which can only be used for ecological preservation purposes; or
 - include building setbacks at least 30 m from the high water line or natural boundary; and
 - Establish a provincial no-net-loss policy for forage fish spawning beach habitat – to require ample compensatory restoration for those situations where ecologically damaging development is unavoidable. Such restoration should be required and facilitated in all areas where beaches have been or will be compromised by development;
 - Incentivize shoreline naturalization, utilization of soft shoreline armoring, removal or relocating of existing hard armoring structures in the foreshore/intertidal zone, through
 - promotion of the Green Shores program; and/ or
 - adoption of tax exemption policies and programs to provide landowners – in appropriate circumstances – with tax incentives for placing conservation covenants on their lands to maintain natural shorelines near forage fish spawning habitat.

Finally, the Province should amend the *Local Government Act* and other laws to restrict private property owners' archaic right to protect property from erosion by building ecologically harmful beach armoring.

Appendix A – Fisheries and Oceans Canada: Project Activities and Waterbodies Where Review isn't Required

Fisheries and Oceans Canada: Project Activities and Waterbodies Where Review isn't Required²⁰³

Your project does not require a Fisheries and Oceans Canada review if it meets the criteria outlined on this page.

Your responsibilities

Regardless of the activity, you're still required to:

- avoid causing serious harm to fish
- comply with the prohibitions under the Species at Risk Act (SARA)
- follow the [measures to avoid harm](#)
- follow requirements from other federal, provincial and municipal jurisdictions

If your project doesn't meet the above criteria, submit a [request for review](#).

If your project is taking place in the James Bay Territory in Quebec, consult the [best practice guide](#) (PDF, 1.12 MB).

Criteria for projects not requiring our review take the protection of aquatic species at risk listed under SARA, their critical habitat and residences into consideration.

Species at Risk Act violations

You're violating Section 32 of SARA if you:

- take or capture aquatic species listed as endangered or threatened, including during:
 - fish salvage
 - site isolation
 - shellfish relocation activities
 - baseline environmental studies
- are responsible for the entrainment or impingement of such species

Waterbodies

You don't need to submit your project for review if it's taking place in one of the following **existing** waterbody types.

- [Approved marine disposal or dumping sites](#) that have been used in the past 10 years.
- Tailings impoundment areas (as listed in [Schedule 2 of the Metal Mining Effluent Regulations](#)).
- Artificial waterbodies that aren't connected to a waterbody that contains fish at any time during any given year, such as:

²⁰³ Note: Due to Bill C-38 receiving Royal Assent, the information in this Appendix may have changed or will change. Currently, the webpage this information was obtained from can only be accessed in archive. ([ARCHIVED VERSION](#): <https://web.archive.org/web/20190709233925/http://www.dfo-mpo.gc.ca/pnw-ppe/activities-activites-eng.html>). The newest relevant information can be found as follows: Department of Fisheries and Oceans, "Projects Near Water" (29 August 2019), online: <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>. See also Department of Fisheries and Oceans, "Measures to Protect Fish and Fish Habitat" (29 August 2019), online: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html>; Department of Fisheries and Oceans, "Standards and Codes of Practice" (29 August 2019), online: <http://www.dfo-mpo.gc.ca/pnw-ppe/practice-pratique-eng.html>.

- private ponds
- roadside drainage ditches
- quarries and aggregate pits
- irrigation ponds or channels
- stormwater management ponds
- agricultural drains and drainage ditches
- commercial ponds like golf course ponds or stocked fishing ponds
- Any other waterbody that:
 - doesn't contain fish at any time during any given year
 - isn't connected to a waterbody that contains fish at any time during any given year

Bridges, causeways and culverts

Bridges

- maintenance
 - cleaning, removal and application of protective coatings and surface replacement
 - relevant [measures to avoid harm](#) are followed
 - removal of debris necessary to protect piers and abutments
 - no new temporary or permanent fill placed below the high water mark
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed
- repairs
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - all work is conducted above the high water mark
 - relevant [measures to avoid harm](#) are followed
- construction of ice bridges and snow fills
 - channel realignment isn't required
 - no dredging, backfilling (except with clean snow) or excavation of the bed or banks of the watercourse
 - no use of gravel, stone or wood, with the exception of logs lashed together
 - snow fills will be put in place when the watercourse is dry or when the water is frozen through to the bed
 - on ice bridges, water flow is maintained under the ice, where it naturally occurs
 - relevant [measures to avoid harm](#) are followed
- construction of clear-span bridges
 - no new temporary or permanent fill placed below the high water mark
 - channel realignment isn't required
 - relevant [measures to avoid harm](#) are followed
- removal
 - no new temporary or permanent fill placed below the high water mark
 - all work is conducted above the high water mark
 - relevant [measures to avoid harm](#) are followed
- no permanent increase in existing footprint above the high water mark if the riparian area is identified as part of the critical habitat of an aquatic listed species at risk
- where SARA-listed shellfish occur, no scaffolding or support structures will be placed directly on the bed of the watercourse
- no new construction of overhead structures where resident killer whales could occur

Causeways

- repairs
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - all work is conducted above the high water mark
 - relevant [measures to avoid harm](#) are followed

Culverts

- maintenance (debris removal)
 - gradual removal such that flooding downstream, extreme flows downstream, release of suspended sediment and fish stranding can be avoided
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed
- repairs
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - relevant [measures to avoid harm](#) are followed
 - channel realignment isn't required
 - no narrowing of the channel
 - any obstruction to fish passage will respect [timing windows](#)
 - provides for fish passage
 - work can be done in isolation of flowing water
 - where SARA-listed aquatic species occur, no culvert repairs will take place
- removal
 - no temporary or permanent increase in existing footprint below the high water mark
 - relevant [measures to avoid harm](#) are followed
 - channel realignment isn't required
 - no narrowing of the channel
 - any obstruction to fish passage will respect [timing windows](#)
 - work can be done in isolation of flowing water
 - the banks and bed of the waterbody are restored to replicate conditions upstream and downstream of the work area and provide for fish passage
- where critical habitat or residences of SARA-listed aquatic species occur, or endangered or threatened shellfish occur, no dredging or excavation of the waterbody will take place except where exempted in the recovery strategy for that species
- where SARA-listed aquatic species, their residences or critical habitat occur:
 - no permanent increase in existing footprint above the high water mark if the riparian area is identified as part of the critical habitat of an aquatic listed species at risk
 - no removal of riparian vegetation if the riparian area is identified as part of the critical habitat of an aquatic listed species at risk
- where SARA-listed shellfish occur:
 - no scaffolding or support structures will be placed directly on the bed of the watercourse
 - no dredging or excavation of the waterbody will take place

Cottage, boating and recreation

Docks

- all new construction, repair or rebuild of a floating, cantilever or post dock where total combined footprint doesn't exceed 20 m2
- all removal activities
- where SARA-listed shellfish occur, or critical habitat or residences of freshwater SARA-listed aquatic species occur no new temporary or permanent fill placed below the high water mark

Boat houses

- new construction, repairs or rebuilds of boat houses where total combined footprint doesn't exceed 20 m2
 - no temporary or permanent increase in footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
- all removal activities

Boat launches/ramps

- construction or repairs
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
- all removal activities
- **species at risk** where critical habitat or residences of SARA-listed aquatic species occur, no new construction of public or commercial boat launches and ramps

Aquatic vegetation removal

- removal of aquatic vegetation by hand or mechanical cutting for swimming areas and private boat access
 - areas less than 4 metres in width (measured along the shoreline) and of any length (out from the shore)
 - **species at risk** where SARA-listed aquatic species or their critical habitat or residences occur, only hand cutting will take place, no mechanical cutting

Dredging

- dredging for private boat access
 - area being dredged is less than 4 metres in width (including the side sloping) and 10 metres in length (measured out from the shore)
 - no dredging activities will take place where SARA-listed shellfish occur except where exempted in the recovery strategy for that species
- marina routine maintenance dredging
 - no temporary or permanent increase in existing footprint below the high water mark
 - dredging material is deposited and stabilized on land (no open water disposal)
 - dredging has occurred in the last 10 years
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed
 - no dredging activities will take place where SARA-listed shellfish occur except where exempted in the recovery strategy for that species

Moorings

- all installations of new moorings and repairs to existing moorings
- all removal activities

Excavation

- in-land excavation for nearshore development
 - all work is conducted above the high water mark
 - no alteration of water levels in nearby waterbodies
 - no excavation in seasonally inundated areas and floodplains
 - **species at risk** no excavation in the riparian area if it's identified as part of the critical habitat of an aquatic listed species at risk

Shoreline/bank stabilization

- shoreline/bank stabilization such as rock protection, plantings and bioengineering
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark

Beaches

- installation and replenishment of private and public beaches
 - all sand is isolated and contained above the high water mark such that sand can't wash into the water
 - where SARA-listed shellfish occur, or where critical habitat of freshwater SARA-listed aquatic species occurs, no installation of new public beaches

Water intakes

- installation of and repairs to water intakes
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - use fish screens to avoid killing fish
- all removal activities

Harbours and marine commercial activities

Breakwaters, groynes, piers and wharves

- repairs to existing breakwaters, groynes, piers and wharves
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
- all removal activities

Moorings

- all installations of new moorings and repairs to existing moorings
- all removal activities
- where SARA-listed shellfish occur, no installation of new moorings

Pile driving

- repairs to, or replacement of, existing piles
 - can avoid killing fish and avoid harming, harassing, taking or capturing SARA-listed aquatic species

Log handling/dumps

- existing log dump operations
 - no increase in existing footprint
 - a debris management plan is in place to avoid wood accumulation on site
 - dump area has been used within the last 10 years

Dredging and disposal of dredged material

- maintenance dredging for commercial marinas, shipping access and ports
- no temporary or permanent increase in existing footprint of dredged and disposal area
- dredged material is deposited and stabilized on land or at an [approved marine disposal and dumping sites](#) that have been used in the past 10 years
- dredging has occurred in the last 10 years
- time work in water to respect [timing windows](#)
- relevant [measures to avoid harm](#) are followed
- where SARA-listed shellfish occur, or critical habitat or residences of freshwater endangered or threatened aquatic species occur, no dredging activities will take place except where exempted in the recovery strategy for that species
- where southern or northern resident killer whale could occur, polychlorinated biphenyls (PCB) analysis of the substrate to be dredged was undertaken within the last 5 years and mitigation measures over and above best management practices for dredging weren't required

Drainage, flooding and erosion control, stormwater and wastewater management

Stormwater management facilities/basins

- construction of new land-based stormwater management facilities, settling ponds and storage basins
 - no work occurring below the high water mark of a nearby waterbody

Tailings impoundment areas

- construction of new land-based [tailings impoundment areas](#)
 - no work occurring below the high water mark of a nearby waterbody

Water outfalls

- construction of, and repairs to, water outfalls
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
- all removal activities

Drainage channels

- construction and routine clean-out of drainage channels
- clean-out has occurred in the past 10 years
- work can be done in the dry or under frozen conditions
- where SARA-listed aquatic species, their residences or critical habitat occur, no construction or clean-out activities will take place

Bank stabilization

- bank stabilization using rock protection, plantings or bioengineering
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - no removal of riparian vegetation if the riparian area is identified as part of the critical habitat of an aquatic listed species at risk

Aquatic vegetation removal

- removal of aquatic vegetation by hand or mechanical cutting for flood control
- where critical habitat of SARA-listed aquatic species occurs, only hand cutting will be done, no aquatic vegetation removal by mechanical cutting will take place

Dykes

- repairs to existing dykes
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark

Berms

- repairs to existing berms
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark

Water level and flow management

Dams

- repairs to existing dams
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - no increase or decrease in height of dam
 - no change in water levels and flows upstream and downstream of existing dam
 - where critical habitat of SARA-listed aquatic species occurs, no dam repairs will take place

Fishways/ladders

- repairs to existing fishways and fish ladders
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - any obstruction to fish passage will respect [timing windows](#)
 - no modification to original design, such as:
 - height of weirs
 - number of baffles
 - distance between baffles

Weirs

- repairs to existing weirs
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - no change in water levels and flows upstream and downstream of existing weir
 - where critical habitat of SARA-listed aquatic species occurs, no dam repairs will take place

Other activities

Habitat restoration

- restoration projects undertaken with the sole purpose of improving or repairing existing habitats including riparian planting, shoreline/bank stabilization, bio-engineering and creation of in-stream structure
 - no new temporary or permanent fill placed below the high water mark
 - any obstruction to fish passage will respect [timing windows](#)
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed
 - criteria for all associated project activities are respected
- no removal of riparian vegetation if the riparian area is identified as part of the critical habitat of an aquatic listed species at risk

Log removal/salvage

- all commercial submerged log salvage operations
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed

Riparian vegetation removal

- vegetation clearing for maintenance of existing linear projects (such as road right-of-ways, electrical and telecommunication transmission corridors) and existing commercial and industrial development sites
 - if your project deals with riparian areas in southern British Columbia, the provincial Riparian Area Regulation may apply
- visit the [provincial website](#) for more information, and follow the provincial process if the regulation applies to your project
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed
- no removal of riparian vegetation if the riparian area is identified as part of the critical habitat of an aquatic listed species at risk

Beaver dam removal

- gradual removal of beaver dams by hand or machinery
 - flooding can be prevented
 - any obstruction to fish passage will respect [timing windows](#)
 - time work in water to respect [timing windows](#)
 - relevant [measures to avoid harm](#) are followed

- where SARA-listed aquatic species, their residences or critical habitat occur beaver dam removal won't occur under frozen conditions where fish may be overwintering

Mineral exploration

- mineral exploration activities such as site reconnaissance, line cutting, temporary work camp operations, small diameter/low density drilling, high density drilling and/or bulk sampling (extraction of large samples of mineralized material) through large diameter drilling, pitting, trenching and surface stripping
 - a plan is in place to plug and permanently seal artesian flow if encountered
 - all work can be done on land with the exception of small diameter/low density drilling which can be carried out on ice

Underwater cables

- all installations on lakebeds and in the marine environment
- where critical habitat of SARA-listed aquatic species occurs, no open trench methods, including ploughing and water-jetting, will be used to bury cables

Water intakes: municipal and industrial

- repairs to existing intakes
 - no temporary or permanent increase in existing footprint below the high water mark
 - no new temporary or permanent fill placed below the high water mark
 - use fish screens to avoid killing fish
 - no change in flows
- all removal activities

Appendix B: Chart Adapted from Green Shores Policy and Regulatory Tools for Local Governments Appendix A

Chart Adapted from Green Shores Policy and Regulatory Tools for Local Governments Appendix A: Green Shores – Scan of Local Government Policy/Regulation

Local Government	Mechanisms used to regulate shoreline	Characteristics
City of Campbell River	OCP Bylaw assigns Foreshore Development Permit Area 30 m seaward and landward from the natural boundary of the sea Zoning Bylaw	30 m setback from natural boundary of the sea for building in the Foreshore Development Permit Area. Approval required for building in this area under the Zoning bylaw. Relies on Qualified Environmental Professional to assess shoreline and determine whether a setback less than 30 m is appropriate for building in a Foreshore Development Permit Area. Guidelines say that shoreline protection should be by softest means necessary and furthest inland possible.
Cowichan Valley Regional District	OCP Bylaw Aquatic Resource Protection Development Permit Area	OCP bylaw designated Marine Resource planning area and stated it supports green shores approaches to stabilization of shoreline areas and does not support hard armoring structures such as seawalls in this planning area. Aquatic Resource Protection Development Area guidelines state that green shores approaches are preferred in “Marine Riparian Areas” where “practical.” Relies on Qualified Coastal Professionals to determine whether green shores alternatives to hard shoreline armoring is appropriate.
Town of Gibsons	OCP Bylaw assigns Development Permit Area No. 2 – Environmentally Sensitive	OCP bylaw designates Development Permit Area No. 2 – Environmentally Sensitive, which includes 15 m upland and 30 m seaward of natural boundary, designated for protection of significant fish habitat and marine environment. Directs an “appropriate setback/leave strip” be left undisturbed. Relies on Qualified Environmental Professional to conduct an environmental assessment for any new development, redevelopment or use to assess impacts on fish habitat.
District of Lantzville	OCP Bylaw designates the DPA IV – Coastal Protection	Entire shoreline of the District (15 m upland from “property boundary or natural boundary”) is a Development Permit Area. Building and accessory structures must be set back at least 15 m from the property boundary adjacent to the Strait of Georgia.

		District discourages use of seawalls and encourages use of natural shoreline armoring methods but defers to a “qualified professional” to assess need for such structures.
Lasqueti Island – Islands Trust	OCP Bylaw sets policies for environmental management of “marine coastal areas” Land Use Bylaw includes general marine-related Regulations and 9 marine zones	OCP Policies for marine coastal areas note that “designation and regulation of the foreshore and marine coastal areas should be designed to preserve and protect the natural environment and character and should recognize the need to dedicate areas of the foreshore” Land Use Bylaw includes a Marine Conservation (M1) zone, where the only permitted uses are “ecological reserves and other reserves designated for protection of marine ecosystems and habitat; public shellfish reserves; underwater conservancy; marine protected areas; marine navigation aids; and emergency log boom tie ups at designated sites.
District of Metchosin	OCP Bylaw	Sets out general policies, designates 5 shoreline classifications (rocky shores; drift-sector beaches; pocket beaches; low-energy shore zone; and lagoon ecosystem) and sets out policies specified to each designation.
City of Nanaimo	OCP Bylaw designates Development Permit Area 2 Environmentally Sensitive Areas Zoning Bylaw	OCP Bylaw identifies environmentally sensitive areas (based on the Sensitive Ecosystem Inventory for East Vancouver Island and the Gulf Islands) as a Development Permit Area. Defers to a Qualified Environmental Professional to conduct an environmental assessment of development within the DPA for environmentally sensitive areas, to identify appropriate buffers or leave strips before development can occur. Zoning Bylaw mandates a 15 m leave strip adjacent to the sea from the natural boundary within the DPA for environmentally sensitive areas.
Nanaimo Regional District – Electoral Area A	OCP Bylaw designates Environmentally Sensitive Features DPA	Environmentally Sensitive Features DPA includes coastal areas 15 m upward from the natural boundary and 15 m seaward. Guidelines include preference for sold measures and opposition to retaining wall placement.
Nanaimo Regional District – Electoral Area G	OCP Bylaw designates Environmentally Sensitive Features DPA	Policy directs owners to avoid disturbance or damage to the foreshore and intertidal areas, supports soft stabilization measures and supports hard measures only where “deemed necessary by a professional.” Guidelines include preference for sold measures and opposition to retaining wall placement.
District of North Cowichan	OCP Bylaw sets out policies and designates Development Permit Area 3 – Natural Environment	OCP Bylaw designates all areas along the marine waterfront as Development Permit Areas. Policies are aimed at encouraging development with minimal impacts rather than shoreline conservation.

	Zoning Bylaw sets out guidelines for Shoreline Protection Areas	<p>Development Permit Area 3 – Natural Environment applies to 30 m horizontal distance upland from present natural boundary and 30 m seaward of the present natural boundary.</p> <p>Zoning Bylaw sets out guidelines applicable to Shoreline Protection Areas, which are restricted to those uses necessitating shoreline access. The guidelines discourage installation of hard structural shore protection measures to address shoreline erosion and encourage non-structural options. Relies on Qualified Coastal Professional to conduct an assessment of shoreline protection measures before they are taken.</p>
District of North Saanich	OCP Bylaw designates Development Permit Area No. 1 – Marine Uplands and Foreshore, classifies shorelines and sets out policies specific to each shoreline	<p>For shorelines classified as beach shores – drift sector beaches, building prohibitions placed over lands within 15 m horizontal distance from natural boundary adjoining beach shores, except where lesser setback is acceptable.</p> <p>For shorelines classified as beach shores – pocket beaches, building prohibitions placed over lands within 15 m horizontal distance from natural boundary, except where lesser setback is acceptable. No bulkheading or placement of shore protection structures is allowed on beach shores – pocket beaches, except where permitted by the District.</p>
City of Powell River	Sustainable Official Community Plan Bylaw	All development along the shoreline of Malaspina Strait must plan for a sea level rise of 1.0 m and associated storm surge and coastal erosion. New buildings must be located at a minimum of 15 m from the natural boundary, except for shoreline protection measures.
Powell River Regional District – Electoral Area A	OCP in Schedule to Bylaw designates Foreshore land use designation	Foreshore land use designation applies to lands below the natural boundary or visible high water mark of the ocean. Encourages: a 30 m leave strip from natural boundary of the sea; protecting intertidal processes; adoption of Green Shores for Homes approach. Discourages: armoring of the shoreline by retaining walls, riprap, concrete blocks or other hard structural shoreline protection. Directs that where necessary, hard structures should be upland of the natural boundary.
District of Saanich	<p>OCP Bylaw designates Development Permit Area 29 Environmental Development</p> <p>Zoning Bylaw</p> <p><i>Saanich's Environmentally Significant Areas Atlas and Saanich Green/Blue Spaces: A Framework for Action</i> provide guidance</p>	<p>DPA 29 Environmental Development includes “marine backshore,” 15 m from the natural boundary and requires development protect the marine backshore.</p> <p>Zoning bylaw says that on properties fronting the ocean, no building, structure, retaining wall, screen or fence more than 0.6 m in height may be constructed on a lot within 7.5 m of the natural boundary of the ocean, except in Portage Inlet and Gorge Waterway.</p>

	for building and conservation.	
Salt Spring Island – Islands Trust	<p>OCP Bylaw sets out Land Use Objectives and Policies for 5 shoreline designations and Development Permit Area 3 Shoreline</p> <p>Land Use Bylaw designates Shoreline Zones</p>	<p>For the Shoreline Conservation Designation, OCP bylaw says that the objective is to protect tidal flats, fish and wildlife habitat that is not suitable for “intensive development.” Directs that the Trust Committee should not support major new structures in areas known to have high value as fish or wildlife habitat.</p> <p>DPA 3 Shoreline includes 300 m seaward from natural boundary and 10 m upland from natural boundary. Requires a development permit for the construction of “shore stabilization works, bulkheads or walkways” and dredging.</p> <p>Shoreline Zones designated by Land Use Bylaw extend from the natural boundary of the sea to the boundary of Electoral Area “F” of the Capital Regional District; all of shore/foreshore if Island is covered except for Piers Island and Crown foreshore within 300 m of natural boundary of Vancouver Island.</p>
District of Sechelt	OCP Bylaw set out Land Use Policies for Ocean and Shoreline Areas and Development Permit Area 3 – Marine, Foreshore & Shoreline Areas	<p>Land use policies support Green shores planning approach and notes that hard armoring with retaining walls or other hard structures is not supported “unless erosion is threatening an existing building.”</p> <p>DPA 3 – Marine, Foreshore & Shoreline Areas apply to entire coastline; 15m upward from highest high water mark and 15m below the low tide mark. Guidelines defer to Qualified Environmental Professional to determine whether new shoreline protection measures are required to protect existing structures.</p>
Sunshine Coast Regional District	OCP Bylaw designates Development Permit Area 5 – Shoreline Protection & Management	DPA 5 – Shoreline Protection & Management extends 15 m landward from the natural boundary of the ocean and includes any works below the natural boundary. Defers to a Qualified Coastal Professional to conduct an assessment addressing any natural hazards and impacts on marine environment for specified development activities (including shoreline protection works) within the area.
District of West Vancouver	<p>OCP Bylaw outlines policies applicable to the Natural Environment and designates shoreline as a general Development Permit Area for “difficult terrain”</p> <p>Shoreline Protection Plan</p>	Policy prohibits new private encroachments into the foreshore.

Appendix C: WAC 173-26-231: Shoreline Modifications

WAC 173-26-231: Shoreline Modifications

(1) **Applicability.** Local governments are encouraged to prepare master program provisions that distinguish between shoreline modifications and shoreline uses. Shoreline modifications are generally related to construction of a physical element such as a dike, breakwater, dredged basin, or fill, but they can include other actions such as clearing, grading, application of chemicals, or significant vegetation removal. Shoreline modifications usually are undertaken in support of or in preparation for a shoreline use; for example, fill (shoreline modification) required for a cargo terminal (industrial use) or dredging (shoreline modification) to allow for a marina (boating facility use). The provisions in this section apply to all shoreline modifications within shoreline jurisdiction.

(2) **General principles applicable to all shoreline modifications.** Master programs shall implement the following principles:

- (a) Allow structural shoreline modifications only where they are demonstrated to be necessary to support or protect an allowed primary structure or a legally existing shoreline use that is in danger of loss or substantial damage or are necessary for reconfiguration of the shoreline for mitigation or enhancement purposes.
- (b) Reduce the adverse effects of shoreline modifications and, as much as possible, limit shoreline modifications in number and extent.
- (c) Allow only shoreline modifications that are appropriate to the specific type of shoreline and environmental conditions for which they are proposed.
- (d) Assure that shoreline modifications individually and cumulatively do not result in a net loss of ecological functions. This is to be achieved by giving preference to those types of shoreline modifications that have a lesser impact on ecological functions and requiring mitigation of identified impacts resulting from shoreline modifications.
- (e) Where applicable, base provisions on scientific and technical information and a comprehensive analysis of drift cells for marine waters or reach conditions for river and stream systems. Contact the department for available drift cell characterizations.
- (f) Plan for the enhancement of impaired ecological functions where feasible and appropriate while accommodating permitted uses. As shoreline modifications occur, incorporate all feasible measures to protect ecological shoreline functions and ecosystem-wide processes.
- (g) Avoid and reduce significant ecological impacts according to the mitigation sequence in WAC 173-26-201 (2)(e).

(3) **Provisions for specific shoreline modifications.**

(a) **Shoreline stabilization.**

(i) **Applicability.** Shoreline stabilization includes actions taken to address erosion impacts to property and dwellings, businesses, or structures caused by natural processes, such as current, flood, tides, wind, or wave action. These actions include structural and nonstructural methods. Nonstructural methods include building setbacks, relocation of the structure to be protected, groundwater management, planning and regulatory measures to avoid the need for structural stabilization.

(ii) **Principles.** Shorelines are by nature unstable, although in varying degrees. Erosion and accretion are natural processes that provide ecological functions and thereby contribute to sustaining the natural resource and ecology of the shoreline. Human use of the shoreline has typically led to hardening of the shoreline for various reasons including reduction of erosion or

providing useful space at the shore or providing access to docks and piers. The impacts of hardening any one property may be minimal but cumulatively the impact of this shoreline modification is significant.

Shoreline hardening typically results in adverse impacts to shoreline ecological functions such as:

- Beach starvation. Sediment supply to nearby beaches is cut off, leading to "starvation" of the beaches for the gravel, sand, and other fine-grained materials that typically constitute a beach.
- Habitat degradation. Vegetation that shades the upper beach or bank is eliminated, thus degrading the value of the shoreline for many ecological functions, including spawning habitat for salmonids and forage fish.
- Sediment impoundment. As a result of shoreline hardening, the sources of sediment on beaches (eroding "feeder" bluffs) are progressively lost and longshore transport is diminished. This leads to lowering of down-drift beaches, the narrowing of the high tide beach, and the coarsening of beach sediment. As beaches become more coarse, less prey for juvenile fish is produced. Sediment starvation may lead to accelerated erosion in down-drift areas.
- Exacerbation of erosion. The hard face of shoreline armoring, particularly concrete bulkheads, reflects wave energy back onto the beach, exacerbating erosion.
- Groundwater impacts. Erosion control structures often raise the water table on the landward side, which leads to higher pore pressures in the beach itself. In some cases, this may lead to accelerated erosion of sand-sized material from the beach.
- Hydraulic impacts. Shoreline armoring generally increases the reflectivity of the shoreline and redirects wave energy back onto the beach. This leads to scouring and lowering of the beach, to coarsening of the beach, and to ultimate failure of the structure.
- Loss of shoreline vegetation. Vegetation provides important "softer" erosion control functions. Vegetation is also critical in maintaining ecological functions.
- Loss of large woody debris. Changed hydraulic regimes and the loss of the high tide beach, along with the prevention of natural erosion of vegetated shorelines, lead to the loss of beached organic material. This material can increase biological diversity, can serve as a stabilizing influence on natural shorelines, and is habitat for many aquatic-based organisms, which are, in turn, important prey for larger organisms.
- Restriction of channel movement and creation of side channels. Hardened shorelines along rivers slow the movement of channels, which, in turn, prevents the input of larger woody debris, gravels for spawning, and the creation of side channels important for juvenile salmon rearing, and can result in increased floods and scour.

Additionally, hard structures, especially vertical walls, often create conditions that lead to failure of the structure. In time, the substrate of the beach coarsens and scours down to bedrock or a hard clay. The footings of bulkheads are exposed, leading to undermining and failure. This process is exacerbated when the original cause of the erosion and "need" for the bulkhead was from upland water drainage problems. Failed bulkheads and walls adversely impact beach aesthetics, may be a safety or navigational hazard, and may adversely impact shoreline ecological functions. "Hard" structural stabilization measures refer to those with solid, hard surfaces, such as concrete bulkheads, while "soft" structural measures rely on less rigid materials, such as biotechnical vegetation measures or beach enhancement. There is a range of measures varying from soft to hard that include:

- Vegetation enhancement;
- Upland drainage control;
- Biotechnical measures;
- Beach enhancement;
- Anchor trees;
- Gravel placement;
- Rock revetments;
- Gabions;
- Concrete groins;
- Retaining walls and bluff walls;
- Bulkheads; and
- Seawalls.

Generally, the harder the construction measure, the greater the impact on shoreline processes, including sediment transport, geomorphology, and biological functions.

Structural shoreline stabilization often results in vegetation removal and damage to near-shore habitat and shoreline corridors. Therefore, master program shoreline stabilization provisions shall also be consistent with WAC **173-26-221**(5), vegetation conservation, and where applicable, WAC **173-26-221**(2), critical areas.

In order to implement RCW **90.58.100**(6) and avoid or mitigate adverse impacts to shoreline ecological functions where shoreline alterations are necessary to protect single-family residences and principal appurtenant structures in danger from active shoreline erosion, master programs should include standards setting forth the circumstances under which alteration of the shoreline is permitted, and for the design and type of protective measures and devices.

(iii) **Standards.** In order to avoid the individual and cumulative net loss of ecological functions attributable to shoreline stabilization, master programs shall implement the above principles and apply the following standards:

(A) New development should be located and designed to avoid the need for future shoreline stabilization to the extent feasible. Subdivision of land must be regulated to assure that the lots created will not require shoreline stabilization in order for reasonable development to occur using geotechnical analysis of the site and shoreline characteristics. New development on steep slopes or bluffs shall be set back sufficiently to ensure that shoreline stabilization is unlikely to be necessary during the life of the structure, as demonstrated by a geotechnical analysis. New development that would require shoreline stabilization which causes significant impacts to adjacent or down-current properties and shoreline areas should not be allowed.

(B) New structural stabilization measures shall not be allowed except when necessity is demonstrated in the following manner:

(I) To protect existing primary structures:

- New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, should not be allowed unless there is conclusive evidence, documented by a geotechnical analysis, that the structure is in danger from shoreline erosion caused by tidal action, currents, or waves. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need. The geotechnical analysis should evaluate on-site

drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization.

- The erosion control structure will not result in a net loss of shoreline ecological functions.

(II) In support of new nonwater-dependent development, including single-family residences, when all of the conditions below apply:

- The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.
- Nonstructural measures, such as placing the development further from the shoreline, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
- The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report. The damage must be caused by natural processes, such as tidal action, currents, and waves.
- The erosion control structure will not result in a net loss of shoreline ecological functions.

(III) In support of water-dependent development when all of the conditions below apply:

- The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.
- Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
- The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report.
- The erosion control structure will not result in a net loss of shoreline ecological functions.

(IV) To protect projects for the restoration of ecological functions or hazardous substance remediation projects pursuant to chapter **70.105D** RCW when all of the conditions below apply:

- Nonstructural measures, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
- The erosion control structure will not result in a net loss of shoreline ecological functions.

(C) An existing shoreline stabilization structure may be replaced with a similar structure if there is a demonstrated need to protect principal uses or structures from erosion caused by currents, tidal action, or waves.

- The replacement structure should be designed, located, sized, and constructed to assure no net loss of ecological functions.
- Replacement walls or bulkheads shall not encroach waterward of the ordinary high-water mark or existing structure unless the residence was occupied prior to January 1, 1992, and there are overriding safety or environmental concerns. In such cases, the replacement structure shall abut the existing shoreline stabilization structure.
- Where a net loss of ecological functions associated with critical saltwater habitats would occur by leaving the existing structure, remove it as part of the replacement measure.

- Soft shoreline stabilization measures that provide restoration of shoreline ecological functions may be permitted waterward of the ordinary high-water mark.
- For purposes of this section standards on shoreline stabilization measures, "replacement" means the construction of a new structure to perform a shoreline stabilization function of an existing structure which can no longer adequately serve its purpose. Additions to or increases in size of existing shoreline stabilization measures shall be considered new structures.

(D) Geotechnical reports pursuant to this section that address the need to prevent potential damage to a primary structure shall address the necessity for shoreline stabilization by estimating time frames and rates of erosion and report on the urgency associated with the specific situation. As a general matter, hard armoring solutions should not be authorized except when a report confirms that there is a significant possibility that such a structure will be damaged within three years as a result of shoreline erosion in the absence of such hard armoring measures, or where waiting until the need is that immediate, would foreclose the opportunity to use measures that avoid impacts on ecological functions. Thus, where the geotechnical report confirms a need to prevent potential damage to a primary structure, but the need is not as immediate as the three years, that report may still be used to justify more immediate authorization to protect against erosion using soft measures.

(E) When any structural shoreline stabilization measures are demonstrated to be necessary, pursuant to above provisions.

- Limit the size of stabilization measures to the minimum necessary. Use measures designed to assure no net loss of shoreline ecological functions. Soft approaches shall be used unless demonstrated not to be sufficient to protect primary structures, dwellings, and businesses.
- Ensure that publicly financed or subsidized shoreline erosion control measures do not restrict appropriate public access to the shoreline except where such access is determined to be infeasible because of incompatible uses, safety, security, or harm to ecological functions. See public access provisions; WAC **173-26-221(4)**. Where feasible, incorporate ecological restoration and public access improvements into the project.
- Mitigate new erosion control measures, including replacement structures, on feeder bluffs or other actions that affect beach sediment-producing areas to avoid and, if that is not possible, to minimize adverse impacts to sediment conveyance systems. Where sediment conveyance systems cross jurisdictional boundaries, local governments should coordinate shoreline management efforts. If beach erosion is threatening existing development, local governments should adopt master program provisions for a beach management district or other institutional mechanism to provide comprehensive mitigation for the adverse impacts of erosion control measures.

(F) For erosion or mass wasting due to upland conditions, see WAC **173-26-221 (2)(c)(ii)**.

(b) **Piers and docks.** New piers and docks shall be allowed only for water-dependent uses or public access. As used here, a dock associated with a single-family residence is a water-dependent use provided that it is designed and intended as a facility for access to watercraft and otherwise complies with the provisions of this section. Pier and dock construction shall be restricted to the minimum size necessary to meet the needs of the proposed water-dependent use. Water-related and water-enjoyment uses may be allowed as

part of mixed-use development on over-water structures where they are clearly auxiliary to and in support of water-dependent uses, provided the minimum size requirement needed to meet the water-dependent use is not violated.

New pier or dock construction, excluding docks accessory to single-family residences, should be permitted only when the applicant has demonstrated that a specific need exists to support the intended water-dependent uses. If a port district or other public or commercial entity involving water-dependent uses has performed a needs analysis or comprehensive master plan projecting the future needs for pier or dock space, and if the plan or analysis is approved by the local government and consistent with these guidelines, it may serve as the necessary justification for pier design, size, and construction. The intent of this provision is to allow ports and other entities the flexibility necessary to provide for existing and future water-dependent uses.

Where new piers or docks are allowed, master programs should contain provisions to require new residential development of two or more dwellings to provide joint use or community dock facilities, when feasible, rather than allow individual docks for each residence.

Piers and docks, including those accessory to single-family residences, shall be designed and constructed to avoid or, if that is not possible, to minimize and mitigate the impacts to ecological functions, critical areas resources such as eelgrass beds and fish habitats and processes such as currents and littoral drift. See WAC **173-26-221** (2)(c)(iii) and (iv). Master programs should require that structures be made of materials that have been approved by applicable state agencies.

(c) **Fill.** Fills shall be located, designed, and constructed to protect shoreline ecological functions and ecosystem-wide processes, including channel migration.

Fills waterward of the ordinary high-water mark shall be allowed only when necessary to support: Water-dependent use, public access, cleanup and disposal of contaminated sediments as part of an interagency environmental clean-up plan, disposal of dredged material considered suitable under, and conducted in accordance with the dredged material management program of the department of natural resources, expansion or alteration of transportation facilities of statewide significance currently located on the shoreline and then only upon a demonstration that alternatives to fill are not feasible, mitigation action, environmental restoration, beach nourishment or enhancement project. Fills waterward of the ordinary high-water mark for any use except ecological restoration should require a conditional use permit.

(d) **Breakwaters, jetties, groins, and weirs.** Breakwaters, jetties, groins, and weirs located waterward of the ordinary high-water mark shall be allowed only where necessary to support water-dependent uses, public access, shoreline stabilization, or other specific public purpose. Breakwaters, jetties, groins, weirs, and similar structures should require a conditional use permit, except for those structures installed to protect or restore ecological functions, such as woody debris installed in streams. Breakwaters, jetties, groins, and weirs shall be designed to protect critical areas and shall provide for mitigation according to the sequence defined in WAC **173-26-201** (2)(e).

(e) **Beach and dunes management.** Washington's beaches and their associated dunes lie along the Pacific Ocean coast between Point Grenville and Cape Disappointment, and as shorelines of statewide significance are mandated to be managed from a statewide perspective by the act. Beaches and dunes within shoreline jurisdiction shall be managed to conserve, protect, where appropriate develop, and where appropriate restore the resources and benefits of coastal beaches. Beaches and dunes should also be managed to reduce the hazard to human life and property from natural or human-induced actions associated with these areas.

Shoreline master programs in coastal marine areas shall provide for diverse and appropriate use of beach and dune areas consistent with their ecological, recreational, aesthetic, and economic values, and consistent with the natural limitations of beaches, dunes, and dune vegetation for development. Coastal

master programs shall institute development setbacks from the shoreline to prevent impacts to the natural, functional, ecological, and aesthetic qualities of the dune.

"Dune modification" is the removal or addition of material to a dune, the reforming or reconfiguration of a dune, or the removal or addition of vegetation that will alter the dune's shape or sediment migration.

Dune modification may be proposed for a number of purposes, including protection of property, flood and storm hazard reduction, erosion prevention, and ecological restoration.

Coastal dune modification shall be allowed only consistent with state and federal flood protection standards and when it will not result in a net loss of shoreline ecological functions or significant adverse impacts to other shoreline resources and values.

Dune modification to protect views of the water shall be allowed only on properties subdivided and developed prior to the adoption of the master program and where the view is completely obstructed for residences or water-enjoyment uses and where it can be demonstrated that the dunes did not obstruct views at the time of original occupancy, and then only in conformance with the above provisions.

(f) Dredging and dredge material disposal. Dredging and dredge material disposal shall be done in a manner which avoids or minimizes significant ecological impacts and impacts which cannot be avoided should be mitigated in a manner that assures no net loss of shoreline ecological functions.

New development should be sited and designed to avoid or, if that is not possible, to minimize the need for new and maintenance dredging. Dredging for the purpose of establishing, expanding, or relocating or reconfiguring navigation channels and basins should be allowed where necessary for assuring safe and efficient accommodation of existing navigational uses and then only when significant ecological impacts are minimized and when mitigation is provided. Maintenance dredging of established navigation channels and basins should be restricted to maintaining previously dredged and/or existing authorized location, depth, and width.

Dredging waterward of the ordinary high-water mark for the primary purpose of obtaining fill material shall not be allowed, except when the material is necessary for the restoration of ecological functions. When allowed, the site where the fill is to be placed must be located waterward of the ordinary high-water mark. The project must be either associated with a MTCA or CERCLA habitat restoration project or, if approved through a shoreline conditional use permit, any other significant habitat enhancement project. Master programs should include provisions for uses of suitable dredge material that benefit shoreline resources. Where applicable, master programs should provide for the implementation of adopted regional interagency dredge material management plans or watershed management planning.

Disposal of dredge material on shorelands or wetlands within a river's channel migration zone shall be discouraged. In the limited instances where it is allowed, such disposal shall require a conditional use permit. This provision is not intended to address discharge of dredge material into the flowing current of the river or in deep water within the channel where it does not substantially affect the geohydrologic character of the channel migration zone.

(g) Shoreline habitat and natural systems enhancement projects. Shoreline habitat and natural systems enhancement projects include those activities proposed and conducted specifically for the purpose of establishing, restoring, or enhancing habitat for priority species in shorelines.

Master programs should include provisions fostering habitat and natural system enhancement projects. Such projects may include shoreline modification actions such as modification of vegetation, removal of nonnative or invasive plants, shoreline stabilization, dredging, and filling, provided that the primary purpose of such actions is clearly restoration of the natural character and ecological functions of the shoreline. Master program provisions should assure that the projects address legitimate restoration needs and priorities and facilitate implementation of the restoration plan developed pursuant to WAC 173-26-201 (2)(f).

Appendix D: Case Study – Ross Bay Restoration Project



Figure 1: Ross Bay Beach pre-restoration construction. Image courtesy of John Readshaw.



Figure 2: Ross Bay Beach post phase 1 restoration construction. Image courtesy of John Readshaw



Figure 3: Ross Bay beach approximately 7 years post restoration construction. Image courtesy of John Readshaw.

The Ross Bay Seawall was originally built in 1911 to protect the historic cemetery from erosion by redirecting the wave energy along the curve. Though the wall did initially protect the cemetery, the recurve wall also caused the beach at the base of the seawall to be scoured because of the relentless wave action.

Over the next 80 years, despite efforts by city crews to halt its progress, over 1 metre of beach had eroded away from the toe of the seawall and the intertidal beach had disappeared completely.

In 1993 a new seawall was installed, replacing the curved backwall with a stepped design. However, nearby residents noted increased noise and vibrations as a result of the stepped wall.

City planners - seeking a practical, cost-effective and environmental solution to the problem - partnered with coastal engineers and habitat biologists to create a 3-phase plan. The goal was to both prevent future erosion, as well as restore and re-nourish the beach area.

The 3-phase plan focused on natural shoreline protection methods. Phase 1, which began in 1995, consisted of 19,000 tonnes of gravel being placed in front of the wall to raise the existing beach to the top of the lower step on the reconstructed seawall.



Figure 4: Ross Bay beach approximately 19 years post restoration construction. Image courtesy of John Readshaw.

Phase 2, which began in 1998, added 60,000 tonnes of gravel beach fill to the mid and eastern part of the bay, three large rock groynes (installed perpendicular to shore) to help keep the gravel in place, and a habitat berm situated parallel to shore.

Phase 3 consisted of continuing a program of long-term monitoring to determine whether erosion had decreased, while assessing the restoration of habitat above and below the tide line.

Now, more than 2 decades later, the long-term monitoring program has confirmed the success of this project. Erosion has virtually ceased and the re-nourished beach has further regenerated, offering excellent habitat for bladed and bull kelp, and by extension forage fish, gulls, otters, and blue heron.