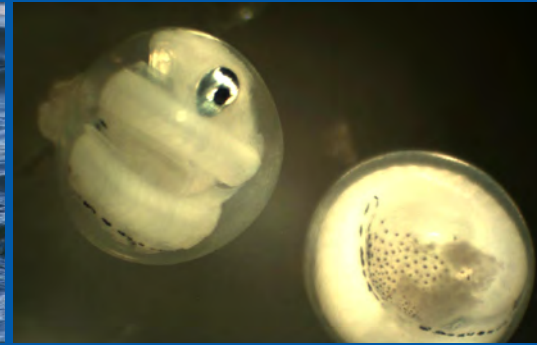


### Environmental Guidelines for Urban and Rural Land Development in British Columbia

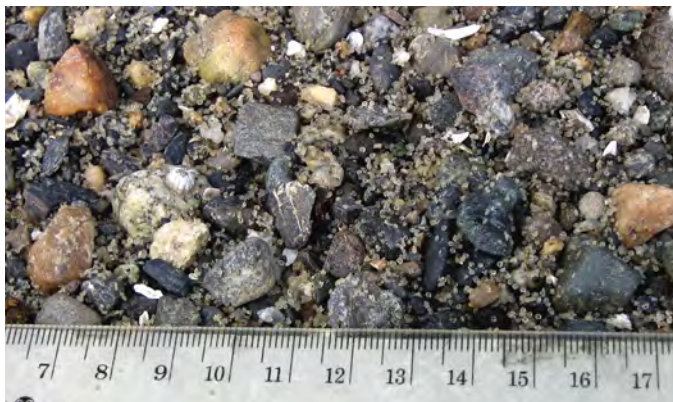


*Are you planning any development on your property? If your property is adjacent to gravel or sand beaches, it may support critical habitat features for coastal forage fish. This fact sheet will provide you with important information about complying with the law and protecting these species while still benefiting from the enjoyment and value of your property.*

Forage fish are extremely abundant, schooling fishes, and include herring, anchovies, smelts, and sand lance. They are an essential component of marine ecosystems, providing critical food sources for many birds and for larger fish such as salmon and ling cod which in turn are eaten by marine mammals such as sea lions and killer whales.

This fact sheet focuses on surf smelt and Pacific sand lance.

Surf smelt (*Hypomesus pretiosus*) grow to be 20–25 cm long, and feed on small organisms. They are an important food source for salmon, marine mammals and many birds. They spawn on gravel and sand beaches near the high tide line, where overhanging vegetation protects the eggs from the summer sun. Some stocks spawn during summer months, others in winter, others year-round.



Sand lance make up at least 50% of the diet of an adult Chinook salmon

Surf smelt also support recreational and commercial fisheries in B.C.

Pacific sand lance (*Ammodytes hexapterus*) are slightly smaller than surf smelt (up to 20 cm long). They live near the shore year-round and spawn on sand or pebbled beaches in the intertidal zone during the winter (November–February), often using the same beaches as the surf smelt. They bury themselves in the sea bed to avoid predators and to hibernate.

Surf smelt and Pacific sand lance lay their tiny (0.5–1 mm) eggs on gravel and sand beaches from Alaska to California, including the B.C. coast. The distribution of spawning beaches in B.C. is not well known, but the Sea Watch Society (an alliance of community groups) is currently studying and mapping their distribution (<https://www.facebook.com/foragefish>).

#### AT RISK

Forage fish populations are affected by changes to their spawning habitats. Even small modifications can lead to considerable change through time, resulting in the loss or significant degradation of these habitats.

Hardening of the foreshore with structures such as seawalls, boulder structures (riprap), groynes, and boat



ramps affect beach sediment drift, leading to sediment loss and degrading spawning habitat quality. Loss of trees and other shoreline vegetation removes shade that keeps summer surf smelt eggs cool and affects the food supply for juvenile salmon. Although walking on the beach does not damage the eggs, vehicles and ATVs can harm the spawning deposits.

Pollutants from stormwater runoff or leaking septic fields and changes to stream flows can affect the quality of a beach spawning area. Diversion of sediment bearing streams through culverts can also starve spawning beaches of sediments.

Climate change will further affect the survival of forage fish, as rising sea levels may increase homeowner efforts to protect shorelines, with resultant loss of beach habitat. Increasing ocean acidity and increasing sea surface temperatures will likely affect larval survival.

## LEGALLY PROTECTED

The federal [Fisheries Act](#) provides protection for forage fish and their spawning beaches, including habitat features. The B.C. [Land Act](#) prohibits changes below high tide without lease or license of occupation. As well, many local governments have zoning, development permit areas and other bylaws affecting activities above and below high tide.

### For more information:

*Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia*

<http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare/>

*Penttila, Dan. 2007. Marine Forage Fishes in Puget Sound. Prepared in support of the Puget Sound Nearshore Partnership.*

[http://www.pugetsoundnearshore.org/technical\\_papers/marine\\_fish.pdf](http://www.pugetsoundnearshore.org/technical_papers/marine_fish.pdf)

*Washington Department of Ecology Shoreline Management website*

<http://www.ecy.wa.gov/programs/sea/shorelines/index.html>

*Coastal Shore Stewardship: A Guide for Planners, Builders and Developers*

<http://www.stewardshipcentrebc.ca/portfolio/coastal-shore-stewardship/>

## DEVELOPMENT GUIDELINES

More detailed guidelines for protecting fish and wildlife habitats along the foreshore are provided in [Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia](#).

### Retain naturally vegetated shoreline

- ☑ Leave natural vegetation on the foreshore and coastal bluffs as the roots help to bind the soil and minimize erosion. Re-establish native vegetation if absent.
- ☑ Retain trees and other overhanging vegetation above the high water mark to provide the summer shade needed by surf smelt eggs.
- ☑ Work with a professional arborist to trim trees to improve your view instead of removing them. This helps to retain the stability of the bank and slope soils and to maintain shade on the beach.

### Develop carefully

- ☑ Set back any new development from the bluff or foreshore, to minimize the future need for foreshore protection.
- ☑ Manage stormwater and maintain vegetation above bluffs to avoid soil saturation and slumping.
- ☑ Retain natural drainage patterns and design stormwater systems so that water is 'cleaned' before it enters the foreshore.
- ☑ Use 'soft shore' approaches rather than hardening the shoreline. Information is available from [Greenhores](#) and the Washington Department of Ecology [Shoreline Management website](#).

37% of the world's fisheries directly target forage fish.