SOUND FACTS

Forage Fish

Overview

Adult forage fish are small and are the diet of many larger fish. They are a critical link in the marine food web.

- **Pacific herring** *(Clupea pallasi)* — Grows up to 9-inches long. Bluish green to olive backs with silvery sides. Large scales on body; none on the head and tail. Lays eggs on eelgrass and marine algae. The largest stock is in the Cherry Point area (northern Puget Sound).

- **Sand lance** *(Ammodytes hexapterus)*— Grows up to 8-inches long. Gray to green backs, silver sides. Long dorsal fin covers most of the length of their elongated pointed body. Scales almost invisible. Lays eggs in the upper intertidal area on mixed sand and gravel beaches. Adults can bury themselves into the mud when frightened.

- **Surf smelt** *(Hypomesus pretiosus)*— Grows up to 9-inches long. Olive green backs, silver or yellow band on sides. Adipose fin, a small fleshy fin near the tail. Small scales. Spawning preferences similar to sand lance and eggs may be found together.

All three forage fish species occur in Puget Sound. Humans use forage fish for bait and food. Forage fish and their eggs are critical prey for a large variety of marine life including seals, fish, waterfowl and other animals. Their populations are also a valuable indicator of the health and productivity of our marine environment. Forage fish depend on nearshore habitat for their survival. Because forage fish spawn high on the beach, local spawning populations are vulnerable to shoreline development.

Human threats to forage fish

- **Bulkheads** and other shoreline armoring can bury the upper intertidal zone, increase erosion along the base of the structures and prevent renewal of fine beach sediments needed for surf smelt and sand lance. Construction usually involves complete vegetation removal causing multiple disturbances for marine life.

- **Removing trees** along the shoreline can increase erosion and decrease shading. Forage fish egg survival decreases in areas without overhanging vegetation.

- **Dredging, pollution and shading** can remove or diminish eelgrass beds.

What can we do?

- **Inventory programs** are underway in many Puget Sound counties to identify areas where forage fish spawn. These data can help guide protection efforts. Contact your county to learn more about local programs.

- **Shoreline stewardship is needed**— Consider alternatives to bulkhead construction. Keep or maintain a buffer of native shrubs and trees along your beach. Minimize beach access trails and stairways. Share access points with neighbors.

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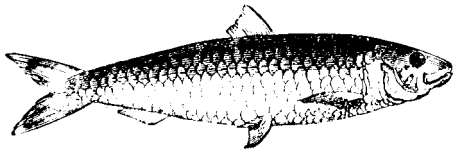
PUGET SOUND WATER QUALITY ACTION TEAM

Life histories and status

	Pacific herring	Sand lance	Surf smelt
Spawning	Late Jan. – April in same area each year. Sticky eggs deposited on eelgrass blades or other marine vegetation. Cherry Point stock April-June.	Nov.-Feb. in upper zones of gravel-sand beaches near high tide line. Tiny, sticky eggs same size as sand grains and attach to sand.	Throughout the year in upper zones of mixed sand-gravel beaches near high tide line. Overhanging vegetation helps egg development by providing shade. Often spawn in same area each year. Small, sticky eggs attach to sand grains.
Egg hatching	14 – 15 days (depending on conditions).	About 4 weeks.	2-5 weeks.
Larval stage	2 weeks - 3 months. Drifts with currents.	4 weeks – 3 months. Drifts with currents.	5weeks – 3 months. Drifts with currents.
Juvenile stage	Feed on animals (such as crab larvae) in plankton. Rear in nearshore waters.	Feed on animals in plankton. Rear in nearshore waters of Puget Sound.	Feed on animals in plankton. Rear in nearshore waters of Puget Sound.
Adults	Return to spawn after 2-3 years. Can spawn in successive years. Can migrate to open ocean or stay in Puget Sound. Lives to 4-5 years.	Adults feed in open water during the day and burrow into the sand at night. Migration or age structure of adults unknown.	Return to spawn after 1-2 years. Can spawn in successive years. Lives to 4-5 years.
Status	Total herring in Puget Sound are in decline. North Sound and Strait of Juan de Fuca stocks are in critical condition.	No monitoring of Sand lance is done. Inventory of spawning beaches is occurring.	No monitoring of Surf smelt is done. Inventory of spawning beaches is occurring.

Regulation—Surf smelt and Pacific herring spawning sites are given enhanced "no net loss" protection while the spawning habitat of sand lance is considered a "marine habitat of special concern" under state law. The fishery is co-managed by the Washington Department of Fish and Wildlife and Treaty Tribes.



Sources

- 2000 Puget Sound Update, Puget Sound Water Quality Action Team
- Washington Department of Fish and Wildlife, www.wa.gov/wdfw
- Washington Department of Ecology, www.ecy.wa.gov
- Forage Fish Spawning Distribution in San Juan County and Protocols for Sampling Intertidal and Nearshore Regions. Moulton and Pentilla, June 2000.
- Snohomish County Marine Resource Committee

Much of the text for this fact sheet came from Snoh Co PW, SWM fact sheet