



## AQUATIC LANDS HABITAT CONSERVATION PLAN — Species Spotlight

### **Pacific herring** — *Clupea pallasii*

*Protection status: State candidate in Washington State (federal species of concern)*

Pacific herring populations range from Baja California, Mexico, to the Bering Sea; the Asian coast from the Arctic Ocean in Russia to Japan; and northeast to the Beaufort Sea. A mix of resident and migratory herring stocks are found throughout the Puget Sound basin.

The Washington Department of Fish and Wildlife (WDFW) recognizes 18 distinct herring stocks in the Puget Trough ecoregion and two in the Northwest Coast ecoregion (Willapa Bay and Grays Harbor). WDFW survey results indicate that the different Puget Sound herring stocks have specific characteristics, including how they grow, where and when they spawn, and how they behave prior to spawning. Two of the stocks—Cherry Point and Squaxin Pass—are genetically distinct from each other and from other Washington and British Columbia stocks. The Cherry Point population has dramatically declined and is considered in critical condition. Other Puget Sound stocks—including the Squaxin Pass populations—have experienced, less extreme declines and are considered moderately healthy.

#### **Life history**

Pacific herring in Puget Sound have a relatively short lifespan, rarely surviving beyond 5 years. They reach sexual maturity at 2 to 3 years of age. Herring do not normally die after spawning and continue to



Pacific herring (*Clupea pallasii*), adult and roe. Top photo: WA Dept. of Fish and Wildlife. Lower photo: Brad Pruitt/DNR.

spawn in successive years. This herring species has silvery sides with a blue-green upper body with no markings, typically not growing more than 18 inches (46cm) in length and weighing no more than 2 pounds (900 grams).

Herring deposit transparent, adhesive eggs on intertidal and shallow subtidal eelgrass and marine algae. Eggs may be deposited anywhere between the upper limits of high tide to a depth of 40 feet. Eggs hatch in about 14 days, producing slender, transparent larvae. At this stage, they are at the mercy of currents and subject to heavy predation by larger organisms. At about three months of age and 1½ inches long, herring metamorphose into their adult form and coloration.

Following metamorphosis, juvenile herring use the same ecosystem and habitats as adults. They will mature and return to their spawning ground in their second or third year. They spawn from late January through early April, except for the Cherry Point stock (the largest in the state), which spawns from early April through early June.

#### **Habitat use**

Some herring stocks appear to have an annual migration from inshore spawning grounds to open ocean feeding areas, while others appear to be more resident, remaining inside the Puget Sound basin year-round. Larvae emerge in the shallow nearshore and drift with the currents. Juveniles rear in nearshore waters, and adults migrate to the open ocean or stay in Puget Sound. Observations indicate adults and juvenile herring do not remain near spawning areas during the non-spawning season.

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## Importance in the ecosystem food web

Herring are a foundation food source in the food web because they are *secondary consumers*—eating smaller plant-eating animals. Recently emerged herring and juveniles feed on plankton. Adult feed primarily on planktonic crustaceans, such as copepods and other zooplankton. Approximately 50 to 70 percent of adult herring from Puget Sound are estimated as an important prey item each year for numerous marine animals, such as seabirds, marine mammals, and other fishes. Herring stock strength is directly linked to the health and status of many such predators, including those protected by state and/or federal laws, such as the Endangered Species Act (ESA).

## Cultural and socio-economic significance

For many centuries, Native Americans have used nets, traps and mazes to capture Pacific herring for use as a fresh or salted food source, for trade and for bait. Commercial herring fisheries in Puget Sound have experienced several major shifts since the start of the last century. In the early 1900s, dry salted herring and canned herring were important export products for human consumption. From the late 1950s to early 1980s, large quantities were also reduced to fish meal and oil.

The only commercial herring fishery currently operating in Puget Sound provides bait for sport salmon and groundfish fisheries and takes place mostly in south and central Puget Sound. Most of the harvest is taken by non-tribal fishers using small lampara seine nets. Annual landings by this fishery are generally influenced most by market conditions and processing/holding capacities rather than fish abundance.

## Why are herring included in the Aquatic Lands HCP?

The Aquatic Lands Habitat Conservation Plan (HCP) addresses 29 species of animals that depend on submerged or intertidal lands for either all or a significant portion of their life history. Specific threats that warrant protection of the Pacific herring include:

- Loss and modification of habitat.
- Poor water quality.
- Chemical treatments.
- Toxins in marine waters and plankton.
- Disruption of fish movements by overwater structures and related activities.

## The Aquatic Lands Habitat Conservation Plan

The Washington State Department of Natural Resources (DNR) is steward of more than 2.6 million acres of state-owned aquatic lands beneath Washington's navigable lakes, rivers, marine waters, and estuaries. DNR sustainably manages these aquatic lands on behalf of the people of the state to protect fish and wildlife and to provide opportunities for commerce, navigation, and public access.

The increased demand for the use of aquatic lands can be harmful to aquatic habitats and species. To encourage a balanced approach to managing and protecting these lands, DNR is developing an Aquatic Lands **Habitat Conservation Plan** (HCP). The HCP will provide a framework for managing the aquatic lands under DNR's stewardship to ensure the continued health of our state's marine and fresh waters and the species that inhabit them.

## Learn more

For more information about DNR's Aquatic Lands HCP and the other species that are covered in the plan, visit: <http://www.dnr.wa.gov/aquaticHCP>.

More information about monitoring Pacific herring:

- Washington Department of Fish and Wildlife Conservation Website (Species & Ecosystem Science): [wdfw.wa.gov/conservation/research/projects/marine\\_fish\\_monitoring/herring\\_population\\_assessment/](http://wdfw.wa.gov/conservation/research/projects/marine_fish_monitoring/herring_population_assessment/)
- NOAA Fisheries Puget Sound Pacific Herring ESA Review Documents: [www.nwr.noaa.gov/protected\\_species/other/puget\\_sound\\_herring.html](http://www.nwr.noaa.gov/protected_species/other/puget_sound_herring.html)

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