

Hood Canal Bridge Assessment

How can we reduce the environmental impacts of a floating bridge?



Project Duration



Phase 1



Estimated Total Project Cost

\$2.2 Million



Funds Raised To Date

\$2.2 Million



Project Status

Phase 1 synthesis and reporting



Project Partners

- Hood Canal Coordinating Council
- Port Gamble S'Klallam Tribe
- Washington Department of Fish and Wildlife
- National Oceanic and Atmospheric Administration
- Pacific Northwest National Laboratory
- Washington State Dept of Transportation
- U.S. Navy
- U.S. Fish and Wildlife Service



Species Impacted

- Salmon and steelhead
- Forage fish
- Groundfish (rockfish)
- Shellfish, crab, and shrimp
- Harbor seals and killer whales

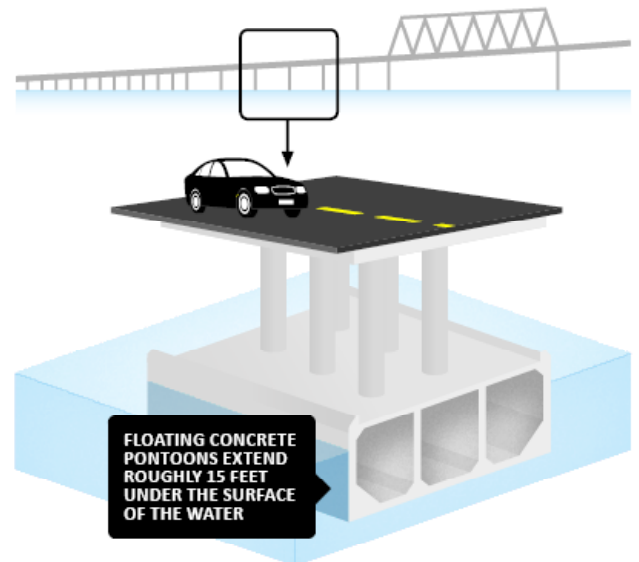
Purpose:

The Hood Canal Bridge Ecosystem Impact Assessment is investigating the causes of high fish mortality at the bridge and whether the bridge impacts water quality in a priority water body of Washington State. Solutions that improve fish passage and survival without compromising bridge functionality will then be identified and tested.

Context:

Vital elements of Hood Canal's natural ecosystem are at risk. Wild salmon — including Chinook, chum, and steelhead — are listed as threatened under the Endangered Species Act.

The Hood Canal Bridge spans the northern outlet of Hood Canal, connecting the Olympic and Kitsap peninsulas. As a floating bridge, its pontoons span 83% of the width of Hood Canal and extend 15 feet into the upper water layer.

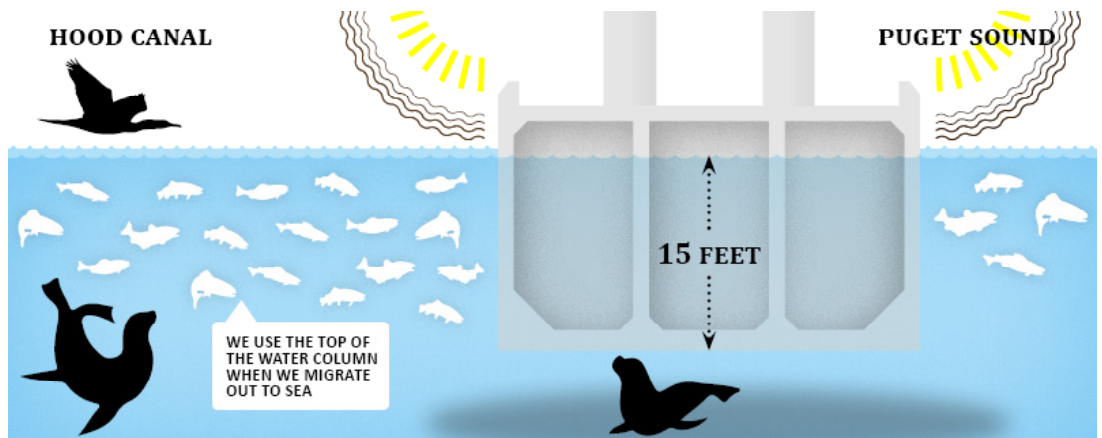


Preliminary Phase 1 Results:

Tracking data indicates that up to 50% of juvenile steelhead that make it to the bridge do not survive past it. Furthermore, water quality modeling shows that the bridge impacts temperature, salinity, and currents down to ~20 m below the water surface and up to 2-5 km away from the bridge. This dual threat to fish and their ecosystem may be limiting the effectiveness of millions of dollars already spent recovering steelhead, salmon, and their habitat in Hood Canal.

How does the bridge increase juvenile fish mortality?

Bridge pontoons create an obstruction, increasing fish densities and making juvenile steelhead more vulnerable to predators near the bridge. Light, shade, and noise from the bridge may lend an advantage to predators but do not appear to directly contribute to fish mortality. Furthermore, certain portions of the bridge appear to aggregate plankton, incentivizing Chinook, chum and forage fish to linger at the bridge, which could increase their susceptibility to predation.

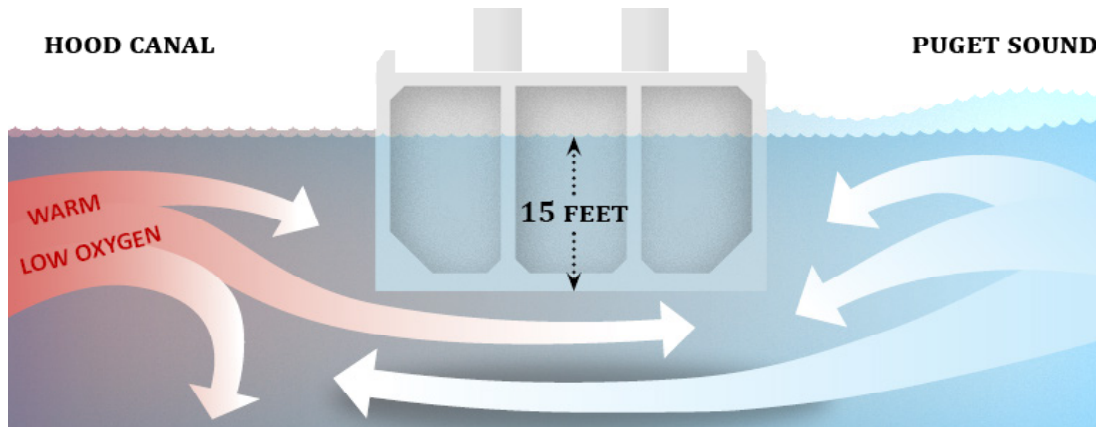


Hood Canal Bridge Assessment

Is a Floating Bridge Impacting the Hood Canal Ecosystem?

How does the bridge impact water quality and circulation?

Previous research suggested that the bridge may be affecting water quality throughout Hood Canal by limiting the exchange of water critical to the fjord's health. Phase 1 of the assessment collected water quality data near the bridge to refine existing models in order to quantify the bridge's impact to temperature, salinity, dissolved oxygen, nitrate, and algal biomass. Modeling efforts indicate water quality impacts near the bridge, but the assessment did not show significant canal-wide impacts. Additional research is needed to fully understand impacts to marine life near the bridge and understand bridge effects under changing climate scenarios.



Approach:

The Hood Canal Bridge Assessment Team – a collaboration of federal, state, tribal, and non-profit partners coordinated by Long Live the Kings – is working to pinpoint the causes of increased fish mortality at the bridge and determine the impacts to water quality. During phase 2 of the assessment, the Team will work cooperatively with the Management Committee to develop, test, refine, and ultimately implement a suite of potential management actions to address adverse impacts of the bridge without affecting the function of the bridge as a major transportation corridor.

Measures of Success:

- Identifies impacts of the bridge on steelhead survival, salmon, and forage fish distribution, and impacts to water quality in the Hood Canal ecosystem (phase 1).
- Develops, simulates, and field-tests potential management actions based on assessment results (phase 2).
- Implements data-driven solutions that minimize or mitigate impacts to salmonids and the ecosystem (phase 2)

Phase 1 Cost: \$2.2 million (2016-2019)

The project received \$2,210,000 from the Salmon Recovery Funding Board, Port Gamble S'Klallam Tribe, NOAA, Hood Canal Coordinating Council, Laird Norton Family Foundation, Washington State Appropriation, and other federal sources. In 2020, we will shift to testing management solutions (Phase 2).

For more information, please contact Lucas Hall at (206) 382-9555 x30 or lhall@lltk.org.

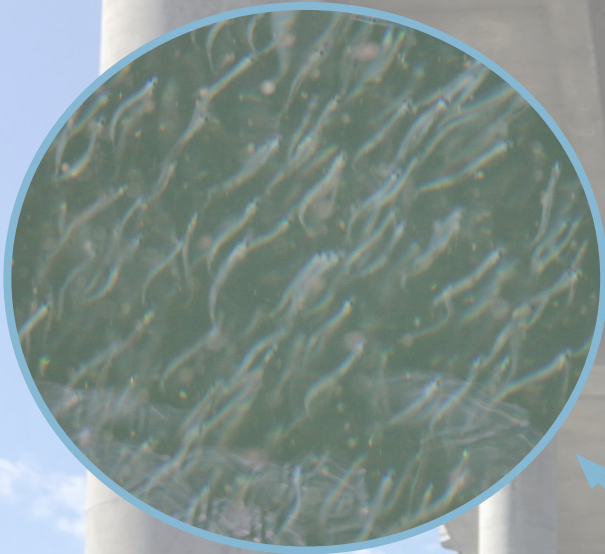


Hood Canal Bridge Assessment

Is a Floating Bridge Impacting the Hood Canal Ecosystem?

At the Hood Canal Bridge we see...

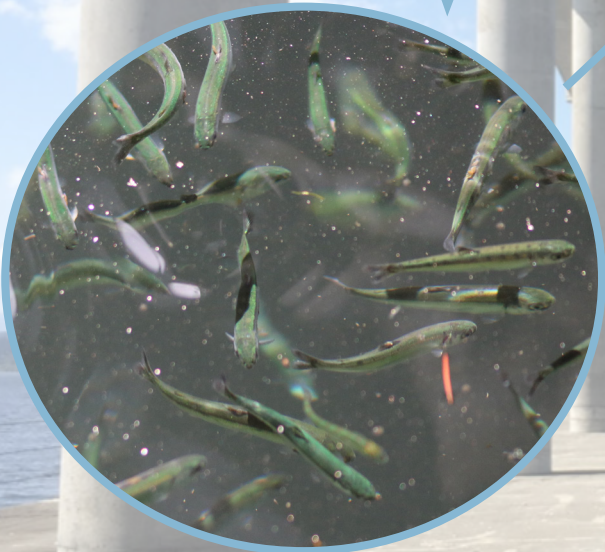
Dense schools of juvenile forage fish
(e.g. herring)



Fish predators present all the time



Dense schools of juvenile salmon
(e.g. Chinook and chum)



Abundant plankton
(salmon food)



Use your phone's camera
to scan and watch!

Images captured by Port Gamble
S'Klallam Tribe scientists.