Estuary and Nearshore Fish Monitoring
FACT SHEET

Who?
This project is a collaboration between the **City of Bellingham, Lummi Nation** and the **Skagit River System Cooperative** (on behalf of the Sauk-Suiattle Indian Tribe and the Swinomish Indian Tribal Community). Project partners include NOAA (National Oceanic and Atmospheric Administration) and the Bellingham Bay Action Team. The City received funding for this project through the **Washington State Department of Ecology** via the **Bellingham Bay Action Team**.

What?
We are **beach seine sampling** to monitor fish use of estuary and nearshore habitats, with an emphasis on juvenile Chinook salmon. Other species likely to be encountered include: chum salmon, pink salmon, Pacific herring, Pacific sand lance, surf smelt, lingcod/greenling, and sculpin.

Data collected include fish catch and length by species and hatchery mark, and data on the local environment such as temperature, salinity, dissolved oxygen, depth, and habitat type. We will also be collecting prey samples from the water column and from some Chinook stomachs. Prey items may include protozoans, bugs, bacteria, and other critters living on top of or under the water surface.

When?
Because juvenile salmon use nearshore areas as migration corridors, our sampling will occur during the times of year when it juvenile salmon are present within shoreline habitats of Bellingham Bay and the Nooksack estuary. **Sampling frequency is twice per month, February thru October in 2014**. Timing at each site is dependent upon tides and other conditions.

Where?
We will be sampling at **23 sites** to test the hypothesis that space and habitat type differences will influence whether or not fish are present (or abundant) at specific locations. Each site along the Bellingham Bay coastline or Nooksack estuary represents a specific region, geomorphic shoreline, and habitat type.

Why?
Native Nooksack Chinook and Bull Trout stocks are listed as Threatened under the Endangered Species Act. Results from this study will contribute to long-term salmonid recovery efforts.

How?
Field Methods: Beach seine nets are used to safely capture fish in shoreline habitats. Depending on conditions at the site (eg. water depth, size of area, and substrate), either a small or large seine net may be cast.

The smaller seine net (80-ft x 6-ft with 1/8" mesh, knotless nylon net) is deployed in “round haul” fashion by a crew on the beach. One end of the net is fixed on the beach, while the other end is deployed from a floating tub pulled “upstream” against the water current (if present) by wading along the shoreline and then returning to form a half circle.

The larger net (120-ft x 2-ft with 1/8" mesh, knotless nylon net) is deployed in deeper water using an **open hull, welded aluminum jet sled boat**. One end of the net is fixed on the beach while the other end is set across the current (if present) at an approximate distance of 65–85% of the net’s length. The same boat is used to access the different monitoring sites.

For each beach seine set, we **count, measure, identify, and release** captured fish. After 20 individuals of one species is measured, remaining individuals of that species are simply counted and released.

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How?

Study: For each beach seine set, the **density of fish** by species (the number of fish divided by set area) will be calculated. This data will be combined with other studies to describe temporal, spatial, and habitat type patterns of juvenile salmon in the estuary and nearshore. From these results species-specific **fish presence probabilities** will be modeled and **mapped** for the Nooksack estuary and Bellingham Bay shorelines.

This study will also look specifically at juvenile Chinook salmon density in the Nooksack estuary, examining how competition for prey in different habitat types influences growth and residency. Juvenile salmon outmigrating from the Nooksack river may be using shoreline habitats of Bellingham Bay, and conditions within the Nooksack estuary could influence the timing and size of fish entering the bay.

More info?

A final report will be available through the City of Bellingham in the summer of 2015.

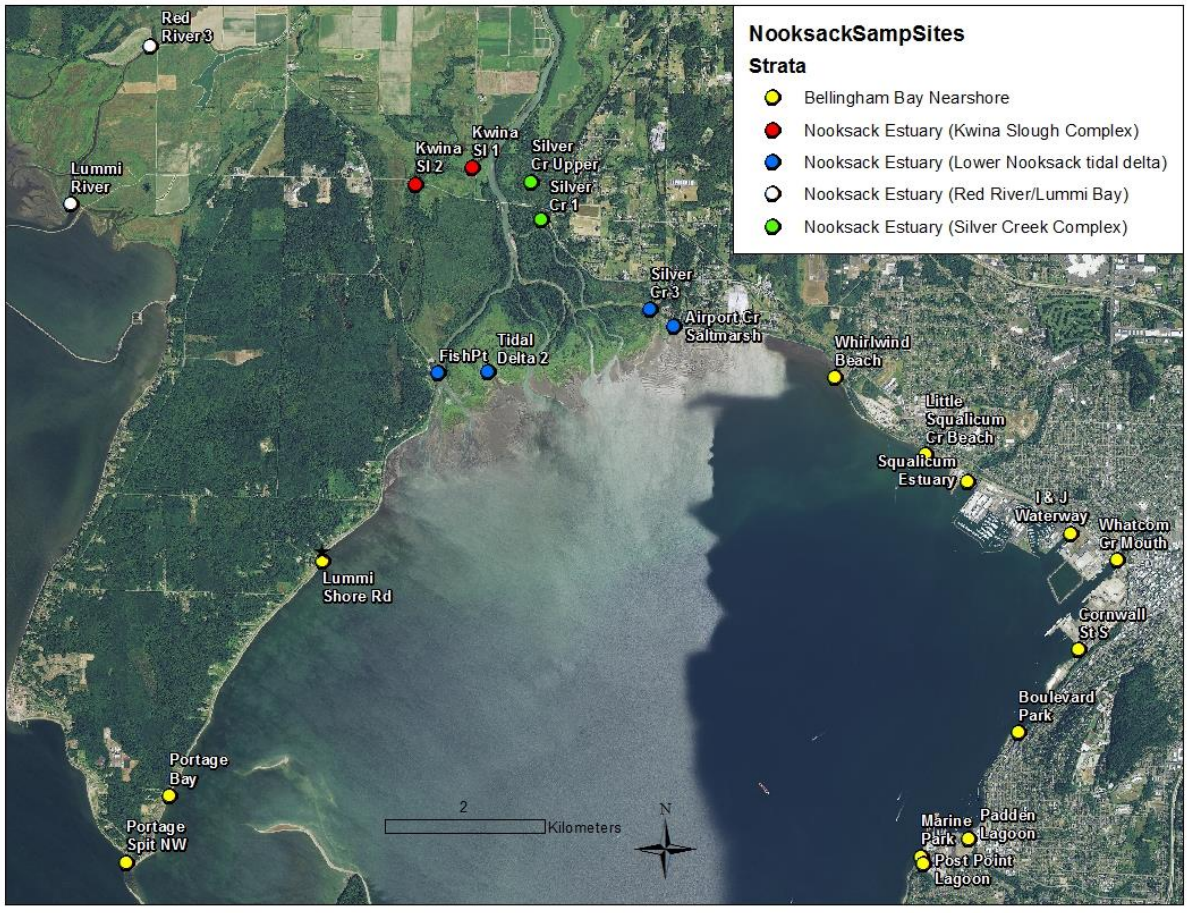

Figure 1. Map of sampling sites created by the Skagit River System Cooperative. Yellow dots represent the 23 sampling sites in this study.