



PROJECT PROFILE

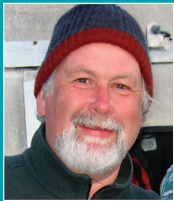
Monitoring Long-term Changes in Forage Fish Distribution, Abundance, and Body Condition in Prince William Sound

WHO WE ARE

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WHY ARE WE SAMPLING?

Changes in the abundance of forage fish (small, schooling fish that are the prey species of larger fish, marine birds, and marine mammals) can have dramatic effects in marine ecosystems because much of the energy transferred from lower to upper food web levels passes through these species. Forage fish typically produce a large number of offspring and have short lifespans, making their populations vulnerable towards large fluctuations in abundance, with associated impacts on predators that depend on them as prey.

WHERE ARE WE SAMPLING?

Our study includes surveys throughout Prince William Sound (bounding coordinates: 61.292, -148.74; 61.168, -146.057; 60.273, -145.677; 59.662, -148.238).

HOW ARE WE SAMPLING?

We are conducting annual forage fish surveys in Prince William Sound during July of each year. We are using a combination of aerial spotting surveys, hydroacoustics and various fishing techniques (i.e., midwater trawl, dip net, cast net, jig, gill net, beach seine, purse seine, video) to collect target species to measure age, length and weight). We are also ground-truthing hydroacoustic backscatter data to refine biomass estimates for specific species.



Aerial-acoustic surveys of forage fish in Prince William Sound in 2014.

WHAT ARE WE FINDING?

We conducted monitoring surveys in Prince William Sound in July, 2014. Based on findings in our 2012 surveys in which we had a low encounter rate with target species, we made improvements to the study design for the 2013-2014 field seasons. To increase our sampling efficiency, we devoted a significant portion of our 2013 effort to developing a strategy that incorporated nearshore aerial spotting to guide the boat-based hydroacoustic transects and the use of nets to sample fish. In 2014, we continued to work towards this new approach, which has the benefit of facilitating broad spatial scale comparison of current and future data to previous work in the Sound (e.g., E. Brown, project 10100132-F). Moving forward, our project will focus on validating nearshore aerial survey observations with hydroacoustics and net sampling to quantify forage fish age

class and biomass by species. We are collaborating with several other Gulf Watch Alaska projects to ensure the timing and location of forage fish surveys are relevant to the larger program goals.



Juvenile Pacific herring (*Clupea pallasii*) are the most commercially significant forage fish species.



Three examples of forage fish commonly found in Prince William Sound and the Gulf of Alaska. From top to bottom: Pacific sand lance (*Ammodytes* spp.), Pacific herring (*Clupea pallasii*), and capelin (*Mallotus villosus*).



Pigeon guillemot foraging on a Pacific sand lance.

Forage fishes such as eulachon, Pacific herring, Pacific capelin, and their eggs, are important prey items for many species in the Northern Gulf of Alaska, including humpback whales, many species of marine birds, other marine fishes and invertebrates. Small-schooling fishes have patchy distribution and abundance, and are strongly affected by the environmental conditions that affect their food, reproduction, and growth.



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