

524 Processes Affecting Capelin and Pollock in the Gulf of Alaska

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Why do fish choose particular habitats? Research suggests that individual species of fish select habitats based on food availability, shelter from predators, water temperature, and water chemistry. For example, in Barnabus Trough off Kodiak Island there is a hydrographic front that appears to physically separate capelin and pollock schools, with capelin occurring offshore of the front and pollock occurring inshore.

What happens when these habitats overlap? If climate changes break down the hydrographic front in Barnabus Trough, the capelin and pollock habitats will overlap. If this overlap occurs, the capelin and pollock might compete for the same food sources, causing a decrease in the population. On the other hand, it may be changes in water temperature that will affect the populations by creating changes in their reproductive and growth rates.

What are we studying? With funding from the North Pacific Research Board, Janet Duffy-Anderson, Mathew Wilson, and Patricia Livingston are conducting an intensive study of the role of hydrography on zooplankton composition and on the diets of capelin and juvenile walleye pollock in Barnabus Trough, Kodiak Island. Over the next year the study will focus on the hypothesis that *“the distribution and abundance of juvenile pollock and capelin are controlled by different processes. Pollock distribution is determined by prey availability, whereas capelin distribution is determined by relative temperature.”* After they have tested the first hypotheses, the next step will then be to test the second hypothesis: *“spatial separation is necessary to prevent competition for food between juvenile pollock and capelin.”*

How will the hypothesis be tested? Hydro-acoustic equipment will be used to map the distribution of pollock and capelin in Barnabus Trough. Nets will be used to sample actual fish and supplement the hydro-acoustic data. Zooplankton samples will be collected at different depths to measure capelin and juvenile pollock prey abundance. The scientists will also measure water characteristics including temperature, salinity, nutrient levels, and chlorophyll concentration.



Pollock at various developmental stages

Why is this project important? The ultimate goal of the project is to understand some of the physical and biological processes affecting the productivity of capelin and pollock in the Gulf of Alaska. Walleye pollock is a key species in the Alaska groundfish complex and a target species for one of the world's largest fisheries. They are an important prey for other groundfish such as Pacific cod, arrowtooth flounder and Pacific halibut, and for marine mammals. Capelin are an important forage fish in Alaska, serving as prey for seabirds, groundfish, and marine mammals. Because habitat quality and competition are likely to influence the population numbers and survival of these important commercial fish, information gathered in pursuit of these questions can be used by NMFS to improve single-species assessment and ecosystem-based management in the Gulf of Alaska.