Essential Fish Habitat project status report

Reporting date: December 5, 2008

Project number: 2006-12

Title: Overwinter habitat use and energy dynamics of juvenile capelin, eulachon, and Pacific herring

PIs: Johanna Vollenweider, John Hudson, Ron Heintz

Funding year: FY 2006

Funding amount: $50.3K

Status: ☐ Complete ☐ Incomplete, on schedule ☒ Incomplete, behind schedule

Planned completion date if incomplete: Field work completed April 2007. Fish sample proximate analysis completed September 2008. Data summarization, analysis and report/manuscript drafting will be completed in FY 2009.

Reporting: Have the project results been reported? If yes, where were the results reported? The project results have not been reported. The results of this project will be presented in a poster at the 2009 Alaska Marine Science Symposium held in Anchorage in January.

Results: In winter 2007 we studied the energetics of juvenile eulachon (age-0 and age-1) in Fritz Cove and Berners Bay near Juneau, Alaska. Prey abundance was more than 30% greater in Fritz Cove than in Berners Bay. Fritz Cove eulachon maintained energy levels throughout winter indicating that prey consumption offset metabolic demands. In contrast, the energy content of eulachon in Berners Bay decreased during winter, primarily from consumption of stored lipid. Winter energy losses were independent of size in age-0 eulachon which experienced a 27% decrease in energy content (84% of this energy was derived from lipid reserves and the remainder from protein). Winter energy loss in age-1 eulachon was size-dependent. In the smallest fish, energy content decreased by 27% (76% from lipid) whereas energy content decreased by only 4% (91% from lipid) in the largest age-1 fish. We attribute this size-dependence in winter energy conservation to enhanced foraging success in larger age-1 fish. Previously, higher winter survival of larger juvenile fish has been attributed to lower weight-specific metabolic rates and greater allocation of surplus energy to storage. These results suggest that size-dependent foraging success may also influence winter energy dynamics, and ultimately the survival and recruitment of juvenile forage fishes in north-temperate marine systems.