Essential Fish Habitat project status report

Reporting date: 10/11/2011

Project number: 2009-09

Title: Characterize habitat utilization and productivity for rockfish species

PIs: Rooper, Heintz, Aydin, Boldt

Funding year:FY09

Funding amount: $23,200

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

Planned completion date if incomplete:

Reporting: A manuscript was completed and submitted for internal review in May 2011 and was submitted to Fishery Oceanography in early October 2011for consideration as a research article. The citation is:

Rooper, C.N., J.L. Boldt, S. Batton & C. Gburski. In review. Growth and production of Pacific ocean perch (*Sebastes alutus*) in nursery habitats of the Gulf of Alaska. Submitted to Fish Ocean

Results:
Nursery areas for juvenile fishes are often important for determining recruitment in marine populations by providing habitats that can maximize growth and thereby minimize mortality. Pacific ocean perch (POP, *Sebastes alutus*) have an extended juvenile period where they inhabit rocky nursery habitats. We examined POP nursery areas to link growth potential to recruitment using field data collected in 2003, 2004, 2007 and 2008. FY09 project #9 provided funding for analysis of samples collected in 2007 and 2008.

During FY11, aging analyses were completed on juvenile POP collected from two sites near the Islands of Four Mountains during all four years. Analysis of otoliths was completed in March 2011, which allowed us to estimate growth for POP nursery areas during the summers of 2004 and 2008. Juvenile POP growth rates ranged from -0.19 $g*d^{-1}$ to 0.60 $g*d^{-1}$ based on differences in size between June and August. Predicted growth rates from a bioenergetics model ranged from 0.05 $g*d^{-1}$ to 0.49 $g*d^{-1}$ and were not significantly different than observed rates. Substrate preferences and the distribution of their preferred habitats were utilized to predict the extent of juvenile POP nursery habitat in the Gulf of Alaska. Based on densities of fish observed on underwater video transects and the spatial extent of nursery areas, we predicted 278 and 290 million juvenile POP were produced in 2004 and 2008. Growth potential for juvenile POP was reconstructed

using the bioenergetics model, spring zooplankton bloom timing and duration and bottom water temperature for 1982 to 2008. When a single outlying recruitment year in 1986 was removed, growth potential experienced by juvenile POP in nursery areas was significantly correlated to the recruitment time-series from the stock assessment, explaining ~30% of the variability. This research highlights the potential to predict recruitment using habitat-based methods and provides a potential mechanism for explaining some of the POP recruitment variability observed for this population.