

## Essential Fish Habitat project status report

Reporting date: 10/10/08

Project number: 2008-5

Title: Habitat characterization and utilization of early benthic phase red king crab

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Funding year: 2008

Funding amount: \$45,166

Status:  Complete  Incomplete, on schedule  Incomplete, behind schedule

Planned completion date if incomplete:

June 2009

Reporting: Have the project results been reported? If yes, where were the results reported? No.

Results: What is the most important result of the study?

Deployment of 96 sausage-shaped artificial collectors (SACs) for assessment of larval supply and settlement patterns of red king crab in 4 bays within Chiniak Bay on Kodiak Island returned a total of 2 red king crab juveniles. SACs were placed in seawater tanks in the Kodiak Lab in April to initiate biofouling and deployed in Chiniak Bay in May. Individual "test" SACs were pulled weekly at each site to check for larval settlement. All collectors were retrieved from the water in August and September. The near-complete absence of settling-stage king crab was surprising given the success the Alaska Department of Fish and Game (ADF&G) had with the collectors in Kodiak in the early 1990s. Our results indicate that one or more of the following may have contributed to this season's outcome: 1) there was a very low-level larval release of red king crab in Chiniak Bay in 2008, 2) larvae are being transported elsewhere than to their historical settlement areas, 3) collectors were not placed to adequately capture larvae, or 4) failure of the sampling methodology. Given the low numbers of adult red king crabs documented in Chiniak Bay by ADF&G and by NMFS divers, it is quite likely that the lack of larvae collected may be due to diminished levels of reproductive adults. The SACs were successful at collecting megalopae and juveniles of other species of crabs and invertebrates, particularly the crab *Telmessus cheiragonus* (approx. 675 juveniles), and supported hydrozoan growth, a preferred substrate for red king crab settlement. Due to the absence of significant numbers of crabs, no relationship was determined between settling crabs and preferred habitat. The lack of crabs also resulted in no juveniles being sent to Newport for laboratory studies on predation impact on habitat use. Rather, the Newport lab is using hatchery-raised juveniles for habitat selection studies in the laboratory. Four sites will be dredged in May 2009 to search for YOY and older early

benthic phase red king crabs. The presence of such crab may indicate settlement success from preceding years or a deficiency in SAC numbers or usage.

Given the low numbers of RKC collected from the wild, the Newport Laboratory proceeded with the proposed laboratory experiments using 1500 hatchery-reared juveniles. Experiments on habitat preference showed that juvenile crabs in the earliest post-settlement stages have a strong preference for complex structure, and that biofilm is an important component of that relationship, and that habitat choices are not strongly density dependent. Early benthic stages showed no overt behavioral responses to the presence of predators and innate crypsis appears to be the primary form of defense by RKC in stages C1 to C3. In experiments with age-1 Pacific halibut as predator, survival of RKC less than 5 mm CL is significantly higher in habitats structured with algae or gravel compared with sand bottom. Survival increases in a direct response to amount of structural complexity. Experiments will continue into FY-09 as the crabs grow to larger size and predation experiments (with halibut and Pacific cod) will continue, exploring the role of habitat heterogeneity and patchiness.