Essential Fish Habitat project status report

Reporting date: 10/25/2011

Project number:
2010-09
Title: Recruitment, post-settlement processes and habitat utilization by Tanner crab Chionoecetes bairdi

PIs: Ryer, Long, Spencer

Funding year: 2010

Funding amount:
$48,000
Status: ☐ Complete ☒ Incomplete, on schedule ☐ Incomplete, behind schedule

Planned completion date if incomplete: All research has been conducted and analyzed. We are combining some of this work with work conducted as part of a 2011 HEPR project and anticipate submission of 2 manuscripts by 09/31/2013.

Reporting: Have the project results been reported? If yes, state where the results were reported and attach an electronic copy of the report.

Not yet fully reported out. Anticipate 6/1/12.

Results: What is the most important result of the study?
Three principle goals were itemized in our proposal:

Goal #1 Develop improved gear: We modified an existing camera sled, equipping it with a codend, to allow collection of juvenile Tanner crabs. This gear scrapes off the upper 2 cm of sediment and deposits it in a 3mm mesh codend. To examine the utility of this gear as a mainstay for studying crabs/habitat associations, we conducted synoptic sampling, during each of 3 months, using the crab scrape data, diver quadrats and 2m beam trawl. Preliminary analysis indicates that the scrape is as efficient as diver enumerated quadrats and approximately 6 times more efficient than the 2m beam trawl at collecting age-0 Tanners. Importantly, the video capability of the scrape allows for quantification of habitat features.

Goal #2-Tanner settlement: During 2010 we conducted 331 crab scrapes at 2 sites, over a range of depth. Data clearly indicate that juvenile Tanners preferentially settle at depths that correspond to the distribution of of worm turf habitat during May and June. Data further indicate that the density of juvenile Tanners decreases at depth beyond 40 m, indicating sedimentary bottom at depths of 20 – 40 m likely constitutes EFH/nursery habitat for this species. Diver enumeration of crab and worm densities from > 100

quadrats (June, July, August) indicate that juvenile Tanner crabs are closely associated with the worm tubes, rather than simply having the same depth distribution as the worms. During each month the worm tube/crab numerical relationship was characterized by a type II asymptotic curve with an $R^2 > 0.70$.

Goal #3-Tanner post-settlement processes: Field sampling demonstrated that, subsequent to their settlement into the worm tube habitat, crabs begin to migrate to deeper water (>40m) during the months of July and August. Crab growth also differs between embayments. In August we sampled crabs from Womens Bay and Kalsin Bay, in addition to our normal Pillar Creek Cove and Holiday Beach sites. Crabs at Womens and Kalsin were significantly larger than those at Pillar and Holiday. This was manifest in Women and Kalsin crabs being one molt stage larger, in their development, at Womens and Kalsi, than at Holiday and Pillar. In addition, for each molt stage, crabs at Womens and Kalsin were significantly larger.

In support of field work examining post-settlement processes, approximately 1000 live Tanner crabs were shipped back to Newport for laboratory experimentation. Lab experiments demonstrated that 1) age-0 Tanner prefer fine sediments to coarser gravels and pebble bottoms, 2) burial is facilitated by finer grain sediments and the ability to successfully bury increases with crab size, 3) crabs bury deeper when they perceive predation risk, 4) juvenile Tanners demonstate a preference for simulated worm tube habitat, as opposed to bare sediment, and 5) dense worm tube habitat renders juvenile Tanners less vulnerable to cod predation, compared to bare sediment.