Essential Fish Habitat project status report

Reporting date: 10/20/2012

Project number: 2009-1

Title: Recovery of deep water sponges and sea whips from bottom trawling

PIs: Pat Malecha, Jon Heifetz

Funding year: 2009

Funding amount: $105,900

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

Planned completion date if incomplete: Video processing from submersible transects was completed during the winter and spring of 2009/2010. A draft manuscript is in preparation and near completion.

Reporting: No reporting has occurred yet.

Results: In 1996 AFSC scientists and their collaborators initiated a study to identify immediate effects of trawling on sponges and other invertebrates near Salisbury Sound (Freese et al. 1999). The same site was visited one year later to document medium-term effects (Freese 2003). Thirteen years after the trawling took place, we successfully relocated 12 of 14 transect markers on the seafloor and completed 7 transects within trawl paths as well as 7 reference transects outside trawl paths. Additionally, we obtained close-up video of individual sponges both inside and outside trawl paths to further examine the incidence of injury and the rate of recovery of damaged sponges. In total, we completed 16 dives with the *Delta* submersible. In some areas, trawl evidence, including seafloor gouging, boulder displacement, and sponge damage, was still readily apparent. Processing of video transects was completed during the winter and spring of 2009/2010. Preliminary data analyses reveal drastic differences between trawled and reference sites. Density of sponges at reference sites was 1.77 times greater than trawled sites. The difference we observed in sponge density was slightly greater than the differences observed immediately after trawling and one year post trawling, perhaps indicating that delayed mortality is prevalent among trawl-damaged sponges. The percentage of damaged sponges we observed was 3.67 times higher in trawled sites versus reference sites indicating that damage to sponges is persistent. Although the percentage difference we observed was substantial, the difference observed immediately after trawling and one year post trawling was much greater. Taken alone, the decreasing percentage of damaged sponges could indicate significant recovery processes occurred. However, since the difference in overall sponge density between trawl and reference sites has increased over time, it is more likely that damaged sponges have simply been lost from the population. The percentage of damaged sea whips was greater in trawled sites

(9.78%) than reference sites (5.88%) but was much less than the percentage of damaged sea whips observed immediately following trawling (55.00%).

Identification of sponges from visual observations is problematic since they often take many shapes and sizes within a single species and definitive visual keys for sponge species in the Gulf of Alaska are lacking. Determining species often requires comparison of spicules under magnification. For these reasons, Freese et al. (1999) and Freese (2000) grouped sponge species by shape and size in order to facilitate analyses. We also group sponge species by shape and size. However, in 2012, reference sponge specimens, collected during the 2009 submersible dives, were examined under magnification to confirm species identifications. Our sponge identifications differed somewhat from those tentatively reported by Freese et al. (1999) and Freese (2003). Since the current study and the previous studies occurred in the exact same locations and likely observed many of the same long-lived specimens, it is unlikely that different species were actually observed and more likely that the same specimens were identified differently. In the years since the first studies were completed, the taxonomic literature describing many deepsea sponges and invertebrates has expanded. We, therefore, believe our identifications to be more accurate than those in the previous publications. The previous studies identify the demosponges (Class Demospongiae) *Mycale* sp., *Geodia* sp., and *Esperiopsis* sp. They also identify the glass sponges (Class Hexactinellida) *Rhabdocalyptus* sp. and an unidentified "morel" sponge. We agree that the study site contains many *Mycale* sp., presumably *Mycale loveni*. However, based on the images presented in Freese et al. (1999) and Freese (2000), we disagree with the identification of the *Geodia* sp. and *Esperiopsis* sp. specimens. Based on spicule examination, we believe that the majority of the specimens previously identified as *Geodia* sp. are *Poecillastra tenuilaminaris* and those specimens identified as *Esperiopsis* sp. are *Isodictya quatsinoensis*. The previously unidentified "morel" sponge is likely *Farrea occa occa*. It should be noted as well that *Rhabdocalyptus* is an outdated genera and the current accepted name of the sponge is *Acanthascus* (*Rhabdocalyptus*) *dawsoni*. We also identified a second *Acanthascus* sp. and verified its identity under magnification. Finally, Freese et al. (1999) identifies a sea whip as *Stylea* sp. We disagree with this identification and believe the species to be *Halipteris willemoesi*.