Comparing Methods for Surveying Rockfishes

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In FY10, the SWFSC was granted $150k to participate in a comparison of methods for surveying rockfishes in untrawlable habitat. The money was used to contract 21 days at sea (DAS) on CPFV *Outer Limits* ($100k) and for purchasing ROV and acoustic- and optical-sampling equipment and supplies ($50k). To conduct the field work in FY11, the SWFSC requires an additional $50k for overtime ($24k, 6 people for 21 DAS), equipment and supplies ($12k), and contract labor for image and data processing ($14k).

The goal of the comparison is to estimate the relative accuracy, precision, and efficiency of four methods for surveying the distributions, abundances, and size compositions of target rockfish species. The methods include optical sampling from a SUB, AUV, and ROV, and combined optical and acoustic sampling from an ROV and boat, respectively (COAST). We propose to target five rockfish species including: cowcod, bocaccio, vermillion, sunset, and blackgill. Specific questions to be answered are:

1. Are biomass estimates derived from optical observations from the three platforms (SUB, AUV, and ROV) sufficiently unbiased and precise to allow them to be combined in time series for assessing changes?

2. For which species are the accuracies and precisions of the biomass estimates improved using the COAST, versus optical-only sampling methods?

Towards answers to these questions, we propose to survey concurrently, during September 2011, at one or more of the following sites, listed in order of preference: Tanner Bank, Potato Bank, and Hidden Reef (aka Pilgrim Bank). The proposed survey time period is in FY11 and follows the summer sportfishing season for *Outer Limits*. Four of the target species (cowcod, bocaccio, vermilion, and sunset) have been observed at each of the proposed locations (Table 1), but their densities were highest at Tanner Bank. Blackgill rockfish, observed from the ROV at depths greater than about 220 m (Figure 1), may also be present at each of the proposed sites, except perhaps Hidden Reef, which is relatively shallow.

We propose that the metrics used for comparing the survey methods include: abundance by species; coefficients of variation for abundance by species; size-distributions by species; habitat-specific densities; depth-specific densities; species richness in the entire area, and areas with low and high acoustic backscatter; and survey cost in units of dollars per 100 square meters of seabed surveyed.

Table 1. ROV-optical observations of target species by site. The numbers for vermilion rockfish include sunset rockfish. All of these species were observed most frequently at Tanner Bank.

Site	Sci name	Common name	Counts	Total dives	Normalized sigtings
Tanner Bank	S. paucispinis	Bocaccio	2242	27	83
Potato Bank	S. paucispinis	Bocaccio	236	15	16
Pilgrim Bank	S. paucispinis	Bocaccio	127	4	32
Tanner Bank	S. levis	Cowcod	417	27	15
Potato Bank	S. levis	Cowcod	25	15	2
Pilgrim Bank	S. levis	Cowcod	11	4	3
Tanner Bank	S. miniatus	Vermilion rockfish	698	27	26
Potato Bank	S. miniatus	Vermilion rockfish	84	15	6
Pilgrim Bank	S. miniatus	Vermilion rockfish	11	4	3

Figure 1. ROV-optical observations of relative blackgill abundance versus depth. Blackgill rockfish are observed shallower than 515 m and most often in depths between 400 and 450 m.