Seasonal habitat use and productivity of commercially important rockfish in the Gulf of Alaska

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----------OVERVIEW----------

The contribution of specific habitat types to the productivity of many rockfish species in the Gulf of Alaska (GOA) remains poorly understood. In the GOA, rockfish tend to have patchy distributions that frequently occur in rocky, hard, or high relief substrates and many species are associated with coral and sponge habitats. The presence of biotic cover (coral and sponge) may enhance the value of this habitat by providing protection and/or enhancing food resources similar to other structurally complex habitats. The overarching goal of this project is to examine seasonal changes in the distribution, abundance, and productivity of rockfish across 3 habitat types: low-relief, high-relief rocky/boulder, and high-relief coral/sponge. This research will enable us to better understand the relative importance of particular habitats to rockfish productivity throughout the year and provide data critical for understanding Essential Fish Habitat for these species.

----------OBJECTIVES---------

- Examine the density of rockfish and the community structure associated with three habitat types
- Examine the seasonal habitat use patterns for juvenile and adult rockfish in each of the habitat types
- Compare seasonal prey availability and diet diversity of rockfish collected from each habitat type
- Compare the seasonal energy content, condition, and growth of rockfish within the three habitat types
- Compare the reproductive potential of rockfish within the three habitat types

----------METHODS AND STUDY SITES----------

- Research cruises were conducted during three seasons: summer (August 2012), spring (May 2014), and winter (December 2014) in two sites southwest of Kodiak Island (Figure 1).
- A underwater stereo drop camera system (SDC) was utilized to examine rockfish habitat associations, community structure, size structure and density within each habitat type.
- Bottom trawling was conducted to ground truth SDC video drops and collect rockfish specimens to examine diet diversity, condition, and reproductive potential in each habitat.
- CTD drops and plankton tows were conducted to assess environmental temperature profiles and prey availability in each habitat.

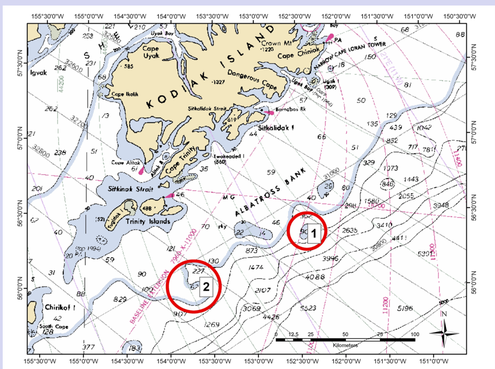

Figure 1. The 49 Fathom Pinnacle (1) and Snakehead (2) study sites.

---------PRELIMINARY RESULTS – 49 FATHOM PINNACLE SITE----------

- Initial observations indicate that the coral habitat was dominated principally by *Stylaster* corals. Hexactinellid sponges were also frequently observed.
- Preliminary CPUE estimates of rockfish density from the SDC video drops indicate significant differences in rockfish density among habitats, with highest densities at the boulder and coral habitats (Figure 2).
- Preliminary estimates of rockfish condition suggest differences among species, but similar condition across habitats (Figure 3).
- Preliminary results indicate the fish fauna in this region was dominated by adult dusky and northern rockfish (Figure 4).

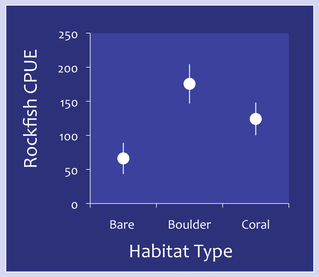

Figure 2. Rockfish CPUE estimates from 2012 SDC video survey at the 49 Fathom Pinnacle site.

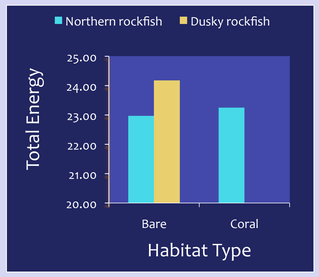

Figure 3. Rockfish condition from 2012 summer survey at the 49 Fathom Pinnacle site.

----------PRELIMINARY RESULTS – SNAKEHEAD SITE---------

- Initial observations indicate that the coral habitat in this region is dominated by soft corals like the gorgonian coral, *Fanellia fraseri*.
- Preliminary results from video analyses and trawl catches at this site suggest that rockfish were rare at sites lacking boulder or coral habitat.
- Preliminary results indicate the fish fauna in this region is dominated by small rockfish species including harlequin rockfish, pygmy rockfish, and juvenile Pacific ocean perch , northern, and redstripe rockfish. In addition, a small amount of adult dusky rockfish were present (Figure 5).

Figure 4. Typical trawl sample from high relief habitats at the 49 Fathom Pinnacle site; dominated by adult northern and dusky rockfish.

Figure 5. Typical trawl sample from high relief habitats at the Snakehead site; dominated by small red rockfish with some adult dusky rockfish present.

--------FUTURE WORK----------

- Complete analysis of video and finish processing of diet, plankton, reproduction, and energetic samples from 2014 spring and winter surveys.
- Complete assessment of differences in productivity between sites, habitats, and seasons.
- Complete final analyses and publish results.

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