New coral data for Bering Sea canyons

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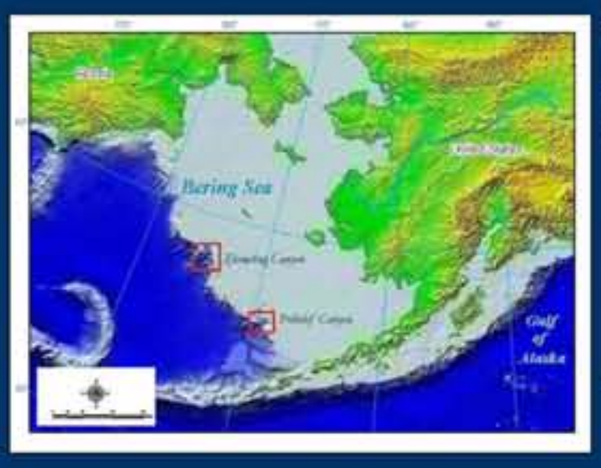
Introduction

Pribilof and Zhemchug Canyons, located 25 miles southeast and 80 miles northwest of the Pribilof Islands, respectively, are huge submarine canyons on the highly productive Bering Sea shelf break. The region supports some of the largest and most productive fisheries in the world. Despite their importance to the nation's economy, the ecological value of the canyon systems is poorly understood. Aside from a single ROV study of the upper reaches of Pribilof Canyon, there has been no *in situ* exploration of these areas. Efforts to secure protections for canyon habitat from fishing gear disturbance were rejected by the North Pacific Fishery Management Council (NPFMC), who cited a lack of sufficient ecological information to take such action. The NPFMC did, however, adopt a measure to gather more information on habitat in the canyons and listed it as a top priority for research. The purpose of this study was to conduct that research -- to explore the seafloor habitat in the canyons and determine whether current fishing activities have disturbed sensitive habitat.

Wide swath of damaged gorgonian corals, Pribilof Canyon, Bering Sea

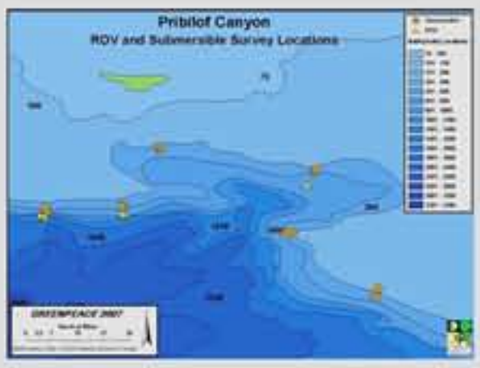


Deep Worker submersibles on the deck of the Greenpeace ship *Esperanza*

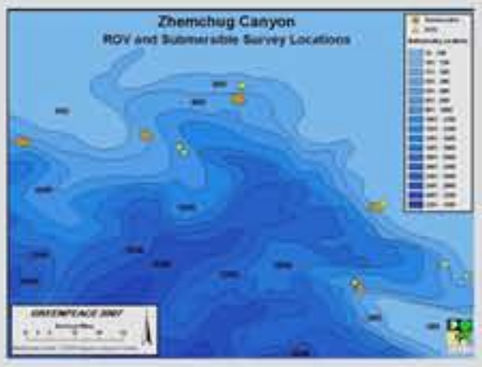
Methods

Deep Worker submersibles and a Sea Eye 1000 ROV were used to conduct video surveys of seafloor habitat in Pribilof and Zhemchug Canyons. Thirty-one transects covered the geographical extent of the canyons and were located approximately equidistantly apart. Video transects were perpendicular to depth contours and depths between 1000 and 150 meters were surveyed.

Specimens of corals, sponges, and benthic invertebrates were collected for taxonomic identification.



Location of submersible and ROV surveys made in Pribilof and Zhemchug Canyons, Bering Sea



Results

The canyons support diverse coral habitats ranging from relatively dense fields of gorgonians (*Plumarella* and *Acanthoprimnoa*) and groves of sea whips (*Halipteris willemoesi*) to isolated boulders with large arborescent corals. We collected or observed *in situ* at least 14 unique coral taxa (Table 1). With the exception of the sea whip groves, distribution of corals in the canyons tended to be substrate limited. Exposed rock was most common on the shelf break, with drop stones providing important coral substrate on slope habitats. Both demosponges and hexactinellid sponges were also common in the canyons and preliminary identifications indicate that at least 18 species are present. In general, coral and sponge diversity and abundance were higher in Zhemchug Canyon than in Pribilof Canyon. Evidence of disturbance from fishing activities (i.e. damage to corals and striations in the substrate) was observed on several transects in both canyons. Commercially important species, most notably *Sebastes alutus* and several species of king crabs, were observed associated with corals and sponges.

Table 1. Coral taxa observed during the 2007 Bering Sea Canyons expedition

Taxa	Pribilof Canyon	Zhemchug Canyon
Order Scleractinia *Caryophyllia alaskensis*		Present; new record and depth range extension
Order Antipatharia *Bathypathes* sp.		Present; new record or new species
Order Alcyonacea *Anthomastus* sp.		Present; possible range extension
Suborder Stolonifera *Clavularia* sp.		Present; new record
Order Gorgonacea *Acanthoprimnoa* sp.	Common; possible range extension	
Family Isididae		Common; possible new record
Paragorgia sp.		Present
Plumarella sp.	Common; possible range extension	
Primnoa pacifica		Present
Primnoa wingi		Present; new record
Swiftia pacifica	Present; new record	Common; new record
Order Pennatulacea *Anthoptilum* sp.	Present	Present; possible range extension
Halipteris willemoesi	Common	Abundant
cf. *Pennatula* sp.		Present; possible new species

Conclusions

This study provided the most extensive *in situ* observations of seafloor habitat along the Bering Sea slope to date and expanded on available data from fisheries by-catch records and NOAA surveys in the region. We documented the presence of coral habitat in the canyons including new species records, northern range extensions, and possibly the discovery of species new to science. Fragile corals and sponges in the canyons provide essential habitat for Pacific ocean perch and king crabs, and also support a high diversity of micro-fauna that may be prey for many commercially important species. There are currently no protections for shelf-break or upper slope habitats within fishable depths in the Bering Sea, including those in Pribilof and Zhemchug Canyons. We recommend that canyon coral habitats be prioritized for protection and that additional research is undertaken to fully document the sensitive habitats in the region.

Acknowledgements

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