

PROJECT 2000-6: *Submarine-canyon and Scavenger Communities on the Hawaiian Slope*

Principal Investigators

Craig R. Smith, Oceanography, University of Hawai'i

Eric W. Vetter, Marine Science, Hawai'i Pacific University

Frederic Martini, Marine Option Program, University of Hawai'i

Project Objectives

We propose to evaluate, on the Hawaiian slope, the significance of submarine canyons as sites of enhanced benthic and fishery biomass (and production), and to determine the abundance, species structure and food-consumption rates of scavenger assemblages inside and outside of canyons. Using submersibles, we will address the following hypotheses:

Canyons contain more macrophytic detritus, organically richer sediments, and higher macro- and megafaunal biomasses than do equivalent depths on the open slope.

Demersal fish (including juveniles and adults) and migratory zooplankton are concentrated in canyon habitats.

Scavenger aggregations are larger (after a specific bait deployment interval) and carcass consumption rates are higher inside than outside of canyons at a specific depth.

Scavenger aggregation size and carcass consumption rates increase with increasing water depth.

Scavenger aggregations are composed increasingly of species with special scavenging adaptations (e.g., large body size, capacious guts, tearing mouthparts) with increasing water depth. This work will elucidate (a) the role of canyons as critical fisheries habitats, and (b) the potential for scavenging assemblages to serve as resources and/or pests to fisheries on the Hawaiian slope.

Summary of Research

Using the manned submersible *Pisces V* and the ROV *RCV-150*, we will evaluate background and scavenger-community structure along three depth transects (100-1500 m) down the windward (NE) O'ahu slope. Two transects will be run down the axes of submarine canyons and one doing an open slope reference area. The abundance and distribution of megafaunal fish and invertebrates, and macrophytic detritus, will be evaluated using video surveys conducted with standard protocols. The abundance and biomass of infaunal macrobenthos, and the organic content of sediments, will be assessed from quantitative slurp-gun and tube-core samples collected at depths of 100, 500, 1000, and 1500 m along each transect. Scavenger assemblages will be studied by deploying standardized 5-kg bait parcels, as well as baited traps, at depths of 100, 500, 1000, and 1500 m along each transect. Baits and traps will be examined, videotaped, and recovered 24 hours later by submersible. The species structure and aggregation sizes of scavengers will be evaluated from videotapes and trap samples, and scavenging rates will be assessed from weighing bait parcels before and after deployment.

Programmatic Relevance

NOAA/NURP FY2001 Goal 1: In cooperation with NMFS, provide the science basis to maintain healthy fisheries stocks, and to rebuild protected species; and NOAA/NURP FY2001 Goal 2: Achieve sustainable use and conservation of coastal, marine and Great Lakes ecosystems.

Location: North and East O‘ahu

Dives Scheduled: 6 *Pisces V* dives & 6 ROV dives. A further 6 ROV dives, and 6 *Pisces V* dives which could not be scheduled as simultaneous (conjoint) dives, have been deferred to 2002.