

November 19, 2001

MILESTONE: REEF CONNECTIVITY: A STUDY OF LARVAL SUPPLY AND SOURCE OF RECRUITS TO THE FLORIDA KEYS AND THE FLOWER GARDEN BANKS. Southeastern U.S. & Gulf of Mexico, Steven Miller (PI: Mary Alice Coffroth, SUNY-Buffalo)

Developing conservation and management strategies is highly dependent on knowledge of larval sources. This is especially important in coral reef systems, where the main framework builders, scleractinian corals, depend on the dispersal of larvae to maintain and repopulate reefs; yet, the source of recruits is unknown. In this work, the level local dispersal and source of coral recruits to the Florida Keys and the Flower Garden Banks will be examined in order to assess reef interdependence or connectivity. Larval dispersal capabilities and the resulting recruitment patterns are reflected in the genetic structure of populations and these data can be used to identify sources of coral recruits.

PM: *By 2004, 60% of stocks have "essential fish habitat"*

Q1: *Define Essential Fish Habitat, e.g., physiography and how the fish use the habitat, for at least four species of declining fisheries (NURP, E. Myers)*

MILESTONE: QUANTIFYING THE REPRODUCTIVE BEHAVIOR OF THE COMMERCIALY IMPORTANT SQUID *LOLIGO OPALESCENS* ON SPAWNING GROUNDS IN MONTEREY BAY, CALIFORNIA. West Coast & Polar, Ray Highsmith (PI: Roger Hanlon and Jon Rummel, Marine Resources Center)

California's most valuable fishery is now *Loligo opalescens*, but this is a very recent development. These squids have a brief 1-year life cycle and congregate near shore to spawn. They are fished directly on the spawn grounds. Fisheries managers at the state and federal levels are concerned that the population may be near maximum exploitation, yet they have practically no data on the mating system or the reproductive potential of individual squids. This proposal would be one of the first to address the question whether the behavioral mechanisms of *Loligo opalescens* are flexible enough to withstand the high level of fishing pressure.

MILESTONE: GEOLOGY OF THE DAVIDSON (FOSSIL) SPREADING CENTER, OFF MONTEREY, CALIFORNIA. West Coast & Polar, Ray Highsmith (PI: Peter Lonsdale and Paterno Castillo, University of California San Diego)

The geology of a fossil spreading center off the coast of central California will be studied. Although abandoned about 19 Ma, it continued to erupt (alkalic) lava for several million years after that. The abandoned rise crest seems to be typical of many others along the sites in the eastern Pacific. One well-developed characteristic feature is a high post-spreading axial ridge (Davidson Seamount). Objectives include describing and interpreting how the chemistry of lavas changes after spreading stops, and ascertaining whether superficial deposits of hydrothermal minerals occur on inactive as well as active spreading centers.

MILESTONE: HABITAT UTILIZATION BY GOLDEN KING CRABS: AN *IN SITU* TRANSLOCATION EXPERIMENT. West Coast & Polar, Ray Highsmith (PI: Thomas Shirley, University of Alaska Fairbanks)

Most crustacean stocks in Alaska are in need of rebuilding. The establishment of reproductive refugia may prove to be an effective management tool for rebuilding crab stocks. However, the delineation of reproductive refugia requires a detailed knowledge of habitat use by key reproductive stages in the life of the species. Although golden king crabs (*Lithodes aequispinus*) are still fished commercially in southeastern Alaska, catches are a fraction of the historic maximum for the species. Little is known about the habitats occupied by golden king crabs beyond the depth distribution and the general substrate type (rocky) of those benthic areas that harbor the crab. Nothing is known about the risks to or responses of these crabs to displacement outside the normal depth range that they occupy. These parameters will be the topic of this study.

MILESTONE: EVALUATING THE ROLE OF FLUID FLOW AND SUBSTRATUM CHARACTERISTICS ON THE SPATIO-TEMPORAL DISTRIBUTION OF HYDROTHERMAL FAUNAL ASSEMBLAGES. West Coast & Polar, Ray Highsmith (PI: Margaret Tivey and Jozee Sarrazin, WHOI)

The overall objective of the proposed project is to characterize the habitat of six faunal assemblages that are recurring on active sulfide edifices of the Juan de Fuca Ridge and to identify the role of *in situ* measured environmental factors on the small scale spatio-temporal distribution of these assemblages. Achievement of this goal will be realized by combining ecological studies with information on the rates of hydrothermal flow, fluid chemistry, as well as substratum composition, and texture.

MILESTONE: COMBINING HISTORICAL DATA, HIGH RESOLUTION SEAFLOOR IMAGERY, AND NEW SURVEY AND ANALYSIS TECHNIQUES IN FISHERIES HABITAT STUDIES OFF OREGON. West Coast & Polar, Ray Highsmith (PI: Waldo Wakefield and Robert Embley, PMEL)

An interdisciplinary approach will be used to study the habitat groundfish populations on and near Heceta Bank, the largest and most important of the heavily fished rocky banks on the outer continental shelf off Oregon. Heceta Bank was the site of 58 submersible dives in the late 1980s that characterized the species composition of the bank and provided important data on relationships between fish species and bottom types. The acquisition of a state-of-the-art multibeam/backscatter survey at this site in May 1998 provides a highly detailed, precisely navigated seafloor map of bathymetry and seafloor texture that serves both as a context for the historical data set and as a basis for a more comprehensive study of groundfish/habitat relationships over a larger area. This study would do just that, comparing it historical data, and asking a number of very relevant questions regarding groundfish and habitat (e.g., texture, morphology, spatio-temporal relationships, etc.) in this valuable groundfish area.

MILESTONE: AGGREGATION OF DEEPWATER FISH COMMUNITIES TO PRECIOUS CORAL BEDS: IMPLICATIONS OF CORAL HARVEST TO SUB-PHOTIC SEAL FORAGING. Hawai'i and Western Pacific, Alex Malahoff (PI: Frank Parrish, NMFS-Honolulu)

Submarine dives will again collect information on fish communities associated with precious coral beds. HURL dives in 1998, documented endangered Hawaiian monk seals foraging in precious coral beds which prompted a hypothesis that precious corals may aggregate fish and improve the seal's foraging success. Dives will be used to document the fish community (diversity, abundance, and size structure) in precious coral beds throughout the Hawaiian Archipelago prior to commercial harvest. This will provide a baseline for future comparison. Densities of fish in coral beds will be compared with adjacent habitat areas to determine if coral beds aggregate fish resulting in higher densities. Secondary objectives include collecting size frequency data on precious coral and marking corals for age and growth studies. These data are needed to interpret the age frequency distribution of coral and establish estimates of maximum sustainable yield.

Q2: Assess the effectiveness of Marine Protected Areas (MPAs) for sustaining and enhancing fisheries and EFH (NURP, E. Myers)

MILESTONE: COUPLING OF GULF STREAM WATER INTRUSIONS WITH POSTLARVAL SETTLEMENT OF SNAPPER/GROUPER AND LOBSTER AT MIDSHELF REEF, ONSLOW BAY, NC. Southeastern U.S. & Gulf of Mexico, Steven Miller (PI: David Eggleston, North Carolina State University)

Coupling the source and variability of fish and invertebrate recruitment to physical oceanographic processes is a major objective of NOAA's efforts in fisheries oceanography. The geographical source of recruits is vital to the conservation of the adult fishery because without knowledge of the ultimate source of recruits (spawning adults), management of potential "source" populations cannot be effective. Knowledge of the source of recruits is critical to locating fishery reserves proposed for the U.S. South Atlantic Bight. It is hypothesized that meandering of the Gulf Stream is major component of spatiotemporal variation in recruitment of many finfish and shellfish species into nearshore, hardbottom reef habitats of the Carolinas.

MILESTONE: PRECIOUS CORALS IN THE HAWAIIAN ISLANDS MANAGEMENT UNITS DETERMINED BY MOLECULAR GENETICS. Hawai'i and Western Pacific, Alex Malahoff (PI: Craig Smith, et al., University of Hawaii)

We will examine the population genetic structure of three species of precious corals, the black coral *Antipathes dichotoma*, the pick coral *Corallium secundum*, and the gold coral *Gerardia* sp., to determine the appropriate management units (or stocks) for each of these species. We will also collect samples of the bamboo coral *Acanella*

sp., which is not affected by commercial harvest. We propose to study found precious corals beds in the main Hawaiian Islands to collect specimens to address the following specific hypotheses: (1) Beds of precious corals in the main Hawaiian Islands are genetically isolated units. (2) Rates of gene flow differ between species and are correlated with life histories. (3) Commercial harvest has resulted in a decrease in genetic diversity within and among population of precious corals relative to non-harvested species with similar distributions. (4) Precious corals in the WesPac “Refugium” do not supply sufficient propagules to replenish commercial beds of corals throughout the Islands.

MILESTONE: CHARACTERIZATION AND ASSESSMENT OF TWO TYPES OF CRITICAL HABITAT FOR ETELINE SNAPPERS IN THE MAIN HAWAIIAN ISLANDS. Hawai’i and Western Pacific, Alex Malahoff (PI: Gordon Grau, et al., Hawaii Institute of Marine Biology)

The objectives are to conduct *in situ* observations necessary to characterize and compare, biologically and ecologically, wall and pinnacle habitats of onaga and ehu; and to obtain baseline assessments of onaga and ehu stocks on these two types of habitats in both refuge and non-refuge areas for future evaluation of the effectiveness of DLNR’s management plan. This study will complete a study started in 1998.

Q3: Define the impacts of fishing and other anthropogenic activities on EFH. (NURP, E. Myers)

MILESTONE: SUBMARINE-CANYON AND SCAVENGER COMMUNITIES ON THE HAWAIIAN SLOPE. Hawai’i and Western Pacific, Alex Malahoff (PI: Craig Smith, University of Hawaii)

Scavenger-community structure will be evaluated along three depth transects (100m – 1000m) 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 also be evaluated. The species structure and aggregation sizes of scavengers (to bait and traps) will be evaluated from videotapes and traps samples, and scavenging rates will be assessed from weighing bait parcels before and after deployment.

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