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CRUISE REPORT

VESSEL: *Townsend Cromwell*, cruise 91-04 (TC-162)

CRUISE PERIOD: June 24-July 21, 1991

AREAS OF OPERATION: Northwestern Hawaiian Islands (Fig. 1)

TYPE OF OPERATION: Personnel from the Southwest Fisheries Center (SWFSC) Honolulu Laboratory (HL), National Marine Fisheries Service (NMFS), NOAA conducted trapping, trawling and diving operations in the waters of the Northwestern Hawaiian islands. Supplies were delivered to field camps on Tern, Laysan and Lisianski Islands.

ITINERARY:

- 24 June - Start of cruise. On board were Ray C. Boland, Elizabeth A. Delaney, William G. Gilmartin, Wayne R. Haight, Casey Jarman, Theresa L. Martinelli, Frank A. Parrish, Craig M. Rowland, Leslie K. Timme, and Happy A. Williams. Departed Snug Harbor at 1100 and proceeded to Tern Island, French Frigate Shoals (FFS).
- 26 June - Arrived Tern Island, offload supplies and disembarked Delaney.
- 28-29 June - Arrived at Lisianski Island and commenced diving operations. Set Lisianski field camp and disembarked Gilmartin and Jarman. Deployed trap reef with acoustic beacon.
- 30 June - Arrived at Laysan Island, disembarked Rowland and off-loaded supplies. Commenced diving, trawling, and trapping operations in waters around Laysan. Proceeded to Maro Reef.

- 3-11 July - Arrived at Maro Reef and commenced trawling, diving, and trapping operations. Deployed trap reef with acoustic beacon.
- 13-19 July - Arrived at Necker Island and commenced trawling, diving, and trapping operations.
- 20 July - In transit to Honolulu, Oahu.
- 21 July - Arrived at Snug Harbor, Honolulu, Oahu, at 0645. End of cruise.

**MISSIONS
AND
RESULTS:**

- A. Conduct lobster trapping operations at selected sites in the NWHI using wire and plastic lobster traps.

Lobster trapping stations were conducted, utilizing standard two-chambered California traps (Hen's Nest and Keola) with a 2- x 4-in wire mesh and black plastic (Fathom's Plus) traps with a 1- x 2-in mesh. Each station consisted of a single string of traps. Stations using a mix of wire and plastic traps were set with 8 traps and an inflatable buoy only on one end. Stations using only plastic traps were set with 20 traps per string and buoys on each end of the string. Traps were baited with between 1.5 and 2 lb of halved, frozen mackerel and soaked overnight.

A total of 3,347 spiny lobster, *Panulirus marginatus*, and 910 slipper lobster, *Scyllarides squammosus*, were caught in 1,623 trap-nights of fishing. Of these, approximately 300 spiny and 100 slipper lobsters were retained alive and brought to Honolulu for ghost fishing and feeding experiments. The remainder were released at sea. Overall catch rates were 2.06 and 0.56 lobster/trap-night for spiny and slipper lobster, respectively. These catch rates were higher than those obtained in 1990: 1.86 spiny and 0.43 slipper lobster/trap-night. Differences in overall catch may be attributed to the greater number of plastic traps used during this trip.

Standard California wire lobster traps were mixed alternately with plastic and set at selected locations at Necker Island, Maro Reef, and Laysan Island to target spiny lobster. The majority of these traps were set at their intended 15 fm depths. Minimum size for legal spiny lobster was limited to a tail width (T-3) of 50 mm. Berried females of legal size were not eliminated in the determination of legal catch. The catch per unit of effort (CPUE = lobster/trap-night) of legal spiny lobster was 0.3875 at

Necker Island, 0.27 at Maro Reef, and 1.62 at Laysan Island. CPUE for sublegal spiny was 3.58 at Necker Island, 0.06 at Maro Reef, and 0.02 at Laysan Island. Legal slipper CPUE was 0.17 at Necker Island 0.7 for Maro Reef, and 0.11 for Laysan Island. Sublegal slipper CPUE was 0.03 at Necker Island, 0.20 for Maro Reef, and 0.02 at Laysan Island.

Standard plastic lobster traps were set at selected locations at Necker Island, Maro Reef, and Laysan Island, targeting slipper lobster. These traps were set at a target depth of 20-30 fm, just over the edge of the bank when this type of habitat was available and on the bank when unavailable. Minimum size for legal slipper lobster was a tail width (T-3) of 53 mm. At Necker Island the CPUE of slipper lobster in these traps was 0.39 lobster/trap-night compared to 0.65 for 1990 traps set in the same locations. At Maro Reef CPUE of slipper lobster in these traps was 0.84 lobster/trap-night compared to 1.21 for 1990 traps set in the same locations. The mean catch rate of slipper lobster in these traps at Laysan Island was 0.20 lobster/trap-night.

Seven strings of 20 plastic traps in addition to the assessment traps were deployed to collect lobsters for laboratory experiments on feeding physiology. Possible effects of the modified bait canisters (screened with fine mesh) prevent including landings in assessment work.

- B. Obtain length-frequency data on spiny and slipper lobsters to compare with previous years and to refine estimates of growth and mortality.

Carapace length and the width between the tail nubs (measurement T-3) were measured and recorded for lobster species. Sex and reproductive condition were also recorded.

- C. Describe lobster habitats to compare habitat type with lobster abundance.

A total of 25 drop dives and 13 towed sled dives were conducted at 13 sites: 3 at Necker Island, 5 at Maro Reef, 2 at Lisianski Island, and 2 at Laysan Island. Divers observed and recorded bottom type, relief and biotic community, and took video and photographic records. Dives were conducted in close proximity to the traps for comparison of bottom type with trap catch rates, both current and historical. Sand and algal samples were also collected for further analysis in the laboratory.

- D. Ghost fishing experiments using plastic traps stocked with lobster.

Two strings of 8 plastic traps were stocked with 2 spiny and 2 slipper lobsters and left to soak for 9 days. The traps

were checked 3 times within this period. At the end of the 9-day period 11 spiny and 6 slipper lobsters remained in each of the two strings. There were two deaths during this time: one from octopus predation and the other unexplained.

- E. Collect lobster larvae to add to information regarding phyllosome distribution within the Hawaiian Archipelago.

A total of 36 2-hr Cobb trawls were conducted at distances of 15-20 nmi from Necker Island, Maro Reef, and Laysan Island on the north-south axis. These tows were conducted at night, between 2100 and 0200 hours, with the net fishing at a depth of 10-20 m. These samples will be thoroughly examined in the laboratory.

- F. Trap-reef deployment

Two arrays, consisting of 30 plastic traps filled with concrete block, were deployed with acoustic beacons as part of a lobster habitat experiment. The 30 traps were confined to a 170 ft line anchored with a concrete plug at one end. One was placed at 30 m on Lisianski Island, the other at 30 m on Maro Reef. They will be surveyed in the summer of 1992 for post-recruit lobster.

- G. Collect and return with 400 live lobster.

Three hundred spiny and 100 slipper lobsters were collected and returned to the laboratory for ghost fishing studies and feeding experiments.

- H. Deliver supplies to field camps.

Supplies were delivered to Tern, Laysan, and Lisianski Islands.

- I. Handline fishing resulted in the landing of 57 fish. Measurements were taken, and the heads saved for otoliths.

- J. General observations and miscellaneous activities.

Bird flock, fish school, and marine mammal sightings were recorded by the ship's officers and crew during daylight hours when possible.

Standard weather observations were made at 0000, 0600, 1200, and 1800 (G.m.t.) by the ship's officers and crew.

RECORDS:

The following forms, logs, charts, and data records were kept and turned in to the Honolulu Laboratory upon termination of the cruise.

Marine operations log
 Station number and activity log
 Trap, Pot, and Net Report
 Crustacean tagging and morphometric form
 Plankton, eggs and larvae log
 Handline fishing log
 Occurrence of birds, aquatic mammals and fish schools log
 Pacific dolphin project marine mammal sighting form
 Chief scientist's log
 Diver's logs
 Weather logs
 Activity reports

SCIENTIFIC PERSONNEL:

Frank A. Parrish, Chief Scientist, National Marine Fisheries
 Service (NMFS), Southwest Fisheries Science Center (SWFSC),
 Honolulu Laboratory (HL)
 Ray C. Boland, Cooperative Scientist, University of Hawaii (UH)
 Elizabeth A. Delaney, Research Assistant, NMFS, SWFSC, HL
 William G. Gilmartin, Fishery Biologist, NMFS, SWFSC, HL
 Wayne R. Haight, Fishery Biologist, NMFS, SWFSC, HL
 Casey Jarman, Research Assistant, NMFS, SWFSC, HL
 Theresa L. Martinelli, Cooperative Scientist, UH
 Craig M. Rowland, Cooperative Scientist, U.S. Fish and Wildlife
 Service (USFWS)
 Leslie K. Timme, Research Assistant, NMFS, SWFSC, HL
 Happy A. Williams, Research Assistant, NMFS, SWFSC, HL

Submitted by: _____
 Frank A. Parrish
 Chief Scientist

Approved by: _____
 George W. Boehlert
 Director, Honolulu Laboratory

Attachment