

July 27, 1992

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CRUISE REPORT

VESSEL: *Townsend Cromwell*, Cruise 92-04 (TC-172)

CRUISE PERIOD: 18-29 May 1992

AREA OF OPERATION: The waters in and adjacent to Kaneohe Bay, Oahu; Kahului Bay, Maui; and Hanalei Bay, Kauai; in the main Hawaiian Islands (MHI). (Fig. 1)

TYPE OF OPERATION: Primary sampling effort was coordinated with deployment of bottom (Kali) longlines and baited video cameras (stationary, 10 min duration) during daylight hours, at 35-50 fm depths on unconsolidated and other low-relief bottoms to describe and compare the relative abundance of juvenile pink snapper or opakapaka (*Pristipomoides filamentosus*, F. Lutjanidae) offshore and adjacent to several windward MHI embayments (Kaneohe Bay, Oahu; Kahului Bay, Maui; and Hanalei Bay, Kauai). A complementary task involved trial deployments of fine-mesh, baited funnel traps off Kaneohe Bay for juvenile opakapaka. A secondary objective was to capture several large opakapaka from deeper, rocky reef habitat (75-100 fm) using the *Townsend Cromwell*'s power gurdies, implant dummy tags (similar to sonic transmitters) in specimens aboard ship, and hold test fish for several days to one week in the ship's baitwell to evaluate survivorship and tag retention. An ancillary project was a sea trial of a single-warp shrimp trawl at some convenient time and place during the cruise.

ITINERARY:

18 May - Departed Snug Harbor for Kaneohe Bay, windward Oahu, at 1300. Tested launch and retrieval of NMFS Boston Whaler (Nehu) and the *Townsend Cromwell*'s Boston

Whaler (Whaler) between 1430-1530 off Diamond Head, Oahu. Also tested deployment/retrieval of video camera systems off the Nehu and Whaler. At 1530 continued transit to Kaneohe Bay; arrived at 1700. Conducted power gurdy fishing off Kaneohe Bay from 1800-2000. Overnight at anchor in Kaneohe Bay.

- 19 May - Deployed Nehu and Whaler at 0800 and weighed anchor. Transited to 35-50 fm depths offshore Sampan Channel, conducted simultaneous longline sets off *Townsend Cromwell* and video camera deployments off the Nehu and Whaler. Sampling off Nehu interrupted 1000-1100 when Nehu was used to get supplies ashore at the Hawaii Institute of Marine Biology on Coconut Island. Resumed full sampling schedule from 1130 until 1600 (including gear demobilization). At 1600 deployed string of fish traps. Overnight at anchor in Kaneohe Bay.
- 20 May - During 0700-0915 (while still at anchor in Kaneohe Bay), service personnel from Oahu repaired gyro on ship's bridge. Weighed anchor at 0915 and transited west to opposite Mokolii Island (Chinaman's Hat), launched Boston Whalers at 0945. Conducted abbreviated longline and video camera operations off Chinaman's Hat until 1500, began transit back to fish trap stations off central Kaneohe Bay. Retrieved and re-deployed traps 1530-1615. Overnight at anchor in Kaneohe Bay.
- 21 May - At 0800, launched both Boston Whalers and weighed anchor. Transited offshore opposite central Kaneohe Bay. Conducted routine longline/video sampling operations at central bay stations until 1500. Retrieved fish traps 1530-1600; traps not reset (gear stowed on ship's foredeck for transit). At 1730 departed Kaneohe Bay for Kahului Bay, Maui.
- 22 May - Arrived off coast of Maui, northwest of Kahului, at 0600. Launched Boston Whalers at 0800. Conducted routine longline/video sampling operations through 1600 at stations several nmi north-northwest of Kahului Bay. Transited to Kahului Bay. Overnight at anchor in the harbor entrance.
- 23 May - Launched both Boston Whalers at 0800 and weighed anchor. Conducted routine longline/video sampling operations through 1630 at stations spanning the northeast and southwest channel entrances to the harbor. Transited to within harbor, overnight at anchor.

- 24 May - Deployed Boston Whalers and weighed anchor at 0800. Transited 6 nmi east of Kahului Harbor, where conducted routine longline/video sampling operations until 1500. At 1500 departed Kahului, Maui, for Kaneohe Bay, Oahu. During 1500-1600, conducted sea trial of single-warp shrimp trawl off north Maui while in route to Kaneohe Bay.
- 25 May - Arrived off Kaneohe Bay, Oahu, by 0700. Deployed string of fish traps at 35-50 fm offshore of the central bay starting at 0800. Transited to area off Kahana Bay-Laie by 0845, conducted routine longline/video sampling operations until 1530. Transited back to off central Kaneohe Bay by 1600 and completed retrieval of fish traps by 1630. Traps were not reset (gear stowed for transit). Used Zodiac to put sick crewman ashore at Heia Kea pier within Kaneohe Bay at 1700. At 1800 began transit to Hanalei Bay, Kauai.
- 26 May - Arrived Hanalei Bay, Kauai, at 0700. At 0800, launched both Boston Whalers, and conducted routine longline/video sampling operations until 1630 at stations spanning the entrance to Hanalei Bay. Transited to within Hanalei Bay. Overnight at anchor within the bay.
- 27 May - At 0800 weighed anchor and began transit to region 5 nmi east of Hanalei Bay, launched both Boston Whalers. Conducted routine longline/video sampling operations until 1630. Transited back to Hanalei Bay. Overnight at anchor within the bay.
- 28 May - Weighed anchor by 0800 and began transit to region 5 nmi west of Hanalei Bay, launched both Whalers. Conducted routine longline/video sampling operations in region until 1600. Transited farther west off the Na Pali Coast, and power gurdy fished during 1730-2030 at 55- to > 100 fm depths, about 12 nmi west-southwest of Hanalei Bay. Departed Na Pali Coast, Kauai, for Snug Harbor, Oahu, at 2030.
- 29 May - Arrived Snug Harbor by 0800. Disembarked scientists. End of cruise.

**MISSIONS
AND RESULTS:**

- A. Conduct primary task comprising matched samples with two gear types (bottom longline and stationary/baited video camera), soak passive (baited trap) gear as complementary method for collecting juvenile opakapaka, conduct power gurdy fishing to

collect adult bottomfish specimens for shipboard test, and complete ancillary sea trial.

1. A total 45 sampling stations were occupied aboard the *Townsend Cromwell*. Sampling conducted aboard the two Boston Whalers contributed another 111 stations.
- B. Set and retrieved Kali longlines off *Townsend Cromwell* to index the relative abundance (CPUE, catch per one-half-hour soak of 150 hooks) of juvenile opakapaka and associated fishes at 35-50 fm depths off, and adjacent to, several windward MHI embayments. Each longline string comprised 30 buoyed and weighted, 10 ft-long droppers (7/8-in outside diameter, hollow PVC pipe). Five, no. 12 Izuo AH hooks, spaced at 18 in intervals, were attached to each dropper. Each branchline consisted of an 11 in leader of 20-lb test, hard/clear monofilament nylon, followed by a 5 in hook snell of 10-lb test, hard/clear monofilament. Droppers were spaced 10 fm apart, along a double-anchored, double-buoyed 300 fm main line of 1/2-in polypropylene. All bait was stripped squid.
1. A total of 39 standard longline sets were conducted in and near the three embayments. These included 15 sets near Kaneohe Bay (8 sets offshore and 7 sets in either a near-field or far-field area adjacent to the bay), 12 sets near Kahului Bay (4 sets offshore, and 8 sets adjacent to the bay); and 12 sets near Hanalei Bay (4 sets offshore and 8 sets adjacent to the bay).
 2. A total 216 fish were caught by the longline gear. Ninety-four percent were two species: 147(68%) puffers, *Lagocephalus hypselogeneion* (F. Tetraodontidae) and 57 (26%) opakapaka. Three species comprised the remaining 6% of the catch: the lizardfish, *Trachinocephalus myops* (F. Synodontidae); the blue-lined snapper or "taape," *Lutjanus kasmira* (F. Lutjanidae); and the sandperch, *Parapercis schauinslandii* (F. Pinguipedidae). The overall catch rate was < 4% (216 fish/5,850 hooks). Nearly all (53/57 or 93%) of the longlined opakapaka were caught in the Kaneohe Bay region; all were juveniles (range: 13-21 cm fork length (FL)).
- C. Deploy baited video camera systems concurrently with bottom longline sets, to evaluate the relative accuracy and precision of the two sampling techniques for indexing juvenile opakapaka abundance. For each longline set (station), a maximum of six, fixed duration (10 min on-bottom time) video recordings were taken: ideally, 3 discrete camera drops were made parallel to (but, for safety, 50-75 m distance from) the track of each longline set. Camera drops

were positioned approximately at the center, offshore end, and inshore end of each longline set. Primary data included several species-specific abundance indices (time to first arrival, maximum number of individuals viewed in a single frame, cumulative number viewed, and percentage of total time present on tape). Near-bottom fish and decapod fauna were attracted to a bait canister mounted on the sled to which the housed camera was attached. A single, 15 cm long (major axis), semitransparent and perforated plastic bait canister was mounted 50 cm in front of and off-center within the camera's field of view, a single chub mackerel (*Scomber*) was enclosed within, and a single squid (*Loligo*) was cable-tied to the outside of the canister. All bait was changed for each camera drop.

1. A total of 111 camera drops were made in and near the three embayments, of which > 100 were quantitative, 10-min recordings, matched with specific longline stations. These included 39 drops near Kaneohe Bay (18 drops offshore of the bay, 21 drops at near-field and at far-field stations adjacent to the bay), 36 drops near Kahului Bay (12 drops offshore of and 24 drops adjacent to the bay); and 36 drops near Hanalei Bay (12 drops offshore of and 24 drops adjacent to the bay).
 2. On numerous occasions, juvenile opakapaka were recorded on video but were not longlined at the respective station. This observation suggests that, in this application, video CPUE data are more accurate than longline CPUE data for indexing juvenile opakapaka abundance. Quantitative appraisal of the video recordings, including comparison of the precision of video and longline CPUE, are pending statistical analyses.
- D. Deploy prototype fish traps at 35-50 fm depths off Kaneohe Bay, where the target organism (juvenile opakapaka) was known to be abundant. Test gear consisted of a 6-trap string of funnel traps, spaced 30 fm apart along a double-buoyed, double-anchored main line of 1/2-in polypropylene. All traps were constructed entirely of fine-mesh (1/2-in) hardware cloth, draped on frames of 1/2- and 3/8-in rebar; 2 different trap sizes were tested: 3 "small" traps, 4 ft long by 3 ft wide by 2 ft high; and 3 "large" traps, 6 ft long by 4 ft wide by 3 ft high. Each trap had a single, upwardly ramped funnel of 4 in (maximum) entrance width at one of the two small ends. Traps were always baited; bait type varied among individual traps and sets (chub mackerel, scrap swordfish meat, and deep-water squid). At least some baits were always secured in 2, 14 in long by 4 in wide by 3 in high enclosures of 1/2-in hardware cloth, placed beneath the funnel ramp near, but not touching, the trap end. On some deployments,

additional baits were strung vertically on lines within the center of traps.

1. Juvenile fish traps were deployed at three stations off Kaneohe Bay. Soak times varied among stations: Station 06, about 1 day from 1600-1530; station 10, about 1 day from 1530-1500;, and station 27, about 8 hr from 0730-1600.
2. Totals of 40 fish and 49 invertebrate macrofauna individuals were caught in 333 trap-hours. Twelve fish and 3 invertebrate taxa were trapped; haole crab (*Portunus sanguinolentus*, F. Portunidae) ranked first in numbers of invertebrates caught (43; 88% of all invertebrates). Among fishes, taape were first ranked in numbers caught (16; 40% of all fishes). Only 3 opakapaka were trapped; all were juveniles (13.5-14.5 cm FL). All opakapaka were caught in a single trap (1-day soak).
3. Conduct power gurdy fishing to collect adult-sized opakapaka for shipboard implantation of dummy tag and test of survivorship and tag retention in ship's baitwell.
 1. Three line fishing stations were occupied during the cruise: a single station off Kaneohe Bay on 18 May and two stations off the Na Pali Coast, about 12 km west of Hanalei Bay, Kauai, on the evening of 28 May.
 2. Only a single taape (27 cm FL) was caught at 52 fm off Kaneohe Bay; a 62 cm FL opakapaka (plus a 78 cm FL kahala, *Seriola dumerilii*, F. Carangidae) was caught at 1745 hrs (at 76 fm depth; station 45) off the Na Pali Coast. The opakapaka appeared to be in excellent condition when first brought aboard ship. Its empty stomach was everted through the pharynx but appeared intact; there was no obvious rupture of its swimbladder nor embolism of its eye sinuses or skin.
 3. A 1-in-diameter wooden dowel was used to gently replace the opakapaka's stomach in natural position, and a 80 mm long by 17 mm diameter dummy tag made of ABC plastic (as a proxy for a SONOTRONICS DT-88 sonic transmitter), was then inserted in its stomach. The fish was placed in the ship's baitwell, where it immediately sounded and remained quiet, finned slowly, and maintained equilibrium near bottom until return to port at 0730 on 29 May.
 4. The specimen was transferred from the *Townsend Cromwell's* baitwell to a large outside tank at the Kewalo Laboratory during 1000-1020 on 29 May. A rectangular, 6 ft by 4 ft by 3 ft tank, aerated with compressed air, was used for the transfer; the specimen was quiet but appeared healthy

during transit and for several hours following its introduction to the tank at Kewalo.

5. When next checked in mid-afternoon on Saturday, 30 May, the specimen was dead. Based on its condition (slight decomposition), death had occurred several hours prior, approximately 40 hr after capture. Dissection revealed that its swimbladder was intact. Its stomach, however, was badly perforated. (The exact cause of rupture remains unexplained--see 1 and 2 above.) The tag was free in its coelom, which was filled with fluid (water with some blood). The specimen might have slowly bled to death, although bacterial infection cannot be excluded as a contributing cause. The specimen was a mature female, in the early stages of vitellogenesis, with 95 g ovaries.
- F. Conduct test deployment of a single-warp shrimp trawl to evaluate the potential and estimate the magnitude of the scale-up factor to use in construction of otter boards for near-surface gear for potential use in sampling juvenile green turtles (*Chelonia mydas*) in and near open-ocean surface slicks.
1. Test deployment was successfully conducted at 1500-1600 on 24 May, off north Maui, as transited from Kahului, Maui, to Kaneohe Bay, Oahu.

**SCIENTIFIC
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Attachment

Figure 1.--Area of juvenile snapper survey of the main Hawaiian Islands (MHI) on TC-92-04 (TC-172), 18-29 May 1992.