

August 25, 2000 F/SWC2:EED:FLF  
CR9306-2.EED

### CRUISE REPORT

**VESSEL:** *Townsend Cromwell*, Cruise TC-93-06 (TC-184)

**CRUISE PERIOD:** 3-29 September 1993

**AREA OF OPERATION:** The waters off Kaneohe Bay, Oahu, and Kolo Harbor, Molokai, in the main Hawaiian islands (MHI) (Leg I) and the waters off French Frigate Shoals (FFS), Necker Island, and Nihoa Island in the Northwestern Hawaiian Islands (NWHI) (Leg II) (Fig. 1).

**TYPE OF OPERATION:** Deployment of baited fish traps and baited video cameras for juvenile pink snapper or opakapaka (*Pristipomoides filamentosus*), plus power gurney line fishing for juvenile snappers in the waters off Oahu and Molokai in the MHI and off FFS in the NWHI, additional power gurney fishing for adult bottomfish off Nihoa and Necker Islands, and FFS in the NWHI.

**ITINERARY:**

3 September Embarked Leg I (3-12 September). Departed Snug Harbor for Kaneohe Bay, off windward Oahu, at 0945. Arrived at first fish trap station off Kaneohe Bay 1300. Deployed traps 1330-1700. At 1730 transited to offshore Sampan Channel for overnight at anchor.

4 September Weighed anchor at 0700. Motored to near the southeasternmost trap station at lat. 21°30'N, long. 157°46'W, deployed *Townsend Cromwell* Boston Whaler ("Whaler") and NMFS Honolulu Lab Whaler ("Nehu") 0800-0830. Motored to 75-fm curve for juvenile line fishing. Retrieved small craft 1400-1430. At 1630, ceased line fishing and

motored back to anchor off Sampan Channel, for overnight.

- 5 September Weighed anchor 0700 and motored to central station area at lat.  $21^{\circ}30.5'N$ , long.  $157^{\circ}47.2'W$ . Deployed Whaler and Nehu 0800-0830. Motored to 75 fm and line-fished for juveniles until 1600, with breaks to retrieve small craft at 1330 and 1430. At 1630 returned for overnight at anchor off Sampan Channel.
- 6 September Weighed anchor 0700 and motored to northern station area near lat.  $21^{\circ}31.7'N$ , long.  $157^{\circ}47.9'W$ . Deployed Whaler and Nehu 0800-0830. Line-fished at 50-70 fm until 1630, with early afternoon breaks to retrieve small craft. At 1630 returned for overnight at anchor off Sampan Channel.
- 7 September Weighed anchor 0730 and launched Whaler and crewman to pick up Landgraf ashore at Heia Kea. Motored to southeasternmost trap station. After unsuccessfully searching 0.5 hr for trap buoys, motored to next upcoast trap station. Blew hydraulics of king puller on first attempt and waited at station while ship's crew replaced puller 0830-1030. Whaler with Landgraf meanwhile conducted remedial video drops, then searched for lost trap station with grappling hook. Completed retrieval of all 11 trap strings (including the recovered first station) by 1640. Transited to south Molokai 1700-2200 for overnight at anchor between Kaunakakai and Kolo Harbors.
- 8 September Weighed anchor 0730. At 0800 started setting 9 strings of fish traps at 44 fm between the two harbor areas, running from east to west. At 0945 completed all trap sets and began run to west Molokai. Line-fished for juvenile snappers at 50-70 fm during 1045-1600 off west Molokai. At 1630, began return to anchor off south Molokai for overnight.
- 9 September Weighed anchor 0730 and motored to western end of farthest west station area near lat.  $21^{\circ}02.6'N$ , long.  $157^{\circ}15.9'W$ , where launched Whaler and Nehu for video operations 0800-0830. Motored offshore where line-fished at 45-70 fm for juveniles until 1630, with break at 1430-1500 to retrieve small craft. At 1630 motored back for overnight at anchor off South Molokai.

- 10 September Weighed anchor 0730 and motored to eastern end of central station area near lat.  $21^{\circ}04.4'N$ , long.  $157^{\circ}10.1'W$ . Launched Whaler and Nehu for video operations 0800-0830. Motored offshore where line-fished for juveniles until 1630, with break at 1400-1430 to retrieve small craft. At 1630 motored back for overnight at anchor.
- 11 September Weighed anchor 0730 and motored to near easternmost trap station at lat.  $21^{\circ}04.3'N$ , long.  $157^{\circ}07.1'W$ . Deployed Whaler and Nehu 0800-0830. Motored offshore where conducted juvenile line fishing until 1630, with break to retrieve small craft 1330-1400. At 1630, motored to anchorage off Kaunakakai Harbor for overnight at anchor.
- 12 September Weighed anchor 0600 and motored to easternmost trap station. Successfully retrieved all 9 strings of fish traps (27 total traps) during 0630-1000; single lighted buoy and line lost from westernmost trap station. Began transit back to Snug Harbor at 1000. Arrived Snug Harbor 1330. At dock 1400 and disembarked scientists. End of Leg I.
- 13 September In-port day. Bow mount repaired on Nehu.
- 14 September Beginning of Leg II (14-29 Sep). Embarked scientists. Departed Snug Harbor for Nihoa Island in the NWHI, at 1030.
- 15 September Continued transit to Nihoa. Arrived off southwest Nihoa Island to conduct handline fishing for adult bottomfish from 1000-1900. Resumed transit to Necker Island.
- 16 September Arrived at 100-fm curve off southwest Necker Island at 0800; commenced adult bottom fishing until 2015. Resumed transit to FFS.
- 17 September Arrived off southeast FFS 0800. During 0815-1100 set 9 strings of 3 fish traps along 45-50 fm contour and 2 strings of 2 and 3 traps each on the 80-fm contour in southeast sector of bank. Proceeded south to first trap area and handlined for juvenile snappers 1130-1630. Transited to anchorage south of La Perouse Pinnacle.
- 18 September Weighed anchor 0630 and transited to fish trap stations to conduct video camera and juvenile handline fishing operations. At 0800 experienced electronic (GPS) problems. Operations resumed 0915, when Nehu and Whaler were launched in

inclement weather for video camera drops. Juvenile handline operations commenced 1000. Weather forced alteration of video operations; completed video operations for the day at 1400. Beginning 1430, transited to 70 fm curve south of Disappearing Island, where handlined adult bottomfish 1600-1830. At 1830 transited to anchorage south of La Perouse Pinnacle.

- 19 September Weighed anchor at 0600 and transited to working grounds on 50-fm curve in second sector of operations. Conducted routine juvenile and video camera sampling along 45-70-fm curve 0815-1415. At 1600, began transit to 100-fm curve south of Disappearing Island to conduct adult fishing operations, ceased the latter 1810. At 1815 began transit to anchorage south of La Perouse Pinnacle.
- 20 September Weighed anchor 0545 and transited to fish trap station in third sector, where conducted routine juvenile and video camera operations 0820-1430. Conducted routine adult fishing at 70-130 fm south of Disappearing Island 1625-1835. Transited to anchorage south of La Perouse Pinnacle.
- 21 September Weighed anchor 0600 and transited to working grounds for trap retrieval. Recovered traps with difficulty (strong currents; tangled buoys, lines, traps) 0800-1400. Lost five traps set on deep contour. Traps set on shallower contour "walked" an estimated 0.2 to >1.2 nmi south-southeast during the 4-night soak. Redeployed traps in east to north area during 1430-1800 using different buoy system to prevent trap movement. Deployment interrupted 1600 to free gear fouled in ship's propellers. Engines stopped to put divers over the side to free line from propellers; 1 trap was lost and trap string dragged to 37 fm. Continued deployment until 1800. Transited to anchorage south of Tern Island.
- 22 September Weighed anchor at 0600 and transited to working grounds to conduct routine operations. Conducted video drops and juvenile line-fishing 0800-1430. Transited to adult bottomfish grounds on 100 fm curve west of Tern Island and gurney-fished 1600-1800. Transited to anchorage south of Tern Island 1800-1900.
- 23 September Weighed anchor at 0600 and transited to working grounds. On station 0800; hove to because of 30 to 40 kn winds with lightning and heavy squalls associated with low pressure system stalled over

- FFS. Waited for weather to abate until 1530. Then began return to anchorage south of Tern Island; strong winds continued throughout day and had to anchor in area overnight.
- 24 September Weighed anchor at 0600. Transited to working grounds, arrived 0800, and conducted routine video and juvenile line-fishing operations 0800-1430. To make up day missed due to weather on 23 September, video sampling itinerary altered to cover missed area as well as final sampling area. Transited to anchorage south of Tern Island, embarked MMES personnel at 1545, where anchored overnight.
- 25 September Weighed anchor 0600 and transited to working grounds. Arrived 0820 to begin trap recovery. New buoy system worked very well and trap retrieval completed without incident by 1400. Transited to adult bottomfish grounds west of Tern Island, where line-fished until 1800. Transited to south of La Perouse Pinnacle where anchored overnight.
- 26 September Weighed anchor 0600 and transited to lost trap stations. At 0730 just south of Disappearing Island a buoy was discovered that belonged to one of the lost deep sets 17 nmi north of location; the buoy was retrieved along with 100 fm of line and one anchor chain. Proceeded to lost trap stations; no success in finding other lost gear. Began transit to Nihoa Island 1130.
- 27 September Arrived at bank west of Nihoa 0815 and commenced adult fishing operations along the 70-120 fm contour. At 1800 began transit to Kaula Rock off Niihau.
- 28 September Arrived off Kaula Rock 0800. Line-fished for adults along 100 fm contour 0800-1300. Weather inclement, catches poor; fishing halted at 1300. Began transit to Snug Harbor.
- 29 September Arrived Snug Harbor at 0800. Disembarked scientists. End of Leg II and end of cruise.

#### **MISSIONS AND RESULTS:**

- A. Deploy baited fish traps for juvenile opakapaka and other eteline snappers; reevaluate baited trap catches for indexing juvenile opakapaka abundance.

1. A total 119 trap-sets were conducted at three sites (two in the MHI and one in the NWHI). Listed in chronological order these comprised 11 strings totaling 33 traps set off Kaneohe Bay, Oahu, including 2 "deep exploratory" strings of 3 traps each; and 9 strings totaling 27 traps set off Kolo Harbor, Molokai, on MHI Leg I. Another 32 traps (in 11 strings, including 5 traps in 2 "deep exploratory" strings) and 27 traps (9 strings) were set off FFS on NWHI Leg II.
2. Traps baited with 5 kg each of chopped mackerel (*Scomber japonicus*) were fished for 4 to 5 days (4-night soak) in three-trap strings, with traps spaced 30-fm apart. Most (108; 91%) trap-sets were at 44 fm; a total of 11 trap-sets were "deep exploratory" at 79 fm.
3. Rectangular traps (6 ft long by 4 ft wide by 3 ft high) were constructed of 3/8-inch rebar frames and 1-inch, vinyl-coated chicken wire mesh. Each trap had a rot-out panel attached with cotton twine in case of trap loss. Each trap had a single, narrow funnel at one of its two long ends (3-inch maximum width, to prevent possible entrapment of monk seals, *Monachus schauinslandi*).
4. Catches at the two MHI sites and the one NWHI site varied in composition and magnitude. A total 500 individual fish of 14 taxa weighing nearly 50 kg were caught in the 27 traps set at 44 fm off Kaneohe Bay; another 11 fish (3 taxa; 1 unique) weighing <3 kg were caught in the 6, 79-fm trap-sets. Opakapaka dominated fish biomass (50%) in the 44-fm trap-sets off Kaneohe (see #5). Off South Molokai, the 9 strings of 27 total traps altogether caught 550 individual fish of 11 taxa weighing about 100 kg. Fish biomass in the Molokai trap catch was dominated by taape (*Lutjanus kasmira*, 54%) and kahala (*Seriola dumerilii*, 23%). Eleven strings totaling 59 traps (2 strings were lost) set off FFS caught 281 individual fish of 18 taxa weighing 124 kg. Kahala comprised 26% by numbers and 88% by weight of the FFS total.
5. Juvenile opakapaka were trapped at all sites. A total of 190 young-of-the-year (YOY) and I+ juvenile opakapaka weighing 24 kg were trapped off Kaneohe Bay, Oahu, representing 38% (numbers) and 50% (biomass) of all fish trapped at 44 fm off Kaneohe. The traps set off Molokai yielded another 54 juvenile opakapaka weighing nearly 16 kg; opakapaka here represented 10% (numbers) and 16% (weight) of all trap-caught fishes. At FFS the opakapaka catch was token (2 fish in 2/53 traps).

6. Haole crab (*Portunus sanguinolentus*) was a significant by-catch off Kaneohe Bay and Molokai (a total of 140 crabs weighing 23 kg, split 0.55-to-0.45 between the respective locations).
- B. Use the *Townsend Cromwell's* power gurdies to handline specimens of juvenile opakapaka and other eteline snappers at 40-80 fm depths off Kaneohe Bay and South Molokai in the MHI (Leg I) and off FFS in the NWHI (Leg II). Also, collect subadult- to adult-sized bottomfish (snapper, grouper, jacks) from along 40- to 140-fm contours on banks off, near, and en route to FFS in the NWHI (Leg II); use the latter fish to provide ovary specimens for characterization of body size at 50% sexual maturity.
1. Terminal gear differed between adult and juvenile handlining in terms of hook size, breaking strengths of leaders/snells, and weights used. Sizes No. 26-30 Izuo circle hooks, 80-200-lb test terminal lines, and 5 kg weights were used to fish adults on the deep reef. Sizes No. 8 and 12 Izuo AH hooks, 12-20 lb terminal lines, and 2-kg weights were used for juvenile opakapaka fishing. Squid strips were the primary bait used for both adults and juveniles.
  2. On Leg I, conducted 93 line-hours of power gurdy handline fishing (four hooks per line) at a total 52 juvenile snapper stations. (Line-hours represent total fishing time or gross total effort, as the values include time spent retrieving and lowering gear, as well as time spent rebaiting and rerigging lost and damaged gear.)
  3. On Leg II, conducted 58 line-hours of power gurdy handline fishing (four hooks per line) at a total 56 stations. About 65% of total line-time was spent fishing for adult bottomfish at 44-140 fm (28 stations), and 35% was spent fishing for juvenile snappers at 45-85 fm (28 stations).
  4. On Leg I, a total 176 fish individuals (of 5 species) were handlined at juvenile snapper stations off Kaneohe Bay (73 fish, 23 stations, 38 line-hr) and off South Molokai (103 fish, 29 stations, 55 line-hrs). Grand mean CPUE for these two series of MHI stations was 1.9 fish·line-hr<sup>-1</sup>). Three species--opakapaka, the lizardfish *Trachinocephalus myops*, and the pufferfish, *Torquigener florealis* (reported as *Lagocephalus hypselogeneion* in previous reports)--accounted for 91% of all fishes caught. Juvenile opakapaka represented 31% overall, lizardfish comprised 24%, and puffers contributed another 36%. Among the remaining species, a total of 9 juvenile (15.0-20.5 cm FL) kalikali (*Pristipomoides sieboldii*),

were handlined at 55-77 fm; most (8/9) were caught off South Molokai.

5. On Leg II, a total 15 fish individuals (of 7 taxa) were handlined at the juvenile snapper stations off FFS, for a grand mean CPUE of 0.75 fish·line·hr<sup>-1</sup>. The catch included 6 *Parupeneus chrysonemus*, 4 *Parapercis schauinslandi*, a single (9.2 cm FL) opakapaka, and four other taxa.
  6. Also on Leg II, a total 252 subadult-adult bottomfish individuals of 12 species were handlined, for a grand mean CPUE of 6.7 fish·line·hr<sup>-1</sup> at adult stations.
  7. Matched ovary and body weight data were collected for 126 bottomfish specimens on Leg II. Gonad samples were fixed in 10% formalin. Specimens included subadult-adult females of 6 species of eteline snappers, 1 grouper, and 1 jack. These comprised 65 ehu (*Etelis carbunculus*), 1 onaga (*E. coruscans*), 23 kalikali (*Pristipomoides sieboldii*), 18 gindai (*P. zonatus*), 4 opakapaka, 3 yellowtail kalikali (*P. auricilla*), 11 hapuupuu (*Epinephelus quernus*), and 1 butaguchi (*Pseudocaranx dentex*).
- C. Conduct baited video camera drops using auxiliary craft to index juvenile opakapaka abundance.
1. A total 108 baited video camera drops were conducted off Kaneohe Bay and off South Molokai. About 98% of all drops were quantitative, 10-min recordings (all 54 off Kaneohe Bay and 51/54 off Molokai). Drops off Kaneohe Bay spanned a longshore distance of 3.7 nmi between Sampan Channel and Mokolii Island ("Chinaman's Hat"). A 8.9 nmi longshore expanse was sampled between Kaunakakai and Lono Harbors off South Molokai. Approximately one-half of the drops off each island were made at 41 fm, with the remainder at 47 fm.
  2. Juvenile opakapaka were abundant (but patchy) off Kaneohe Bay, particularly at the deeper depth. Pufferfish also were abundant off Kaneohe Bay. Both species were common but patchy off South Molokai. More specific results are pending film analyses.
  3. A total of 54 baited video camera drops were made off FFS, of which 53 were quantitative, 10-min recordings. Drops were done along the entire 23.1 nmi southeast-to north facing (windward) side of the bank. Approximately one-half of the drops were made at 41 fm, and one-half of the drops at 47 fm.

4. No juvenile opakapaka were observed, and very few other fishes were seen, on the FFS video films.
- D. Estimate and compare short-term survivorship of juvenile opakapaka caught by trap versus handline methods.
1. Totals of 87 trap-caught and 55 handlined juvenile opakapaka were de-gassed using a #18 syringe needle immediately upon being brought aboard ship; fish were held in the *Townsend Cromwell's* baitwells (starboard: trap-caught; port: handlined) for 15-20 minutes to provide data on possible differences in short-term mortality resulting from method-specific barotrauma and handling.
  2. Short-term survivorship of the 87 trap-caught and the 55 handlined juveniles was 30% and 49%, respectively. Additional data are needed before comparisons can be made.
- D. Retain any trap-caught specimens of the deep-water holocentrid *Neoniphon aurolineatus* for University of Southern California researcher studying biochemical genetics and physiology of the retinal pigments of *Neoniphon* spp squirrelfishes.
1. No specimens of the target species were collected.

**SCIENTIFIC  
PERSONNEL:**

**Leg I:**

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Attachment