

May 27, 1994

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CRUISE REPORT

VESSEL: *Townsend Cromwell*, Cruise TC-94-02 (TC-188)

CRUISE

PERIOD: 11-15 April 1994 (Leg I)
18-22 April 1994 (Leg II)
25-29 April 1994 (Leg III)

AREA OF

OPERATION: The waters between Waialua and Waialeale, north Oahu (Leg I); between Kaiehu Point and Kalaupapa, and north Molokai, and between Lono and Kaunakakai Harbors, south Molokai (Leg II); and between Lono and Kaunakakai Harbors, south Molokai (Leg III), in the main Hawaiian islands (MHI) (Fig. 1).

TYPE OF

OPERATION: Deployment of baited fish traps and baited video cameras for juvenile pink snapper or opakapaka (*Pristipomoides filamentosus*), plus power gurdy line fishing for juvenile eteline snappers in the waters off Oahu and Molokai in the MHI.

ITINERARY:

11 April Embarked Leg I (11-15 April). Departed Snug Harbor for north Oahu at 0915. Arrived at first fish trap station T1 (21°36.3-.4'N, 158°9.5-.6'W) off Waialua at 1400. Deployed traps at 42-44 fm 1415-1730, ending with station T9 off Waialeale (21°43.9-44.0'N, 158°0.7-.8'W). At 1730, because increasingly rough sea conditions (10-ft seas) precluded safe anchorage north of Kaena Point, began return transit to lee (south) side of Kaena Point for overnight at anchor off Kepuhi Point north of Waianae.

- 12 April Weighed anchor at 0600 and began motoring north to station area off Haleiwa. At about 0815 aborted transit north of Kaena Point due to strong winds (25-30 kn) and heavy seas (12 ft) and began transit back to lee of Kaena Point. Line-fished using power gurdies at 40-120 fm off and south of Kepuhi Point 0915-1630. At 1630 returned to Kepuhi Point anchorage for overnight.
- 13 April Weighed anchor 0700. Deployed *Townsend Cromwell* Boston Whaler ("Whaler") and NMFS Honolulu Lab Whaler ("Nehu") 0800-0820. Both small craft aborted video operations due to extreme (>4 kn) water currents and returned aboard *Townsend Cromwell* 0930. Line-fished at 20-120 fm between Kepuhi and Kaena Points using *Townsend Cromwell's* power gurdies until 1615, when returned to Kepuhi Point anchorage for overnight.
- 14 April Weighed anchor 0800 and began motoring to survey area north of Kaena Point. Rechecked locations of surface buoyed trap stations T1-T9 0845-0915 as winds subsided to 20 kn. Motored back south to trap station T8 (21°43.1-.3'N, 158°2.9-3.1'W), where began line-fishing 1100 using *Townsend Cromwell's* power gurdies at 40-65 fm. Continued line-fishing as motored south to near trap station T3 (21°37.4'N, 158°7.9-8.0'W), where stopped fishing at 1615. At 1630 began return transit south of Kaena Point for overnight at anchor off Kepuhi Point.
- 15 April Weighed anchor 0430 and began 3-h transit to trap station area north of Kaena Point. Began trap retrievals at station T9 off Waialeale at 0740. Finished retrieving last (9th) trap string at station T1 off Waialua at 1110, when began return transit to Snug Harbor. Arrived Snug Harbor 1600; disembarked all scientific personnel 1615. End of Leg I.
- 16 April In-port day.
- 17 April In-port day.
- 18 April Embarked Leg II (18-22 April). Departed Snug Harbor and began motoring east to Molokai at 0900. At 1000 decided (based on best available weather forecast) to transit to north, rather than south, Molokai. Arrived at first fish trap station (T1, off Kaiehu Point (21°14.0'N, 157°9.7-.8'W) at

1335. Deployed traps at 40-49 fm 1405-1535. Line-fished using *Townsend Cromwell's* power gurdies at 41-46 fm near trap station T9 (just offshore Kalaupapa, at 21°11.9'N, 157°0.5-.9'W) until 1630. Overnight at anchorage near station T9.

- 19 April Weighed anchor 0700 and motored near trap station T9, where launched Whaler and Nehu for video operations 0740-0750. *Townsend Cromwell* motored offshore, then gradually west to station T6 area (157°4.3'W), where line-fished at 48-70 fm until 1630, with breaks at 1200 and at 1300 to retrieve Nehu and Whaler, respectively. As sea conditions again worsened, at 1645 began motoring west, then south and east to overnight anchorage off south Molokai. Arrived off Kolo Harbor (21°4'N, 157°12'W) at 2000, for overnight at anchor.
- 20 April Weighed anchor 0730; aborted scheduled small craft deployments for video operations as sea conditions continued to deteriorate in area. Began line-fishing at 49-63 fm near (21°3.2-.3'N, 157°13.2-.3'W) future trap station T7, using *Townsend Cromwell's* power gurdies 0820. At 0830, governor on one of ship's engines malfunctioned; shut down biological operations until repair completed 1030. Resumed line-fishing 1045 and continued until 1630, when began transit back to Kolo Harbor anchorage for overnight.
- 21 April Weighed anchor 0730; again canceled scheduled launch of small craft because sea conditions in area still inadequate. Transited near (21°03.9'N, 157°9.6'W) future trap station T3, where line-fished at 56-71 fm using *Townsend Cromwell's* power gurdies 0830-1500. At 1500 began 4-h transit around west side, to off north, Molokai. Arrived at inshore lee, west of trap station T9, just offshore Kalaupapa at 1945, for overnight at anchor.
- 22 April Weighed anchor 0530 and motored to trap station T9; arrived 0630. Successfully retrieved all 9 strings of fish traps; finished last string (T1) pickup and sample processing 0915. Began transit back to Snug Harbor at 0915. At dock 1330. Disembarked all scientific personnel 1345. End of Leg II.
- 23 April In-port day.

- 24 April In-port day.
- 25 April Embarked Leg III (25-29 April). Departed Snug Harbor for south Molokai 0910. Arrived at location of fish trap station T9 (21°2.7'N, 157°15.8'W) off Lono Harbor 1330 and began trap deployment. Trap line snared starboard propeller and shaft during first trap set. Biological operations suspended until 1600 while ship's divers attempted (with partial success) to free line from propeller and shaft. Deployed remaining 8 strings of traps running east 1700-1900 using port engine (finishing with station T1 at 21°4.2-.3'N, 157°7.1-.3'W). All traps set at 40-44 fm. At 1900 began return to Honolulu to complete overside repairs at dockside. Arrived off Honolulu 2330; overnight by live-boating off approach to harbor.
- 26 April At 0600 began final approach into Honolulu Harbor. Berthed at Foreign Trade Dock 0715. Biological personnel conducted daytime work duties aboard ship or ashore: two personnel (Ellis, Landgraf) remained aboard; one (Kazama) worked at the Kewalo Lab; and two (DeMartini, Mundy) worked at Honolulu Lab on Dole Street. Starboard propeller shaft successfully freed of fouled line by ship's force at dockside 1200. All scientific personnel back aboard 1600. Reembarked Leg III 1840, and began retransit to south Molokai. Arrived at Kolo Harbor anchorage 2240 for overnight at anchor.
- 27 April Weighed anchor 0715 and motored to near trap station T5 (21°4.1-.2'N, 157°11.5-.6'W), where launched Whaler and Nehu for video operations between T5 and T9 0745-0810. *Townsend Cromwell* motored east to 21°3.8-.9'N, 157°8.9-9.6'W, between trap stations T2-T3 and west of T3, where line-fished at 61-76 fm until 1630, with breaks at 1200 and 1300 to retrieve Nehu and Whaler, respectively. At 1630 transited west, for overnight at anchor off Waiakane Point, inshore of trap station T3.
- 28 April Weighed anchor 0700 and motored east near trap station T1, where launched Whaler and Nehu for video operations between T1 and T4 0750-0810. *Townsend Cromwell* motored west and offshore of trap stations T2-T3, where line-fished for juvenile kalikali at 55-75 fm between 21°3.0-4.1'N and 157°8.8-10.7'W until 1500, with breaks at 1200 and 1300 to retrieve Nehu and Whaler,

respectively. At 1500, began targeting juvenile opakapaka at 40-45 fm in station T2-T3 area, continuing until 1630, when motored back west to anchorage off Waiakane Point for overnight.

29 April Weighed anchor 0530 and motored east to trap station T1, where began trap retrievals 0630. Completed retrieval of westernmost trap string (T9) at 1010 and began transit to Snug Harbor. Arrived Snug Harbor 1400. Disembarked scientists. End of Leg III and end of cruise.

MISSIONS AND RESULTS:

- A. Deploy baited fish traps for juvenile opakapaka and other eteline snappers; continue ongoing evaluation of baited trap catches for indexing juvenile opakapaka abundance.
1. A total 80 trap-sets were conducted at three sites in the MHI. Listed in chronological order these comprised 9 strings totaling 27 traps set along a 9.5 nmi reach between Waialua and Waialeale, north Oahu, on Leg I; 9 strings of 27 traps set along a 9 nmi reach between Kaiehu Point and Kalaupapa, north Molokai, on Leg II; and 9 strings of 26 traps (one trap mis-set when deployed) set along a 9 nmi reach between Lono and Kaunakakai Harbors, south Molokai, on Leg III.
 2. Traps baited with 4 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. Traps were set at 40-50 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 three sites varied in composition and magnitude. Only 33 individual fish of 9 taxa weighing 4.3 kg were caught in the 27 traps set off north Oahu on Leg I. A total 65 individual fish of 10 taxa weighing 9.4 kg were caught in 27 traps set off north Molokai on Leg II; taape (*Lutjanus kasmira*) dominated fish numbers (49%) and kahala (*Seriola dumerilii*) accounted for most fish biomass (70%). Off south Molokai on Leg III, the 9 strings of 26 traps altogether caught 527 individual fish of 19 taxa weighing about 98 kg. The most numerous of

the fishes trapped off south Molokai was taape (48%). Trap biomass off south Molokai was dominated by taape (30%), juvenile opakapaka (18%), and kahala (17%).

5. Juvenile opakapaka were not trapped off north Oahu, and only two young-of-the-year (YOY) juvenile opakapaka (15.1, 16.7 cm FL; station T1) were trapped off north Molokai. A total 49 YOY-sized (16.6-19.0 cm FL) and larger (22.8-34.3 cm FL) juvenile/subadult opakapaka weighing about 17 kg were trapped off south Molokai, representing 9% (numbers) and 18% (biomass) of all fishes trapped there.
 6. No juvenile etelines other than opakapaka were caught in fish traps set at any of the 3 sites.
 7. A single, recently settled (34 mm TL; pigmented but with elongate vertical fin spines still present) hapuupuu grouper (*Epinephelus quernus*) was captured by bait container in a trap at station T1, north Molokai.
 8. Twelve large juvenile-sized butaguchi (*Pseudocaranx dentex*; 25.3-30.8 cm FL) were caught in 2 of 3 traps at station T5 (21°4.2'N, 157°11.6'W) off south Molokai. Juvenile-sized kahala were present in the 2 traps. These butaguchi represent the first documented catches of the species from the MHI.
 9. Haole crab (*Portunus sanguinolentus*) was a significant by-catch at all 3 sites, particularly off north Molokai. Haole crab catches off north Molokai totaled 118 crabs weighing 18.6 kg; sex ratio 50% male to 50% female, with 17% of the latter berried. Haole crab catches were lower off south Molokai (56 crabs weighing 9.8 kg; 77% male, 23% female, 8% berried); and lower still off north Oahu (34 crabs weighing 6.2 kg; 71% male, 29% female, 30% berried).
- B. Use the *Townsend Cromwell's* power gurdies to handline specimens of juvenile opakapaka and other eteline snappers at 20-120 fm depths off north Oahu (Leg I), north and south Molokai (Leg II), and south Molokai (Leg III).
1. Scaled-down terminal gear was used to target juvenile-sized fish at all 3 sites: sizes No. 8 and 12 Izuo AH hooks, 12-20 lb branch leaders, and 2-kg weights. Squid strips were used for bait.
 2. On Leg I, conducted 39.1 line-hours of power gurdy handline fishing (four to six hooks per line) at a total 33 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

rebauling and rerigging lost and damaged gear.) Totals included 28.5 line-hours at 24 stations occupied off the Waianae coast, west Oahu, and 10.6 line-hours at 9 stations off north Oahu.

3. On Leg II, conducted 34.7 total line-hours of gurdy fishing (four to six hooks per line) at a total 29 stations. About 31% of total line-time was spent fishing at 15 stations off north Molokai and 69% was spent fishing at 14 stations off south Molokai.
 4. On Leg III, conducted 21.6 line-hours of gurdy fishing (four to six hooks per line) at 18 stations off south Molokai.
 5. On Legs I through III inclusive, a grand total 149 fish individuals (of 11 taxa) were handlined in 95.4 total line-hrs at the 3 sites. Grand mean CPUE for the series of 3 MHI sites thus was 1.56 fish·line-hr⁻¹. On Leg I, a total 48 fish (of 6 taxa) were caught off west (14 fish of 5 taxa--including 13 of 2 taxa of balistids; mean = 0.5 fish·line-hr⁻¹) and north Oahu (34 fish of 4 species; mean = 3.2 fish·line-hr⁻¹), for an overall mean catch rate of 1.23 fish·line-hr⁻¹. On Leg II, a total 70 individuals of 6 taxa were caught off north (18 fish of 5 taxa; mean = 0.5 fish·line-hr⁻¹) and off south Molokai (52 fish of 5 species; mean = 2.18 fish·line-hr⁻¹) for an overall average catch rate of 2.02 fish·line-hr⁻¹. On Leg III, a total 31 individuals of 5 species were caught off south Molokai (mean = 1.44 fish·line-hr⁻¹). Two species--the pufferfish, *Torquigener florealis* (42%) and the lizardfish *Trachinocephalus myops* (15%)--together accounted for a majority (57%) of all fishes caught by handlines. YOY-sized (15-18 cm FL) and larger (22-33 cm FL) juvenile opakapaka ($n = 13$; 2 off north Oahu and 11 off south Molokai) accounted for < 9% of all line-caught fishes, in part because other species were targeted at depths greater than those abundantly frequented by juvenile opakapaka. A total 27 YOY and I+ juvenile kalikali (*Pristipomoides sieboldii*) (12.1-15.0 and 18.3-23.9 cm FL, respectively), representing 18% of all handlined fishes, were caught at a median depth of 65 fm (range 37-70 fm) off south Molokai only on Legs II and III. All juvenile kalikali were caught offshore an area spanning trap stations T2, T3 and T4 (between 157°8.6'W and 157°9.5'W).
- C. Conduct baited video camera drops using auxiliary craft to index juvenile opakapaka abundance.
1. A total 53 baited video camera drops were conducted off north Molokai on Leg II (17 drops) and off south Molokai

on Leg III (36 drops). (Four video deployments attempted off Kepuhi Point, north of Waianae, Oahu, on Leg I were nonquantitative and are not discussed further.) All of the Molokai deployments were quantitative, 10-min recordings. Drops made off north Molokai on 19 April spanned a longshore distance of about 3 nmi (with 0.25 nmi longshore spacing between stations). Video stations spanned $157^{\circ}0.0'W$ and $157^{\circ}3.9'W$ in the easternmost third of the sampling grid between trap stations T9 and T6-T7. The entire 9 nmi longshore expanse between Kaunakakai and Lono Harbors off south Molokai was sampled at video stations adjacent each trap station (skipping every third video station), on 27 and 28 April (Leg III). Approximately one-half of all video deployments at each site were made at 41 fm, with the remainder at 47 fm.

2. Juvenile opakapaka were not present on the videos taken off north Molokai; juvenile opakapaka were abundant (but patchy) on tape recordings made off south Molokai. Pufferfish were abundant off north and south Molokai. More specific results are pending analyses of the tapes.
- D. Estimate and compare short-term survivorship of juvenile opakapaka caught by trap versus handline methods.
1. Totals of 35 trap-caught and 10 handlined juvenile opakapaka were de-gassed using a #18 syringe needle immediately upon their being brought aboard ship; fish were held in the *Townsend Cromwell's* baitwells for 20 minutes to provide data on possible differences in short-term mortality resulting from method-specific barotrauma and handling.
 2. Short-term survivorship of 35 trap-caught and 10 handlined juveniles was 40% and 60%, respectively. These data are being compiled together with data from cruise TC-93-06 for further analyses.

**SCIENTIFIC
PERSONNEL:**

Legs I, II, and III:

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Attachment