



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**  
Southwest Fisheries Center Honolulu Laboratory  
2570 Dole St. • Honolulu, Hawaii 96822-2396

August 21, 1990

CRUISE REPORT

**VESSEL:** *Townsend Cromwell*, cruise 90-06 (TC-154)

**CRUISE PERIOD:** 20 July-16 August 1990

**AREA OF OPERATION:** Southeast (SE) Hancock Seamount and Northwestern Hawaiian Islands (NWHI) (Fig. 1)

**TYPE OF OPERATION:** Personnel from the Southwest Fisheries Center (SWFC) Honolulu Laboratory (HL) of the National Marine Fisheries Service (NMFS), NOAA, and Office of NOAA Corps Operations, Systems Technology, in Rockville, Maryland conducted sea trials of the newly-installed Scientific Computer System (SCS) during our initial transit from Honolulu en route to Southeast (SE) Hancock Seamount. Personnel were disembarked at Tern Island, French Frigate Shoals and Midway Islands. Five monk seal pups were transported from French Frigate Shoals to Kure Island. At SE Hancock, personnel conducted daytime bottom longlining for armorhead and surface Cobb trawl and pelagic longline operations at night. After returning to Midway to disembark seamount scientific personnel, personnel were embarked and disembarked at field camps on Lisianski and Laysan Islands and at French Frigate Shoals.

**ITINERARY:**

20 July - Departed Snug Harbor, Honolulu, at 1030 and proceeded to Tern Island, French Frigate Shoals. On board Milo G. Burcham, Mark A. Crossler, Daniel J. Forman, Ilse M. Hamann, Robert L. Humphreys, Jr., Bert S. Kikkawa, Kenneth R. Niethammer, Dennis Shields, Richard I. Uyeda, and Happy A. Williams.

22 July - Arrived Tern Island, French Frigate Shoals; disembarked Niethammer and embarked five monk seal pups. Departed Tern Island in the afternoon and proceeded to Midway Island.



- 25 July - Arrived Midway Island at 1300 and disembarked Hamann, Shields, and Uyeda. Departed Midway at 1800 and proceeded to Kure Island.
- 26 July - Arrived Kure Island at 0800 and off-loaded the five monk seal pups. Departed Kure at 1145 and proceeded to SE Hancock Seamount.
- 27 July - Arrived SE Hancock Seamount at 0200 and deployed radar buoy over northwest sector of summit.
- 27 July-6 August - During this interval work was conducted over a 24-h period. During daylight hours, a series of four bottom longline sets (with hook timers installed on the droppers of each set) were conducted each day. Nighttime operations consisted of near-surface Cobb trawl tows and pelagic longline sets.
- 7 August - Deploy and retrieve final pelagic longline set, conduct final two bottom longline sets, and retrieve radar buoy. Depart SE Hancock at 1300 and proceed to Midway Island.
- 8 August - Arrive Midway Island at 1030 for port call.
- 9 August - Disembark Crossler, Forman, Humphreys, Kikkawa, and Williams; embark Jeffrey S. Marks.
- 10 August - Departed Midway Island in morning and proceeded to Lisianski Island.
- 11 August - Arrived Lisianski Island and embarked Margaret M. Lee, Leslie K. Timme, Richard Van Toorenburg, and Alan C. Ziegler. Onloaded gear and supplies from field camp. Departed Lisianski that day and proceeded to Laysan Island.
- 12 August - Arrived Laysan Island and embarked Brenda L. Becker, Karen B. Lombard, and Gregory Spencer. Disembarked Burcham and Marks. Onloaded and offloaded gear and supplies from field camps.

Departed Laysan that day and proceeded to French Frigate Shoals.

- 14 August - Arrived Tern Island, French Frigate Shoals and embarked Mitchell P. Craig, and Leona Laniawe. Onloaded gear and supplies from field camp. Departed Tern Island that day and proceeded to Snug Harbor, Honolulu.
- 16 August - Arrived Snug Harbor, Honolulu; end of cruise. Disembarked Becker, Craig, Laniawe, Lee, Lombard, Spencer, Timme, Van Toorenburg, and Ziegler.

MISSIONS  
AND  
RESULTS:

- A. Estimate the relative abundance of armorhead, *Pseudopentaceros wheeleri*.

A total of 46 bottom longline sets were conducted during daylight hours over the summit and upper slopes of SE Hancock Seamount. A standard set consisted of a 550 m groundline to which thirty 2.9 m long polyvinyl chloride (PVC) tube droppers were attached at 18 m intervals. Each dropper consisted of five No. 20 Izuo circle hooks baited with cut squid. Hooks were linked to a resin encased digital watch timer by an intermediary magnetic plunger unit. Activation of the digital timers relied on the release of the magnetic plunger once a hooked fish exerted a pulling force exceeding 1 kg. Additionally, depth recorders were attached to the midpoint and near either end of the groundline. Failure rate of hook timers was low and losses were primarily due to bottom entanglement and shark attack. A total of 1,695 fish were caught on bottom longline gear; 1,350 of these fish were armorhead, constituting 79.6% of the total catch. Armorhead with body depth at first anal spine >8.4 cm (presumed recent recruits) comprised only 26% of the armorhead catch.

- B. Conduct experimental pelagic longlining for swordfish, *Xiphias gladius*.

Pelagic longline gear consisted of a 0.79 cm diameter nylon/cotton line which is negatively buoyant. Length of mainline used was initially 2,055 m but was later expanded to 2,878 m.

During the first five sets, No. 28 circle hooks were used with a dropper length of 1 m. Thereafter, No. 32 and 50 circle hooks with a dropper length of 3.6 m were used. During most sets the mainline was buoyed to the surface at 411 m interval and droppers attached to the mainline at 14.5 m intervals. On each set, a single blue or green chemiluminescent Cyalume stick was attached to the snap end of every other dropper. The majority of sets had hooks baited with whole *Loligo* squid. All sets were soaked during the night; soak time was 2.5-3.5 h. A total of 19 pelagic longline sets were conducted around SE Hancock. Catch consisted of 31 *Scomber* sp., 3 *Carcharhinus galapagensis*, 2 *Xiphias gladius*, 2 *Promethichthys prometheus*, and 1 *Prionace glauca*. Catch does not include the following fish which were brought alongside the ship but not boarded: 4 *C. galapagensis*, 2 *Thunnus albacares*, 1 *P. glauca*, 1 *Scomber* sp., 1 *Lepidocybium flavobrunneum*, and an unidentified manta ray. Additionally, 3 *Alopias pelagicus*, 1 *C. longimanus*, and 1 *C. galapagensis*, were tagged and released. The two swordfish caught were dead upon retrieval, thus precluding their tag and release.

- C. Conduct near surface Cobb trawl hauls for lobster phyllosomes.

A total of eight 2-h Cobb trawl hauls were conducted at night at depths of 5-15 m. Seven tows were conducted over and adjacent to SE Hancock Seamount and one tow off Midway Island. Lobster phyllosomes were observed among the catch from the tow of Midway and in some of the SE Hancock tows, particularly during tows when moonlight was absent.

- D. Conduct sea trials of Scientific Computer System (SCS).

Performance testing, modifications and corrections of various systems, and user instruction on the MicroVAX SCS was conducted at sea during July 20-25. System checks and modifications conducted included test casts of the Seabird CTD using both the AT computer and the MicroVAX, modifications allowing transfer of data from MicroVAX to PC in PC readable format, interfacing of MOCNESS system with MicroVAX, interfacing of GPS with the Acoustic Doppler Current Profiler (ADCP), and sensor and

graphic output checks of nearly all sensors inputing into SCS. Attempts to interface a Li-Cor 1000 photometer with the SCS proved unsuccessful due to incompatible features inherent in the photometer. Two items which were not addressed due to time constraints were a test run of a ADCP user exit program and interfacing the Seabird CTD oxygen sensor with the MicroVAX. An additional ADCP diagnostics test was run in bottom tracking mode at ship speeds of 3, 6, and 9 knots and with the ship adrift. Scientific and ship personnel received operational instruction on SCS and how SCS sensor files are structured and sensor parameters specified.

- E. Supply logistic support to field camps in the NWHI.

Personnel and supplies were disembarked at Tern Island, French Frigate Shoals and Laysan Island. Personnel and supplies were embarked at Lisianski Island, Laysan Island, and French Frigate Shoals. On July 22, five monk seal pups were loaded aboard at French Frigate Shoals and transported to Kure Island where they were offloaded on July 26.

- F. Miscellaneous observations and activities.

1. Occurrence of Birds, Aquatic Mammals, and Fish Schools Log was maintained by ship's officers and crew during the cruise.
2. Standard weather observations were made at 0000, 0600, 1200, and 1800 (G.m.t.) by the ship's officers and crew.
3. While in transit, XBT casts were made around 0000, 0600, 1200, and 1800 (G.m.t.) as part of the Shipboard Environmental (Data) Acquisition System project.
4. Armorhead otoliths were removed from a random sample of 200 individuals collected from bottom longline operations. An additional 200 armorhead otoliths were collected from a systematic sampling of fat type (body depth at first anal spine >8.4 cm) individuals also collected from bottom longline sets. Additional specimens saved were some 30 *Squalis mitsukurii* and 10 *Etmopterus* sharks.

5. At 0715 on 30 July a derelict life preserver was spotted on the surface in waters over SE Hancock Seamount. This debris was collected with a large dip-net. A moment before the debris was collected, we recognized that a sea turtle was floating within the middle of the life preserver but did not appear to be tangled with it. The debris and turtle were successfully collected and brought aboard. The turtle was identified as a green sea turtle, *Chelonia mydas*, of dimensions 24.4 cm carapace length and 20.2 maximum carapace width. The turtle was held in a seawater container for 24 h and all regurgitated items and excrement collected and frozen. The turtle was photographed from a dorsal and ventral perspective prior to its release over SE Hancock at 0915 on July 31. The life preserver was saved and stored frozen. The preserver had numerous patches of gooseneck barnacles and pelagic crabs. A blackish substance was found both on the life preserver and the posterior ventral portion of the turtle.
  
6. The current structure of the upper water column was continuously monitored and recorded via the RD Instruments ADCP. Due to an undetected oversight, the ADCP was not in bottom tracking mode during the entire stay at SE Hancock Seamount.

SCIENTIFIC  
PERSONNEL:

Robert L. Humphreys, Jr., Chief Scientist, NMFS, SWFC, HL (20 July-9 August)  
 Margaret M. Lee, Chief Scientist, NMFS, SWFC, HL (11-16 August)  
 Brenda L. Becker, Research Assistant, NMFS, SWFC, HL (12-16 August)  
 Mitchell P. Craig, Research Assistant, NMFS, SWFC, HL (14-16 August)  
 Mark A. Crossler, Research Assistant, NMFS, SWFC, HL (20 July-9 August)  
 Bert S. Kikkawa, Fishery Biologist, NMFS, SWFC, HL (20 July-9 August)  
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Richard I. Uyeda, Computer Programmer, NMFS, SWFC,  
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Milo G. Burcham, Research Assistant, USFWS (20 July-  
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Daniel J. Forman, M.O.P. Student, UH (20 July-9  
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Ilse M. Hamann, Cooperating Scientist, JIMAR, UH  
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Jeffrey S. Marks, Wildlife Biologist, USFWS (10-12  
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Kenneth R. Niethammer, Research Assistant, USFWS  
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Dennis Shields, SCS Specialist, NOAA, Systems  
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Alan C. Ziegler, Cooperating Scientist, BPBM  
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Submitted by: Robert L. Humphreys, Jr.  
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(20 July-9 August)  
Margaret M. Lee  
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(11-16 August)

Approved by: George W. Boehlert  
George W. Boehlert  
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Attachment

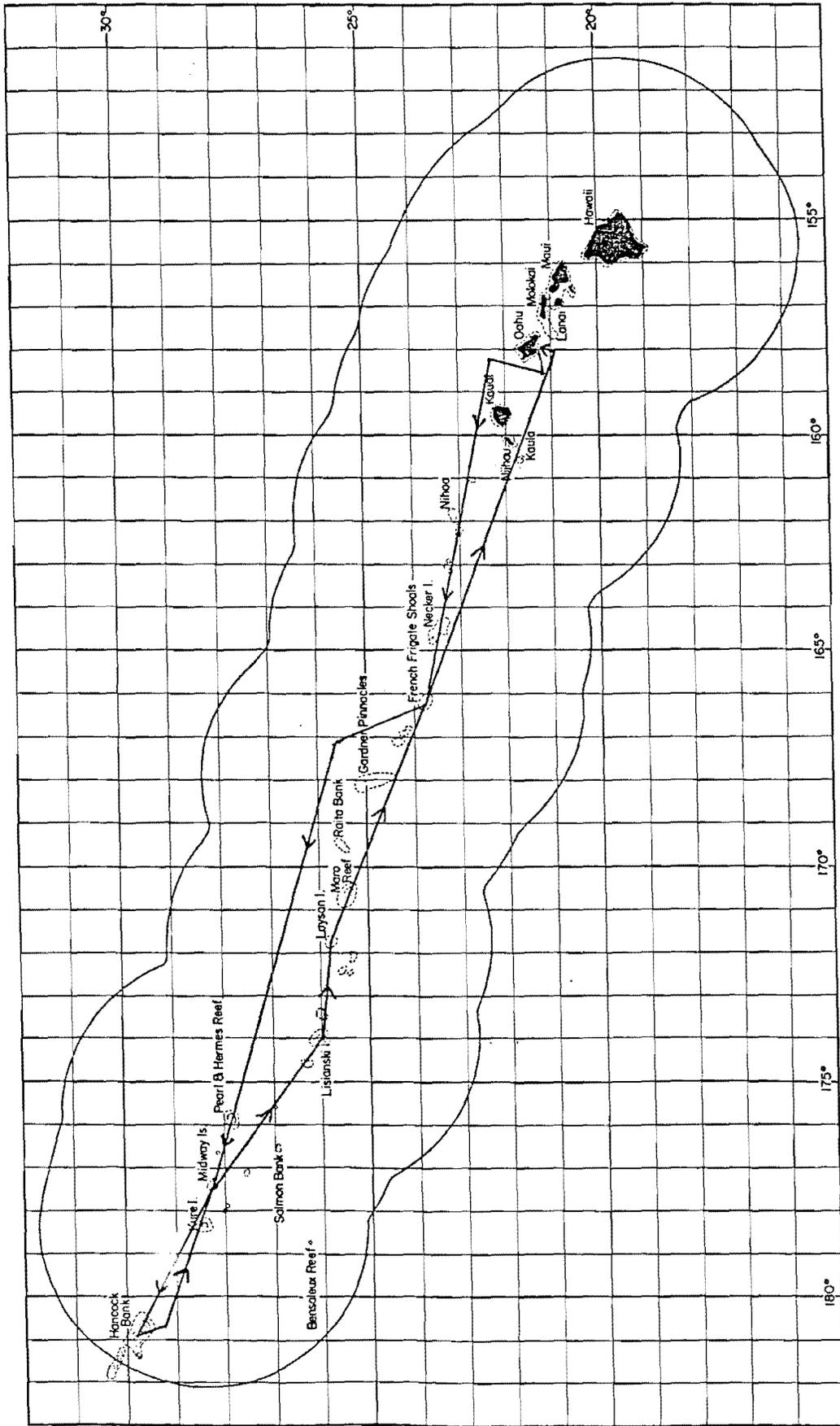


Figure 1.---Track of the TOWNSEND CROMWELL cruise 90-06 (TC-154) , 20 July-16 August 1990.