



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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CRUISE REPORT

VESSEL: *Townsend Cromwell*, Cruise 01-06 (TC-269)

CRUISE PERIOD: 31 May-06 June 2001

AREA OF OPERATION: Kona coast off the Island of Hawaii (Fig. 1)

TYPE OF OPERATION: Daylight operations consisted of larval billfish surface tows targeting coastal surface slicks with a 6-ft. Issacs-Kidd (IK) trawl towed from the ship and 1-m neuston tows and dip-netting conducted from the ship's small boat. Night operations entailed towfish acoustical surveys and CTD casts equipped with a dolphin sonar transducer and underwater camera.

ITINERARY:

- 31 May Embarked Robert Humphreys, Robert Nishimoto, Mike Musyl, Eric Lynn, Kelly Benoit-Bird, Christopher Bird, Miguel Donoso, June Firing, and Mike Stork. Departed Snug Harbor at 1445 and proceeded to Kailua-Kona, Island of Hawaii.
- 1 June Arrived on site at 0945 and embarked Andrew West from Kailua-Kona pier. Commenced larval billfish collections using surface IK tows from the ship and small boat operations both targeting surface slicks off the Kona coast. At nightfall, commenced nightly operations that included towfish acoustical surveys and CTD casts equipped with a dolphin sonar transducer and underwater camera.
- 2-4 June Continued daily schedule of daylight surface IK trawls from ship and neuston tows and dip-netting from ship's small boat for billfish larvae and nighttime towfish acoustical surveys and CTD operations casts equipped with a dolphin sonar transducer and underwater camera.



- 5 June Ended daylight surface tows at 1630 and disembarked Benoit-Bird, Bird, and West at Kailua-Kona pier; then proceeded back to Snug Harbor, Honolulu.
- 6 June Arrived Snug Harbor, Honolulu at 0730. Disembarked Humphreys, Nishimoto, Musyl, Lynn, Firing, Donoso, and Stork; end of cruise.

MISSIONS AND RESULTS:

- A. Collect larval billfish specimens associated with surface slicks along the Kona coast of Hawaii.

A total of 44 daylight 1-hour surface IK trawls were conducted targeting coastal surface slicks (when available) between Keahole Point to the north and Paakai Point to the south. Thirty-two swordfish larvae were captured during daylight IK trawls. An additional 11 swordfish larvae were captured during small boat operations yielding a total of 43 swordfish larvae captured during this cruise. Two of these larvae were kept alive and retained by Andrew West. A total of 22 istiophorid larvae were also collected. A number of other species of fishes, primarily larval and juvenile stages of pelagic fish species, were incidentally captured. Surface IK tows were conducted primarily at a speed of 3.8 knots.

- B. Conduct at-sea trials of laboratory procedures for the genetic identification of billfish eggs and larvae.

Based on a PCR (polymerase chain reaction)-RFLP (restriction fragment length polymorphism) laboratory technique published by Seinen Chow in 1994 for identifying Pacific billfish species, shipboard trials were conducted to determine whether this technique could be conducted and applied to unidentified billfish larvae and eggs caught at-sea with near-real time results. These at-sea trials were successful in extracting and PCR amplifying DNA and running the restriction digests on E-gels (using the restriction enzymes Alu I, BSA JI, and Taq I on a 350-bp mtDNA section of the cytochrome *b* gene). Twenty-seven of 47 istiophorid larvae (57%) tested provided near real-time (1 day) species identifications (22 shortbill spearfish, *Tetrapterus angustirostis* and 5 blue marlin, *Makaira nigricans*). This is believed to be the first successful at-sea attempt at conducting the entire PCR-RFLP technique for species identification of larval fishes.

- C. Conduct night towfish hydroacoustic transects off the Kona coast.

Over the four working nights of the cruise, four 10 m long transects were surveyed once each at 2100, 2230, 0000, 0130, and 0230 using a 200 kHz towfish echosounder.

D. Conduct CTD casts equipped with a dolphin sonar transducer and an underwater digital still camera attached to the CTD frame.

During each of the 2100, 0000, and 0230 transects, one cast of the CTD and accompanying equipment was conducted for a total of 12 casts.

**SCIENTIFIC
PERSONNEL:**

Robert L. Humphreys, Jr., Chief Scientist, National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center (SWFSC), Honolulu Laboratory (HL)

Kelly Benoit-Bird, Cooperating Scientist, University of Hawaii

Christopher Bird, Cooperating Scientist, University of Hawaii

Miguel Donoso, Cooperating Scientist, Instituto de Fomento Pesquero, Chile

June Firing, Cooperating Scientist, Joint Institute for Marine and Atmospheric Research (JIMAR), University of Hawaii (UH)

Eric Lynn, Fishery Biologist, NMFS, SWFSC, La Jolla

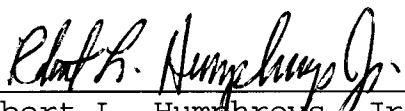
Michael Musyl, Cooperating Scientist, JIMAR, UH

Robert Nishimoto, Fishery Biologist, NMFS, SWFSC, HL


Mike Stork, Teacher-at-sea, Artondale Elementary School, Gig Harbor, Washington

Andrew West, Cooperating Scientist, University of Tech., Sydney

Submitted by:


Robert L. Humphreys, Jr.
Chief Scientist

Approved by:

 *Russell E. Bramard* CDR NOAA
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Attachment

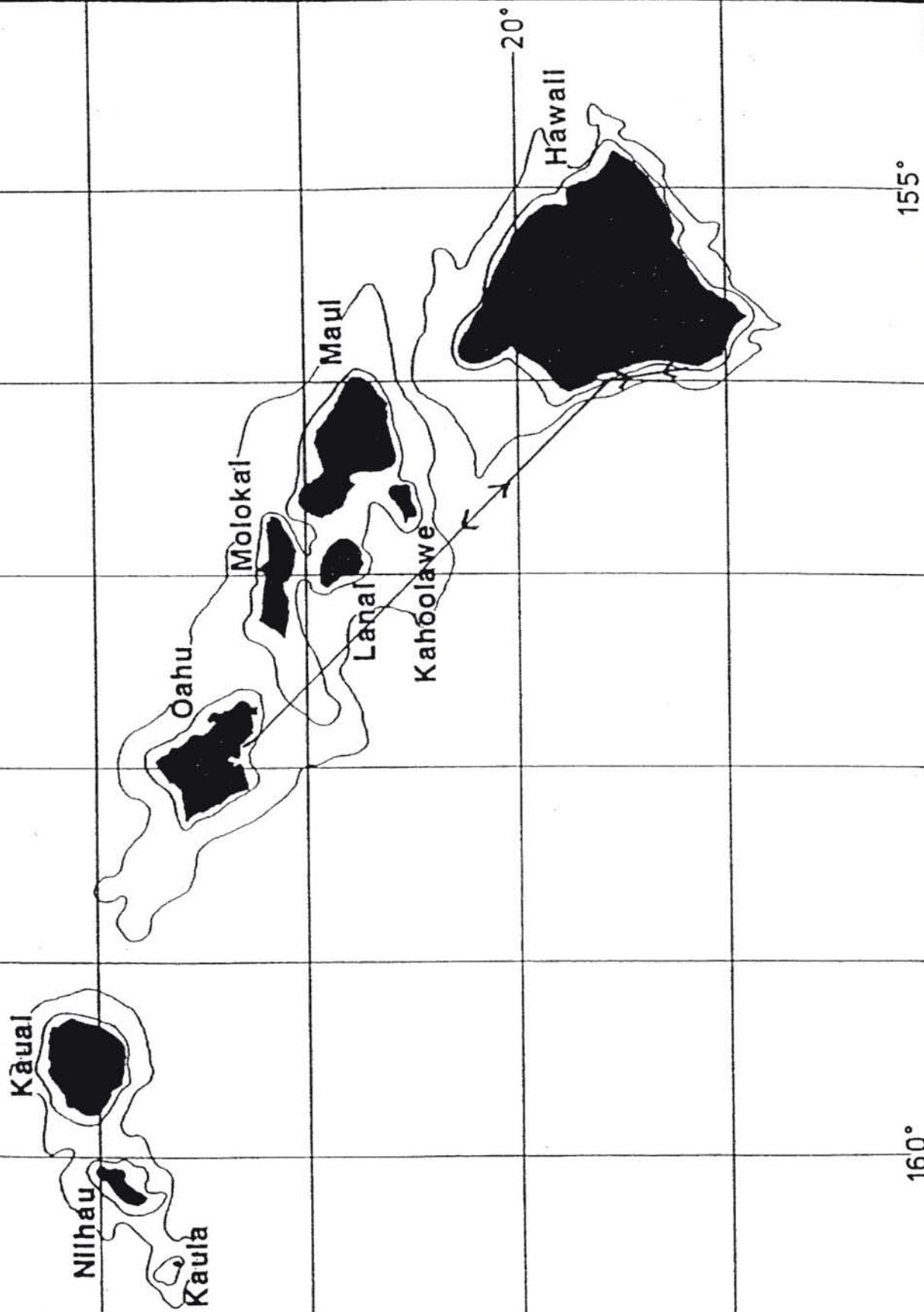


Figure 1.--Proposed cruise track of NOAA ship Townsend Cromwell cruise 01-06 (TC-269),

31 May-6 June 2001.