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## CRUISE REPORT

**VESSEL:** *Townsend Cromwell*, Cruise 95-03 (TC-199)

**CRUISE PERIOD:** July 26-August 5, 1995

**AREA OF OPERATION:** Waters off the Kailua-Kona coast of Hawaii (Fig. 1)

**TYPE OF OPERATION:** Personnel from the Southwest Fisheries Science Center (SWFSC) Honolulu Laboratory (HL) conducted a series of conductivity-temperature-depth (CTD) casts along a sampling grid off the Kailua-Kona coast of the island of Hawaii to map the prevailing oceanographic conditions during the annual Hawaiian International Billfish Tournament (HIBT). The station sites on the grid were generally spaced 10 minutes of latitude and longitude apart and extended about 50 nmi offshore (Fig. 1). In addition to the temperature, salinity, and dissolved oxygen with depth data collected with CTD casts, estimates of *in situ* ocean current direction and velocities were obtained with a shipboard acoustic Doppler current profiler (ADCP) to help determine the near real time synoptic oceanographic conditions. Subadult tuna and billfish specimens were also collected with surface plankton tows and dipnets for genetic and other biological studies.

### ITINERARY:

26 July                      Departed Snug Harbor, Honolulu, at 0600 for fleet inspection sea trials returning to Snug Harbor at 1000. Embarked Dan Curran, John Fishback, Robert L. Humphreys, Jr., Cheryl Koenig, William Kwok, Michael P. Seki, and Paul M. Shiota. Conducted dockside shakedown of CTD system with new computers, J-frame, and refurbished winches.

- 27 July Departed Snug Harbor for waters off Barbers Point to conduct sea trials of longline fishing gear (including a new shooter and new hydraulic power supply), CTD, and plankton nets. Gear trials and modifications to longline and CTD systems continued overnight to 28 July.
- 28 July Departed Barbers Point for waters off the Kona coast of Hawaii. Current drifter buoys were deployed in transit at the request of the University of Hawaii.
- 29 July Arrived at first station located at latitude 19°00'N, longitude 155°50'W. Commenced oceanographic operations with 1000-m CTD casts. Surface plankton tows with a 2m<sup>2</sup> ring net or a 1.8-m Isaacs-Kidd trawl were made if time permitted.
- 30 July-5 August Conducted oceanographic and fishing operations at designated sampling locations on grid (Fig. 1).
- 5 August Arrived Kailua-Kona, Hawaii. Disembarked Curran, Fishback, Humphreys, Koenig, Kwok, Seki, and Shiota.

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

- A. Map the oceanographic features of waters off the Kona coast of Hawaii in support of swordfish and yellowfin tuna tracking activities that will be conducted on cruise TC-95-04, as well as fishing activities by participants in the HIBT.

Fifty-four CTD casts were conducted along the sampling grid over the duration of the cruise. These data together with continuous data obtained from the ship mounted ADCP and thermosalinograph (TSG) were used to develop a near-synoptic characterization of the prevailing oceanographic conditions during the week of the HIBT. During the survey period, a mesoscale cyclonic eddy dominated the physical flow field as evidenced by the ADCP data (Fig. 2). On the local scale in the region closest to shore (where most tournament fishing activity occurred), the eddy appeared as a strong north-northwest current following the shape of the coast from South Point to Keahole Point. Current velocities were estimated up to 80 cm·s<sup>-1</sup> in the region nearest the coastline, decreasing westward to about 12 to 18 nmi offshore where a sharp shearline was observed. A well-defined mixed layer (ca 80 m) was present in the water column of the narrow swath of strong northward current flow

and degrades rapidly with distance offshore to the shearline where waters were well stratified.

- B. Ensure that the newly acquired portable hydraulic gear, new line shooter, and repaired longline reel are set up and working properly on TC 95-04.

A vendor representative assisted with the installation of the new longline system during the first 2 days of the cruise. Although the system as a whole worked properly, the spooler was unable to pay out line at an unattended rate matching that expelled through the shooter. This would not be a problem unless abrupt stops or large reductions in shooting speeds were encountered. The new shooter was tested to pay out line as fast as 14.5 knots; tests of the ship's radio direction finder (RDF) reception system with the radio beacon transmission were successful.

- C. Collect subadult billfish and tuna specimens to be used in genetic and other biological studies.

A total of 13 surface Isaacs-Kidd trawls, 4-2m<sup>2</sup> ring net tows, and 3 night light sampling stations yielded 7 larval and 1 juvenile Pacific blue marlin, *Makaira mazara*; 1 larval swordfish, *Xiphias gladius*; 3 larval yellowfin tuna, *Thunnus albacares*, 2 sailfish, *Istiophorus platypterus*, larvae, and 11 unidentified juvenile tunas.

- D. While in transit, deploy current drifter buoys for the University of Hawaii, Department of Oceanography.

Fifteen drifter buoys were deployed during the course of the cruise. Four were released north and west of the Alenuihaha Channel, the other 13 within the vicinity of the study area along longitudes 156°20'W and 156°50'W.

**SCIENTIFIC  
PERSONNEL:**

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Submitted by:

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Attachments