

**Hawaii Fisheries Disaster Relief Program**  
**Final Report**

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**2. Title of Project:**

The Use of Temperature-Depth-Recorders in the Hawaii-based Longline Fishery to Characterize Bigeye tuna (*Thunnus obesus*) Fishing Grounds

**3. Fishery Targeted:**

The Hawaii-based Longline Fishery

**4. Award received:**

\$107,600.00 See Attachment\_A-657779BSR.pdf

**Actual amount spent:**

\$107,432.28 See Attachment\_A-657779BSR.pdf

**5. Project Objectives:**

Using Temperature-depth-recorders (TDRs) and catch data to describe bigeye tuna (*Thunnus obesus*) vertical movements and interactions with fishing gear in the Hawaii-based longline fishery.

With the use of TDRs:

- 1) To better estimate vertical depth and temperature distributions of longline gear throughout the fishing grounds;
- 2) provide to the user, direct methods for improving fishing gear performance through a wide range of water column conditions which coincide with preferred bigeye tuna habitat; and
- 3) produce current information to improve fishing methods for developing a healthy sustainable fishery.

**6. Describe how the objectives were met.**

- 1) A total of 282 fishing operations were pooled during the study period in waters between 2°N and 34°N and 168°W and 148°W were analyzed. Twenty-three species of marine taxa were reported caught with bigeye tuna representing 42.6% ( $n = 3,643$ ) of the overall catch. The results indicate that fishing gear depths and temperatures ranged from 0 to 443.2 m and 31.0° to 6.5°C, respectively. The majority of first branchline snaps fished within the mixed layer stratum with a mean depth and temperature of  $72.8 \pm 18.2$  m and  $23.8 \pm 3.6$ °C (median: 72.7 m and 23.8°C). The deep sections fished below the thermocline with a mean depth and temperature of  $265.0 \pm 73.6$  and  $13.0 \pm 3.5$ °C (median: 282.1 m and 12.1°C; however, on an hourly basis, deeper depths and cooler temperatures were observed as the gear further settled between 1100 and 1400 *h*. Our data show mean differences of  $\approx 200$  m and  $\approx 11$ °C between first branchline snaps and deep sections. These estimates represent the vertical distance and temperature range of suspended basket gear as it sinks, settles and rises through a wide range of water column conditions which coincide with bigeye tuna habitat.
- 2) Vessels were provided with TDRs and infrared readers.
- 3) Preliminary results were presented at the 59<sup>th</sup> tuna conference, Lake Arrowhead California, May 19 – 22, 2008. An amended report will be completed June 1, 2009. The amended report output will be submitted for a scientific publication.

**7. Discuss differences between work anticipated in your proposal and work that was actually completed.**

We were unable to accomplish some of the work anticipated because of several delayed deliveries by Lotek Wireless Inc. (TDR manufacturer, St. John's Newfoundland, Canada) and catastrophic TDR failure during the study period. Of the 100 TDRs ordered, 80 tags were tested in the field and failed, the tags were then replaced six months later and 70 of the tags failed. We anticipate the new tags to be delivered sometime mid-August, 2008, and will deploy them for another six months using other project funds.

**8. Discuss differences between expected and actual costs.**

There was a difference of \$167.72 (Attachment\_A-657779BSR.pdf) between expected and actual cost.

**9. List all publications, posters, brochures, and other informational material published with project funding. Submit copies of publications to JIMAR**

Poster presentation, 59<sup>th</sup> tuna conference, Lake Arrowhead California, May 19 – 22, 2008: USE OF TEMPERATURE-DEPTH-RECORDERS IN THE HAWAII-BASED LONGLINE FISHERY TO CHARACTERIZE BIGEYE TUNA (*Thunnus obesus*) FISHING GROUNDS (See Attachment\_B-657779BSR.ppt., also see <http://www.tunaconference.org/>).