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HAWAII TUNA TAGGING PROJECT 2: PROGRESS REPORT

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1

Hawaii Tuna Tagging Project 2 – progress report

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Background

The Pelagic Fisheries Research Program has funded a number of tuna tagging projects to provide information useful for the management of pelagic resources in the central and western Pacific region. The original Seamount Tagging Project and the Hawaii Tuna Tagging Project deployed conventional dart tags to estimate residence times, size-specific mortality and investigate general movement patterns and aggregation effects. These projects concentrated on studies related to the yellowfin (*Thunnus albacares*) and bigeye tuna (*T. obesus*) in the Hawaii and central Pacific region (Itano and Holland 2000; Sibert et al. 2000; Adam et al. 2003).

Subsequent PFRP funded tagging initiatives deployed acoustic, archival and PAT tags to examine finer scales of residence, school fidelity and habitat utilization in relation to floating object and island associated behavior in Hawaii and Papua New Guinea (Dagorn et al. 2006; Leroy et al. 2009).

In order to update movement and life history parameters of tuna relevant to Hawaii and the broader WCPO and to address changes in Hawaii-based pelagic fisheries, the PFRP initiated a new tagging effort in, the ***Hawaii Tuna Tagging Project 2*** (HTTP2). This project will use a combination of conventional, acoustic, internal archival and popup archival tags to investigate the movement, exploitation and behavior of skipjack (*Katsuwonus pelamis*) and lustrous pomphret (*Eumegistis illustris*) in addition to bigeye and yellowfin tuna.

The **HTTP2** has been designed to address fishery issues of direct relevance to Hawaii and the central Pacific. However, the project has also been developed as an integrated component of the WCPFC endorsed Pacific Tuna Tagging Project (PTTP) being implemented by the SPC Oceanic Fisheries Programme. Common tag release and recapture techniques will be used by both programs with arrangements in place for integrated data storage and analysis.

HTTP2 justification and Project description

The **HTTP2** is being planned and implemented to update mortality and movement parameters derived during the original HTTP and to address more recent fishery issues of management concern, while adding skipjack and pomphret to the species to be investigated. The three principal objectives of the **HTTP2** are:

1) to update estimates of fishing mortality (F), 'natural' mortality (M) and movement parameters for yellowfin and bigeye tuna in Hawaiian waters while deriving initial estimates of F, M and movement parameters for skipjack.

   a. To include a continuation of existing PFRP projects to define the typical size of habitat for "Hawaiian" tuna using sonic, archival and PAT tags,

   b. … with a greater emphasis on areas and species under-represented during HTTP, i.e.

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i. bigeye tuna found around the main Hawaiian Islands and targeted by the private FAD fishery, and

    ii. yellowfin and skipjack tuna on FADs and near shore aggregation sites,

  c. … with increased emphasis on tagging unassociated or near shore bank associated tuna schools with both conventional dart and acoustic tags. This segment is an attempt to estimate the amount of exchange ('recruitment') between free schools and FADs.

2) Document the FAD-associated temporal and vertical behavior of skipjack tuna.

  a. Using acoustic pinger and depth reporting tags on receiver equipped FADs with

  b. … simultaneous releases with yellowfin and bigeye tuna to provide species-specific comparisons in mixed aggregations.

3) Determine the diurnal vertical behavior of bigeye tuna, yellowfin tuna and lustrous pomphret (*E. illustris*) associated with an offshore seamount feature in the Hawaii EEZ.

  a. Using acoustic depth reporting tags on all three species in simultaneous seamount residence,

  b. … which will require deployment of acoustic receivers on bottom-mounted acoustic release systems.

Progress in 2009

♦ Inventory
  - Gather and inventory left over gear from HTTP
  - Order tags, applicators, voice recorders, acoustic releases, safety equipment, rain gear
  - Design, order and stockpile tag reward shirts/hats

♦ Publicity and tag rewards/distribution
  - Print and distribute tagging posters
  - Establish tag reporting hotline and email notification

♦ Gear preparation
  - Fabricate tag magazines, tag mattresses, tagging cradles
  - Design, fabricate and test acoustic release modules for acoustic receivers

♦ Data recording and archiving
  - Modify SPC tag release/recapture database to handle HTTP2 fields

♦ Administration
  - Work on compliance with University insurance/liability requirements for vessel charter

♦ Tagging cruises
  - Nearshore tagging cruises (conventional, acoustic, archival) off Maui and Oahu

4

using project vessel R/V Opah

♦ Personnel
  - Advertise for and hire one field/database technician

♦ Data processing and analysis
  - Conventional tag releases entered into SPC relational database TAGDAGER
  - Workshop on **TAGBASE** and **TRACKIT** held 6-9 July 2009 in Honolulu

    ▪ Chi Lam and Vardis Tsontos conducted training in archival/PAT tag handling and display software and geolocation visualization tools

Discussion

The Project successfully geared up for the tagging work during the fiscal year and put in place the essential components of a successful tagging experiment: project awareness, tag recovery mechanisms, tag recording procedures and an efficient tag release/recapture database. However, progress in the deployment of acoustic releases for seamount sonic tagging and large-scale conventional tagging has been delayed by administrative issues related to the chartering of the commercial vessels necessary for multiple-day, offshore tagging cruises. In the meantime, conventional, acoustic and archival tagging of yellowfin and bigeye tuna continued using the program research vessel Opah on single-day trips to the nearshore FAD locations. The chartering requirements should be resolved during the last quarter of 2009 when multiple-day tagging cruises will commence.

REFERENCES

Adam, M.S., J. Sibert, D. Itano, and K. Holland. 2003 Dynamics of bigeye (*Thunnus obesus*) and yellowfin (*T. albacares*) tuna in Hawaii's pelagic fisheries: analysis of tagging data with a bulk transfer model incorporating size-specific attrition. Fish. Bull. 101:215-228.

Dagorn, L., K. N. Holland, D. G. Itano. 2007. Behavior of yellowfin (Thunnus albacares) and bigeye (T. obesus) tuna in a network of fish aggregating devices (FADs). Mar. Biol. DOI 10.1007/s00227-006-0511-1.

Itano, David G., and Kim N. Holland. 2000. Movement and vulnerability of bigeye (*Thunnus obesus*) and yellowfin tuna (*T. albacares*) in relation to FADs and natural aggregation points. Aquatic Living Res., 13 (4): 213-223.

Leroy, B., D.G. Itano, T. Usu, S.J. Nicol, K.N. Holland, and J. Hampton. 2009. Vertical Behavior and the Observation of FAD Effects on Tropical Tuna in the Warm-Pool of the Western Pacific Ocean. *In* Tagging and Tracking of Marine Animals with Electronic Devices. Springer Netherlands. Part 1: 161-179.

Preliminary analysis and observations on the vertical behaviour of WCPO skipjack, yellowfin and bigeye tuna in association with anchored FADs, as indicated by acoustic and archival tagging data. Western and Central Pacific Fishery Commission, Scientific Committee Third Regular Session, 13-24 August 2007, Honolulu, USA. WCPFC–SC3 BI WP-4.

Sibert, John, Kim Holland, and David Itano. 2000. Exchange rates of yellowfin and bigeye tunas and fishery interaction between Cross seamount and near-shore FADs in Hawaii. Aquatic Living Res., 13 (4): 225-232.