SCIENTIFIC COMMITTEE
HEIGHTH REGULAR SESSION

BUSAN, Korea
07-15 August 2012

Report of the Pacific Tuna Tagging Programme steering committee

WCPFC-SC8-RP-PTTP-01

PTTP Steering Committee

Preliminaries

Background

The Pacific Tuna Tagging Programme (PTTP) is a joint research project being implemented by the Oceanic Fisheries Programme (OFP) of the Secretariat of the Pacific Community (SPC) and the PNG National Fisheries Authority (NFA) with assistance from the Western and Central Pacific Fisheries Commission and the Inter American Tropical Tuna Commission. The goal of the Pacific Tuna Tagging Programme is to improve stock assessment and management of skipjack, yellowfin and bigeye tuna in the Pacific Ocean. The specific objectives are:

1. To obtain data that will contribute to, and reduce uncertainty in, WCPO tuna stock assessments.
2. To obtain information on the age-specific rates of movement and mixing of skipjack, yellowfin and bigeye tuna in the equatorial WCPO, between this region and other adjacent regions of the Pacific basin, and the impact of FADs on movement at all spatial scales.
3. To obtain information on species-specific vertical habitat utilisation by tunas in the tropical WCPO, and the impacts of FADs on vertical behaviour.
4. To obtain information on local exploitation rates and productivity of tuna in various parts of the WCPO.

The PTTP Steering Committee was established by SC2 to provide guidance and oversight in the development of firstly the project document (WCPFC-SC3-GN-WP-10) and subsequently of operational plans, implementation and analytical work. The sixth meeting of the PTTP Steering Committee was held at the 8th Regular Meeting of the WCPFC Scientific Committee, Busan, Republic of Korea on 9 August 2012. The current donors to the project are European Union (through the SPC implemented project SCICOFISH), Korea, Papua New Guinea, Heinz and the WCPFC.

Review and adoption of agenda

The provisional agenda was adopted.

PTTP Progress Report (SC8-RP-PTTP-02)

Since the last PTTP Steering Committee meeting, two Central Pacific handline tagging cruise (CP6 and CP7) and one Papua New Guinea pole-and-line tagging cruise (PNGTP2) have been conducted in addition to continued implementation and refinement of tag recovery processes and tag seeding, and data preparation for use in WCPO stock assessments.

CP6 was a cruise of 4 weeks duration conducted in Oct 2011 targeting bigeye tuna aggregations associated with the TAO oceanographic moorings straddling the Equator at 170°W and 180°. The Tonga-based multipurpose vessel Pacific Sunrise was chartered for the cruise. A total of 3,929 tuna (3,804 bigeye, 123 yellowfin and 2 skipjack) were tagged. All releases were made at the Equator and

2°S moorings of the 170°W and the 180°. Within these releases, 51 and 2 archival tags were deployed respectively on bigeye and yellowfin tuna.

CP7 was a cruise of 6 weeks duration conducted in collaboration with the IATTC in November to December 2011 targeting bigeye tuna aggregations associated with the TAO oceanographic moorings straddling the Equator at 155°W and 140°W. The Hawaii-based multipurpose vessel Aoshibi Go was chartered for the cruise. A total of 4,509 tuna (4,212 bigeye, 245 yellowfin and 52 skipjack) were tagged. Most of the releases (88%) were made at the Equator/140°W mooring. Within these releases, 207 archival tags were deployed respectively on 92 bigeye, 85 yellowfin and 30 skipjack tuna.

The second cruise of the PNGTP (PNGTP2) was conducted over two months from January to March 2012, using the chartered pole-and-line vessel, Soltai 105. The cruise was designed to release conventional tags across 4 areas within the PNG EEZ. A total of 39,925 tuna (28,310 skipjack, 9,607 yellowfin, 2,008 bigeye) were tagged during PNGTP2. Within these releases, 27 fish (19 yellowfin and 8 bigeye) received an archival tag. Archival tagging in Solomon Sea region for yellowfin was undertaken in collaboration with CSIRO.

The total tag releases for the PTTP is 356,172 tuna (63% skipjack, 28% yellowfin, 9% bigeye) including 1312 that were tagged with archival tags. A total of 54,699 tagged tuna had been recaptured and the data reported to SPC and this figure is expected to exceed 60,000 by 2013. Tag attrition follows the expected declining pattern with the rate of decline in skipjack tag returns indicating their shorter expected lifespan and higher natural mortality when compared to yellowfin and bigeye tuna. The recovery rates of yellowfin and bigeye tagged with archival tags and conventional tags vary depending on cruise indicating increased tag rejection/fish mortality with archival tagging on some cruises. The recoveries have come from purse-seine vessels (89%), pole and line and other gear types (5%), unknown (5%) with longline recoveries <1% (114 in total). Tag recoveries have been received from all vessel nationalities involved in the purse seine fishery. The pattern of recoveries is very similar to that reported to the steering committee at SC7 in 2011.

Full-time Tag Recovery Officers continue their duty in Wewak, Madang, Lae, Honiara, Pohnpei and Majuro. Full-time TRO appointments have also recently been made in Tarawa and in Manta, Ecuador and an appointment is planned for General Santos in the Philippines. The establishment of these positions has provided greater opportunity for collection of tags during unloading, transhipments and processing in canneries with more complete and reliable capture information. Lotteries to encourage tag returns have been conducted in Wewak, Madang, Lae, General Santos and Bangkok.

To aid in the implementation of tag seeding experiments, training is provided as part of the PIRFO Observer training courses. Tag Recovery Officers in the ports of Majuro, Pohnpei, Honiara, Lae, Madang, Wewak and Tarawa also liaise closely with Observer coordinators, Observer debriefers and observers to implement tag seeding experiments and to recover the tag seeding logs for deployed kits. 273 tag seeding kits have been distributed to observer coordinators and 168 have been given to observers for deployment. Currently 129 tag seeding datasheets have been received for these observer trips. Since August 2011, 76 kits have been deployed, using a total of 1897 tags. This is a significant increase in the rate of deployment in comparison to previous years. The employment of TROs, greater emphasis on this task during observer training, and increased awareness of the

importance of tag seeding by observer coordinators is responsible for this increase in deployment of seeding kits. In addition to allowing estimation of tag reporting rates, the tag seeding data also allow the error rate in tag return information to be determined. The accurate reporting of vessel name is particularly important for validation of location and time of recapture using VMS and log book data. Vessel name was reported incorrectly or was absent for 34% of the 1220 seeded tags already recovered.

Analyses of the tag seeding data also indicate that there are often substantial errors in the reported tag recovery dates and positions. The errors are large enough to exaggerate the perceptions of movement. The tag seeding data allows us to quantify tag recovery errors in relation to the specific circumstances of the recovery (e.g. vessel, port, TRO, etc.), such that a reliability index can be assigned for each individual tag. Once the statistical uncertainties in the seeded tags are quantified, they can be applied to all of the PTTP tag recoveries and formally recognized within the stock assessment process. Furthermore, identification of the source of the errors allows resources to be prioritized to most effectively improve future tag recovery operations. A number of analyses are being undertaken to use the PTTP tagging data to estimate movement and mortality rates. This includes the relatively coarse resolution (Multifan-CL), and relatively high resolution models (SEAPODYM, TAGEST). We are analysing the movements to identify the appropriate spatio-temporal resolution for assessment models that will be consistent with tag mixing assumptions. Movement trends observed from both conventional and archival tags are consistent with expectations for highly migratory species with larger movements positively related to time at liberty

PNGTP2 also provided an opportunity to collect an additional 414 stomach samples as part of a long-term project to characterize the trophic status of the western and central Pacific pelagic ecosystem. Since the beginning of the PTTP in 2006, 4,575 stomach samples have been collected, mainly from skipjack, yellowfin, bigeye and albacore tuna. The examination of the stomachs is an ongoing process and is conducted in the laboratory at SPC headquarters. A total of 3,375 stomach, representing 74% of the samples collected, have been examined and corresponding data entered in a dedicated database

2012-2013 Work Plan

The proposed PTTP work plan for the period 2012-2013 comprises:

- Central Pacific Cruises 8 and PNG tagging project 3;
- Continued deployment of tag seeding kits representatively across the purse-seine fishery in the WCPO;
- Tag recovery activities, including concentrated effort on transshipment;
- Tag return data quality checking with VMS and logbook records;
- Data management and reporting including improved web-based information;
- Data analyses including tag reporting rates, mortalities, and movement

Other Regional or Sub-regional Tagging Projects

Eastern Pacific Ocean

The Inter-American Tropical Tuna Commission (IATTC) has not conducted any medium or large-scale tagging experiments in the eastern Pacific Ocean, since those of 2000 to 2005 focused on bigeye tuna. Although, the Director of Investigations presented a regional tuna tagging project proposal to the Commission in recent years seeking funding from the member countries for a multi-year large scale project for the three primary tuna species, and such research is considered by the scientific staff to be of highest priority for improving the information to be included in tuna stock assessments, no funding has been received to date. Regardless, during the time period of 2006-2011 a unique tagging project was undertaken on yellowfin tuna by the IATTC in conjunction with the Instituto Nacional de Pesca of Mexico, and the owners of the long-range sportfishing vessel *Royal Star*, at the Revillagigedo Islands Marine Biosphere Reserve through a special access permit specifying no retention. That project was primarily funded by the sport fisherman whom participated for the opportunity to be fishing within a marine protected area from which world record size fish are commonly captured. In addition, during February 2012 an opportunistic tagging experiment was undertaken with yellowfin tuna at Clipperton Island, again in cooperation with the owners of the *Royal Star*.

Hawaii

Tag release efforts aligned with the Hawaii Tuna Tagging Project 2 concentrated on: 1) the double tagging of yellowfin and bigeye tuna with internal acoustic + archival tags on anchored FADs to examine both fine scale FAD associative behavior and medium/larger scale movements and unassociated vertical behavior 2) and the vertical behavior of bigeye tuna in association with seamounts. This involved the tagging of 40 bigeye with acoustic tags and the deployment of 10 listening stations on the cross seamount. The results have estimated different seamount residence times to that estimated by conventional tags. Significant dart tagging of tropical tuna species was not achieved due to the contraction of the Hawaii pole and line fishery.

Due to a lack of continuation funding and the need to spend down existing PFRP funds due to administrative purposes the Pelagic Fisheries Research Program will essentially cease to exist as a viable research funding entity after 30 September 2012. However, researchers involved in Hawaii tuna tagging projects will finish the deployment of remaining electronic tags and documentation and dissemination of results beyond this date.

Japan

Three tagging campaigns were implemented between February and April 2012. A total of 6562 skipjack, 680 yellowfin and 126 bigeye were tagged, including the archival tagging of 357 skipjack. Tagging campaigns occurred around the 18°-24°N, 130°-139°E (using a chartered Pole and Line Vessel); 24°N, 123°E (collaboration with the Ajinomoto company); and 23°-27°N, 135°-141°E (using a research pole and line vessel) locations. Recoveries include 167 skipjack (including 16 archival tagged individuals), 32 yellowfin and 6 bigeye. Most of the recoveries received have come from the coastal waters of southern Japan.

Korea

No tagging activities reported

New Zealand

Tagging of billfishes and sharks by recreational fishers continues in New Zealand. In the last 12 months 700 Striped Marlin, 80 Blue Marlin, 515 Mako Sharks and 125 Blue sharks have been conventionally tagged. An electronic tagging program for sharks has also commenced with 2 Mako Sharks tagged with spot tags. There are plans to tag 15 hammerhead sharks with spot tags over the next 12 months.

Administrative Matters

The support of all current and past donors was gratefully acknowledged as were the efforts of all contributors and project collaborators.

A tag return lottery was held for tags returned in Korea. The Gosung Sajo company was the winner of the lottery (tag P115537) and 250,000 Won was provided to the Korean delegation present atthe Steering Committee to forward to the company.

Discussion

The Steering Committee noted that the field component of the PTTP will finish in 2013 if no further donor funds become available.

The Steering Committee also noted that movement from the PTTP is showing an easterly movement of individuals with few westerly movements reported into the Indonesia and Philippines region. The Steering Committee was advised that no formal analyses had been undertaken as yet to explain this movement pattern.

The Steering Committee discussed that the Fukushima disaster in Japan has provided the opportunity for additional analyses of tuna movement through analyses to detect the presence of radio-active isotopes. This type of analyses has already occurred for Pacific Bluefin with results demonstrating the movement of individuals from Japan to California since the disaster. Japan noted that their priority research has been to assess the food safety consequences of the Fukushima disaster.

The Steering Committee also discussed the results from the recent tagging undertaken by Japan and noted that movement has been in a northerly direction with recaptures occurring in the southern coastal waters of Japan. Since the tagging occurred in February to April this year the initial movements observed can only be interpreted as representing seasonal trends and migration to equatorial regions may be detected in the future. The Steering Committee did note that tags have been recovered in the coastal waters of Japan from previous tagging activities undertaken in the equatorial waters of Indonesia, Philippines and Papua New Guinea.