



**SCIENTIFIC COMMITTEE
SIXTH REGULAR SESSION**

Nuku'alofa, Tonga
10-19 August 2010

REPORT OF THE FOURTH PTTP STEERING COMMITTEE

WCPFC-SC6-2010/GN WP-05

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. 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 of Phase 2 are:

1. To obtain data that will contribute to, and reduce uncertainty in, WCPO tuna stock assessments. Conventional tagging data are an important component of tuna stock assessments, providing quasi-fishery-independent information on various biological and fishery processes, such as exploitation rates, natural mortality, movements and growth rates, and their spatial and temporal variability.

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. This information is important for understanding the relationship of tuna stocks in the tropical WCPO with those in the sub-tropical WCPO and the EPO. Movement rates are particularly important for assessing the potential for interaction between fisheries operating in different areas. The comparison of tagged fish movements from areas of high FAD density with tagged fish movements from the same areas in the early 1990s (before extensive FAD deployment) will provide important new information on the meso- to large-scale effects on tuna movement of high-density FAD arrays. This will allow various hypotheses regarding the impact of FADs on the movements of small tuna, to be tested. The movement data will also provide critical information on appropriate spatial structuring of stock assessment models.

3. To obtain information on species-specific vertical habitat utilisation by tunas in the tropical WCPO, and the impacts of FADs on vertical behaviour. Vertical habitat utilisation plays a large role in determining vulnerability to all major gear types operating in the fishery. This objective seeks to characterise the effect of FADs (anchored and drifting) and other possible impactors (e.g., seamounts) on tropical tuna vertical behaviour and habitat utilisation. This information will allow better estimation of abundance indices and standardised effort for the main fisheries and possibly contribute directly to the design of management measures for FAD fishing.

4. To obtain information on local exploitation rates and productivity of tuna in various parts of the WCPO. Knowledge of local exploitation rates, productivity and movements is important for understanding the impact of fishing at more local scales and to estimate optimal exploitation of tuna resources within EEZs. In particular, it allows estimation of the extent to which current catch levels may reduce the standing stock of tuna and the catch-per-unit-effort of the fisheries, a phenomenon commonly known as “local depletion”.

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 fourth

meeting of the PTTP Steering Committee was held at Fa'onelua Convention Centre, Nuku'alofa, Tonga on 17 August 2010.

Review and adoption of agenda

The provisional agenda was adopted.

PTTP Progress Report (SC6-GN-IP-04)

Since the last PTTP Steering Committee meeting, one Western Pacific pole-and-line tagging cruises (WP3) and two Central Pacific handline tagging cruise (CP3 and CP4) have been conducted. WP3 consisted of a three month cruise from June to October 2009, operating primarily in the EEZs of FSM, PNG and Indonesia. CP3 and CP4 were cruises of 6 weeks duration conducted in October-November 2009 and May to June 2010 targeting bigeye tuna aggregations associated with the TAO oceanographic moorings.

A total of 38,843 tuna (30,769 skipjack, 7,339 yellowfin and 735 bigeye tuna) were tagged during WP3 and 70 archival tags were deployed on skipjack (56), yellowfin (13) and bigeye tuna (1). During CP3, 5,105 tuna (4,802 bigeye, 237 yellowfin and 66 skipjack) were tagged and 135 archival tags were deployed on yellowfin (28) and bigeye tuna (107). All releases were made at the 155°W and 140°W TAO moorings with most of the releases occurring at the 5°N, 2°N, and equatorial moorings. A total of 2,411 tuna (2,284 bigeye, 120 yellowfin and 7 skipjack) were tagged during CP4, including 59 archival tags that were deployed on yellowfin (20) and bigeye tuna (39). The 155°W and 170°W TAO moorings were visited, but most of the releases (96%) occurred at the 170°W, 02°N TAO. At the conclusion of CP4 the total number of tuna tagged for the PTTP was 262,142. In excess of 38,000 tags have been recovered to date. Various descriptive analyses of the tag recoveries were presented to provide indications of potential tag reporting problems and to illustrate the nature of the data being accumulated.

The PTTP mid-term review was undertaken in February 2010. The review provided technical advice for conducting the remainder of the project, in particular work relating to tag recovery and analysis. This advice has been incorporated into the work plan for 2010-2011.

Discussion

The meeting discussed the importance of tag recovery in detail. Important discussion points are detailed as follows:

1. The importance of reporting the recovery of tagged fish and raising awareness of the PTTP is an important ongoing activity of the PTTP work programme. The project team indicated that efforts to ensure people are aware of the tagging program will continue, as detailed in the work program. It was noted that over the last 12–18 months considerable effort had been made to publicize the tag recovery program in the longline fishery. Work was undertaken throughout the locally based operations in Micronesia, with local bases in Palau and RMI serving as recovery points for tags and immediate payment of rewards for crew by fishing companies. Archival and conventional tag returns have improved recently. The tagging program was also advertised through fishery associations in Korea, Japan

and China. Hopefully as the fish mature and enter the population targeted by the longline fishery more tags will be returned.

2. The tag recovery rate depends in part on the volume of fish that have passed through a particular handling stage. One of most important tag recovery locations has been at canneries. Fish have often passed through several chains of custody before arriving at the cannery. It was noted that it is better to detect tagged fish in the landed catch as early as possible since the quality of recapture information deteriorates with subsequent movement of fish from catcher vessel, through transshipment and unloading to canneries. The information on tag recaptures when vessels transship is potentially of better quality than when tags are found at the cannery, but detection at transshipment is difficult, so efforts will be directed to raising awareness at the transshipment process in the future. It was noted that almost 6,000 tags had been recovered from Thai canneries alone.
3. It was clarified that while all tags provide very useful information, location and date of capture data is particularly valuable, as it can be used to help estimate natural mortality, capture rates, mixing rates, etc. About 50%–60% of recoveries come with enough information to piece together at least the approximate date and location of recapture; but 40% or so of recoveries don't have this information. This data is likely to be more readily available from transshipment points than canneries. Good observer, VMS and logbook data are available, and these can be used to validate the tag data, although this involves significant effort.
4. An explanation was provided that the differences between PNG 1 and PNG 2 tag recovery rates are due to the differences in the size classes of tagged fish, the time of release and fishing effort. The recovery rate of smaller size classes of tagged fish are expected to be lower as natural mortality is expected to be higher for small size classes. The variation observed in recovery rates may result from differences in size at time of release. The meeting was advised that both size at release and the proximity of fishing effort are taken into account when analyzing tag data. The low recovery rate from Pago Pago tagging data remains unexplained at present, but may be better understood when more returns are analyzed.
5. Lower numbers of bigeye were tagged in the western Pacific Ocean in comparison to the central Pacific Ocean. This is probably a result of bigeye tuna distribution, and the vulnerability of bigeye in the central Pacific to capture when associated with TAO moorings. Current recovery rates have reached about 15% in the Western Pacific and 30% in the central Pacific indicating that bigeye may be differentially susceptible to capture in these areas. Almost all bigeye recoveries are from the purse seine catch. The high recovery rates in the Solomon Islands are explained by the close proximity of the Solomon Islands fleet fishing to the areas where the fish were tagged. In addition, the recovery rate is based on raw data, and includes very short-term capture data. Archival data from PNG and Solomon Islands is consistent with other movement information.
6. In response to how the tag seeding data will be applied, it was noted that the use of the new steel head tags in the tag seeding experiments showed slightly higher than average recovery rates (~70%), but that more time is required to ensure all tags can be located before determining their success and establishing reporting rates. Fish sometimes stay in cold store in canneries for up to 1 yr, and thus there

is some lag in recoveries. There will therefore be a delay in determining the tag seeding recovery rates. It was noted that the tag seeding data would best be analyzed by unloading location, but information is first needed on vessel transshipments, which is difficult to obtain. The tag seeding deployments are designed to get good coverage across all fleets; with 100% observer coverage this should be quite effective. Estimates of non-reporting are directly used in the stock assessment models on a fleet basis.

7. An explanation was given regarding the impact of ENSO on tuna movement, and it was noted that tagging results associated with an El Nino event recorded lower SKJ numbers, as would be expected due to the eastward movement of SKJ.
8. The meeting was advised that the tag release locations were selected in the project design, when a decision was made to focus tag releases in the core area of the fishery, where some 90% of fish are caught. Logistical considerations were also a factor (e.g., pole and line fishing requires live bait, and thus access to bait grounds), but effort was made to tag across a wide area including Indonesia and Kiribati.

2010-2011 Work Plan (SC6-GN-IP-04)

The proposed PTTP work plan for the period 2010-2011 comprises:

- Central Pacific Cruise 5, a 6 week cruise that will undertake tagging operations on the TAO Oceanographic buoys at 170°W and 180°W, commencing October 2010.
- Deployment of 100 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 Analysis, including improved web-based information
- Country and sub-region reporting, including PNG Country Report, Solomon Islands Country Report, Indonesia/Philippines Regional Report and FSM/RMI/Kiribati Regional Report.

Discussion

The meeting endorsed the work plan for 2009-2010 as presented. It was clarified that no chemically marked OTC data would be used for analyses of growth using the PTTP data and that growth analyses will need to consider the possible effect of tagging on growth will be confounded with growth estimates. The country and sub-regional reports are expected to be publically available subject to country approval.

Other Regional or Sub-regional Tagging Projects

Hawaii Tuna Tagging Project

David Itano provided an update of the Hawaii Tuna Tagging Project 2 (HTTP2). The HTTP2 was designed and is being implemented as a sub-regional component of the PTTP with arrangements for compatible data compilation and sharing. The project evolved from the original HTTP project (HTTP1) that ran in the 1990s that examined movement, mortality and interaction issues relevant to bigeye and yellowfin, primarily in relation to a tuna-productive seamount in the Hawaii EEZ. Both projects have been funded by the Pelagic Fisheries Research Program. HTTP2 objectives were developed to: 1) update

estimates of growth, fishing mortality, natural mortality and movement (or residence) parameters for yellowfin and bigeye while providing initial estimates for skipjack tuna in Hawaiian waters; 2) continue work to define FAD-associated and island-associated spatial behaviour of these species through a combination of sonic, archival and mini-PAT tagging, and; 3) determine the diurnal behaviour of bigeye and lustrous pomphret (*Eumegistis illustris*) that are now targeted in tandem on the same seamount examined during HTTP1. During the 2009/2010 season, acoustic data loggers were deployed on the seamount summit with acoustic releases to allow eventual retrieval of logged data. Both bigeye and pomphret have been tagged and released with pressure sensitive acoustic tags that transmit information on vertical behaviour and presence/absence. Data retrieval and additional tagging will continue in the third quarter 2010. Archival and sonic tagging has continued during 2010 for yellowfin and bigeye on Hawaii FADs in support of objective 2 with plans to deploy mini-PAT tags on larger tuna during the 3rd and 4th quarter 2010. Larger-scale dart tagging of all three species with an emphasis on skipjack tagging on FADs and free schools will commence during the 3rd quarter 2010 using the last viable pole-and-line vessel remaining in the Hawaii domestic fleet.

Eastern Pacific

Kurt Schaefer of IATTC provided an update on plans for tagging in the EPO. The IATTC has prepared a regional tuna tagging project proposal for yellowfin, bigeye, and skipjack tunas in the eastern Pacific Ocean. That document is available at the IATTC website. An international steering committee has been formed. The proposal will be presented in early September in La Jolla during the first meeting of the newly formed SAC of the IATTC, under the new IATTC Antiqua convention.

The tagging proposal calls for a 3 year time period in which to conduct tagging operations utilizing both plastic dart tags and archival tags throughout the EPO with those 3 major tuna species. The proposed budget is US\$1.5 million per year. The primary objective is to obtain essential data for improving the scientific basis for estimation of movements and movement parameters, natural mortality, growth rates, and exploitation rates of these species within some defined geographical areas within the EPO. These tagging experiments are crucial as IATTC is now considering the necessity to develop a fine scale spatial model for stock assessments including integration of tagging data and movement parameters. This is based on what we now know about the restricted movements of these species, particularly from archival tag data in some areas of the EPO, and also this being a high priority recommendation resulting from the recent external review of the IATTC EPO BET stock assessment. The IATTC is seeking funding for this project, and until such time adequate funding is secured the timeline for undertaking these important tagging experiments is unknown.

Aside from the successful BET tagging cruises to the equatorial central Pacific Ocean in a collaborative effort between SPC and IATTC in 2009 under the PTPP, which we hope to continue in future years, the IATTC has not conducted any BET tagging in the EPO since the successful BET pilot tagging project which took place between 2002-2006.

The IATTC currently only has an ongoing small scale tagging project being conducted in collaboration with INP of Mexico and the owners of the long-range sportfishing vessel Royal Star. This is a unique tuna tagging project as it is being conducted at the Revillagigedo Islands biosphere reserve of Mexico for strictly catch and release fishing by recreational anglers targeting giant yellowfin tuna. The project began in 2006 and will continue through at least 2011 through special permit of the government of Mexico. It has provided the opportunity to tag and release thousands of YFT with PDTs and several

hundred with ATs during this time period. This tagging project is funded almost entirely by recreational anglers, and has grown in popularity since its inception.

Northwestern Pacific

Miki Ogura provided an update of the Japanese tagging programs in the temperate waters around Japan. The tagging project on bigeye and yellowfin was started in 1999 in southern Japan, and is being continued. Major objectives of this project are to investigate movements of fish in this area in relation to the surrounding waters, collection of detailed movements around the anchored FADs, information on growth, the degree of exploitation by fishing gear in the area and so on. To date, 2,652 bigeye and 12,224 yellowfin of 21-133cm (mainly 30-60cm) in fork length were released with dart tag, of which 293 bigeye and 939 yellowfin tunas were recaptured. After released from the waters around Okinawa and Amami Islands (24-30°N, 123-132°E), some fishes remained around the released area and the majority of others showed northeastern movement to east of Honshu along the Kuroshio Current. At the same time, archival tagging was also conducted for both species. Although the days at liberty of most recaptures are short, interesting results on the swimming behavior of these species are being gathered. As the information of movement after they reach east of Honshu is very rare, tagging on bigeye and yellowfin tunas caught by pole and line fishing in the eastern offshore of Japan has been attempted since 2006. Practical tagging in this area has been conducted since 2008. The studies have been conducted by prefectural research vessel “Shin Miyagi-Maru” in cooperation with NRIFSF (National Research Institute of Far Seas Fisheries). The fish for tagging were caught by pole-and-line gear aiming at small to medium size (40-80cm) bigeye tuna. A total of 1000 (of these, 892 bigeye: 49 -109 cm FL and 34 yellowfin: 48 -65 cm FL) and 714 (of these, 465 bigeye: 48 -101 cm FL and 92 yellowfin: 46 -68 cm FL) fish were tagged and released in waters of eastern offshore of Japan (off central Honshu, 32-37°N, 142-150°E) in summer season in 2008 and 2009, respectively. This project is being continued and another research cruise was conducted this year (from 25th June to 19th July). Also, pop-up and archival tagging of adult and subadult bigeye tuna was conducted in the eastern and central north Pacific temperate and subtropical area between October and December 2009. This study was conducted by Japanese government’s research vessel Shoyo-Maru. The fish caught by longline gear were used for tagging. A total of 39 bigeye tuna (92-144 cm FL) were released with pop-up tag and 5 bigeye tuna (98-166 cm FL) were released with archival tag.

Four research/training pole-and-line vessels were involved in the skipjack tagging in 2009. The tagging was conducted in a wide area of Western Pacific ranged from 11°N to 35°N, from 127°E to 145°E. Total of 780 skipjack were released in 2009 and 31 skipjack were recovered to date. Most recaptures were recorded in the second or third quarter and within 60 days after release.

In addition, skipjack tagging in the coastal area of southwestern Japan started in 2009. Main objective of this study is to investigate migration to the Pacific coast of Japanese water (mainly western part of Japan) along the Kuroshio Current including migration rate from Nansei Islands area to Pacific coast of Japan. The fish caught by coastal pole-and-line vessels were tagged and released. Both dummy and non-dummy archival tags (Lotek LAT2510 and its dummy) were also deployed on some individuals. In 2009, a total of 1,327 fish including 30 fish with dummy archival tag were released around Amami Island (Nansei Islands, around 28°N, 130°E) in April and May. So far 42 fish including 2 fish with dummy archival tag were recaptured. In 2010 tagging was conducted around Amami Island and off Kochi area (around 32°N, 133°E) from April to June. A total of about 3,000

individuals (mainly 40-45cm FL) were tagged and released which includes 33 dummy and 44 real archival tags.

Another tagging was conducted in Sagami Bay (central part of Japan, Pacific coastal area, around 35°N, 139°E) in September 2009. Main objective of this study is feasibility study of archival tagging of skipjack using dummy tags. A total of 211 fish were released, of which 73 fish were released with dummy archival tags. So far 38 fish were recaptured including 3 fish with dummy archival tag. These results indicate that feasibility study of archival tagging of skipjack was successful.

Also, some skipjack were released during tropical tuna tagging mentioned above. In 2009, 90 and 157 fish were released in the Nansei Islands and off central Honshu, respectively. Two individuals released off central Honshu were recaptured to date.

Shark tagging program has been conducted since 1996 to examine migration, population structure and life history parameters of pelagic sharks. In 2009, tags were attached to 1164 blue sharks, 12 bigeye threshers, 42 shortfin makos, 37 salmon makos and 6 others in the Pacific Ocean. Fifteen tags attached to blue sharks and one to shortfin mako, one to salmon shark and one to other were recovered and the tag recovery data indicated seasonal latitudinal migration of blue shark.

The issue of tag contamination of processing plants products (Sashimi and Tataki) was raised and discussion was deferred to the upcoming International Symposium on Tuna and Billfish Tagging where this issue can be reviewed in an international context.

PNG National Tuna Tagging Programme

Augustine Mobuha described the new 3 year PNG tagging project scheduled to commence in 2011. Preliminary plans include yearly tagging cruises of 3 month duration focused upon tagging within the EEZ of PNG and managed by NFA in collaboration with SPC using a pole and line vessel. A target of 30,000 tuna conventionally tagged with an ideal species composition of skipjack: 60%; yellowfin 35%; and bigeye 5% has been set.

Coral Triangle tuna tagging

John Hampton provided an update on plans to initiate tagging in Indonesia and Philippines as part of the Coral Triangle Initiative. Funding is not yet confirmed but a 2-3 month cruise focused upon tagging within the EEZ of Indonesia and the Philippines in collaboration with WWF is being considered for 2011. A second cruise that will archivally tag yellowfin tuna on FADs in the Philippines is also under consideration.

South Pacific Albacore (SC6-GN-IP-06)

The SPC-OFP undertook three tagging operation in New Zealand, New Caledonia and Tonga-Niue during March – July 2010. The primary objectives were to tag larger albacore than were tagged in 2009 in an attempt to increase tag recapture rates and also to release 30 satellite archival tags (miniPATs) to obtain detailed information on movement patterns. Longlining was the principal fishing method used to catch albacore for tag and release. Catch rates and the condition of albacore landed varied significantly between locations, but generally a large proportion of albacore landed were unsuitable for tag and release. As a result, only 92 albacore were tagged with conventional tags and 19 with miniPATs. All conventional tag releases were in New Zealand where the proportion of albacore landed in good condition was substantially higher than in other locations. Future tagging programs for albacore should consider the implications of different fishing gears and locations for tagging. Tagging at tropical latitudes is unlikely to yield large numbers

of albacore suitable for tag and release, and longlining and trolling both cause injuries to a significant proportion of albacore thus reducing the proportion of tagged fish. Alternative methods for obtaining information on exploitation rates and movement for albacore should be explored due to the difficulties in the application of traditional tagging programs and the very low recapture rates of tagged albacore.

Korea

Korean observers tagged 19 yellowfin tuna and 6 bigeye tuna during 2009. Korean purse seine and longline vessels recaptured 223 tagged fish released by the PTTP and other tagging programmes and reported the recapture information to relevant tuna RFMOs (including the SPC). Korea is implementing a tagging program in nearshore waters in 2011.

Administrative Matters

No administrative matters were raised.



Scientific Committee Sixth Regular Session
10-19 August 2010
Nuku'alofa, Tonga

DRAFT AGENDA

Pacific Tuna Tagging Programme (PTTP) Steering Committee
8.30 am Tuesday 17 August, 2010

1 Preliminaries

1.1 Review and adoption of agenda

2 PTTP Progress Report

2.1 Tagging Activities

2.2 Tag Seeding

2.3 Tag Recovery

2.4 Mid term Review

3 Work Plan 2010-2011

4 Other regional or sub-regional tagging

4.1 Hawaii (PFRP)

4.2 Eastern Pacific (IATTC)

4.3 North-western Pacific (Japan)

4.4 PNG National Tuna Tagging Programme

4.5 Coral Triangle tuna tagging

4.6 South Pacific albacore

5 Administrative Matters

6 Adoption of Report