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**REPORT OF THE PACIFIC TUNA TAGGING PROGRAMME STEERING
COMMITTEE**

WCPFC-SC9-2013/RP-PTTP-02

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 seventh meeting of the PTTP Steering Committee was held at the 9th Regular Meeting of the WCPFC Scientific Committee, Pohnpei, Federated States of Micronesia on 10 August 2013. The current donors to the project are Korea, New Zealand, Papua New Guinea, Heinz, Lenfest Oceans Project and the WCPFC.

Review and adoption of agenda

The provisional agenda was adopted.

PTTP Progress Report (SC9-RP-PTTP-01, Revision 1 08/08/2013)

Since the last PTTP Steering Committee meeting, two troll/handline cruises, CP8, in the tropical central Pacific and a trial TAO cruise in PNG, and the third and last pole-and-line cruise of the PNGTP, 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. CP8 was a cruise of 23 days duration conducted in Sep-Oct 2012 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 6,174 tuna (6,014 bigeye, 140 yellowfin and

20 skipjack) were tagged. All releases were made at the 2°S, equator and 2°N moorings of the 170°W. Within these releases, 18 archival tags were deployed on bigeye tuna.

The trial TAO PNG cruise was designed to improve the number of tagged bigeye in PNG waters using the same fishing technique that was successfully employed in the central Pacific area. The cruise also provided the opportunity of using the new training vessel purchased by NFA and assesses its suitability for the purpose. Unfortunately none of the visited TAOs at the equator and 2°N on the 147°E was associated with a tuna school. The third cruise of the PNGTP (PNGTP3) was conducted over two months from April to June 2013, using the chartered pole-and-line vessel, Soltai 101. The cruise was designed to release conventional tags across 4 areas within the PNG EEZ. A total of 29,920 tuna (23,396 skipjack, 5,960 yellowfin, and 564 bigeye) were tagged during PNGTP3. Within these releases, 31 fish (30 yellowfin and 1 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 PTPP is 393,562 tuna (63% skipjack, 27% yellowfin, 10% bigeye) including 1361 that were tagged with archival tags. A total of 63,770 tagged tuna had been recaptured and the data reported to SPC. 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. 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 SC8 in 2012.

Full-time Tag Recovery Officers continue their duty in Wewak, Madang, Lae, Honiara, Pohnpei, Rabaul, General Santos, Majuro and Manta. The establishment of these positions has provided greater opportunity for collection of tags during unloading, transshipments and processing in canneries with more complete and reliable capture information.

To aid in the implementation of tag seeding experiments, training is provided as part of the PIRFO Observer training courses. Tag Recovery Officers 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. 331 tag seeding kits have been distributed to observer coordinators and 200 have been given to observers for deployment. Currently 178 tag seeding datasheets have been received for these observer trips. Since July 2012, there have been 4,290 reported tags that have been seeded and 1,937 of these have been returned to SPC.

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 for 416 tags, was absent from the recovery information for 130 tags and was correct for 1,391 tags. 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 PTPP 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 PTPP 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.

PNGTP3 also provided an opportunity to collect diverse samples on 483 fish 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 PTPP in 2006, 5,695 stomach samples have been collected, mainly from skipjack, yellowfin, bigeye and albacore tuna. The examination of the stomachs is an on-going process and is conducted in the laboratory at SPC headquarters. A total of 4,466 stomach, representing 78.4% of the samples collected, have been examined and corresponding data entered in a dedicated database.

2012-2013 Work Plan

The proposed PTPP work plan for the period 2013-2014 comprises:

- Central Pacific Cruises 9;
- 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

During 2012 and 2013, scientists of the Inter-American Tropical Tuna Commission (IATTC) have continued to focus on deployments of electronic archival (data storage) tags in yellowfin tuna in areas of the eastern Pacific Ocean, in order to better understand their stock structure, movements and movement parameters, and behaviour for improvements to stock assessments and management advice. Working in collaboration with the owners of the San Diego based 92-foot US-flag long-range sport fishing vessel *Royal Star*, along with anglers, on regularly scheduled fishing trips to Clipperton Island, IATTC scientists deployed 97 archival tags in yellowfin tuna in 2012 and another 50 in yellowfin tuna in 2013.

IATTC scientists have been working in collaboration with scientists of the Oceanic Fisheries Program (OFP) of the Secretariat of the Pacific Community within the framework of the PTPP, including the tagging experiments with bigeye tuna in the central Pacific Ocean since

2008. Currently efforts of IATTC scientists along with those of the OFP include finalizing the analyses of bigeye tuna archival tag and plastic dart tag data sets obtained from bigeye tuna releases and recaptures in the CPO. A manuscript describing the horizontal movements, movement parameters, and mixing of bigeye tuna between the eastern, central, and western Pacific based on these tagging experiments and subsequent data analyses is underway and intended to be submitted for publication to a scientific journal in early 2014.

Hawaii

University of Hawaii-Hawaii Institute of Marine Biology staffs continue to conduct small-scale acoustic and archival tagging experiments around FADs located in the Main Hawaii Islands (MHI), deploying depth sensitive transmitters and archival data logging tags in yellowfin and bigeye tuna. These research activities will continue in the near term.

Furthermore, analysis and creation of manuscripts of existing Hawaii Tuna Tagging Project 2 (HTTP2) tagging datasets, including those from Cross Seamount associated acoustic tagged bigeye, and double electronic tagged yellowfin around MHI FADs are in progress.

Japan

Tagging work commenced in to 2011 in the sub-tropical areas to waters around Japan. Tag releases were conducted on commercial pole-and-line vessel, research vessel and collaborative research with Ajinomoto Co., Inc. In 2012, 6555 conventional tags and 356 archival tags were released in February to April. Information on recaptures provided very good results showing movement from sub-tropical to waters around Japan. In 2013, so far, 4739 conventional tags and 305 archival tags were released. The project will still continue and hope for good results in the near future.

Administrative Matters

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

Discussion

The Steering Committee discussed the incorporation of tagging data into model analyses such as SEOPODYM.

The Steering committee also discussed information from archival tagging data apart from the normal conventional tags to elucidate some of the information on diffusion and mixing rates of bigeye and yellowfin in areas like Indonesia and Philippines and its impact on stock assessment models. The committee noted that there are information on skipjack and some yellowfin available and is possible to use these data to supplement some of the information provided from conventional tags.

The Steering Committee noted the extent of the PTPP given the fact that it's has been going for a number of years now. In the long term, the data can be used to relate to changes in

the oceanographic conditions as to where the tags end up and putting some environment indices into the Multifan-CL for this purpose.

The Steering Committee noted the tagging work conducted in Japan and data is showing clear movement of tuna between the subtropical areas to waters around Japan. The committee noted the continuation of the project and hope the study would provide more information on the mixing of tunas in Western Pacific Ocean.

The Steering Committee noted the continuation of long term tagging work by IATTC in the Eastern Pacific Ocean. The information will be used to define stock structure and movement parameters in spatially structured stock assessments of the EPO. The committee also noted the collaboration of IATTC scientist specifically Dan Fuller and Kurt Schaefer and SPC scientist in finalising the analyses of all bigeye tagging data from Central Pacific cruises. A manuscript of the report will be ready before the end of this year including both conventional and archival tagging data for bigeye.

The Steering Committee also noted the continuation of acoustic tagging on FADs around the main Hawaiian Islands. This work also includes the deployment of pop-satellite tags when the opportunity arises.

The Steering Committee acknowledged the announcement by Korea to continue funding support for the PTP until 2018. Korea recognises the importance of the tagging data used in stock assessments models.