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REGIONAL TUNA TAGGING PROJECT - OVERVIEW OF FIELD OPERATIONS

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PRESENTATION SUMMARY

The primary objective of the Regional Tuna Tagging Project (RTTP) is to gather information on the population dynamics of western Pacific yellowfin tuna with secondary tagging effort and studies conducted on skipjack and bigeye. The RTTP began field work in December 1989 and will continue field operations until December 1992. The Project has succeeded in tagging large numbers of tuna throughout a wide stretch of the western Pacific, roughly encompassing 10°N to 10°S, 120°E to 170°W, which corresponds to the area of most intense surface tuna fisheries in the western Pacific. Tagging operations have maintained a relatively high proportion of yellowfin and bigeye releases through a variety of methods that concentrate fishing effort and promote the capture of these two tuna species.

The bulk of RTTP field work is carried out on the MFV *Te Tautai*, a Japanese-style tuna pole-and-line vessel owned by the National Fishing Corporation of Tuvalu. In addition to the tagging and research activities of the *Te Tautai*, a number of auxiliary tagging projects have been conducted that support the overall goals of the RTTP while providing information on specific regions and fisheries of the western Pacific. Country specific tagging studies have been conducted for countries that have domestic pole-and-line fisheries, i.e. the Solomon Islands, Kiribati and Fiji and a tuna resource assessment project is underway in the Philippines. These projects use domestic vessels or the *Te Tautai* as a tagging platform with tagging conducted by SPC personnel and national fisheries officers using RTTP gear and methods. Small-scale, experimental tagging projects have also been conducted on tuna taken by Japanese purse seine, small-scale longline, artisanal handline and Philippine ring-net vessels.

The tagging procedures used by the SPC Skipjack Survey and Assessment Project were largely adopted by the RTTP with modifications made to concentrate tagging effort on a broad size range of yellowfin and bigeye tuna. The tags used are yellow, plastic dart tags manufactured by Hallprint Pty, Ltd. of Australia, and marked with a single letter prefix, followed by a five digit number and the legend "SPC NOUMEA REWARD". A small quantity of orange RTTP tags have been used to mark oxytetracycline injected tuna in the Solomon Islands for a tuna age validation study. Two tag size are in use by the RTTP, with the larger tags having 13 cm streamers with either an X, Y, K or P prefix. Fish less than 35 cm in fork length are tagged using smaller, thinner dart tags of the same style marked with a Z, S or T prefix. Tag applicators designed to fit both tag sizes are made from tubular stainless steel, pointed and notched at one end to receive the barbed point and sharpened and sterilized regularly when in use. Both tag sizes are available in serially numbered blocks of 100 at each of the tagging stations.

Most tagging is conducted on steel frame, vinyl covered tagging cradles, marked in one cm gradations with padded nose pads and fitted with a box to hold tag applicator blocks and used applicators. Vinyl covered, foam tagging mattresses are also used to tag large tuna that are difficult to lift or pole to the tagging cradles. The mattresses are used when tagging from small skiffs or from various locations on the *Te Tautai* during handlining operations. A steel tagging platform has been fitted to the centre stern of the *Te Tautai*, which provides a tagging station only 40 cm above the sea surface that is used for handlining large tuna.

Fish to be tagged are quickly received and unhooked by a gloved assistant who is responsible to make an initial assessment of the tagging condition of the fish. Injured tuna or those appearing to be in an exhausted or traumatized condition are rejected to the deck for subsequent biological sampling.

Tags are set below or slightly posterior the second dorsal fin with the streamer angled toward the tail to minimise water resistance when the fish is at liberty. The tag is pushed transversely through the musculature and mesentery deep enough for the barb to interlock with dorsal fin ray supports or neural vertebral spines.

Biological sampling of at least five fish per species, per school is conducted, which includes the recording of fork length, weight, sex, ovary weight, ovary stage, stomach volume and stomach content. Otoliths are extracted and stored from sampled yellowfin and bigeye and morphometric measurements and meristic counts taken. The species, fork length, fish condition and tagging quality are noted on a portable cassette recorder for each tag release and then transcribed to paper and entered on a computer database at the end of each tagging day. The fishing gear type used for each release is carefully noted and entered on the database, as fish condition can differ markedly depending on the capture method.

Operations on the *Te Tautai* aim to maximize effective fishing time and concentrate on yellowfin and bigeye releases by extension of the operational range of the vessel and focusing effort in areas or on school associations that contain a high proportion of these species. A large proportion of total yellowfin releases have been made on schools found in association with drifting logs, FADs, seamounts and whale sharks. Over 61 % of total bigeye releases were made during a short period on yellowfin and bigeye feeding aggregations in the Australian Coral Sea. Most of the remaining bigeye releases were made from unassociated, log or FAD associated schools. In contrast, the majority of skipjack releases were made on unassociated or anchored FAD associated schools.

Tag releases by 30 June 1992 totalled 125,281 from all projects, comprised of 32,408 yellowfin (25.9%), 6,170 bigeye (4.9%) and 86,703 skipjack (69.2%). Most of the releases have been made from the *Te Tautai* (86.5%), with the Solomon Island, Kiribati and Fiji In-Country Tuna Tagging Projects each contributing 6.6%, 3.4% and 3.0% respectively. Yellowfin tag releases have ranged from 19 to 140 cm with a mean length of 49.1 cm. Bigeye length frequencies range from 21 to 130 cm, with a large mean fork length of 69.1 cm, due to the high proportion of large bigeye that were tagged on Coral Sea feeding aggregations. The mean size of skipjack tagged during the RTTP is 48.2 cm, ranging from 20 to 80 cm.

Tuna schools are located and assessed visually or with the assistance of electronic fishing gear, i.e. depth sounders, sonar, satellite navigation systems, etc. Tuna pole-and-line gear is most frequently used on the *Te Tautai* and during the In-country projects. The RTTP has also utilized heavy pole/handline gear, troll, purse seine, ring-net and a variety of handline gear types and methods to concentrate on yellowfin releases.

Tag return publicity for the RTTP has been extensive, with posters, now available in 12 languages, explaining the project and tag return and reward procedures being distributed to fisheries offices, fishing companies, canneries and unloading ports throughout the world. The tag return reward offered by the RTTP is a shirt or cap imprinted with the RTTP logo or a cash amount equivalent to approximately ten dollars in the local currency. Annual tag return lotteries offering large cash prizes are also held in areas having a high potential for large numbers of tag returns in order to stimulate tag reporting levels.

As at 30 June 1992, a total of 11,940 tags had been returned to SPC headquarters and entered to the master tagging database representing an overall return rate of 9.5% coming from 2,908 yellowfin, 241 bigeye and 8,791 skipjack recaptures. The majority of recaptures have been made by purse seine vessels of the Philippines (operating in PNG), Japan, USA, Solomon Islands, Taiwan and Korea. Indonesian, Solomon Islands, and Fijian pole-and-line vessels have also returned large numbers of tags. Countries or territories reporting the largest numbers of tag returns from canneries or transshipment ports, in descending order of abundance, are Thailand, the Philippines, American Samoa, the Commonwealth of the Northern Marianas Islands (Tinian), Puerto Rico and Indonesia.

Tag shedding rates are being estimated through analysis of returns from double tagged releases. Double tagging of all three species has been carried out regularly throughout the course of the Project. Estimates of non-reporting within the fishery are being made from on-going tag seeding experiments as well as landing data and comparisons between suspected under-reporting fleets and fleets where reporting can be assumed to be excellent.

Timely reporting and documentation of RTTP cruises has been conducted since the beginning of the project and preliminary data analysis has been conducted on some aspects of the available data. Intensive analysis of recapture data began in 1992 and will continue until project objectives are satisfied.