

JIMAR, PFRP ANNUAL PROGRESS REPORT FY 2001

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Project Proposal Title: Hawaii Regional Tuna Tagging Project

Funding Agency: NOAA/JIMAR

1..Purpose of the project and indicative results.

The purpose of the project is to better define the movement patterns and exploitation rates of yellowfin and bigeye tuna around the Hawaii region with particular reference to natural and man-made aggregations. Field work for the project has produced a release dataset of 17,896 bigeye and yellowfin tuna with data from more than 2241 recaptures (12.52%) that can be examined in a variety of ways to address project objectives. Patterns of tag recaptures highlight the overwhelming importance of aggregation to tuna vulnerability in Hawaiian fisheries, with approximately 95% of all recaptures resulting from tuna caught in association with seamounts and fish aggregation devices.

Yellowfin movements from releases made within two hundred miles of the main Hawaiian Islands have generally remained within this region, with only a few long-distance movements noted. Yellowfin recaptures from fish tagged near Midway Atoll at the northwest end of the Hawaiian Islands have been very low (0.8%) but have shown considerable movement: southeast to the main Hawaiian Islands and westward to Japan. Bigeye movements have also remained relatively short distance in nature with a slowly increasing trend over time.

Quantitative analysis of the larger recapture datasets agree with previous studies that bigeye persist at the offshore seamount areas twice as long as yellowfin, although yellowfin appear to experience higher fishing mortality rates when they are present on the Cross seamount. Natural mortality estimates for both species indicated very high mortality rates for small fish, lowest for middle size classes with a slight rise in mortality with the largest size classes. Although overall fishing mortality on both species at the offshore seamounts and FADs was considered moderate, the estimated transfer rates suggest that these catches are not adversely impacting local populations of tuna in the offshore areas or their recruitment to inshore fisheries.

2. Progress during FY 2001 (accomplishments and problems)

The primary field work for the project concluded during the latter part of FY 2000. Six smaller scale field trips were conducted during FY 2001, with greater time devoted to reporting and publications of results. Tagging cruises emphasized double tagging of both species to gain better estimates of tag shedding rates. Additional tagging cruises were conducted at inshore areas to increase vessel participation in tagging small yellowfin aggregated to the inshore FADs. A total of 426 bigeye and yellowfin were tagged during the latter half of the 2000 calendar year of which 195 were double tagged. Yellowfin and

bigeye were also tagged on a more opportunistic basis during an extended cruise to Palmyra Atoll, approximately 950 nautical miles south of Hawaii.

Tag recapture and reward activities continued throughout FY 2001. The Charter Desk in Honokohau Harbor continues to be an important tag return and reward station for the project, which has proved to be a very useful and cost effective solution to tag reporting from the island of Hawaii. Personnel at the United Fishing Agency and cooperation from National Marine Fisheries Service personnel who collect longline logsheet data continue to provide excellent cooperation and data at no cost to the project.

Preliminary results and status of the project were reported on at a number of international and domestic fisheries meetings as listed in section 5 below. Three papers related to this project were published during FY 2001 as listed in section 4 below. Work toward the publication of other papers dealing specifically with Hawaii based pelagic fisheries, movement and residence times of bigeye and yellowfin tuna were well developed during the year and will be published during FY 2002.

No significant problems were encountered during FY 2001.

3. Plans for the next fiscal year.

During FY 2002, activities will be similar to FY 2001, with an emphasis on database work, documentation and reporting of results. Tagging data requires a great deal of verification and editing depending on the required analysis. The data technician will continue with these tasks as necessary in conjunction with other staff and maintain data entry and tag recapture reward systems. A number of publications describing the related fisheries, exchange rates, residence times and growth parameters from the tagging data will be written and published. Analysis of residence times and exchange rates of the offshore FADs will be conducted in a similar manner to what has been done for the Cross Seamount. It is anticipated that the work will result in a broader publication examining yield per recruit of yellowfin and in particular, bigeye tuna that will have important management implications to Hawaii's pelagic fisheries. Data permitting, a broader diffusion analysis of the tag recapture data will be carried out.

During the coming fiscal year, tag release effort on small yellowfin and bigeye found in aggregation to the inshore FAD network will be increased, and preliminary analysis of movements and residence on these FADs will be conducted.

Reporting of results of the tagging project will be given a high priority during FY 2002. The project PI s will travel to various venues throughout the Hawaiian Islands to present the project results and management implications to the many fishery sectors and user groups that have cooperated in the return of tags and data to the project. We feel that this return of information to the fishing and processing community is key to developing and maintaining a cooperative relationship with the various user groups. Presentations related to the tagging project and results will continue at various meetings and sub-groups of the Western Pacific Regional Fisheries Management Council.

4. List of papers published in refereed journals during FY 2001.

Itano, D.G., and K.N. Holland. 2000. Movement and vulnerability of bigeye (*Thunnus obesus*) and yellowfin tuna (*T. albacares*) in relation to FADs and natural aggregation points. *Aquat. Living Resour.* 13 (2000) 213-223.

Sibert, J., Holland, K., and D. Itano. 2000. Exchange rates of yellowfin and bigeye tunas and fishery interaction between Cross Seamount and near-shore FADs in Hawaii. *Aquat. Living Resour.* 13 (2000) 233-240.

Holland, K.N., S. M. Kajiura, D.G. Itano and J. R. Sibert. 2001. Tagging techniques can elucidate the biology and exploitation patterns of aggregated pelagic fishes. Pages 211 - 218 in G. R. Sedberry, editor. *Island in the stream: oceanography and fisheries of the Charleston Bump*. American Fisheries Society, Symposium 25, Bethesda, Maryland

5. Other papers, technical reports, meeting presentations, etc.

13th Meeting of the Standing Committee on Tuna and Billfish, Noumea, New Caledonia. 5 – 12 July, 2000.

Indian Ocean Tuna Commission: Working Party on Tagging, Victoria, Seychelles. September 29 – 30, 2000.

Pelagic Fisheries Research Program: Principal Investigators Workshop, Honolulu, Hawaii. December 5 – 7, 2000.

WPRFMC Pelagics Plan Team Meeting, Honolulu, Hawaii. May 1 – 3, 2001.

WPRFMC Scientific and Statistical Committee Meeting, Honolulu, Hawaii. May 15 – 17, 2001.

52nd Annual Tuna Conference, Lake Arrowhead, California. May 21 – 24, 2001.

WPRFMC Pelagics Advisory Panel Meeting, Honolulu, Hawaii. June 15, 2001.

110th Meeting of the Western Pacific Regional Fisheries Management Council, Honolulu, Hawaii. June 18 – 20, 2001. (S. Adam)

Indian Ocean Tuna Commission: Working Party on Tropical Tunas and Tagging, Victoria, Seychelles. June 18 – 22, 2001.

6. Names of students graduating with MS or Ph.D. degrees during FY 2001.

No students graduated on this project during FY 2001.