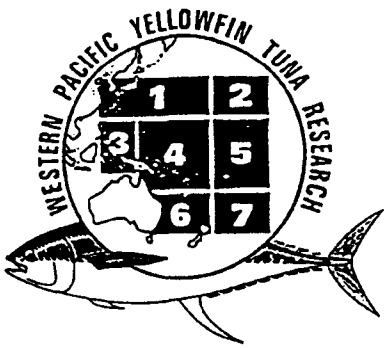

Nadi, Fiji
June 18-20, 1997

WPYRG7/7

Discussion Paper

Fisheries Oceanography of the Northwest Subtropical Pacific Ocean

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Joint Institute for Marine and Atmospheric Research
University of Hawaii
Honolulu

Working paper for the 7th Meeting of the Western Pacific Yellowfin Tuna Research Group, Nadi, Fiji, June 18 - 20, 1997.

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Background

The tropical western pacific ocean supports one of the largest tuna fisheries in the world, annually yielding over 1 million metric tonnes of tuna. (Lawson, 1995). This fishery is concentrated west of the dateline between 10° S and 10° N latitude and exploits primarily skipjack and yellowfin. Major fisheries also operate north of 10° N latitude in the area roughly bounded by the Philippines, Japan, the extension of the Kuroshio current, and the Hawaiian archipelago. These more northern fisheries target tropical tunas (yellowfin and skipjack), the more temperate and more valuable tunas (bigeye, bluefin, and albacore) as well as swordfish and marlin. The landed value of the combined tropical and sub-tropical landings is unknown but may exceeds US$500,000,000. The seasonal abundance of these species is certainly linked to the large scale oceanographic features of the region such as the Kuroshio extension and the interplay between the sub-tropical convergence and the sub-arctic convergence. The coupling between the equatorial fisheries and the subtropical fisheries as well as the role of large scale oceanographic features in mediating tuna abundance are unaddressed research topics.

Two major tagging studies conducted by the South Pacific Commission (SPC) have produced valuable information on the population dynamics and movement of skipjack and yellowfin tuna in the tropical Pacific ocean. The SPC work has emphasized the equatorial and south Pacific region with less effort expended on tagging tuna in the northern part of their range. Also, the SPC tagging work was conducted with little attention to the questions of large scale oceanographic variability.

The north sub-tropical Pacific region is of great importance to many fisheries organizations. The Western Pacific Regional Fishery Management Council (WPRFMC) has the responsibility to develop fishery management policies for areas of the western Pacific under United States jurisdiction, including American Samoa, Guam, the Commonwealth of Northern Mariana Islands, the State of Hawaii, and several US

administered islands. This region is of importance to both the Japanese distant-water and its coastal tuna fisheries. This region also includes the Extended Economic Zones of several SPC and Forum Fishery Agency (FFA) member countries.

Objectives of Proposed Study

1. Analyze the large-scale distribution, movement and ecology of tunas and other large commercially important pelagic fish in the northwest sub-tropical Pacific.
2. Determine the oceanographic features and processes that mediate the ecology of pelagic fish in this region.
3. Combine the biological and oceanographic processes into an integrated model to predict the abundance and distribution of major commercial pelagic fish.

Activities

The proposed project would be a multidisciplinary study involving field work, analysis of satellite observations, and computer modeling. The principle means of conducting field observations would be a large-scale tagging program with a duration of 2-3 years. A suitable vessel will be identified and chartered to conduct field operations. The most appropriate vessel would likely be a modified large live-bait pole and line tuna boat. Such a dedicated tagging vessel should be viewed as a platform from which to conduct a wide spectrum of both biological and oceanographic observations. There are technical challenges to the success of this project and careful planning would be required.

Financial

The proposed project would cost approximately US$1,000,000 per year during the phase active field work (minimum of two years) plus US$200,000 per year during the phase of tag recovery and data analysis (3 to 5 years). Although this expenditure is small in relation to the landed value of the catch, it is nevertheless a substantial cost, and funding from several sources would be appropriate. The Pelagic Fisheries Research Program is currently supporting a number of studies that are relevant to this proposal: (1) modeling of large scale tuna movements; (2) observation and modeling of surface circulation in the central Pacific; (3) analysis of meso-large-scale oceanographic features in relation to fishery production; (4) analysis of yellowfin tuna population dynamics in the western Pacific; (5) analysis of yellowfin reproduction in the western Pacific; (6) yellowfin and bigeye tuna tagging in Hawaiian waters. **The PFRP is seeking partners in the further development and eventual implementation of this project.**

References

Lawson, T.(ed.),1995. Tuna Fishery Yearbook 1994. South Pacific Commission, Noumea, New Caledonia, 77 pp.