

## **JIMAR, PFRP ANNUAL PROGRESS REPORT FY 2001**

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**Project Proposal Title:** Distributions, Histories, and Recent Catch Trends with Six Fish Taxa Taken as Incidental Catch by the Hawai'i-based Commercial Longline Fishery

**Funding Agency:** National Oceanic and Atmospheric Administration / National Marine Fisheries Service

**Project Purpose and Indicative Results:** This proposal involves statistical research into catch trends with several types of marine fishes that are sometimes characterized as non-target or incidental catch in the Hawaii-based commercial longline fishery, with the intention of providing the most accurate histories possible. This is considered important because these fishes in combination represent a large fraction of the entire catch of this fishery, and because the individual species may be economically or ecologically important or prized in recreational fishing. The work utilizes data gathered by the Hawai'i Longline Observer Program of the National Marine Fisheries Service (NMFS), logbook records submitted to NMFS by the Hawai'i-based longline fleet, and sales records from public fish auctions conducted at the United Fishing Agency, Honolulu, Hawaii (UFA). The objectives are to develop statistical models of catch rates for the fishes of interest, which will in turn be used to evaluate logbook accuracy and reporting behavior over the long-term, to generate corrected fishery-wide catch statistics, and to investigate geographical distributions. This project is also expected to contribute to improved linkage of the observer and logbook data sets with that from the United Fishing Agency public fish auction, which should facilitate comparison of the condition and composition of the catch to its economic value.

This project is expected to generate two major types of results. The statistical analyses mentioned previously as objectives are expected to yield useful information in finished form; e.g. identification of environmental or technical factors that affect catch rates may suggest ameliorative measures to reduce bycatch, and improved knowledge of geographic distributions should contribute to greater insight into actual or potential management measures such as area closures. The second type of results are the corrected data sets to be made available to other PFRP-funded investigations of biology, population dynamics, and fisheries economics, which should then be able to produce their own analyses with the minimum possible effects of data error problems.

Results obtained to date have indicated that parsimonious models of catch rates for the fishes of interest can be fitted to the observer data. These models, in turn, can be used to examine logbook reporting behavior and to characterize and estimate bias on unobserved longline sets.

**Project Activities and Progress during FY 2001:** This project was funded in October 2000. There have been three major project activities conducted since the provision of funding. Presentations (by Walsh) at the December meeting in Honolulu and at the Tuna Conference in Lake Arrowhead, California represented descriptions of planning and preliminary results, respectively. The other major activity consisted of the initiation of the required statistical

analyses. Preliminary analyses have been completed for each species of interest listed in the proposal.

Supplies acquisitions proceeded according to the proposal. A laptop computer, a color laser printer that will be available to the Fishery Monitoring and Economic Performance Investigation of the Honolulu Laboratory, and three software packages have been purchased. All items were within the budgetary projections.

The most important completed activities directly related to this project consisted of the steps necessary to publish previous work. A paper co-authored with Dr. Pierre Kleiber, now in press with *Fisheries Research*, presents methodology that will be used throughout this project. It was noteworthy that both reviewers described the presentation and comparison of two types of statistical analyses (generalized additive models and regression trees) as one of the most interesting and useful elements of the paper. Therefore, both types of analyses will be conducted for the fishes of interest to this project, which represents a slight revision of the original proposal. The sequel to the aforementioned paper, co-authored with Drs. Kleiber and Marti McCracken, was also submitted to and then accepted by *Fisheries Research*. This paper presents the methodology and results obtained from a fishery-wide expansion of a statistical model fitted to observer data. This approach will also be used throughout the project. It is believed, therefore, that the conceptual and procedural underpinnings of this project have been firmly established.

A second activity directly related to this project consisted of checking NMFS Observer data prior to its incorporation into the electronic archives of the NMFS Honolulu Laboratory. These checks were performed because adoption of ORACLE as a data management system for the Laboratory has proven challenging from a technological perspective, and it was deemed necessary and important to have the data examined by a familiar user to ensure that inaccuracies associated with the transition were detected and corrected.

One activity precluded full-time efforts on this project during its first four months. A series of exploratory analyses concerning interactions between this fishery and sea turtles were conducted at the behest and with the advice of Dr. Christofer Boggs. Additional analyses of protected species interactions have subsequently been required intermittently within the context of the Laboratory-wide effort devoted to mitigation of adverse environmental impacts of this fishery.

**Planned Project Activities for FY 2002:** The initial activity to be conducted will consist of an evaluation of the quality of recent (i.e., 2000-2001) NMFS fishery observer data. This is necessary because legal decisions have required an increase in the number of observers, which necessarily implies that the typical level of experience is less than was previously the case, and in their allocation, which might also influence job performance if the deployments have been shifted to previously unfamiliar circumstances. These evaluations will compare the new observers to longer-term personnel during the early stages of their employment in order to assess whether observer accuracy relative to their job experience has remained constant (or nearly so). This is important because the observer data represents the development set for all of the previously described statistical analyses.

After completing the quality control assessment with the NMFS fishery observer data, the definitive analyses described in the proposal will be conducted. The development set for each species will consist of the first seven years of observer data (March 1994 – February 2001); the

application set will consist of the corresponding unobserved logbook data. Manuscripts will be prepared to present both the statistical models (analogous to Walsh and Kleiber) and their fishery-wide applications (analogous to Walsh et al.).

**Papers Published in Journals during FY 2001:**

Generalized additive model and regression tree analyses of blue shark (*Prionace glauca*) catch rates by the Hawai'i-based commercial longline fishery, by Walsh, W.A. and Kleiber, P. Accepted for publication in *Fisheries Research* as of November 21, 2000.

Comparison of logbook reports of incidental blue shark catch rates by Hawai'i-based longline vessels to fishery observer data by application of a generalized additive model, by Walsh, W.A., Kleiber, P., and McCracken, M. Accepted for publication in *Fisheries Research* as of April 20, 2001.

**Other Papers, Reports, and Presentations during FY 2001:** None

**Graduate Student Advisory Activities:** None