

## **JIMAR, PFRP ANNUAL PROGRESS REPORT FY 2003**

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**Project Proposal Title:**

Regulatory Impact Analysis Framework for Hawaii Pelagic Fishery  
Management: A Multilevel and Multiobjective Programming Model

**Funding Agency:** Pelagic Fisheries Research Program/NOAA

**Purpose of the Project and Indicative Results:**

The objective of this project is to enhance the multi-level multi-objective programming model for the Hawaii fisheries, developed under PFRP Project #2066/2113. This will involve making the basic model structure more tractable for regulatory analysis, and to allow more flexible time-area specification as well as updating the underlying data. The update focuses on the Hawaii longline fishery.

**Project Activities and Progress During FY 2003:**

Modify GAMS (General Algebraic Modeling System) programs and input data files to be simpler and more easily modified with respect to area, season, target, and species. The updated programs were validated by reproducing the same results as the those previously produced by the Leung's project (see Pan et al. 1999).

Develop a couple of data processors that flexibly generate the parameters for 5-8 areas that are more realistic for fisheries management. These data processors use the following three existing data sources, which were collected and processed by NMFS Honolulu Laboratory:

- Longline logbook data summarized into monthly 1-degree square areas, by target (billfish/mixed/tuna) and vessel size (small/medium/large),
- Longline trip data generated from the original logbook data, and
- Auction Data to estimate fish price and weight for each species/season/target.

Apply the model with a new time-area specification, where Hawaiian waters are divided into five areas (Main Hawaiian Islands, North-East, North-West, North-Center that were closed during Dec 1999 - Mar 2001, and South, and one year is divided into five periods (Jan-Mar, Apr-May, Jun-Jul, Aug-Sep, and Oct-Dec). This specification is to analyze the impacts of the regulatory policies during 1999-2002. However, this model was first applied to examine the model's predictability using the 1993 data because the previous study (Pan et al., 1999) was done for Year 1993 and the most complete cost-earning data set is available for that year (see Hamilton et al. 1993).

Evaluate alternative objective functions with different constraints to examine alternative economic assumptions for the Hawaii longline industry (i.e., competitive equilibrium where resource rent is dissipated vs. effort allocation by a sole fishery regulator where resource rent is maximized). The analysis of the model results is continued while the project reexamines and revises the cost parameters (e.g., fixed and operating costs, and expected wages) for the three longline fleets.

#### **Planned Project Activities and Progress for FY 2004.**

Evaluate the regulatory impacts of recent and potential area closures regulatory policies, using the update empirical model. All parameters for fish stocks, catch rate, and prices will be updated using the latest catch, effort and price data (1998-2002) generated by the data processors mentioned in the above, while the cost parameters are adjusted using new cost-earning survey data (if available).

Enhance the model by:

- Trying different CPUE profile in the variable catch rate component of the catch function
- Dynamic element of vessel entry/exit condition
- Incorporating an upward-slope labor supply function: i.e., expected wage is endogenously determined with the total amount of labor for the industry, instead of constant over time periods.

Extend the application including other fisheries (troll, handline, recreational fishing), which enable us to estimate the change in the tradeoff value between small boats and longline fishery with regulations. It may require other data sources (e.g., HDAR) and revise the time-area specification (e.g., additional inshore area).

**Papers Published in Refereed Journals during FY 2003:** None

#### **Other Papers, Technical Reports, Meeting Presentations, during FY 2003:**

Nemoto, Keiichi. "Update on the Multilevel and Multiobjective Programming Model of the Hawaii Pelagic Fisheries", presented at the PFRP Principal Investigators Workshop, Univ. of Hawaii at Manoa, Honolulu, Hawaii, December 2002.

Nemoto, Keiichi. "Regulatory Impact Analysis Framework for Hawaii Pelagic Fishery Management (tentative title)", to be presented at the 54<sup>th</sup> Tuna Conference, Lake Arrowhead, California, May 2003.

**Names of students graduating with MS or Ph.D. degrees during FY 2002:** None.

Keiichi Nemoto was awarded the Ph.D. in Agricultural and Resource Economics, December 2002.

**Budget Request:** N/A