JIMAR – PFRP ANNUAL REPORT FOR FY 2007

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Project Proposal Title: Modeling Longline Effort Dynamics and Protected Species Interaction

Funding Agency: NOAA

NOAA Goal (Check those that apply):

X To protect, restore, and manage the use of coastal and ocean resources through ecosystem-base management

To understand climate variability and change to enhance society's ability to plan and respond

To serve society's needs for weather and water information

To support the nation's commerce with information for safe, efficient, and environmentally sound transportation

1. Purpose of the Project (one paragraph)

The general aim of the proposed study is to refine and extend the existing fleet dynamic model, and the specific objectives and tasks are as follows:

- i. Extend the longline trip level time-series data set to 2002.
- ii. Re-estimate the technical and economic interrelationships among different species landed and the entry/stay/exit behavior.
- iii. Estimate the catch-effort relationships for each species and for each fleet.
- iv. Analyze the factors, rate, and degree of protected species interaction (e.g., turtles, and seabirds) with longline fishing activities.
- v. The information generated above will be incorporated into the existing fleet dynamic model in maximizing fishery welfare and fishing effort considering broader implications on protected species and stock conditions.
- **2. Progress during FY 2007** (One-two paragraphs, including a comparison of the actual accomplishments to the objectives established for the period, and the reasons for slippage if established objectives were not met):

The major activities of this project have been completed by December 31, 2006. We have used the period from July 1 to December 31, 2006 as planned to finalize the two journal articles which have now been accepted for publication. The first article (to appear in *Applied Economics*) summarizes the modification and improvement of the

existing fleet effort dynamic model in maximizing fishery welfare by incorporating protected species, seasonal and spatial features in the longline fishery. The second article (to appear in *Journal of Environmental Management*) employed a distance function approach to model sea turtle interaction as an undesirable output in Hawaii's longline fishery. This approach provides a method of calculating temporal and trip-specific cost of sea turtle bycatch reduction without assuming any policy intervention. Such information can be useful in analyzing tradeoffs between number of incidental take of sea turtles and the marginal cost of sea turtle bycatch.

All the objectives have been achieved and the results have been summarized in several journal articles as listed below.

3. Plans for the next fiscal year (one paragraph):

Project completed.

4. List of papers published in refereed journals for entire project.

- Pradhan, N.C., and P.S. Leung, 2003. "Analyzing Technological and Economic Interrelationships in Hawaii's Longline Fishery", *Marine Resource Economics*, 18:167-193.
- ii. Sharma, K.R., N.C. Pradhan, and P.S.Leung, 2003. "Technological and Economics Interrelationships in Hawaii's Troll and Handline Fisheries", *North American Journal of Fisheries Management*, 23:869-882.
- iii. Pradhan, N.C. and P.S. Leung. 2004. "Modeling entry, stay, and exit decision of the longline fishers in Hawaii", *Marine Policy*, 28:311-324.
- iv. Pradhan, N.C. and P.S. Leung. 2004. "Modeling trip choice behavior of the longline fishers in Hawaii", *Fisheries Research*, 68:209-224.
- v. J. Cai, P.S. Leung, M. Pan and S. Pooley. 2005. "Economic linkage impacts of Hawaii's longline fishing regulations," *Fisheries Research*, 74:234-242.
- vi. Pradhan, N.C. and P.S. Leung. 2006. "A Poisson and negative binomial regression model of sea turtle interactions in Hawaii's longline fishery," *Fisheries Research*, 78:309-322.
- vii. Pradhan, N.C. and P.S. Leung. 2006. "Incorporating sea turtle interactions in a multi-objective programming model for Hawaii longline fishery" *Ecological Economics*, 60(1):216-227.

- viii. P.S. Leung. 2006. "Multiple-criteria decision making (MCDM) applications in fishery management," invited paper in a special issue on Planning Support Systems for Environmental Management, *International Journal of Environmental Technology and Management*, 6(1/2):96-110.
- ix. Huang, H. and P.S. Leung. 2007. "Modeling protected species as an undesirable output: The case of sea turtle interactions in Hawaii's longline fishery," *Journal of Environmental Management*, in press.
- x. Pradhan, N.C. and P.S. Leung. 2007. "Sea turtle interactions with Hawaii's longline fishery: An extended multiobjective programming model incorporating spatial and seasonal dimensions," *Applied Economics*, in press.

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

- i. Pradhan, N.C. and P.S. Leung. "A Poisson and negative binomial regression model of sea turtle interactions in Hawaii's longline fishery," Paper presented at the PFRP PI Meeting in November, 2004.
- ii. Huang, H. and P.S. Leung. "Modeling protected species as an undesirable output: The case of sea turtle interactions in Hawaii's longline fishery," Paper presented at the PFRP PI Meeting in November, 2004.
- iii. Pradhan, N.C. and P.S. Leung. "Modeling entry, stay, and exit decisions of the longline fishers in Hawaii," Paper presented at the International Fishery Economics and Trade conference held in Tokyo, Japan on July 21-30, 2004.
- iv. J. Cai, P.S. Leung, M. Pan and S. Pooley. 2005. Linkage of Fisheries Sectors to Hawaii's Economy and Economic Impacts of Longline Fishing Regulations, Pelagic Fisheries Research Program, JIMAR Contribution 05-355, 24 pp. [Paper presented at the PFRP PI Meeting in November, 2005]
- v. Pradhan, N.C. and P.S. Leung. "Sea turtle interactions with Hawaii's longline fishery: An extended multiobjective programming model incorporating spatial and seasonal dimensions," Paper presented at the PFRP PI Meeting in November, 2005.
- vi. A paper entitled "Sea turtle interactions with Hawaii's longline fishery: An extended multiobjective programming model incorporating spatial and seasonal dimensions" is accepted for presentation at the International Fishery Economics and Trade conference to be held in Plymouth, United Kingdom in July 11-14, 2006.
- vii. Pradhan, N.C. and P.S. Leung. 2006. "Trade-offs between Sea Turtle Interactions and Profitability of the Hawaii-based Longline Fleet," *PRFP Newsletter*, 11(3):4-6.

6. Graduates (Names of students graduating with MS or PhD degrees. Provide titles of their thesis or dissertation):

Naresh C. Pradhan. *Three Essays on the Economics of Hawaii's Longline Fishery: Modeling Fishers's Behavior*, Department of Economics, University of Hawaii at Manoa, Summer 2003.

7. Awards (List awards given to JIMAR employees or to the project itself during the period):

None.

8. Publication Count (Total count of publications for the reporting period and previous periods categorized by NOAA lead author and Institute (or subgrantee) lead author and whether it was peer-reviewed or non peer-reviewed (not including presentations):

	JL Lead Author			NOAA Lead Author			Other Lead Author		
	FY04	FY05	FY06/07	FY03	FY04	FY05	FY03	FY04	FY05
Peer-	2	2	6						
reviewed									
Non-peer			2						
reviewed									

9. Students and Post-docs (Number of students and post-docs that were associated with NOAA funded research. Please indicate if they received any NOAA funding. For institutes that award subcontracts, please include information from your subgrantees):

2 graduate research assistants and 1 post-doc supported by the project.

10. Personnel:

- i. Number of employees by job title and terminal degree that received more than 50% support from NOAA, including visiting scientists (this information is not required from subgrantees): 0
- ii. Number of employees/students that received 100% of their funding from an OAR laboratory and/or are located within that laboratory. 0
- iii. Number of employees/students that were hired by NOAA during the past year:
 0

11. Images and Captions (JIMAR will be including images in the annual report. Please send two of your best high-resolution, color images (photo, graphic, schematic) as a JPEG of TIFF with a caption for each image. Hardcopies of images can be dropped off at the JIMAR office if no electronic versions are available.

None.

12. For multi-year projects, provide budget for the next year on a separate page. Contact Dodie Lau to confirm whether or not your project is to receive continuation funds (e.g., year 2, year 3), and for budget preparation assistance, <u>lau@hawaii.edu</u>