

## JIMAR ANNUAL REPORT FOR FY 1999

P.I. NAMES: PingSun Leung, Stuart Nakamoto and Sam Pooley

PROJECT RESERACHER: Khem Sharma

COLLABORATOR: Marcia Hamilton

PROJECT PROPOSAL TITLE: **Economic Contributions of Hawaii's Fisheries**

FUNDING AGENCY: NOAA

### **1. Purpose of Project:**

The purpose of this research is to integrate the cost-earnings information for the various commercial (longline, troll and handline, and others) and charter boat fleets, and estimated expenditure patterns of the recreational fisheries into the input-output framework to measure the economic contributions of various fisheries sectors to Hawaii's economy. It will also provide information on the linkages of fisheries sectors to the other sectors of the economy, and their relative importance compared to the other sectors in terms of outputs, employment and household income, as well as income distribution effects. The specific objectives of the project include:

1. Systematically integrate all the baseline cost-earnings data of commercial, recreational, and charter fleets being gathered by recent PFRP projects into the 1992 Hawaii State Input-Output (I-O) model, the latest table available for the state;
2. Provide information on forward and backward linkages of fisheries sectors vis-a-vis the other sectors of the economy;
3. Provide information on economic importance and value of the various fishery sectors to Hawaii's economy in terms of their contributions to output, household income, and employment; and
4. Provide a systematic framework to assess the economy-wide impacts of fishery regulations as well as the impacts of other government policies on fisheries sectors based on various I-O and SAM multipliers

### **2. Progress during FY 1999:**

The integration of the cost-earnings information for the various commercial (longline, troll and handline, and others) and charter boat fleets, and estimated expenditure patterns of the recreational fisheries into the 1992 Hawaii State Input-Output model has been more or less completed. The cost-earnings data were cross-checked using the information collected from a survey of fishing supply wholesalers/retailers, repair and dry-dock facilities, and fish seafood

dealers and brokers on Oahu, Big Island, and Maui. This information is used in estimating the inter-industry flow of outputs produced and inputs purchased by various fisheries sectors.

For the purpose of estimating economic contributions and related multipliers of Hawaii's fisheries sectors, the original 118-sector I-O model for the state has been aggregated to about 60-sectors, including four fisheries sectors: (i) Commercial – longline; (ii) Commercial - small boat; (iii) Expense and recreational; and (iv) Charter boat. Preliminary task of estimating relevant production relations, expenditure patterns, and I-O multipliers for the four fisheries sectors has already been completed. The preliminary sales, purchases, labor income and employment estimates for Hawaii's fisheries are presented in Table 1 and preliminary multipliers are presented in Table 2. Some of these results were presented at the 1998 annual WPRFMC meeting, Honolulu, December 3, 1998.

Table 1. Preliminary Sales, Purchases, Income, and Employment for Hawaii Fisheries

Fishery sectors	No. of boats	Million of 1992 dollars			No. of jobs
		Sales	Purchases	Labor income	
Commercial: Longline	122	60.5	27.9	29.2	652
Commercial: Small boat	711	24.0	11.1	9.9	667
Charter boat	188	16.5	9.3	6.4	417
Expense & recreational	3,595	6.7	25.5	0.0	0
Total	4,616	107.7	73.8	45.5	1,736

Since the 1992 Hawaii I-O table lacks all information needed to calculate SAM multipliers, attempts are being made toward the possibility of getting such information from IMPLAN. However, since the available information on economywide flow of goods and services is limited to industry by industry basis, SAM analysis of fisheries sectors will be attempted on an industry by industry basis.

In addition, we have also completed a study on the level and determinants of technical efficiency of the longline fleet based on the 1993 cost-earnings survey. The paper has been published in *Marine Resource Economics*, Vol. 13, pp. 259–274. The earlier version of the paper was presented at the *International Institute of Fisheries Economics and Trade '98 Biennial Conference*, Tromso, Norway, July 8–11, 1998 and has been published in the *1998 IIFET Conference Proceedings*.

Table 2. Preliminary Output, Income, Value Added and Employment Multipliers for Hawaii's Fisheries Sectors

	Commercial: Longline	Commercial: Small boat	Charter boat	Expense & recreational boat	Agriculture	Food processing	Construction	Manufacturing
Type I								
Output (\$/\$ of final demand)	1.53	1.57	1.73	1.96	1.33	1.60	1.27	1.16
Income (\$/\$ of final demand)	0.66	0.58	0.63	0.32	0.54	0.40	0.58	0.28
Value added(\$/\$ of final demand)	0.84	0.75	0.84	0.53	0.80	0.60	0.70	0.43
Employment (No. of jobs/ million \$ of final demand)	18	69	34	14	33	18	14	8
Type II								
Output (\$/\$ of final demand)	2.46	2.39	2.62	2.41	2.09	2.18	2.09	1.55
Income (\$/\$ of final demand)	0.98	0.87	0.94	0.47	0.81	0.61	0.87	0.42
Value added(\$/\$ of final demand)	1.42	1.26	1.38	0.81	1.26	0.95	1.21	0.67
Employment (No. of jobs/ million \$ of final demand)	32	81	47	20	44	26	26	13

### 3. Future Work Plan:

1. Refine estimation of I-O output multipliers, income multipliers, value added, and employment multipliers for four fishery sectors;
2. Calculate the forward and backward linkage indicators for the four fisheries sub-sectors and compare with other sectors in the Hawaii economy;
3. Estimate the economic contributions of the four fisheries sub-sectors to Hawaii's economy;
4. Attempt to integrate a social accounting matrix (SAM) and append it to the expanded I-O model to measure income distribution effects for the four fisheries sub-sectors; and

5. Prepare report and one or two technical papers for journals and international conferences.

**4. Other Papers, Technical Reports, etc.**

Sharma, K.R. and Leung, P.S. "Technical efficiency of the longline fishery in Hawaii: an application of stochastic production frontier," *Marine Resource Economics*, 13(4): 259–274, 1998.