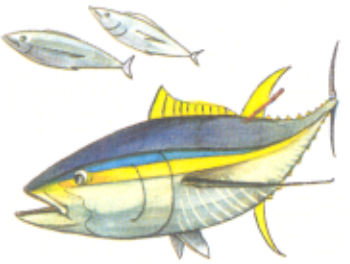
PFRP



Pelagic Fisheries Research Program

Volume 2, Number 1

January 1997

Social Sciences in Fisheries Research

Fisheries research in support of the goal of maximizing social benefits leads to a set of parallel inquiries about the resource (fish) and resource users (fishers). Attempts to understand the resource leads to much of the research usually conducted under the rubric of "fisheries research." Attempts to understand resource users leads to an agenda of social, cultural and economic studies that are not usually conducted under the rubric of "fisheries research."

The Pelagic Fisheries Research Program (PFRP) attempts to integrate these two important lines of research.

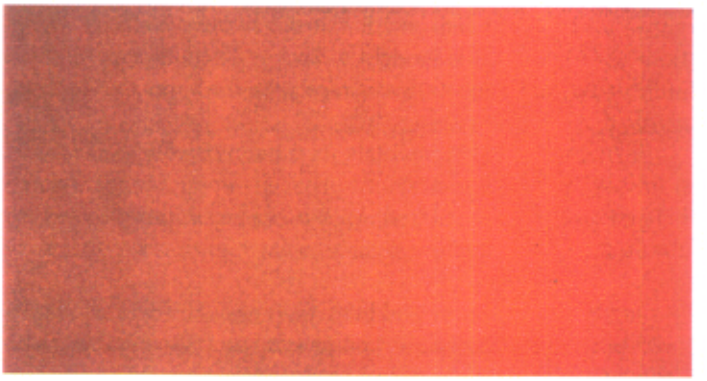
Resource	Users
Forecast population	Forecast effort
Identify and characterize	Identify and characterize
Movement between fishing grounds	Movement between fishing grounds
Response to exploitation	Response to change in resource
Response to environment	Response to economic conditions
	Response to changes in policy

The common goal of all PFRP projects is to provide fishery managers with information that will enable them to optimize use of fishery resources, as specified by the Magnuson-Stephens Fisheries Conservation and Management Act. To do so, economic and socio-cultural questions—such as the prediction of fishing effort, the relative value of various fisheries, and the importance of fishing to local populations—need to be addressed. Fourteen PFRP research projects currently focus on the economic and socio-cultural aspects of fishery management within the U.S. Pacific islands.

This issue of the PFRP Newsletter features the results of research into the contribution of tuna fishing, transshipment, and processing to local economies of the U.S. Pacific Islands; price determinants in the fresh Pacific tuna and marlin markets; cost-earnings analyses of the Hawai'i longline fleet; and socio-cultural values of the Hawai'i pelagic troll and handline fishery. For a description of all PFRP projects, consult the PFRP Web site at

http://www/soest.hawaii.edu/rbailey/pfrp1.html.

Price Determinants in the Marketing of Fresh Pacific Tuna



A color chart, such as that reproduced here, has potential for standardizing the most subjective dimension of tuna grading muscle color. The color scheme represents the changes in tuna muscle pigments that occur during normal post-mortem deterioration. (The normal printing process does not, however, accurately capture the color of the sample card.)

The fresh tuna industry, which originally focused on sashimi markets, is becoming more complex. "White tablecloth" restaurants are serving "seared," "blackened" or "Cajun-style" tuna steaks that are cooked rare from high quality tuna that could have been eaten raw. Food processors are producing dried, smoked and "meat-like" products, including tuna hams, sausages and burgers, from lower quality tuna that were once destined for canning.

Researchers Paul Bartram of Honolulu-based Akala Products and John Kaneko of Honolulu-based Pacmar, Inc., look at these and other evolving market-related trends in the recently completed PFRP study "Quality and Product Differentiation as Price Determinants in the Marketing of Fresh Pacific Tuna and Marlin."

(continued on page 2)

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PFRP (continued from page 1)

The market

Consumers in Japan, the world's largest importer of tuna, spend more on tuna than any other fresh seafood. Tokyo and Sendai are known to be good markets for high-fat bluefin and bigeye tuna, whereas the leaner yellowfin is preferred in Osaka and Nagoya, and the pink muscle of marlin is preferred to the red muscle of tuna in Fukuoka and Sapporo. Dramatic increases in tuna imports occurred from 1988 to 1994 (39,000 to 71,000 metric tons). In 1993, fresh tuna consumption in Japan peaked at 133,000 metric tons (half supplied by imports). There appears to be little potential for continued increases in Japanese sashimi consumption, and the market is thought to have reached its upper limit as indicated by a decline in the average price for imported fresh yellowfin tuna for the past two years.

In the continental United States, consumption of fresh and frozen tuna exceeds 40,000 metric tons per year—about half of which is believed to be consumed fresh. West Coast buyers have higher purchasing standards and are willing to pay higher prices for medium-grade tuna than buyers in other regions of the continent.

Korea has been successful in developing a domestic market for sashimi tuna. Korean fishing companies currently own 140 sashimi restaurants and 100 sashimi home-delivery businesses. Annual consumption has increased to 20,000 metric tons.

In Hawai'i , the average consumption of tuna, including skipjack, is about 3,500 metric tons annually, of which at least 40% is estimated for consumption as sashimi or as poke (raw fish cubes with relish). Imported tuna arrives in Hawai'i on a regular schedule, and since importers usually have several days of advance notice to pre-sell the product, they can sometimes obtain higher prices than those offered to the local fleet at the Honolulu auction.

In England and the European continent, most of the demand is for low quality, cooking grade tuna.

Suppliers

At least 50 countries are exporting fresh tuna, and new producing areas, such as Papua New Guinea, which controls some of the richest tuna fishing grounds in the Pacific, continue to enter the market.

Most tuna-producing areas in the Pacific basin have the capability to ship sashimi-grade tuna to Japan. Taiwan-flag longline fleets operating throughout the Indo-Pacific are the leading suppliers. A recent trend is for Taiwan to be the contractor of tuna longliners from the People's Republic of China, which will become a major fresh tuna supplier in the near future. The PRC longline fleet has the lowest operating costs in the Pacific basin, but tuna production is at a much lower scale than other fleets. According to market monitoring of Japan prices for Hawai'i tuna exports during June 30–July 14, 1994; the highest prices on average for bigeye and yellowfin in Japan are paid for Hawai'i tuna (1,800¥/kg to 990¥/kg). The break-even price in Japan for fresh tuna exports from Indonesia, Micronesia, and Fiji is considered to be in the range of 700–800¥/kg. Few suppliers from these regions made sales that were more than marginally profitable during a two-week market survey in 1995. The survey illustrates the trend toward increasing supply and declining price for fresh yellowfin tuna in Japan.

The continental United States is supplied in large part by Hawai'i, Pacific basin and Gulf of Mexico fisheries, but new fisheries transshipping through Miami are increasing. The gulf yellowfin tuna fishery experienced rapid growth during the 1980s with most of the fishing activity was based out of Florida, Louisiana and Texas. Many of the vessels, however, have since left the gulf to join longline fisheries in Hawai'i and elsewhere. In recent years, there has been a remarkable increase in fresh tuna imports entering the country through Miami as longline fishing undergoes rapid development in South and Central America and the Caribbean, with Ecuador, Venezuela, Trinidad, and Costa Rica tuna becoming increasingly common in the market. Imports are also entering the East Coast market from an Indian Ocean yellowfin tuna fishery based in Oman. The cost of ground transportation from Miami to New York is significantly cheaper than air freight from the Gulf unloading stations. Consequently, imports in the New York market are often priced US$0.25 per lb less than gulf tuna. Increasing dependence on imported tuna is displacing gulf tuna from the East Coast grilling market. Gulf producers are shifting marketing emphasis to the West Coast, and 12 longliners recently left the Gulf of Mexico to enter the Eastern Pacific swordfish fishery, based in Ventura county, California.

Fresh tuna: a globally traded commodity in need of a common language

With fresh tuna being exported by at least 50 different countries, tuna buyers are presented with so much quality variation that it is common to inspect and grade tuna prior to purchasing. Each fish thereby acquires an individual identity (i.e., a quality grade) which links it to possible end uses and market niches (Figure 1). Quality grades communicate a range of physical

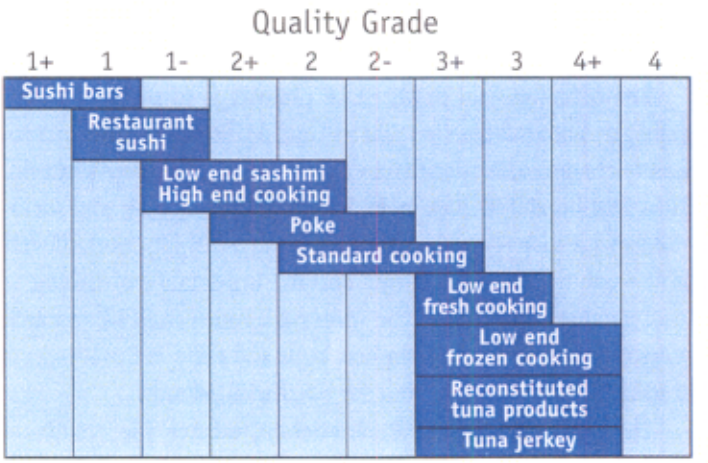

Figure 1. Trends toward increased differentiation in the fresh tuna market.

attributes of a tuna that is expected by the buyer. Grading is also useful in market reporting, resolving disagreements about product quality, and in providing performance feedback to harvesters.

Lack of grading experience or agreement can cause economic losses in two ways. If tuna is misgraded lower than its actual quality, losses are borne by the producers who could have sold the fish to higher-priced markets. On the other hand, if tuna is misgraded higher than its actual quality, the result is claims for credits or

outright rejection of fish by the buyer and, more importantly, the seller's credibility and the buyer's confidence are reduced.

Unfortunately, only a few fresh tuna sources are consistently satisfactory in grading. Others consistently overrepresent the grade of their tuna exports. In fact, disputes over quality grades are so commonplace in fresh tuna marketing, they are accepted as a necessary part of doing business. Evidently, both sellers and buyers could benefit from a standardized system of tuna grading that would allow a satisfactory comparison of products from various source areas.

Grading decisions: art not science

Tuna grading decisions are guided by three major factors: (1) observable characteristics, such as species, size and body defects; (2) shelf life after purchase, deduced from core temperature of fish, body condition, muscle texture and bloodline, and fishing, handling and storage methods; and (3) muscle quality, including texture, color, clarity, and fat content.

Except for species, weight, and core temperature, the measurements used in tuna grading are subjective. The subjective nature of grading is evident by a comparison of the situation in Hawai'i to that of the rest of the United States. In Hawai'i, where much of tuna is consumed raw, the No. 1 grade requires red muscle with high transparency and firm texture. But in the rest of the U.S. market, where the majority of tuna is not consumed raw, muscle color alone is much more important. Consequently, in the Gulf of Mexico, typical longline boat loads reportedly produce more than 50% No. 1 grade tuna, but this extremely high percentage was attributed to the grading emphasis on color attributes alone. High-standard grading may explain why Hawai'i No. 1 tuna is often priced much higher than Gulf No. 1.

Understanding and standardizing the grading of tuna quality is of the utmost importance as it is the primary factor affecting market competition. For example, the premium price for No. 1 grade bigeye and yellowfin tuna in Hawai'i was US$2.00–2.50/lb higher than for No. 2 grade. The No. 2 grade reaped more than US$1.00/lb over the No. 3 grade (Figure 2). Grade No. 2 yellowfin is the tuna product most commonly exported from Hawai'i to the U.S. West Coast. The opportunity to export lower grades of fresh tuna (No. 2-/3+) was apparently overlooked despite an abundant supply in Hawai'i. Obviously, a lack of mutual understanding about what constitutes an acceptable cooking-grade tuna in the less sophisticated U.S. markets inhibits the export of lower grades of fresh tuna from Hawai'i and the Pacific.

As part of the present study, a color chart (on page 1) was developed and tested as a tool with potential for standardizing the most subjective dimension of tuna gradingmuscle color. The color scheme was designed to represent the changes in tuna muscle pigments which occur during normal post-mortem deterioration. The tool helped to reveal differences between continental U.S. and Hawai'i markets in defining acceptable color in grade No. 1 tuna. Hawai'i standards were confirmed to be stricter. Some graders in the continental United States observed that the scale of color was incomplete because the chart did not represent the brown to gray to black range at the lowest end of the quality spectrum. Based on preliminary testing of the tuna color chart, the tool has potential to improve mutual understanding of muscle color grading between buyers and sellers, and it may serve as a training tool for graders and quality control personnel.

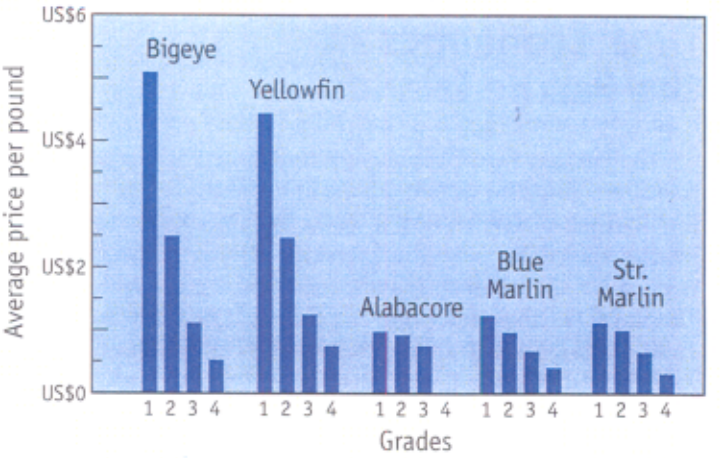

Figure 2. Average price by species and grade at the Honolulu fish auction (June 30–July 14, 1994; June 22–July 8, 1995).

Future marketing strategies

Worldwide consumption of fresh and frozen tuna is increasing, although consumption of the traditional tuna products in the continental United States (canned tuna) and in Japan (sashimi tuna) is not. Most notable are the creation and rapid expansion of Korea's sashimi industry and of Europe's retail tuna industry. The trend toward more sophisticated and discriminating purchasing is likely to be repeated in newly emerging markets, such as the more affluent nations in Asia, Europe and South America.

The increasing supply of "reject" tuna produced by Indo-Pacific longline fleets has created opportunities to manufacture value-added products, such as fresh and frozen loins, tuna jerky, and reconstituted, "meat-like" foods. Processing of fresh tuna loins has several advantages:

- value added by local economies at tuna landing sites, savings on air freight compared to shipping less-processed tuna, and
- greater certainty in grading quality after tuna is exposed by loining.

The product, however, is highly perishable and must be transported to market and sold within 48 hours.

International expansion of tuna fisheries will continue, and there is potential for oversupply, particularly of Grade No. 2 tuna. To compensate for a possible decline in No. 2 grade tuna prices, Pacific island suppliers are advised to consider the following: (1) target bigeye tuna because of its price stability in Japan; (2) increase the proportion of No. 1 grade tuna through improved handling; (3) investigate alternative markets for premium tuna products in countries with rapidly growing economies; and (4) establish greater price stability for low-quality tuna and by-catch by diversifying products and market niches and through vertical integration of tuna producers and processors.

PFRP

Tuna Economics in the Pacific Islands

The Western Pacific commercial tuna fishery is in a period of transition, propelled by two driving forces: the assertive policy in the licensing of foreign fishing boats in the Federated States of Micronesia (FSM) and the increased fishing activity in the Republic of the Marshall Islands, Palau and Papua New Guinea. The impact of these forces are analyzed in "The Contribution of Tuna Fishing and Transshipment to the Economies of the American Samoa, the Commonwealth of the Northern Mariana Islands (CNMI), and Guam." In the study, PFRP investigators Michael P. Hamnett of the Center for Development Studies at University of Hawai'i's Social Science Research Institute and William Sam Pintz, a Hawai'i-based resource economist, provide a historical description of the fisheries in the U.S. Pacific territories and commonwealth and suggest strategies for keeping them viable.

American Samoa: a cannery-driven fishery

In the territory of American Samoa, Van Camp Seafoods established the Samoa Packing tuna cannery in 1954 and StarKist established a second cannery in 1963 to take advantage of statutory provisions in U.S. law. The first provision exempts the territory from the prohibition of the landing of fish by foreign-flagged fishing vessels in U.S. ports; the second gives products from U.S. territories duty-free status if the foreign component of the product is less than 50% of the market value; and the third effectively makes income derived by the U.S. parent companies of the Samoa operations exempt from U.S. corporate income tax. These provisions, along with American Samoan tax exemptions and wage structure, have made it advantageous for the parent companies to operate in the Pacific.

Through the years, the canneries serviced a growing number of longline and purse-seine tuna vessels. The fleet, in turn, has promoted the development of provisioning and repair services that contribute significantly to the American Samoa economy. Today, the tuna industry is by far American Samoa's largest private industry, its largest source of direct private-sector employment, and its largest private consumer of power and water. At US$317.6 million, the combined exports of Samoa's two canneries represents more than 99% of American Samoa's gross domestic product, according to American Samoa's governor.

The future of the canneries, however, is uncertain. Proposed changes in the tax treatment of U.S. companies operating in U.S. territories would result in significant increases in the canneries' operational "costs." Moreover, the North American Free Trade Agreement (NAFTA) may result in duty-free imports of Mexican canned tuna to the American market, and the recent General Agreement on Tariffs and Trade (GATT) negotiations establish a framework that will make it increasingly difficult to maintain tariff protection for the American Samoan packers. These trends further compound the declining competitiveness of the Samoan canneries, which face increasing foreign competition, primarily from canneries in Thailand.

The effect of cannery closures in American Samoa would be devastating. A 1994 assessment by the territory's Planning Office indicates that closure of StarKist Samoa would cause the following losses:

- almost 15% of current wage employment;
- a 10–12% reduction in aggregate household income;
- a 7% reduction in American Samoa Government's fiscal receipts;
- a 20% loss of power sales; and
- a significant increase in fuel costs and upward pressure on cost of living.

Closure of both canneries would result in a direct loss of nearly 35% of wage employment in the territory. With limited tuna resources and a geographic position that is remote from both the primary Western Pacific fishing grounds and the lucrative Asian fish markets, there would be little justification for basing a tuna harvesting industry in American Samoa were the canneries to close.

Northern Mariana Islands: limited benefits

In the Commonwealth of the Northern Mariana Islands (CNMI), the island of Tinian became a transshipment center for cannery-grade frozen tuna in the early 1980s with fishing vessels off-loading directly on to vessels bound for American Samoa, Puerto Rico, and Asian processing centers. Limited shore facilities were developed, and the use of Tinian gradually expanded. Since 1991, use of the Tinian transshipment facility has been steadily declining. Currently, the direct benefit of tuna transshipment on Tinian is estimated to be below US$1.4 million annually.

On Saipan, an additional tuna transshipment operation was established beginning in 1991. This operation transshipped fresh (sashimi-grade) tuna caught in the FSM from air freighters to wide-body jets bound for Japan. However, the economic benefits to CNMI is small even in comparison to the minimal benefits derived from the transshipment base on Tinian. Furthermore, it appears unlikely that the government can increase the economic benefits of transshipping tuna by air through Saipan. Any increase in landing fees or jet fuel tax or the imposition of a transfer tax at the Saipan airport would probably cause tuna operators to find an alternative air route to Japan.

Guam: a diversifying industry

The territory of Guam's tuna industry developed in the mid 1980s with longline tuna boats off-loading sashimi grade tuna at Apra Harbor. The fish were graded, packed, and loaded onto wide-body jets bound for Japan. By 1990, Apra Harbor was home port to more than three hundred tuna vessels, including both (sashimi-grade) longliners and purse-seine vessels that transshipped frozen fish through Tinian. The presence of the vessels provided a demand for a range of provisioning, vessel maintenance, and gear-repair services. Total direct shore expenditures in Guam for 1994 by the fishing vessels is estimated at between US$55 million and US$122 million.

A second Guam transshipment operation, which started in March 1995, is removing heads and guts from longline caught fish that do not meet Japanese sashimi market requirements and then air freighting the fish to Europe via Korea. While the potential

contribution of this operation to the Guam economy is small, it may further diversify the tuna transshipment industry in Guam and provide an additional inducement to longliners to call at Apra Harbor.

Another tuna transshipment pattern through Guam began in March 1995 when Casamar, a Guam vessel maintenance company, began shipping frozen purse-seine-caught tuna to Bangkok using American President Line (APL) refrigerated containers. During 1995, the Casamar/APL operation shipped more than 28,000 tons of tuna to Thai packers. Reportedly, Casamar/APL have the capacity to eventually transship up to 100,000 tons a year of frozen tuna.

In December 1996, the governor of Guam announced an ambitious development plan for the island, which includes a strategy to double tourism arrivals. To achieve this goal, major upgrading of infrastructure, including Guam's international airport and harbor, is planned. An important byproduct of this tourism expansion will be increased air-freight capacity for handling fresh fish exports to major Asian markets.

Another promising venture is the expansion of a bait-fish aquaculture industry. One of Guam's largest aquaculture farms was contracted to supply live milkfish to a Taiwanese longliner agent at the beginning of 1995. Milkfish have been shown to yield tuna catch rates of three to five times those of dead bait. A Guam Commerce Department study estimates that 1995 bait sales of milkfish would have been between $11.4 million and US$13 million. If a bait-fish venture of this magnitude could be successfully established and sustained, it would effectively ensure Guam's future as a longline port.

Neighboring states: linked fisheries

Since there is no significant tuna fishery in the waters of American Samoa, CNMI, or Guam, the fish-harvesting strategies of neighboring states are important considerations in assessing future development in the territories and commonwealth. Take for example, the effect of the FSM policy adopted in June 1991 that made the "local landing of tuna" a condition of fishing licenses for longline tuna vessels. Prior to the 1991 policy, most of the sashimi longliners operating in the North Pacific transshipped their fish through Guam's Apra Harbor. After 1991, shore bases in FSM and Palau began transporting sashimi-grade tuna by smaller cargo jets to Guam and Saipan where shipments were consolidated for transshipment onto jumbo jets bound for Japan. In 1991, 95% of the fish transshipped in Guam came through the sea port with the remainder coming in on chartered jet freighters. By 1993, fish landed at Apra Harbor constituted less than 65% of the total fish being flown to Japan. The problem for Guam is that the tuna being flown into and out of Guam generates little additional employment or purchases of goods and services, with the exception of landing fees and jet fuel purchases.

Fishing activity in other Pacific Island states has a similar potential to affect the U.S. Pacific territories and commonwealth. Some recent noteworthy events include the following:

- In the Marshall Islands, the addition of 40 Chinese boats home-porting in Majuro and discussions to develop a new longliner shore facility on Enewetak Atoll;
- In Palau, negotiations to schedule nonstop Japan Air Lines and Continental Micronesia flights to Japan. Such a connection would reduce (and possibly eliminate) the need to transship tuna destined for the Japanese sashimi market from Palau (and possibly Yap) through Guam and Saipan; and
- In Papua New Guinea (PNG), plans to establish a tuna cannery or canneries. A potential consequence could be a redeployment of fish-harvesting capacity (and shore support facilities) from American Samoa and Guam to PNG.

Possible strategies: expansion and regional liaisons

Hamnett and Pintz suggest that the primary way for the U.S. Pacific territories and commonwealth to increase the benefits of the presence tuna fleets is through expansion of goods and services in the seaport operations of Pago Pago, Tinian and Guam. Less scope for increasing the benefits from air transshipment exist, even though that activity has experienced the most growth in the past four years.

Hamnett and Pintz also note that, as integration of tuna harvesting, processing and transshipment, and boat provisioning in the Central Pacific increases, a strong case can be made for closer liaison between the U.S. Pacific territories and commonwealth and the Freely Associated States of FSM, Marshall Islands and Palau. Such a liaison may be possible with the new provisions of the Magnuson-Stephens Fisheries Conservation and Management Act, which recognize the customary fishing rights of indigenous people. The effect should give the U.S. Pacific Island governments a much greater voice in the development of policies governing the management of the 200-mile exclusive economic zones which surround their islands, including the potential for increased interaction with the Forum Fisheries Agency whose membership includes the Freely Associated States. One area of mutual concern is the effect in the market of huge increases in the amount of sashimi-grade tuna being sent to Japan.

PFRP

For a copy of the technical report for any of the studies featured in this issue, contact

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The 1993 Hawai'i-based Longline Fleet: Understanding Factors That Lead to Profitability

With 122 operational vessels and an estimated annual revenue of US$55 million, the 1993 Hawai'i-based domestic longline fleet is a formidable subject for analysis. University of Hawai'i's Joint Institute of Marine and Atmospheric Research investigators Marcia Hamilton, Rita Curtis, and Michael Travis, along with UH graduate assistant Minling Pan, approached the task by surveying 101 of Hawai'i's domestic longline vessels between May and December 1994. The surveys focused on 1993 vessel operations and resulted in the PFRP study "Cost-Earnings Study of the Hawai'i-Based Domestic Longline Fleet." Information was gathered through interviews primarily with the vessels' owners and operators. In the end, 95 vessels were analyzed, excluding two vessels that port in Kona rather than Honolulu, three vessels that fished in other fisheries for part of 1993 (e.g., South Pacific, Gulf of Mexico), and one vessel that made only one set during the year.

The results show that Hawai'i-based domestic longline vessels earned an average annual net return of US$27,000 in 1993. The highest net return was achieved by vessels using a mixed target strategy (mixed vessels) followed by tuna vessels, those whose target varied by trip (varied vessels) and swordfish vessels.

To better understand factors that lead to profitability within a vessel type, the study analyzed economic highliners, defined as the three vessels that earned the highest annual net return within a given group. On average, economic highliners sold more pounds of their target species than other vessels in their group and tended to secure higher prices for their fish while maintaining lower mean costs. Interestingly, while highliners paid less in supply costs and sales fees, they had higher labor costs as they generally used more crew members per trip.

The study also found that swordfish vessels realized the highest gross revenue, but profitability was offset by the highest variable and fixed costs of all groups. Variable costs are those that vary with the number of trips taken (e.g., fuel, oil, ice, bait, food, fishing supplies, excise taxes, labor costs and sales charges). Fixed costs consist of maintenance, insurance, loan payments, dry-dock, depreciation, accounting and non-trip miscellaneous costs. The higher variable costs are the result of several factors. First, swordfish vessels took longer trips and made more sets per trip than did other vessels, which led to greater fuel, food and bait expenses. Second, these vessels used more lightsticks per set than other types of vessels. Finally, swordfish vessels tended to sell their fish through export brokers, whose sales fees include shipping costs as well as commissions.

What if...?

Although no new management issues have been proposed for the Hawai'i-based longline fishery, "what if" simulations were used to determine the potential effect of a variety of changes in the fishery. For example, simulations showed that a one-day reduction in fishing days per trip (i.e., one less set per trip) would, on average, result in a US$16,000 loss, for an annual mean gross return of US$24,000.

Simulation modeling also assessed the impact of an increase in the mean travel days per trip (with mean fishing days per trip at their original level). Such a situation could occur following changes in the migratory patterns of the fish or a widening of the closed areas (shoreline "buffer" zones) in which longliners are prohibited from fishing. These buffer zones currently range from 25 to 75 miles from the shoreline. The results showed that a one-day increase in travel days per trip would result in a US$4,000 loss, for an annual gross mean return of US$36,000.

The third simulation revealed that the minimum level of operations required for vessels to break-even (i.e., gross revenue equals the total of variable and fixed costs) was US$12,000.

(continued on page 8)

Social Value of Hawai'i's Troll and Handline Fishery

Fishery management policies require answers to two interlocking questions. The first conservation question is "How many fish can be harvested on a sustainable basis without undue hardship to other important species and the environment?" Disciplines addressing this question are fishery biology and oceanography. The second allocation question is "How should the opportunities to harvest fish be allocated to elements of the fishing industry?" Disciplines of the social sciences address this question. Economists commonly utilize the notion of economic value, while cultural anthropologists and social scientists examine the significance of fishing in generating social and moral solidarity critical for the sustainability of communities and in providing lifestyles and identity options that give meaning to the life of individuals.

A multi-phased PFRP project, "Social Aspects of Pacific Pelagic Fisheries," headed by Marc L. Miller, School of Marine Affairs, University of Washington, seeks to answer this second question from the social science perspective for the Hawai'i troll and handline pelagic fishery. The fishery is composed of up to 10,000 small vessels (under 45'), of which only 2,000 to 3,000 are owned by persons with commercial marine licenses required for the sale of fish. In the initial phase of the study, Miller was assisted by Julie K. Walker, Alistair Letham, Michael K. Orbach, Nina Hadley, Annie L. Rice, and Scot Copeland.

A main objective of the study was to identify social relationships that link people in fishing situations. Three overlapping situations were identified: (1) fishing trips, (2) fish selling and sharing, and (3) fish talk. Phase I of the project considered the first of these. Information was gathered between August 1994 and March 1995 by three project fieldworkers who formally surveyed 54 Hawai'i troll and handline fishermen in O'ahu and Hawai'i, primarily at Kewalo Basin, Hilo and Kailua-Kona. In addition, team members conducted informal interviews with several hundred fishermen and fishery managers. All but one of the fishermen formally interviewed were men. They ranged between 21 and 61 years in age,

(continued on page 7)

Economists and social scientists gather for a group shot during a meeting of PFRP principal investigators in Honolulu on Nov. 15, 1996.

Front row, from left: Kin Ping Tse, Ujjayant Chakravorty, Marcia S. Hamilton and Julie Walker.

2nd row, from left: Keichi Nemoto, Craig Severance, Michael D. Travis and Michael P. Hamnett.

Back row, from left: John Yanagida, Stuart Nakamoto, Ping Sun Leung, Jennifer Kelleher and Marc L. Miller.

Social value (continued from page 6)

with 38 being the average age. More than half fished in trailerable vessels under 25' in length.

Fishing trips were identified as being the social productions of fishing crews. Surveys revealed that the troll and handline crews are based on three kinds of social relations: a family structure (or *'ohana*), a friendship structure (or *hoaloha*), and an enterprise structure (or *hui*). Results revealed that the majority of Hawai'i's pelagic troll and handline crews are based on friendship, family, or a combination of the two.

Four basic styles of troll and handline fishing emerged. *Holoholo fishing* is the Hawai'i formulation of recreational fishing; holoholo fishermen value the aesthetic, sporting, social, familial, and isolationistic aspects of fishing. *Kaukau fishing* is the Hawai'i variant of fishing for food or subsistence; by definition, kaukau fish are not sold. *Expense fishing* arises from the motive of wanting to sell enough of the catch to cover the prices of fuel and provision. *Profit fishing* involves the selling of a product or a service; profit fishermen are committed to fishing as an occupation or profession.

The study revealed that within a given year Hawai'i's troll and handline fishermen engage in more than one style of fishing: 96% in holoholo fishing; 83% in expense fishing; 81% in kaukau fishing; and 58% in profit fishing.

Fishermen were also asked about fishery management issues. The majority of the fishermen felt that fishing was worse than the year previous and expressed concern about overfishing, resource depletion, market prices for fish, pollution and waste, fishing groups using certain gear techniques (longliners, driftnetters, gillnetters, and purse-seiners), and management issues (such as manganese mining, fishing licenses, tag-and-release, and FADs). The fishermen also expressed concern about fishery issues related to costs and income problems, competition, and enforcement of laws.

A main sociocultural theme of Hawai'i troll and handline fishing that emerged in the first phase of this study is that fishermen are able to develop relationships with family, friends, and coworkers through holoholo, expense, kaukau, and profit fishing.

PFRP

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Upcoming Events

March 3–6, 1997
Swordfish Symposium
Honolulu, HI; National Marine Fisheries Service
(808) 943-1253

May 19–22, 1997
48th Tuna Conference
Lake Arrowhead, CA; Inter-American Tropical Tuna Commission; (619) 546-7045

April 21–25, 1997
Western Pacific Regional Fishery Management Council Meeting, Honolulu, HI; WPRFMC
(808) 522-8220

Long-line fleet (continued from page 6)

Longline fishermen speak up

The last question in the survey asked fishermen to provide comments regarding fishery management and regulations. Their responses fell into six major categories: limited entries and permits; area closures; on-board observers; dock facilities; Coast Guard regulations; and regulation of other fishermen.

Almost all of the fishermen thought that the limited entry system was necessary, but most had negative regard for a change in permit rules that would allow permit transfers. Such a change would benefit wealthy corporate boat owners and would cause large boats to enter the fishery and drive out the small boats, they contended.

Almost all of the longline fishermen said the area closures, or buffer zones, increased their operating costs by causing them to take longer trips, thus increasing their main trip expensefuel.

While many fishermen said that they did not mind having an observer on their boats, those who operated small boats said the observer takes up space and forces the boat to operate with one less crew member, thus making fishing operations more difficult and potentially less successful.

Many fishermen said that lack of dock space was a major problem as it makes the loading of supplies and unloading of fish difficult.

Some fishermen who are non-native speakers of English expressed concern that the Coast Guard had recently started to impose and rigorously but inconsistently enforce innumerable rules that the fishermen described as overly strict, confusing, and not related to safety. Language differences created significant problems between the fishermen (particularly the crew members) and the Coast Guard.

Hawai'i-based longliners in Honolulu harbor.

Non-regulation of other fishermen was the main concern (in terms of frequency and intensity of feeling) of the longline fishermen. Their comments dealt with two groups: (1) other Hawai'i fishermen and (2) non-U.S. fishermen. Longliners maintained that the contribution of other fishermen to local problems, such as overfishing, had not been properly studied. Moreover, they believed that, if anyone should be regulated, it should be the non-commercial (i.e., recreational) fishermen who do not rely on fishing for their livelihood.

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