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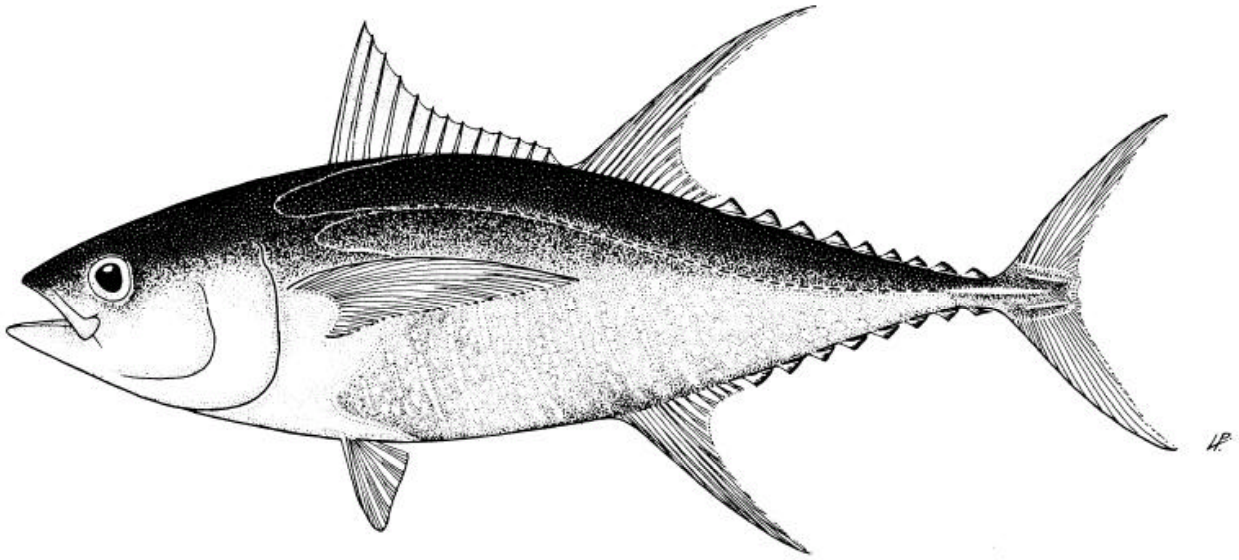
Economic and operational characteristics of the Hawaii longline fleet in 2000



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Economic and operational characteristics of the Hawaii longline fleet in 2000. [1]

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INTRODUCTION

The Hawaii-based longline fleet grew rapidly from the mid-1980s until the late 1990s (Fig. 1,2). However the fishery experienced considerable changes during 2000-01. Before 2001, the fleet could be separated into vessels that targeted swordfish (*Xiphias gladius*), those that targeted sashimi-grade bigeye tuna, *Thunnus obesus*, or yellowfin tuna, *Thunnus albacares,* and those that had a mixed fishing strategy. In 1999, protected species bycatch issues resulted in a partial closure of the area where the swordfish fishery operated (waters north of Hawaii) and, ultimately, a complete closure of the swordfish fishery in 2001. This required a significant portion of the fleet to either leave Hawaii or switch target species from swordfish to tuna, which entailed changing fishing gear and methods. Subsequently NMFS also closed an area south of Hawaii from April 1 through May 31 in waters bounded on the south by the equator, on the west by 180° longitude on the east by 145° W. longitude and on the north by 15° N. latitude for the entire fishery. The fleet suffered another setback due to state regulations concerning the landing of shark fins (June 2000) and later a federal prohibition on the finning of sharks (December 2000). All of these regulations resulted, to various degrees, in an economic impact on both the swordfish and tuna fleets.

The economic impact(s) of state and federal regulations on commercial fishers is (are) playing an increasing role in fisheries management. The Magnuson-Stevens Fishery Conservation and Management Act[2] requires the regional fishery management councils to consider potential economic impacts of future regulations in their planning efforts. Hamilton, et al. (1996) conducted a cost/earning study of the Hawaii-based longline fleet which documented the costs associated with operating a longline vessel in Hawaii during the 1993 fishing season as well the estimated earnings of these vessels. The authors concluded that while both segments of the fleet were profitable the amount varied according to target and vessel size. The present study

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[1] A working document submitted to the 15th Meeting of the Standing Committee on Tuna and Billfish, Honolulu, Hawaii, 22-27 July 2002.

[2] SEC. 303 Contents of Fishery Management Plans 16 U.S.C. 1853 95-354, 99-659, 101-627, 104-297. (a) Required Provisions. – Any fishery management plan which is prepared by any Council, or by the Secretary, with respect to any fishery shall—(2) contain a description of the fishery, including,…the cost likely to be incurred in management, actual and potential revenues from the fishery…

was conducted to provide updated information because the fleet is now operating under considerably different conditions than early in the last decade.

The primary objective of this study was to provide baseline economic information associated with operating a pelagic longline vessel in Hawaii in 2000. Additional objectives include documenting vessel physical and operation characteristics, the economic impacts of the most recent regulations, fishers' opinions on the status of the fishery, and basic demographics of the fleet. This information will assist fisheries managers when they are considering the potential economic impacts of future regulations.

METHODS

Survey and data acquisition

Vessel owners or operators were interviewed by the senior author from March 2001-January 2002 at Kewalo Basin and Honolulu Harbor. All Hawaii longline permitted vessels that fished in 2000 and were in port during this time period were approached. Survey questions focused on variable costs (those incurred when the vessel actively fishes) and fixed costs (those incurred regardless of the number of trips the vessel takes) as well as vessel characteristics, demographics, fishers' comments and the economic effects of recent management changes due to the protected species issues. Commercial fishing industry members were also interviewed and provided pertinent ancillary information on the longline fleet.

Revenue and landings information for vessels that landed in Hawaii were obtained from the Hawaii Division of Aquatic Resources (HDAR). Receipts from the California Department of Fish and Game (CDFG) were used to generate revenue information for vessels that landed their fish in California.

Fishing expenditures and data analysis

Vessel specific information from interviews and logbooks included overall length (small <56', medium = 56.1' to 73.9', large > 74') and target species (tuna or swordfish). These variables represented the vessel categories. Annual individual fixed costs were reported directly by the fishers. Trip variable costs (e.g. fuel, oil, ice, bait, daily maintenance) were determined by multiplying the amount used per trip by the average cost per unit as reported by fishers. Annual variable costs were calculated by multiplying the cost per trip by the number of trips the vessel made during 2000.

RESULTS

Interviews

Seventy-four vessels were approached of which 62 (82%) were willing to provide information via interviews. These vessels represent 37% of the swordfish fleet, 60% of the tuna fleet, and 49% of the entire fleet.

Physical and operational characteristics

The physical and operational characteristics of the vessels varied according to their target. Swordfish vessels were newer, larger, and had greater fuel and fish hold capacity as well

as ice-making capabilities. There were also differences in operational characteristics. Swordfish vessels traveled a greater distance to the fishing grounds, set their gear at dusk and hauled at dawn, average four hooks/float, set the gear close to the surface, used squid of various species as bait, and average 15 sets/trip. Tuna vessels set during at dawn, hauled at dusk, averaged 29 hooks/float, fished deeper (100% of tuna vessel use a line shooter), used sanma (*Cololabis saira*) or sardine (*Sardinops sagax*) as bait, purchased ice prior to each trip and averaged 11 sets/trip.

Income statements

The estimated total ex-vessel value of the Hawaii-based longline fleet in 2000 was $51 million. Only vessels that were interviewed were included in the final income statements, which included fixed costs, variable costs, labor costs, landings, and revenue (Table 1). Swordfish and tuna vessels earned an annual net return of $27,484 and $55,058, respectively. Among the latter, small vessels were the most profitable. These vessels had higher gross revenues and, consequently, higher labor costs but lower fixed and variable costs. Large swordfish vessels were more profitable than smaller swordfish vessels.

Miscellaneous Economic Analysis

Comparison with the 1993 cost-earning study.

Table 2 compares the results of the 1993 cost-earning study (Hamilton, 1996) and the current study (2000). A striking difference between the two studies is the amount of gross revenue generated by the tuna fleet with the 2000 fleet having higher gross returns and therefore higher net revenue. To a certain extent this may reflect the transition of some larger swordfish and mixed target vessels that began to target tuna in the late 1990s.

Shark finning ban

Prior to June 2000, swordfish and tuna vessels were actively taking shark fins. The ban on shark finning resulted in a loss primarily to crewmembers because, in most cases, the revenue generated from the sales went directly to the crew, not the vessel. The approximate annual loss of revenue per tuna vessels is $10,652 and the loss to swordfish vessels is $23,492. This equates to approximately 10% of the annual pay to tuna crews, which is similar to the percentages estimated by McCoy and Ishihara (1999), and 23% to swordfish crew.

Cost to convert from swordfish to tuna

Swordfish vessels that stayed in Hawaii after the ban on swordfish style fishing were forced to target tuna, which entailed converting their gear. Because tuna are fished deeper than swordfish, tuna gear is considerably heavier than swordfish gear. The cost to purchase new gear is approximately $36,000 not including the labor to assemble the gear.

Foreign Crew

A recent trend that will affect the cost of operating a longline vessel is the hiring of foreign crew, primarily from the Philippines. These crewmembers are paid a monthly salary and possibly a tonnage or captain's bonus. There are also agency, crew, and immigration fees associated with the hiring of foreign crew. During 2000, only 6 interviewed vessels employed foreign crews. During the interview the type of crew presently (i.e., 2001 and 2002) employed was noted. It is estimated that over 54% of the vessels currently employ foreign crew.

An analysis was conducted comparing the annual costs to pay crew using the shares (crew gets a portion of the catch revenue) and those that pay a fixed salary. The 2000 fleet average annual cost to pay crew shares of the catch was $152,097 and the annual cost to pay the crew a monthly salary was $44,333. Vessels that changed from 'local' to foreign crews were asked what motivated them to switch. Three distinct answers were given, corresponding to the ethnicity of the vessels' owners. The vessels owned by Korean-Americans stated the foreign crewmembers were easy to work with, the vessels owned by Caucasian-Americans found foreign crew to be cheaper than local crew, and the vessels owned by Vietnamese-Americans switched because they could not find Vietnamese-American crew who wanted to fish for tuna.

DISCUSSION

Most Hawaii longline vessels experienced a positive net return in 2000. Small tuna vessels were the most profitable due to low fixed and variable costs. Larger tuna vessels accrued higher costs (specifically variable costs) but this did not necessarily result in higher gross revenue. Larger swordfish vessels accrued higher costs but experienced higher catch rates than smaller swordfish vessels and therefore had higher net revenue.

The year 2000, although profitable for most vessels, brought considerable changes to the Hawaii longline fleet. The shark finning ban resulted in an economic loss to almost all vessels. The swordfish vessels also suffered economically because of, first, the reduction in effort and second, the cost to convert their fishing gear. Swordfish vessels that did switch to targeting tuna are experiencing an inestimable economic loss while learning to fish for tuna. Many fishers indicated that did not expect 2001 to be as profitable as 2000, with some even expecting a loss.

LITERATURE CITED

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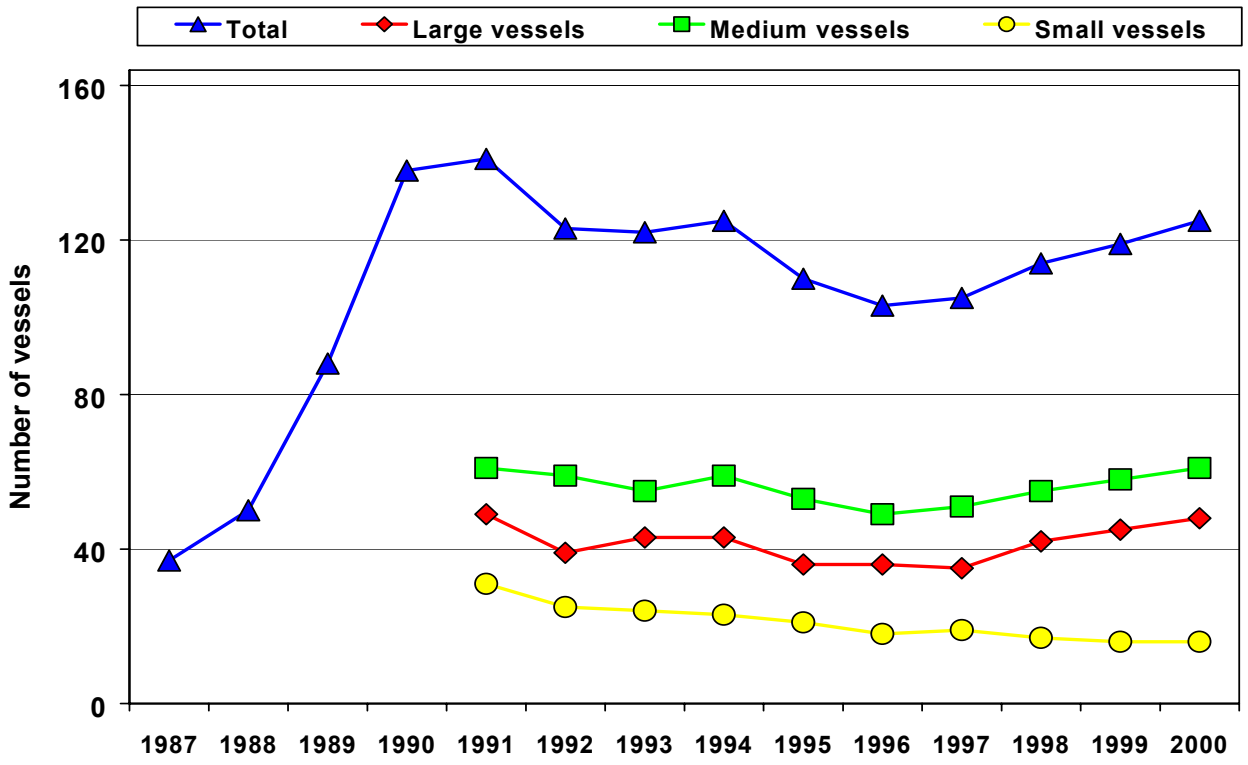

Figure 1. Number of active Hawaii-based longline vessels, 1987-2000 (Ito and Machado, 2001).

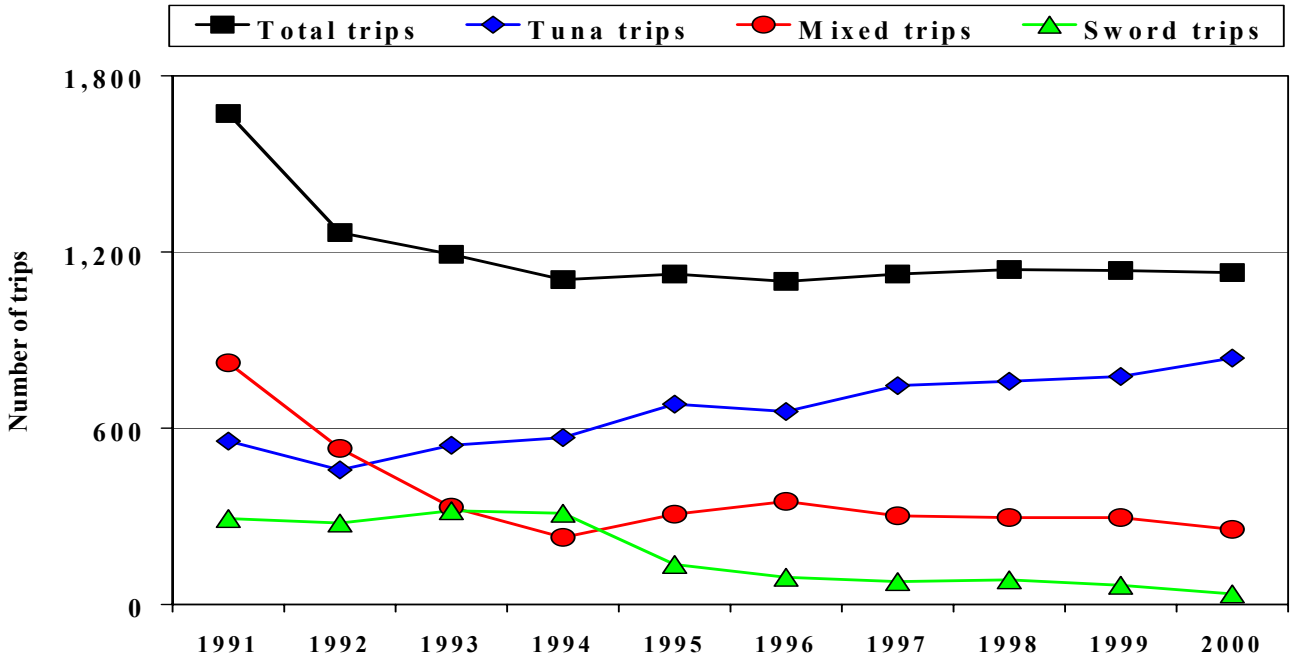

Figure 2. Number of trips by Hawaii-based longline vessels, 1991-2000 (Ito and Machado, 2001).

Table 1. Summary of annual revenues and costs (US$) for the Hawaii longline fleet in 2000. Vessels are classified by target and size (small <56', medium = 56.1' to 73.9, large >74') and target (tuna or swordfish). Vessel classification ST= small tuna, MT= medium tuna, LT= large tuna, MS=medium swordfish, LS= large swordfish. Swordfish values include corrected costs.

	Target		Vessel Classification				
	Swordfish	Tuna	ST	MT	LT	MS	LS
Statement	average	average	average	average	average	average	average
Gross Revenue	490,301	495,456	502,740	496,578	485,286	459,465	526,277
Fixed Costs Total	93,207	90,597	66,409	93,056	84,433	81,520	105,633
Variable Costs Total	230,232	184,986	147,503	182,868	239,749	239,928	221,449
Labor	139,379	164,815	187,685	167,378	142,896	114,422	160,619
Total Costs	462,818	440,398	401,597	443,302	467,078	435,870	487,701
Net Revenue	**27,483**	**55,058**	**101,143**	**53,276**	**18,208**	**23,595**	**38,576**

Table 2. Comparison of the 2000 and 1993 Hawaii cost-earning study (Hamilton, 1996).

	Tuna		Swordfish	
Statement	1993 avg ($1000)	2000 avg ($1000)	1993 avg ($1000)	2000 avg ($1000) *
Revenue	355	495	633	490
Fixed costs	89	91	127	93
Variable costs	133	185	356	230
Labor	113	165	139	139
Total costs	335	441	622	462
Net revenue	20	55	11	27