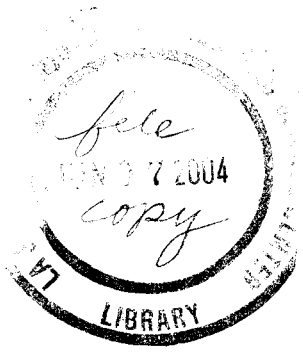

A SURVEY OF THE IKA-SHIBI FISHERY IN THE STATE OF HAWAII, 1980

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PREFACE

This report was prepared under contract (Purchase Order No. 80-JJA-00389, dated 19 September 1980) by Walter N. Ikehara, graduate student, University of Hawaii. The contract objective was to collect data from the Hawaiian ika-shibi fishery. The resulting data tabulations and summarizations, and descriptions of data collecting methodology provide information on the status of the Hawaiian ika-shibi fishery through 1980 and are intended to aid future data collecting activities for this fishery. Since the report was prepared under contract, the statement, findings, conclusions, and recommendations in it are those of the contractor and do not necessarily reflect the view of the National Marine Fisheries Service.

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16 April 1982

INTRODUCTION

The ika-shibi, or night handline, fishery for tunas has undergone rapid expansion in the last few years. This is due mainly to the high productivity of the method and its low capital and operating costs. Although predominantly occurring on the island of Hawaii, it has also become established on Kauai and possibly other islands in the state of Hawaii. Since the description of the fishery by Yuen (1979), based on 1973-1975 data, there have been no reports detailing the recent development and progress of the fishery.

Since there is no separate category for ika-shibi in the catch reports of the Division of Aquatic Resources, state of Hawaii, ika-shibi catch data are usually reported in the deep-sea handline category. Because the deep-sea handline category may also include catch data from the day handline and bottomfish handline fisheries, it is difficult to distinguish the ika-shibi catch. It is also possible that some of the ika-shibi catch may not be reported at all. The National Marine Fisheries Service funded this contract for the purpose of collecting descriptive data on the ika-shibi fishery in the state of Hawaii in order to assess the size of the fishery, its economic value, and its catch, for inclusion in fishery management plans for tuna and billfish species.

The results of this survey will be useful in the formulation of economic and development plans for the fishing industry in the state and in the planning of further research on the ika-shibi fishery.

METHODS

The data were collected in two ways from five principal wholesalers on the island of Hawaii and one from the island of Kauai: 1) The wholesalers who deal with ika-shibi fishermen were approached and direct access was gained to their fish records. The data I collected from these records included the date of catch, locality, and catch by species with individual fish weights and prices. 2) In some cases, I could not collect the data myself and so the data were extracted by the wholesaler, and did not always include complete records of all desired data. As a result some of the data presented in the tables represent mixtures of actual data and estimates based on similar data from other wholesalers.

The value data were incomplete from two wholesalers so the ex-vessel revenues were estimated by the following method. The mean price per pound was calculated from data from other wholesalers in the same area. The weight of each fish was multiplied by the price per pound, then summed for the entire month. The month's total value was divided by the total weight of fish for the month yielding the monthly mean price per pound. The total weight of fish for each month from the wholesaler with

missing value data was multiplied by the calculated mean price per pound resulting in the month's estimated ex-vessel revenue. This was done for each month and each species for which the wholesaler lacked value data. Note that the figures cited in Table 1 represent the ex-vessel value of the fish only and do not include the value added by the wholesalers and retailers dealing with the marketing and processing of fish caught in the ika-shibi fishery. Data were not collected from small wholesalers dealing with a few ika-shibi fishermen or from fishermen who market their catch independently as they comprise a small segment of the total ika-shibi fishery and it was difficult to collect these data.

The catch records were arbitrarily selected, with the consultation of wholesalers and fishermen, for inclusion in the ika-shibi catch data, as notations were not made as to the method by which fish were caught. The records were selected based on knowledge of the established ika-shibi fishermen and presence in the catch of species usually caught by ika-shibi fishermen, such as yellowfin tuna, albacore, swordfish, and bigeye tuna. In Hilo, on the island of Hawaii, fishermen who use the ika-shibi method do not usually fish any other way. However, along the south and west coast of Hawaii, fishermen may utilize the ika-shibi, day tuna handline, trolling, and bottom-fishing methods, depending on the season and the particular types of fish in abundance. Along the southwest coast, it seems that most tuna fishermen use the ika-shibi

method only at times when large tuna are abundant in certain areas. Some fishermen use the ika-shibi method consistently during much of the year.

Since the wholesale records do not include data on fishing effort, a stock assessment study was infeasible and there was no certainty as to which fishermen were full-time or part-time. Full-time meant that the fisherman had no other full-time job, while part-time meant that the fisherman may have another full-time job, or that less than one-half of his income came from fishing. Some indication can be obtained by examining the dates of reported catch (not presented here) assuming that full-time fishermen are more likely to fish during the week than are part-time fishermen. A large number of full-time fishermen will confirm the validity of the ika-shibi fishery as an industry.

RESULTS

The tables clearly show that the ika-shibi fishery is now considerably larger than when described by Yuen (1979). The total weight of tunas caught in 1980 was almost six times that for 1975 (887,782 vs. 154,955 kilograms). The ex-vessel revenues for tunas in 1980 was about $2.8 million compared to $327,500 for 1975, almost a ten-fold increase. Other species added about $110,000 to the total ex-vessel revenues for 1980. The species caught are listed in order of weight (Table 1) and show that yellowfin tuna is definitely the primary species

caught. What is somewhat surprising, is the considerable catch of albacore in the fishery, larger in 1980 than the bigeye tuna catch. However, in other years the bigeye tuna catch may be larger than the albacore catch, as in 1975 (Yuen, 1979). Also interesting are the appreciable catches of swordfish and large marlins, although probably smaller than the catch of the longline fleet. It is possible that some of the marlin catch, especially the striped marlin, may have been caught by ika-shibi fishermen using longlines during the off-season.

The number of fishermen listed in Table 2 is a conservative estimate of the total number of ika-shibi fishermen. In the case of one wholesaler, no data were provided as to the number of ika-shibi fishermen reporting their catch each day. No attempt was made to estimate the number of these fishermen.

Of those for which good records were available, 233 fishermen reported fish caught by the ika-shibi method. Of these, 175 reported 15 times or less in 1980 and are probably part-time fishermen, although a few may actually be supporting themselves mainly on fishing income. Fifty-eight of the 233 reported catches more than 15 times in 1980, with 103 as the highest number of reported catches. From personal observation and communications, it seems that the number of ika-shibi fishermen increased in early 1981, especially on Kauai, and that more than a few new boats were added to the fleet. It is likely that 300 or more fishermen will use the ika-shibi method at least once during 1981 and that the number of full-time

fishermen will increase by the end of the year.

The information in Table 3 shows the seasonality of various species in the fishery. Although the figures can be misleading because no effort data are available to compare with the catch data, the monthly catch figures indicate the effects of seasonal fishing effort and fish abundance on seasonality. The seasonality of the fishery also depends on the location, being slightly different for the east and west coasts of the islands. The east coast of the island of Hawaii generally has a fishing season lasting from May through October. The west coast seems to have a summer/early fall season also, but there seems to be a winter "run" of large tuna near the South Point area of Hawaii. In general, summer and early fall is the period of peak abundance of yellowfin tuna throughout the state. Yuen (1979) provides more details for the fishing season in Hilo.

DISCUSSION

As seen from the tables, the ika-shibi fishery has grown about six times larger since 1975 (see Table 4). This confirms the suspected rapid growth of the fishery within recent years. Although no data are available to confirm this, I don't think that the fishery has reached its maximum size yet.

The total ex-vessel revenues of the fishermen exceeded $2.9 million in 1980. Industry sources have cited estimates as high as $5 million as the total worth of the fishery. If the revenues of the wholesalers and retailers marketing the

ika-shibi catch are added to the fishermen's revenues, it seems that this estimate is accurate. This estimate will place the ika-shibi fishery as one of the more important fisheries in the state. Considering that individual fishermen have been estimated by fishery sources to have a gross income as high as $140,000 per year, with an estimated average gross income of $40,000 to $80,000 per year, it is not surprising that the fishery is experiencing rapid growth.

The ika-shibi fishery, along with the albacore troll fishery off the Northwestern Hawaiian Islands, is a very promising newcomer to the small but locally important fishing industry in the state of Hawaii. Since it is characteristically productive and low-cost, it is an ideal fishery development project for other small Pacific Ocean island groups. It has been found to be highly successful in the Philippines (Yuen, 1979). Attempts to introduce the ika-shibi method to other areas have met with varying degrees of success (Strong, 1979). If the ancillary fish-handling and transportation facilities are available, then it is potentially a highly profitable industry.

RECOMMENDATIONS

While the ika-shibi fishery possesses high growth potential, it is also hindered by certain problems. A condition known as "burnt tuna" occurs in a significant proportion of the ika-shibi catch. It appears as a pale, soft deterioration of raw tuna muscle which causes a sour, bitter taste and a

displeasing appearance to the raw tuna (Cramer, et. al., 1981). The incidence of burnt tuna is a serious problem, primarily because of the need for high quality in fresh tuna for the export market. Since the local market is too small to absorb the large quantities of fresh tuna caught during the peak season, export markets are important to the further expansion of the fishery (Hawaii Business, 1979). Burnt tuna occurs in tuna caught by other fishing methods, such as trolling and purse seining, but fish caught by these methods are not usually exported from Hawaii.

The first goal in improving the quality of fresh tuna should be the development of a burnt tuna assay for use on whole tuna. If the exporters can ensure that the tuna being exported are of high quality by assaying for burnt tuna, then export marketing losses will be eliminated. Secondly, the incidence of burnt tuna should be reduced by improvements in fishing and handling procedures so that a higher level of quality in fresh tuna can be maintained. Such measures will benefit both the local markets and the export markets.

As the ika-shibi fishery continues to grow, new fishing areas should be explored and exploited as the traditional fishing areas become more crowded. It is likely that not all islands will have suitable ika-shibi fishing areas, but I do not think that enough exploration has been done. Occasional anecdotal reports of ika-shibi fishing have been reported for areas of the state where ika-shibi fishing is not regularly

taking place. As a requisite for exploratory work, thorough studies should be made of the existing ika-shibi fishing grounds, such as food resources, oceanographic conditions, and fish migratory patterns in the area.

I also recommend that some mechanism be set up to collect data regularly from the ika-shibi fishery so that a good historical data base of the fishery can be established. Such a data base would be valuable in stock assessment studies, fishery management plans, research on topics such as burnt tuna, and in economic studies. Although the Hawaii Division of Aquatic Resources collects data on the deep-sea handline fishery, the catch data does not segregate bottom-fishing and ika-shibi catches. Furthermore, not all of the ika-shibi catch may be reported in the deep-sea handline data because it may be reported in other categories or not at all. The ika-shibi fishery is unique and deserves its own category.

The opinions and recommendations expressed in this report are my own and not of the National Marine Fisheries Service or the Hawaiian fishing industry.

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TABLE 1

IKASHIBI FISHERY CATCH SUMMARY 1980

SPECIES	TOTAL WEIGHT(kg)	NUMBER	VALUE($)	SOURCES&
Yellowfin tuna	814,871#	21,110	2,618,945*	6
Albacore	43,645	1,837	71,374*	4
Bigeye tuna	29,266	819	108,611*	5
All tunas	887,782	23,756	2,798,930	-
Swordfish	19,720	269	58,507	3
Mahimahi	6,658	672	33,348	3
Marlin +	6,229	54	7,861	3
Striped marlin	2,570	73	7,070	2
Sailfish	111	9	359	1
Shortbill spearfish	30	1	86	1
Squid	2,437	-	4,268	2

Weight to nearest kilogram, converted from pounds.
Of this total yellowfin tuna catch, 5,825 kg of unidentified tuna were reported from Kauai. The remainder were reported from Hawaii.
* In some cases, a portion of the values are estimated.
+ Species not identified in records, probably blue marlin.
& Number of sources reporting catch.

TABLE 2

ESTIMATED NUMBER OF IKASHIBI FISHERMEN 1980

Number Reporting Catch (Of 233)		Mean no. reports	SD
1-5 Times per year	124	2.0	1.3
6-15 Times per year	51	9.8	2.6
>15 Times per year	58	40.2	24.0

Note: Data from 4 sources from the island of Hawaii. Mean number and standard deviation (SD) refer to the number of reports for each category at left.

TABLE 3

MONTHLY CATCH 1980

MONTH	YF	ALB	BE	MM	SW	BM	SM	SF	SQU
Jan	49,677	854	7,238	131	--	218	120	14	--
Feb	8,743	--	975	28	--	--	96	--	--
Mar	6,022	--	260	220	--	--	41	27	--
Apr	20,185	96	1,366	435	212	157	553	38	--
May	65,251	1,238	743	281	5,363	345	135	12	4
Jun	114,844	7,006	2,140	675	9,768	991	--	10	108
Jul	116,044	3,104	4,034	667	3,617	2,246	--	--	205
Aug	95,910	12,623	1,669	382	237	795	--	--	111
Sep	83,729	6,889	2,267	532	218	1,045	--	--	1,145
Oct	113,445	10,347	4,805	1,310	71	--	86	--	788
Nov	25,218	296	2,435	1,059	34	140	739	10	29
Dec	115,804	1,191	1,516	938	201	291	801	--	47

Catch listed to nearest kilogram.
Abbreviations in headings stand for: YF=yellowfin tuna, ALB=albacore, BE=bigeye tuna, MM=mahimahi, SW=swordfish, BM=blue or black marlin, SM=striped marlin, SF=sailfish, and SQU=squid.

TABLE 4

IKASHIBI CATCH DATA 1975

SPECIES	WEIGHT(kg)	VALUE($)
Yellowfin tuna	75,636	157,000
Bigeye tuna	63,182	149,500
Albacore	16,136	21,000
All tunas	154,955	327,500
Squid	1,273	3,500

Data from Yuen (1979), to nearest kilogram.