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PELAGIC FISHERIES RESOURCES OF THE NORTHWESTERN HAWAIIAN ISLANDS

Thomas S. Hida

Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, P.O. Box 3830, Honolulu, Hawaii 96812

ABSTRACT

Included in this paper are reviews of data collected by the Hawaii Division of Aquatic Resources on the fish catch in the Northwestern Hawaiian Islands (NWHI) by longlining and trolling in recent years, the relatively new fishery for albacore, Thunnus alalunga, in the vicinity of the NWHI that is being carried out by U.S. West Coast albacore trollers, and some of the longline, live-bait, and gill-net fisheries that are being carried out by Japanese and Taiwan vessels in the North Pacific Ocean.

gill net
longline
troll
live bait
pelagic fisheries
Northwestern Hawaiian Islands

INTRODUCTION

The purpose of this report is to review some of the pelagic fisheries within the 200-mile U.S. fishery conservation zone around the Northwestern Hawaiian Islands.

DOMESTIC CATCHES IN THE NORTHWESTERN HAWAIIAN ISLANDS

The commercial fish landing reports of the Division of Aquatic Resources (DAR) of the Hawaii Department of Land and Natural Resources from 1971 through 1980 show that fish harvested in the NWHI ranged from 23 to 108 metric tons (MT) (Table 1). Besides the total landings, shown in parentheses are the catches of pelagic species. The amount of pelagic species caught fluctuated from 1.7 to 9.4 MT and represented 2 to 26 percent of the fish caught in the NWHI, with an average of 11 percent. Table 2 shows the catch by species for the same years. The catches of 245 to 6,700 kg of yellowfin tuna, Thunnus albacares, and 760 to

3,730 kg of wahoo, Acanthocybium solandri, were the largest contributors to the pelagic fish landings. Kawakawa, Euthynnus affinis, made a noticeable contribution of 1,200 kg in 1975, as well as skipjack tuna, Katsuwonus pelamis, with a catch of 3,260 kg in 1979. These data show that the amount of pelagic species caught in the NWHI contributed less than 1 percent of the state's annual fish landings. This indicates that the pelagic fish resources are either very scarce in the NWHI or that pelagic species are not being fished very hard. It seems that the latter is true -- that pelagic resources in the NWHI are not being utilized to any significant extent by Hawaiian fishermen.

TABLE 1. COMMERCIAL LANDINGS OF FISH CAUGHT IN THE NORTHWESTERN HAWAIIAN ISLANDS, 1971-80

Year	Metric Tons Sold	Value
1971	36.5 (2.4)	$ 52,848
1972	23.4 (4.0)	46,282
1973	30.8 (2.8)	65,979
1974	25.2 (2.7)	53,277
1975	36.4 (9.4)	70,439
1976	35.0 (8.1)	89,272
1977	64.0 (2.2)	279,366
1978	94.9 (1.7)	360,742
1979	66.4 (8.8)	260,655
1980	107.5 (2.5)	623,479

Source: Data from Hawaii Division of Aquatic Resources

Note: Contribution to the landings by pelagic species given in parentheses

PELAGIC FISH OBSERVATIONS IN THE NORTHWESTERN HAWAIIAN ISLANDS

The data collected from the bird flock and fish school observations made on the cruises of the Townsend Cromwell in the NWHI from 1976 to 1982 were analyzed since bird flocks are known to be associated with fish schools. Their abundance would theoretically reflect pelagic fish school abundance. The recorded observations were summarized by three subareas (Figure 1). Subarea I includes Nihoa, Necker Island, and French Frigate Shoals. Subarea II includes Gardner Pinnacles, Laysan Island, and Lisianski Island. Subarea III includes Pearl and Hermes Atoll, Midway Islands, and Kure Atoll.

TABLE 2. COMMERCIAL LANDINGS (KILOGRAMS) OF PELAGIC SPEICES FROM THE NORTHWESTERN HAWAIIAN ISLANDS, 1971-80

Species	Year									
	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Yellowfin tuna	1,043	1,069	374	1,152	6,700	4,266	1,106	660	1,699	245
Kawakawa	40	80	146	373	1,204	109	197	100	496	301
Mahimahi	240	161	334	235	151	30	9	54	14	160
Wahoo	975	2,717	1,909	910	747	3,727	758	907	3,268	1,688
Rainbow runner	36	—	—	—	11	—	—	7	36	48
Skipjack tuna	38	—	—	—	632	—	97	—	3,260	—
Broadbill	—	—	—	—	—	—	—	—	64	—
Blue marlin	—	—	—	—	—	—	—	—	—	79
Shortbill spearfish	—	—	—	—	—	—	—	—	—	8
TOTAL	2,372	4,027	2,763	2,670	9,445	8,132	2,167	1,728	8,837	2,529

Source: Data from Hawaii Division of Aquatic Resources

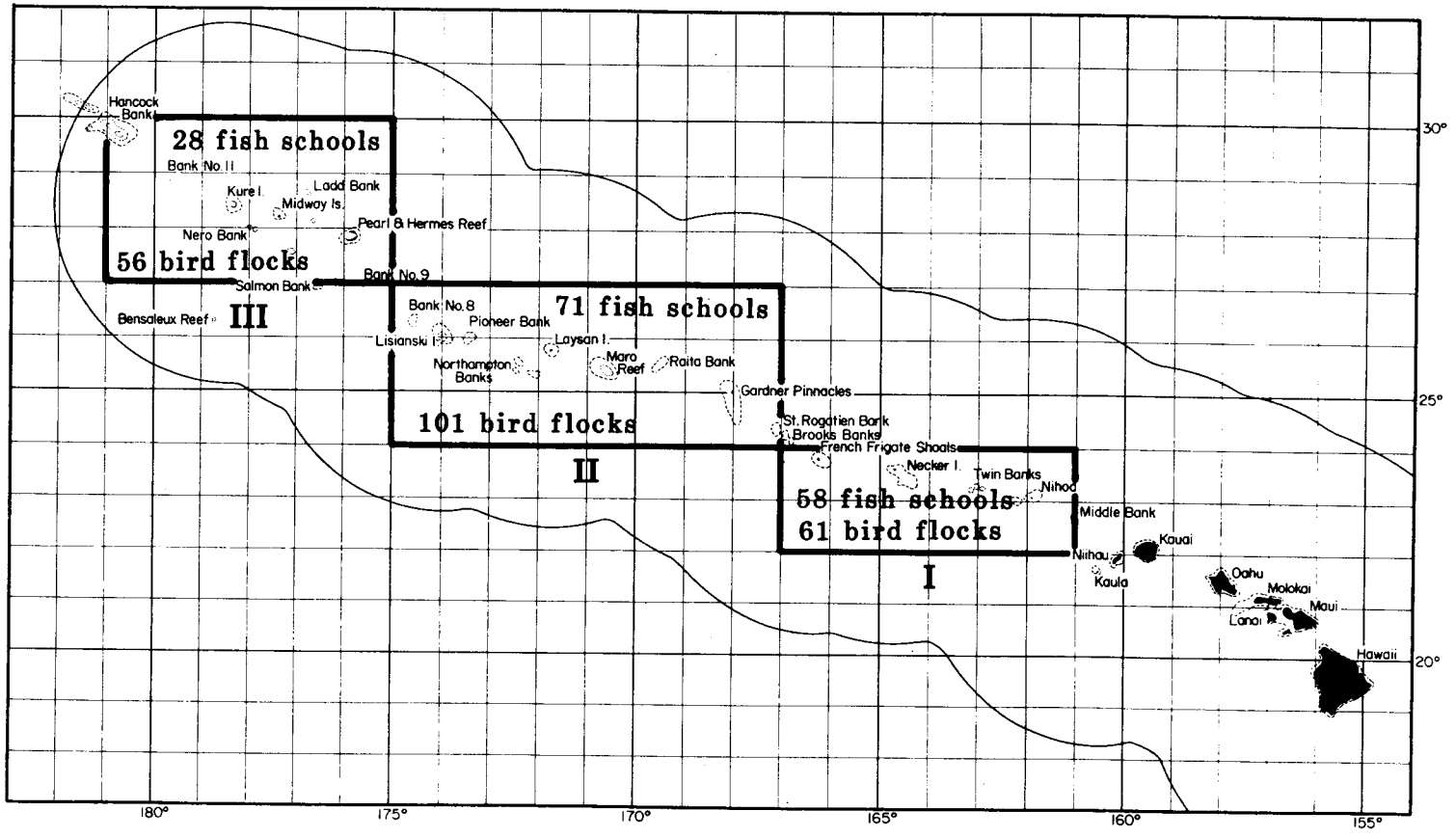

Figure 1. The number of fish schools and bird flocks observed on cruises of the Townsend Cromwell in three subareas in the Northwestern Hawaiian Islands, 1977-82

Bird Flocks

The total numbers of bird flocks and fish schools sighted were 61 in subarea I, 101 in subarea II, and 56 in subarea III. Well over 50 percent of the bird flocks seen in each area were made up of flocks estimated to have 26 to 100 seabirds. It was noted that the larger flocks of over 100 birds were more numerous in subareas II and III where they accounted for 29 to 34 percent of the flocks recorded.

Fish Schools

Of the 58 fish schools recorded for subarea I, 12 were porpoises (Delphinidae), 9 were skipjack tuna, 5 were kawakawa, 3 were yellowfin tuna, and 4 were mixed tuna schools. Of the 71 fish schools observed in subarea II, 16 were porpoises, 13 were yellowfin tuna, 6 were kawakawa, 4 were skipjack tuna, and 3 were flyingfish (Exocoetidae). Of the 28 schools sighted in subarea III, 4 were porpoises, 4 were yellowfin tuna, 3 were kawakawa, and 2 were flyingfish. Thirty-eight percent of the fish schools sighted could not be identified.

Trolling

Besides observing bird flocks and fish schools while on the cruises of the Cromwell, trolling was conducted whenever possible. Trolling catches were also summarized by the same three subareas. The trolling records show that 284 fishes were caught in subarea I, 332 fishes in subarea II, and 123 fishes in subarea III. Of the 284 fishes caught in subarea I, 190 (67 percent) were kawakawa, 44 (16 percent) were yellowfin tuna, and 19 (7 percent) were wahoo. In subarea II, of the 332 fishes caught, 181 (54 percent) were kawakawa, 55 (17 percent) were yellowfin tuna, and 46 (14 percent) were wahoo. Of the 123 fishes caught in subarea III, 72 (58 percent) were yellowfin tuna, 22 (18 percent) were skipjack tuna, and 20 (16 percent) were kawakawa. The average size of the species caught were as follows: skipjack tuna, 2.8 kg; yellowfin tuna, 8.6 kg; wahoo, 13.9 kg; kawakawa, 2.8 kg,; and mahimahi, Coryphaena hippurus, 6.2 kg.

FOREIGN FISHERIES IN THE NORTHWESTERN HAWAIIAN ISLANDS

Longliners

Yong and Wetherall (1980) made estimates of catches by Japanese longliners within the 200-mile U.S. fishery conservation zone in the NWHI for the years 1971 through 1977 (Table 3). The catches of albacore, T. alalunga, ranged from 170 to 910 MT during these years. Yellowfin tuna catches ranged from 120 to 470 MT and bigeye tuna, T. obesus, catches ranged from 100 to 1,300 MT. Only negligible catches of skipjack tuna and bluefin tuna, T. thynnus, were made. The annual tuna catches ranged from 500 MT in 1974 to 2,400 MT in 1976.

TABLE 3. ESTIMATED CATCH (METRIC TONS) BY JAPANESE LONGLINERS IN THE NORTHWESTERN HAWAIIAN ISLANDS, 1971-77

Species	Year						
	1971	1972	1973	1974	1975	1976	1977
Albacore	398	478	348	281	170	912	446
Yellowfin tuna	467	268	133	119	171	330	304
Bigeye tuna	821	1,284	496	95	512	1,155	1,510
Skipjack tuna	2	2	2	2	2	1	1
Bluefin tuna	1	2	1	1	1	1	1
Total tunas	1,689	2,034	980	498	856	2,399	2,262
Blue marlin	81	62	18	24	14	22	26
Striped marlin	261	173	78	20	70	136	113
Broadbill	63	192	89	45	27	220	57
Black marlin	4	2	1	1	1	1	2
Spearfish and sailfish	8	8	10	7	7	8	5
Total billfishes	417	437	196	97	119	387	203
Grand total	2,106	2,463	1,176	595	975	2,786	2,465

Source: Data from Yong and Wetherall, 1980

Among the billfishes, catches ranged from 27 to 220 MT for swordfish, Xiphias gladius, 20 to 261 MT for striped marlin, Tetrapturus audax, and 14 to 81 MT for blue marlin, Makaira nigricans. Only small amounts of black marlin, M. indica, shortbill spearfish, T. angustirostris, and sailfish, Istiophorus platypterus, were caught. The annual billfish catches ranged from 97 to 437 MT. The annual catches of tunas and billfishes by Japanese longliners during these years ranged between 600 and 2,800 MT and averaged 1,800 MT.

The number of days fished in the NWHI by the Japanese longliners from 1971 to 1975 ranged from a low of 444 to a high of 1,747. Based on 2,000 hooks fished per day, Yong and Wetherall calculated catch per unit of effort for these vessels to be 14 to 19 tunas per 1,000 hooks fished (28 to 38 per day). The catch per unit of effort for billfishes ranged from two to three per 1,000 hooks fished (four to six per day).

Bait Boats

Yong and Wetherall also made estimates of catches by Japanese bait boats within the 200-mile U.S. fishery conservation zone in the NWHI from 1972 through 1977 (Table 4). The annual skipjack tuna catches ranged from 823 to 4,375 MT. Annual catches of some of the other tunas ranged from 20 to 337 MT for yellowfin tuna, and 71 to 734 MT for bigeye tuna. Albacore and bluefin tuna were, at times, caught only in small quantities. The annual catches made by these bait boats ranged from 964 to 5,619 MT.

It was reported that bait boats fishing within 200 miles of the NWHI made catches of 20 to 90 MT per day of mixed small skipjack, yellowfin, and bigeye tunas when fishing was good in May of 1977 and 2 to 4 MT per day when fishing was poor in June and July of 1977 (Tanaka, 1978). It was also reported that four to five bait boats fishing within 200 miles of the NWHI in May of 1979 made catches of 7 to 38 MT of mixed skipjack, yellowfin, and bigeye tunas per day, averaging 8 to 10 MT per day (Tanaka, 1980).

TABLE 4. ESTIMATED CATCH (METRIC TONS) BY JAPANESE BAIT BOATS IN THE NORTHWESTERN HAWAIIAN ISLANDS, 1972-77

Species	Year					
	1972	1973	1974	1975	1976	1977
Albacore	26	0	0	89	0	49
Yellowfin tuna	19	20	50	167	124	337
Bigeye tuna	105	109	147	71	92	734
Skipjack tuna	1,282	823	1,971	1,906	4,294	4,375
Bluefin tuna	26	0	1	25	0	0
Total tunas	1,458	952	2,168	2,258	4,510	5,495
Others	37	12	25	94	37	124
Grand total	1,495	964	2,193	2,352	4,547	5,619

Source: Data from Yong and Wetherall, 1980

NORTH PACIFIC ALBACORE FISHERIES

The North Pacific albacore fisheries extends throughout the North Pacific. The albacore landings made by Japanese longline

and surface (pole-and-line) fisheries, the North American fishery, and the total landings from 1961 through 1981 as presented by Majors et al. (1982) are shown in Figure 2. The catch figures are complete only up to 1979 for all fisheries.

The catches made by the Japanese longline fishery have not fluctuated very widely with a low of 10,000 MT in 1975 and a high of 29,000 MT in 1967. The Japanese longliners fish in the North Pacific subtropical zone during winter. It has been estimated that 40 percent of the catch (by number) is albacore (Laurs et al., 1981). The area where they operate centers on lat. 32°N and extends from 800 nmi off the coast of California westward across the Pacific. The total albacore landings fluctuated between 47,000 MT in 1962 and 124,000 MT in 1976 in the North Pacific and reflect the fluctuations of the Japanese surface catches which ranged from a low of 9,000 MT in 1962 to a high of 85,000 MT in 1976. The catches made by U.S. jig boats have fluctuated between 10,000 MT in 1977 and 25,000 MT in 1963.

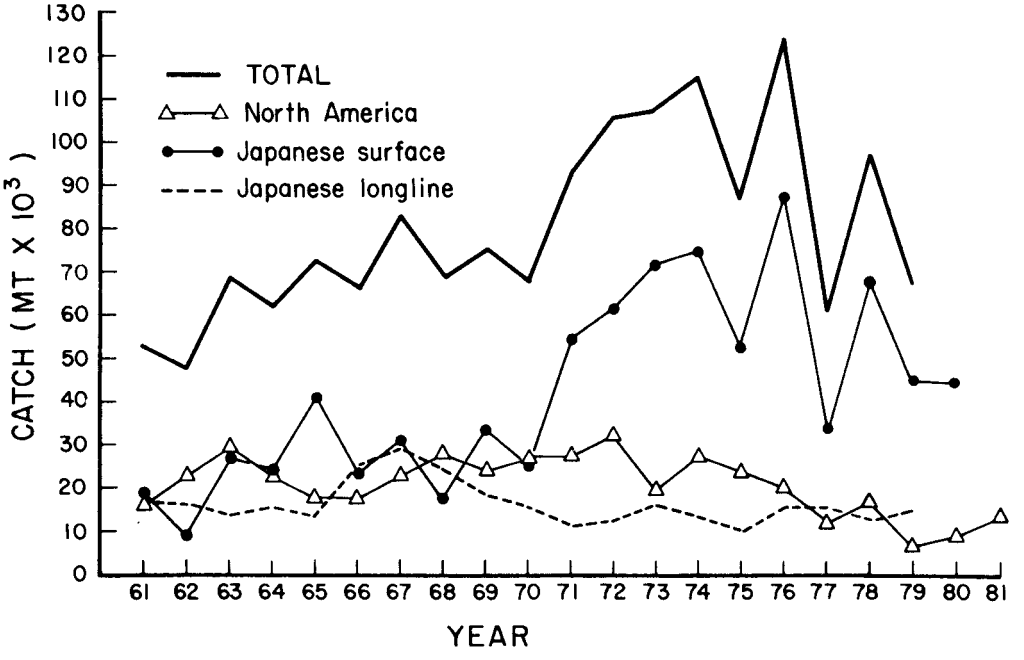

Figure 2. The total albacore catch in the North American and the Japanese longline and surface fisheries, 1961-81 (Majors et al., 1982)

In recent years, there has been increased interest by U.S. West Coast trollers to fish in waters northwest of Midway. The Pacific Tuna Development Foundation sponsored exploratory fishing surveys by West Coast trolling boats in areas northwest of Midway

from 1975 to 1978. The surveys showed that trolling for albacore in this area was practical for U.S. fishermen. In 1979, the state of Hawaii and a private seafood processor obtained a 1-year use permit from the Navy and organized a mother ship operation at Midway supporting 20 albacore trollers that fished to the northwest of the island. This undertaking resulted in a catch of 2,000 tons of albacore which was valued at more than $3 million.

The state attempted to organize support operations for the albacore trollers in 1980, 1981, and 1982 but were not able to do so. The albacore trollers, however, fished the area northwest of Midway in increased numbers and unloaded most of their catch in Dutch Harbor, Alaska.

In 1981, an estimated 47 albacore trolling boats fished in the area and landed an estimated 754 tons of mostly albacore in Honolulu (B.M. Ito, 1983: personal communication). This catch was made in 38 trips which gave a catch rate of 20 tons per trip. In 1982, about 54 boats fished in the area and landed their catch in Honolulu (B.M. Ito, 1983: personal communication). The catch from 73 trips amounted to 1,858 tons which gave a catch rate of 25 tons per trip.

In 1982, the Hawaii Legislature appropriated funds to do a feasibility study for establishing a Midway fishery support base. DAR was given the responsibility for implementing the project.

At the present time, about a dozen albacore trolling boats have left Honolulu and are headed for the fishing grounds to the northwest of Midway.

OTHER PELAGIC FISHERIES

One of the fisheries that is distant from the NWHI is a gill-net fishery for squid centered on the Emperor Seamount fishing grounds. The primary species is Ommastrephes bartramii. It was reported that 79 Taiwan gill-net vessels, 200 Japanese squid jigging vessels, and about 200 Japanese squid gill-netting vessels were fishing in August of 1981 (Suisan Sekai, 1981). The Taiwan vessels reportedly made good catches of 3 to 6 tons of squid per day.

The Japanese made a gill-netting survey from April 1979 to January 1980 in subarctic waters in the North Pacific for pomfret, Brama japonica, and salmon shark, Lamna ditropis (Japan Marine Fishery Resource Research Center, 1980-81). Catches on five cruises within that timespan included the following: pomfret, 247 MT; blue shark, Prionace glauca, 180 MT; albacore, 180 MT; and salmon shark, 86 MT. Total catch amounted to 806 MT.

Closer to Hawaii, a Japanese gill netter operating for 29 days within 200 miles of the NWHI during February and March caught 57 striped marlin, 12 swordfish, 872 albacore, 2,191 skipjack tuna, 331 mahimahi, 659 pomfret, 152 amberjack, Seriola

sp., 682 squids, 32 sharks, and 23 bigeye tuna (NMFS unpublished data).

A Japanese gill-net fishery for North Pacific albacore, which made nominal catches of between 1,000 and 4,000 MT per year since its inception in the early 1970s up until 1980, caught an estimated 15,000 to 20,000 MT in 1981 (Bartoo and Kume, 1982).

CONCLUSIONS

This review shows that pelagic fisheries resources in the NWHI area have been utilized by Japanese bait boats and long-liners. It also shows that U.S. West Coast trollers are increasing effort to harvest albacore and possibly other species in the area.

REFERENCES

Bartoo, N., and S. Kume. 1982. Report of the Seventh North Pacific Workshop. Southwest Fisheries Center Administrative Report Lj-82-28. National Marine Fisheries Service, NOAA, La Jolla. 17 pp.

Japan Marine Fishery Resource Research Center (JAMARC). 1980-81. The development of the pomfret (shimagatsuo, Brama japonica) resource in the North Pacific Ocean, fiscal years 1979 and 1980 (Shimagatsuo shin-shigen kaihatsu chosa hokoku -- Kita Taiheiyo kai-iki -- Sokuho). JAMARC Kaihatsu News (Development News)(11):8-16, August 1980 and (1/):1-11, June 1981. (English translation by T. Otsu, 1982, 12 pp., Translation No. 62; available Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

Laurs, R.M., R.J. Lynn, R. Nishimoto, and R. Dotson. 1981. Albacore trolling and longline exploration in eastern North Pacific waters during mid-winter 1981. U.S. Department of Commerce, NOAA Technical Memorandum NMFS, NOAA-TM-SWFC-10. 40 pp. + 52 appendices.

Majors, A.P., A.L. Coan, N. Bartoo, and F. Miller. 1982. Summary of 1981 North Pacific albacore fishery data. Southwest Fisheries Center Administrative Report LJ-82-12, National Marine Fisheries Service, NOAA, La Jolla. 35 pp.

Sekai, Suisan. 1981. Taiwan sends 79 vessels to gill net for squid in Emperor Seamount grounds (Taiwan gyosen no doko. Ika nagashi-amiryo ni 79-seki ga shutsugyo. O-nigiwai no Tenno-zan gyojo). Suisan Sekai 30(9):55. (English translation by T. Otsu, 1982, 3 pp., Translation No.71; available Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

Tanaka, T. 1978. Atlas of skipjack tuna fishing grounds in southern waters, 1977 fishing season (June 1977-April 1978). Tohoku Regional Fisheries Research Laboratory. [8 pp. text, 16 charts.] (English translation by T. Otsu, 1978, 33 pp., Translation No. 30; available Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

Tanaka, T. 1980. Atlas of skipjack tuna fishing grounds in southern waters, 1979 fishing season (May 1979-April 1980). Tohoku Regional Fisheries Research Laboratory. [12 pp. text, 19 pp. charts.] (English translation by T. Otsu, 1980, 48 pp., Translation No. 48; available Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.)

Yong, M.M., and J.A. Wetherall. 1980. Estimates of the catch and effort by foreign tuna longliners and baitboats in the fishery conservation zone of the central and western Pacific, 1965-77. U.S. Department of Commerce, NOAA Technical Memorandum NMFS, NOAA-TM-NMFS-SWFC-2. 103 pp.