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# SOUTHWEST FISHERIES SCIENCE CENTER

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APRIL 1995

## THE 1994 U.S. PURSE SEINE FISHERY FOR TROPICAL TUNAS IN THE WESTERN PACIFIC OCEAN

By

Atilio L. Coan Jr., Doug Prescott and Gordon Yamasaki

ADMINISTRATIVE REPORT LJ-95-10





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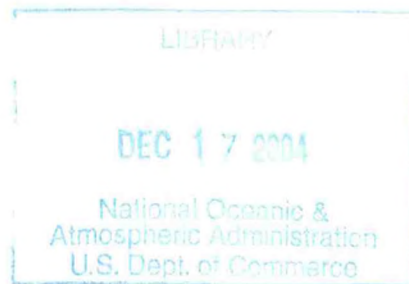
# THE 1994 U.S. PURSE SEINE FISHERY FOR TROPICAL TUNAS IN THE WESTERN PACIFIC OCEAN

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## INTRODUCTION

U.S. purse seiners began fishing for tunas in the central-western Pacific Ocean in 1976 on a limited basis. Rapid expansion occurred thereafter, but it was not until June 1988 that the expansion was solidified for the long term. This occurred when the U.S. entered into a South Pacific Tuna Treaty with 16 island countries. The Treaty allowed access to much of the productive fishing areas of the region. The number of licensed U.S. vessels since 1990 has remained between 42 and 51 vessels. Since 1993, the Treaty has limited the fleet to 55 licensed vessels. Catches from these vessels increased to record highs of over 200,000 metric tons (t) in 1991 and 1992. Catches decreased slightly in 1993 and again in 1994. The fishery is a multispecies fishery, catching skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and bigeye tuna (*Thunnus obesus*). About 70% of the catch is skipjack tuna.

The fishery has changed since 1988. Aside from gear changes, one of the most important changes has been the shift of fishing from areas off Papua New Guinea to areas off Kiribati and Tuvalu. This shift appears to be related to a change in the availability of fish in the area, probably due to environmental changes caused by El Niño events. In the early years, fishing focused on skipjack tuna catches from log-associated schools (log sets) and free swimming schools (school sets) in the Papua New Guinea region. Since 1990, fishing appears to be on large-sized yellowfin tuna which are mainly found in free-swimming schools and towards the eastern part of the region, areas between Kiribati, Tuvalu and Jarvis Island.

The U.S. fleet's fishing activities are monitored by the National Marine Fisheries Service (NMFS), Southwest Regional (SWR) Field Office in Pago Pago, American Samoa. As required by the Treaty, 100% of the fleet's landings and logbook records are collected from all licensed vessels. Sizes of fish in the catches are also sampled by the SWR. Fifty-fish samples are drawn at random for this. The objective is to obtain at least thirteen 50-fish samples for each species caught by month and statistical area fished by the fleet. Species composition is also monitored for landings suspected to be a mixture of yellowfin and bigeye tunas. Whenever a mixture of species is encountered in the landings, a random sample of 100 fish is drawn for species composition.

This report reviews catch and effort, length-frequency and species composition statistics collected during the 1994 fishing season. Plans for monitoring of the 1995 season are also presented. Data for the 1994 fishing season are preliminary because all records have not yet been tabulated. Data used in this report represent approximately 83% of the fishing effort and 93% of the length-frequency samples. Full year's statistics for 1994 are estimates.

## **CATCHES**

During 1994, 47 U.S. purse seiners unloaded an estimated 190,472 t of yellowfin, skipjack and bigeye tunas (Table 1). This was an increase from the 42 active vessels in 1993. Catch in 1994 decreased approximately 1% below the catch in 1993, and approximately 5% below the record high catch in 1992.

Total yellowfin tuna catch in 1994 was 55,328 t, a record high for the fleet and an increase of 12% over that in 1993. Total skipjack tuna catch was 135,144 t, a decrease of approximately 6% from catch in 1993. Skipjack tuna represented 71% of the 1994 total catch, down from 74% of the 1993 total catch.

Approximately 66% (107,813 t) of the 1994 landings were unloaded directly to canneries in Pago Pago, American Samoa (Figure 1). Landings for transshipment were from various locations within the Treaty area. The most frequently used transshipment ports were Tinian and Pago Pago with approximately 15% and 12% respectively of the 1994 landings. Other transshipment ports included Majuro, Moen, Kosrae, Rabaul, Tarawa, and Pohnpei (7.8%). Destinations of the landings (Figure 1) were to canneries in American Samoa (70%), Thailand (11%), Puerto Rico (9%) and Italy (7%). Other destination countries included Australia, Japan, and Spain (3%).

Catches were made throughout the year in 1994. Peak yellowfin tuna catches occurred in June and peak skipjack tuna catches occurred in February to June.

The fleet caught more fish in areas farther east in 1994 than in 1993 and most within Exclusive Economic Zone (EEZ) waters. Approximately 68% of the 1994 catch was made within the EEZs of foreign countries, 21% on the high seas and 11% in U.S. EEZs. Catches in foreign EEZs decreased by 10% from those in 1993, and catches on the high seas and in U.S. EEZs increased by 7% and 5% respectively. Kiribati waters accounted for the majority of the foreign EEZ catches with over 40%. The highest catches in U.S. EEZs occurred off Howland, Baker, and Jarvis Islands. Skipjack tuna was the predominant species caught in all EEZs (70 to 80% of the catch) except off Jarvis Island. There, yellowfin tuna was the dominant species (66%).

## **SIZES OF FISH AND SPECIES COMPOSITION**

Yellowfin tuna in the 1994 U.S. catch averaged 78 cm fork length (FL); 111 cm FL in school sets and 55 cm FL in log sets. Modes in the length-frequency distributions (Figure 2) were at 47 cm, 71 cm, 113 cm, and 130 cm. In general, yellowfin tuna in 1994 catches were



smaller in log sets and larger in school sets than in 1993. The larger sizes of yellowfin tuna were more often caught in the Jarvis Island area than in other areas.

Skipjack tuna in the 1994 U.S. catch averaged 55 cm FL; 57 cm FL in school sets and 51 cm FL in log sets. Three dominant modes at 45 cm, 53 cm and 60 cm were present in the length-frequency distribution (Figure 3). In general, skipjack tuna in 1994 catches tended to be smaller than in 1993.

Since the cannery prices paid for yellowfin and bigeye tunas are the same, both are reported in cannery landings as yellowfin tuna. Species composition was determined for landings that appeared to be a mixture of yellowfin and bigeye tunas. Sampling indicated that such landings contain approximately 25% bigeye tuna. When combined with pure landings of yellowfin tuna, the percentage drops to 4%. If applied to the total landings labeled yellowfin tuna in 1994, bigeye tuna would be 2,213 t and yellowfin tuna 53,115 t. This correction has not been made in Table 1 because the procedure is undergoing review of the effects of size of fish on the procedure.

Since 1994, data for a yellowfin tuna length-weight study are being collected in Pago Pago. To date, over 2,400 yellowfin tuna have been measured for length and corresponding weight. Preliminary analysis of the data show comparable results as in earlier studies, but more data on large fish are required for completion of the study.

## FISHERY PERFORMANCE

The U.S. fleet spent approximately 7,600 days fishing in 1994, a decrease of 8% over fishing effort in 1993. Fishing patterns were very similar to those in 1993, but more fishing occurred in areas farther east, around Howland, Baker and Jarvis Islands in 1994. The effort was distributed from Papua New Guinea to Jarvis Island, over a much larger area than in 1993 and less concentrated (Figure 4). In 1994, only three, 1-degree squares had more than 60 days of fishing effort, whereas in 1993, thirty squares had more than 60 days of fishing effort.

The fleet made 167 trips in 1994, a decrease of 12% from total trips made in 1993 and in line with the decreasing trend that started in 1991 (Figure 5). The decrease in the number of trips was accompanied by a decrease in the number of days per trip. The number of sets per trip (40) and trips/vessel (4), however, remained relatively stable.

The fleet made 83% of its sets on free-swimming schools of yellowfin, bigeye and skipjack tunas in 1994. The number of school sets increased almost 11% over those in 1993, and correspondingly, the number of log sets decreased. This increase in the number of school sets broke a trend of decreasing numbers of school sets that started in 1991 (Figure 6).

Overall catch rate (26 t of tuna/day fished) increased 4% in 1994 over the catch rate (25 t/day fished) in 1993, and broke a decreasing trend that started in 1991 (Figure 7). Catch rate for yellowfin tuna in 1994 (7 t/day fished) increased 18% over that reported in 1993. Skipjack tuna catch rate of approximately 18 t/day fished remained the same as in 1993.



## 1995 MONITORING PLANS

Forty-seven of the 48 licensed U.S. purse seiners are actively fishing in the Treaty area so far in 1995. NMFS is monitoring fishing activities of the fleet, and is collecting landings and logbook information in the same way as in past years. Length-frequency and length-weight sampling is also ongoing in Pago Pago, American Samoa.

A port sampling program in Tinian was established in the latter half of 1994, but no samples were collected because sampling in American Samoa was adequate to apply to Tinian landings. In 1995, sampling of U.S. purse seiner landings is again planned for Tinian. Sampling there will be important if the fleet landing in Tinian fishes in areas different from the fleet that lands in American Samoa.

## SUMMARY

The U.S. tuna purse seine fishery in the central-western Pacific Ocean caught an estimated 190,472 t of yellowfin, skipjack, and bigeye tunas in 1994. Forty-seven of the 48 licensed vessels actually landed fish in 1994. The catch of yellowfin tuna was 55,328 t—a record high for this fishery. The catch of skipjack tuna was 135,144 t. Fishing effort was distributed over a broad area from Papua New Guinea to Jarvis Island with a larger proportion concentrated towards the eastern side than in 1993. Overall catch rate was 26 t/day fished, an increase from 25 t/day fished in 1993. Average size of yellowfin tuna in the catch was 78 cm FL and larger than in 1993 (70 cm FL). Average size of skipjack tuna was 55 cm FL and slightly smaller than in 1993 (57 cm FL).

**Table 1.** Catches (t) of yellowfin and skipjack tunas from U.S. purse seiners fishing in the western Pacific Ocean under the South Pacific Regional Tuna Treaty. Yellowfin catches include small quantities of bigeye tuna.

YEAR	VESSELS LICENSED <sup>2</sup>	VESSELS LANDING	YELLOWFIN	SKIPJACK	TOTAL
1992	44	46	47,222	154,911	202,133
1993	42	42	49,216	143,698	192,914
1994	48	47	55,328 <sup>1</sup>	135,144 <sup>1</sup>	190,472 <sup>1</sup>

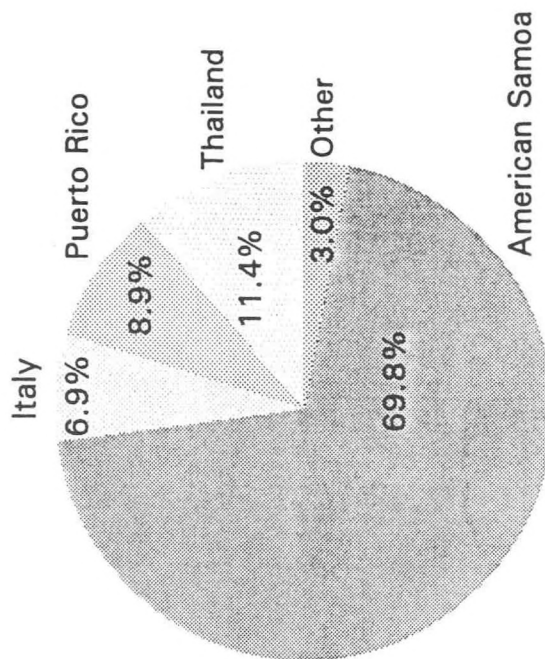
<sup>1</sup> Preliminary, estimated from approximately 83% of the full year's data.

<sup>2</sup> Vessels are licensed from June 15 of one year to June 14 of the next. Since 48 vessels were licensed in June 15, 1991 to June 14, 1992 period, the number of vessels fishing in 1992 is more than the number of licensed vessels shown.

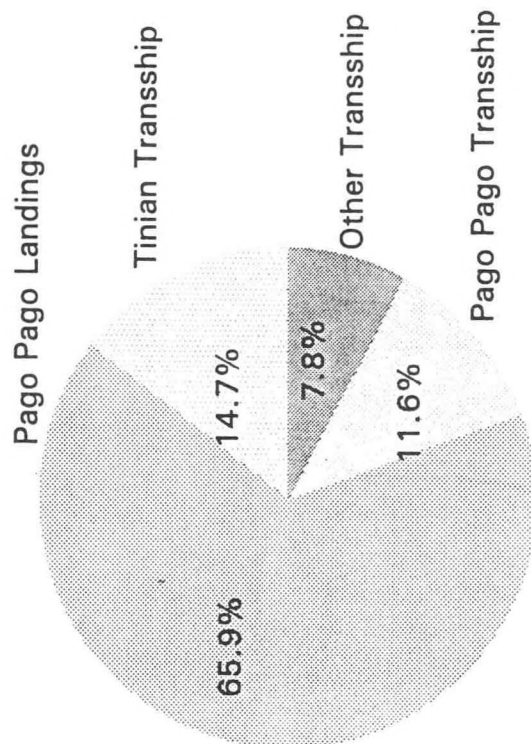




## DESTINATION COUNTRIES FOR 1994 LANDINGS

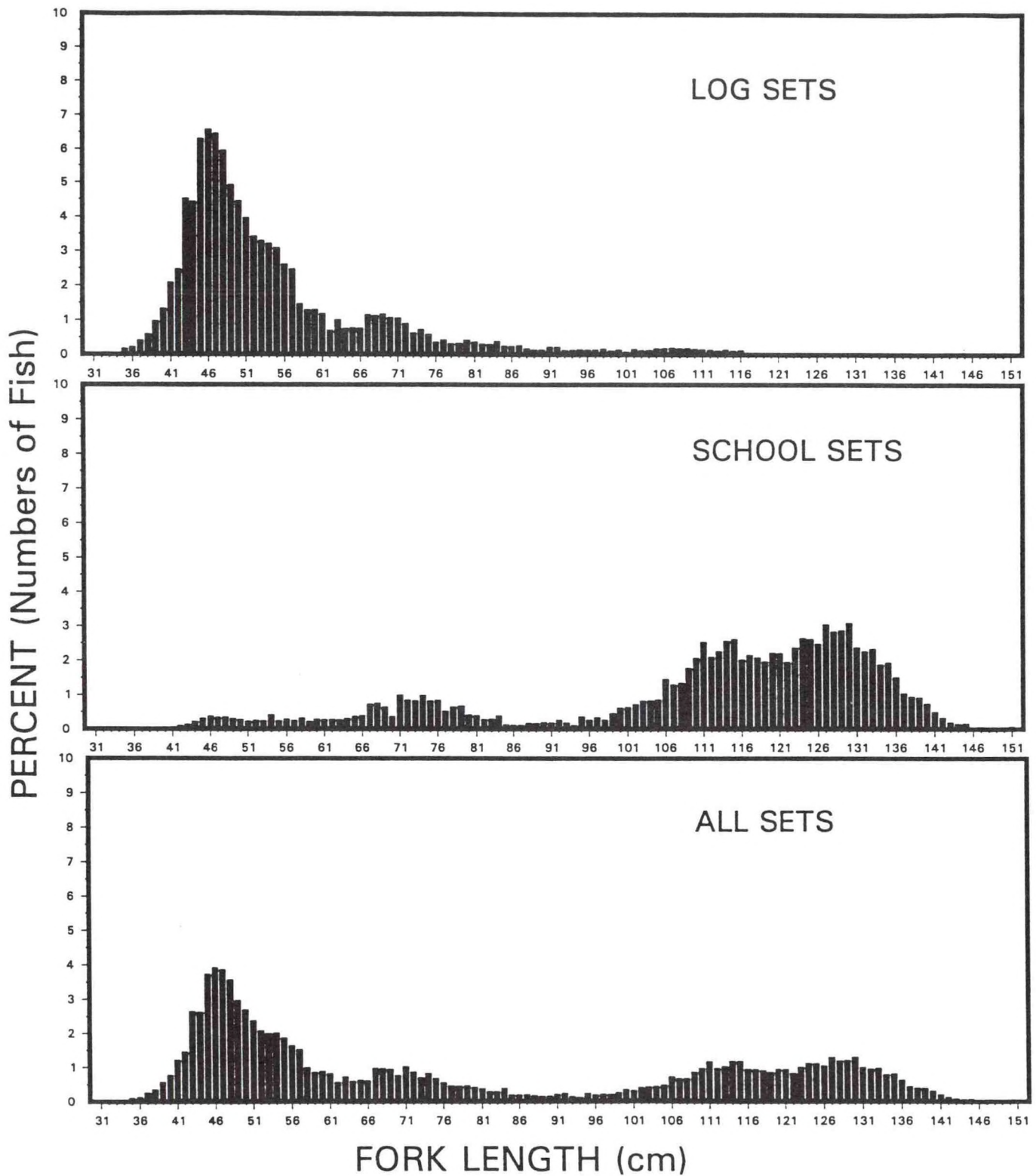


## DISTRIBUTION OF 1994 LANDINGS

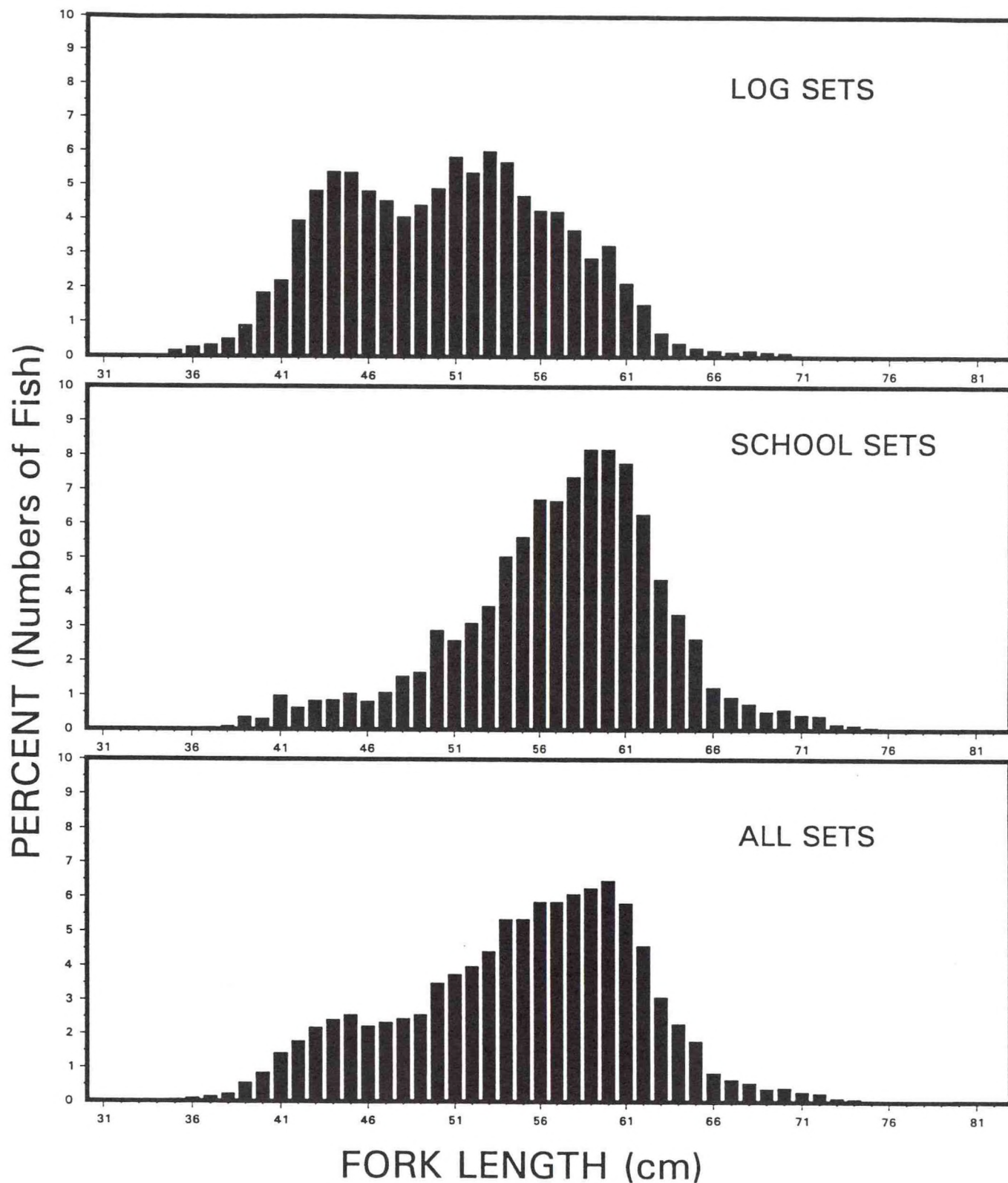


**Figure 1.** Percentage of U.S. purse seine tuna landings from the central-western Pacific Ocean fishery by type and port of landing, and percentage by destination.



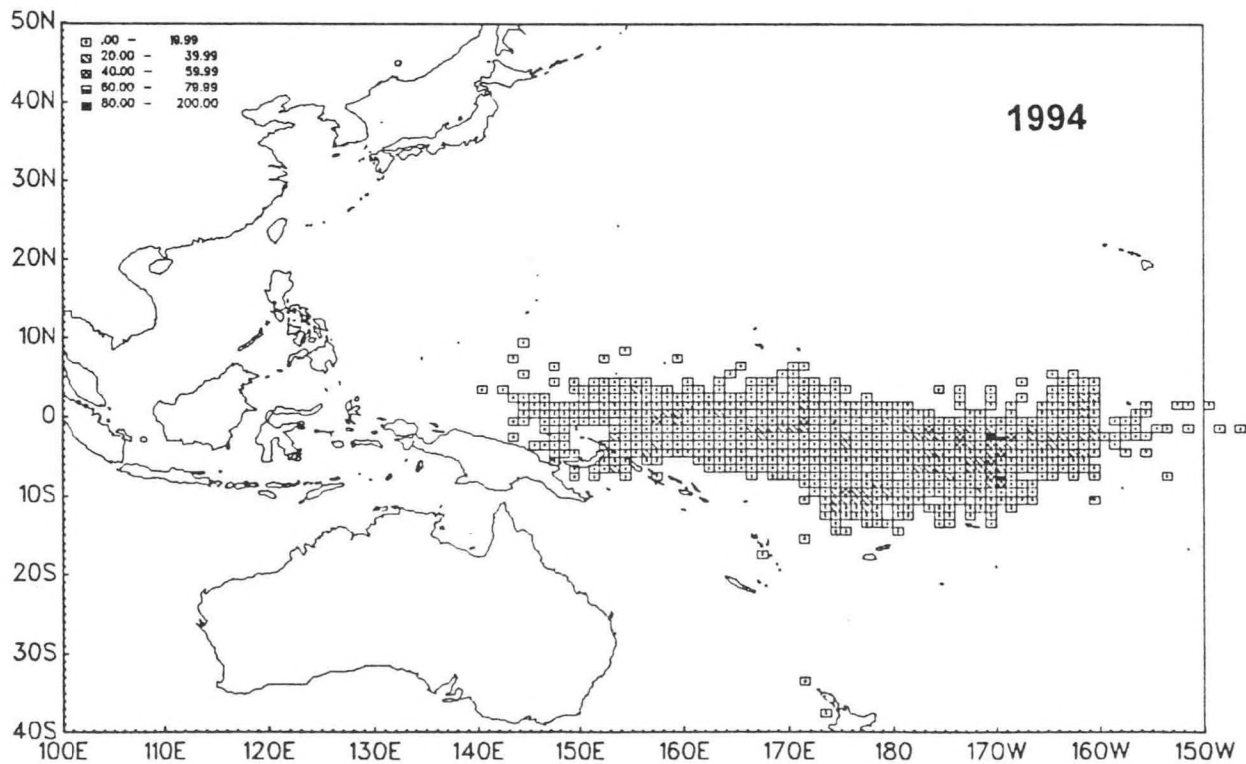
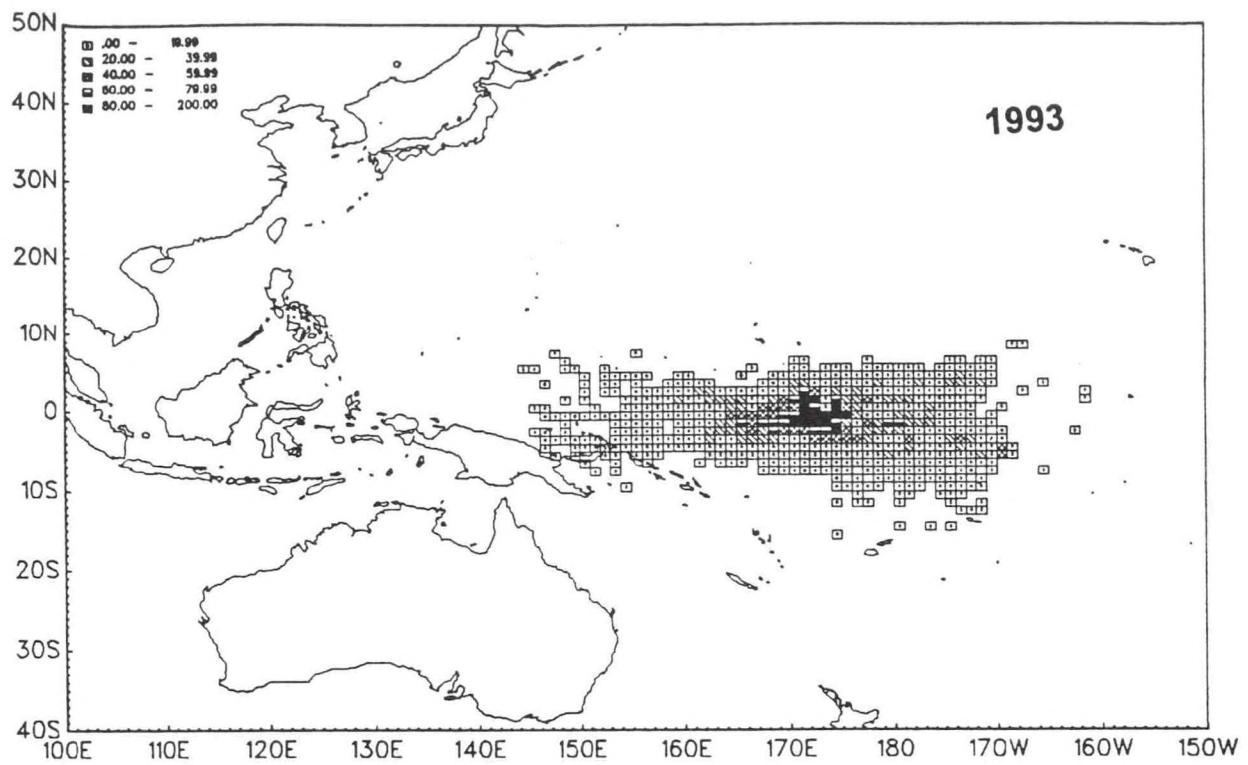


**Figure 2.** Length-frequency distribution of yellowfin tuna in log sets, school sets, and all sets caught by U.S. purse seiners in the central-western Pacific Ocean in 1994.

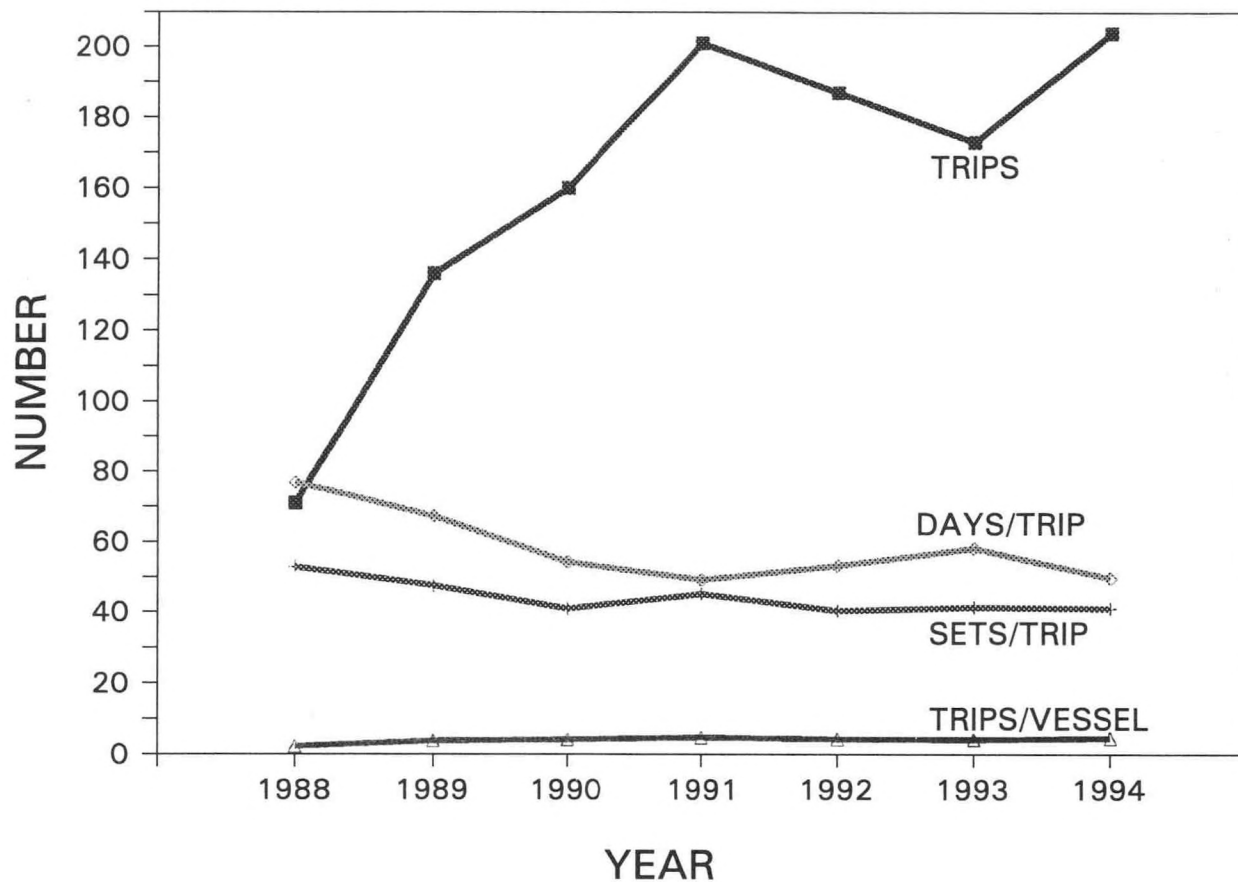


**Figure 3.** Length-frequency distribution of skipjack tuna in log sets, school sets and all sets caught by U.S. purse seiners in the central-western Pacific Ocean in 1994.



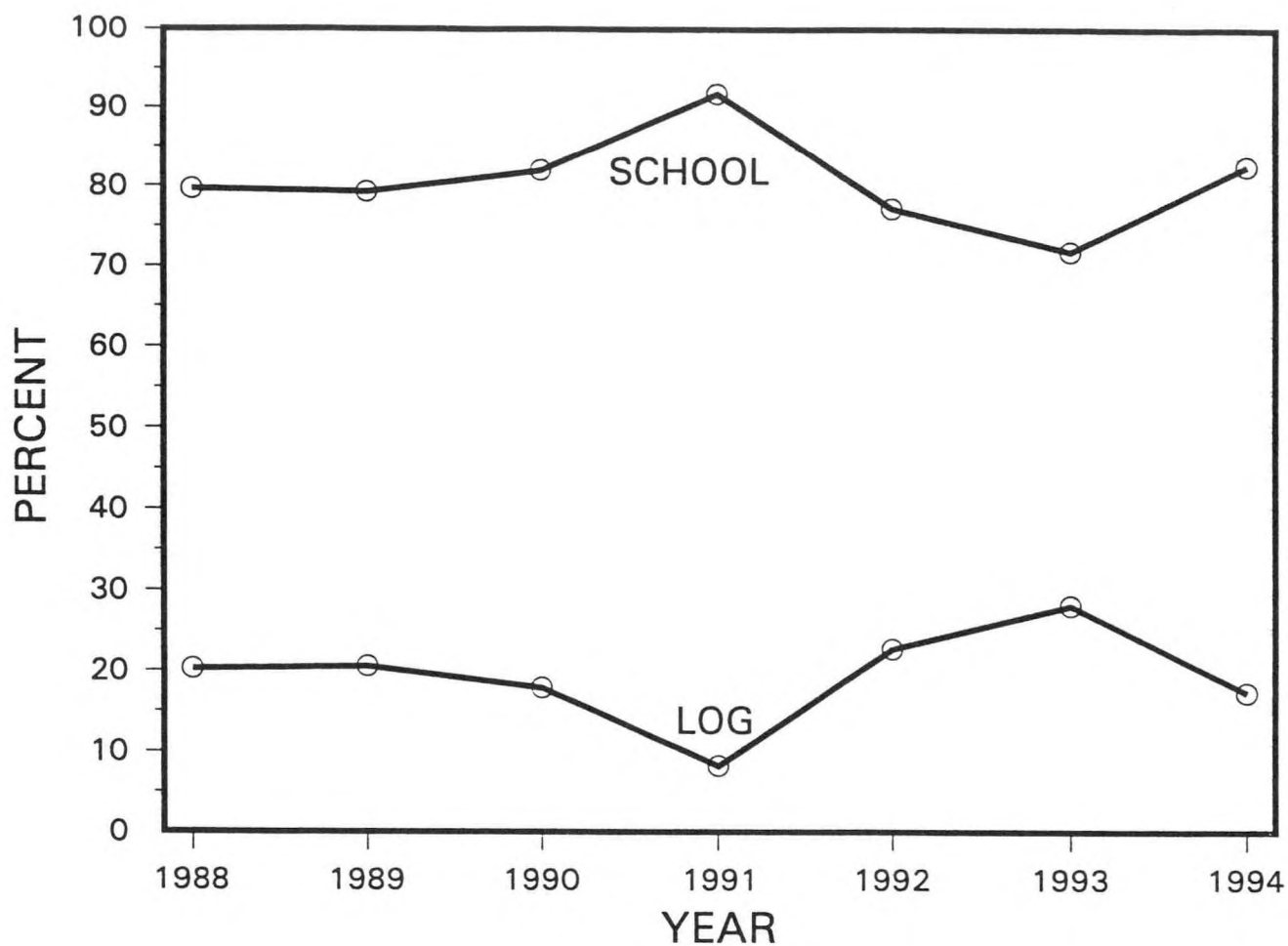


**Figure 4.** Geographical distribution of fishing effort (days fished) in 1993 and 1994 for U.S. purse seiners fishing for tunas in the central-western Pacific Ocean.

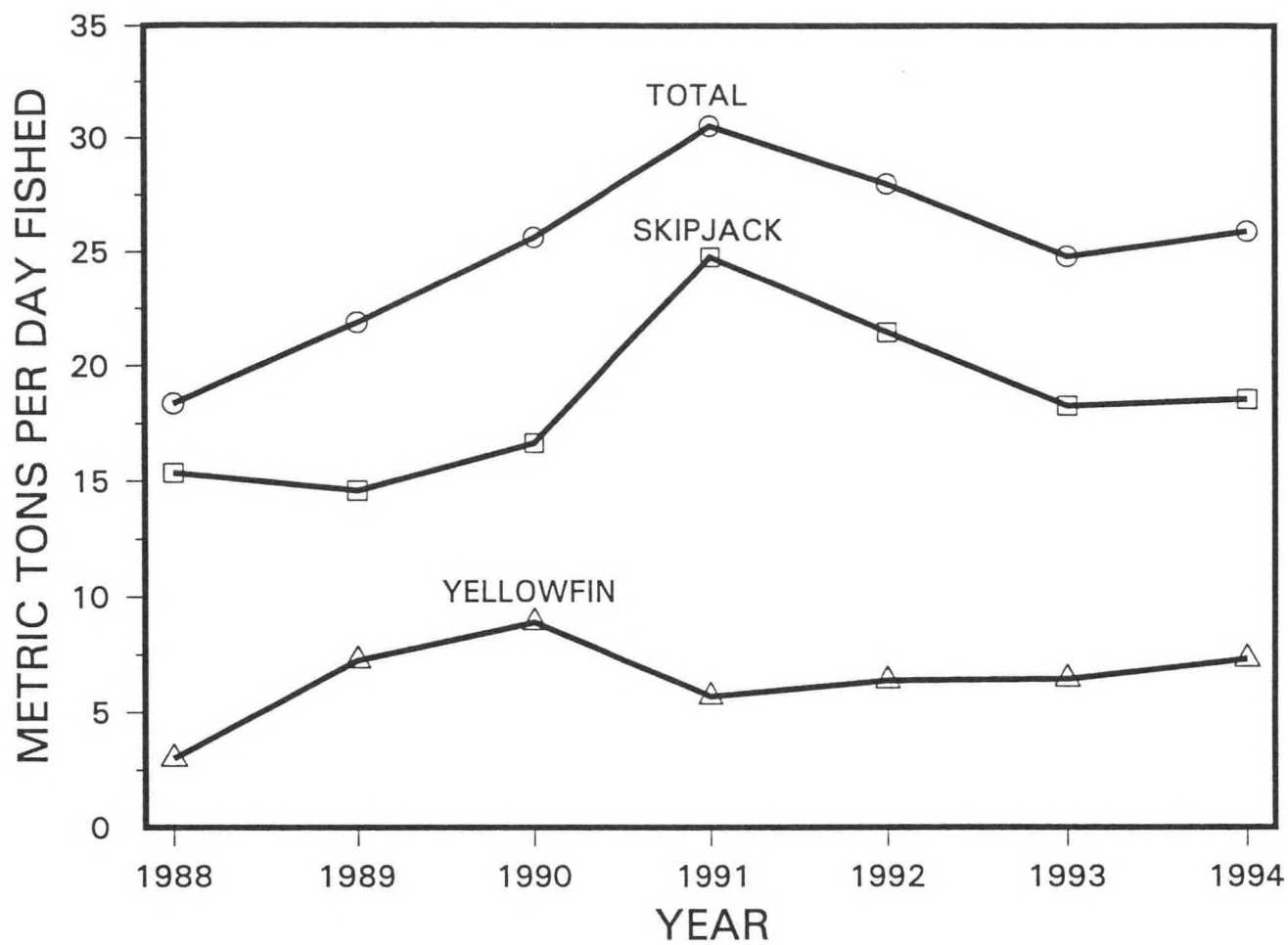


**Figure 5.** Number of trips, days per trip, sets per trip, and trips per vessel for U.S. purse seiners fishing in the central-western Pacific Ocean.





**Figure 6.** Percentage of sets by set type—floating objects (Log) and free-swimming (School)—for U.S. purse seiners fishing in the central-western Pacific Ocean.



**Figure 7.** Catch rate (t/day fished) for U.S. purse seiners fishing in the central-western Pacific Ocean.