TUNA FISHERY STATISTICS FOR THE INDIAN OCEAN AND THE INDO-PACIFIC

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by

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INTRODUCTION

Events leading up to the formation of the FAO Programme for Tuna Management in the Indian and Pacific Oceans are documented in the reports of the Indian Ocean Fisheries Commission (IOFC) and the Indo-Pacific Fisheries Commission (IPFC), as well as in reports from the joint meetings of the IOFC Committee on Management of Indian Ocean Tuna and the IPFC Special Committee on Management of Indo-Pacific Tuna. These events were presented in some detail by Skillman (1980) and will be only briefly summarized here.

Repeatedly during the joint meetings of these Tuna Management Committees from 1971 in Rome to 1978 in Manila, participating scientists said they were unable to prepare reliable stock assessments because of inadequate tuna fishery statistics. As a consequence, their advice and counsel was couched in vagueness and contained many qualifiers. Because of these deficiencies and the lack of a strong management mandate, the Committees never issued any firm statements with respect to the state of the resources or the fisheries on them. It became pro-forma to recommend that the countries conducting the fisheries endeavor to improve their collection and reporting of fishery statistics.

At the joint meeting of the Tuna Management Committees in Manila, it was recommended that FAO assign staff to begin assembling tuna statistics for the area, provide a discussion of management alternatives, and formulate mechanisms for institutionalizing both the statistical and management functions for consideration by the Committees. In response to this recommendation, FAO initially established in 1979 a Tuna Module Within the South China Sea Fisheries Development and Coordinating Programme (SCSP). In 1980 the Tuna Module was set up separately as the Programme for Tuna Management in the Indian and Pacific Oceans. It is intended that the Tuna Programme will move to its permanent site in Colombo, Sri Lanka during 1981. Core funding for the Programme is currently provided by the United Nations Development Programme, and additional support is provided by Japan for specific activities.

In the long term, the goal of this Programme is to "promote area-wide management of fisheries on tuna and tuna-like species by governments in the area." In the short term, the objectives include: continuing to assemble tuna statistics; to establish a computer-based, statistical system; to promote population dynamics assessments of tuna; to facilitate biological studies on tuna and baitfish; to promote consultations among interested states on tuna management; and to initiate economic studies pertaining to area-wide management and coastal state participation in the fisheries.

While progress has been made in the statistical area, much remains to be accomplished in obtaining production statistics from some fishing nations, fishing effort and size composition statistics from most countries, and transshipment information. In addition, the computer-based system, which is to facilitate making these statistics and derived information available to scientists, administrators, and managers, has not yet been established.

The purpose of this report is then to supply information on the kinds and quantities of statistics assembled as well as historical trends in these statistics. It is envisaged that the statistical system will provide comparable, though more detailed in some respects, summaries once it has been established.

STATISTICS REPORTED TO FAO

The FAO Yearbooks of Fishery Statistics, which have been published since 1947 in varying formats, provides estimates of annual catch statistics on a worldwide basis. These statistics are provided by governments and include catches made by commercial, industrial, and subsistence fisheries. In general, statistics from subsistence fisheries are not as concisely estimated as those from commercial or industrial scale fisheries; in addition for the most part, catches from recreational fisheries are not reported. While these annual statistics are presented only by relatively large geographical areas within oceans, they provide a useful benchmark for comparing relative catch magnitudes contributed by the various fishing nations and more detailed statistics available from individual countries.

The most recent information appears in volume 46, which includes statistics for 1977-78 (FAO, 1979). I have chosen to present statistics only for the current year, 1978, even though these may be preliminary and subject to revision in subsequent volumes. Species included are those commonly regarded as tuna or as tunalike either because they are biologically similar or are commonly caught by tuna fishing gear. Included within the family Scombridae are the true tunas (the genera Auxis, Euthynnus, Katsuwonus, and Thunnus in the tribe Thunnini) and seerfishes (genera Scomberomorus and Acanthocybium in the tribe Scomberomorini). No catches of bonitos (genus Sarda or Gymnosarda in the tribe Sardini) are reported for the area, although they are known to occur and enter the fisheries in many locations. The mackerels (genera Scomber and Rastrelliger in the tribe Scombrini) are not included because the fisheries for them are usually quite distinct from those for other Scombridae. Included also are the billfishes (the genus Xiphias in the family Xiphidae and the genera Makaira, Istiophorus, and Tetrapturus in the family Istiophoridae) because they are commonly caught with tuna longline gear and the dolphinfishes (genus Coryphaena in the family Coryphaenidae) because they are caught with surface fishing tuna gears. The common English names used in the tables presented below generally follow those used in the FAO Yearbooks although some used in the FAO Species Identification Sheets (Fischer and Whitehead, 1974) or elsewhere are employed. "Commercial tunas" is here used to mean skipjack tuna and all species of Thunnus except the longtail tuna. "Small tunas" is here defined as Auxis spp., eastern little tuna, and longtail tuna. For ease of presentation, Auxis spp. is hereafter referred to as auxis tunas.

The statistics[1] for the entire Indian Ocean are presented in Table 1, and then for the western Indian Ocean (FAO Fishing Area 51) in Table 2, and the eastern Indian Ocean (FAO Fishing Area 57) in Table 3. Unfortunately, the FAO Fishing Areas in the Pacific Ocean do not allow the presentation of statistics for the extreme western Pacific, which is the region of interest to the Programme (because of its relationship to the IPFC). Table 4 contains statistics for the central western Pacific Ocean (FAO Fishing Area 71) and

[1]Symbols used in all tables follow the FAO convention, namely: "..." data not available, unobtainable, or not separately available but included in another category; "--" none, magnitude known to be nil or zero, or given in original source as "nil or negligible" without any further indication of the magnitude; "NEI" not elsewhere included.

Table 5 for the northwest Pacific Ocean (FAO Fishing Area 61), both of which extend eastward to 175° W longitude. Table 6 represents the southwest Pacific Ocean (FAO Fishing Area 81), which extends eastward to 105° W longitude; few tuna are caught in the area to the east of New Zealand. Lastly, Table 7 represents the entire western Pacific region.

Looking at the Indian Ocean as a whole (Table 1) and considering the total catch of all tuna and tunalike species, the Republic of Korea, India, and Sri Lanka report the largest catches. For commercial tunas, Korea ranks first followed by Japan and "Other Not Reported Elsewhere." For small tunas, Indonesia probably ranks second (although they report no small tuna catches to FAO, their national statistics suggest that the "Tuna-like Fishes" category reported to FAO consists mostly of small tunas), followed by Pakistan and Maldives. For seerfishes, the rank order is India, Pakistan, and Yemen Arab Republic. Thus as expected, it can be seen that distant water fishing nations concentrate on commercial tunas, in fact, accounting for 59 percent of the reported catch. The total catch of some 174 thousand tons of commercial tunas for the Indian Ocean in comparison to that for the western Pacific Ocean catch of some 864 thousand tons (Table 7) suggests that the Indian Ocean fisheries are not well developed or possibly that the resource potential is not as great. Looking at the rank order of the species catches, namely yellowfin tuna, bigeye tuna, skipjack tuna, southern bluefin tuna, and albacore suggests that the fisheries for skipjack tuna and albacore (at least for surface dwelling subadults of the latter species) are underdeveloped. Because of the more coastal distribution of small tunas and most seerfishes, the coastal states account for nearly all of the catch of these species. Comparing the catch of 11 thousand tons of small tunas in the Indian Ocean to the 130 thousand tons in the western Pacific Ocean (Table 7) suggests that the Indian Ocean fishery is relatively underdeveloped, catches are underreported, or possibly that the potential is less. The distribution of the catches of seerfishes suggests that the harvestable segment of the resource is associated with continental land masses.

For the western Indian Ocean (Table 2), it can be seen that the two coastal states, Maldives and Sri Lanka, have significant fisheries for commercial tunas; although, Korea retains their leading rank. Maldives exports a significant part of their catch whereas virtually all of the Sri Lanka catch is consumed domestically.

For the eastern Indian Ocean (Table 3), it may come as a surprise to some that Indonesia recorded the largest catch of all tuna and tunalike fishes. This is due to their large catch of small tunas (apparently reported to FAO as "Tuna-like Fishes") and seerfishes. In comparison with other regions, the rank order of catches (and the catches themselves) of commercial tunas, namely bigeye tuna, southern bluefin tuna, yellowfin tuna, albacore, and skipjack tuna, suggests that the fisheries for skipjack and yellowfin tunas are significantly underdeveloped.

Turning to the entire western Pacific Ocean (Table 7), it is certainly no surprise to note that Japan is the leading fishing nation not only for commercial tunas, but also for all tuna and tunalike fishes. However, it may come as a surprise to some that the Philippines ranks second followed by "Other Not Reported Elsewhere" for both of these categories. Assessment of the state of the commercial tuna resources (e.g., Bartoo and Kikawa, 1979 and see [U.S.]

National Marine Fisheries Service, Southwest Fisheries Center, Honolulu Laboratory and the Far Seas Fisheries Research Laboratory of the Fisheries Agency of Japan) indicates that most of the fisheries are fully developed except for younger aged yellowfin tuna, possibly for bigeye tuna, younger aged albacore in the South Pacific stock, and skipjack tuna. The catches of small tunas indicate that the fisheries on these species are more fully developed than for any other region in the world. Philippines and Indonesia are the two leading fishing nations for these species, and their catches result primarily from small scale fisheries in both countries. The distribution of catches of seerfishes indicates that the dense Indo-Pacific island assemblage is also conducive to the development of fisheries on these resources.

For the central western Pacific Ocean (Table 4), Japan is again the leading fishing nation, but the importance of the catches contributed by the coastal, developing states, particularly the Philippines and Indonesia, is noteworthy. While the distant water fishing nations harvest 80 percent of the commercial tunas, they account for only 41 percent of the total tuna and tunalike catches. The catch of small tunas amounting to some 113 thousand tons is 71 percent of the reported world catch.

For the northwest Pacific Ocean (Table 5), the fisheries are naturally dominated by Japan, "Other Not Elsewhere Included," and Korea. Compared to the catch of some 299 thousand tons of commercial tunas, the 17 thousand tons of small tunas seems small, indicating as before that either the fisheries are underdeveloped or the resource potential is not substantial.

In the southwest Pacific Ocean (Table 6), the tuna fisheries are primarily directed (naturally) toward temperate water species, notably albacore and southern bluefin tuna. Surface fisheries directed toward skipjack tuna have only recently been developed. The rank order of fishing nations is Korea, "Other Not Elsewhere Included," and New Zealand. No catch of small tunas is reported, and the catch of seerfishes is small.

COASTAL STATE TUNA STATISTICS

The kinds of fishery statistics that I have attempted to assemble for the area fall into three categories: first, annual catch by species within fishery (gear) types with counts of the number of boats by gear type; second, fishing effort by gear type and the resulting catch by species for monthly or quarterly time periods; and third, size composition of the landings by species and by major fishing gear types on a monthly or quarterly basis. These statistics were sought both from the regional coastal states and the distant water fishing countries. Summaries of the information obtained from the former will be presented in this section while the latter will not be addressed in this paper since only published statistics were made available (by Japan and another tuna fishing entity).

Surprisingly, information on the number of boats was not readily available from either distant water fishing states or developing countries. For the former, the mobility of the fleets makes it difficult to assign boats to any one ocean or subarea; fishermen associations are generally better sources of information than government fisheries offices. For the latter countries, the typically multispecies nature of the fisheries makes it nearly impossible to designate boats as fishing for tuna as opposed to other species. However,

statistics are sometimes available on the number of boats by gear type and catch by species within gear type, thus making it possible to make inferences on the number of boats catching a substantial amount of tuna.

Size-composition statistics were available only from Indonesia among the developing states, and then only for 1977 and 1978. In November 1979, the SCSP with Norway aid initiated a project in Indonesia and Philippines to establish country projects to collect these measurements on a routine basis from several landing sites in each country. Since only an internal SCSP progress report covering the first three northern winter months has been prepared, the findings will not be presented here because they may present a biased view of the situation. At the time of this writing, it appears that both Indonesia and the Philippines will carry on the joint size sampling project under the umbrella of the REGTUNA project but implemented by the SCSP.

India

While the FAO Yearbooks of Fishery Statistics do not provide much insight into the Indian tuna fisheries except for reported landings of seerfishes, two recent publications provide significantly more information. A paper prepared by the [India] Fishery Resources Assessment Division (1979) of the Central Marine Fisheries Research Institute provides estimates of the production of tunas and seerfishes by states from 1969-1978. Then Silas, Rajagopalan, and Pillai (1979) provide additional information on the species composition and type of operations for selected landing centers.

The former paper presents national and state statistics for all fishes by species groups, and these estimates are based on a multistage stratified random sampling plan. For ease in interpretation, tuna statistics were extracted from several tables and are presented here in Table 8. As indicated from the FAO statistics, there is a significant fishery for seerfishes, the landings amounting to some 20 thousand tons in 1978. Both coasts have significant fisheries, but the production from the island states, Andaman and Lakshadweep, is small. However, it can be seen from this table that India's tuna fishery has been increasing over the last 10 years, from some 3 thousand tons in 1969 to a high of 19 thousand tons in 1976. The state of Kerala on the southwestern tip of India accounts for around 50 percent of the total production with the states of Tamil Nadu (southeastern tip) and Lakshadweep, Laccadive, Minicoy, and Amindivi Islands, contributing the next largest shares. The fishery in the Andamans does not seem to be well developed for either tuna or seerfishes.

The latter paper presents summaries of data on catch, fishing effort, species composition, and size measurements collected from various landing sites, primarily on the western coast. The most detailed information has been collected from Kerala State (Cochin, Calicut, Neendakara, and Vizhinjam landing sites) where as was stated earlier, the largest tuna catches are reported. Most catches result from drift gill net operations by small boats, and May-July is the peak season. The eastern little tuna is the most important species accounting for 70 to 98 percent of the landings depending on landing site. The range in sizes of tuna measured during 1978 and 1979 in Cochin are shown in Table 9. Fishing effort has been measured in hours fished for Cochin and in boats for Calicut-based drift gill net boats. In Tamil Nadu State, eastern little tuna and frigate tuna are about equally represented in the landings from drift gill net boats. Peak season is from July to September. Returning to the

western coast, for Karnata State, the eastern little tuna is the most important tuna in the catches, occurring from January through April. Drift gill net and small purse seine boats operate in the area. In Goa State, eastern little and longtail tunas are caught by small purse seine and drift gill net boats. In 1979, the fishing season was quite restricted occurring in only September-October. In Maharashtra State, the longtail tuna comprised 60 percent of the catch by drift gill net boats with the eastern little tuna accounting for the remainder. The season is from September through November. In the offshore Lakshadweep State, skipjack tuna made up 72 percent and yellowfin tuna 25 percent of the catch by pole-and-line boats in Minicoy. The fourth quarter was the most productive for skipjack tuna. Bigeye tuna are reportedly caught by trolling.

Indonesia

The [Indonesia] Directorate General of Fisheries (1973, 1974, 1976, 1977, 1978, 1979, 1980), Statistics Division, Directorate of Living Resources Management, has published the Fishery Statistics of Indonesia for the years 1972 through the current volume for 1978. Previously, similar statistics were issued under the title "Facts and Figures." Recent volumes include estimates of fishery production, value of the production, number of boats, and various other factors of national, social, and economic significance. The first two statistics categories were initially reported by large species groups and then in later years by smaller species groups and important single species. The first three statistics categories have been presented according to various geographical subdivisions becoming increasingly more specific over the years. These subdivisions are by coastal areas, then by provinces within coastal areas, and then by eastern Indian Ocean (FAO Fishing Area 57) and central western Pacific Ocean (FAO Fishing Area 71) segments for appropriate coastal areas/provinces (Fig. 1). Estimates for the number of boats have been presented according to nonpowered or powered (outboard and inboard) and, later, tonnage-class categories. Starting in 1978, catch will be reported by species and gear type, the number of boats by size class and gear type, and fishing effort in trips by gear type. These various changes suggest a government commitment to refining and improving the implementation of their multi-stage, modified random sampling scheme (Yamamoto 1978a, 1978b, 1978c, 1979).

Because these published statistics are quite voluminous, they will not be presented here in tabular form; rather, figures of selected statistics will be presented to illustrate historical trends and other salient features.

The production of all tunas has shown a steady and quite marked increase from some 42 thousand tons in 1971 to some 105 thousand tons in 1977 (Fig. 2). It is also apparent from this figure that most of this increase has been in the production of small tunas while the production of skipjack tuna has increased only slightly and that for large tunas (larger species of the genus Thunnus) has remained fairly stable over the time period. The production of king mackerels (including probably some wahoo) increased from some 29 thousand tons in 1971 to 39 thousand tons in 1974 but declined to the earlier level by 1977 (Fig. 3). Clearly the narrow-barred king mackerel is the most important species. As one would expect, the production of tunas is much greater for the Pacific Ocean segment of the fishery than for the Indian Ocean (Fig. 4A and B).

Proportionally small tunas are more important in the Indian Ocean fishery than in the Pacific. The largest tuna production (Fig. 5A) is reported for the coastal areas of Sumatra and Celebes, amounting to some 25 thousand tons and 28 thousand tons in 1977, respectively. However, the production reported for the coastal areas of Java, Maluku-West Irian, and Bali-Lesser Sunda Islands have risen sharply since 1974 or 1975. Sumatra is by far the largest producer of king mackerels (Fig. 5B); although the sharp decline in 1974 might be cause for concern. Species-wise for Sumatra, landings of small tuna are much larger than for either skipjack tuna or large tuna species (Fig. 6A), whereas for Celebes landings of skipjack tuna are slightly larger than for the other two species groups (Fig. 6B). For Java which has shown rapidly increasing catches, it is apparent that landings of small tunas account for most of the total tuna landings (Fig. 6C). For Maluku-West Irian where catches have also been increasing rapidly, the landings of skipjack tuna dominate but the contribution from small tunas has become proportionally more in later years (Fig. 6D).

While it is not possible to present data on the number of boats fishing for tuna since Indonesia has not included gear type in their survey, nonetheless the presentation of overall statistics should provide some perspective. In 1960, there were over 169 thousand fishing boats, and the number increased to about 295 thousand in 1970-73 before declining to around 245 thousand boats in 1977 (Fig. 7). Most of these boats are nonmotorized, although the number of powered boats has been increasing steadily albeit slowly until the later years. In 1977, there were about 9,600 outboard powered and 10,700 inboard powered boats. It is surprising to observe how similar the number of boats has been on the different islands or island groups, at least since 1968 (Fig. 8). However, the number of boats in Java declined by 50 percent over the last 10 years.

Within the Ministry of Agriculture, the Marine Fisheries Research Institute (LPPL) conducts research on fisheries and fish resources. With respect to tuna, this has included the collection of catch and effort statistics primarily from state enterprises and joint ventures but including some information from small-scale fisheries. The following figures and tables were derived from Uktolseja (1978 and updated by personal communication from the author).

For the state enterprise, pole-and-line fishery based in Ambon, Maluku-West Irian coastal area, monthly catch (reportedly around 90 percent skipjack tuna with the remainder being mostly yellowfin tuna), fishing effort in effective fishing days, and catch per unit effort (CPUE) are presented in Appendix Table 1. After an initial period of increase, catches declined or entered a period of fluctuation (Fig. 9). It is quite apparent that catch and CPUE are highly correlated. The monthly trend in CPUE indicates that the resource is less abundant from May-August (Fig. 10). The non-industrial or small-scale fishery in Ambon caught in 1968 just over half as much as the state enterprise but caught twice as much in 1977 (Table 10). This would indicate that the CPUE statistics derived from the state enterprise statistics are probably a reasonable measure for the fishery, but if the small-scale fishery continues to expand, it will become desirable to collect catch and effort data from this segment of the fishery as well.

For the state enterprise pole-and-line fishery based in the north Celebes coastal area, catches are again reported to be largely skipjack tuna (Appendix Table 2). As can be seen in Figure 11, the production from this fishery has been falling steadily from 1969 through 1978; and this is reportedly due to the

inability of the industrial-scale boats to compete effectively for baitfish with the small-scale fishers. Over the same period there has been a decrease in the CPUE which could be due to a decrease in efficiency of the boats (possibly due to scarcity of baitfish) or in availability of the resource. Catches by the small-scale fishery have been quite variable but generally increasing (Table 11). This then suggests that if this fishery is to be effectively monitored for changes in the abundance of the fishable stock, effort statistics should be collected from the small-scale fishery. Monthly CPUE statistics do not show any marked seasonal trend except that the highest CPUE occurs in August (Fig. 12).

The state enterprise pole-and-line fishery for skipjack tuna fishery based in Waegeo, Maluku-West Irian coastal area started operation in mid-1976, too short a time to investigate annual trends (Appendix Table 3). Skipjack tuna makes up nearly all of the catch with yellowfin tuna contributing less than 10 percent. There does not seem to be much seasonality in the abundance of the harvestable resources, but CPUE is slightly higher in the second semester (Fig. 13).

For the skipjack tuna pole-and-line fishery in Sarong, Maluku-West Irian coastal area, which is also a state enterprise, statistics are available for too short a period to discern trends (Appendix Table 4). The catch is made up of about 90 percent skipjack tuna, 7 percent yellowfin tuna, and 3 percent eastern little tuna. Seasonally the CPUE of skipjack tuna is highest in May-July and lowest in August (Fig. 14).

For the small-scale, pole-and-line skipjack tuna fishery based in Ternate, Maluku-West Irian coastal area, statistics have been collected (Appendix Table 5) which indicate that while the catch has increased, generally, there is no discernible historical trend in the CPUE statistics (Fig. 15). There seems to be a quite regular seasonal trend with catch highest in June and lowest in December (Fig. 16).

For the tuna longline fishery operating out of Bali, Bali-Lesser Sunda Island coastal area and Sabang, Sumatra coastal area, catch in number and fishing effort in hooks and sets were made available by month for 1974-78. Unfortunately, catch by species was not recorded in 1976-77 (Appendix Table 6). Catch of all species has increased substantially as has the amount of fishing effort expended, though less steadily. No historical trend is apparent for CPUE (Fig. 17).

Lastly, as was mentioned in the introductory material for Indonesia, some information is available on the size composition of skipjack and yellowfin tuna in the landings at various centers (Fig. 18). Generally for skipjack tuna, there is a single mode at around 50 cm fork length (FL) while for yellowfin tuna, there seems to be multiple modes with individuals as small as 30 cm FL. More comprehensive information should be available shortly from the project initiated in November 1979 by the SCSP.

Malaysia

There is no fishery directed specifically on tuna, rather these species are caught as part of a multispecies, small-scale fishery. While the FAO Yearbook of Fishery Statistics (FAO 1979) and the SEAFDEC Fishery Statistical Bulletin

(SEAFDEC 1979) indicate that only eastern little tuna is caught, the Malaysia Annual Fisheries Statistics (Ministry of Agriculture Malaysia 1979) lists the catches as a composite of "bonito, eastern little tuna, longtail tuna" or "Euthynnus spp./Thunnus spp." The greatest production of tunas is landed on Peninsular Malaysia (Table 4) with three times as much being landed on the east coast as on the west. The production has increased from 2600 tons in 1961 to 12,147 tons in 1978. On a monthly basis on Peninsular Malaysia, the largest catches are made in March-April and September-October, and the lowest in December-January.

The important gear types are purse seines, hook and line, and drift gill net. In 1978 there were 373, 2308, and 7868, respectively, of these types of boats on Peninsular Malaysia. On Sarawak the landings of tunas have increased from 100 tons in 1969 to 2011 tons in 1978; the largest landings are made in March April, and May and the lowest in September and October. On Sabah, the landings have increased from 610 tons in 1971-73 to 1000 tons in 1978.

For king mackerel, there would seem to be a directed fishery since most are caught with drift gill nets, but both trawls (10-44.9 gross tons (GT)) and hook-and-line boats contributed a significant amount. In 1978 on Peninsular Malaysia, there were 5392 trawls (of all sizes). The production of king mackerel is greatest on Peninsular Malaysia varying from 5400 tons in 1964 to 7461 tons in 1978 with the west coast producing less than twice the east coast production. There is no obvious seasonality of the catches, but they are highest in September and lowest in May. The production from Sarawak has varied from 700 tons in 1969 to 3750 tons in 1978. On a monthly basis, the highest production occurs in June and the lowest in January. No separate king mackerel statistics are available for Sabah.

Maldives

The fishermen in the Maldives traditionally target almost exclusively on tuna and tunalike fishes, and it is a small-scale fishery with over 5 thousand boats operating (Table 12). The number of pole-and-line dories has remained stable at around 2 thousand units, but mechanization of the existing boats started in 1974. Reportedly this has changed the behaviour of the sailing pole-and-line dories in that an increasing proportion have become baitfish catchers rather than fishers of tunas. Traditionally, the pole-and-line dories target on skipjack tuna and incidentally catch other tuna such as yellowfin while the trolling dories are said to target on eastern little tuna and seerfishes. The dories are spread throughout the island chain from the north on Haa Alifu to Seenu in the south (Table 13).

The annual total tuna production has declined significantly from 1971 to 1978 (Appendix Table 7), and the production of skipjack tuna has dropped precipitously since 1970 (Fig. 19). The production of auxis tuna seems to be quite variable but also shows a decline, even ignoring the obviously unusually large amount landed in 1971. While the number of trips made by all pole-and-line dories also declined from 1976 through 1978, it is not possible to ascertain on the basis of the available data which is cause or effect. On the basis of production for skipjack tuna, there does not seem to be a marked seasonality but landings are greatest in December and January and smallest in September (Fig. 20 and Appendix Table 8). Reportedly in response to changes in the monsoon season, the fleet moves north-south or east-west along the island

chain. There is a marked difference in the landings made at the different atolls (Fig. 21 and Appendix Table 9), but data by season within atoll were not made available. The density of skipjack tuna as measured by catch per trip follows essentially the same pattern as catch by atoll (Fig. 22 and Appendix Table 10). The time series for CPUE since it exists for only 3 years is too short to discern historical trends.

Philippines

The Philippine Bureau of Fisheries and Aquatic Resources (BFAR) within the Department of Natural Resources has been collecting fishery statistics and publishing the Fisheries Statistics of the Philippines annually since 1952 (for 1951) through to the current volume for 1978. Information on the number of fishing establishments, boats, gears, etc., have been collected only irregularly, the most recent being in 1969 and 1978, the latter in preparation for redesigning the collection system for statistics. The marine fisheries sector is divided into two segments. The commercial sector includes only boats of more than 3 GT, and these must be registered and licensed by the federal government. The municipal sector is made up of boats of less than 3 GT and includes production by gathering, catching, and culturing. These boats are not licensed by the Federal government.

Up until 1976, the production from the commercial sector was estimated from "Fish Caught Reports" submitted by the vessel operator. The estimation procedure employed by BFAR used a raising factor to counteract apparent underreporting. Municipal sector landings were estimated by surveying only six municipalities during the 1951-58 period. Subsequent estimates were estimated by employing an annual inflation factor.

In 1976, a new statistics system was put into effect based on a frame survey procedure (Chakraborty, 1976), which employs a statistical sampling programme for both the commercial and the municipal sectors. The new procedure is to provide estimates of production by gear, species, and species group as well as associated fishing effort by fishing ground and province.

The accuracy of the published production statistics for the Philippines have long been held suspect. This has resulted in a number of attempts to estimate production from fish consumption (see draft by Smith, Puzon, and Vidal, 1979 and papers cited therein NORCONSULT A. S. and IKO, 1975, NEDA various years, Development Academy of the Philippines et al., 1977, and Juliano and Yutuc, 1977). Based on these admittedly rough estimates, it appears that even the new statistics procedure may understate the production of the Philippines.

The apparent underestimation of annual production and the lack of estimates of fishing effort and resulting catch until 1977 when some estimates of days fished became available has led to the belief that the quality of the Philippine fishery statistics is not commensurate with the volume of the total fishery and the importance of fish to the country.

The latest volume of the Fishery Statistics of the Philippines (BFAR, 1980) provides a means for comparing the nationwide production of tuna by both sectors of the fishery from 1976 to 1978 (Table 14). The production of all tunas has apparently increased by nearly a factor of 100 from 1964 to 1977, but

estimates are not available for the production of tunas by the municipal sector before 1976. It is generally thought that the municipal sector has expanded greatly over the years. The near doubling of the commercial catch of tunas from 1976 to 1977 is generally attributed largely to full implementation of the new statistical system. The decrease in production by both sectors between 1977 and 1978 could be due to the decrease in field enumerators employed for the statistical system. Quite obviously, the municipal sector is the most important sector of the fishery as far as the tonnage of tunas landed is concerned. Considering tonnage only, auxis tunas, yellowfin and bigeye tunas, skipjack tuna, and eastern little tuna are of about equal importance.

In order to show the importance of tuna fishing in different areas of the Philippines, tuna statistics have been summarized by region (Fig. 23). Production estimates by "Fishing Grounds" were presented by BFAR for the commercial sector in 1977 and by larger "Fisheries Statistical Areas" in 1978. Region XI had the largest reported catch of all tunas in 1978 with more than 53 thousand tons, and this was followed by Region IV-A with nearly 40 thousand tons and Region VI with over 20 thousand tons (Table 15). The municipal sector was the most important. In 1978 for auxis tunas of which more were landed than any other tuna, Regions XI, IV, IX-A, and VII each reported over 7 thousand tons. The latter Region seems unusual in that it is mostly what may be called interior archipelagic waters. The municipal fishery was most important in Regions IX-A and VII, and the commercial sector in Regions IV and IX. For skipjack tuna, Regions IV-A and XI are by far the most important areas, reporting over 15 thousand tons each. The municipal sector was most important in both of these Regions. For the yellowfin and bigeye tunas group, Region XI accounted for over 50 percent of the total catch and Region IV-A reported some 5 thousand tons. The municipal sector was by far the most important. For eastern little tuna, nearly 11 thousand tons is reported from Region VI and over 6 thousand tons for Region IX-A. Again, the municipal sector made the greatest contribution to the catch.

The production of tunas by species within gear types for 1978 shows for the commercial sector that purse seine, ring net, and bag net are the most important gear types (Table 16). For the municipal sector, the most important gear types for all tunas are hook and line, surface gill net, and ring net. Hook and line is the most important gear type for the yellowfin and bigeye tunas group, surface gill net for skipjack tuna, and ring net for auxis tunas and eastern little tuna.

From Table 17, it can be seen that the most important commercial gear types with respect to catching tunas are also the most abundant gear types. Almost all of the ring net and bag net boats were under 100 GT while for purse seiners, 15 percent were 100 GT or over.

An estimate of the number of purse seiners in the commercial sector targeting on tunas was provided by a member of the industry. In May 1980, there were 32 purse seiners ranging from 60 to 1450 GT; and 16 more ranging from 111 to 430 GT were scheduled to be added to the fleet in 1980.

Four Regional offices (VII IX-B, X, and XI) provided estimates of catch of tunas by species and fishing effort based on the new statistical survey plan. In some cases, statistics collected back to 1973 were subjected to the same computational procedures to provide estimates. Summing the 1978 estimated

total tuna catches for all of the gear types provided for each of the four Regions and comparing these to the values reported in BFAR (1980) indicates that these estimates represent only 23.3, 0.4, 16.2, and 7.3 percent of the total catch for all gear types for each of the Regions. Either the catch and effort statistics are not raised in the same manner as the production estimates or else they represent some kind of subsample. The estimated catch and fishing effort statistics in terms of number of boats, fishing days, and trips for hook and line, purse seine, ring net, gill net, and bag net are presented in Table 18. There are too many missing values to be able to discern any historical pattern in the calculated CPUE statistics.

Singapore

While the fishery in Singapore is small, the Primary Production Department supplied data on catch and the number of boats (Table 19). No historical trend seems apparent in the 3 years of data, but it should be noted that these catch values are substantially greater than those appearing in the FAO Yearbooks of Fishery Statistics.

Somalia

There is no established system for the routine collection of fishery statistics of any kind. Some records of landings at the canneries located along the Gulf of Aden were made available by the Director of Cooperatives, Ministry of Fisheries (for Laas Qoray) and State Planning Commission (for Kandala and Habo). The landings reported for Laas Qoray were said to be 65 percent tuna, 25 percent king mackerel, and the remainder other species; landings at the other tuna canneries were described as tuna. These figures (Table 20) do not approach the figures appearing in FAO Yearbooks of Fishery Statistics (Tables 1 and 2).

Sri Lanka

Tuna production in Sri Lanka comes mostly from night fishing of drift gill nets from 3.5 GT mechanized boats and recently from 11 GT boats. One or two tuna longline vessels have been operating for several years. The small-scale fishery accounts for about 90 percent of the total national production, and the Planning and Programming Division of the Ministry of Fisheries measures this production by employing a statistically designed landing site observation programme. The commercial sector, which except for the tuna longliners employs the same kind of tuna catching gill net boats, accounts for only 10 percent of the production; this production is reported to the Ministry of Fisheries according to species or species groups, which do not conform to common international convention.

The reported production of all tuna and tunalike species has increased from over 6 thousand tons in 1954 to a high of 29 thousand tons in 1975 (Appendix Table 11). Starting in 1970, statistics by species categories became available. Skipjack tuna catch fluctuated upward to 15 thousand tons in 1975 and declined to 8 thousand tons by 1979 (Fig. 24). The catch of yellowfin tuna, which includes bigeye tuna in an unknown proportion and possibly large skipjack tuna by the commercial sector, shows no historical trend. In contrast to this, the catch of other tunas, which includes the eastern little tuna, auxis tunas, and billfishes, has apparently increased from a level of about 4 thousand tons

to over 8 thousand tons in 1979. The catch of king mackerel has remained fairly stable. The observational nature of the data collection activities and the problems with species separation preclude drawing solid inferences on species catch trends.

The monthly catch by 3.5 ton drift gill net boats indicates that the June–October period is the most productive (Fig. 25). The peak catch of skipjack tuna occurred in July while that for other tunas occurred in September or October.

The seasonal cycle is in effect due to changes in the monsoon season and this results in quite different area effects. Along the south coast, which is the most important tuna fishing area, the landings of skipjack tuna at Galle peak sharply in July and at Matara show a substantial increase in the July–September period. Increased catch levels occur during the southwest monsoon, which is from May–October (Fig. 26A). For the north and east coasts encompassing five ports, there seems to be little seasonality in the relatively small catches (Fig. 26B); apparently, this area is more important for small pelagics and demersal stocks than for tuna. For the central west coast, a seasonal effect is seen only in Putalam where the landings are particularly low in May–June and then rise to the highest levels in July–December (Fig. 26C).

Catch per unit effort is available only in terms of landings by the number of 3.5 GT gill net boats fishing along the southern coastal area and by the number of trips by 11 GT gill net boats fishing for the Ceylon Fisheries Corporation, a government enterprise. For the southern coastal area, the monthly CPUE for skipjack tuna follows much the same pattern as the catch statistics. If the number of boats can be accepted as a measure of fishing effort, the CPUE trend suggests that skipjack tuna is most abundant early in the southwest monsoon season (Fig. 27). The larger 11 GT boats tend to fish more offshore and use larger mesh gill nets. The historical record in catch per trip for a selection of such boats operating in the country indicates a downward trend in the abundance of not only skipjack tuna but king mackerel as well (Table 21). Both of these statistical series are neither sufficiently accurate in measuring real fishing effort nor are available for a sufficiently long time series to allow reasonable assessment of the state of the fisheries.

The small-scale nature of the fisheries is suggested by the proportion of nonmechanized boats in the fishery (Table 22); however, much of the tuna is caught by the 3.5 GT boats, which in 1978 numbered just over 2 thousand.

A number of papers have been published that describe the fishery and provide some historical perspective (de Bruin, 1970 and Sivasubramaniam, 1970, 1971, 1972, 1978).

Thailand

Tuna fishing has been a relatively minor component of the Thailand fishery, however, the country is showing an interest in expanding their tuna fishery. Currently, there is a FAO country project directed toward development of small-scale fisheries on small tunas. In 1976, nearly 9 thousand tons of narrow-barred king mackerel and nearly 10 thousand tons of small tunas by various gears, both commercial and small scale, were harvested (Table 23). Results from the FAO/Country project indicate that most of the small tuna catch

in the Indian Ocean area is probably longtail tuna. Reportedly longtail tuna is an important component of the Gulf of Thailand harvest also.

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Table 1. Tuna catch for the Indian Ocean north of 45-55° south latitude (FAO Fishing Areas 51 and 57) in 1978 from FAO (1979)

Species	Australia	Comoros	Egypt	German Dem Rep	India	Indonesia	Japan	Kenya	Korea Rep	Kuwait	Malagasy Rep	Maldives	Mauritius	Oman	Pakistan	Reunion	Seychelles	Somalia	Sri Lanka	Tanzania	Thailand	USSR	Yemen Arab Rep	Yemen Dem. Rep.	Other NEI	Total
Narrow-barred King Mackerel	99	-	-	-	-	2,406	-	..	-		-	-	-	-	-	-	-	-	3,714	1,680	-	-	4,000	-	-	12,060
Indo-Pacific King Mackerel	-	-	-	-	-	357	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	357
King Mackerel NEI	-	300F	-	-	22,952	-	-	-	-	-	-	-	-	-	6,003	-	-	-	-	-	1,974	-	-	-	-	31,229
Total Seerfishes	99	300F	-	-	22,952	2,763	-	..	-		-	-	-	-	6,003	-	-	-	3,714	1,680	1,974	-	-			
Auxis	-	-	-	-	-	-	-	-	-	-	-	1,900	-	-	-	-	-	-	-	-	-	-	4,000	-	-	43,646
Eastern Little Tuna	-	1,000F	-	-	-	-	-	-	-	-	-	800	-	-	7,066	-	120F	-	-	-	-	-	-	-	-	1,900
Longtail Tuna	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	577	-	-	10
Total Small Tunas	10	1,000F	-	-	-	-	-	-	-	-	-	2,700	-	-	7,066	-	120F	-	-	-	-	-	-	-		11
Skipjack Tuna	49	300F	-	-	-	6,244	918	-	253	-	-	13,800	14	-	-	-	20F	-	10,994	-	-	-	577	-	-	32,592
Albacore	-	-	-	-	-	-	248	-	4,103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,250F	14,601F
Southern Bluefin Tuna	6,916	-	-	-	-	-	8,234	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14F	15,258F
Yellowfin Tuna	15	100F	-	-	-	1,492	3,659	-	25,165	-	-	3,700	15	8,280F	-	-	80F	-	5,369	11,310	-	-	-	-	3,420F	62,515F
Bigeye Tuna	-	-	-	-	-	-	9,504	-	32,855	-	-	-	-	-	-	-	-	-	-	-	-	-	1,925	-	4,370F	48,654
Total Commercial Tunas	6,980	400F	-	-	-	7,736	22,473	-	62,470	-	-	17,500	29	8,280F	-	-	100F	-	16,363	11,310	-	-	1,925	-	18,054F	173,620F
Total Tunas	7,089	1,700F	-	-	22,952	10,499	22,473	..	62,470	-	-	20,200	29	8,280F	13,069	-	220F	-	20,077	12,990	1,974	-	6,502	-	18,054	228,739
Sailfish	-		-	-	-	-	81	-	107	-	-	-	-	-	-	-	-	-	-	-	-	22	-	-	186F	396F
Blue Marlin	-	-	-	-	-	-	896	-	773	-	-	-	-	-	-	-	-	-	-	150	-	14	-	-	-	1,833F
Black Marlin	-	-	-	-	-	-	290	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	251F	541F
Striped Marlin	-	-	-	-	-	-	1,655	-	249	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500F	2,404F
Billfishes NEI	-	-	-	-	-	-	-	-	1,907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,907F
Swordfish	-	-	-	-	-	-	694	-	610	-	-	-	-	-	398	-	-	-	-	-	-	-	-	-	580F	2,282F
Total Billfishes	-	-	-	-	-	-	3,616	-	3,646	-	-	-	-	-	398	-	-	-	-	150	-	36	-	-	1,517	9,383F
Tuna-Like Fishes	8	100F	14	2	16,081	11,495	-	-	548	-	-	-	8	-	-	323F	-	3,465F	7,414	-	1,673	452	-	10,300	-	51,883
GRAND TOTAL	7,097	1,800F	14	2	39,033	21,994	26,069	..	66,664	161	-	20,200	37	8,280F	13,467	323F	220F	3,465	27,491	13,140	3,647	488	6,502	10,300	19,571	289,985F

Table 2. Tuna catch for the western Indian Ocean (FAO Fishing Area 51) in 1978 from FAO (1979).

Species	Comoros	Egypt	German Dem. Rep.	India	Japan	Kenya	Korea	Kuwait	Madagascar	Maldives	Mauritius	Oman	Pakistan	Reunion	Seychelles	Somalia	Sri Lanka	Tanzania	USSR	Yemen Arab Rep.	Yemen Dem. Rep.	Other NEI	Total
Narrow-Barred King Mackerel	-	-	-	-	-	...	-	161	-	-	-	-	-	-	-	-	3,714	1,680	-	4,000	-	-	9,555
King Mackerels NEI	300F	-	-	14,732	-	-	-	-	-	-	-	-	6,083	-	-	-	-	-	-	-	-	-	21,035F
Total Seerfishes	300F	-	-	14,732	-	-	-	161	-	-	-	-	6,008	-	-	-	3,714	1,680	-	4,000	-	-	30,590F
Auxis	-	-	-	-	-	-	-	-	-	1,900	-	-	-	-	-	-	-	-	-	-	-	-	1,900
Eastern Little Tuna	1,000F	-	-	-	-	-	-	-	-	800	-	-	7,056	-	120F	-	-	-	-	577	-	-	9,563F
Total Little Tunas	1,000F	-	-	-	-	-	-	-	-	2,700	-	-	7,056	-	120F	-	-	-	-	577	-	-	11,463F
Skipjack Tuna	300F	-	-	-	10	-	174	-	-	13,800	14	-	-	-	20F	-	10,994	-	-	-	-	-	25,312F
Albacore	-	-	-	-	28	-	3,606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,980F	6,614F
Southern Bluefin Tuna	-	-	-	-	1,336	-	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3F	1,429F
Yellowfin Tuna	100F	-	-	-	2,624	-	12,096	-	-	3,700	15	8,280F	-	-	80F	-	5,369	11,310	-	-	-	1,200F	50,714F
Bigeye Tuna	-	-	-	-	6,494	-	23,758	-	-	-	-	-	-	-	-	-	-	-	-	1,925	-	820F	32,997F
Total Commercial Tunas	400F	-	-	-	10,492	-	45,664	-	-	17,500	29	8,280F	-	-	100F	-	16,363	11,310	-	1,925	-	5,003F	117,066F
Total Tunas	1,700F	-	-	14,732	10,492	...	45,664	161	-	20,200	29	8,280F	13,069	-	220F	-	20,077	12,990	-	6,502	-	5,003	159,119
Sailfish	-	-	-	-	55	-	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100F	238F
Blue Marlin	-	-	-	-	748	-	480	-	-	-	-	-	-	-	-	-	-	150	14	-	-	-	1,392F
Black Marlin	-	-	-	-	165	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	151F	316F
Striped Marlin	-	-	-	-	1,087	-	211	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300F	1,598F
Billfish NEI	-	-	-	-	-	-	1,389	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,389
Swordfish	-	-	-	-	360	-	448	-	-	-	-	-	368	-	-	-	-	-	-	-	-	350F	1,976F
Total Billfishes	-	-	-	-	2,435	-	2,589	-	-	-	-	-	368	-	-	-	-	150	36	-	-	901F	6,509F
Tuna-like Fishes	100F	14	2	13,379	-	-	361	-	-	-	8	-	-	323	-	3,465F	7,414	-	432	-	10,300	-	35,748F
GRAND TOTAL	1,800F	14	2	28,111	12,927	...	48,614	161	-	20,200	37	8,280F	13,437	323F	220F	3,465F	27,491	13,140	468	6,502	10,300	5,904F	201,426F

Table 3. Tuna catch for the eastern Indian Ocean (FAO Fishing Area 57) in 1978 from FAO (1979).

Species	Country								Total
	Austra-lia	India	Indone-sia	Japan	Rep.of Korea	Thai-land	USSR	Other NEI	
Narrow-Barred King Mackerel	- 99	-	2,406	-	-	-	-	-	2,505
Indo-Pacific King Mackerel	-	-	357	-	-	-	-	-	357
King Mackerel NEI		8,220	-	-	-	1,974	-	-	10,194
Total Seerfishes	99	8,220	2,763	-	-	1,974	-	-	13,056
Longtail Tuna	10	-	-	-	-	-	-	-	10
Total Small Tunas	10	-	-	-	-	-	-	-	10
Skipjack Tuna	49	-	6,244	908	79	-	-	-	7,280
Southern Bluefin Tuna	6,916	-	-	6,898	4	-	-	11F	13,829F
Albacore	-	-	-	220	497	-	-	7,270F	7,987F
Yellowfin Tuna	15	-	1,492	945	7,129	-	-	2,220F	11,801F
Bigeye Tuna	-	-	-	3,010	9,097	-	-	3,550F	15,657F
Total Commercial Tunas	6,980	-	7,736	11,981	16,806	-	-	13,051F	56,554F
Total Tunas	7,089	-	10,499	11,981	16,806	1,974	-	13,051F	69,620F
Sailfish	-	-	-	26	46	-	-	86F	158F
Blue Marlin	-	-	-	148	293	-	-	-	441
Black Marlin	-	-	-	125	-	-	-	100F	225F
Striped Marlin	-	-	-	568	38	-	-	200F	806F
Billfishes NEI	-	-	-	-	518	-	-	-	518
Swordfish	-	-	-	314	162	-	-	230F	706F
Total Billfishes	-	-	-	1,181	1,057	-	-	616F	2,854F
Tuna-like Fishes	8	2,702	11,495	-	187	1,673	20	-	16,085
GRAND TOTAL	7,097	10,922	21,994	13,162	18,050	3,647	20	13,667	88,559

Table 4. Tuna catch for the central western Pacific Ocean (FAO Fishing Area 71) in 1978 from FAO (1979)

Species	Australia	Fiji	Indonesia	Japan	Kiribati	Korea	Malaysia Peninsular	Malaysia Sarawak	Malaysia Sabah	New Hebrides	Pacific Is Trust T	Papua NewGuinea	Philippines	Singapore	Solomon	Thailand	Other NEI	Total
Narrow-Barred King Mackerel	1,102	293	29,321	-	-	-	-	-	-	-	-	-	13,454	-	-	-	-	44,170
Indo-Pacific King Mackerel	-	-	4,112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,112
King Mackerel NEI	...	-	-	-	-	-	7,481	3,750	-	-	-	-	-	109	-	10,849	-	21,989
Wahoo	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	10
Total Seerfishes	1,102	293	33,433	-	10	-	7,481	3,750	-	-	-	-	13,454	109	-	10,849	-	70,281
Auxis	-	-	-	50	-	-	-	-	-	-	-	-	54,698	-	-	-	-	54,796
Eastern Little Tuna	-	-	-	-	-	-	12,147	2,011	-	-	-	28	44,229	-	-	-	-	58,413
Longtail Tuna	24	-	-	-	-	-	-	-	-	-	-	- 0	-	-	-	-	-	24
Total Small Tunas	24	-	-	50	-	-	12,147	2,011	-	-	-	28	98,925	-	-	-	-	113,183
Skipjack Tuna	-	1,966	28,698	198,217	450	5,856	-	-	-	-	10,795	45,529	54,387	40	17,455	-	-	363,493
Bluefin Tuna	-	-	-	193	-	21	-	-	-	-	-	-	-	-	-	-	5F	219F
Albacore	-	-	-	6,553	-	771	-	-	-	-	-	-	-	-	-	-	4,500F	11,824F
Yellowfin Tuna	-	540	9,102	58,668	100	5,088	-	-	-	-	-	3,109	42,219	-	-	-	2,085F	120,911F
Bigeye Tuna	-	-	-	21,453	-	3,514	-	-	-	-	-	-	-	-	-	-	470F	25,437F
Total Commercial Tunas		2,506	37,800	283,184	550	15,250					10,795	48,638	96,606	40	17,455	-	7,060F	521,884
Total Tunas	1,126	2,799	71,233	285,234	560	15,250	19,628	5,761	-	-	10,795	48,664	208,985	149	17,455	10,849	7,060F	705,328F
Sailfish	-	-	-	358	-	465	-	-	-	-	-	-	-	-	-	-	-	823
Blue Marlin	-	-	-	4,179	-	136	191	-	-	-	-	-	-	-	-	-	-	4,506
Black Marlin	-	-	-	783	-	-	-	-	-	-	-	-	-	-	-	-	-	783
Striped Marlin	-	-	-	519	-	31	-	-	-	-	-	-	-	-	-	-	-	550
Billfishes NEI	-	-	-	-	-	225	-	-	-	-	-	-	1,546	-	-	-	-	1,771
Swordfish	-	-	-	859	-	50	-	-	-	-	-	-	1,237	-	-	-	-	2,146
Total Billfishes	-	-	-	6,698	-	907	191	-	-	-	-	-	2,783	-	-	-	-	10,579
Tuna-like Fishes	0	-	47,666	5,410	-	26	-	-	1,000	6,800F	-	-	-	-	318	11,550	-	72,770F
Common Dolphin-fishes	-	-	-	327	-	-	-	-	-	-	-	-	56	-	-	-	-	383
GRAND TOTAL	1,126	2,799	118,899	297,669	560	16,183	19,799	5,761	1,000	6,800	10,795	48,664	211,824	149	17,773	22,199	7,060F	789,060

Table 5. Tuna catch for the northwest Pacific Ocean (FAO Fishing Area 61) in 1978 from FAO (1979).

Species	Country				Total
	Hong Kong	Japan	Korea	Other	
Japanese King Mackerel	-	7,355	10,030	-	17,385
Indo-Pacific King Mackerel	-	-	-	14,063F	14,063F
King Mackerel NEI	3,211	-	-	-	3,211
Total Seerfishes	3,211	7,355	10,030	14,063F	34,659F
Auxis	-	14,718	-	2,138F	16,856F
Total Small Tunas	-	14,718	-	2,138F	16,856
Skipjack Tuna	-	156,474	-	3,157F	159,631F
Bluefin Tuna	-	13,594	-	345F	13,939F
Albacore	-	69,760	-	863F	10,623F
Yellowfin Tuna	-	19,509	-	19,492F	39,001F
Bigeye Tuna	-	12,381	-	2,987F	15,368F
Total Commercial Tunas	-	271,718	-	26,844F	298,562F
Total Tunas	3,211	293,791	10,030	43,045G	350,077F
Sailfish	-	921	-	3,966F	4,887F
Blue Marlin	-	2,971	-	2,305F	5,276F
Black Marlin	-	32	-	1,734F	1,766F
Striped Marlin	-	7,386	-	1,525F	8,911F
Swordfish	-	10,572	-	1,002F	11,574F
Total Billfishes		21,882		10,532F	32,414F
Common Dolphinfishes	-	13,140	-	6,879F	20,019F
Tunz-like Fishes	-	19,302	168	41,699F	61,069F
GRAND TOTAL	3,211	348,115	10,198	102,155F	463,679F

Table 6. Tuna catch for the Southwest Pacific Ocean (FAO Fishing Area 81) in 1978 from FAO (1979)

Species	Country					Total
	Australia	Japan	Korea	New Zealand	Others NEI	
Narrow Barred King Mackerel	113	-	-	-	-	113
Japanese King Mackerel	-	-	221	-	-	221
Total Seerfishes	113		221			334
Skipjack Tuna	403	456	91	5 402F	-	6 352F
Southern Bluefin Tuna	4 814	2 608	4	5F	2F	7 433
Albacore	-	689	8 974	938F	10 678F	21 279F
Yellowfin Tuna	60	363	5 340	0	160F	5 923F
Bigeye Tuna	-	222	1 782	-	230F	2 234F
Total Commercial Tunas	5 277	4 338	16 191	6 345F	11 070F	43 221
Total Tunas	5 390	4 338	16 412	6 345F	11 070F	43 555
Sailfish	-	2	38	-	0	40
Blue Marlin	-	12	279	-	-	291
Black Marlin	-	11	-	-	100F	111F
Striped Marlin	-	182	17	-	200F	399F
Billfishes NEI	-	-	92	-	-	92
Swordfish	-	269	100	-	170F	539F
Total Billfishes	-	476	526	-	470F	1 472
Tuna-like Fishes	-	-	54	-	-	54
GRAND TOTAL	5 390	4 814	16 992	6 345	11 540	45 081

Table 7. Tuna catch for the western Pacific Ocean (FAO Fishing Areas 61, 71 and 81) in 1978 from FAO (1979).

Species	Australia	Fiji	Hongkong	Indonesia	Japan	Kiribati	Korea	Malaysia Peninsular	Malaysia Sarawak	Malaysia Sabah	New Hebrides	New Zealand	Pacific I. Trust T.	Papua New Guinea	Philippines	Singapore	Solomon	Thailand	Other NEI	Total
Japanese King Mackerel	-	-	-	-	7,355	-	10,251	-	-	-	-	-	-	-	-	-	-	-	-	17,606
Narro-barred King Mackerel	1,215	293	-	29,321	-	-	-	-	-	-	-	-	-	-	13,454	-	-	-	-	44,283
Indo-Pacific King Mackerel	-	-	-	412	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,063F	16,175F
King Mackerel NEI	...	-	3,211	-	-	-	-	7,461	3,750	-	-	-	-	-	-	109	-	10,649	-	25,180
Wahoo	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	10
Total Seerfishes	1,215	293	3,211	33,433	7,355	10	10,251	7,461	3,750	-	-	-	-	-	13,454	109	-	10,649	14,063F	105,254F
Aumis	-	-	-	-	14,768	-	-	-	-	-	-	-	-	-	54,698	-	-		2,138F	71,502F
Eastern Little Tuna	-	-	-	-	-	-	-	12,147	2,011	-	-	-	-	26	44,229	-	-	-	-	58,413
Longtail Tuna	24	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	24
Total Small Tunas	24	-	-	-	14,768	-	-	12,147	2,011	-	-	-	-	26	98,925	-	-	-	2,138F	130,039F
Skipjack Tuna	403	1,966	-	28,698	355,247	450	5,947	-	-	-	-	5,401	10,795	45,529	54,387	40	17,455	-	3,157F	529,476F
Bluefin Tuna	-	-	-	-	13,787	-	21	-	-	-	-	-	-	-	-	-	-	-	350F	14,158F
Southern Bluefin Tuna	4,814	-	-	-	2,608	-	4	-	-	-	-	5F	-	-	-	-	-	-	2F	7,433F
Albacore	-	-	-	-	77,002	-	9,745	-	-	-	-	938F	-	-	-	-	-	-	16,041F	103,726F
Yellowfin Tuna	60	540	-	9,102	78,540	100	10,428	-	-	-	-	0	-	3,109	42,219	-	-	-	21,737F	165,835F
Bigeye Tuna	-	-	-	-	34,056	-	5,296	-	-	-	-	-	-	-	-	-	-	-	3,687F	43,039F
Total Commercial Tunas	5,277	2,506		37,800	561,240	550	31,441					6,345	10,795	48,638	96,606	40	17,455	-	44,974	863,667F
Total Tunas	6,516	2,799	3,211	71,233	583,363	560	41,692	19,608	5,761	-	-	6,345	10,795	48,664	208,985	149	17,455	10,649	61,175	1,098,960
Sailfish	-	-	-	-	1,281	-	503	-	-	-	-	-	-	-	-	-	-	-	3,966F	5,750
Blue Marlin	-	-	-	-	7,162	-	415	191	-	-	-	-	-	-	-	-	-	-	2,308F	10,073
Black Marlin	-	-	-	-	826	-	-	-	-	-	-	-	-	-	-	-	-	-	1,834F	2,660
Striped Marlin	-	-	-	-	8,087	-	48	-	-	-	-	-	-	-	-	-	-	-	1,725F	9,860
Billfishes NEI	-	-	-	-	-	-	317	-	-	-	-	-	-	-	1,546	-	-	-	-	1,863
Swordfish	-	-	-	-	11,700	-	150	-	-	-	-	-	-	-	1,237	-	-	-	1,172F	14,259
Total Billfishes	-	-	-	-	29,056	-	1,433	191	-	-	-	-	-	-	2,783	-	-	-	11,002	44,465
Tuna-like Fishes	0	-	-	47,666	24,712	-	248	-	-	1,000	6,800F	-	-	-	-	-	318	11,550	41,699F	133,993F
Common Dolphinfishes	-	-	-	-	13,467	-	-	-	-	-	-	-	-	-	56	-	-	-	6,879	20,402
GRAND TOTAL	6,516	2,799	3,211	118,899	650,598	560	43,373	19,799	5,761	1,000	6,800F	6,345	10,795	48,664	211,824	149	17,455	22,199	120,755	1,297,826

Table 8. Annual production (in tons) in India of seerfishes and tunas by state for 1969-78. From (India) Fishery Resources Assessment Division (1979).

State	Species Group	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
West Bengal & Orissa	Seerfishes	612	826	338	329	769	1 169	554			
	Tunas	-	1	42	28	46	9	16			
West Bengal	Seerfishes								287	32	54
	Tunas								-	-	-
Orissa	Seerfishes								940	672	1 059
	Tunas								84	37	609
Andhra Pradesh	Seerfishes	2 951	3 608	3 352	5 830	4 054	4 438	5 277	3 412	3 261	2 600
	Tunas	193	135	293	495	141	683	664	334	449	328
Tamil Nadu	Seerfishes	2 461	2 926	5 032	6 010	5 763	5 178	4 100	3 784	6 424	4 700
	Tunas	1 368	788	1 044	658	624	1 691	1 785	2 923	3 238	1 169
Pondicherry	Seerfishes	33	83	76	25	46	68	23	28	34	41
	Tunas	2	2	16	1	-	9	-	1	-	3
Kerala	Seerfishes	1 010	1 731	2 800	1 386	1 690	4 909	4 065	5 936	3 250	3 354
	Tunas	978	1 226	3 043	3 626	2 699	5 927	5 845	12 880	6 705	6 548
Karnataka	Seerfishes	720	1 552	2 506	2 498	1 313	1 532	776	1 341	1 831	1 463
	Tunas	109	4	515	134	124	394	212	576	622	614
Goa	Seerfishes	34	36	108	67	66	273	222	501	213	691
	Tunas	-	2	-	-	-	-	2	23	207	300
Maharashtra	Seerfishes	2 570	1 496	1 509	2 089	1 769	1 434	1 850	2 116	3 220	2 915
	Tunas	123	278	292	294	743	286	274	463	312	1 939
Gujarat	Seerfishes	1 030	1 043	2 524	2 850	4 110	686	1 879	1 634	2 022	3 734
	Tunas	-	-	1	1	268	579	546	734	332	451
Andamans	Seerfishes	32	51	46	75	91	63	85	93	119	127
	Tunas	7	9	12	9	13	7	9	13	37	57
Lakshadweep	Seerfishes	63	58	48	51	29	91	66	87	41	41
	Tunas	665	571	774	514	1 020	1 254	1 932	1 291	1 166	1 875
T O T A L	Seerfishes	11 516	13 410	18 339	21 210	19 700	19 841	18 897	20 159	21 119	20 779
	Tunas	3 445	3 015	6 032	5 760	5 678	10 839	11 285	19 322	13 005	13 893

Table 9. Size ranges of tuna samples at Cochin, Kerala State, India in 1978-79. From Silas, Rajagopalan, and Pillai (1979).

Species	Fork Length (cm)		Weight (Kg)	
	Minimum	Maximum	Minimum	Maximum
Eastern Little Tuna	21	71	0.9	5.2
Frigate Tuna	33	48	0.6	2.0
Longtail Tuna	38	64	0.9	3.5
Yellowfin Tuna	63	78	4.8	7.1
Oriental bonito	11	52	0.1	1.8

Table 10. Ratio of small-scale to large-scale (Peram Perikani Maluku) skipjack tuna catches by pole-and-line fleets in Ambon Island, Indonesia. Derived from Uktolseja (1978).

Year	Catch Small-Scale	Catch Large-Scale	Ratio Small to Large
1968	302.2	472.5	0.64
1969	161.4	449.6	0.36
1970	203.7	657.6	0.31
1971	755.3	773.4	0.98
1972	1075.7	1067.2	1.01
1973	690.9	944.1	0.73
1974	610.8	616.2	0.99
1975	656.2	546.4	1.20
1976	614.8	682.6	0.90
1977	996.7	500.9	1.99
1978	Not Collected	944.0	

Table 11. Ratio of skipjack tuna catches in North Celebes between small-scale and large-scale (P.N. Perikani Aertembaga) pole-and-line fishers. Derived from Uktolseja (1978).

Year	Catch Small-Scale	Catch Large-Scale	Ratio Small to Large
1967	1650.3	1283.5	1.29
1968	2034.3	1397.0	1.46
1969	1942.3	1511.6	1.28
1970	1525.2	1578.3	0.97
1971	2245.8	1326.0	1.69
1972	2487.0	597.8	4.16
1973	3238.3	501.5	6.46
1974	1412.7	656.6	2.15
1975	2118.8	616.5	3.44
1976	1641.0	281.2	5.84
1977	3116.4	339.4	9.18
1978	2921.3	231.9	12.60

Table 12. Number of tuna fishing boats in the Maldives

Year	Pole and Line		Sailing Trollers	Total
	Sailing	Motorized		
1970	1801	-	2710	4511
1971	2011	-	2898	4909
1972	2089	-	2986	5075
1973	2146	-	3012	5158
1974	2131	1	3056	5188
1975	2074	42	3154	5270
1976	2122	218	3284	5624
1977	2085	413	3385	5883
1978	1725	548	3480	5753

Table 13. Number of fishing boats in the Maldives by atoll, from north to south, in 1978.

Atoll	No. of Fishermen	Pole & Line (Sailing only)	Pole & Line Motorized	Sailing Troller
Haa Alifu (1)	1884	120	38	204
Haa Dhaalu (2)	1298	101	24	326
Shaviyani (3)	1197	62	17	326
Noonu (4)	1630	85	15	216
Raa (5)	1864	82	53	286
Baa (6)	1352	55	46	162
Leaviyani (7)	1220	26	47	65
Kaafu (8)	1150	93	5	89
Alifu (9)	1621	178	4	305
Vaavu (10)	248	20	12	26
Meemu (11)	910	45	15	55
Faafu (12)	413	48	3	60
Dhaalu (13)	656	37	20	94
Thaa (14)	1195	108	23	154
Laamu (15)	1261	90	15	110
Gaafu Alifu (16)	1216	123	37	148
Gaafu Daalu (17)	1403	131	46	215
Gnaviyani (18)	459	28	1	71
Sennu (19)	1706	199	17	411
Male' (20)	...	94	110	157
TOTAL	22683	1725	548	3480

Table 14. Annual tuna production in tons of the Philippines by fishery sector. Derived from BFAR (1980).

ear	Sector	Total	King Mackerel	Auxis Tunas	Yellowfin and Big-eye Tunas	Skipjack Tuna	Eastern Little Tuna	Sailfishes	Swordfishes
964	Comm.	2,950	162	not reported	1,432		1,756	not reported	not reported
965	Comm.	4,927	117	"	1,685	95	3,030	"	"
966	Comm.	10,794	1,932	"	3,146	169	5,547	"	"
967	Comm.	20,669	2,207	"	3,987	230	14,245	"	"
968	Comm.	24,287	5,047	"	4,917	1,041	13,282	"	"
969	Comm.	18,134	769	"	2,657	2,316	12,392	"	"
970	Comm.	12,858	3,597	"	1,892	122	7,247	"	"
971	Comm.	13,425	5,142	"	3,812	225	4,246	"	"
972	Comm.	10,590	1,289	"	1,917	131	7,253	"	"
973	Comm.	23,927	1,327	3,201	6,865	1,463	11,071	"	"
974	Comm.	27,708	2,369	2,248	11,415	2,761	8,915	-	-
975	Comm.	26,177	4,618	3,396	9,694	3,181	5,288	-	-
976	Comm.	36,262	3,402	6,101	12,845	9,816	4,098	-	-
	Mun.	102,271	7,513	22,227	31,633	19,358	18,906	1,076	1,556
	Total	138,533	10,915	28,328	44,478	29,174	23,004	1,076	1,556
977	Comm	69,421	9,034	11,318	12,260	22,519	14,289	-	1
	Mun.	165,462	6,684	31,689	50,799	32,571	40,455	1,162	2,102
	Total	234,883	15,718	43,007	63,059	55,090	54,744	1,162	2,103
978	Comm.	55,153	4,145	20,897	5,519	14,816	9,468	265	43
	Mun.	144,302	7,779	30,002	41,510	34,914	26,873	2,377	847
	Total	199,455	11,924	50,899	47,029	49,730	36,341	2,642	890

Table 15. Philippine tuna production in tons by Region for both the commercial and municipal sectors for 1978. Derived from BFAR (1980).

Region	Sector	Total	King Mackerels	Auxis Tuna	Yellowfin and Bigeye	Skipjack Tuna	Eastern Little Tuna	Shellfishes	Swordfish
I	Comm.	40	40	-	-	-	-	-	-
	Mun.	2,753	196	321	1,869	151	11	1	204
	Total	2,793	236	321	1,869	151	11	1	204
II	Comm.	85	-	85	-	-	-	-	-
	Mun.	229	37	58	99	-	10	9	16
	Total	314	37	143	99	-	10	9	16
III	Comm.	79	8	13	-	-	58	-	-
	Mun.	1,280	71	115	308	19	744	5	18
	Total	1,359	79	128	308	19	802	5	18
IV	Comm.	17,492	748	8,709	2,089	4,248	1,629	66	3
	Mun.	-	-	-	-	-	-	-	-
	Total	17,492	748	8,709	2,089	4,248	1,629	66	3
IV-A	Comm.	5,532	294	659	484	15	4,080	-	-
	Mun.	26,388	1,793	3,350	4,614	16,616	-	-	15
	Total	31,920	2,087	4,009	5,098	16,631	4,080	-	15
V	Comm.	2,780	1,006	1,138	357	80	199	-	-
	Mun.	7,460	1,221	1,704	972	259	1,250	1,851	203
	Total	10,240	2,227	2,842	1,329	339	1,449	1,851	203
VI	Comm.	4,725	1,790	669	1,079	249	902	-	36
	Mun.	15,685	268	1,084	412	3,867	10,054	-	-
	Total	20,410	2,058	1,753	1,491	4,116	10,956	-	36
VII	Comm.	1,525	14	1,453	27	30	1	-	-
	Mun.	8,849	1,045	5,908	999	463	106	237	91
	Total	10,374	1,059	7,361	1,026	493	107	237	91
VIII	Comm.	2,272	215	1,967	86	4	-	-	-
	Mun.	8,293	750	4,399	2,169	75	669	39	192
	Total	10,565	965	6,366	2,255	79	669	39	192
IX-A	Comm.	120	-	-	117	3	-	-	-
	Mun.	17,920	938	7,453	856	2,532	6,141	-	-
	Total	18,040	938	7,453	973	2,535	6,141	-	-
IX-B	Comm.	3,913	24	74	565	3,175	74	-	1
	Mun.	4,239	177	837	648	963	1,452	102	60
	Total	8,152	201	911	1,213	4,138	1,526	102	60
X	Comm.	845	-	268	157	101	319	-	-
	Mun.	7,830	637	271	2,489	376	3,976	44	37
	Total	8,675	637	539	2,646	477	4,295	44	37
XI	Comm.	15,465	30	5,862	558	6,814	1,999	199	3
	Mun.	38,344	110	3,525	26,004	8,366	239	89	11
	Total	53,809	140	9,387	26,562	15,180	1,238	278	14
XII	Comm.	280	-	-	-	97	183	-	-
	Mun.	5,032	536	977	71	1,227	2,221	-	-
	Total	5,312	536	977	71	1,324	2,404	-	-

Table 16. Philippine tuna production in tons by fishing gear within fishery sector, 1978. Derived from BFAR (1980).

Sector Gear Type	Total	King Mackerels	Auxis Tunas	Yellowfin and Big-eye Tunas	Skipjack Tunas	Eastern Little Tunas	Sailfishes	Swordfishes
Commercial	55,153	4,169	20,897	5,519	14,816	9,444	265	43
Bag Net	7,676	187	1,728	471	1,302	3,988	-	-
Gill Net	89	-	89	-	-	-	-	-
Hook & Line	124	-	102	19	-	-	-	-
Muro-Ami	108	1	2	3	59	43	-	-
Purse Seine	25,618	1,832	10,403	4,133	6,400	2,849	-	1
Trawl	1,953	1,881	-	3	3	-	66	-
Round Haul Seine	140	65	73	1	-	1	-	-
Ring Net	19,321	203	8,500	801	7,052	2,563	199	3
Longline	124	-	-	88	-	-	-	36
Municipal	98,171 1/	5,861 1/	25,078 1/	31,745 1/	17,892 1/	14,410 1/	2,353 1/	832 1/
Surface Gill Net	21,419	2,281	3,853	4,918	7,321	2,466	229	351
Bottom Gill Net	1,264	499	355	-	-	410	-	-
Hook and Line	50,252	2,594	10,965	24,922	6,753	2,471	2,109	438
Beach Seine	1,830	24	419	649	7	725	3	3
Longline	2,961	180	393	801	1,366	420	1	
Baby Trawl	133	114	10	7	-	-	-	2
Bagnet	2,403	43	404	275	-	1,661	-	20
Push Net	9	2	-	-	-	7	-	-
Fish Corral	2,494	59	473	44	1,865	40	-	13
Round Haul Seine	81	14	14	35	-	18	-	-
Ring Net	14,212	6	7,686	167	273	6,080	-	-
Purse Seine	949	18	488	42	301	100	-	-
Fish Pot	104	12	-	85	-	5	-	2
Others	60	15	18	-	6	7	11	3

1/ Do not agree with totals in Table 14.

Table 17. The number of Philippine commercial fishing crafts by tonnage class and gear - 1978. Taken from BFAR (1978).

Tonnage Class	Gear	Total	Bagnet	Beach Seine	Drive in Net	Gill Net	Hook & Line	Long Line	Purse Seine	Push Net	Ring Net	Round Haul Seine	Trawl
	Grand Total	2,133	642	46	5	16	50	5	327	92	158	23	769
	Total:												
	Powered	2,123	638	44	5	16	50	5	324	92	157	23	769
	Non-Powered	10	4	2	-	-	-	-	3	-	1	-	-
3.1 - 4.9	Powered	214	47	9	-	10	3	-	29	12	35	10	59
	Non-Powered	3	1	1	-	-	-	-	1	-	-	-	-
5 - 9.9	Powered	575	201	15	-	4	2	-	54	58	46	12	183
	Non-Powered	5	2	1	-	-	-	-	1	-	1	-	-
10 - 14.9	Powered	375	179	11	-	2	5	-	33	21	25	1	98
	Non-Powered	1	1	-	-	-	-	-	-	-	-	-	-
15 - 19.9	Powered	139	80	1	-	-	2	-	18	-	16	-	22
	Non-Powered	1	-	-	-	-	-	-	1	-	-	-	-
20 - 24.9		152	50	7	1	-	10	-	20	-	13	-	51
25 - 49.9		269	59	-	2	-	15	2	27	-	17	-	147
50 - 99.9		292	11	1	-	-	11	1	94	-	5	-	169
100 149.9		76	10	-	-	-	2	-	35	-	-	-	29
150 - 199.9		10	1	-	-	-	-	-	6	-	-	-	3
200 - 249.9		6	-	-	2	-	-	-	1	1	-	-	2
250 - 299.9		-	-	-	-	-	-	-	-	-	-	-	-
300 - 349.9		3	-	-	-	-	-	2	1	-	-	-	-
350 - 399.9		1	-	-	-	-	-	-	-	-	-	-	1
400 - 449.9		3	-	-	-	-	-	-	2	-	-	-	1
450 - over		4	-	-	-	-	-	-	3	-	-	-	1
Not reported		4	-	-	-	-	-	-	1	-	-	-	3

Table 18. Estimates of catch by species and species groups and fishing effort by number of boats, fishing days, and trips for selected gear types for Philippine Regions VII, IX-B, X, and XI.

Gear / Year / Region	Catch in Tons				Fishing Effort		
	Large Tunas	Skipjack	Eastern Little	Auxis	Boats	Fishing Days	Trips
Hook and Line							
1973							
XI	432	18	-	-	53	340	350
1974							
XI	951	4	-	-	85	380	385
1975							
XI	200	605	-	-	65	355	360
1976							
IX-B	818	-	292	-	450	...	...
XI	1019	11	-	6	100	989	1000
1977							
IX-B	4119	-	479	-	1650	...	...
X	72	133	144	4	...	...	...
XI	933	899	-	-	319	1906	3250
1978							
IX-B	1609	-	825	-	950	...	...
X	104	129	82	-	...	...	...
XI	1380	3	-	225	217	1627	4079
Purse Seine							
1973							
XI	-	200	-	-	68	148	160
1974							
XI	-	171	-	-	52	110	122
1975							
VII	1428	-	-	-	197	...	...
1976							
VII	-	-	37	1338	314	...	...
XI	-	-	-	3	2	40	40

Table 18 Con't...

Gear Year Region	Catch in Tons				Fishing Effort		
	Large Tunas	Skipjack	Eastern Little	Auxis	Boats	Fishing Days	Trips
1977							
VII	-	-	-	6450	383	...	...
XI	5	-	-	-	2	35	35
1978							
VII	-	-	11	1316	158	...	...
XI	-	782	-	-	205	1040	1063
Ring Net							
1973							
XI	41	500	-	-	210	2120	2140
1974							
X	19	-	-	-	9	134	...
XI	500	788	-	-	282	3470	3485
1975							
VII	5	-	-	-	13	...	...
X	23	13	-	-	13	394	...
XI	45	-	-	-	10	210	220
1976							
VII	-	-	-	50	10	...	...
IX-B	-	1093	731	1238	350	...	...
X	133	63	607	43	24	1308	...
XI	-	1611	-	313	395	3670	2675
1977							
VII	-	-	-	461	35	...	...
X	54	76	471	-	19	1269	...
IX-B	-	1376	1197	3945	500	...	...
XI	36	373	-	-	118	1012	1020
1978							
VII	-	2	-	495	102	...	...
X	68	50	83	323	24	1503	...
IX-B	-	2485	2062	6580	800	...	...
XI	497	647	-	-	232	1780	1786

Table 18 Con't ...

Gear Year Region	Catch in Tons				Fishing Effort		
	Large Tunas	Skipjack	Eastern Little	Auxis	Boats	Fishing Days	Trips
Gill Net							
1973							
XI	9	4	-	-	4	35	38
1976							
XI	-	359	-	3	50	125	130
1977							
X	-	-	94	1	...	...	...
XI	300	126	-	-	56	128	130
1978							
X	18	3	56	-	...	...	...
Bagnet							
1975							
VII	88	-	-	-	92	...	...
1976							
VII	-	-	-	62	41	...	...
1977							
VII	-	-	-	148	25	...	...
1978							
VII	-	-	2	-	68	...	...

Table 19. Singapore skipjack tuna and king mackerel catch in tons and number of boats for 1976-78.

Year	Skipjack Tuna		King Mackerel		Boats	
	Nation	FAO	Nation	FAO	Inshore	Offshore
1976	30	4	69	28	501	236
1977	40	0	76	6	481	228
1978	40		109		486	250

Table 20. Somalia tuna landings in tons at three canneries along the Gulf of Aden Coast.

Season	Cannery	Landings
1970-71	Laas Qoray	787
	Kandala	92
	Habo	195
	Total	984
1971-72	Laas Qoray	337
	Kandala	165
	Habo	219
	Total	721
1972-73	Laas Qoray	435
1973-74	"	614
1974-75	"	1553
1975-76	"	1309
1976-77	"	1409
1977-78	"	1200
1978-79	"	1005

Table 21. Sri Lanka annual estimates of landings in tons[1/] by species fishing effort in boats and trips, and catch per unit effort in tons per 100 trips for a sample of 11 GT (11.6 m) boats fishing for the Ceylon Fisheries Corporation.

Year	Landings		Effort		CPUE	
	King Mackerel	Skipjack	Boats	Trips	King Mackerel	Skipjack
1967	7.8	108.9	25	1061	0.74	10
1968	17.1	487.9	40	2704	0.63	18
1969	6.2	403.1	33	2467	0.25	16
1970	2.1	365.8	32	1501	0.14	24
1971	3.0	336.8	30	1904	0.16	18
1972	0.5	213.2	20	1783	0.03	12
1973	0.6	93.5	20	1086	0.06	9
1974	0.2	89.4	10	1018	0.02	9
1975	0.4	34.7	12	944	0.04	3

1/ Ports distributed nationwide

2/ July-December period only

Table 22. Number of boats at beginning of 1978 in Sri Lanka.

Region	3.5 GT	5.5 m Fiberglass	Outboard mechanized	Non-mechanized	Total
Colombo	79	36	16	602	733
Kalutara	113	-	30	634	777
Galle	103	-	99	916	1118
Matara	288	3	1	923	1215
Tangalle	199	5	11	1164	1379
Kalmunai	31	5	27	872	935
Batticalou	82	45	79	1890	2096
Trincomalee	77	27	45	1207	1356
Mullativu	97	59	338	426	920
Jaffna	426	319	1151	2029	3925
Mannar	133	430	81	481	1125
Puttalam	304	665	357	3016	4342
Negombo	239	937	264	1584	3024
Total	2171	2531	2499	15744	22945

Table 23. Thailand catch of narrow-barred king mackerel and small tunas (species unclassified) in 1976 by gear type and by Indian Ocean and Gulf of Thailand in the Pacific Ocean. Derived from SEAFDEC (19).

Gear	Ocean	Boats	N.B. King Mackerel	Small Tunas
Otter Board Trawl	Indian	353	203	-
	Pacific	3735	1049	-
Pair Trawl	Pacific	814	2062	-
Chinese Purse Seine	Indian	15	1	404
Thai Purse Seine	Indian	89	139	1333
	Pacific	262	104	3321
Luring Purse Seine	Pacific	300	86	966
King Mackerel Drift Gill Net	Indian	22	156	76
	Pacific	135	2597	2385
Mackerel Encirc. Gill Net	Pacific	226	233	704
Small Scale Drift Gill Net	Indian	...	116	14
	Pacific	...	233	131
Other Small Scale	Indian	...	917	-
	Pacific	...	870	370
Bamboo Stake Trap	Pacific	...	83	6
Total	Indian		7317	7883
	Pacific		8849	9710

APPENDIX

Table 1. Skipjack tuna pole-and-line fishery in Ambon, Maluku-West Irian, Indonesia by "Perum Perikani Maluku" (a state enterprise): catch in ton, effective fishing days, CPUE in kg per effective fishing day. Derived from Uktolseja (1978)

YEAR / STATISTIC	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1968													
Catch	58.4	29.3	37.4	49.0	70.1	29.3	30.0	30.8	29.1	40.3	30.4	38.4	472.5
Days	101	87	97	92	114	91	78	87	98	102	100	84	1 131
CPUE	578	337	386	533	615	322	385	354	297	395	304	457	413 / 418
1969													
Catch	36.0	11.9	16.4	28.9	19.6	16.9	9.6	26.4	52.8	56.0	102.7	72.4	449.6
Days	105	48	63	90	83	81	61	84	88	100	101	107	1 011
CPUE	343	248	260	321	236	209	157	314	600	560	1 017	677	412 / 445
1970													
Catch	65.8	42.7	60.0	37.6	36.4	43.4	15.2	34.5	93.1	47.9	94.6	86.4	657.6
Days	107	105	99	95	71	81	36	56	99	75	96	102	1 022
CPUE	615	407	606	396	513	536	422	616	940	639	985	847	627 / 643
1971													
Catch	79.0	87.9	55.4	72.3	62.6	31.6	25.7	45.7	126.7	26.1	84.5	75.9	773.4
Days	85	100	92	89	87	62	52	47	97	51	93	107	962
CPUE	929	879	602	812	720	510	494	972	1 306	512	909	709	780 / 804
1972													
Catch	54.5	146.5	125.4	165.4	129.2	58.9	78.2	24.3	59.5	82.8	53.3	89.2	1 067.2
Days	93	111	100	105	108	73	62	33	58	90	78	103	1 014
CPUE	586	1 320	1 254	1 575	1 196	807	1 261	736	1 026	920	683	866	1019 / 1052
1973													
Catch	84.7	111.7	121.5	107.4	115.0	44.7	17.8	10.0	43.0	113.5	114.6	60.2	944.1
Days	121	116	135	131	130	99	70	35	84	144	107	86	1 258
CPUE	700	963	900	820	885	452	254	286	512	788	1 071	700	694 / 750

1/ Upper figure is ratio of averages CPUE and lower is average of ratio CPUE.

Table 1. (contd.)

YEAR / STATISTIC	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1974													
Catch	26.7	43.7	64.6	72.6	25.5	26.5	29.8	98.5	71.2	50.1	54.7	52.3	616.2
Days	59	82	96	82	97	68	61	98	80	97	87	78	985
CPUE	453	533	673	885	263	390	489	1 005	890	516	629	671	616 / 626
1975													
Catch	60.6	60.5	10.6	24.3	38.6	23.2	66.5	20.8	48.2	110.1	57.2	25.8	546.4
Days	97	70	38	67	98	69	97	44	70	90	55	39	834
CPUE	625	864	279	363	394	336	686	473	689	1 223	1 040	662	636 / 655
1976													
Catch	45.5	46.9	72.9	81.7	50.7	16.9	17.5	38.7	49.1	103.0	92.6	67.1	682.6
Days	65	57	91	104	65	58	52	66	54	92	84	60	848
CPUE	700	823	801	786	780	291	337	586	909	1 120	1 102	1 118	779 / 805
1977													
Catch	43.4	11.0	57.7	51.5	41.7	2.7	2.4	12.4	29.4	38.0	137.0	73.7	500.9
Days	71	41	79	65	56	32	9	29	67	74	121	104	748
CPUE	611	268	730	792	745	84	267	428	439	514	1 132	709	560 / 670
1978													
Catch	49.4	17.1	81.8	82.2	47.9	28.4	44.6	111.5	126.0	119.4	111.7	124.0	944
Days	100	67	110	121	82	84	91	97	122	154	177	186	1 391
CPUE	494	255	744	679	584	338	490	1 149	1 033	775	631	667	653 / 679

APPENDIX

Table 2. Skipjack tuna pole-and-line fishery in North Celebes by P.N. Perikani Aertembaga (state enterprise): catch in tons, effective fishing days, CPUE in catch per effective fishing day (kg/day). Derived from Uktolseja (1978) and updated

YEAR / STATISTIC	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1967													
Catch	163.1	74.7	111.5	116.7	124.0	122.0	76.7	122.1	54.5	131.0	84.2	102.8	1 283.5
Days	227	158	205	161	178	186	183	198	135	258	244	287	2 420
CPUE	719	473	544	725	697	656	419	617	404	508	345	358	530 / 539
1968													
Catch	219.6	170.5	294.3	121.9	105.6	76.5	93.5	87.5	55.3	47.3	62.7	62.3	1 397.0
Days	220	244	285	191	185	138	166	150	144	134	132	153	2 142
CPUE	998	699	1 033	638	571	554	563	583	384	353	475	407	652 / 531
1969													
Catch	62.5	45.2	50.5	109.8	150.0	56.4	78.6	453.6	170.8	240.6	215.1	178.5	1 511.6
Days	132	164	109	157	178	132	99	132	186	200	141	164	1 795
CPUE	473	276	463	699	843	427	794	3 436	918	1 203	1 526	1 088	842 / 1012
1970													
Catch	111.3	79.1	81.5	69.0	92.9	76.5	113.4	254.2	246.5	160.9	198.6	144.4	1 578.3
Days	96	132	136	127	155	122	124	143	190	163	159	159	1 706
CPUE	1 159	599	599	543	599	627	915	1 778	1 297	987	1 249	908	925 / 938
1971													
Catch	83.2	73.1	140.7	181.6	122.4	159.5	81.0	118.3	71.9	79.8	125.7	88.8	1 326.0
Days	136	132	161	160	102	147	113	193	138	150	145	189	1 766
CPUE	612	554	874	1 135	1 200	1 085	717	613	521	532	867	470	751 / 765
1972													
Catch	50.8	40.8	41.0	39.7	49.1	64.8	37.5	68.2	32.6	53.7	59.2	60.4	597.8
Days	150	135	119	135	147	185	92	124	106	114	125	91	1 523
CPUE	339	302	345	294	334	350	408	550	308	471	474	664	392 / 403

1/ Upper figure is ratio of averages CPUE and lower is average of ratio CPUE.

Table 2. (contd.)

YEAR / STATISTIC	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1973													
Catch	50.3	34.1	31.5	42.9	14.5	37.0	53.9	66.1	40.7	31.2	59.4	39.5	501.5
Days	57	51	96	53	46	81	100	127	141	118	136	128	1 134
CPUE	882	669	328	809	315	457	539	520	289	264	437	309	442 / 485
1974													
Catch	18.5	21.9	20.9	55.7	68.0	61.9	87.8	53.1	103.8	58.0	50.0	57.0	656.6
Days	78	87	76	107	130	130	142	78	161	130	94	143	1 356
CPUE	237	252	275	521	523	476	618	681	645	446	532	399	484 / 467
1975													
Catch	86.5	35.7	82.6	42.7	93.7	61.1	81.9	24.8	34.4	14.5	28.0	26.1	616.5
Days	122	88	147	74	141	117	130	68	79	63	57	77	1 163
CPUE	709	406	562	577	665	522	630	365	435	230	491	339	530 / 494
1976													
Catch	19.1	24.5	47.8	38.1	20.5	7.7	-	-	1.2	66.3	23.0	33.0	281.2
Days	102	109	129	86	45	21	-	-	26	131	94	76	819
CPUE	187	225	371	443	456	367			46	506	245	434	343 / 328
1977													
Catch	29.8	20.3	40.8	51.9	87.5	51.8	15.6	1.0	3.0	8.6	16.3	12.3	338.9
Days	41	44	47	67	70	59	41	3	8	19	32	20	451
CPUE	727	461	868	775	1 250	878	380	333	375	453	509	615	751 / 635
1978													
Catch	4.5	22.6	17.2	21.5	32.0	14.2	18.2	6.2	11.2	27.4	32.2	53.5	263.4
Days	24	37	31	33	57	31	32	26	29	35	57	65	457
CPUE	188	611	555	652	561	458	569	238	386	783	565	823	576 / 532
CPUE	602.5	460.6	568.1	650.9	667.8	571.4	595.6	833.1	500.7	561.3	642.9	567.8	606.06

APPENDIX

Table 3. Statistics for the skipjack and yellowfin tuna pole-and-line fishery in Waegeo, Maluku-West Irian by P.T. East Indonesian Fishery, a joint venture. Derived from Uktolseja (1978). CPUE is in Kg per day.

YEAR / STATISTIC	MONTH												
	1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1976													
Catch													
SKJ	-	-	-	-	37.6	257.3	199.8	305.9	213.4	257.4	270.5	209.4	1 751.3
YFT	-	-	-	-	2.7	3.9	4.8	0.4	0.5	37.2	14.1	26.8	90.4
Total	-	-	-	-	40.3	261.2	204.6	306.3	213.9	294.6	284.6	236.2	1 841.7
Days	-	-	-	-	19	63	72	76	59	72	78	66	505
CPUE SKJ	-	-	-	-	1 980	4 084	2 775	4 025	3 616	3 575	3 468	3 172	3337 / 3468
CPUE Total					2 121	4 146	2 842	4 030	3 625	4 092	3 649	3 579	3510 / 3647
1977													
Catch													
SKJ	228.9	208.8	148.1	158.1	98.0	155.5	40.0	17.9	22.7	74.1	112.2	175.8	1 440.1
YFT	24.9	32.4	5.3	9.4	1.6	8.8	1.0	1.0	1.5	17.0	5.5	10.9	119.3
Total	253.8	234.2	153.4	167.5	99.6	164.3	41.0	18.9	24.2	91.0	117.7	186.7	1 552.4
Days	82	64	59	65	48	65	31	14	13	27	58	46	572
CPUE SKJ	2 792	3 262	2 511	2 360	1 849	2 356	1 334	1 276	1 887	2 848	1 969	2 980	2285 / 2714
CPUE Total	3 095	3 659	2 602	2 577	2 073	2 528	1 323	1 350	1 862	3 370	2 029	4 061	2544
1978													
Catch	72.8	69.9	206.1	212.2	205.7	162.3	250.2	166.5	223.4	234.3	195.2	77.6	2 076.2
Days	49	47	69	54	56	56	74	32	55	59	52	52	655
CPUE	1 486	1 487	2 987	3 930	3 673	2 898	3 381	5 203	4 062	3 971	3 754	1 492	3195 / 3170

1/ Upper figure is ratio of averages CPUE and the lower is average of ratio CPUE.

APPENDIX

Table 4. Statistics from skipjack tuna pole-and-line fishery in Sorong Maluku-West Irian, Indonesia by P.T. Usaha Mina (Persero). From Uktolseja (1978).

YEAR / STATISTIC	MONTH												
	1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1975													
Catch													4 840.4
SKJ	126.3	163.2	274.0	265.1	386.5	468.6	798.4	344.4	438.5	540.0	390.4	252.1	4 447.5
YFT	45.9	60.2	45.4	61.1	41.7	5.3	2.1	1.4	5.2	1.6	4.4	54.1	328.4
ELT	10.3	9.4	12.0	4.7	6.0	6.3	0.2	0.3	0.4	0.5	0.4	14.1	64.5
Days	265	313	379	307	430	378	401	324	349	407	358	318	4 229.0
CPUE SJ	477	521	723	864	899	1 240	1 991	1 063	1 256	1 327	1 091	793	1020 / 1052
1976													
Catch													875.3
SKJ	-	-	-	9.9	63.9	101.1	80.9	61.1	69.3	88.1	186.8	122.7	783.8
YFT	-	-	-	2.7	6.1	7.1	4.9	2.2	4.1	7.7	9.7	12.1	56.5
ELT	-	-	-	3.6	0.6	4.0	12.8	0.0	0.3	5.7	7.4	0.5	35.0
Days	-	-	-	27	110	100	147	164	230	297	312	234	1 621.0
CPUE SKJ				367	581	1 011	550	373	301	297	599	524	511 / 484
1977													
Catch													1 776.9
SKJ	181.5	270.6	232.6	136.3	256.5	88.8	40.2	15.6	41.5	120.2	129.8	94.8	1 608.4
YFT	8.7	24.2	18.5	9.6	10.1	7.7	7.4	1.2	1.7	6.3	9.3	25.0	129.8
ELT	2.3	4.2	0.6	1.5	1.7	2.7	1.3	1.7	1.2	3.9	10.7	7.0	38.7
Days	279	309	312	285	255	182	116	109	221	238	314	310	2 930.0
CPUE SJ	651	876	746	478	1 006	488	347	143	188	505	413	306	512 / 549

1/ Upper figure is ratio of averages CPUE and lower is average of ratio CPUE.

Table 5. Statistics for skipjack tuna, small-scale pole-and line fishery in Ternate, North Maluku, Indonesia: catch in tons, effective fishing days, and CPUE in Kg/effective fishing day.

YEAR / STATISTIC	MONTH 1	2	3	4	5	6	7	8	9	10	11	12	TOTALS
1973													
Catch	102.4	47.0	94.8	65.8	87.6	95.1	40.5	29.4	80.9	73.0	83.7	60.0	860.2
Days	158	98	155	89	126	148	73	50	121	88	158	150	1 414
CPUE	648	480	612	739	695	643	555	588	669	830	530	400	616 / 608
1974													
Catch	36.3	89.2	43.9	138.5	109.6	86.2	104.0	72.2	90.5	85.7	44.7	22.0	922.8
Days	112	77	119	117	118	109	104	86	91	147	140	91	1 311
CPUE	324	1 158	369	1 184	929	791	1 000	840	995	583	319	242	728 / 704
1975													
Catch	21.7	69.3	79.1	146.7	176.3	114.3	92.0	74.6	153.3	38.8	50.3	66.1	1 082.5
Days	114	146	160	245	278	205	190	136	174	120	171	142	2 081
CPUE	190	475	494	599	634	558	484	549	881	323	294	465	496 / 520
1976													
Catch	70.5	68.6	135.9	142.2	70.0	169.0	131.6	78.8	63.9	105.7	219.1	91.0	1 346.3
Days	129	139	190	184	146	217	194	141	126	167	186	141	1 960
CPUE	547	494	715	773	479	779	678	559	507	633	1 178	645	666 / 687
1977													
Catch	111.7	73.6	140.4	109.2	155.0	106.0	51.6	71.7	68.5	232.8	40.3	26.6	1 187.4
Days	152	160	188	180	191	45	98	133	138	214	93	111	1 703
CPUE	735	460	747	607	812	2 356	527	539	496	1 088	433	240	753 / 697

1/ Upper figure is ratio of averages CPUE and lower is average of ratios CPUE.

APPENDIX

Table 6. Annual and monthly statistics of the Indonesian tuna longline fishing in the Indian Ocean (probably) by P.T. Perikanan Samodra Besas

Year / Month	Hooks	Sets	Catch in number				
			YFT	BET	ALT	Other	Total
1974	1 227 690	1 051	9 908	5 604	1 576	3 207	20 295
1	26 305	21	141	52	13	48	254
2	46 405	40	416	178	29	106	729
3	60 690	58	414	174	59	124	771
4	28 830	27	149	207	52	52	460
5	156 200	148	1 049	842	653	554	3 098
6	159 325	137	1 540	966	352	760	3 618
7	142 630	120	963	1 079	219	395	2 656
8	98 430	82	295	544	117	141	1 097
9	106 800	84	878	481	55	174	1 588
10	101 655	84	964	208	17	191	1 380
11	119 110	96	1 106	231	4	294	1 635
12	181 310	154	1 993	642	6	368	3 009
1975	3 429 935	2 455	20 615	8 676	4 169	4 315	37 775
1	202 318	156	1 325	778	277	263	2 643
2	176 290	127	721	622	29	214	1 586
3	330 985	238	1 545	919	276	473	3 213
4	251 530	174	1 390	582	345	356	2 673
5	302 445	206	2 263	841	200	333	3 637
6	248 995	174	1 335	654	164	314	2 467
7	331 810	242	1 753	1 009	410	225	3 397
8	342 010	253	1 872	1 186	1 267	402	4 727
9	464 065	328	2 553	865	1 122	612	5 152
10	262 376	187	2 571	391	35	385	3 382
11	294 236	210	1 970	418	35	447	2 870
12	222 875	160	1 317	411	9	291	2 028
1976	2 874 498	2 261	...	...	...	...	45 245
1	178 978	136	...	...	...	...	1 425
2	334 433	270	...	...	...	...	3 077
3	231 925	180	...	...	...	...	2 237
4	330 222	256	...	...	...	...	4 515
5	196 807	165	...	...	...	...	2 929
6	303 121	232	...	...	...	...	5 543
7	229 697	171	...	...	...	...	4 960
8	221 655	177	...	...	...	...	5 738
9	119 205	103	...	...	...	...	2 014
10	266 830	212	...	...	...	...	4 693
11	206 880	165	...	...	...	...	3 732
12	254 745	194	...	...	...	...	4 382

Table 6. (contd.)

Year Month	Hooks	Sets	Catch in number				
			YFT	BET	ALT	Other	Total
1977	2 550 904	1 917	...	...	...	...	54 876
1	133 093	97	...	...	...	...	2 342
2	172 147	127	...	...	...	...	1 570
3	148 560	112	...	...	...	...	1 855
4	138 425	123	...	...	...	...	1 864
5	134 005	97	...	...	...	...	2 670
6	126 185	93	...	...	...	...	4 241
7	237 967	170	...	...	...	...	9 234
8	243 899	177	...	...	...	...	6 230
9	216 217	164	...	...	...	...	5 046
10	313 361	239	...	...	...	...	6 905
11	352 646	271	...	...	...	...	6 727
12	334 399	247	...	...	...	...	6 187
1978	3 893 428	2 851	32 090	11 467	5 450	5 123	54 130
1	339 465	254	3 491	1 346	-	360	5 197
2	241 355	183	1 980	570	26	304	2 880
3	236 056	176	1 995	529	53	394	2 971
4	326 060	246	2 902	1 068	210	572	4 752
5	370 783	269	2 118	1 235	2 673	502	6 528
6	381 191	279	4 763	1 478	544	688	7 473
7	484 480	351	5 015	1 690	1 148	720	8 573
8	363 945	267	2 227	1 039	728	350	4 344
9	226 085	167	1 431	711	34	255	2 431
10	296 130	220	1 715	684	20	315	2 734
11	303 582	214	1 816	631	-	340	2 787
12	324 296	225	2 637	486	14	323	3 460

Table 7. Annual tuna production by species in the Maldives

Year	Catch in tons x 10^3					
	Skipjack T.	Yellowfin T.	East-Little T.	Auxis Sp.	Other Mar.	Total
1970	27.3	2.1	0.7	3.1	1.3	34.5
1971	28.9	1.3	0.4	26.9	1.4	58.9
1972	16.0	5.0	0.6	3.1	7.5	32.2
1973	20.0	5.2	1.0	6.2	1.3	33.7
1974	24.0	4.5	0.8	5.9	2.3	37.5
1975 1/	16.0	4.2	0.4	3.9	3.4	27.9
1976 2/	19.9	4.8	1.0	2.7	3.9	32.3
1977	14.4	4.3	1.0	3.1	3.5	26.4
1978	13.8	3.7	0.8	1.9	5.6	25.8
Total	180.3	35.1	6.7	56.8	30.2	309.2
Average	20.03	3.90	0.74	6.31	3.36	34.36

1/ Old ratio of converting counts to weight used up through this year; small skipjack and yellowfin tuna 1.963 kg and for large skipjack tuna 2.0 kg. and others 1.0 kg.

2/ New ratios: eastern little tuna and Auxis sp. 0.95 kg, ordinary skipjack tuna and yellowfin tuna 2.12 kg, large skipjack tuna 6.18 kg, white fish 1.36 kg, scads 0.23 kg.

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Table 8. Skipjack tuna landings within year in the Maldives, in tons

Time Period	Year								
	1970	1971	1972	1973	1974	1975	1976	1977	1978
Jan	2 210	3 520	2 270	1 850	1 700	1 200	2 460	1 830	2 390
Feb	2 010	1 450	2 510	1 860	1 950	1 170	1 970	1 060	1 290
Mar	2 400	3 010	1 950	2 530	2 720	1 340	1 890	1 280	1 070
Q1	6 620	7 980	6 730	6 240	6 370	3 710	6 320	4 170	4 750
Apr	1 170	1 690	800	940	2 530	1 640	1 670	810	770
May	780	2 720	1 610	1 230	2 450	1 610	2 470	1 560	1 190
Jun	1 110	1 640	1 200	1 050	2 270	1 510	2 110	1 230	970
Q2	3 060	6 050	3 610	3 220	7 250	4 760	6 250	3 600	2 930
Bi-annual	9 680	14 030	10 340	9 460	13 620	8 470	12 570	7 770	7 680
Jul	3 300	2 740	1 940	1 390	2 060	2 010	880	910	1 230
Aug	2 320	2 270	1 300	1 550	1 280	1 300	1 170	1 290	740
Sep	2 130	1 280	1 110	1 250	890	780	1 120	910	940
Q3	7 750	6 290	4 350	4 190	4 230	4 090	3 170	3 110	2 910
Oct	2 530	2 170	910	1 500	910	650	1 430	1 150	970
Nov	2 430	3 030	730	2 320	2 300	1 010	890	790	870
Dec	4 600	4 150	1 970	2 910	2 970	1 720	1 810	1 590	1 360
Q4	9 560	9 350	3 610	6 730	6 180	3 380	4 130	3 530	3 200
Annual	26 990	29 670	18 300	20 380	24 030	15 940	19 870	14 410	13 790

APPENDIX

Table 9. Skipjack tuna landings by pole-and-line boats, by atoll in the the Maldives, in tons

Island	1976			1977			1978			Total Average		
	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total
Haa Alifu	948.5	905.3	1 853.8	944.8	350.1	1 294.9	862.6	485.7	1 348.3	2755.9 / 918.63	1741.1 / 580.37	4497.0 / 1499.0
Haa Dhaalu	443.3	406.9	850.2	167.7	35.9	203.6	117.5	93.6	211.1	728.5 / 242.83	536.4 / 178.80	1264.9 / 421.63
Shaviyani	146.8	192.9	339.7	187.2	17.2	204.4	59.6	14.7	74.3	393.6 / 131.20	224.8 / 79.93	618.4 / 206.13
Noonu	285.3	151.2	436.5	288.4	35.0	323.4	214.2	52.9	267.1	787.9 / 262.63	239.1 / 79.70	1027.0 / 342.33
Raa	956.0	926.2	1 882.2	662.9	155.5	818.4	856.3	338.9	1 195.2	2475.2 / 825.07	1420.6 / 473.53	3895.8 / 1298.60
Baa	828.8	632.1	1 460.9	763.2	572.3	1 335.5	1 253.5	343.0	1 596.5	2845.5 / 948.50	1547.4 / 515.80	4392.9 / 1464.30
Lhaviyani	698.0	1 654.0	2 352.0	631.8	1 038.1	1 669.9	817.5	707.7	1 525.2	2147.3 / 715.77	3399.8 / 1133.27	5547.1 / 1849.03
Kaafu	622.2	572.8	1 195.0	559.1	127.0	686.1	545.5	7.0	552.5	1726.8 / 575.60	706.8 / 235.60	2433.6 / 811.20
Alifu	233.0	10.7	243.7	61.6	1.4	63.0	43.7	70.9	114.6	338.3 / 112.77	83.0 / 27.67	421.3 / 140.43
Vaavu	354.7	110.7	465.4	167.5	26.7	194.2	224.0	22.6	246.6	746.2 / 248.73	160.0 / 53.33	906.2 / 302.07
Meemu	909.0	226.0	1 135.0	606.3	268.9	875.2	422.3	125.4	547.7	1937.6 / 645.87	620.3 / 206.77	2557.9 / 852.63
Faafu	275.9	6.2	282.1	115.6	2.4	118.0	25.6	2.5	28.1	417.1 / 139.03	11.1 / 3.70	428.2 / 142.73
Dhaalu	206.9	16.4	223.3	164.7	41.5	206.2	94.9	14.5	109.4	466.5 / 155.50	72.4 / 24.13	538.9 / 179.63
Thaa	890.1	96.3	986.4	897.9	247.9	1 145.8	599.7	109.2	708.9	2387.7 / 795.90	453.4 / 151.13	2841.1 / 947.03

1/ 2.12 Kg average

2/ 6.18 Kg average

Table 9. (contd.)

Island	1976			1977			1978			Total/Average		
	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total
Laamu	1 423.4	65.2	1 488.6	1 161.7	231.4	1 393.1	1 341.2	134.7	1 475.9	3926.3 / 1308.77	431.3 / 143.77	4357.6 / 1452.53
Gaafu Alifu	2 423.7	22.0	2 445.7	1 716.7	94.4	1 811.1	914.5	241.6	1 156.1	5054.9 / 1684.97	358.0 / 119.33	5412.9 / 1804.30
Gaafu Dhaalu	1 055.7	162.9	1 218.6	1 082.0	99.1	1 181.1	907.3	927.3	1 834.6	3045.0 / 1015.00	1189.3 / 396.43	4234.3 / 1411.43
Gnaviyani	2.1	-	2.1	0.6	-	0.6	0.1	-	0.1	2.8 / 0.93	- / -	2.8 / 0.93
Seenu	413.4	2.5	415.9	462.3	145.5	607.8	422.3	118.0	540.3	1298.0 / 432.67	266.0 / 88.67	1564.0 / 521.33
Total	13,116.8 / 690.36	6160.3 / 324.23	19,277.1 / 1014.58	10,642.0 / 560.11	3490.3 / 183.70	14,132.3 / 743.81	9722.3 / 511.70	3810.2 / 200.54	13,532.5 / 712.24	33,481.1 / 1762.16	13,460.8 / 708.46	46,941.9 / 2470.63

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Table 10. Skipjack tuna landings in tons, numbers of trips, and catch per unit of effort for pole-and-line boats (both sailing and powered) in the Maldives

Atoll	1976			1977			1978		
	Catch	Trips	CPUE	Catch	Trips	CPUE	Catch	Trips	CPUE
Haa Alifu	1 853.8	7 453	0.25	1 294.9	6 250	0.21	1 348.3	4 569	0.30
Haa Dhaalu	850.2	6 466	0.13	203.6	2 990	0.07	211.1	2 925	0.07
Shaviyani	339.7	3 582	0.09	204.4	3 817	0.05	74.3	1 074	0.07
Noonu	436.5	12 144	0.04	323.4	5 717	0.06	267.1	3 547	0.08
Raa	1 882.2	23 294	0.08	818.4	15 211	0.05	1 195.2	14 811	0.08
Baa	1 460.9	15 266	0.10	1 335.5	11 287	0.12	1 596.5	9 282	0.17
Lhaviyani	2 352.0	12 574	0.19	1 669.9	10 937	0.15	1 525.2	7 858	0.19
Kaafu	1 195.0	15 203	0.08	686.1	12 934	0.05	552.5	11 546	0.05
Alifu	243.7	4 946	0.05	63.0	3 891	0.02	114.6	4 986	0.02
Vaavu	465.4	4 452	0.10	194.2	3 740	0.05	246.6	3 195	0.08
Meemu	1 135.0	10 342	0.11	875.2	7 465	0.12	547.7	4 555	0.12
Faafu	282.1	3 610	0.08	118.0	2 622	0.05	28.1	988	0.03
Dhaalu	223.3	none	none	206.2	3 181	0.06	109.4	2 166	0.05
Thaa	986.4	12 637	0.08	1 145.8	10 488	0.11	708.9	4 955	0.14
Laamu	1 488.6	13 219	0.11	1 393.1	7 372	0.19	1 475.9	5 557	0.27
Gaafu Alifu	2 445.7	16 547	0.15	1 811.1	14 299	0.13	1 156.1	7 078	0.16
Gaafu Dhaalu	1 218.6	13 614	0.09	1 181.1	8 719	0.14	1 834.6	5 814	0.32
Gnaviyani	2.1	32	0.07	0.6	4	0.15	0.1	13	0.01
Seenu	415.9	5 216	0.08	607.8	7 358	0.08	540.3	5 493	0.10
Total	19 277.1	177,742	0.11	14 132.3	138 762	0.10	13 532.5	100 432	0.13

Table 11. Sri Lanka landings in tons of tuna and tuna-like species. Supplied by the Planning and Programming Division, Ministry of Fisheries.

Year	Landings in MT x 10^3				
	Total[1/]	Skipjack	Yellowfin[2/]	King mackerel[3/]	Other[4/]
1954	6.6	...	...	...	...
5	7.0	...	...	...	...
6	11.2	...	...	...	...
7	13.1	...	...	...	...
8	9.7	...	...	...	...
9	12.2	...	...	...	...
1960	12.9	...	...	...	...
1	18.2	...	...	...	...
2	19.5	...	...	...	...
3	32.3	...	...	...	...
4	22.7	...	...	...	...
5	25.6	...	...	...	...
6	30.0	...	...	...	...
7	25.0	...	...	...	...
8	56.5	...	...	...	...
9	51.8	...	...	...	...
1970	23.9	11.8	5.8	2.4	3.9
1	20.6	9.5	4.7	3.2	3.2
2	27.1	13.2	6.5	3.0	4.4
3	22.6	10.4	5.1	3.6	3.5
4	26.9	12.3	6.1	4.4	4.1
5	29.3	15.2	6.6	3.5	4.0
6	28.9	12.2	6.9	4.7	5.1
7	27.3	11.4	5.7	3.8	6.4
8	27.5	11.0	5.4	3.7	7.4
9	26.7	8.2	6.1	4.3	8.1

1/ No species breakdown 1954-1969.
2/ Includes bigeye tuna
3/ Mostly S. commerson but includes all seerfishes
4/ Known to include eastern little tuna. Auxis sp., istiophorids and swordfish.

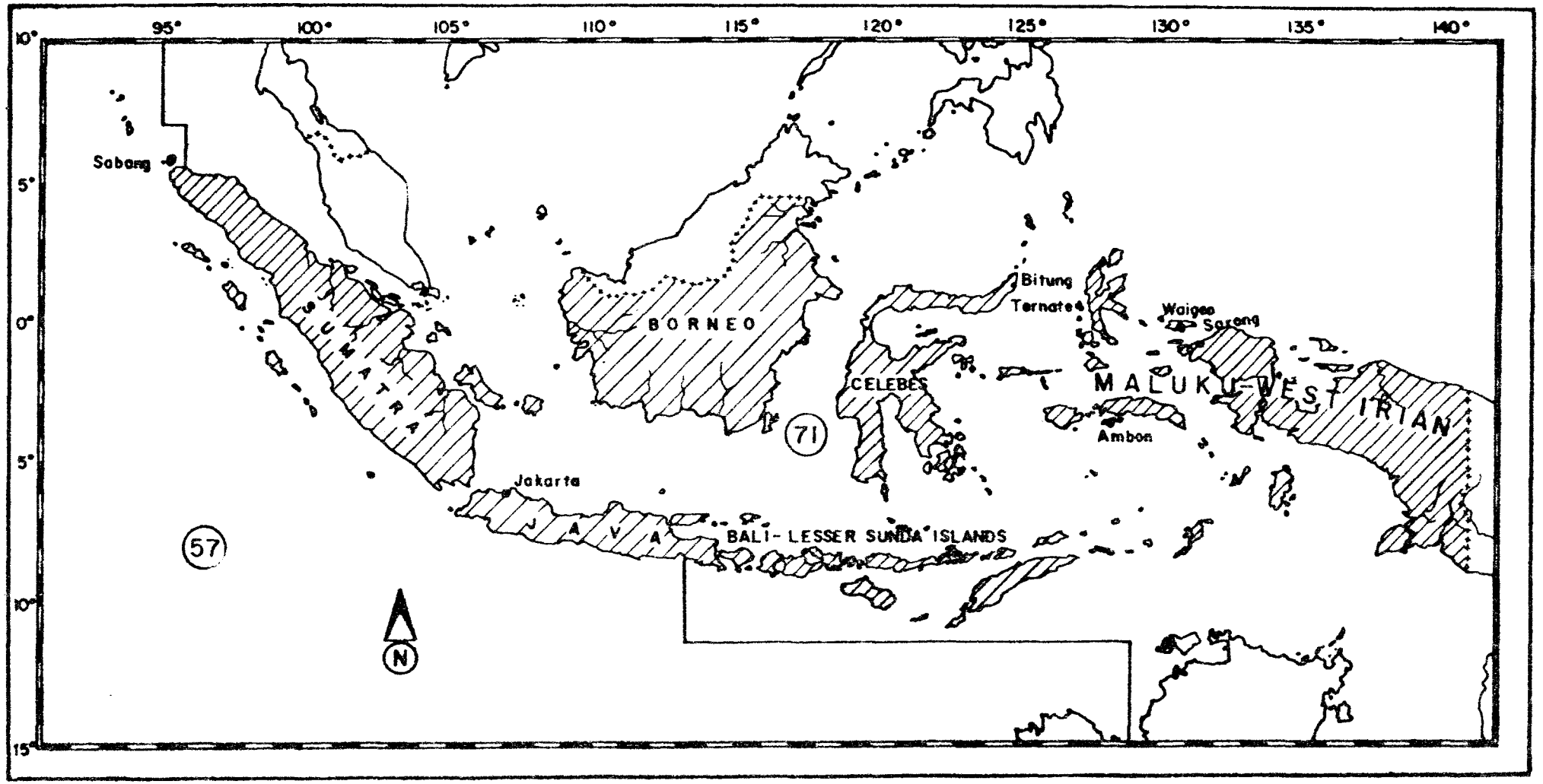

Figure 1. Indonesia, showing coastal areas in all capitals, cities in small case, and FAO fishing areas 57 and 71

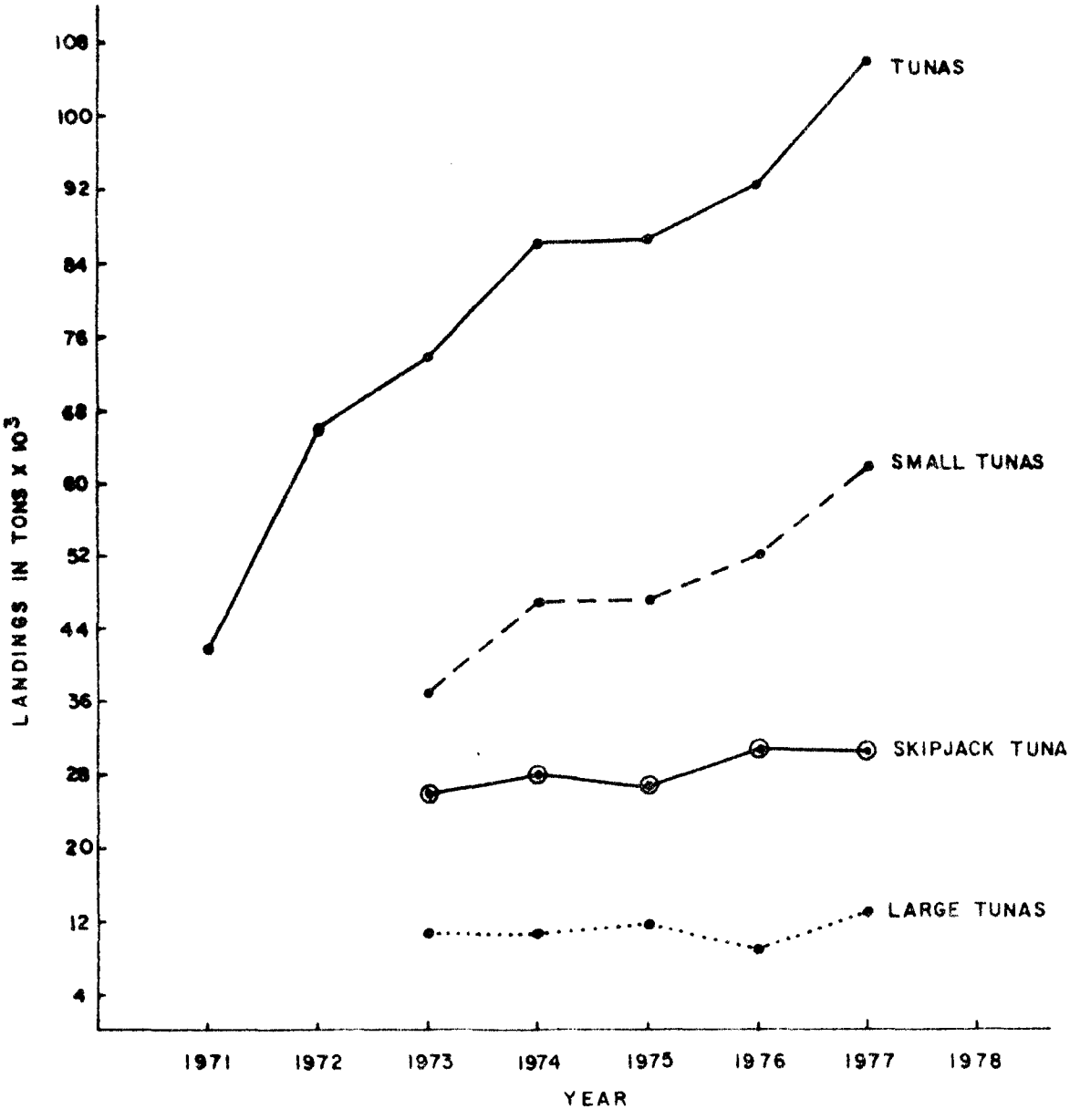

Figure 2. Annual Indonesian landings in tons for total tunas, skipjack tuna, small tunas and large tuna species

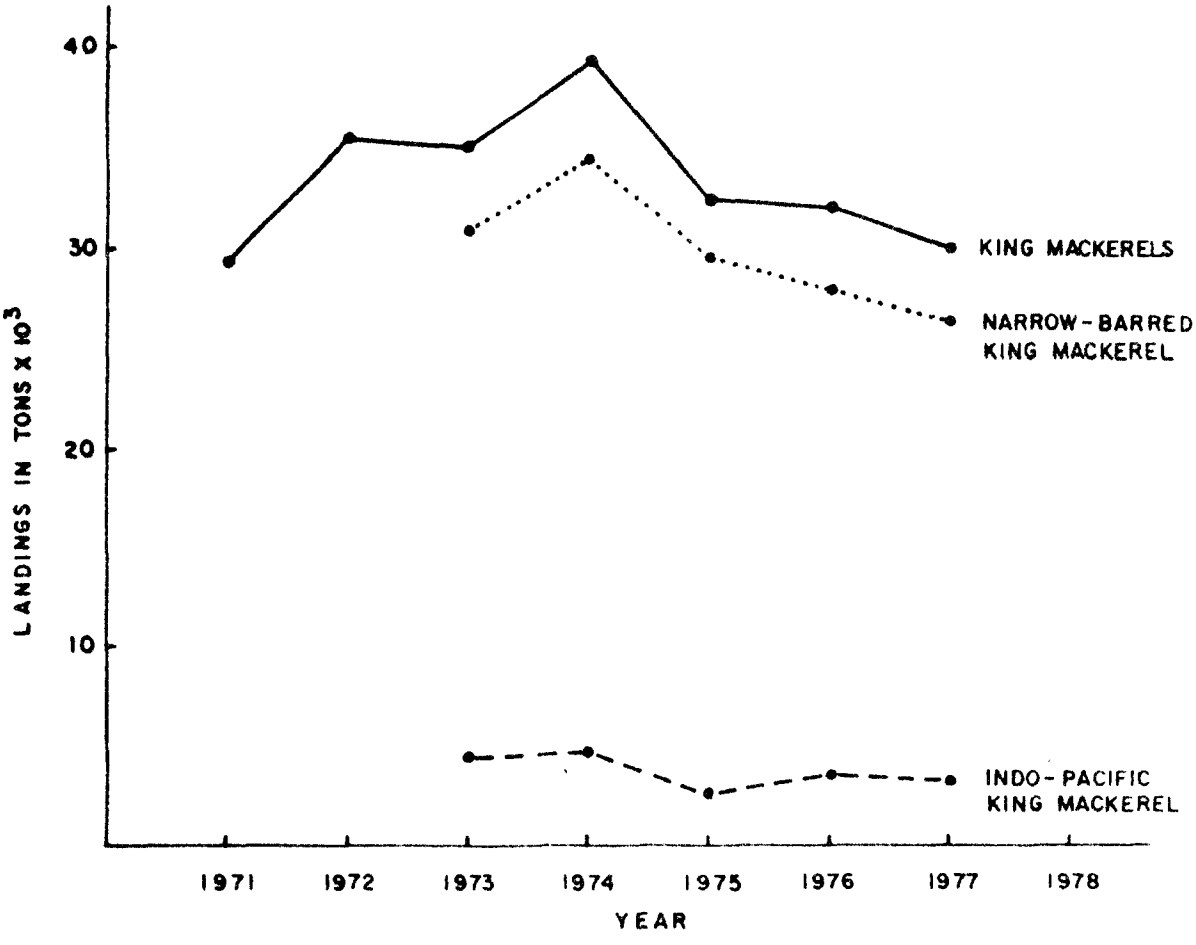

Figure 3. Annual Indonesian landings of king mackerels, Indo-Pacific king mackerel, and narrow-barred king mackerel in tons

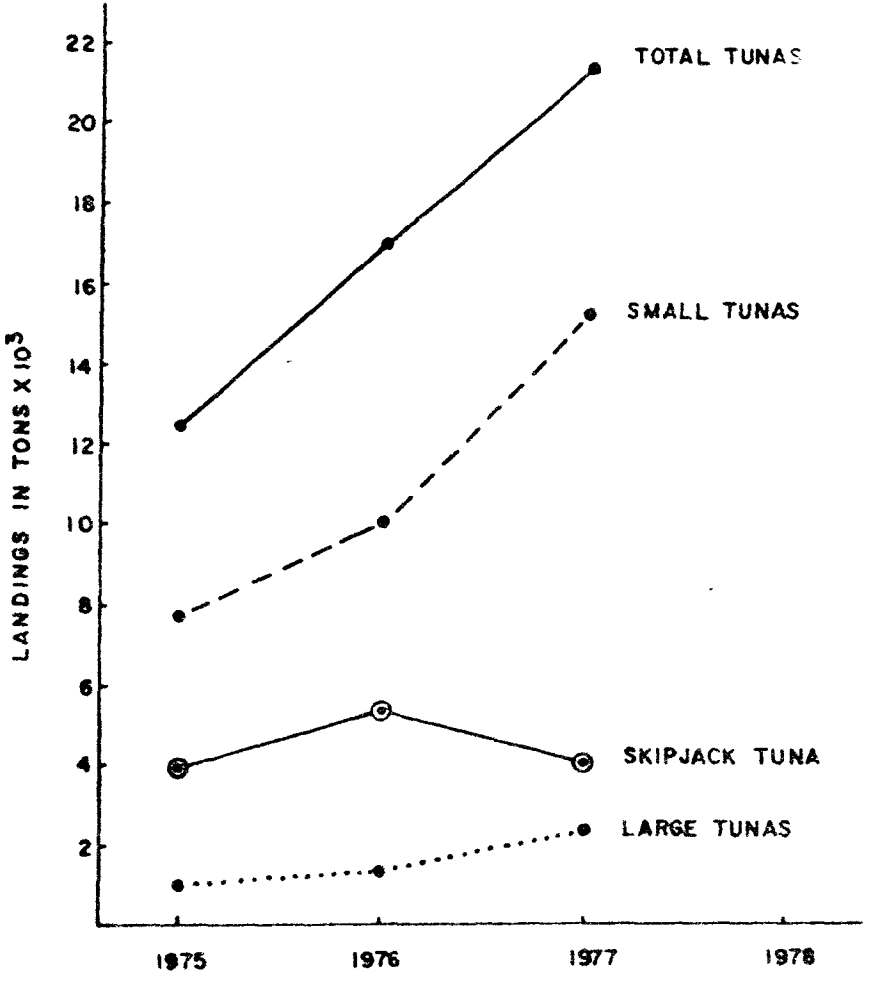

Fig.4A Annual Indonesian landings in tons of total tunas, skipjack tuna, small tunas and large tunas in the east Indian Ocean (FAO fishing area 57)

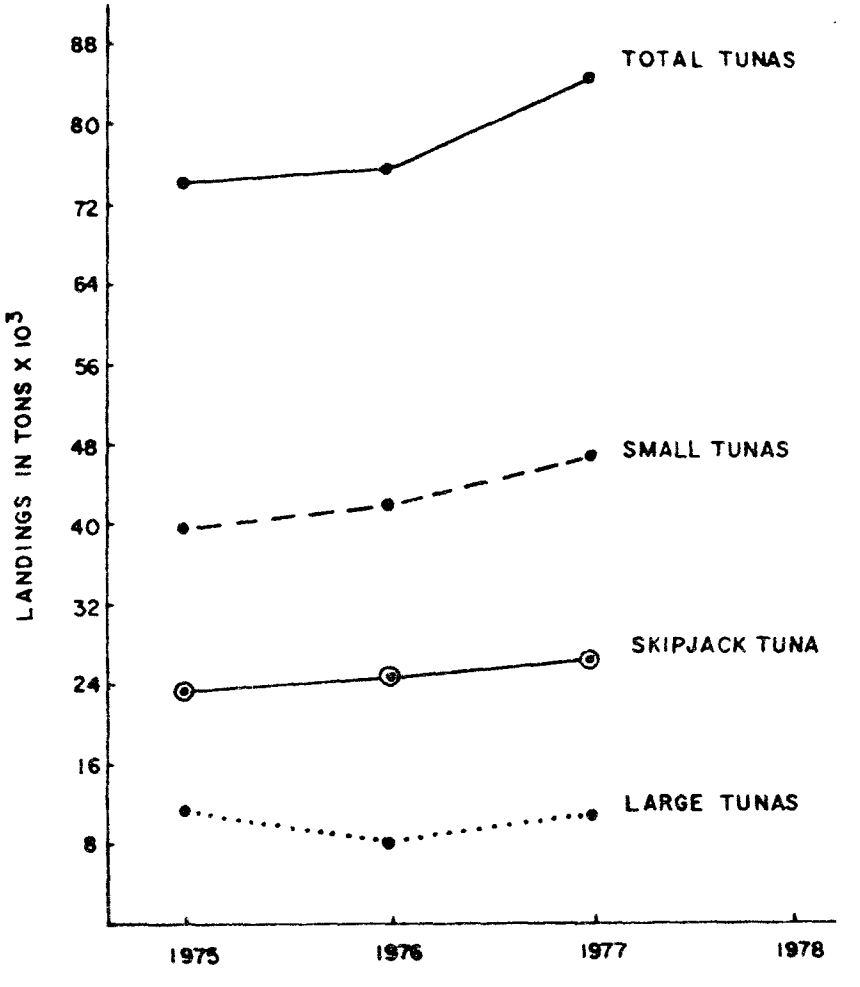

Fig. 4B Annual Indonesian landings in tons of total tunas, skipjack tuna, small tunas and large tuna species in the western central Pacific (FAO fishing area 71)

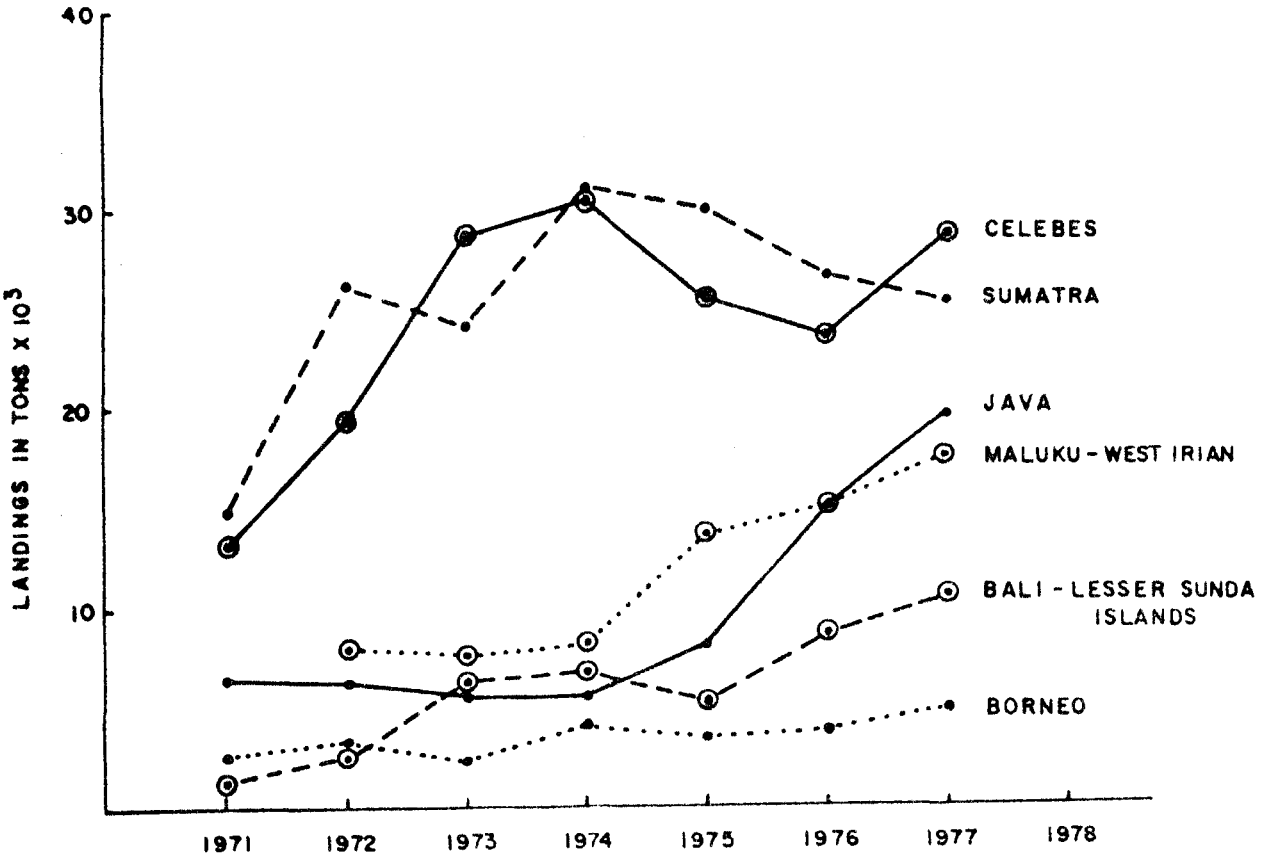

Figure 5A. Annual Indonesian landings of total tunas by coastal area

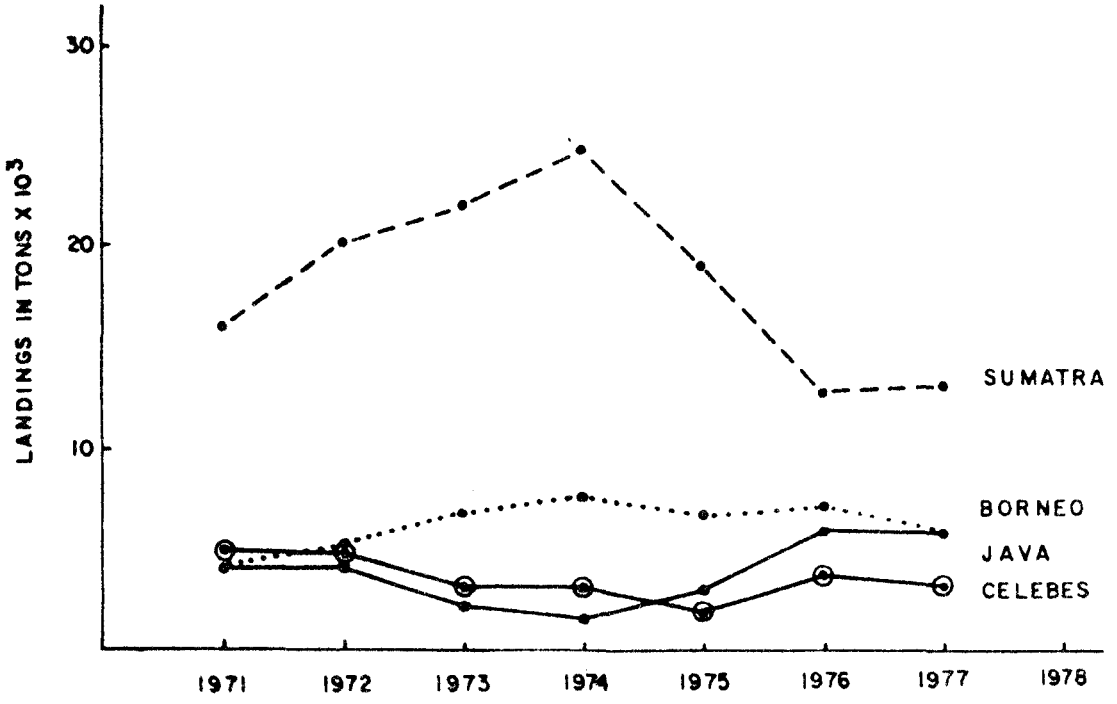

Figure 5B. Annual Indonesian landings of king mackerels by island or coastal area. Landings for Bali-Lesser Sunda Islands and Maluku-West Irian are less than 2000 tons and are not plotted

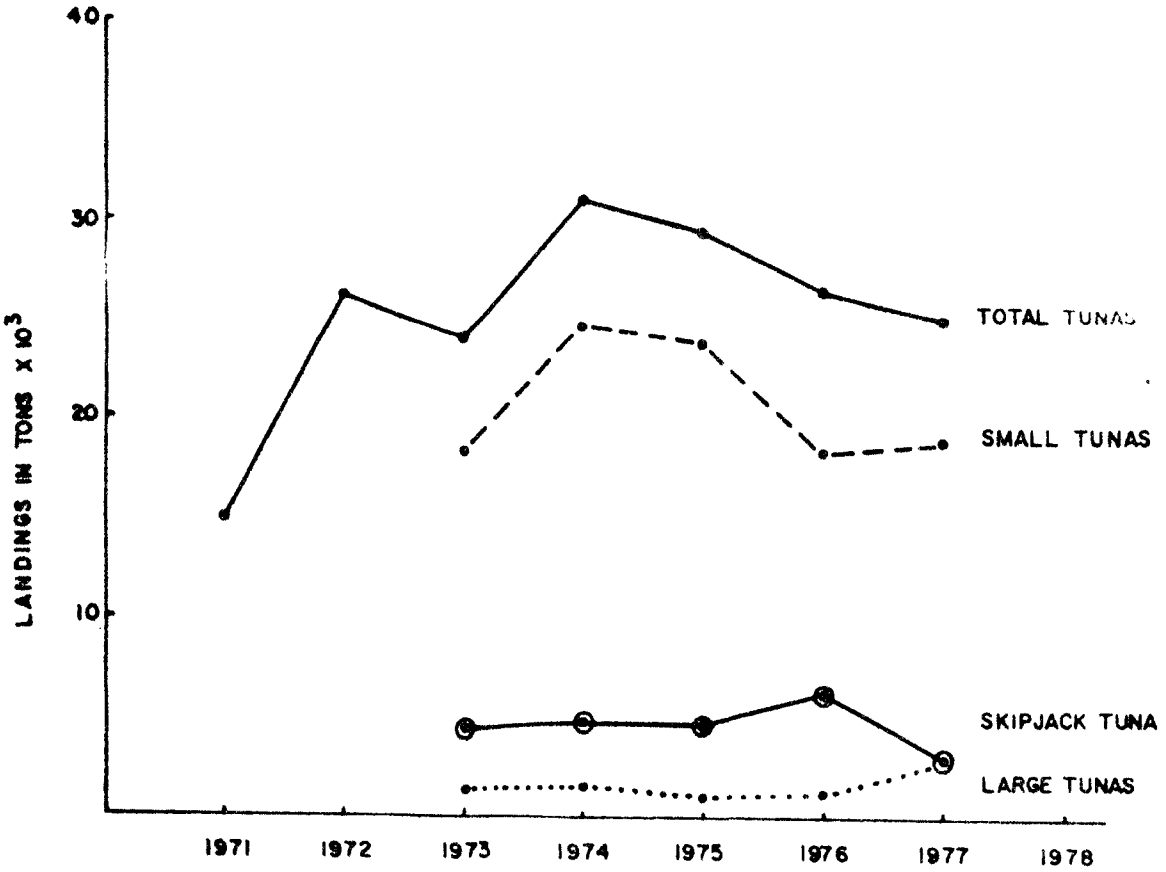

Figure 6A. Annual Sumatra, Indonesia landings of total tunas, skipjack tuna, small tunas and large tunas in tons

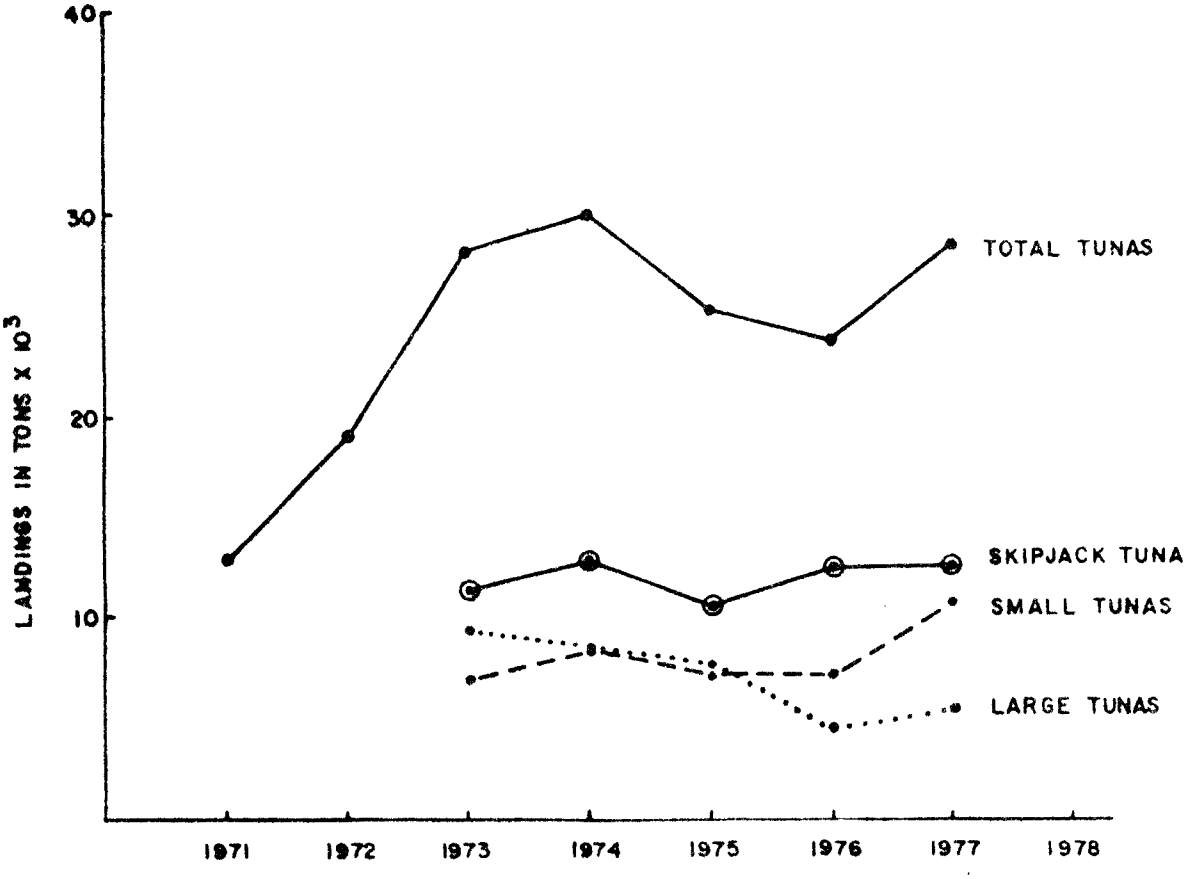

Figure 6B. Annual Celebes, Indonesia landings of total tunas, skipjack tuna, small tunas and large tunas in tons

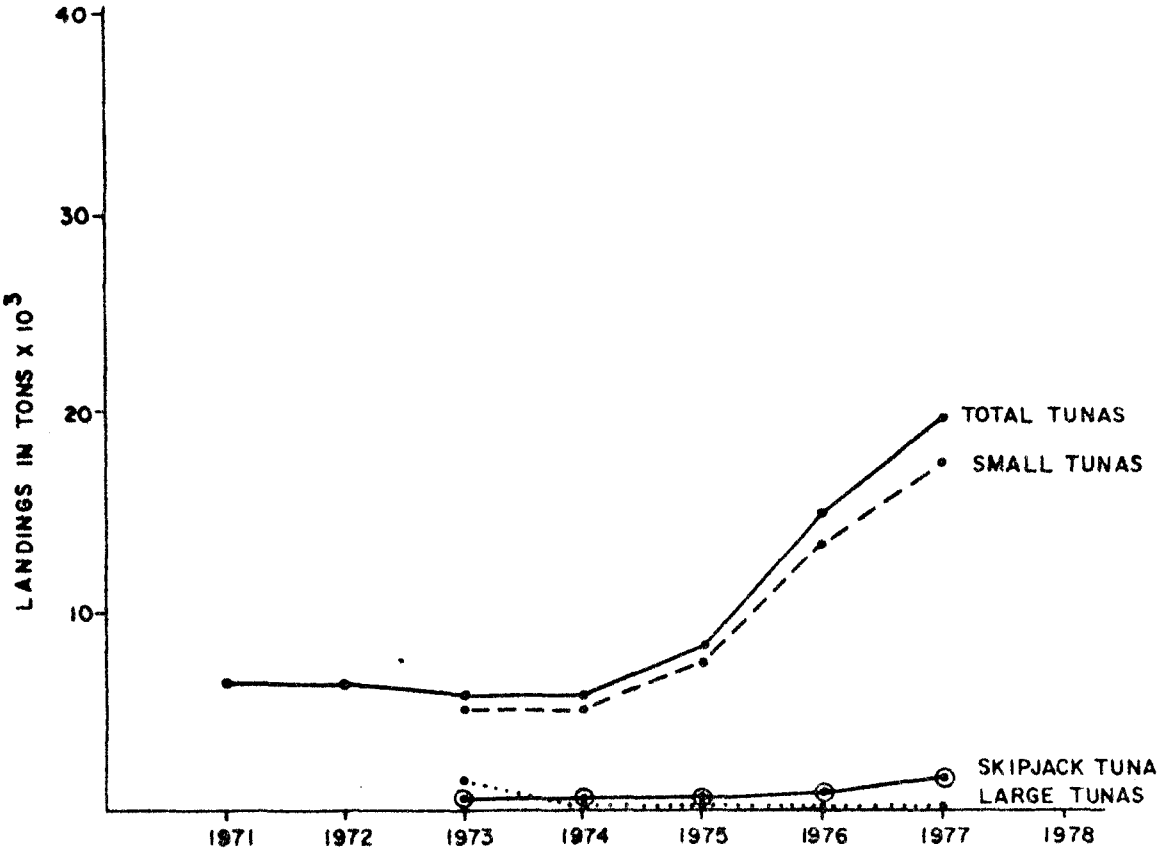

Figure 6 C. Annual Java, Indonesia landings of total tunas, skipjack tuna, small tunas and large tunas in tons

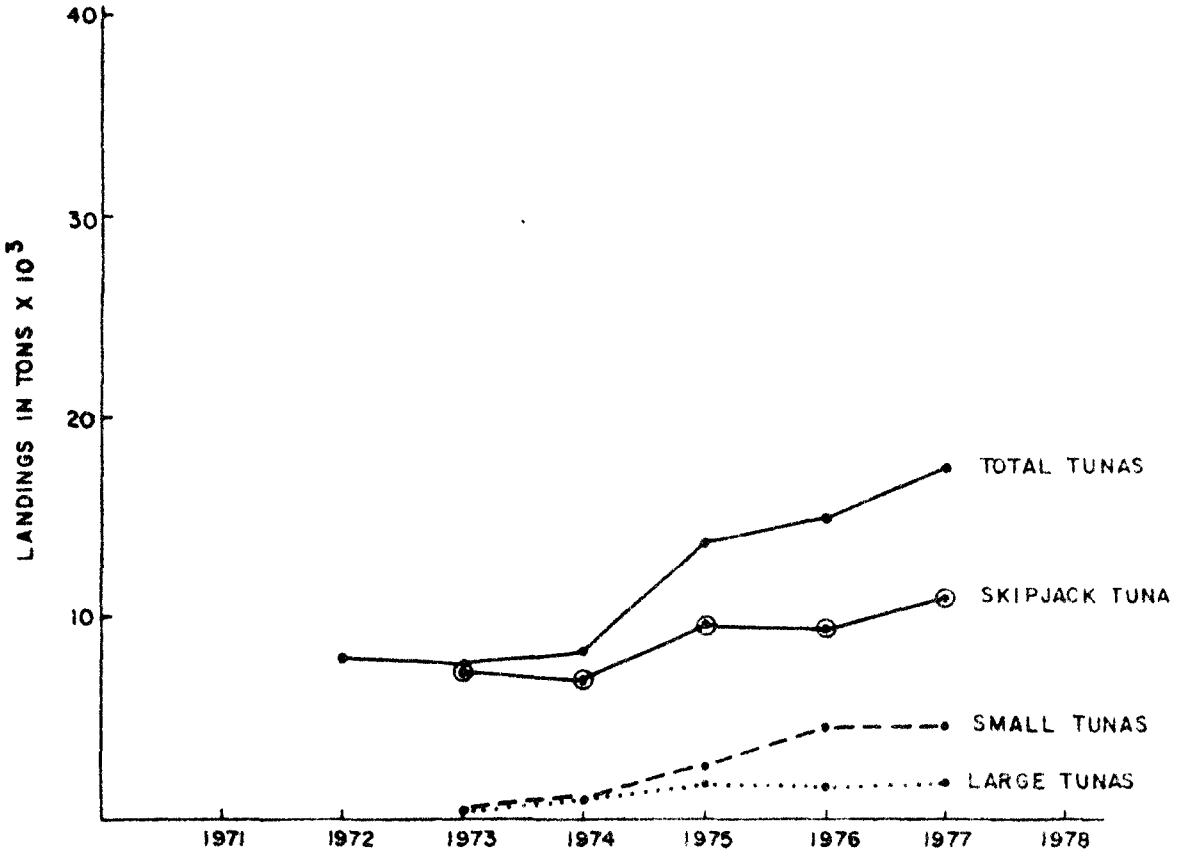

Figure 6D. Annual Maluku-West Irian, Indonesia landings of total tunas, skipjack tuna, small tunas and large tunas in tons

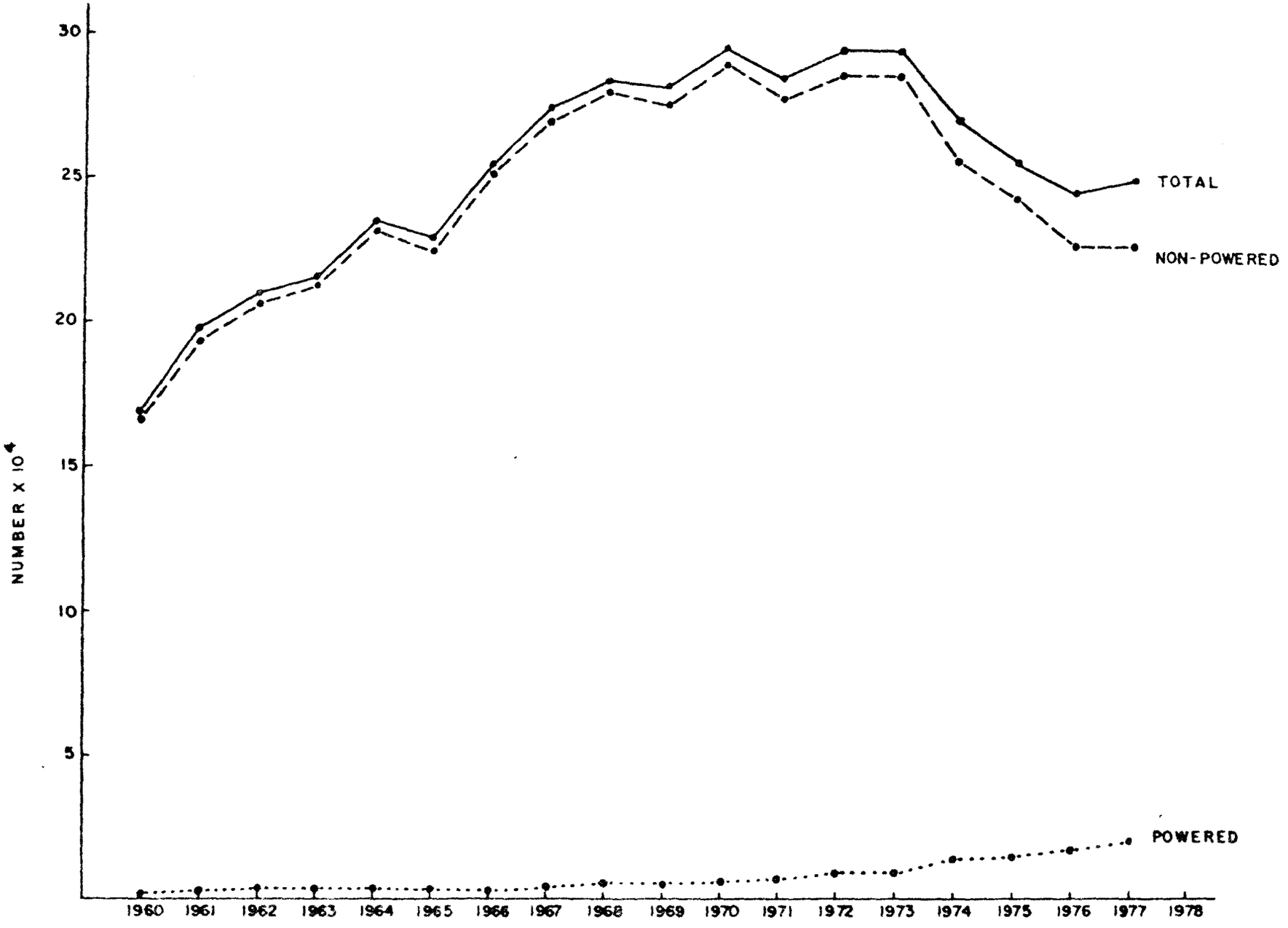

Figure 7. Number of Indonesian boats by year

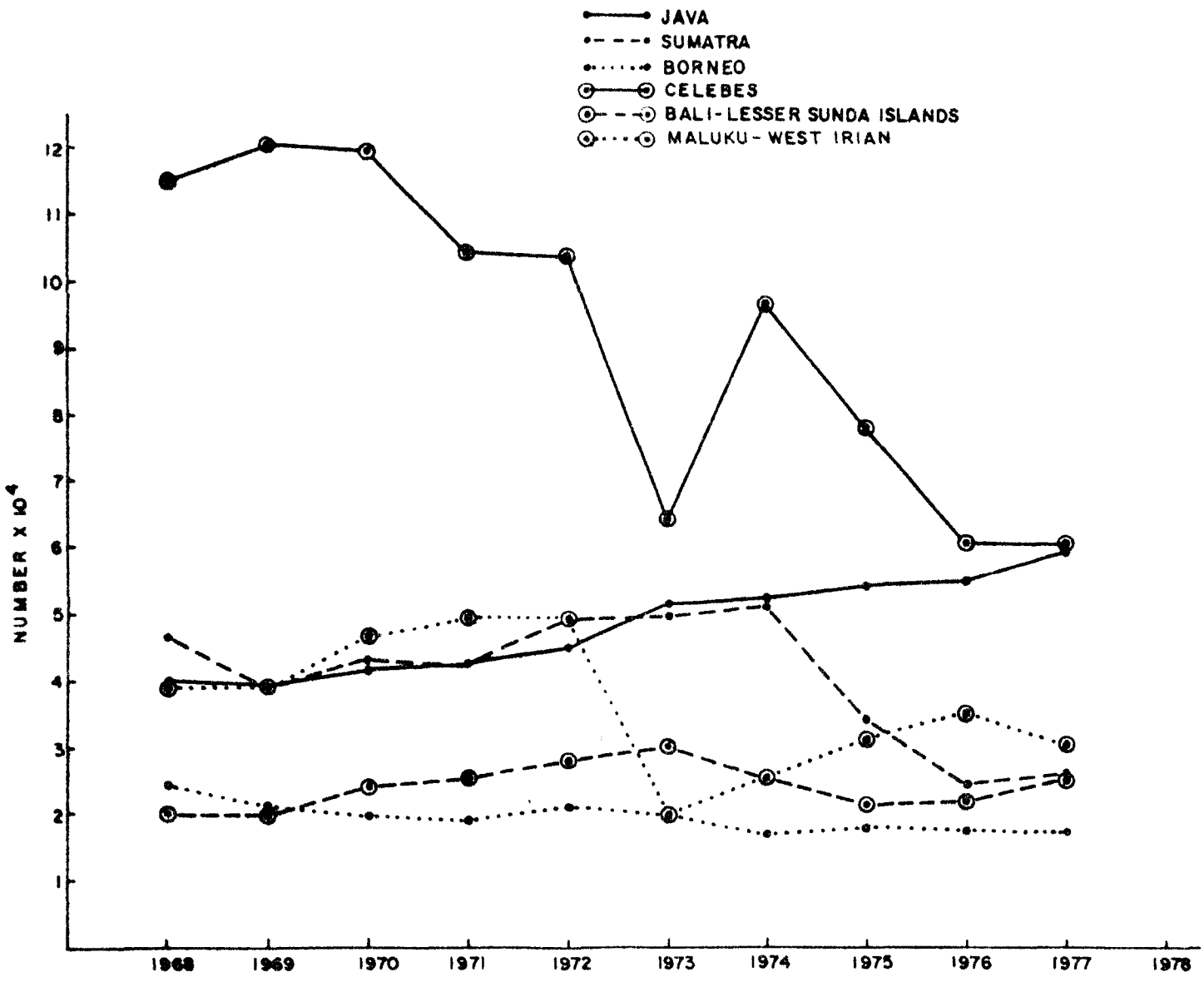

Figure 8. Total number of Indonesian boats by island and by year

Figure 9. Annual skipjack tuna catch (tons) and CPUE (tons per effective day) for the state enterprise pole-and-line fishery in Ambon, Maluku-West Irian, Indonesia. Derived from Uktolseja (1978)

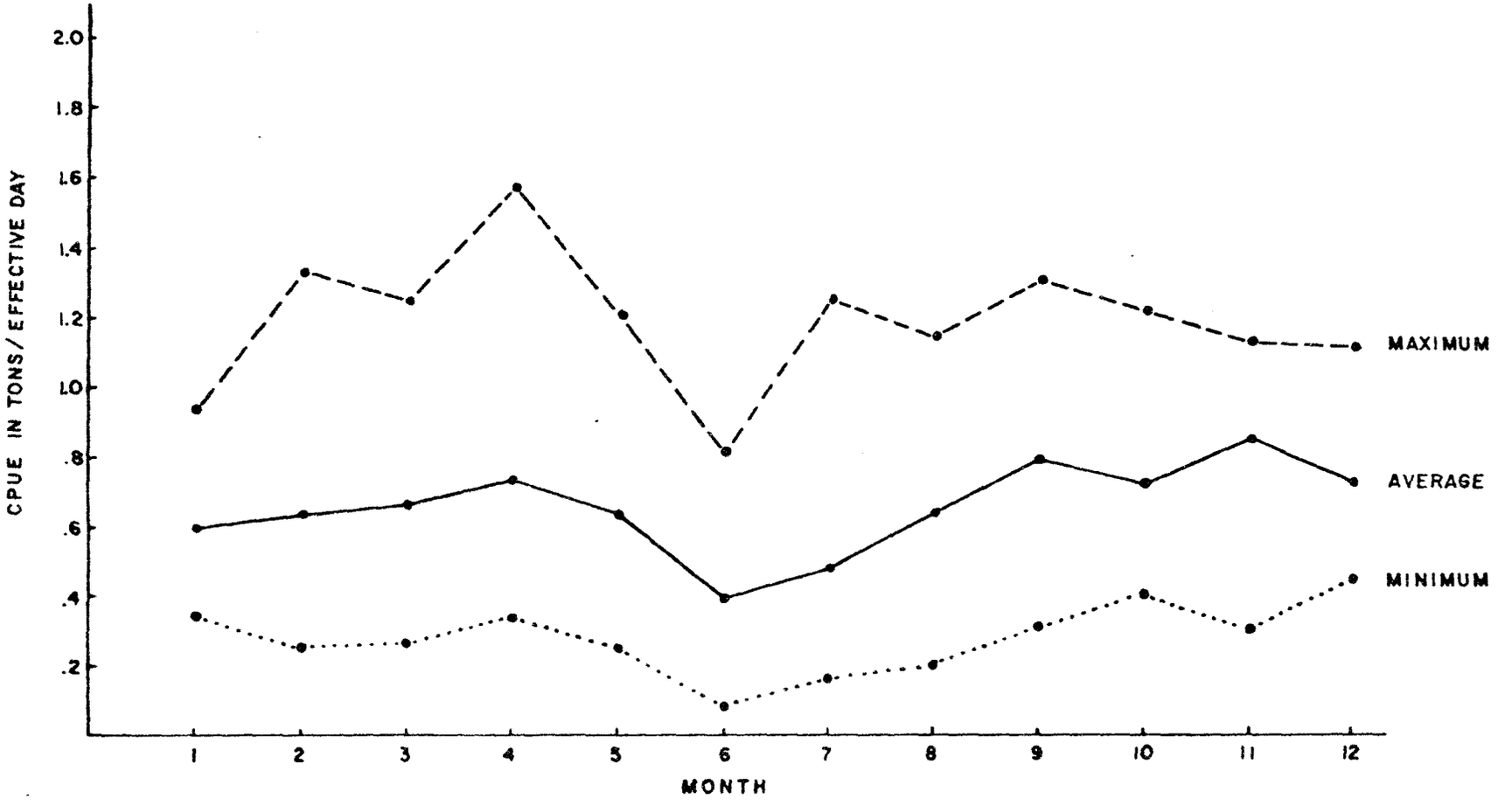

Figure 10. Monthly skipjack tuna CPUE in tons per effective fishing day for state enterprise pole-and-line fishery in Ambon, Maluku-West Irian, Indonesia over the period 1968-1978. Derived from Uktolseja (1978)

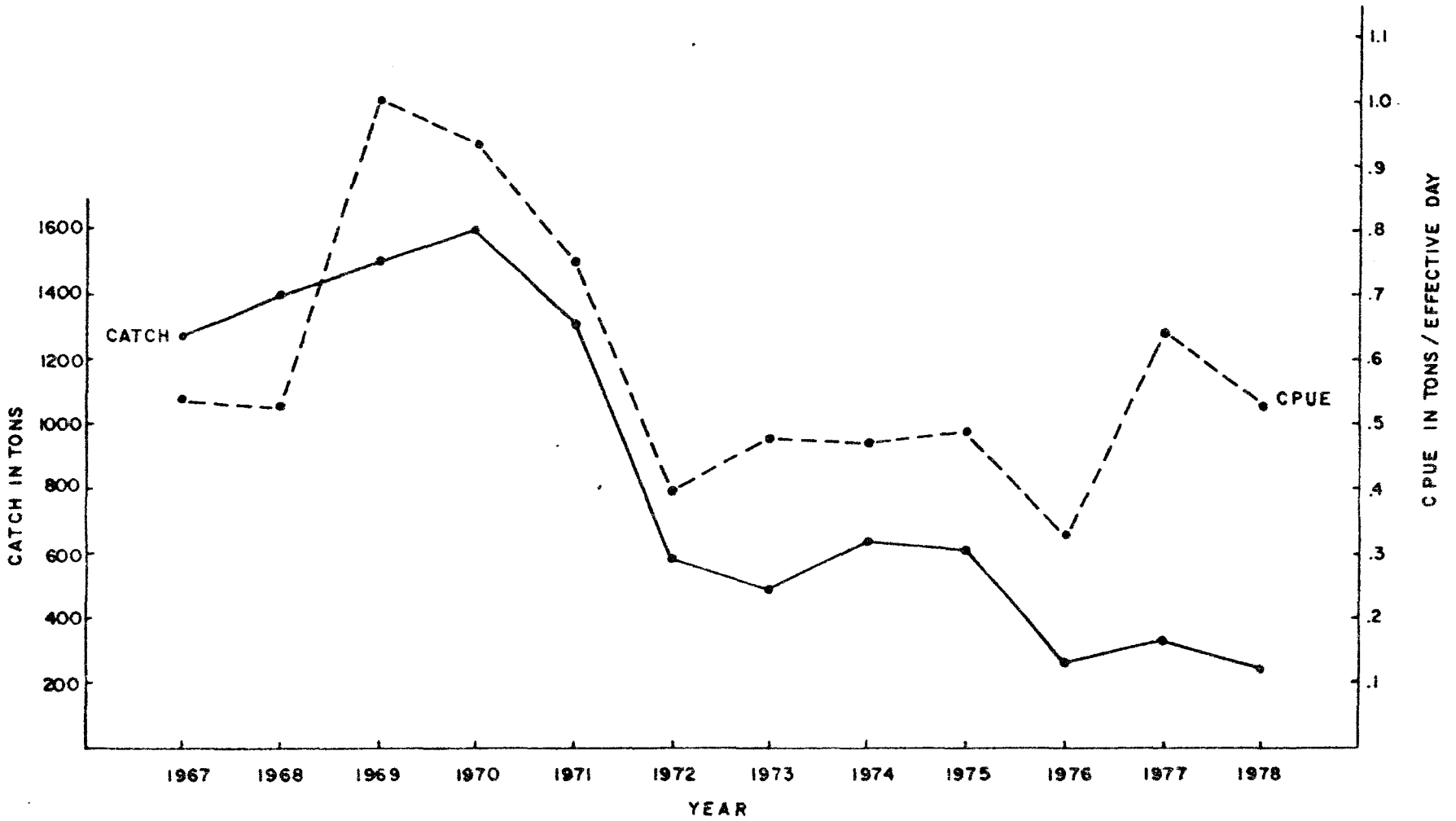

Figure II. Annual catch (tons) and CPUE (tons per effective fishing day) for the state enterprise, skipjack tuna, pole-and-line fishery based in North Celebes, Indonesia. Derived from Uktolseja (1978)

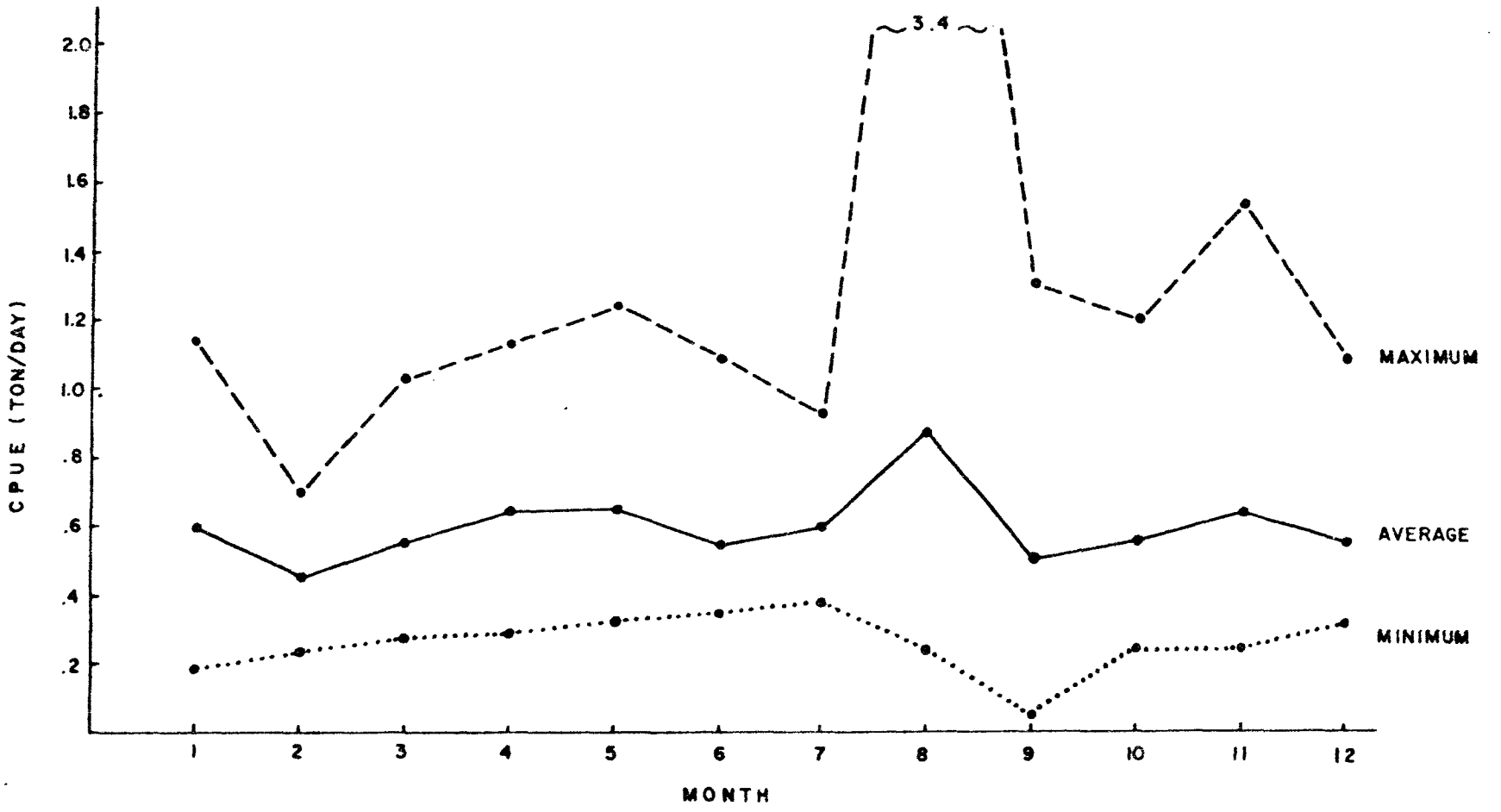

Figure 12. Monthly CPUE (tons per effective fishing day) for the state enterprise, skipjack tuna, pole-and-line fishery based in north Celebes, Indonesia over the 1967-78 period

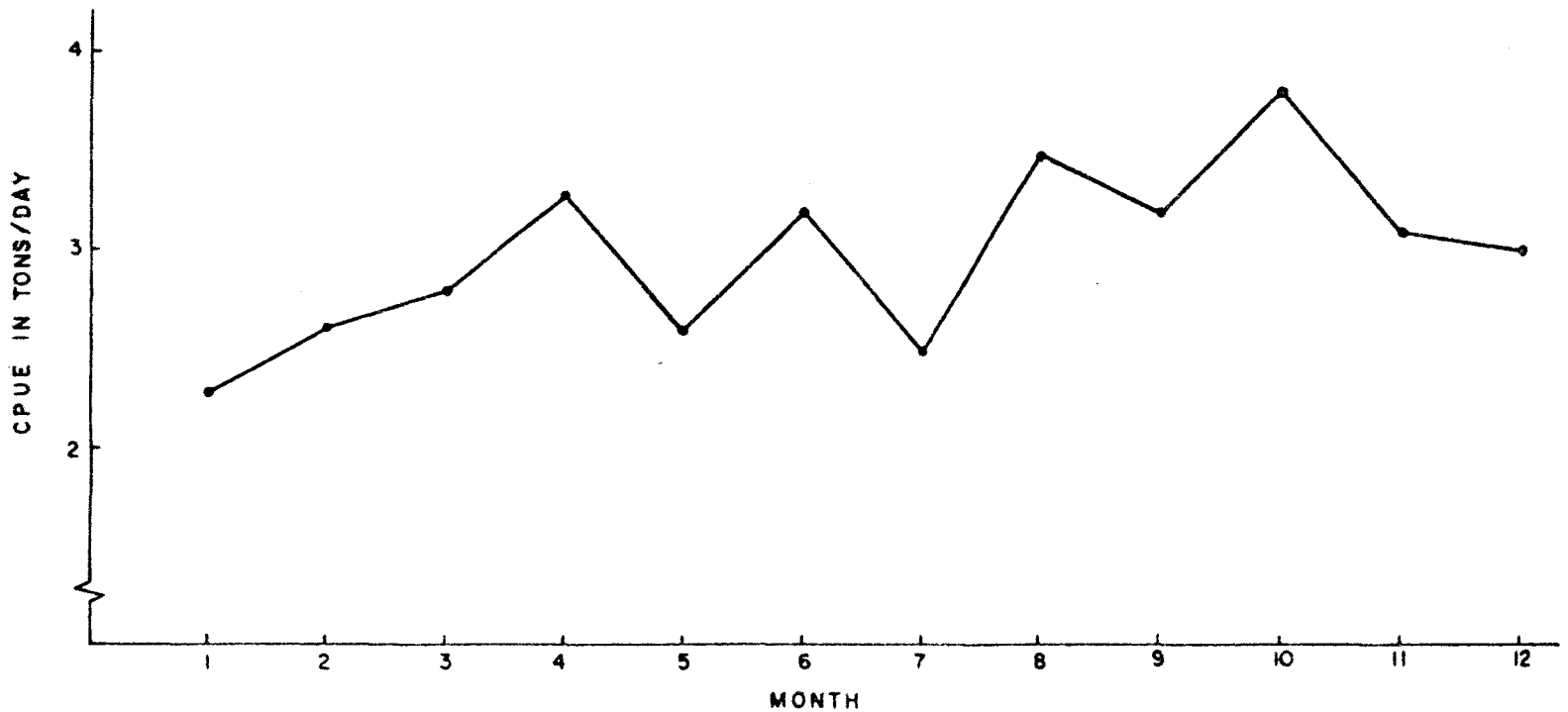

Figure 13. Average monthly CPUE (tons per effective fishing day) for the state enterprise, pole-and-line fishery in Waegeo, Maluku-West Irian, Indonesia, 1976-78. Derived from Uktolseja (1978)

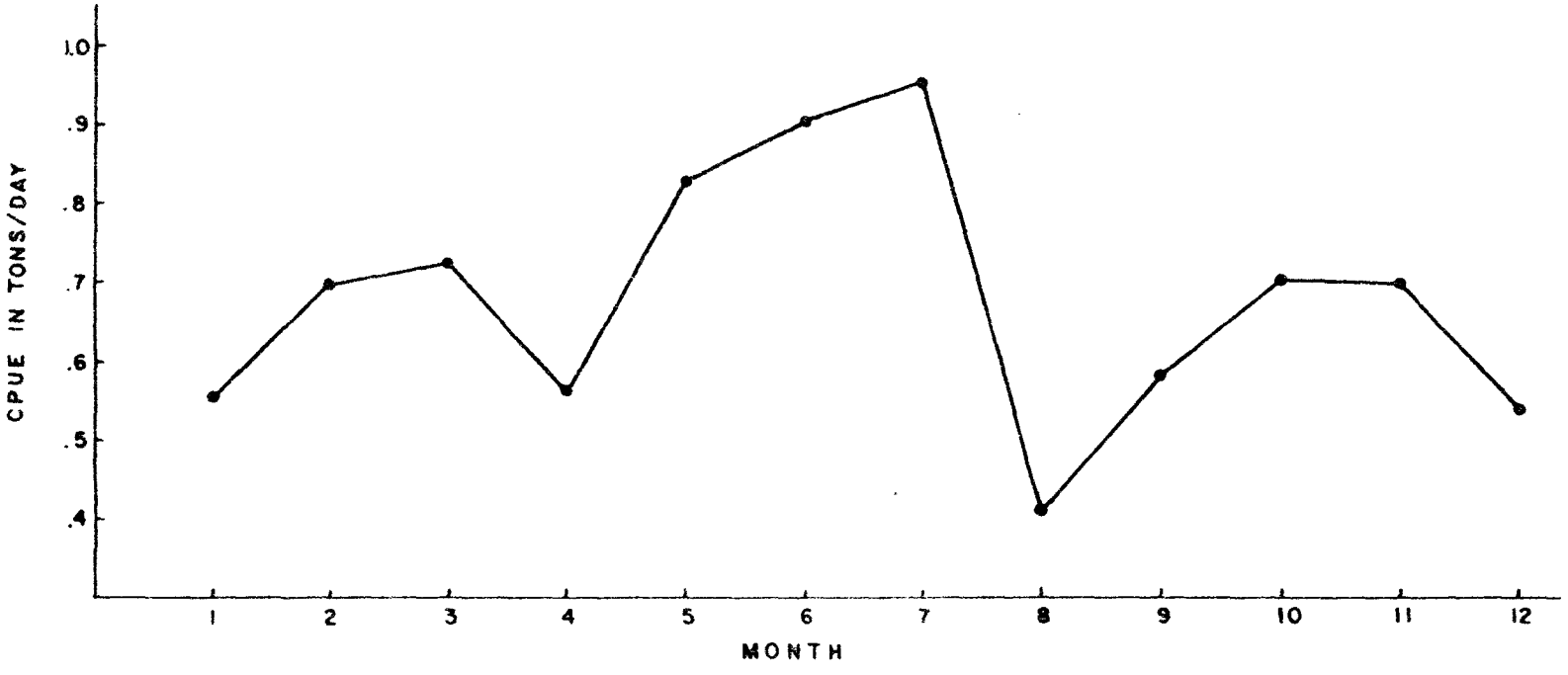

Figure 14. Average monthly CPUE (tons per effective day) of skipjack tuna for the state enterprise, pole-and-line fishery in Sarong, Maluku-West Irian, Indonesia, 1975-77
Derived from Uktolseja (1978)

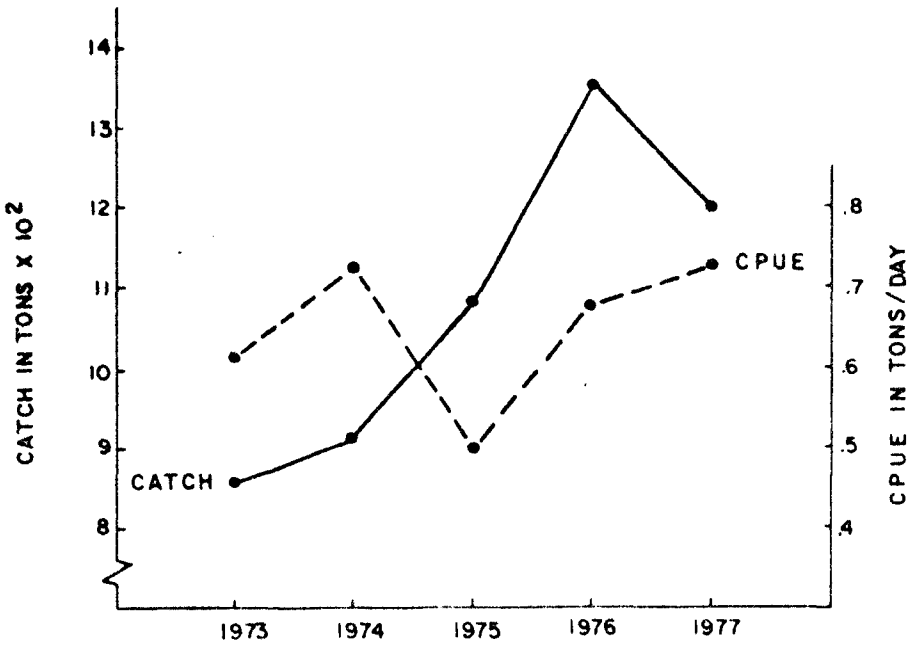

Figure 15. Annual catch (tons) and CPUE (tons per effective fishing day) for the small-scale, pole-and-line, skipjack tuna fishery in Ternate, Maluku-West Irian, Indonesia. Derived from Uktolseja (1978)

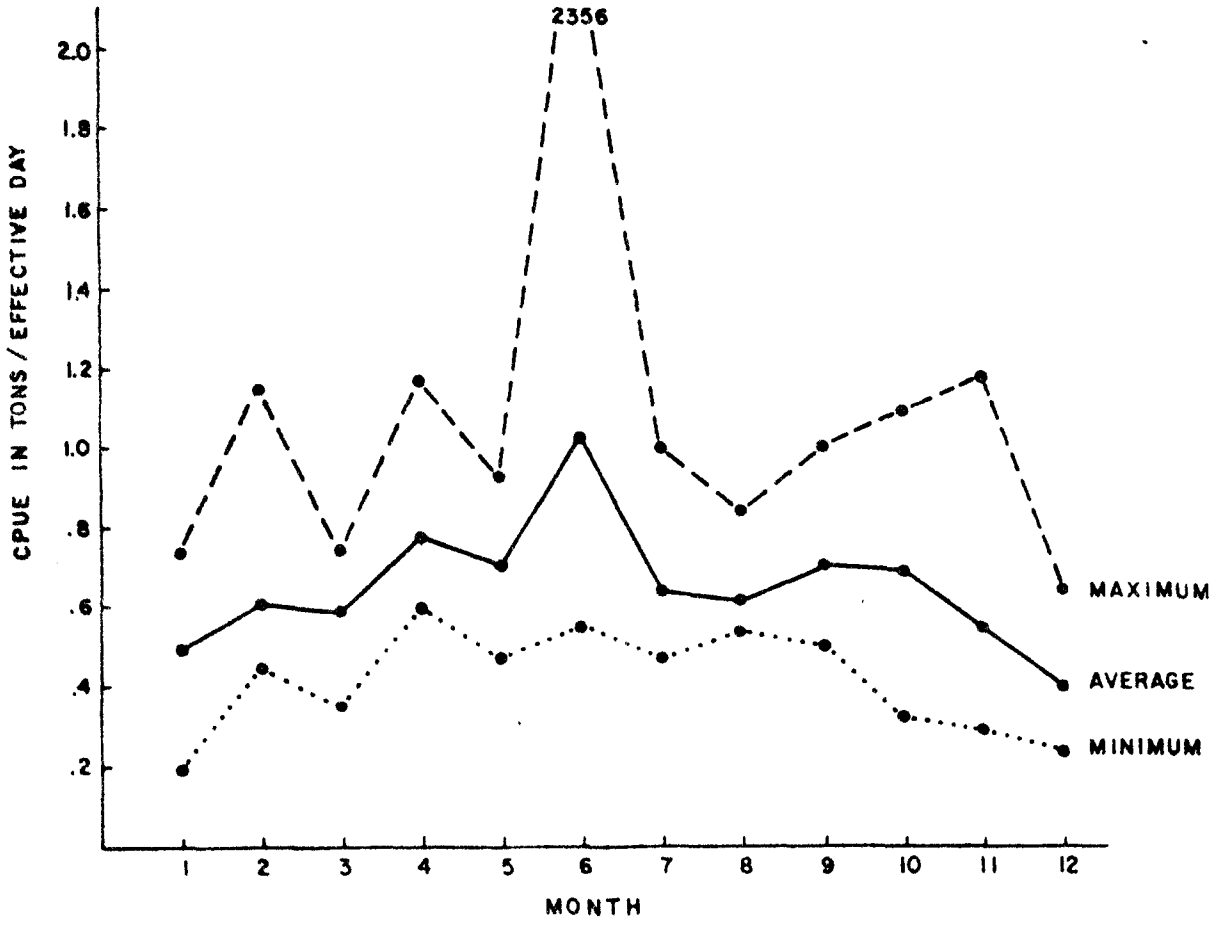

Figure 16. Monthly CPUE (tons per effective fishing day) for the small scale, skipjack tuna, pole-and-line fishery in Ternate, Maluku - West-Irian, 1973-77. Derived from Uktolseja (1978)

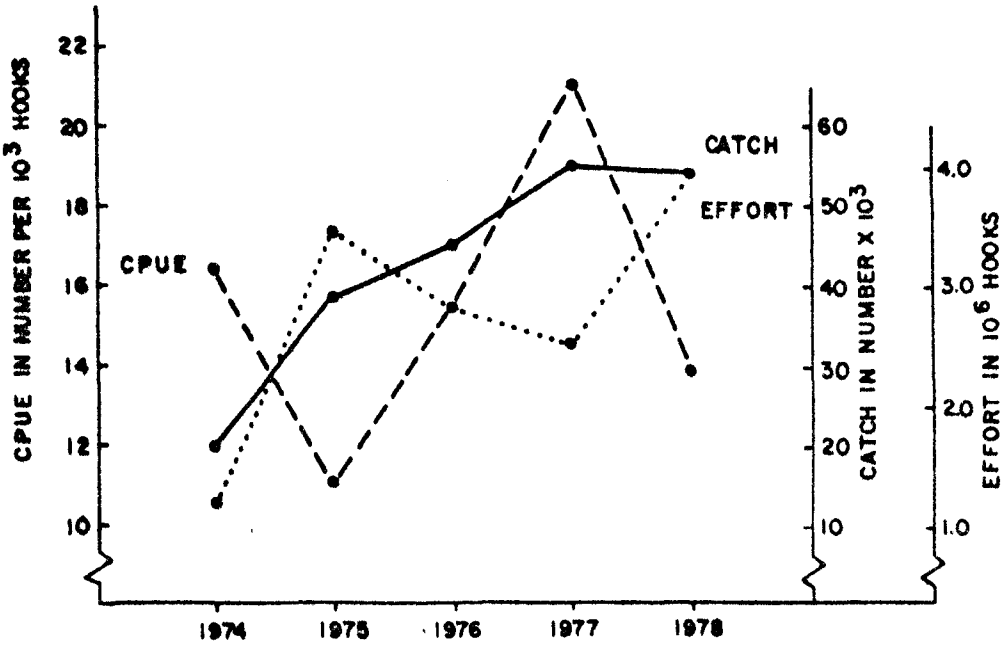

Figure 17. Annual catch (number), effort (hooks) and CPUE (number per 10^3 hooks) for the Indonesian longline fishery based in Bali and Sabang, Indonesia

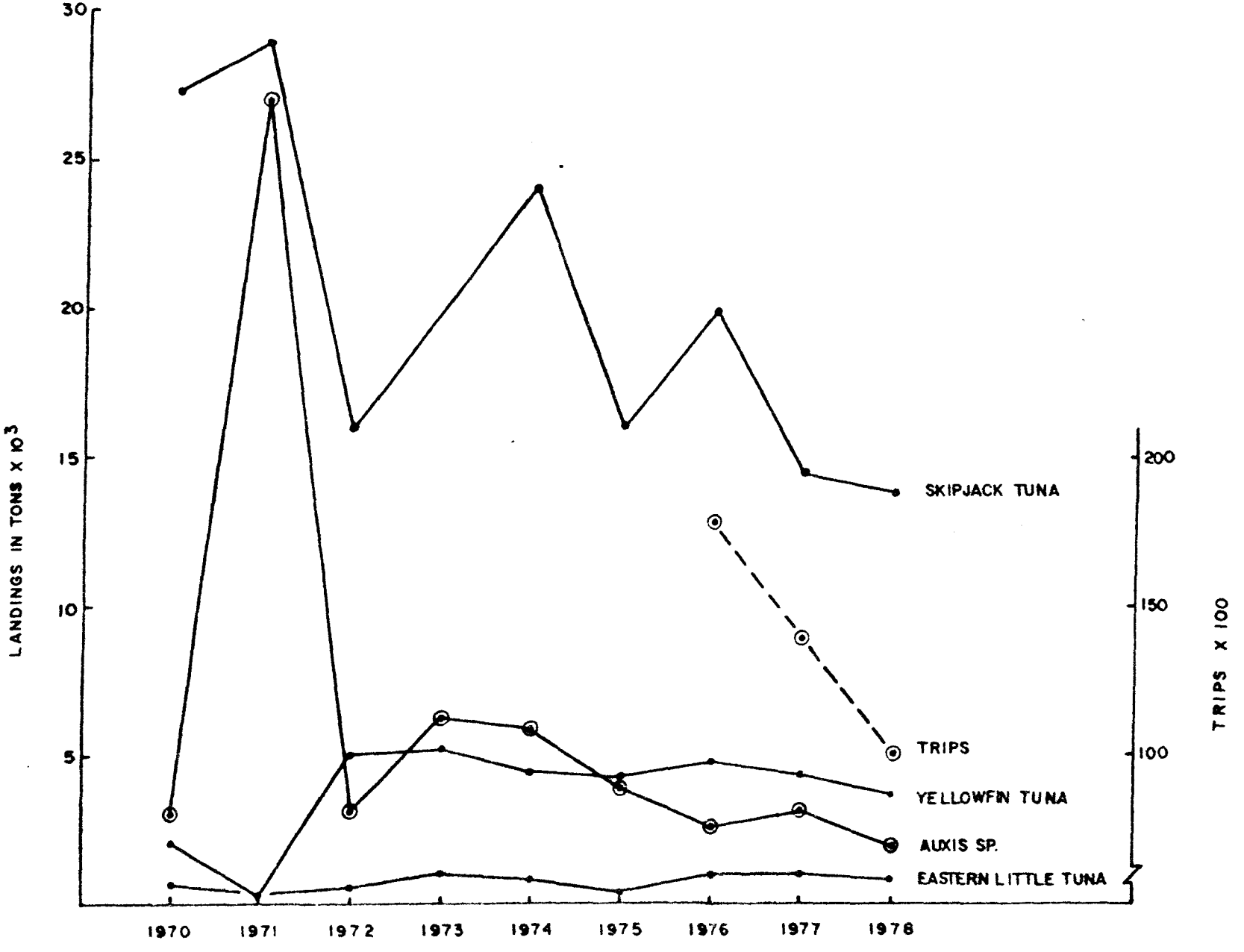

Figure 19. Annual Maldive landings of tunas in tons and the number of pole-and-line dory trips

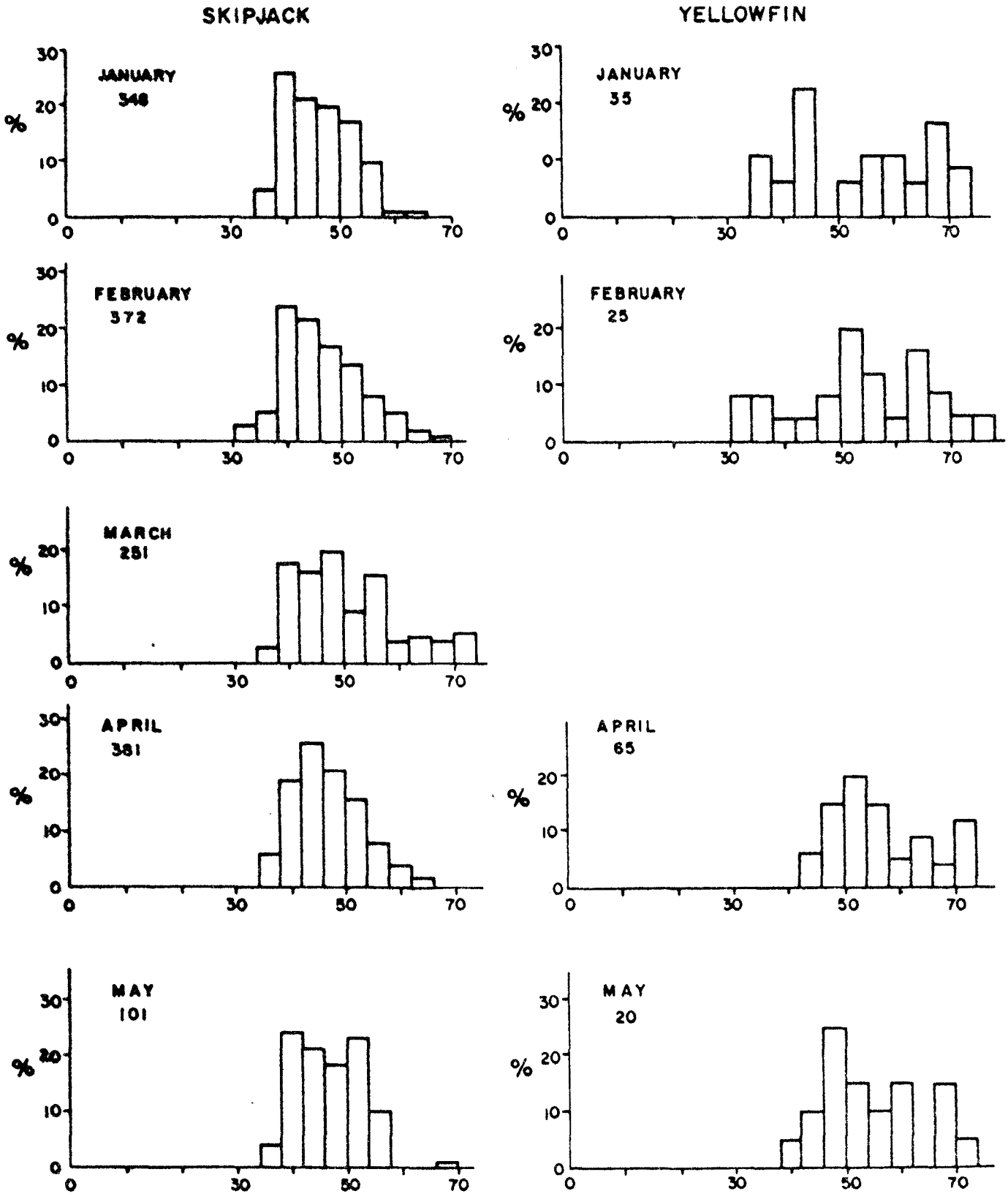

Figure 188. Percent size composition of skipjack and yellowfin tuna at Sorong, Indonesia January-May 1978. From Simpson (1979)

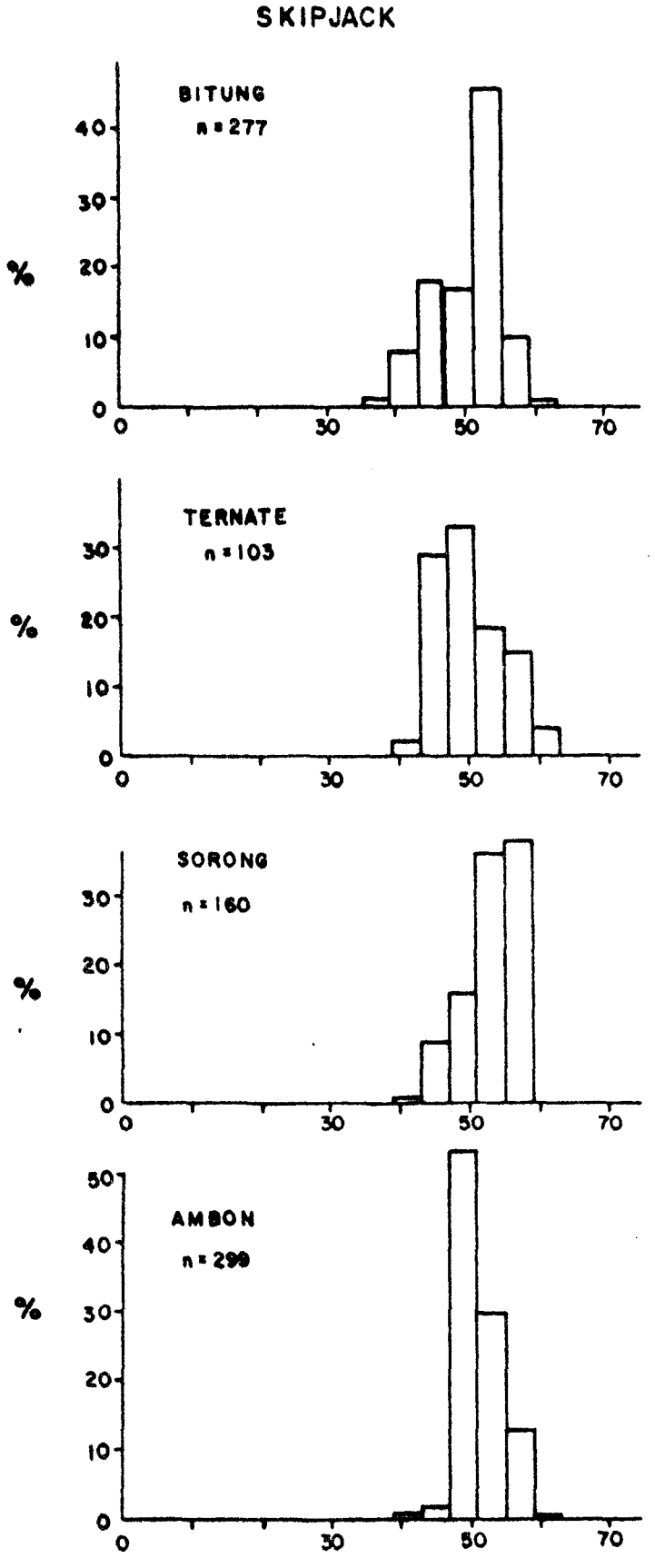

Figure 18A. Percent size composition of skipjack tuna in February 1977 in four areas in Indonesia. From Simpson (1979)

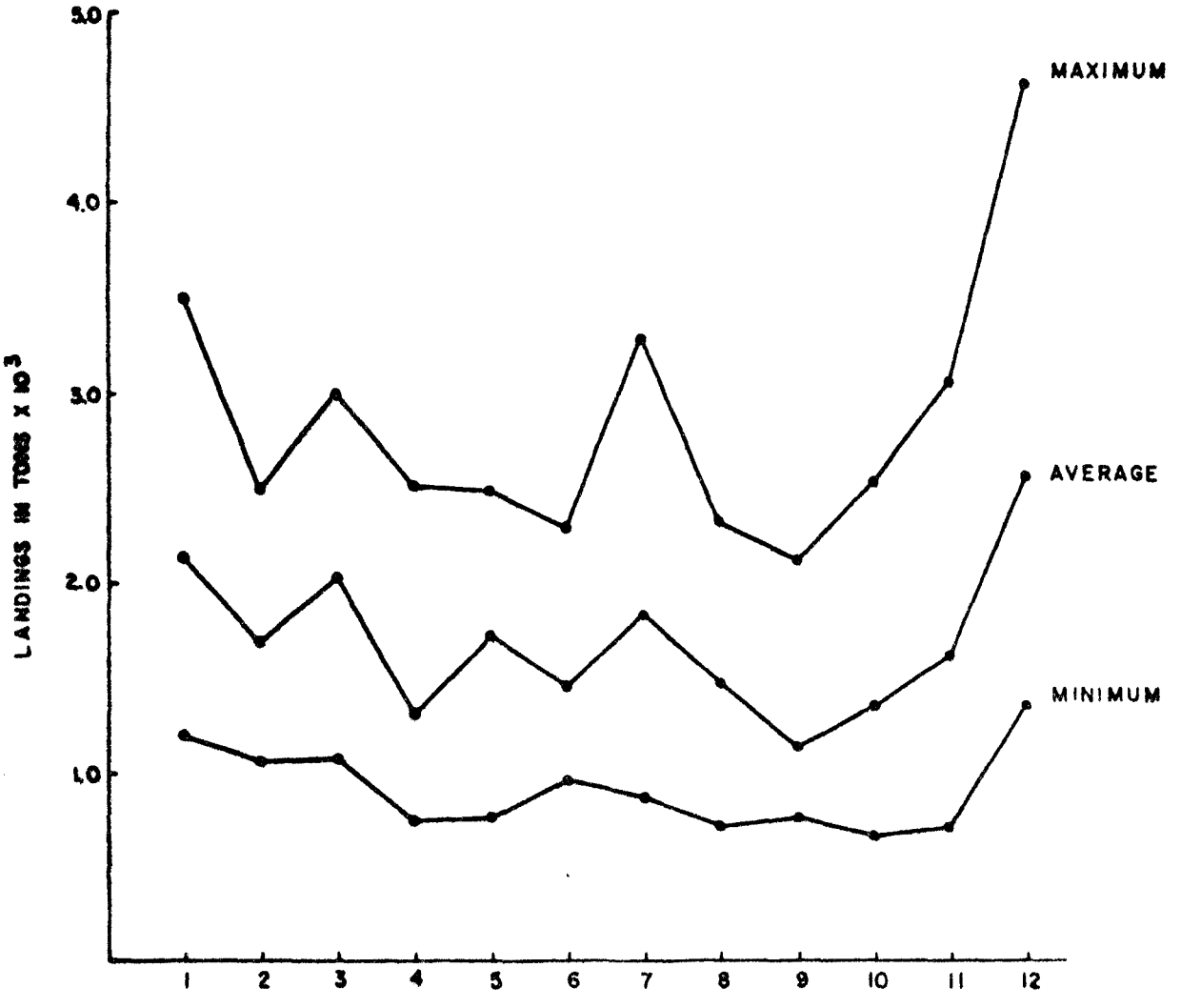

Figure 20. Monthly landings of skipjack tuna in the Maldives primarily from the pole-and-line fishery, for the period 1970-78

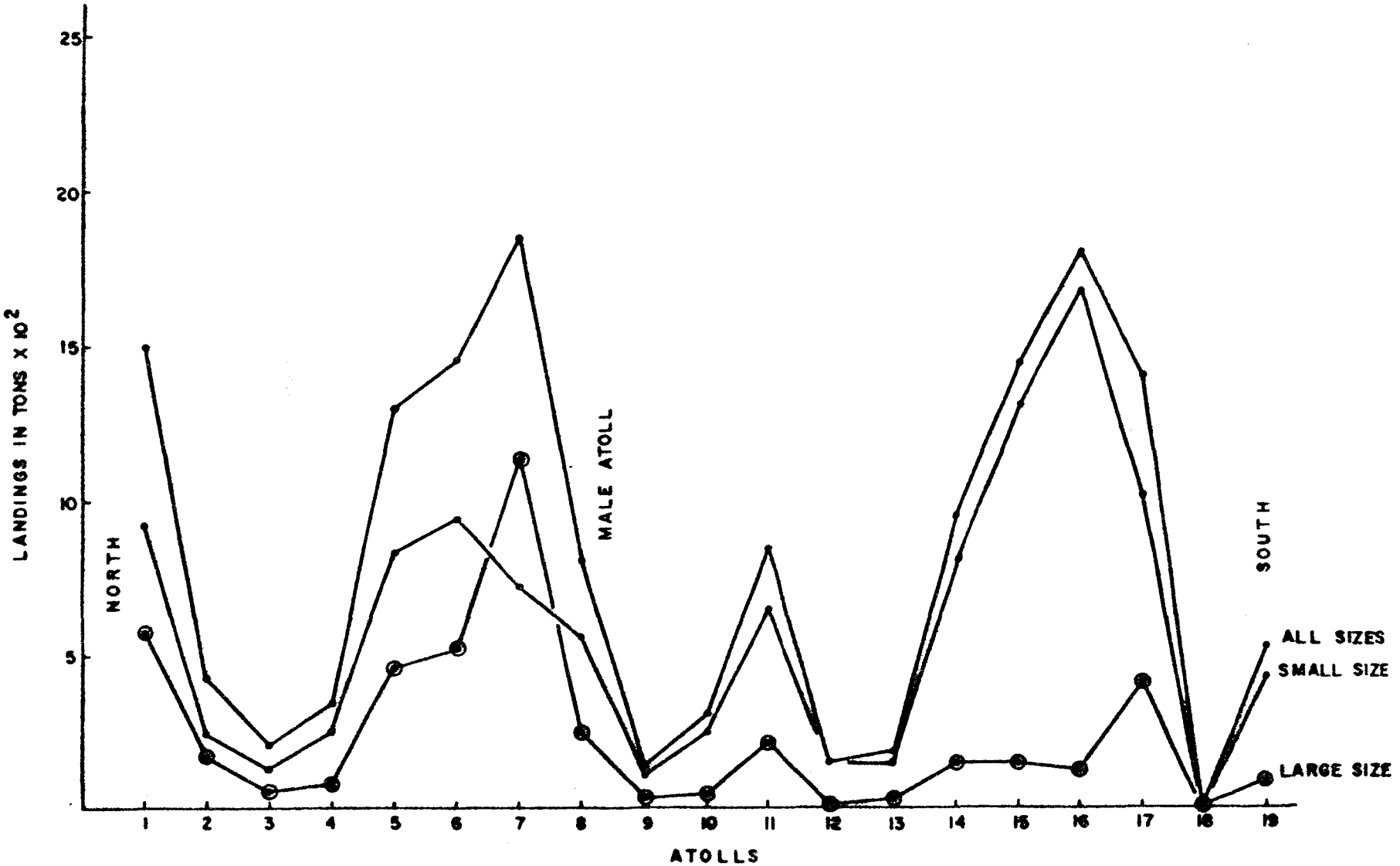

Figure 21. Skipjack tuna landings by small and large size classes at different atolls in the Maldives, averaged over 1976-78. The atoll names appear in Table 13

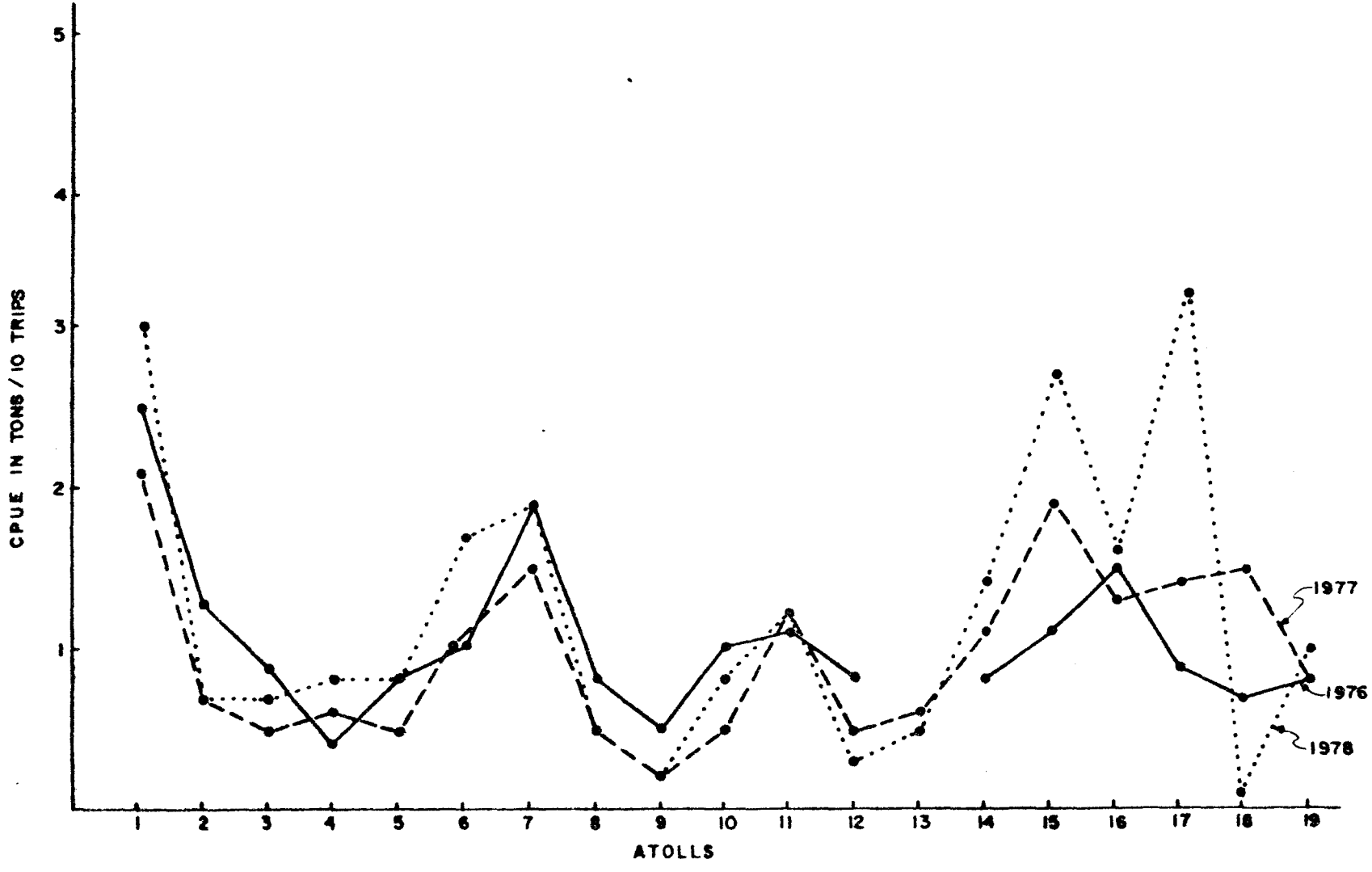

Figure 22. Skipjack tuna CPUE in tons per pole-and-line boat trip in the Maldives by atoll for the years 1976-78. The atoll names appear in Table 13

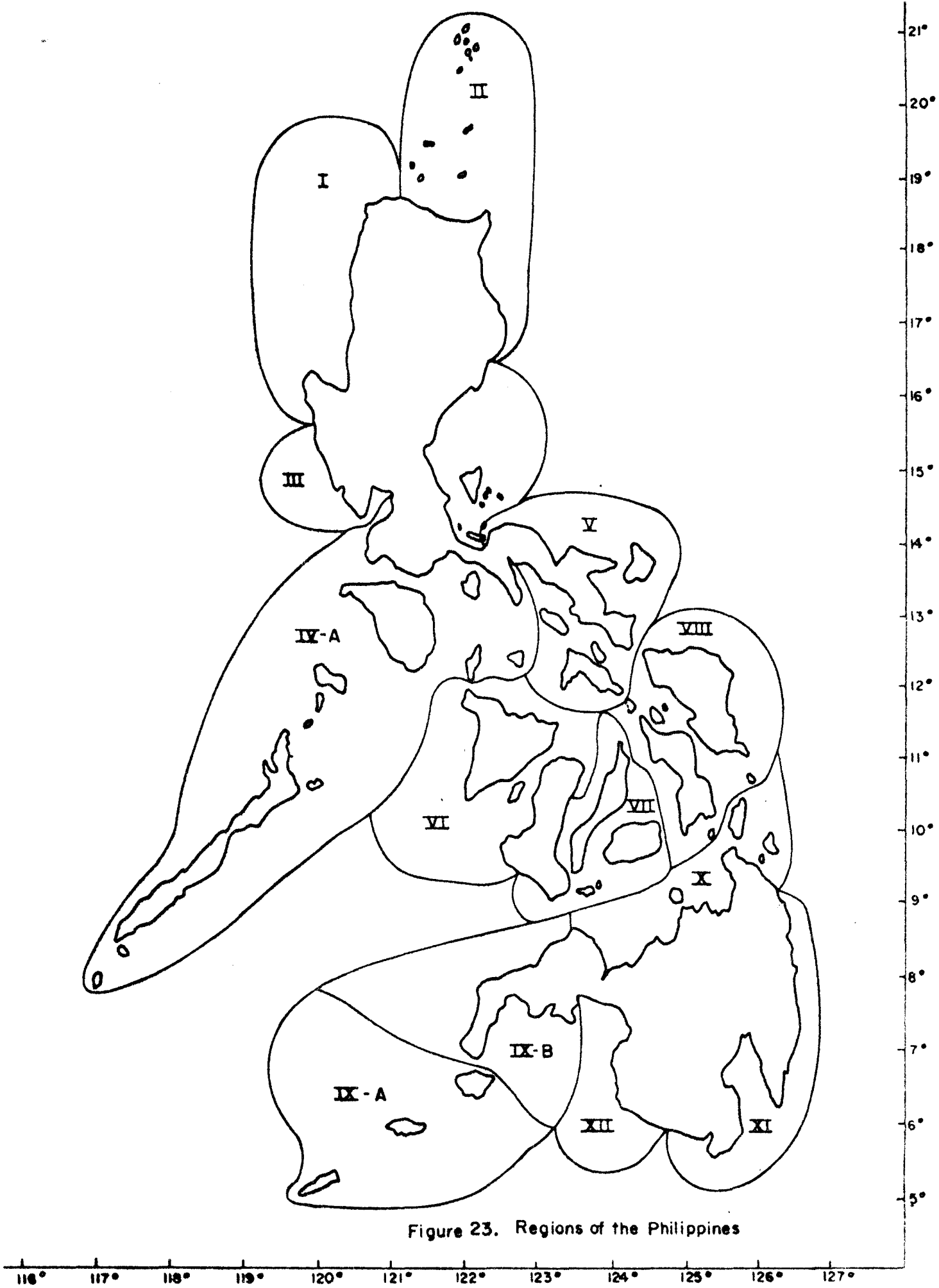

Figure 23. Regions of the Philippines

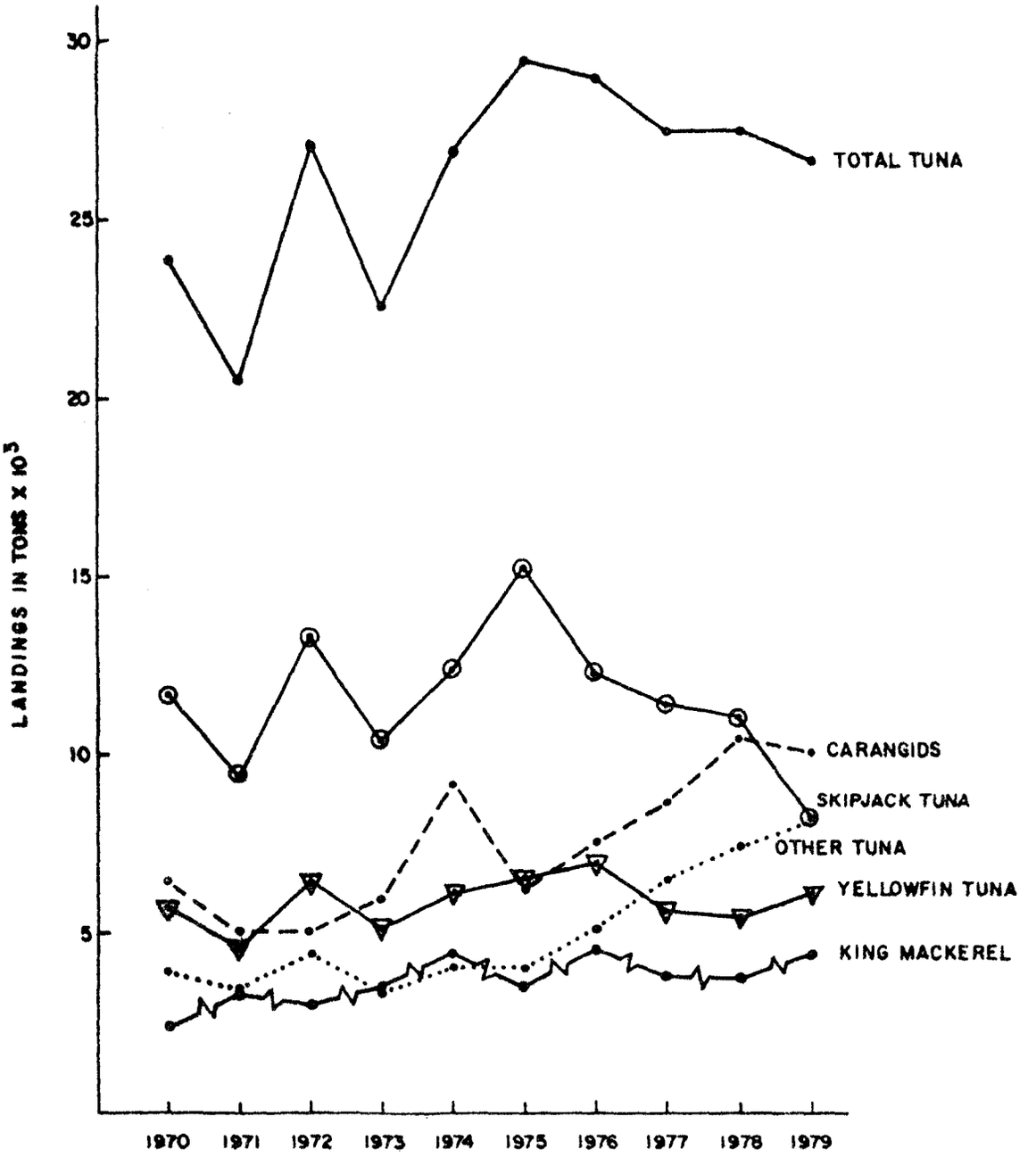

Figure 24. Sri Lanka landings of tuna and tuna-like species. Derived from Appendix table II

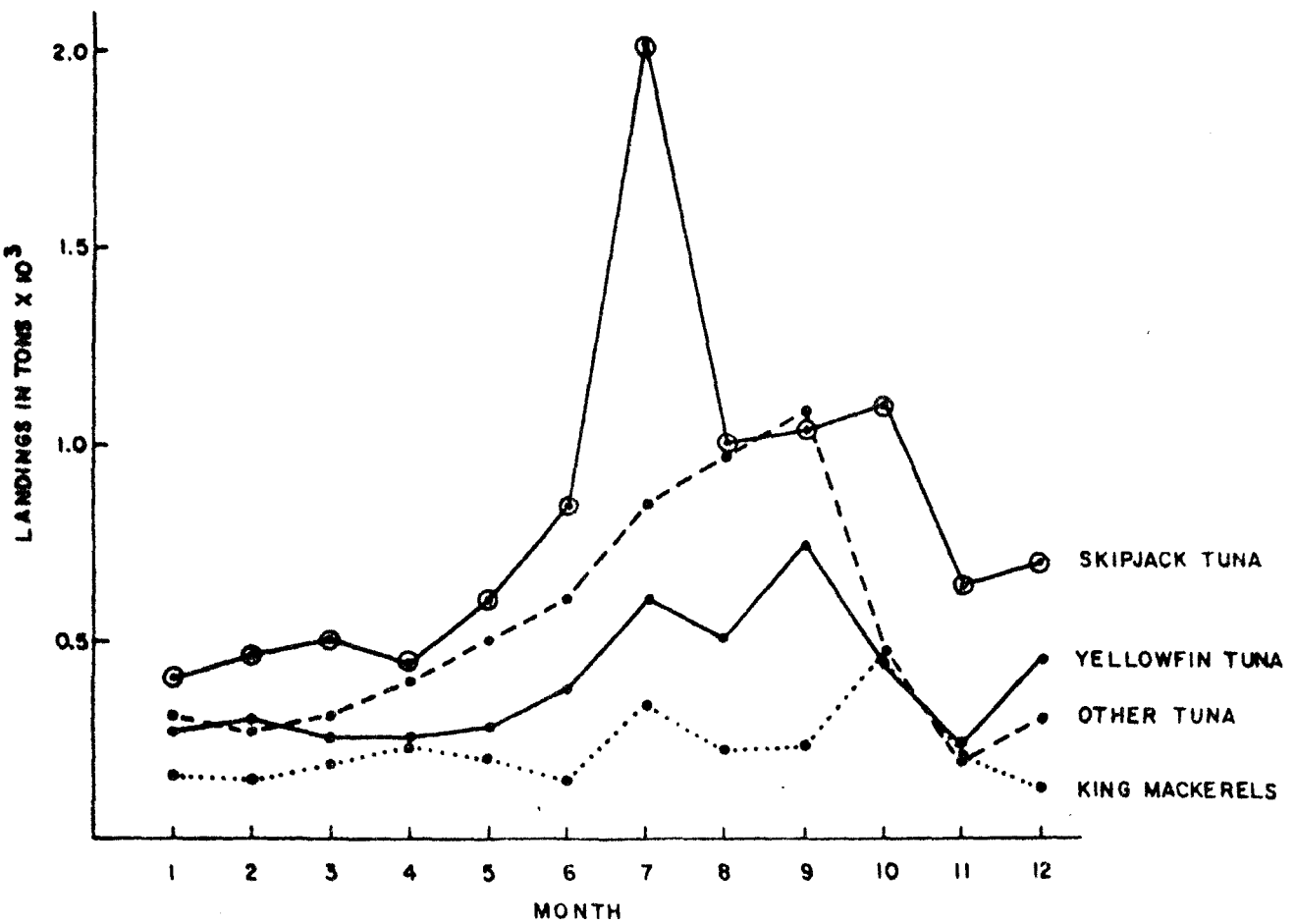

Figure 25. Sri Lanka monthly landings of tuna by 3.5 ton drift gill net boats by month for 1978. Derived from data provided by the Planning and Programming Division, Ministry of Fisheries

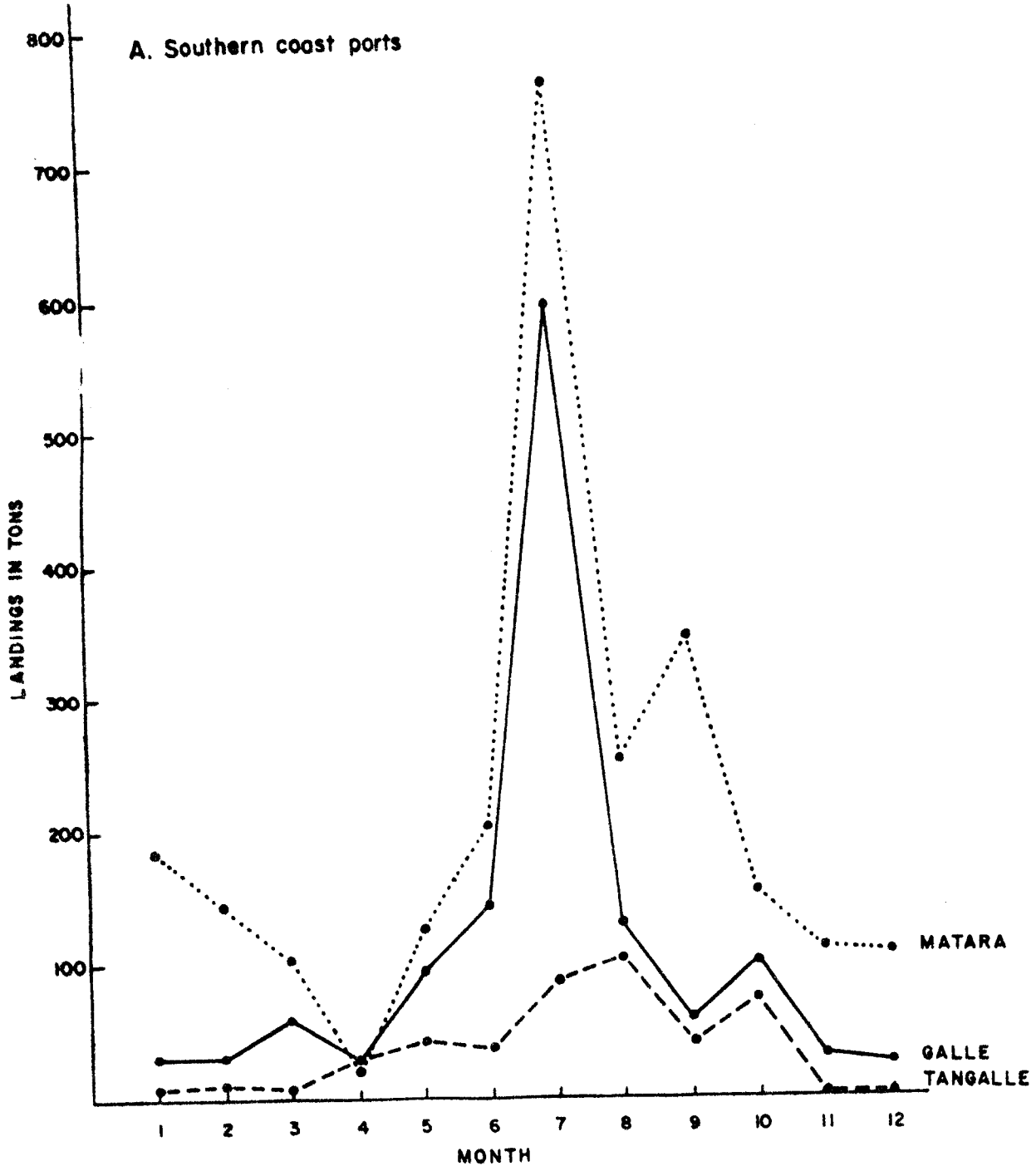

Figure 26. Sri Lanka monthly landings of skipjack tuna by 3.5 GT drift gill net boats. Data provided by Planning and Programming Division, Ministry of Fisheries

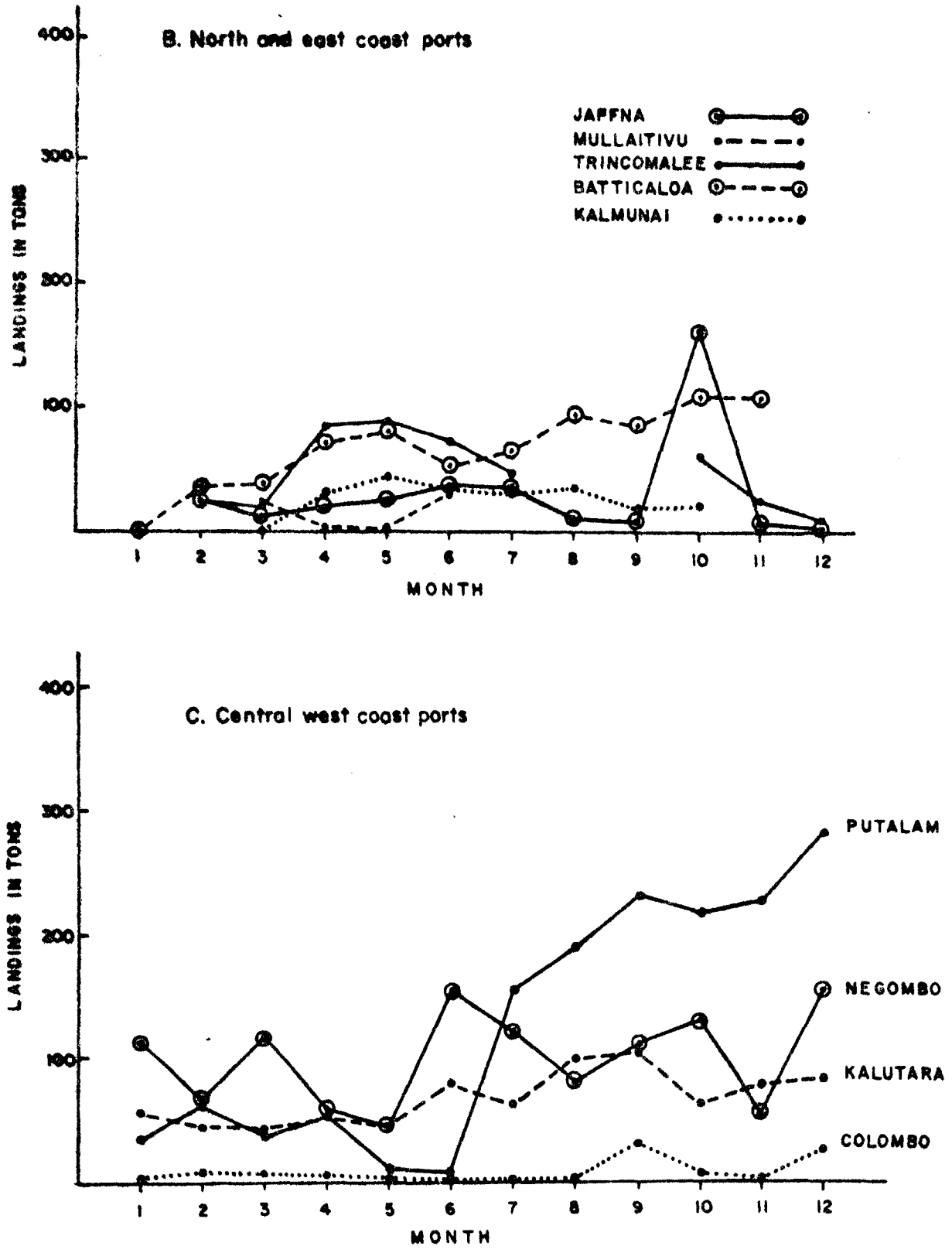

Figure 26. Sri Lanka monthly landings of skipjack tuna by 3.5 GT drift gill net boats. Data provided by Planning and Programming Division, Ministry of Fisheries