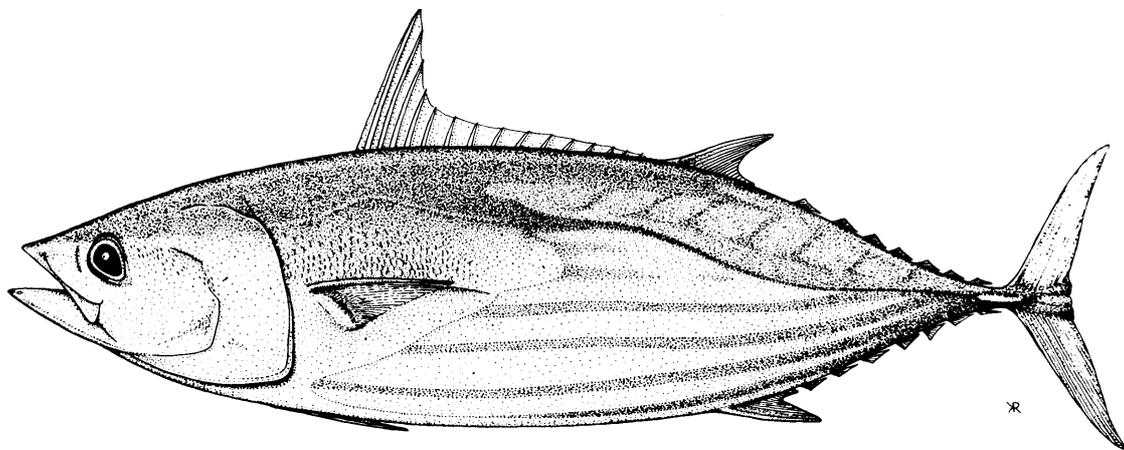


**PROPOSAL FOR MONITORING THE CATCHES OF HIGHLY
MIGRATORY SPECIES IN THE PHILIPPINES AND THE PACIFIC
OCEAN WATERS OF INDONESIA**

Prepared for the Preparatory Conference for the Commission for the Conservation and Management
of Highly Migratory Fish Stocks in the Western and Central Pacific



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SUMMARY

The lack of accurate catch statistics, effort data, and species composition and size composition data for the Philippines and the Pacific Ocean waters of Indonesia has been responsible for much of the uncertainty in the stock assessments for bigeye and yellowfin in the Western and Central Pacific Ocean. Both the Standing Committee on Tuna and Billfish and the Scientific Coordinating Group strongly support improved monitoring of the tuna fisheries of the Philippines and the Pacific Ocean waters of Indonesia. Strong support has also been expressed by agencies of Indonesia and the Philippines.

At the fifth session of Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific (29 September – 3 October 2003, Rarotonga, Cook Islands), Working Group II (Scientific Structure and Provision of Interim Scientific Advice) received a proposal from the SCG for characterising the catches of highly migratory species in the Philippines and the Pacific Ocean waters of Indonesia. Working Group II confirmed the importance of obtaining catch data from Indonesia and Philippines and recommended that, in cooperation with Indonesia and the Philippines, the proposal be further developed, and as a high priority that participants in the PrepCon further consider how they might assist this initiative, through services or financial support.

The primary objective of the proposed project is to collect and compile data that can be used to reduce the uncertainty of the assessments of tuna stocks in the WCPO. The current monitoring of tuna fisheries in the Philippines and Indonesia is insufficient for the purposes of the Western and Central Pacific Fisheries Commission. Therefore, a related objective of the proposed project is to improve the monitoring of tuna fisheries in the Philippines and Indonesia so that both countries will be able to fulfil their future obligations in regard to the provision of fisheries data to the Commission.

The activities of the proposed project include, for each country, (1) a review of the tuna fisheries and the current monitoring systems; (2) the compilation of historical catch and effort data; (3) a workshop to formulate recommendations for the improvement of the monitoring system and to plan the sampling programmes; (4) the establishment of a port sampling programme; (5) the establishment of an observer programme; (6) the analysis of data collected and compiled during the project; and (7) a workshop to review the achievements of the project and to plan for future monitoring.

Funding for the review of tuna fisheries and monitoring in Indonesia will be provided by the Australian Centre for International Agricultural Research. ACIAR is also considering funding the review of tuna fisheries and monitoring in the Philippines.

The budget for the activities for which funding is sought from potential donor countries that are participating in PrepCon has been prepared separately for (a) the port sampling programmes, travel and project meetings, and (b) the observer programmes. Excluding the observer programmes, the cost is USD 128,000 for the Philippines and USD 164,000 for Indonesia, for a total cost of USD 292,000. Including the observer programmes, the cost is USD 184,000 for the Philippines and USD 229,000 for Indonesia, for a total cost of USD 413,000.

1. INTRODUCTION

Annual catches of pelagic tuna in the Philippines and the Pacific Ocean waters of Indonesia (Figure 1) have been estimated to be 599,580 tonnes in 2002, which represents 29.9% of the total catch of pelagic tuna in the Western and Central Pacific Ocean (Lawson 2003). While the catches of bigeye (*Thunnus obesus*), skipjack (*Katsuwonus pelamis*) and yellowfin (*Thunnus albacares*) in the Philippines and Indonesia thus represent an important component of the catches in the WCPO, there are important gaps in the data available for stock assessments. Furthermore, little or no information is available concerning the catches of other highly migratory species to which the 2000 Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (Figure 2) applies, such as billfish and sharks (see Appendix 1).

The lack of species composition data and size composition data covering tuna fisheries in the Philippines and Indonesia, and questions regarding the accuracy and reliability of annual catch estimates, have been highlighted at meetings of the Standing Committee on Tuna and Fisheries for many years. It was noted in the Executive Summary of the Sixteenth Meeting of the SCTB (9–16 July 2003, Mooloolaba, Australia) that:

“estimates of annual catches for the domestic fleets of Indonesia and the Philippines have been provided on a timely basis; however, annual catch estimates in recent years (1992–2002 for Indonesia and 1997–2002 for the Philippines) have not been broken down by gear type and estimates of annual bigeye and yellowfin catches for all years have been reported as a combined catch. Catch data at a higher resolution and effort data have not been provided. Species composition and size data have been collected in the Philippines since 1997, but this programme was interrupted in 2002 due to funding constraints. No sampling is being conducted in the Pacific Ocean waters of Indonesia.”

The lack of accurate catch statistics, effort data, and species composition and size composition data for the Philippines and Indonesia has been responsible for much of the uncertainty in the MULTIFAN–CL stock assessments for bigeye and yellowfin. As a consequence, at the First Meeting the Scientific Coordinating Group (29–31 July 2002, Honolulu, United States of America),

“the SCG recommended that the data available for stock assessment should be improved by strengthening of data collection (improved catch, effort and size composition data) from Indonesian and Philippine domestic fisheries.”

Furthermore, at the Second Meeting of the SCG (17–19 July 2003, Mooloolaba, Australia),

“SCG2 acknowledged that the lack of data from Indonesia and the Philippines is a serious concern because they contributed substantially to the uncertainties in the stock assessments. Given that the stock status of both the yellowfin and the bigeye stocks were either approaching or possibly have exceeded, sustainable levels, the meeting urged Working Group II to bring this situation to the attention of the PrepCon5. SCG2 further requested Working Group II to ask PrepCon5 that it consider, as a matter of urgency, ways in which participants could assist in improving this situation. If this data gap cannot be resolved it is likely that the SCG will not be able to determine whether the stock status of these two stocks is continuing to worsen or not and, in the face of continued uncertainty, calls for a precautionary management intervention may ensue.”

Both the Standing Committee on Tuna and Billfish and the Scientific Coordinating Group strongly support improved monitoring of the tuna fisheries of the Philippines and the Pacific Ocean waters of

Indonesia. Strong support has also been expressed by agencies of Indonesia and the Philippines. In recent years, the monitoring of tuna fisheries in the Indian Ocean waters of Indonesia has improved through a project implemented by the Research Centre for Capture Fisheries, Bogor Agricultural University, the Commonwealth Scientific and Industrial Research Organisation of Australia and the Indian Ocean Tuna Commission, with funding from CSIRO, the Australian Centre for International Agricultural Research and the Overseas Fisheries Co-operation Foundation of Japan. At a meeting held in Jakarta on 7 August 2003 to review the project, strong support for the extension of the monitoring to the Pacific Ocean waters of Indonesia was expressed by the Ministry of Marine Affairs and Fisheries, the Directorate General of Capture Fisheries, the Indonesia Tuna Association, RCCF and IPB. Strong support for improved monitoring in the Philippines has been expressed by the Bureau of Agricultural Statistics, the Bureau of Fisheries and Aquatic Resources, the National Fisheries and Research Development Institute and the National Tuna Industry Council.

At the fifth session of Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific (29 September – 3 October 2003, Rarotonga, Cook Islands),

Working Group II (Scientific Structure and Provision of Interim Scientific Advice) received a proposal from the SCG for characterising the catches of highly migratory species in the Philippines and the Pacific Ocean waters of Indonesia. Working Group II confirmed the importance of obtaining catch data from Indonesia and Philippines as highlighted in the report of the second meeting of the SCG and recommended that, in cooperation with Indonesia and the Philippines, the proposal be further developed, and as a high priority that participants in the PrepCon further consider how they might assist this initiative, through services or financial support.

This document represents the further development of the proposal referred to above. It presents background information, descriptions of the project activities, budgets, outputs and impacts for the monitoring the tuna fisheries in the Pacific Ocean waters of Indonesia and in the Philippines over a two-year period.

2. BACKGROUND

2.1 Provision of Fisheries Data to the Commission

The types of research data that will almost certainly be compiled by the Commission, once it is established, were listed in Annex III of the report of the meeting of Working Group II (Scientific Structure and Provision of Interim Scientific Advice) at the fifth session of PrepCon (29 September – 3 October 2003, Rarotonga, Cook Islands) and include the following:

- annual catch estimates, by species and gear type;
- size composition data;
- operational catch and effort data;
- unloadings or transshipment data;
- port sampling data;
- observer data;

- gear and vessel attribute information; and
- other types of data as required for stock assessment purposes.

Anon. (2003a) discusses these types of data and their usage, and indicates the possible sources of the data, e.g. the flag state, the coastal state or the port state. Given that the Philippines and Indonesia are equally flag states, coastal states and port states, it is anticipated that both countries will be obligated to provide all of the types of data listed above. Each of these is discussed below and reference is also made to vessel monitoring systems.

2.1.1 Annual Catch Estimates

The Commission will compile estimates of annual catches, by species and gear type, for each flag state. The species covered by the Convention are listed in Appendix 1 of this document and include the large pelagic tunas, the small neritic tunas, and the major non-target species, such as billfish, sharks, pomfrets and dolphinfish. It is expected that the Commission will also compile catch estimates for species of special interest, such as marine turtles, sea birds and marine mammals.

Annual catches are usually estimated from unloadings data provided by fishing companies or stevedoring companies. If coverage of the unloadings data is incomplete, then they are raised on the basis of information on the activities of each of the vessels, i.e., the number of days that each vessels was at sea.

Annual catches can also be estimated from operational catch and effort data (see below) if coverage of the operational data is complete.

An extremely important aspect of the estimation of annual catches is the verification of the data. If the estimates are based primarily on unloadings data, then a significant proportion of the unloadings must be verified with operational catch data. If operational catch data are the primary source, then a significant proportion must be verified with unloadings data. If the data upon which the annual catch estimates are based cannot be verified, then the estimates will be considered inadequate.

Certain of the major non-target species (e.g., sharks, pomfrets, dolphinfish), and species of special interest, are usually discarded at sea and so are not reported in unloadings data or in operational catch data. Annual catches of these species are therefore estimated from observer data (see below).

Both the Philippines and Indonesia currently provide annual catch estimates to SPC that are aggregated into two species categories only (skipjack and 'tuna', which includes yellowfin, bigeye and possibly billfish) and that are not broken down by gear type. Both of these deficiencies need to be resolved.

2.1.2 Size Composition Data

The weights and lengths of individual fish contain information about the age structure of the population and they are therefore essential input data for the stock assessments that are currently conducted for tunas in the WCPO. Size composition data are collected from port sampling programmes and/or observer programmes (see below).

Since both the Philippines and Indonesia are coastal states and port states, they will be expected to conduct port sampling programmes for the vessels that land in their ports and observer programmes for the vessels that fish in their EEZs, regardless of whether the vessels are domestic or foreign.

2.1.3 Operational Catch and Effort Data

Operational catch and effort data consist of information about individual purse-seine sets, longline sets, ringnet sets, etc. The data usually consist of the name of the vessel, the date and time of the operation, the latitude and longitude position of the operation, the catch by species, and other information, such as the number of hooks in a longline set or the type of association of the tuna schools set upon by purse seiners. Operational data are collected on logsheets or in logbooks; Anon. (2003b) contains the logsheets (and all other data collection forms) currently used by the SPC member countries and territories.

Neither the Philippines nor Indonesia currently collect operational data systematically, although Indonesia has developed logsheets and attempted to introduce them. The introduction of logsheets in both countries will be a long-term goal and may possibly be achieved through intermediate steps, such as forms for recording catch and effort data referring to trips, rather than to each operation.

2.1.4 Unloadings or Transshipment Data

Unloadings data are used to estimate annual catches and to verify operational catch data. They consist of the tonnage or number of fish unloaded, by species, at the end of a fishing trip and include the name of the vessel, the start and end dates of the fishing trip, the start and end dates of unloading, and the amounts unloaded, by species. For longline-caught fish that may be either air-freighted to foreign markets or sold on the local market, the unloadings are broken down into 'export' and 'local' categories. Transshipment data refer to fish that are unloaded onto a carrier vessel that then delivers the fish to another port.

The Philippines and Indonesia will be expected to provide unloadings and transshipment data to the Commission for the purpose of verifying the operational data.

2.1.5 Port Sampling Data

When vessels unload in port, their catch can be sampled. The data collected usually include the name of the vessel, the start and end dates of the fishing trip, the start and end dates of sampling, and the size composition and the species composition of the catch. As port states, the Philippines and Indonesia will be expected to conduct port sampling programmes.

2.1.6 Observer Data

Certain types of data, such as catches that are discarded at sea, can only be collected by observers. In particular, observers are the major source of data on catches of non-target species, including species of special interest, such as marine turtles, sea birds and marine mammals. Other data collected by observers can be used to verify operational data. Observers also collect size composition data and species composition data. Detailed information on the fishing operations, such as the searching time or the gear attributes, can also be collected.

Both Indonesia and the Philippines will need to establish observer programmes for vessels fishing in the EEZs in order to collect these types of data, and especially data on catches of non-target species.

2.1.7 Gear and Vessel Attribute Information

Gear attributes refer to characteristics such as the length and depth of a purse-seine net, the number of hooks between floats that are used in a longline, etc., while vessel attributes refer to

characteristics such as the gross tonnage of a vessel, the engine power, the types of electronics that are used to locate the fish, etc. These attributes can be used to analyse the fishing power of a vessel and are routinely used in standardising the fishing effort data that are used in stock assessments. Gear and vessel attribute data can be collected from several sources, such as applications for fishing permits, logsheets, observers and inspections by the port authority.

Annex IV of the Convention, which is referred to in Article 24(5), Flag State duties, lists 18 attributes that must be provided to the Commission for the registry of fishing vessels that will be maintained by the Commission. Additional gear and vessel attributes may also be compiled by the Commission for research and/or compliance purposes.

Both the Philippines and Indonesia will be expected to provide gear and vessel attribute information for vessels flying their flags, for the registry and for fishery monitoring and stock assessment purposes.

2.1.8 Vessel Monitoring Systems

VMS was not listed explicitly in the report of the meeting of Working Group II at PrepCon V, possibly because VMS is usually associated with compliance, rather than fishery monitoring and stock assessment. Nevertheless, VMS data can be used for these purposes, primarily to verify the positions recorded for fishing operations on logsheets and to determine the level of coverage by operational data for individual vessels.

Article 24(8) of the Convention requires that vessels fishing on the high seas in the convention area must use a VMS transmitter. While the number of vessels of the Philippines and Indonesia that fish on the high seas may be small or the vessels of relatively small size, it should be recognised that most other coastal states in the WCPO have or intend to introduce VMS systems for all industrial vessels fishing within their EEZs. In this regard, Indonesia has recently contracted for all longliners to be fitted with Argos transmitters.

2.2 Tuna Fisheries and Monitoring in the Philippines

2.2.1 Tuna Fisheries in the Philippines

The information currently available on tuna fisheries in the Philippines is incomplete. The following information was taken from various sources, including Barut (2003):

- The tuna fishery is the most important sector of the fishing industry, both in terms of volume and value.
- Yellowfin and bigeye are exploited for the export market, skipjack for canneries, and frigate tuna (*Auxis thazard*), bullet tuna (*Auxis rochei*) and kawakawa / eastern little tuna (*Euthynnus affinis*) for the local market.
- Purse seine, ringnet and handline are the three main fishing gears; other gears are gillnet, mini-longline, round haul seine, troll line and multiple handline.
- While tuna fishing occurs on all fishing grounds, the main fishing grounds are the Moro Gulf and Celebes Sea in the south, the Sulu Sea, the eastern waters of the Philippines and the South China Sea.
- Purse seine and ringnet operations are almost always done in conjunction with a fish aggregating device, locally known as 'payao'. The payao is made of a round steel buoy with a coconut frond underneath the buoy.

- Handline fishing is also done in the vicinity of FADs; deep-swimming, large yellowfin, bigeye and billfish are targeted, and, in some seasons, large volume of opah (*Lampris guttatus*) are also caught.
- The Philippine fishing industry is divided into the commercial sector and the municipal sector. The municipal sector includes vessels of three gross tonnes or less, while vessels above three gross tonnes are considered commercial fishing vessels. Commercial fishing vessels are not allowed to fish within the municipal waters, which are located 15 kilometres from the shoreline. Catches of pelagic tuna by the commercial and municipal sectors in 2002 were 146,436 tonnes (69.8%) and 63,335 tonnes (30.2%) respectively.
- The number of municipal tuna handline boats is estimated to be around 10,000. Licensing of municipal vessels is the jurisdiction of the Local Government Units. The exact numbers of vessels licensed and non-licensed are difficult to obtain. A fisheries census was to be conducted by BAS during 2003 to cover the number of fishing vessels, both commercial and municipal, the number of fishermen and other information.
- In the commercial sector during 2000, licenses were issued to 135 purse seiners, 29 ringnet vessels, 18 handline vessels and 14 longliners.
- The hand-line / pump-boat fleet based in General Santos City numbers about 2,000 vessels and is the largest in the Philippines. The vessels typically steam for several days to the fishing grounds in the Celebes Sea, where they fish for only a few days, mainly at night, around FADs. Yellowfin and bigeye are the main species, followed by blue marlin, sailfish, black marlin and swordfish. Most of the other species, including shark trunks, is kept for sale at local markets.
- The ringnet fleet based in General Santos City numbers about 500 vessels and is the largest in the Philippines. The catch is usually comprised of skipjack and yellowfin (70%) and small tunas (30%). There are about 40 ringnet vessels based in Davao. The ringnet catch is loaded onto carrier vessels that unload to canneries.
- There are around 40 purse seiners based in General Santos City, and these fish in a similar area as the ringnet vessels, except that they use electronically powered blocks and larger nets.
- The major importer of the fresh, chilled and frozen tunas during 2002 was Japan, which imported 8,907 tonnes, followed by the United States and Hong Kong, which imported 5,290 tonnes and 1,292 tonnes respectively. Other countries imported 8,132 tonnes.
- The major importer of canned tuna during 2002 was Canada, which imported 7,404 tonnes, followed by Germany and Singapore, which imported 5,450 tonnes and 4,943 tonnes respectively. Other countries imported 30,173 tonnes of canned tuna.
- There are eight tuna canning firms based in General Santos City and Zamboanga City. These include First Dominion Corp., Ocean Canning Corp., Celebes Canning Corp., Permex Canning Corp., GenTuna Canning Corp. and Sea Trade Canning Corp. (Sun Star, Cebu, 12 September 2003)
- A draft Fisheries Administrative Order, which will prohibit the catch of small tunas, is being discussed by the National Fisheries and Aquatic Resources Management Council.

2.2.2 *Statistical System of the Bureau of Agricultural Statistics and the Bureau of Fisheries and Aquatic Resources*

Vallesteros (2002) described the statistical system developed by BFAR and BAS to collect data that are used to estimate catches for each province:

- Prior to 1988, fishery statistics were the responsibility of BFAR; however, responsibility passed to BAS under Executive Order 116, signed in 1987. Seven staff of the BFAR Fishery Statistics section were transferred to BAS, but additional funding for fisheries data collection was not allocated to BAS. The level of data collection and compilation have therefore varied, depending on the availability of funds.
- From 1990 to 1995, BAS implemented the National Fishery Information System under the Fishery Sector Program and estimated provincial and regional fishery production for the commercial, municipal and aquaculture sectors. Since 1995, BFAR has funded various fisheries statistics activities of BAS, in addition to surveys conducted by BFAR under the National Stock Assessment Program..
- The Survey of Commercial Fisheries and the Survey of Municipal Fisheries, which are conducted in landing centres, generate data on the amount of catch and prices, by species, gear type, fishing ground, province and region. The sampling frame for the Survey of Commercial Fisheries is a list of landing centres in 54 provinces. The fish landing centres in each province are the first stratum and fishing vessels are the second stratum in the stratified sampling design. All of the ‘top producing landing centres’ are included in the sample, while landing centres in two other strata – ‘major landing centres’ and ‘other landing centres’ – are randomly selected. Due to funding constraints, surveys are usually conducted only in the provinces with the greatest landings. For October – December 2001, 92 Commercial Fish Landing Centers from 26 ‘top producing’ provinces were sampled. Primary data are collected every second day at the landing centres.
- BAS has a Provincial Operation Center in each province to collect, process and disseminate data on agriculture and fisheries. For large-scale data collection, Contractual Data Collectors collect data on the amount of the catch, the price and other information, through interviews with the captain of the fishing vessel, using a standard questionnaire. The CDC collects data for about 2–4 hours during peak unloading, but also compiles data on unloadings before and after the peak periods. CDCs are supervised by Field Statisticians.
- Prior to 1994, data processing was done manually at the BAS Central Office. Since then, data processing has been computerised and conducted by Provincial Processing Officers at the Provincial Operation Centers, using standard systems developed by the Central Office. Summary statistics are forwarded to the Regional Operation Centers, where Regional Agricultural Statistics Officers forward summary statistics to the Central Office.
- Fish ports managed by the Philippine Fisheries Development Authority, Local Government Units and privately-managed fish landing centres are monitored on a monthly basis. BAS field personnel collect data on the unloadings and prices at 70 privately-managed landing centres and 17 centres managed by the PFDA and local government units, using standard forms developed by the Central Office.
- Monthly catches for each landing centre are estimated by raising the survey results by the ratio of the number of vessels that unloaded to the number of vessels that were surveyed, for each day surveyed, and by the ratio of the number of days in the month to the number of days surveyed. Monthly catches for each province are estimated by raising the estimates of the monthly catch for landing centres by the ratio of the total number of landing centres to the number of landing centres surveyed, for each of the three strata, and summing the results together with an estimate of catches from ‘other sources’
- For provinces in which surveys have not been conducted, quarterly catches are estimated by applying an estimate of the percentage change in the catch to the estimate for the previous quarter. The estimate of the percentage change is based on interviews with key informants.

- A similar system is used in the Survey of Municipal Fisheries, which covers 217 municipal landing centres in 50 ‘top producing’ provinces.
- Regional Agricultural Statistics Officers meet at the Central office on a quarterly basis to present regional estimates by province and to explain any changes in levels of production.
- Fishery statistics are disseminated through the publication of quarterly reports. A statistical handbook with the most recent five years of data is published annually.
- The Technical Working Group on Fisheries Statistics was established in 2000 within the Department of Agriculture, with members from BAS, BFAR and PFDA. The TWG meets and conducts workshops to address fisheries statistics issues. It is planned to explore alternatives methodologies for the surveys, since the characteristics of landing centres have changed so fast that the sampling designs may have become inappropriate.
- BFAR provided PHP 10 million (about US\$ 180,000) for surveys in ports not covered by BFAR enumerators in 2003. With this level of funding, the BAS surveys were conducted for only two months during 2003, in October and November.
- The landing centres that are surveyed by BAS are randomly selected from 366 commercial landing centres and 8,205 municipal landings centres. During October 2003, only 143 commercial landing centres and 359 municipal landing centres were surveyed, which represents a monthly coverage rate of 39.1% and 4.4% respectively. If the same number of landing centres are surveyed in December, as expected, then coverage for the year will be 6.5% and 0.7% for commercial and municipal landing centres respectively.

2.2.3 *Estimates of Annual Catches*

Estimates of annual catches of skipjack, yellowfin and bigeye for the Philippines have been provided to SPC by BFAR and BAS for 1970–2002. The estimates presented in Tables 1–3 and Figure 3 have been published in the SPC Tuna Fishery Yearbook (Lawson 2003), based on modifications to the estimates discussed in Lawson & Williams (1998).

Catches of the pelagic tunas – skipjack, yellowfin and bigeye – during 2002 have been estimated to be 109,977 tonnes (52.4%), 90,669 tonnes (43.2%) and 9,126 tonnes (4.4%) respectively. Catches of pelagic tunas during 2002, by gear type, have been estimated to be 85,490 tonnes (40.8%) for purse seine, 70,024 tonnes (33.4%) for handline, 37,435 tonnes (17.8%) for ringnet, 3,917 tonnes (1.9%) for gillnet, 2,929 tonnes (1.4%) for longline and 9,977 tonnes (4.8%) for unclassified gears.

Regarding the annual catch estimates provided by the Philippines to SPC, the following points are of interest:

- Catch estimates for the whole time series have been provided for skipjack and ‘tuna’, which includes yellowfin, bigeye and possibly billfish. The estimates for yellowfin and bigeye in Tables 2 and 3 have been estimated by SPC on the basis of species composition samples taken during 1993–1994.
- The statistics for 1997–2002 have not been broken down by gear type. The estimates by gear type in Tables 1–3 have been estimated by SPC on the basis of information available for 1996.
- The statistics for certain years, particularly 1990–1991, are not consistent with previous and subsequent years. From 1989 to 1990, the catch of skipjack and ‘tuna’ increased by 54,007 tonnes (42.6%), while from 1991 to 1992, the catch decreased by 69,782 tonnes (35.2%).

2.2.4 *Operational Catch and Effort Data*

Operational catch and effort data have not been compiled by government agencies in the Philippines. However, a memorandum of understanding was recently signed by BAS, BFAR and the Socskargen Federation of Fishing and Allied Industries, under which operational catch and effort data will be collected by Federation fishing vessels and provided to BAS and BFAR.

The amount of historical catch and effort data, either operation or trip-level, that have been collected by fishing companies is unknown, but it expected to be significant.

2.2.5 *Port Sampling Programmes*

Port sampling was conducted in the Philippines by the FAO/UNDP Indo-Pacific Tuna Programme from 1978 to 1992. IPTP sampling data stored by BFAR on two 9-track magnetic tapes were retrieved by SPC in November 2000.

Port sampling was conducted by the Landed Catch and Effort Monitoring Programme of the BFAR Tuna Research Project during 1993–1994. Further port sampling was conducted by BFAR during 1996–1997. Since 1997, port sampling in the Philippines have been conducted under the National Stock Assessment Project. NSAP sampling covered more than 200 landing centres in 2002; however, sampling was reduced considerably in August 2002 due to funding constraints. SPC has funded the processing of the NSAP port sampling data by NFRDI.

The protocol for sampling ringnet vessels during unloading is as follows. The catch is extracted from the wells in baskets approximately one metre in diameter and close to 50 cm deep and emptied onto a conveyer belt, at the end of which the catch is sorted by species group (e.g. skipjack / yellowfin, and small tunas). The samplers are positioned on the carrier and randomly select a basket from which they measure and record the size and species of every fish. The captain of the carrier is interviewed and total catch and effort data are collected (e.g., number of boats, total number of sets and general area of fishing).

2.2.6 *Observer Programmes*

An observer programme was considered in 1993 and SPC provided some technical assistance in this regard; however, an observer programme has not yet been established in the Philippines.

2.3 *Tuna Fisheries and Monitoring in Indonesia*

2.3.1 *Tuna Fisheries in the Pacific Ocean waters of Indonesia*

The information currently available on tuna fisheries in the Pacific Ocean waters of Indonesia is incomplete. The following information was taken from various sources, including Merta (2003):

- Tuna fisheries have developed in the North Sulawesi Sea, Mollucca Sea, Banda Sea, Arafura Sea, north of Irian Jaya and elsewhere (Figure 1).
- The main gear types are pole and line, handline and longline. Purse seiners were based in Ternate and Biak in the 1980s and have been based in North Sulawesi since the 1990s.
- The target species are skipjack, yellowfin and small tunas, e.g. frigate tuna, bullet tuna and kawakawa / eastern little tuna.

- The main tuna landing sites are Bitung, Gorontalo, Labuha, Kendari, Bone, Ambon, Sorong, Biak and Jayapura.
- Pole and line ('huhate'), the main gear type, was developed by state enterprises located in Sorong, Bitung and Ambon in the 1970s. Most vessels range in size from under 10 gross tonnes to up to 30 gross tonnes. Small pole and line vessels using sail, with small engines, are called 'funai' and 'rorehe' in North Sulawesi and Ambon respectively. In North Sulawesi, the Molluccas and Irian Jaya, during 1997, there were 139, 702 and 48 pole and line vessels respectively. The Nucleus Estate System of PT Usaha Mina developed in Sorong in 1985, Labuha in 1987 and Gorontalo in 1988.
- Handlines are used by outrigger canoes with one or two crew to catch tuna associated with FADs ('rumpon'). A group of three or four vessels will fish around rumpoms for up to 20 days, drying and salting the fish at sea.
- Since 1992, many longliners less than 50 gross tonnes that were based in Benoa and that fished in the Indian Ocean moved to Bitung to fish in the Banda Sea and the Sulawesi Sea (Naamin 1995). In September 1999, there were 310 longliners licensed to fish in the Pacific Ocean waters of Indonesia, compared to 1,010 in the Indian Ocean waters and Arafura Sea (Merta 2003). The longline operation that was based, until recently, in Ambon has moved to Bitung due to political unrest.
- Purse seiners have fished in North Sulawesi since the late 1990s, some in Indonesia–Philippines joint ventures, catching tuna associated with rumpoms. Purse seining in North Sulawesi has had a negative impact on pole and line, with the number of pole-and-line vessels decreasing from over 100 in 1991 to less than 35 in 1995 (Naamin, Mathews & Monitja 1996). During 1996, 125 purse seiners fished in North Sulawesi.
- In 2000, there were a total of 52 processing companies in Gorontalo, North Sulawesi, North Maluku and Papua, including three canneries in North Sulawesi and one in Papua (Retnowati 2002).

2.3.2 *Statistical System of the Directorate General of Capture Fisheries*

The current statistical system of DGCF was developed by FAO fisheries statistician Dr Tadashi Yamamoto during 1974–1978, in a collaborative program between Indonesia, the Food and Agriculture Organization of the United Nations and the United Nations Development Program (Yamamoto 1980). The system is based on weekly, quarterly, and annual surveys, with catch and vessel-related data compiled and reported from district and provincial offices to DGCF. The resulting statistics are published in the annual report "Statistics of Capture Fishery Indonesia", which includes the numbers and types of fisheries establishments, fishing vessels by gear type, and marine and freshwater production figures for species groups, for all the nation's provinces.

The Central Bureau of Statistics also has staff at the district, provincial and national levels, and works collaboratively with the offices under and within DGCF to publish another annual statistical report, "Export Statistics of Fishery Product".

In addition to the series of annual surveys, a logbook system was implemented by DGCF in 1995 for the collection of catch and effort data from longliners. The logbooks are compiled by the Office for the Monitoring and Control/Surveillance of Fishing Vessels.

The statistical system has been reviewed by Nishida (1988), Ishida et al. (1994), Moron et al. (1997), Gafa & Nishida (2000) and Herrera (2002). The features of the system for Indian Ocean ports are described in Proctor et al. (2003):

- Provincial fisheries offices calculate tuna production figures based on two components: (a) export data for whole and processed fish from the Laboratory of Inspection and Quality Control (raised to represent whole weight) and (b) data for rejects. In Bali, rejects are estimated as 10% of exports. In Jakarta, estimates of rejects are obtained from the Office of Management of Fish Landing Areas (Dinas Pengelola Kawasan Pendaratan Ikan); the reports are based on data gathered during auctions by staff of the Office of Fish Auctioning Place (Dinas Tempat Pelelangan Ikan).
- Catch estimates from fishing companies are not used; the provincial fisheries offices consider the majority of data provided by companies to be underestimates. Regency governments collect tax from fishing companies based on company estimates; therefore, there is a strong incentive for companies to under-report their catches.
- In each port, there are several different offices (e.g., port authorities, provincial fisheries offices, WASKI) that compile and report catch statistics to various degrees. Each office has limited resources, primarily insufficient staff. In many cases, there appears to be duplication of effort, particularly with respect to compilation and reporting.
- The logbook system (Laporan Penangkapan Ikan) administered by WASKI for longliners has had the potential to provide good data for stock assessment. In theory, the logbooks must be filled out and submitted at the time of landing by vessel skippers or vessel fishing masters, as a prerequisite for obtaining a 'license to sail' for the vessel's next fishing trip, but this does not happen in practice. Instead, the logbook is usually completed after WASKI staff seek out the information and often it can only be obtained from the vessel's agent or from the processing company.
- Catches of pelagic tunas and billfish are reported as 'tuna' in the provincial and national reports.
- The procedures used by district fisheries offices in fish auctioning places are not standardised across ports and landing places. The methods of estimation can be highly variable, particularly where there are no weighing facilities. Methods for recording data range from the use of standard forms and to recording notes on slips of paper.
- The national production statistics often show significant fluctuations across years, but explanations are not provided. 'Validation meetings' are held annually between DGCF and provincial fisheries offices and between provincial and district levels. However, there appears to be a lack of verification at the point of data collection.
- Reporting from subdistrict offices to district to provincial to national offices is primarily by hardcopy report and sometimes in hand-written form at lower levels. Currently, there is minimal electronic transfer of data; hence, the likelihood of transcription errors is high.
- In districts with many landing places, the ability of fisheries officers to complete the weekly surveys that are an integral part of the national statistics system are hampered by having to travel large distances and the shortage of available transport.
- Problems have been experienced matching landings of vessels with vessels records in the national licensing registry of DGCF.

2.3.3 *Estimates of Annual Catches*

Estimates of annual catches of skipjack, yellowfin and bigeye for the Pacific Ocean waters of Indonesia have been provided to SPC by DGCF for 1970–2002. The estimates presented in Tables 4–6 and Figure 4 have been published in the SPC Tuna Fishery Yearbook (Lawson 2003).

Catches of the pelagic tunas – skipjack, yellowfin and bigeye – during 2002 have been estimated to be 232,640 tonnes (59.7%), 141,880 tonnes (36.4%) and 15,320 tonnes (3.9%) respectively. Catches of pelagic tunas during 2002, by gear type, have been estimated to be 182,545 tonnes (46.8%) for pole and line, 32,779 tonnes (8.4%) for purse seine, 16,351 tonnes (4.2%) for handline, 12,230 tonnes (3.1%) for longline and 145,935 tonnes (37.4%) for unclassified gears.

Regarding the annual catch estimates provided by Indonesia to SPC, the following points are of interest:

- Catch estimates for the whole time series have been provided for skipjack and ‘tuna’, which includes yellowfin, bigeye and possibly billfish. The estimates for yellowfin and bigeye in Tables 5 and 6 have been estimated by SPC on the basis of species composition samples taken in the Philippines during 1993–1994.
- The statistics for 1997–2002 have not been broken down by gear type. The estimates by gear type in Tables 4–6 have been estimated by SPC on the basis of information available for 1990. Purse-seine catches in recent years have almost certainly been under-estimated. ‘Unclassified’ catches may represent catches taken primarily by trollers fishing in South Sulawesi and in the Molluccas.

2.3.4 *Operational Catch and Effort Data*

Catch and effort data have been collected by PT Perikanan Samodra Besar from Benoa-based longliners during 1978–2003. These data have been summarised by RCCF and show that during the 1980s, longline fishing effort moved from the Banda Sea to the Indian Ocean.

Some fishing companies compile radio reports, consisting of the position and catch, three times a day. However, operational catch and effort data have not been compiled by government agencies on a regular basis, although DGCF and RCCF have developed and attempted to introduce logbooks.

The Office for the Monitoring and Control / Surveillance of Fishing Vessels (WASKI) has developed a form on which summary information for individual trips are reported. The forms are usually obtained from the vessel’s agent, rather than from the captain.

The Fishing Enterprise Services of DGCF has recently introduced forms for the reporting of catch and effort data for individual trips. The licensing of fishing vessels will be dependent on the submission of completed forms by fishing companies.

2.3.5 *Port Sampling Programmes*

Port sampling was conducted in several ports by the FAO/UNDP Indo-Pacific Tuna Programme from 1978 to 1992, including Bitung (pole and line, purse seine), Sorong (pole and line), Ambon (pole and line), Gorontalo (handline) and Labuha (handline and pole and line).

No port sampling has been conducted in the Pacific Ocean waters of Indonesia since 1992.

In the Indian Ocean waters of Indonesia, port sampling was conducted by RCCF and CSIRO during 1992–2002 and by RCCF and CSIRO in a joint project during 2002–2003. Longliners in Benoa, Muarua Baru and Cilacap was sampled with about 30% coverage. Funding for this project, which has been provided by CSIRO, ACIAR, and OFCF (through IOTC), may be available until mid 2005.

2.3.6 *Observer Programmes*

A fisheries school has conducted a longline observer programme in recent years that covers primarily the Indian Ocean. The programme runs from March to December. Each of 16 observers collect data on about 50 logsheets, which results in about 800 logsheets per year covering from 8,000 to 16,000 longline sets. Information concerning the geographic areas covered, the items of data that are collected and the quality of the data are not available.

RCCF has ten observers that each completed one trip in 2002 on longliners operating in the Indian Ocean waters of Indonesia. The observers also work as fisheries scientists. No observer trips were taken in 2003 due to lack of funds. Information concerning the items of data that are collected and the quality of the data are not available.

3. OBJECTIVES

The background information presented above indicates four major deficiencies in the current monitoring of tuna fisheries in the Philippines and the Pacific Ocean waters of Indonesia.

- First, the information that is currently available on the tuna fisheries is limited to general information on the major ports, the industrial gear types used and the target species. There is almost no information on the historical development of the fisheries and very little information on the fleets (e.g., the numbers of vessels active, by gear type and size category, and vessel ownership), fishing operations (e.g., geographic areas and seasons fished, trip duration, gear attributes, major non-target species), post-harvest processing and marketing.
- Second, while general information is available on the current monitoring programmes, the information is insufficient for evaluating the accuracy (bias) and reliability (variance) of the annual catch estimates published by BAS in the Philippines and DGCF in Indonesia.
- Third, the level of port sampling of the species composition and the size composition of the catches is low in the Philippines and no port sampling occurs in the Pacific Ocean waters of Indonesia. No monitoring of the catches of non-target species, including species of special interest (marine turtles, sea birds and marine mammals), is conducted by observers in either country.
- Fourth, operational catch and effort data are not systematically compiled by government agencies in either country.

The current lack of data for tuna fisheries in the Philippines and Indonesia is responsible for much of the current uncertainty in the assessments of stocks of tuna in the WCPO, particularly bigeye and yellowfin. Therefore, the primary objective of the proposed project is to collect and compile data that can be used to reduce the uncertainty of the stock assessments.

The current monitoring of tuna fisheries in the Philippines and Indonesia is insufficient for the purposes of the Commission. Therefore, a related objective of the proposed project is to improve the monitoring of tuna fisheries in the Philippines and Indonesia so that both countries will be able to fulfil their future obligations in regard to the provision of fisheries data to the Commission.

Achieving these objective will benefit all countries and territories concerned with tuna fisheries in the Western and Central Pacific Ocean. Improvements in the monitoring of tuna fisheries in the Philippines and Indonesia will lead to a reduction in the uncertainties of the stock assessments, which will, in turn, lead to improved management of the tuna resources in the region.

4. MONITORING PROJECT FOR THE PHILIPPINES

4.1 *Project Activities in the Philippines*

4.1.1 *Review of Tuna Fisheries and Monitoring Systems*

This activity will be comprised of two components: (a) the compilation of information on the historical development and the current status of tuna fisheries in the Philippines, and (b) a review of the current monitoring systems, with recommendations for improvements.

- Information on the historical development and the current status of the tuna fisheries will be compiled from the literature and from interviews with individuals in government and industry. The information will cover the fleets (e.g., gear types, numbers of vessels by gear type and size category, vessel ownership), their operations (e.g., species targeted, geographic areas and seasons fished, trip duration, gear attributes), post-harvest processing and marketing.
- The review of the current monitoring systems will be undertaken with reference to the obligations of the Philippines to provide tuna fisheries data to the Commission, including estimates of annual catches, operational catch and effort data, unloadings data, port sampling data and observer data.
- The review will concentrate on the BAS / BFAR statistical system for estimating catches. The accuracy (i.e., bias) of catch estimates produced by the statistical system will be examined with reference to the representativeness of the landing centres selected for the surveys; the representativeness of the vessels selected for the surveys; the accuracy of the data collected during the surveys, such as the number of fish caught, the species identification and the average weight per fish; and the impact of errors in raising factors for days, vessels and landing centres.
- The review will also examine the suitability of ports for the port sampling and survey programme (see section 4.1.4) and an observer programme (see section 4.1.5).
- The review will be conducted independently of BAS and BFAR; however, BAS and BFAR will be briefed at the end of each trip by the reviewers.
- If the survey data are made available, the reliability (i.e., variance) of the catch estimates may be examined through sub-sampling studies (see section 4.1.6).
- Recommendations for improvements in the current monitoring system will be formulated in collaboration with BAS and BFAR.
- The report of the review of tuna fisheries and monitoring systems, with recommendations, will be presented at the Review Workshop (see section 4.1.7) as chapters in the final report of the project.

4.1.2 *Compilation of Historical Catch and Effort Data*

Historical catch and effort data may be available from various sources, such as the National Stock Assessment Project or operational-level data from the fishing companies.

- The catch and effort data that are made available will be compiled into a central database, such that they can be used to monitor catch rates and conduct stock assessment. The data will be made available to BFAR, BAS and SPC for analysis (see section 4.1.6).
- A report on the compilation of catch and effort data will be included as a chapter in the final report of the project. A catalogue of the catch and effort data that become available will be included as an appendix in the final report of the project.

4.1.3 *Planning Workshop*

A three-day planning workshop will be held in Manila, with participants from the collaborating agencies (see section 4.2) to consider the review of the tuna fisheries and monitoring, and to plan the port sampling programme and the observer programme.

- The objectives of the workshop will be (a) to formulate recommendations for improvements to monitoring and (b) to make final decisions regarding the activities to be undertaken and the role of each of the collaborating agencies in implementing the sampling activities.
- Preparatory and follow-up discussions between staff of SPC and Philippines agencies will occur immediately before and after the planning workshop.

4.1.4 *Port Sampling and Survey Programme*

The NSAP port sampling programme will be strengthened in the major tuna landing centres. The Survey of Commercial Fisheries and the Survey of Municipal Fisheries will be also be strengthened.

- The objectives of the port sampling programme will be to collect data on the species composition of the catch and the size composition of the catch, primarily from commercial purse-seine, ringnet and handline vessels. A secondary objective will be to collect data from the municipal fishery.
- Three port sampler / enumerators will be employed by BFAR for General Santos City (in addition to the three NSAP port sampler / enumerators currently employed), three each for Zamboanga and Davao City, and two each for the Samar and Bicol regions, for a total of 16 port sampler / enumerators.
- The port samplers / enumerators will be supervised by NSAP regional project leaders in each port and by BFAR / NFRDI staff in Metro Manila.
- Trained port samplers are already available in several ports. If required, training or re-training will be conducted by NFRDI in collaboration with SPC.
- The sampling protocol and data collection forms currently in use will be reviewed by NFRDI in collaboration with SPC.
- Sampling equipment, such as callipers, and data collection forms will be provided by NFRDI, using project funds.
- The port sampling data will be processed by NFRDI. Two data entry technicians will be employed to process port sampling data, observer data and other tuna fisheries data collected by the project.
- Thirty enumerators will be employed by BAS to conduct the Survey of Commercial Fisheries and the Survey of Municipal Fisheries in tuna landing centres that are not covered by the NSAP port samplers / enumerators. The BAS enumerators will conduct surveys on a regular basis, during each month of the year.

- A report on the implementation of the port sampling programme will be included as a chapter in the final report of the project. A catalogue of the port sampling data that are collected will be included as an appendix in the final report of the project.

4.1.5 *Observer Programme*

Funding permitting, an observer programme will be established by BFAR / NFRDI. The objectives of the observer programme will be to collect data on the species composition of the catch, including target and non-target species, the size composition of the catch, discards, effort data and other types of data, primarily from commercial purse-seine, ringnet and handline vessels. A secondary objective will be to collect data from the municipal fishery.

- Six observers will be employed to spend approximately 200 days at sea, each, per annum. The observers will be remunerated with a basic salary, plus per diem for days at sea. Applicants will be expected to hold a university degree in marine biology or a related discipline.
- The observers will be based in General Santos City and will be placed on cooperating vessels on an opportunistic basis. They may also embark from other ports. The observers will be supervised by regional NSAP leaders, which will manage the placement of observers on vessels in collaboration with the fishing companies and the Federation.
- The training of observers will be conducted by SPC in collaboration with NFRDI.
- The sampling protocol, data collection forms and procedures for the briefing and debriefing of observers will be established by SPC in collaboration with NFRDI.
- Sampling equipment, such as callipers, and data collection forms will be provided by NFRDI, using project funds.
- The observer data will be processed by NFRDI (see section 4.1.4).
- A report on the implementation of the observer programme will be included as a chapter in the final report of the project. A catalogue of the observer data that are collected will be included as an appendix in the final report of the project.

4.1.6 *Data Analysis*

BFAR / NFRDI and SPC will collaborate to analyse data collected during the project, including catch and effort data, port sampling data and observer data.

- Any catch and effort data that become available will be used to determine trends in catch rates.
- The port sampling data and observer data collected by the project will be used to determine the species composition and the size composition of the catch.
- Catch and effort data, survey data, port sampling data and observer data will be used to estimate the percentage of the catch that is taken in archipelagic waters.
- If the survey data are made available, the reliability (i.e., variance) of the catch estimates based on the survey data will be analysed with bootstrapping.
- If sufficient catch, effort and sampling data are collected during the project, such that they can be used to estimate catches for landing centres, then catch estimates based on project data for those landing centres will be compared to catch estimates for the same landing centres that are based on BAS / BFAR survey data to identify biases.
- A report on data analysis will be included as a chapter in the final report of the project.

4.1.7 *Review Workshop*

The final activity to be conducted in the Philippines will be to hold a two-day review workshop with participants from the collaborating agencies (see section 4.2).

- The objectives of the workshop will be to review the achievements of the project and to plan for the future monitoring of tuna fisheries in the Philippines.
- The workshop will consider the final report of the project, in draft form, which will include recommendations for improvements to the current monitoring systems and any recommendations that may concern other aspects of the project, such as the port sampling programme, the observer programme and data analysis.

4.2 *Collaboration and Coordination in the Philippines*

4.2.1 *Collaborating Agencies*

The agencies and councils that will collaborate to implement project activities in the Philippines are listed below:

- Bureau of Agricultural Statistics
- Bureau of Fisheries and Aquatic Resources
- Philippine Fisheries Development Authority
- National Tuna Industry Council
- Socskargen Federation of Fishing and Allied Industries
- Secretariat of the Pacific Community

4.2.2 *Coordination of Project Activities*

Coordination of the procurement and distribution of project funding will be the responsibility of SPC. Project funds will be disbursed through an account maintained on behalf of PrepCon.

Suggested responsibilities for the coordination of the project activities are as follows:

4.1.1	Review of Tuna Fisheries and Monitoring Systems	SPC, in collaboration with BAS, BFAR / NFRDI, NTIC and the Federation
4.1.2	Compilation of Catch and Effort Data.....	SPC, in collaboration with BAS, BFAR / NFRDI, NTIC and the Federation
4.1.3	Planning Workshop	SPC, in collaboration with BAS, BFAR / NFRDI, NTIC and the Federation
4.1.4	Port Sampling Programme	BFAR / NFRDI, in collaboration with the SPC and the Federation
4.1.5	Observer Programme.....	BFAR / NFRDI, in collaboration with SPC and the Federation
4.1.6	Data Analysis	SPC, in collaboration with BAS and BFAR / NFRDI
4.1.7	Review Workshop	SPC, in collaboration with all other agencies

4.2.3 *Project Personnel*

Name	Agency	Location	Activity	Source of Funds
Winifredo Amandy, Estella de Ocampo	BAS	Philippines	Review of tuna fisheries and monitoring systems, data analysis	BAS
Noel Barut, Val Manlulu, Francis Torres	BFAR / NFRDI	Philippines	Supervision of port sampling programme, observer programme and data processing, data analysis	BFAR
Tim Lawson	SPC	New Caledonia	Data analysis, project report	SPC
Peter Sharples, Siosifa Fukofuka, Deirdre Brogan	SPC	New Caledonia	Technical support for the port sampling programme and observer programme	SPC
Peter Williams	SPC	New Caledonia	Technical support for database systems	SPC
Augusto Natividad	NTIC	Philippines	Industry liaison	NTIC
Domingo Teng	Federation	Philippines	Industry liaison	Federation
			Review of tuna fisheries and monitoring systems	ACIAR
Port samplers and data entry technicians	BFAR / NFRDI	Philippines	Port sampling programme	Project
Observers	BFAR / NFRDI	Philippines	Observer programme	Project

4.3 Budget for Project Activities in the Philippines

The Australian Centre for International Agricultural Research is considering providing funds for the activities described in sections 4.1.1, Review of Tuna Fisheries and Monitoring Systems. The budget presented below, in Philippines pesos (PHP) and United States dollars (USD), therefore excludes activity 4.1.1. The budget for the observer programme is given separately.

ACTIVITY	YEAR 1		YEAR 2		TOTAL	
	PHP	USD	PHP	USD	PHP	USD
PORT SAMPLING AND SURVEY PROGRAMME						
BFAR port sampler / enumerator basic salary @ 7,500 per month	1,440,000	26,357	1,440,000	26,357	2,880,000	52,713
Desktop computer @ 50,000 x 1 per port	250,000	4,576	0	0	250,000	4,576
Computer supplies & stationery @ 5,000 per port per annum	25,000	458	25,000	458	50,000	915
Photocopying @ 10,000 per port per annum	50,000	915	50,000	915	100,000	1,830
Rain gear @ 1,000 x 2 per person per annum	32,000	586	32,000	586	64,000	1,171
Callipers @ 2,000 x 2 per person per annum	64,000	1,171	64,000	1,171	128,000	2,343
Scales @ 1,500 x 1 per person	24,000	439	0	0	24,000	439
Data entry technician basic salary @ 7,500 per month	180,000	3,295	180,000	3,295	360,000	6,589
Data entry desktop computer @ 50,000 x 1 per person	100,000	1,830	0	0	100,000	1,830
BAS enumerators @ 1,500 per month (part-time)	540,000	9,884	540,000	9,884	1,080,000	19,768
SUB-TOTAL	2,705,000	49,511	2,331,000	42,666	5,036,000	92,174
TRAVEL						
Planning meeting: SPC x 2 x 5 days	225,705	4,131	0	0	225,705	4,131
Port sampler supervision: NFRDI x 10 x 5 days	161,953	2,964	161,953	2,964	323,905	5,929
Port sampler data quality: SPC x 1 x 20 days	0	0	168,356	3,081	168,356	3,081
Programming support for database systems: SPC x 1 x 10 days	143,753	2,631	143,753	2,631	287,505	5,262
Review meeting: SPC x 2 x 5 days	0	0	225,705	4,131	225,705	4,131
SUB-TOTAL	531,410	9,726	699,766	12,807	1,231,176	22,534
PLANNING AND REVIEW MEETINGS						
Planning meeting	45,000	824	0	0	45,000	824
Review meeting	0	0	45,000	824	45,000	824
SUB-TOTAL	45,000	824	45,000	824	90,000	1,647
TOTAL	3,281,410	60,061	3,075,766	56,297	6,357,176	116,355
Contingencies (including exchange rate fluctuations) @ 10%	328,141	6,006	307,577	5,630	635,718	11,636
GRAND TOTAL	3,609,551	66,067	3,383,343	61,927	6,992,894	127,991

OBSERVER PROGRAMME						
Basic salary @ 7,500 per person per month	540,000	9,884	540,000	9,884	1,080,000	19,768
Per diem at sea @ 300 x 200 days per person per annum	600,000	10,982	600,000	10,982	1,200,000	21,964
Insurance @ 20,000 per person per annum	120,000	2,196	120,000	2,196	240,000	4,393
Rain gear @ 1,000 x 2 per person per annum	12,000	220	12,000	220	24,000	439
GPS @ \$500 x 1 per person	163,905	3,000	0	0	163,905	3,000
Callipers @ 2,000 x 2 per person per annum	24,000	439	24,000	439	48,000	879
Scales @ 1,500 x 1 per person	9,000	165	0	0	9,000	165
Observer training: SPC x 1 x 10 days + NFRDI	139,439	2,552	0	0	139,439	2,552
Observer data quality: SPC x 1 x 10 days + NFRDI	139,439	2,552	0	0	139,439	2,552
OBSERVER PROGRAMME TOTAL	1,747,783	31,990	1,296,000	23,721	3,043,783	55,712

5. MONITORING PROJECT FOR THE PACIFIC OCEAN WATERS OF INDONESIA

5.1 *Project Activities in Indonesia*

5.1.1 *Review of Tuna Fisheries and Monitoring Systems*

This activity will be comprised of two components: (a) the compilation of information on the historical development and the current status of tuna fisheries in the Pacific Ocean waters of Indonesia, and (b) a review of the current monitoring systems, with recommendations for improvements.

- Information on the historical development and the current status of the tuna fisheries will be compiled from the literature and from interviews with individuals in government and industry. The information will cover the fleet size and ownership structure for each major port, fleet operations (e.g., species targeted, geographic areas and seasons fished, trip duration, gear attributes), post-harvest processing and marketing.
- The review of the current monitoring systems will be undertaken with reference to the obligations of Indonesia to provide tuna fisheries data to the Commission, including estimates of annual catches, operational catch and effort data, unloadings data, port sampling data and observer data. The review will concentrate on the DGCF statistical system for estimating catches. Potential sources of bias in the catch estimates will be examined.
- The roles of all agencies concerned with tuna fisheries monitoring will be documented. The agencies include DGCF, provincial and district fisheries offices, port authorities, fishing companies, processing companies, fishing associations, the Research Centre for Capture Fisheries and universities with fisheries departments, such as Bogor Agricultural University, the Universitas Sam Ratulangi in Manado and Universitas Cendrawasih in Jayapura.
- Through discussions with RCCF scientists and industry representatives, seven ports have been identified as key landing places for tunas and should form the core focus of the review. These ports are Bitung (North Sulawesi), Ternate (West Halmahera), Sorong (West Irian), Kendari (Southeast Sulawesi), Bone (South Sulawesi), Biak (North Irian), and Jaya Pura (East Irian). It is proposed that the ports be surveyed in three separate trips, with an allocation of 4 to 5 days of investigation time at each port. The first trip will cover Jayapura – Biak – Sorong (total 19 days); the second will cover Bitung – Ternate (total 14 days), and the third will cover Kendari – Bone (total 14 days).
- The review will also examine the suitability of ports for the port sampling programme (see section 5.1.4) and an observer programme (see section 5.1.5).
- The review will be conducted independently of DGCF; however, DGCF will be briefed at the end of each trip by the CSIRO and RCCF reviewers.
- The availability of data that could be used to examine the reliability (i.e., variance) of the catch estimates will be determined (see section 5.1.6).
- Recommendations for improvements in the current monitoring system will be formulated in collaboration with each of the relevant agencies. In particular, the selection of ports where shore-based sampling (see section 5.1.4) should occur (Bitung, Sorong, Jayapura and Kendari) will be confirmed.

- The report of the review of tuna fisheries and monitoring systems, with recommendations, will be presented at the Review Workshop (see section 5.1.7) as chapters in the final report of the project.

5.1.2 *Compilation of Historical Catch and Effort Data*

Historical catch and effort data may be available from various sources. For example, RCCF holds catch and effort data that have been collected by PT Perikanan Samodra Besar from Benoa-based longliners during 1978–2003. These data cover primarily the Indian Ocean waters of Indonesia, although the early part of the time series may cover the Pacific Ocean waters of Indonesia. Observer data collected by students at fisheries high schools, covering about 750 trips per year, may also be available; however, these data also cover primarily the Indian Ocean waters of Indonesia. Additional catch and effort data may be compiled during the review of tuna fisheries and monitoring (see section 5.1.1).

- The catch and effort data that are made available will be compiled into a central database, such that they can be used to monitor catch rates and conduct stock assessment. The PSB data for 1978–1995 have been processed, while the PSB data for 1996–2003 and the high school observer data need to be processed. The data will be made available to RCCF, DGCF, CSIRO and SPC for analysis (see section 5.1.6).
- A catalogue of the catch and effort data that are made available will be included as an appendix in the final report of the project.

5.1.3 *Planning Workshop*

A three-day planning workshop will be held in Jakarta, with participants from the collaborating agencies (see section 5.2) to consider the review of the tuna fisheries and monitoring, and to plan the port sampling programme and the observer programme.

- The objectives of the workshop will be (a) to formulate recommendations for improvements to monitoring and (b) to make final decisions regarding the activities to be undertaken and the role of each of the collaborating agencies in implementing the sampling activities.
- Preparatory and follow-up discussions between staff of SPC, CSIRO and Indonesian agencies will occur immediately before and after the planning workshop.

5.1.4 *Port Sampling Programme*

Port sampling will be conducted in four tuna landing centres, which have tentatively been identified in consultation with RCCF scientists as Bitung, Sorong, Jayapura and Kendari.

- The objectives of the port sampling programme will be to collect data on the species composition of the catch and the size composition of the catch, primarily from pole-and-line, purse-seine, handline and longline vessels. A secondary objective will be to collect data from the troll fishery.
- Bitung, Sorong, Jayapura and Kendari will be confirmed as appropriate for port sampling during the review of tuna fisheries and monitoring (see section 5.1.1).
- Eighteen port samplers will be employed with project funds. Pending confirmation of Bitung, Sorong, Jayapura and Kendari as appropriate ports (see section 5.1.2), then it is expected that seven port samplers will be allocated to Bitung, two to Sorong, four to Jayapura and five to Kendari.

- Project funds will be used to rent office space in each port, purchase sampling equipment (such as t-shirts, rain gear, callipers and bicycles) and to pay for telephone and email communications and photocopying.
- The port samplers will be supervised from Jakarta by RCCF. Bachtiar Gafa, Anung and Budi Iskandar will supervise port samplers in Bitung, Sorong/Jayapura and Kendari respectively. Project funds will be used for travel by RCCF staff to the ports in this regard. If certain port samplers demonstrate the capacity, they may be promoted to senior port samplers to supervise the other samplers at their port.
- The training of port samplers will be conducted by RCCF in collaboration with SPC.
- The sampling protocol and data collection forms will be reviewed by RCCF in collaboration with SPC and CSIRO.
- The port sampling data will be processed by RCCF. Two data entry technicians will be employed to process port sampling data, observer data and other tuna fisheries data collected by the project.
- A report on the implementation of the port sampling programme will be included as a chapter in the final report of the project. A catalogue of the port sampling data that are collected will be included as an appendix in the final report of the project.

5.1.5 *Observer Programme*

Funding permitting, an observer programme will be established by RCCF. The objectives of the observer programme will be to collect data on the species composition of the catch, including target and non-target species, the size composition of the catch, effort data and other types of data, primarily from pole-and-line, purse-seine, handline and longline vessels. A secondary objective will be to collect data from trollers.

- Six observers will be employed to spend approximately 200 days at sea, each, per annum. The observers will be remunerated with a basic salary, plus per diem for days at sea. Applicants will be expected to hold a university degree in marine biology or a related discipline.
- The observers will be placed on cooperating vessels on an opportunistic basis. The observers will be supervised by RCCF, which will manage the placement of observers on vessels in collaboration with the fishing companies and associations.
- The training of observers will be conducted by SPC in collaboration with RCCF.
- The sampling protocol, data collection forms and procedures for the briefing and debriefing of observers will be established by SPC in collaboration with RCCF.
- Sampling equipment, such as callipers, and data collection forms will be provided by RCCF, using project funds.
- The observer data will be processed by RCCF (see section 5.1.4).
- A report on the implementation of the observer programme will be included as a chapter in the final report of the project. A catalogue of the observer data that are collected will be included as an appendix in the final report of the project.

5.1.6 *Data Analysis*

RCCF, DGCF, CSIRO and SPC will collaborate to analyse data collected during the project, including catch and effort data, port sampling data and observer data.

- Catch and effort data that become available will be used to determine trends in catch rates.

- The port sampling data and observer data collected by the project will be used to determine the species composition and the size composition of the catch.
- Catch and effort data, survey data, port sampling data and observer data will be used to estimate the percentage of the catch that is taken in archipelagic waters.
- If appropriate data are available, the reliability (i.e., variance) of the catch estimates based on the survey data will be examined.
- If sufficient catch, effort and sampling data are collected during the project, such that they can be used to estimate catches for districts, then catch estimates based on project data for those districts will be compared to DGCF catch estimates for the same districts to identify biases.
- A report on data analysis will be included as a chapter in the final report of the project.

5.1.7 Review Workshop

The final activity to be conducted in Indonesia will be to hold a two-day review workshop with participants from the collaborating agencies (see section 5.2).

- The objectives of the workshop will be to review the achievements of the project and to plan for the future monitoring of tuna fisheries in the Pacific Ocean waters of Indonesia.
- The workshop will consider the final report of the project, in draft form, which will include recommendations for improvements to the current monitoring systems and any recommendations that may concern other aspects of the project, such as the port sampling programme, the observer programme and data analysis.

5.2 Collaboration and Coordination in Indonesia

5.2.1 Collaborating Agencies

The agencies and committees that will collaborate to implement project activities in Indonesia are listed below:

- Research Centre for Capture Fisheries, Jakarta, Indonesia
- Directorate General of Capture Fisheries, Jakarta, Indonesia
- Bogor Agricultural University, Bogor, Indonesia
- Universitas Sam Ratulangi, Manado, Indonesia
- Universitas Cendrawasih, Jayapura, Indonesia
- Indonesia Tuna Association
- Indonesia Tuna Longline Association
- Secretariat of the Pacific Community, Noumea, New Caledonia
- Commonwealth Scientific and Industrial Research Organisation, Hobart, Australia

DGCF and RCCF will be co-leaders of the project among the Indonesian agencies.

5.2.2 Coordination of Project Activities

Coordination of the procurement and distribution of project funding will be the responsibility of SPC. Project funds will be disbursed through an account maintained on behalf of PrepCon.

Suggested responsibilities for the coordination of the project activities are as follows:

- 5.1.1 Review of Tuna Fisheries and Monitoring Systems CSIRO, in collaboration with DGCF and RCCF
- 5.1.2 Compilation of Catch and Effort Data..... CSIRO, in collaboration with DGCF, RCCF and SPC
- 5.1.3 Sampling Programme Planning Workshop..... SPC, in collaboration with all other agencies
- 5.1.4 Port Sampling Programme RCCF, in collaboration with SPC and CSIRO
- 5.1.5 Observer Programme..... RCCF, in collaboration with SPC and CSIRO
- 5.1.6 Data Analysis SPC, in collaboration with RCCF, DGCF, IPB and CSIRO
- 5.1.7 Review Workshop SPC, in collaboration with all other agencies

5.2.3 Project Personnel

Name	Agency	Location	Activity	Source of Funds
Subhat Nurhakim	RCCF	Indonesia	Project co-leader	RCCF
Parlin Tambunan	DGCF	Indonesia	Project co-leader	DGCF
Dyah Retnowati	DGCF	Indonesia	Review of tuna fisheries and monitoring systems, data analysis	DGCF
Bachtiar Gafa, Budi Iskandar, Anung	RCCF	Indonesia	Supervision of port sampling programme and observer programme	RCCF
Lilis Sadiyah	RCCF	Indonesia	Data analysis	RCCF
Fedi Sondita	IPB	Indonesia	Data analysis	IPB
Tim Lawson	SPC	New Caledonia	Data analysis, project report	SPC
Peter Sharples, Siosifa Fukofuka, Deirdre Brogan	SPC	New Caledonia	Technical support for the port sampling programme and observer programme	SPC
Peter Williams	SPC	New Caledonia	Technical support for database systems	SPC
Craig Proctor, Jessica Farley	CSIRO	Australia	Review of tuna fisheries and monitoring systems	CSIRO, ACIAR
R.P. Poernomo	ASTUIN	Indonesia	Industry liaison	ASTUIN
Sam Simorangkir	ITLA	Indonesia	Industry liaison	ITLA
Port samplers and data entry technicians	RCCF	Indonesia	Port sampling programme	Project
Observers	RCCF	Indonesia	Observer programme	Project

5.3 Budget for Project Activities in Indonesia

ACIAR and CSIRO have indicated that they will provide funding for the activities described in sections 5.1.1, Review of Tuna Fisheries and Monitoring Systems. The budget presented below, in Indonesian rupiah (IDR) and United States dollars (USD), therefore excludes activity 5.1.1. The budget for the observer programme is given separately.

ACTIVITY	YEAR 1		YEAR 2		TOTAL	
	IDR	USD	IDR	USD	IDR	USD
PORT SAMPLING PROGRAMME						
Port sampler basic salary @ 1,500,000 per month	324,000,000	38,452	324,000,000	38,452	648,000,000	76,905
Office rental @ 1,200,000 per port per annum	4,800,000	570	4,800,000	570	9,600,000	1,139
Air conditioning, furniture and fridge @ 10,000,000 per port	40,000,000	4,747	0	0	40,000,000	4,747
Desktop computer @ 7,500,000 x 1 per port	30,000,000	3,560	0	0	30,000,000	3,560
Computer supplies & stationery @ 750,000 per port per annum	3,000,000	356	3,000,000	356	6,000,000	712
Communication @ 750,000 per port per annum	3,000,000	356	3,000,000	356	6,000,000	712
Photocopying @ 3,000,000 per port per annum	12,000,000	1,424	12,000,000	1,424	24,000,000	2,848
T-shirts @ 100,000 x 6 per person per annum	10,800,000	1,282	10,800,000	1,282	21,600,000	2,563
Rain gear @ 100,000 x 2 per person per annum	3,600,000	427	3,600,000	427	7,200,000	854
Callipers @ 250,000 x 2 per person per annum	9,000,000	1,068	9,000,000	1,068	18,000,000	2,136
Bicycles @ 500,000 per person	9,000,000	1,068	0	0	9,000,000	1,068
Data entry technician basic salary @ 1,500,000 per month	36,000,000	4,272	36,000,000	4,272	72,000,000	8,545
Data entry desktop computer @ 7,500,000 x 1 per person	15,000,000	1,780	0	0	15,000,000	1,780
SUB-TOTAL	500,200,000	59,362	406,200,000	48,207	906,400,000	107,569
TRAVEL						
Planning meeting: SPC x 2 x 5 days	37,448,000	4,444	0	0	37,448,000	4,444
Port sampler training: RCCF x 4 ports x 5 days	18,740,800	2,224	0	0	18,740,800	2,224
Port sampler supervision: RCCF x 16 x 5 days	74,963,200	8,897	74,963,200	8,897	149,926,400	17,793
Port sampler data quality: SPC x 1 x 20 days	0	0	34,019,680	4,037	34,019,680	4,037
Programming support for database systems: SPC x 1 x 10 days	24,809,000	2,944	24,809,000	2,944	49,618,000	5,889
Review meeting: SPC x 2 x 5 days	0	0	37,448,000	4,444	37,448,000	4,444
SUB-TOTAL	155,961,000	18,509	171,239,880	20,322	327,200,880	38,831
PLANNING AND REVIEW MEETINGS						
Planning meeting	10,000,000	1,187	0	0	10,000,000	1,187
Review meeting	0	0	10,000,000	1,187	10,000,000	1,187
SUB-TOTAL	10,000,000	1,187	10,000,000	1,187	20,000,000	2,374
TOTAL	666,161,000	79,058	587,439,880	69,716	1,253,600,880	148,774
Contingencies (including exchange rate fluctuations) @ 10%	66,616,100	7,906	58,743,988	6,972	125,360,088	14,877
GRAND TOTAL	732,777,100	86,964	646,183,868	76,688	1,378,960,968	163,651

OBSERVER PROGRAMME						
Basic salary @ 750,000 per person per month	54,000,000	6,409	54,000,000	6,409	108,000,000	12,817
Per diem at sea @ 100,000 x 200 days per person	120,000,000	14,242	120,000,000	14,242	240,000,000	28,483
Insurance @ 2,500,000 per person per annum	15,000,000	1,780	15,000,000	1,780	30,000,000	3,560
T-shirts @ 100,000 x 6 per person per annum	3,600,000	427	3,600,000	427	7,200,000	854
Rain gear @ 100,000 x 2 per person per annum	1,200,000	142	1,200,000	142	2,400,000	285
GPS @ \$500 x 1 per person	25,278,000	3,000	0	0	25,278,000	3,000
Callipers @ 250,000 x 2 per person per annum	3,000,000	356	3,000,000	356	6,000,000	712
Observer training: SPC x 1 x 10 days + RCCF + observers	59,164,240	7,022	0	0	59,164,240	7,022
Observer data quality: SPC x 1 x 20 days + RCCF	51,749,360	6,142	0	0	51,749,360	6,142
OBSERVER PROGRAMME TOTAL	332,991,600	39,520	196,800,000	23,356	529,791,600	62,875

6. OUTPUTS

The activities that will be undertaken to achieve the primary objective are presented in sections 4.1 and 5.1 above. These include, for each country, a review of the tuna fisheries and monitoring, the compilation of catch and effort data, a port sampling programme, an observer programme, and data analysis. The outputs from these activities are listed below:

- A report of the project activities will be prepared and will include chapters on the tuna fisheries (based on information compiled during the review), the current monitoring systems (also compiled during the review), the compilation of catch and effort data, the implementation of the port sampling programmes, the implementation of the observer programmes and the analyses of data that were undertaken. The report will be a valuable reference on the current state of the tuna fisheries and their monitoring in the Philippines and Indonesia.
- Catch and effort data compiled during the project will be used for determining trends in catch rates and for stock assessment, such as the MULTIFAN-CL assessments that have been conducted by the SPC Oceanic Fisheries Programme.
- Port sampling programmes will be established and will generate species composition data and size composition data. The data will be made available for the monitoring of the fisheries and for stock assessment.
- Observer programmes will be established and will generate species composition data and size composition data. Data on catches of non-target species and species of special interest will also be collected. The data will be made available for the monitoring of the fisheries and for stock assessment.
- The review of the current monitoring systems will result in recommendations for the improvement of those systems, which will lead to more accurate and reliable estimates of annual catches and the systematic collection of operational catch and effort data, unloadings data, port sampling data, observer data and information on gear and vessel attributes.
- Capacity building within the agencies of the Philippines and Indonesia will occur in several areas, including the administration of port sampling programmes and observer programmes, the training and supervision of port samplers and observers, data processing, data analysis and reporting. The experience gained by the port samplers and observers during the project will be invaluable for the future operation of those programmes. The capacity building should result in the Philippines and Indonesia being able to assume the responsibilities for the monitoring of their tuna fisheries, without external support, at the end of the two-year project.

7. IMPACTS

7.1 *Community Impacts*

The community impacts of the project in the Philippines and Indonesia will be indirect. Social, economic and environmental impacts will flow from improvements in the reliability of catch estimates and stock assessments for pelagic tunas in the WCPO, which will be a consequence of the improvement in monitoring of the fisheries achieved by the project.

7.2 Capacity Building

The recruitment and training of fisheries high school graduates as port samplers and university graduates as observers will give them valuable work experience and will prepare them for positions of higher responsibility in fisheries research and management.

The involvement of the senior staff of the government agencies will considerably improve the ability of the agencies to supervise the monitoring of tuna fisheries, which will contribute to the Philippines and Indonesia fulfilling their responsibilities to the Commission.

The capacity for fisheries database management will improve in both countries through the experience of NFRDI and RCCF staff in establishing database systems for the project.

Capacity building in regard to data analysis and reporting, which will further improve the ability of both countries to fulfil their obligations to the Commission, will be achieved.

7.3 Scientific Impacts

The evaluation of existing statistical systems for monitoring catches of tuna fisheries in the Philippines and Indonesia will allow scientists to better evaluate the quality of the annual catch estimates published by BAS and DGCF.

The collection of species composition data and size composition data by the port sampling programmes and the observer programmes will have a major impact on the quality of assessments of tuna stocks in the WCPO.

The observer programmes will have an impact on the monitoring of non-target species in the WCPO, including species of special interest (marine turtles, sea birds and marine mammals).

8. TIMELINE

ACTIVITY	YEAR 0			YEAR 1												YEAR 2												
	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Review of tuna fisheries and monitoring																												
Compilation of historical catch and effort data																												
Planning workshop																												
Port sampling programme																												
Observer programme																												
Data analysis																												
Review workshop																												

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Figure 1. Indonesia and the Philippines

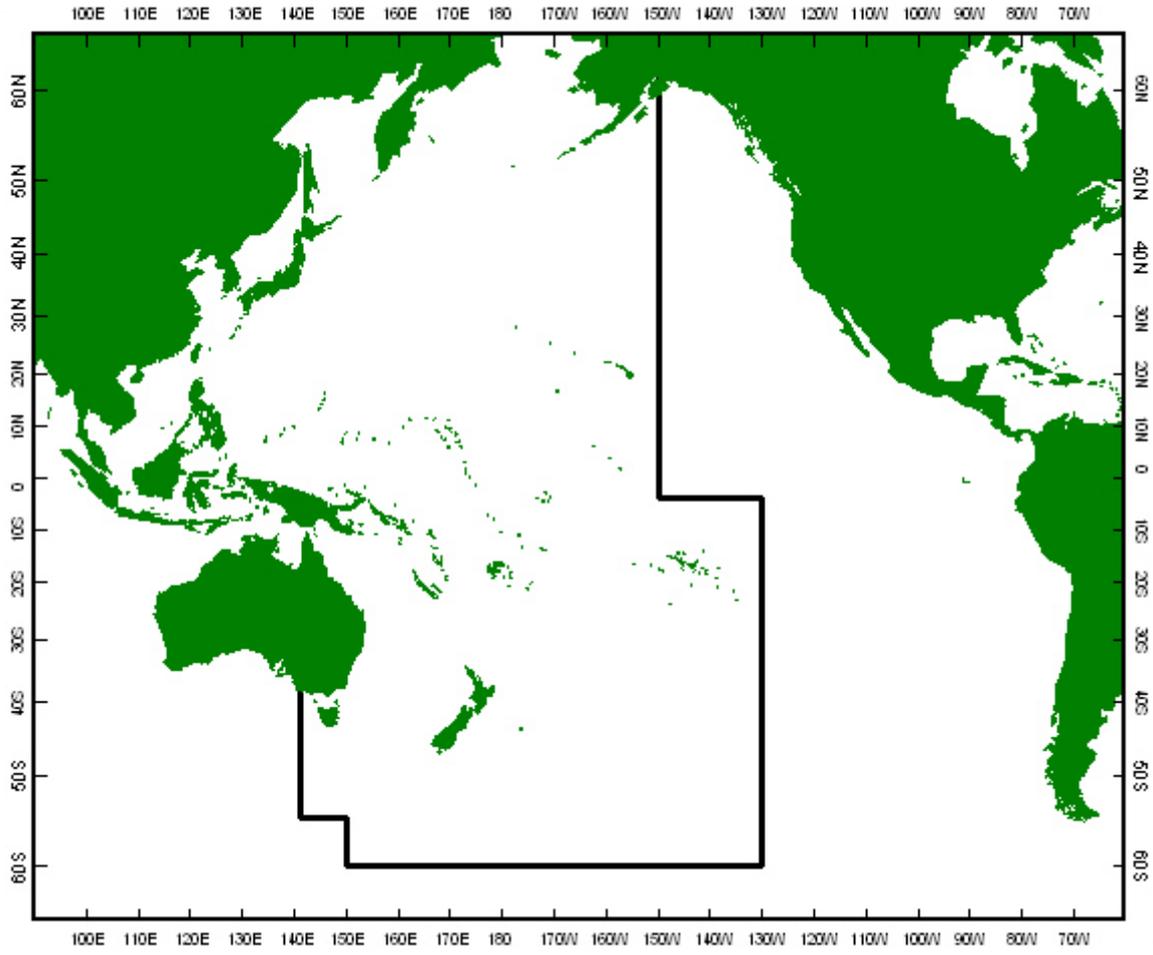


Figure 2. Western and Central Pacific Convention Area

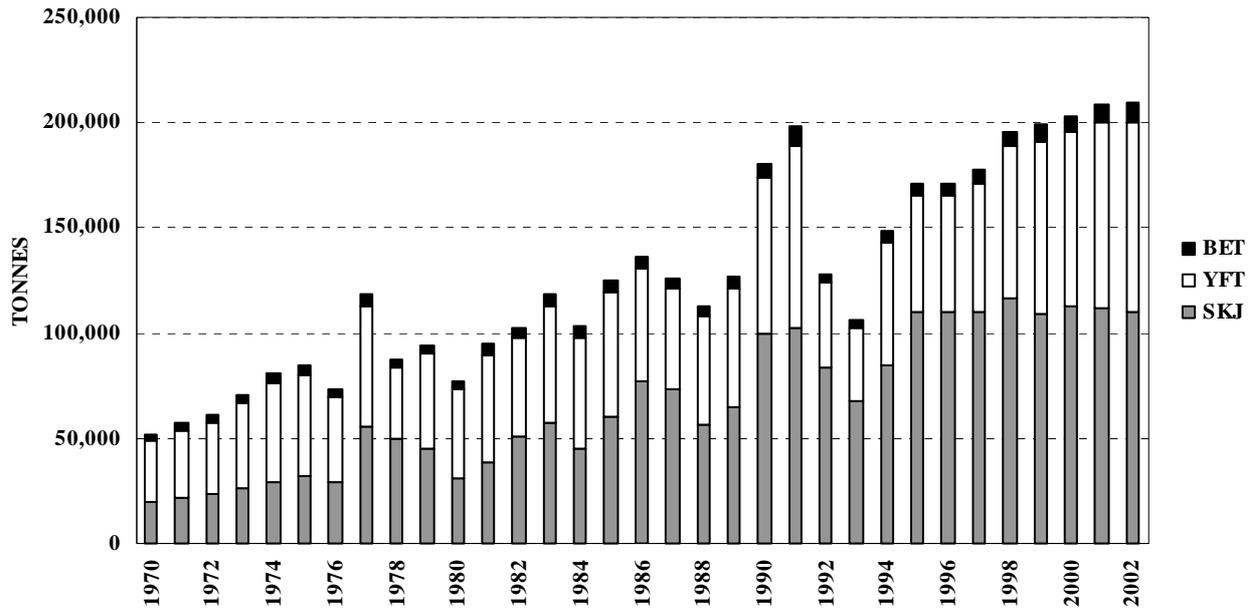


Figure 3. Catches (tonnes) of skipjack (SKJ), yellowfin (YFT) and bigeye (BET) in the Philippines

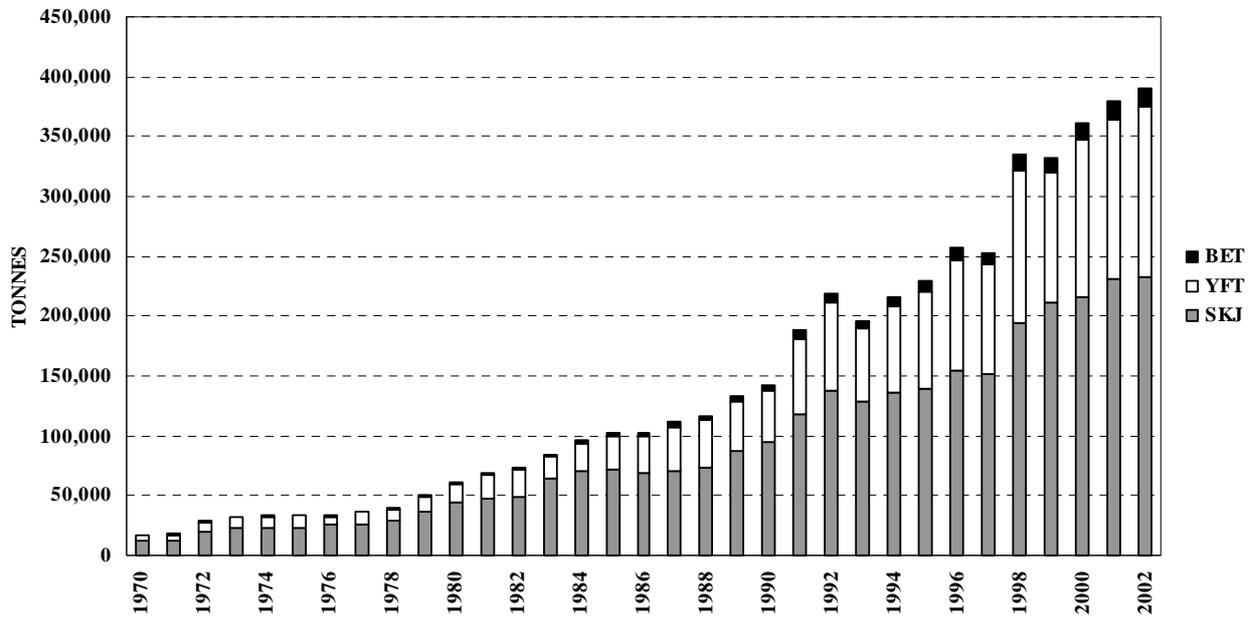


Figure 4. Catches (tonnes) of skipjack (SKJ), yellowfin (YFT) and bigeye (BET) in the Pacific Ocean waters of Indonesia

Table 1. Skipjack catches (tonnes) by Philippines domestic fisheries. Key: GILL gill net; HOOK hook and line, handline; LL longline; PS purse seine; RING ring net; UNCLASS unclassified.

YEAR	GILL	HOOK	LL	PS	RING	UNCLASS	TOTAL
1970	5,747	5,301	1,072	2,811	3,051	2,018	20,000
1971	6,149	5,672	1,147	3,007	3,265	2,160	21,400
1972	6,753	6,229	1,260	3,303	3,585	2,370	23,500
1973	7,586	6,997	1,415	3,710	4,028	2,664	26,400
1974	8,464	7,807	1,579	4,140	4,494	2,972	29,456
1975	9,096	8,391	1,697	4,449	4,830	3,194	31,657
1976	8,246	7,607	1,539	4,444	4,891	2,447	29,174
1977	14,608	13,475	2,725	15,647	4,765	3,870	55,090
1978	14,286	13,178	2,665	6,987	7,585	5,017	49,718
1979	3,677	10,006	2,004	22,426	5,702	1,269	45,084
1980	4,331	9,383	315	13,240	3,351	558	31,178
1981	2,995	14,406	440	14,048	4,683	1,867	38,439
1982	2,437	7,735	530	26,607	4,081	9,405	50,795
1983	1,815	8,999	546	36,645	4,210	4,936	57,151
1984	988	9,287	527	24,247	8,538	1,084	44,671
1985	2,183	10,309	735	28,477	14,303	4,529	60,536
1986	2,851	13,683	590	38,982	18,343	2,519	76,968
1987	2,656	14,627	2,019	39,125	11,873	3,449	73,749
1988	2,015	11,095	1,531	29,677	9,006	2,616	55,940
1989	2,328	12,823	1,770	34,300	10,409	3,024	64,654
1990	8,125	9,444	932	53,751	19,045	8,408	99,705
1991	8,257	9,598	657	62,078	14,612	7,192	102,394
1992	6,249	7,264	717	43,607	18,721	6,621	83,179
1993	1,452	8,351	463	34,555	19,231	4,029	68,081
1994	2,954	8,106	1,102	48,469	17,721	6,208	84,560
1995	1,202	11,655	756	61,185	31,166	4,147	110,111
1996	1,201	11,644	755	61,126	31,136	4,142	110,004
1997	1,202	11,654	756	61,178	31,162	4,145	110,097
1998	1,274	12,350	801	64,832	33,024	4,392	116,673
1999	1,188	11,514	747	60,445	30,789	4,095	108,778
2000	1,234	11,962	776	62,797	31,987	4,255	113,011
2001	1,225	11,880	770	62,367	31,768	4,228	112,238
2002	1,201	11,641	755	61,111	31,128	4,141	109,977

Table 2. Yellowfin catches (tonnes) by Philippines domestic fisheries. Key: GILL gill net; HOOK hook and line, handline; LL longline; PS purse seine; RING ring net; UNCLASS unclassified.

YEAR	GILL	HOOK	LL	PS	RING	UNCLASS	TOTAL
1970	2,304	19,175	537	4,277	1,511	1,300	29,104
1971	2,578	21,452	601	4,784	1,690	1,454	32,559
1972	2,678	22,291	625	4,972	1,757	1,510	33,833
1973	3,203	26,664	748	5,947	2,102	1,808	40,472
1974	3,724	30,998	869	6,914	2,444	2,101	47,050
1975	3,801	31,634	887	7,055	2,493	2,146	48,016
1976	3,202	26,651	748	5,945	2,100	1,806	40,452
1977	4,540	37,785	1,059	8,428	2,978	2,562	57,352
1978	4,426	22,796	630	3,720	910	1,719	34,201
1979	1,824	29,230	829	7,884	3,190	1,808	44,765
1980	2,071	26,721	1,076	7,369	3,852	1,036	42,125
1981	2,390	29,480	1,480	12,909	3,459	1,319	51,037
1982	1,247	27,261	1,734	14,659	1,251	1,103	47,255
1983	1,134	29,610	2,581	15,676	3,028	3,707	55,736
1984	1,945	28,339	1,174	16,855	3,839	1,337	53,489
1985	1,836	32,452	1,663	13,843	5,595	3,004	58,393
1986	1,923	33,076	2,204	11,376	4,461	1,065	54,105
1987	1,945	24,137	3,449	13,654	2,627	1,242	47,054
1988	1,983	29,326	2,897	12,830	3,633	1,184	51,853
1989	2,159	31,940	3,156	13,973	3,957	1,288	56,473
1990	2,542	45,061	2,015	14,515	3,760	5,824	73,717
1991	2,996	53,113	2,375	17,109	4,431	6,864	86,888
1992	1,582	22,101	1,114	10,895	2,447	2,742	40,881
1993	1,026	24,139	954	4,001	1,411	3,234	34,765
1994	3,825	34,519	1,291	12,275	3,180	3,135	58,225
1995	1,493	32,595	1,214	13,402	3,472	3,208	55,384
1996	1,501	32,768	1,220	13,473	3,490	3,225	55,677
1997	1,650	36,009	1,341	14,806	3,835	3,544	61,185
1998	1,940	42,358	1,578	17,416	4,511	4,168	71,971
1999	2,213	48,314	1,799	19,865	5,145	4,756	82,092
2000	2,213	48,300	1,799	19,859	5,144	4,753	82,068
2001	2,363	51,574	1,920	21,206	5,492	5,075	87,630
2002	2,444	53,362	1,987	21,941	5,683	5,252	90,669

Table 3. Bigeye catches (tonnes) by Philippines domestic fisheries. Key: GILL gill net; HOOK hook and line, handline; LL longline; PS purse seine; RING ring net; UNCLASS unclassified.

YEAR	GILL	HOOK	LL	PS	RING	UNCLASS	TOTAL
1970	256	1,804	51	475	166	144	2,896
1971	286	2,018	57	532	186	162	3,241
1972	298	2,097	59	552	193	168	3,367
1973	356	2,509	70	661	231	201	4,028
1974	414	2,917	82	768	268	233	4,682
1975	422	2,976	83	784	274	238	4,777
1976	356	2,508	70	661	231	201	4,027
1977	504	3,555	100	936	327	285	5,707
1978	492	2,145	59	413	100	191	3,400
1979	203	2,750	78	876	351	201	4,459
1980	230	2,514	101	819	423	115	4,202
1981	266	2,774	139	1,434	380	147	5,140
1982	139	2,565	163	1,629	137	123	4,756
1983	126	2,786	243	1,742	333	412	5,642
1984	216	2,666	110	1,873	422	149	5,436
1985	204	3,053	156	1,538	615	334	5,900
1986	214	3,112	207	1,264	490	118	5,405
1987	216	2,271	325	1,517	289	138	4,756
1988	220	2,759	273	1,426	399	132	5,209
1989	240	3,005	297	1,553	435	143	5,673
1990	282	4,240	190	1,613	413	647	7,385
1991	333	4,998	224	1,901	487	763	8,706
1992	176	2,080	105	1,211	269	305	4,146
1993	114	2,271	90	445	155	359	3,434
1994	425	3,248	121	1,364	349	348	5,855
1995	166	3,067	114	1,489	381	356	5,573
1996	167	3,083	115	1,497	383	358	5,603
1997	183	3,388	126	1,645	421	394	6,157
1998	216	3,986	148	1,935	496	463	7,244
1999	246	4,546	169	2,207	565	528	8,261
2000	246	4,545	169	2,207	565	528	8,260
2001	263	4,853	181	2,356	604	564	8,821
2002	272	5,021	187	2,438	624	584	9,126

Table 4. Skipjack catches (tonnes) by Indonesian domestic fisheries in the WCPO. Key: PL pole-and-line; HAND handline; LL longline; PS purse seine; UNCLASS unclassified.

YEAR	PL	HAND	LL	PS	UNCLASS	TOTAL
1970	...	...	...	...	12,100	12,100
1971	...	...	...	...	12,400	12,400
1972	...	...	...	...	19,600	19,600
1973	...	...	...	...	22,300	22,300
1974	...	...	...	...	23,613	23,613
1975	...	...	...	...	23,316	23,316
1976	...	...	...	...	25,338	25,338
1977	...	...	...	...	26,376	26,376
1978	...	...	...	...	29,422	29,422
1979	...	...	...	...	36,310	36,310
1980	19,676	...	...	5,514	19,055	44,245
1981	20,865	...	...	5,847	20,207	46,919
1982	22,121	...	43	6,199	21,380	49,743
1983	28,609	...	...	8,017	27,706	64,332
1984	42,910	...	...	9,152	18,149	70,211
1985	43,999	...	...	10,187	18,132	72,318
1986	48,305	...	...	7,313	13,225	68,843
1987	49,271	...	...	7,459	13,490	70,220
1988	51,735	...	...	7,823	14,165	73,723
1989	64,763	...	...	7,559	14,873	87,195
1990	70,537	...	...	7,994	15,617	94,148
1991	88,070	...	...	9,981	19,499	117,550
1992	82,149	...	...	11,705	43,998	137,852
1993	84,964	...	...	10,895	32,452	128,311
1994	97,404	...	...	11,518	26,730	135,652
1995	100,542	...	...	11,889	27,591	140,022
1996	111,063	...	...	13,133	30,479	154,675
1997	108,927	...	...	12,881	29,892	151,700
1998	139,838	...	...	16,536	38,375	194,749
1999	151,224	...	...	17,882	41,500	210,606
2000	154,850	...	...	18,311	42,495	215,656
2001	166,421	...	...	19,679	45,670	231,770
2002	167,046	...	...	19,753	45,841	232,640

Table 5. Yellowfin catches (tonnes) by Indonesian domestic fisheries in the WCPO. Key: PL pole-and-line; HAND handline; LL longline; PS purse seine; UNCLASS unclassified.

YEAR	PL	HAND	LL	PS	UNCLASS	TOTAL
1970	...	...	...	...	4,950	4,950
1971	...	...	...	...	5,130	5,130
1972	...	...	...	...	8,100	8,100
1973	...	...	...	...	9,180	9,180
1974	...	...	...	...	9,149	9,149
1975	...	...	...	...	9,956	9,956
1976	456	...	...	...	6,777	7,233
1977	532	...	...	...	9,241	9,773
1978	1,044	...	1,111	...	7,403	9,558
1979	1,716	...	1,164	...	10,334	13,214
1980	2,042	...	1,351	1,959	10,463	15,815
1981	1,814	...	1,651	2,048	14,213	19,726
1982	1,698	...	3,295	1,285	15,654	21,932
1983	1,710	...	958	1,812	13,715	18,195
1984	2,054	2,057	1,526	1,897	16,326	23,860
1985	2,110	2,322	2,254	1,896	18,117	26,699
1986	2,050	2,502	2,227	1,485	22,703	30,967
1987	2,091	2,553	8,458	1,515	22,259	36,876
1988	2,195	2,650	8,881	1,590	23,739	39,055
1989	3,198	2,492	4,683	2,268	28,211	40,852
1990	3,990	2,921	5,034	2,399	29,057	43,401
1991	6,614	4,707	7,437	3,022	41,651	63,431
1992	6,965	6,376	8,301	2,881	48,153	72,676
1993	5,692	5,210	6,459	4,686	39,344	61,391
1994	7,125	7,634	5,710	5,989	46,016	72,474
1995	7,934	8,500	6,358	6,668	51,236	80,696
1996	9,077	9,726	7,275	7,629	58,626	92,333
1997	8,953	9,592	7,175	7,525	57,820	91,065
1998	12,446	13,334	9,974	10,461	80,383	126,598
1999	10,795	11,565	8,650	9,072	69,710	109,792
2000	12,931	13,853	10,362	10,868	83,511	131,525
2001	13,091	14,025	10,490	11,003	84,543	133,152
2002	13,949	14,945	11,178	11,723	90,085	141,880

Table 6. Bigeye catches (tonnes) by Indonesian domestic fisheries in the WCPO. Key: PL pole-and-line; HAND handline; LL longline; PS purse seine; UNCLASS unclassified.

YEAR	PL	HAND	LL	PS	UNCLASS	TOTAL
1970	...	...	...	...	550	550
1971	...	...	...	...	570	570
1972	...	...	...	...	900	900
1973	...	...	...	...	1,020	1,020
1974	...	...	...	...	1,017	1,017
1975	...	...	...	...	1,106	1,106
1976	51	...	...	...	753	804
1977	59	...	...	...	1,027	1,086
1978	116	...	105	...	823	1,044
1979	191	...	110	...	1,148	1,449
1980	227	...	127	218	1,163	1,735
1981	202	...	155	228	1,579	2,164
1982	189	...	310	143	1,739	2,381
1983	190	...	90	201	1,524	2,005
1984	228	194	144	211	1,814	2,591
1985	234	218	212	211	2,013	2,888
1986	228	235	210	165	2,523	3,361
1987	232	240	796	168	2,473	3,909
1988	244	249	836	177	2,638	4,144
1989	355	234	441	252	3,135	4,417
1990	443	275	474	267	3,229	4,688
1991	735	443	700	336	4,628	6,842
1992	774	600	781	320	5,350	7,825
1993	632	490	608	521	4,372	6,623
1994	792	718	537	665	5,113	7,825
1995	882	800	598	741	5,693	8,714
1996	1,009	915	684	848	6,514	9,970
1997	995	903	675	836	6,424	9,833
1998	1,383	1,255	938	1,162	8,931	13,669
1999	1,199	1,088	814	1,008	7,746	11,855
2000	1,437	1,304	975	1,208	9,279	14,203
2001	1,455	1,320	987	1,223	9,394	14,379
2002	1,550	1,406	1,052	1,303	10,009	15,320

APPENDIX 1. Stocks to which the 2000 Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean applies. (These include the highly migratory fish species listed in Annex I of the 1982 Convention on the Law of the Sea that occur in the WCPFC Convention Area, excluding saurians.)

Albacore tuna	<i>Thunnus alalunga</i>
Bluefin tuna	<i>Thunnus thynnus</i>
Bigeye tuna	<i>Thunnus obesus</i>
Skipjack tuna	<i>Katsuwonus pelamis</i>
Yellowfin tuna	<i>Thunnus albacares</i>
Little tuna	
Kawakawa / Eastern little tuna	<i>Euthynnus affinis</i>
Southern bluefin tuna	<i>Thunnus maccoyii</i>
Frigate mackerel	
Frigate tuna	<i>Auxis thazard</i>
Bullet tuna	<i>Auxis rochei</i>
Pomfrets	Family Bramidae
Marlins	
Short-billed spearfish	<i>Tetrapturus angustirostris</i>
Striped marlin	<i>Tetrapturus audax</i>
Blue marlin	<i>Makaira nigricans</i>
Black marlin	<i>Makaira indica</i>
Sailfish	
Indo-Pacific sailfish	<i>Istiophorus platypterus</i>
Swordfish	<i>Xiphias gladius</i>
Dolphinfish	
Common dolphinfish / Mahi mahi	<i>Coryphaena hippurus</i>
Pompano dolphinfish	<i>Coryphaena equiselis</i>
Oceanic sharks	
Bluntnose sixgill shark	<i>Hexanchus griseus</i>
Basking shark	<i>Cetorhinus maximus</i>
Thresher sharks	Family Alopiidae
Whale shark	<i>Rhincodon typus</i>
Requiem sharks	Family Carcharhinidae
Hammerhead sharks	Family Sphyrnidae
Mako sharks	Family Isuridae

APPENDIX 2. Acronyms

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ASTUIN	Indonesia Tuna Association
BAS	Bureau of Agricultural Statistics (Philippines)
BFAR	Bureau of Fisheries and Aquatic Resources (Philippines)
CBS	Central Bureau of Statistics (Indonesia)
CDC	Contractual Data Collector
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DGCF	Directorate General of Capture Fisheries (Indonesia)
FAD	Fish aggregating device
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency
IOTC	Indian Ocean Tuna Commission
IPB	Bogor Agricultural University (Indonesia)
IPTP	FAO/UNDP Indo-Pacific Tuna Programme
ITLA	Indonesia Tuna Longline Association
LCEM	Landed Catch and Effort Monitoring Programme (Philippines)
MMAF	Ministry of Marine Affairs and Fisheries (Indonesia)
NFRDI	National Fisheries and Research Development Institute (Philippines)
NSAP	National Stock Assessment Project (Philippines)
NTIC	National Tuna Industry Council
OFCF	Overseas Fisheries Co-operation Foundation (Japan)
PFDA	Philippine Fisheries Development Authority
PrepCon	Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific
PSB	PT Perikanan Samodra Besar (Indonesia)
RCCF	Research Centre for Capture Fisheries (Indonesia)
RIMF	Research Institute of Marine Fisheries (Indonesia)
SCG	Scientific Coordinating Group (PrepCon)
SCTB	Standing Committee on Tuna and Fisheries
TWG	Technical Working Group for Fisheries Statistics (Philippines)
UNDP	United Nations Development Programme
VMS	Vessel monitoring system
WASKI	Office for the Monitoring and Control / Surveillance of Fishing Vessels (Indonesia)
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean



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Jakarta, November 20th, 2003

Reff.No: /BRKP.1/KL520/XI/03

To,
**Mr. Tim Lawson, Fisheries Statiscian
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Secretariat of the Pacific Community
PO BOX D5, 98848 Noumea, New Caledonia
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Email: timl@spc.int**

Dear Mr Lawson,

I refer to the "Proposal for Monitoring the Catches of Highly Migratory Species in the Philipines and the Pacific Ocean Waters of Indonesia" that you have prepared at the direction of PrepCon V.

Indonesia has not yet been able to establish either a port sampling programme or an observer programme for tuna fisheries in Eastern Indonesia because of the lack of funds currently available to the Research Center for Capture Fisheries. Therefore, this is to request the assistance of the PrepCon donor countries for establishing the monitoring programmes.

If the project is implemented and sampling programmes are established, then Indonesia intends to continue the programmes, without external assistance, after the end of the proposed project, and thereby fulfill its obligations for the provision of tuna fisheries data.

Please thank the donor countries on our behalf for their consideration of the proposed project.

Yours sincerely,

Subhat Nurhakim
Director



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26 November 2003

Mr. Tim Lawson,
Fisheries Statistician
Oceanic Fisheries Programme
Secretariat of the Pacific Community
PO Box D5, 98848
Noumea, New Caledonia

Dear Mr. Lawson,

I write to you as the author of the "Proposal for Monitoring the Catches of Highly Migratory Species in the Philippines and the Pacific Ocean Waters of Indonesia", which has been prepared for the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific.

This is to advise that the Philippines would indeed be most grateful for assistance with the monitoring of its tuna fisheries through the proposed project. While the Philippines has made progress implementing the Survey of Commercial Fisheries and the Survey of Municipal Fisheries that are conducted by the Bureau of Agricultural Statistics, and with the National Stock Assessment Project conducted by the Bureau of Fisheries and Aquatic Resources, the coverage of the surveys and of the sampling under these programmes is very low, due primarily to funding constraints.

Funding from the potential PrepCon donors is required to ensure the collection of tuna fisheries data for the duration of the proposed project. Hopefully, the Philippines will be able to assume full responsibility for monitoring its tuna fisheries by the end of the project.

I very much hope that the responses from the potential donors will be favorable and I look forward to hearing from you in this regard.

Yours sincerely,


MALCOLM I. SARMIENTO, JR.
Director