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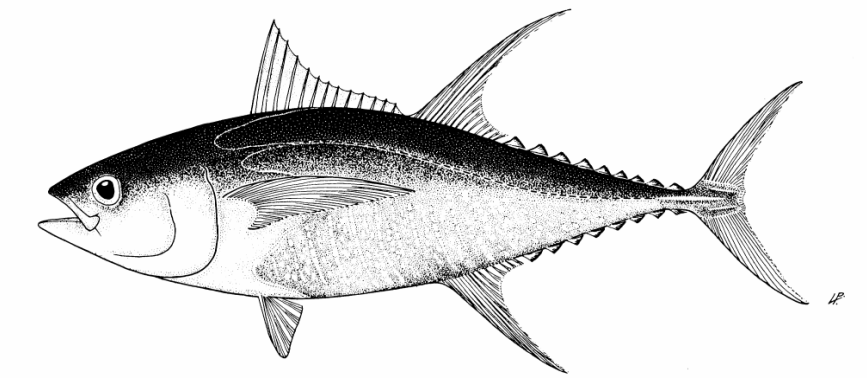
REVIEW OF TUNA FISHERIES AND THE TUNA FISHERY STATISTICAL SYSTEM IN THE PHILIPPINES

A.D. Lewis



Prepared for the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific, with funding from the Australian Centre for International Agricultural Research, by the Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia

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1. Background

Essential background to the study is provided by the project proposal "Review of tuna fisheries and the tuna fishery statistical system in the Philippines", as follows:

"Annual catches of pelagic tuna in the Philippines have been estimated to be 236,983 tonnes in 2002, which represents 13% of the total catch of pelagic tuna in the Western and Central Pacific Ocean. While the catches of bigeye (*Thunnus obesus*), skipjack (*Katsuwonus pelamis*) and yellowfin (*Thunnus albacares*) in the Philippines 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 applies, such as billfish and sharks.

There are four major deficiencies in the current monitoring of tuna fisheries in the Philippines:

- 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.
- Third, the level of port sampling of the species composition and the size composition of the catches is low in the Philippines. 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 lack of species composition data and size composition data covering tuna fisheries in the Philippines, 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 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. 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.

The current project to review the tuna fisheries and statistical system in the Philippines is an important component of this broader project that has been developed by the Preparatory Conference".

1.1 Objectives of the study

"The current monitoring of tuna fisheries in the Philippines is insufficient for both national purposes and the purposes of the Western and Central Pacific Fisheries Commission. Therefore, the main objectives of the project are (a) to work with BFAR and other relevant agencies, especially BAS, to improve the monitoring of tuna fisheries in the Philippines so that the country can better understand and, hence, manage its tuna fisheries, and (b) to enhance the ability of the Philippines to fulfil its obligations in regard to the provision of fisheries data to the Commission.

These objectives will be achieved by conducting the review of the tuna fisheries and the current monitoring system, and by reporting the results of the review, together with recommendations for improvements to the monitoring system, at a workshop to be held following the review.

An additional objective is to reduce the uncertainty in current stock assessments by compiling historical catch and effort data. Several fishing companies have already indicated their willingness to provide such data to SPC through the consultant who will conduct the review of the tuna fisheries and the current monitoring system.

Achieving these objectives will also benefit the other countries and territories concerned with tuna fisheries in the Western and Central Pacific Ocean. The compilation of historical catch and effort data and improvements in the monitoring of tuna fisheries in the Philippines 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".

1.2 Expected outputs

i) *Review of Tuna Fisheries*

"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 report of the project will include a section containing the information compiled during the review of the historical development and the current status of the tuna fisheries.

ii) *Review of Current Monitoring Systems*

The review of the current monitoring systems 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 of the current monitoring system will also address the ability of the system to meet the obligations of the Philippines to provide tuna fisheries data to the Commission, including estimates of annual catches, operational catch and effort data, unloading data, port sampling data and observer data.

BFAR will be actively involved in the review, with one BFAR staff member accompanying the consultant primarily to facilitate access to government and industry.

Recommendations for improvements in the current statistical system will be formulated in collaboration with BAS and BFAR.

The review will also examine the suitability of ports for the port sampling and survey programme and an observer programme.

The report of the project will include sections on: the review of the current monitoring system; the ability of the system to meet the obligations of the Philippines to provide tuna fisheries data to the Commission; recommendations for improvements in the monitoring system (formulated with BAS and BFAR); and the suitability of ports for the port sampling and survey programme and an observer programme.

iii) 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.

The report of the project will include a section listing the catch and effort data sets that are compiled, including the source of the data and the gear types, geographic areas and time periods covered.

iv) Follow-up Workshop

The conclusions of the review of the current monitoring system, with recommendations, will be presented at a workshop to be held by the tuna fisheries monitoring project that will be conducted as follow-up to the current project by the Western and Central Pacific Fisheries Commission. Another output of the current project will therefore be the report of the WCPFC workshop.

1.3 Methodology

According to the project proposal, the following research methodologies were to be applied:

“The project will be implemented by the Secretariat of the Pacific Community, in collaboration with the Bureau of Fisheries and Aquatic Resources and the Bureau of Agricultural Statistics in the Philippines. The SPC Senior Fisheries Scientist, Dr Antony Lewis, will visit the Philippines during a four-week period to review the tuna fisheries and

the current statistical system. He will be accompanied during the review by one staff member from the Bureau of Fisheries and Aquatic Resources.

Travel will be conducted as follows:

- Dr Lewis will travel from Brisbane to the Philippines for a visit of 28 days, comprised of five days in Manila at the start of the period; seven days in General Santos; 11 days in two or three other ports to be determined during the initial meetings with BFAR and BAS; and five days in Manila at the end of the period.
- Dr Lewis will be accompanied to General Santos and the other ports by one BFAR staff member.
- Following completion of his report, Dr Lewis will attend the workshop to be held by the tuna fisheries monitoring project that will be conducted as follow-up to the current project by the Western and Central Pacific Fisheries Commission.

1.4 Definitions

For the purposes of this study, "tunas" unless otherwise indicated refer to the four oceanic tuna species, viz.
Skipjack tuna (*Katsuwonus pelamis*)
Yellowfin tuna (*Thunnus albacares*)
Bigeye tuna (*Thunnus obesus*)
Albacore tuna (*Thunnus alalunga*)

The coastal or neritic tunas, which support important fisheries and may frequently be taken with oceanic tunas, are not included, unless specifically named in the report. These are:
Frigate tuna (*Auxis thazard*)
Bullet tuna (*A. rochei*)
Eastern little tuna or kawakawa (*Euthynnus affinis*)
Longtail tuna (*Thunnus tonggol*)

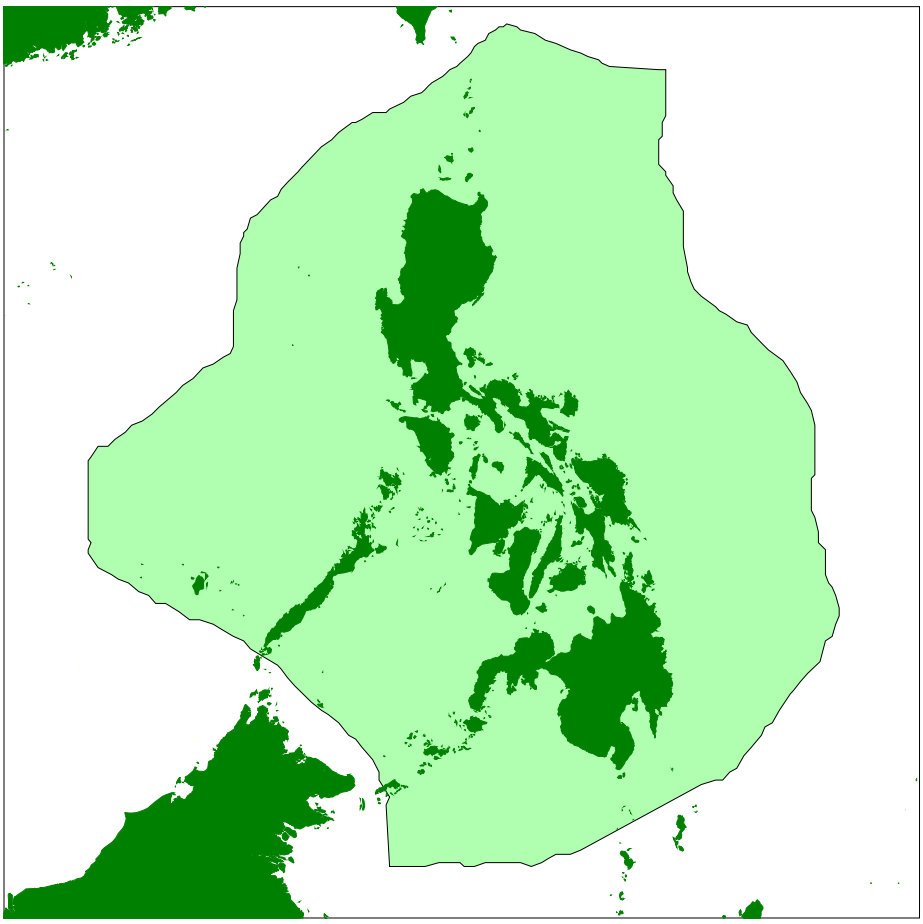
A range of other scombrids, including oriental bonito (*Sarda orientalis*), Spanish mackerel (*Scomberomorus* spp.), chub mackerels (*Rastrelliger* spp., *Scomber australasicus*), dogtooth tuna (*Gymnosarda unicolor*) and others, occasionally taken by tuna fishing gear, are generally not considered, other than as by-catch.

1.5 The study area

In assembling the Philippines catch, or more correctly the catch within Philippine waters (see Sec 4, definition 64 in the Fisheries Code), such waters require definition. In the absence of a declared EEZ (established by Presidential Decree no. 1599 of 1978, but not declared), waters within the boundaries defined under the Treaty of Paris seem to be generally taken as Philippine waters. A more realistic EEZ is shown in Figure 1 below. For the purposes of previous studies on catch in Philippine waters (PTRP, 1995), an area bounded by 5^0N and 20^0N, 115^0 E to 130^0E (PTRP, 1995) has been used. Indonesia has proclaimed a maritime boundary in the Celebes Sea which is not wholly acceptable to Philippines, and other areas are subject to unresolved claims.
The area of Philippine waters (total territorial, archipelagic and EEZ waters) is officially listed in one document as 2.2 million km^2 (BAS, 2003), but the source of this estimate is

not known and should be verified. It approximates the size of the EEZ area as shown in Figure 1. In the interim, it is used here as the *de facto* “area of Philippine waters”.

Figure 1. Provisional map of Philippine waters for the purpose of this study.



Other waters are defined in BAS and other publications and are summarized in the table below.

Area	Extent (million km^2)	Source	Comment
Philippine waters	2.2002	BAS (2003)	Limits uncertain; disputed maritime boundaries
Oceanic	1.9340	“	“
Coastal	0.2660	“	Within 15km ?
Shelf (<200 m)	0.1846	“	Depth < 200m
Coastline (length)	17,460 km		
Deepwater fishing areas	0.4967	Yesaki, 1983	Coastal, as above, plus Sulu Sea, Mindanao Sea
Shallow water f/area	0.0416	“	

2. Review of Tuna Fisheries

Terms of Reference
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 report of the project will include a section containing the information compiled during the review of the historical development and the current status of the tuna fisheries.

2.1 History

The development of commercial fisheries in the Philippines, particularly tuna fisheries, is well documented by Thomas (1999) and is summarized here. Tuna was historically (and traditionally) caught by fish traps, beach seines and small surround nets. With the advent of Japanese fishing interests in the 1930s, pole-and-line fishing was developed in Zamboanga and other areas in the south, in association with small canneries. Longline fishing was not developed to any extent, but some motorized bancas began to appear and were known even then as “pump boats”. After the war, otter trawling for demersal species developed quickly, as did the use of bag nets (*basnig*), to take small pelagics, including some tuna. National marine fish production between 1955 and 1964 grew from 330,000 to 540,000t, mainly through the expansion of commercial fishing. The limited trawling grounds were however depleted over several decades, and the tuna fishery began to develop, initially through the proliferation of handline vessels (thousands of vessels were reportedly in operation during the 1960s, targeting yellowfin and bigeye, mostly for export). 11,376 tons of tunas frozen onshore were exported in 1970. Skipjack and other coastal species continued to be caught in fish traps etc but for local fresh consumption.

The purse seine era commenced in 1969, following some earlier failures of experimental fishing with this gear. Philippine vessels began using lights at night to attract tuna, in association with anchored fish aggregating devices (bamboo *payaos*) and larger deeper nets. Their initial success was built on by two Canadian-built purse seiners operating under the South China Seas Development Program (*Southward Ho, Royal Venture*), and the fishery had begun a new phase. By the early 1970s, 245 purse seiners, many of them modified second hand Japanese vessels, were being operated by 55 companies, taking small pelagics (sardines) and tuna. This growth continued during the 1970s but fuel costs and declining catch rates gradually began to cause concern. Domestic canning began in the late 1970s, initially involving sardines but soon tuna, with canneries in Manila and General Santos fuelling demand for more tuna. Frozen exports began to decrease accordingly, but canned tuna exports were already 2 million cases by 1982 (50,000t whole fish equivalent). Purse seine vessel size and sophistication continued to increase, with 560 vessels over 61 GT fishing at the end of the 1970s.

Efforts to develop longline fishing during the 1980s were not entirely successful, but handlining, initially by municipal fishermen, began to flourish. Sashimi-quality exports began in the early 1980s, when total marine landings had grown to over 1.2 million tones, mainly though expansion of municipal fisheries during the 1970s and continuing growth of commercial fisheries on a more modest scale.

With the industry in difficulty in 1983, as a result of the continuing fuel crisis, dwindling fish resources available to the purse seine fleet, and increasing conflict over the large number of payaos deployed (over 2,000 in the Moro Gulf in the early 1980s), some vessel owners began to look outside the Philippines for fishing opportunities. Two of the larger companies began operations in PNG in the mid-1980s, and others began fishing in Indonesian waters, even on the Indian Ocean side (Nusa Tenggara). In response to calls for management intervention, increasing restrictions were gradually being imposed on domestic commercial fishing (eg the 15km exclusion zone for commercial fishing, plans to increase minimum mesh size, moratorium on the issue of new licences). The Fisheries Code was finally adopted in 1998, and a series of Fisheries Administrative Orders (FAOs) addressing various management issues has been proclaimed since then (see later).

Maritime borders with Indonesia in the Celebes Sea are contested, along with others in the South China Sea. In response to tensions over increased fishing in Indonesian waters, an agreement permitting access by up to 75 purse seiners was signed in recent years. Less than half of this agreed number has currently been taken up.

Handliners are not however covered by this agreement and confiscations, harassment and questionable practices by Indonesian "agents" continue to generate great uncertainty in this sector.

There has also been considerable recent investment in canneries in Bitung, Sulawesi, with two now controlled by Philippines interests and supplied in the main by Philippine flag vessels.

Philippines vessels have enjoyed access to PNG waters since the mid-1980s; 10 vessels are currently involved in bilateral access agreements, whilst three companies are based there, with one company operating a fleet of 11 vessels and a cannery in Madang, and another, with five vessels, in the process of developing a loining plant in Lae. There have been smaller scale bilateral access agreements with several other Pacific island countries.

A Philippines Tuna Management Plan was in development during 2004, with the support of the National Tuna Industry Council and BFAR; it is hoped this will address a range of issues and obligations arising under the WCPF Convention.

2.2 Tuna fishing gear types and contribution to the catch

A comprehensive catalogue of the fishing fishing gears used in the Philippines has been compiled by de Jesus (1982). Five main gear types are listed (hook and line, gillnet, lift net, surround nest and trap nets, along with two aids to fishing – fish corrals and fish aggregating devices (payaos).

At that time, the contribution of the various gears to the official 1980 tuna[1] catch of 200,805t was listed as follows, in increasing % of landings:
hook and line (30%), purse seine (22%), ring net (19%), bagnet (12%), gillnet (9%) beach seine (4%), fish corral (2%), trawl (1%) and longline (1%).

The gears (and the catch) are classified as municipal or commercial, approximating the divide between artisanal/ subsistence and larger scale commercial fishing, with vessel size (3 GT) used as the main classification criterion, along with notions of active versus passive fishing gear. Various Fisheries Administration Orders (FAOs) give official status to this classification

[1] Oceanic and neritic tunas

A brief summary of the main gear types follows, along with information in current fleet size, best estimates of current catch, operations, and size and species of fish caught.

HOOK AND LINE

Of the three main hook and line methods (troll, handline and longline), **handline** has always been the most important of these, and is carried out from outrigger bancas (generally known as “pump boats”, referring to the characteristic diesel engine noise). The narrow bancas may range from 6m up to 40m in length; all sizes are currently still classified as municipal vessels, although a separate classification is likely to be approved in the near future. On the basis of their operation and the size of fish targetted, they may be regarded as large or small fish handliners, the latter involving smaller vessels making short trips and fishing, usually at night, around payaos with jigging lines and taking small tunas (<50cm LCF), whereas the large fish operations target deep swimming adult tunas (yellowfin and bigeye - >100cm LCF), and are usually large vessels but may also be small short-trip vessels.

2.2.1 Large fish handline (municipal)

This gear type is used throughout the Philippines but is most important in waters around southern Mindanao. The vessels are diesel powered, equipped with insulated ice holds (which may hold over 20t of fish on large vessels) and capable of long-range trips up to one month in length. Vessels may now range as far afield as eastern Irian Jaya (Papua) and Papua New Guinea in the east, and Banda Sea (Indonesia) to the south. Single hook handlines are used, with fishing occurring in depths usually between 80-180m. Originally carried out at night, using lamps to attract bait (squid, round scads etc) for use on the lines, handlining, especially in the main fishing area of the southern Philippines, has in recent decades been carried out in the daytime, for security reasons. Most fishing occurs around payaos, but some fishing in the Moro Gulf occurs in association with dolphin pods which often have yellowfin tuna in association. Very small bancas carried on deck are launched in front of the pods and lines lowered to intercept the tuna. Yellowfin comprise over 90% of the large fish handline catch, with bigeye, blue marlin and swordfish also taken; the size of the fish is typically 100-160cm LCF (see later).

Catch estimates

It is generally agreed that, while the handline catch is known to be large, it is also poorly estimated. Many pump boats are not registered (see later), either with LGUs (as municipal vessels) or with the Coast Guard/Marina, such that even vessels numbers are not known with any certainty. Alves (2003, 2004) estimates that there are 2,500-3,000 pump boats in the Soksargen area (Region 12, mostly General Santos) alone, whilst the Coast Guard reports 2,165 pumpboats home ported at General Santos in July 2004. Relatively few of these Region 12 pump boats (210, or less than 10%) are registered with BFAR as commercial fishing vessels (CFVs).

Alves (2003) notes that the Marina register of pump boats below 40GT in Regions 11 and 12 involves 1,185 owners, 1,144 of which own 1-10 pumpboats, and 4 own more than 50 pumpboats. The largest pump boat now seems to be around 69.8 GT.

No catch reports are completed by any pumpboat and catch estimates are based on available landings data.

NSAP sampling suggest that around 11,000t of handline fish (88% yellowfin) was landed in General Santos Fish Port (GSFP) in 2000/2001; Alves (2003) estimates the General Santos handline catch of yellowfin as 15,000t and the Philippines wide-catch as 25,000t. Another estimate, based on operational parameters, puts the handline catch in GenSan as 30,000t/year, not all of which is landed at the port. The PIFDA figures for tuna landings in the GenSan Fish Port appear to be low (4,300t - 9,200t since 1988), suggesting that not all the handline fish landed in the GenSan area is landed at GSFP.

In the early years of the fishery, most of the catch was taken in Moro Gulf/Celebes Sea, but increasingly, vessels have had to travel further and undertake longer trips to maintain catch rates. An analysis of GenSan NSAP data for 1997 to mid 2002 (Williams, 2004) shows average trip length increasing from 9 to 21 days, and the daily catch rate dropping from 70kgs/day down to 30 kgs, although this has been quite variable. It is now generally accepted that over 50% of the catch is now taken in Indonesian waters, where there is no agreement with Indonesia relating to pumpboat access (unlike purse seine vessels – see earlier), and many arrests and confiscations, as well as problems with Indonesian “agents” have resulted. The vessels also fish eastwards, in high seas areas, Palau, Irian Jaya (Papua) waters and probably within PNG waters in some cases, and trip lengths are reportedly now one month or more.

Best estimates of the current handline catch are discussed under 2.2.4, and Figure 2 below shows the distribution of the NSAP-sampled catch, which probably underestimates the proportion of the catch in Indonesian waters at present.

2.2.2 Small fish handline (municipal)

This fishery is not well documented but it is assumed to occur throughout Philippines waters, wherever there are deployed payaos. That the catch is significant is evident in the estimates of skipjack catch in the “hook-and-line” catch (see 2.2.5) of 11,000t, most of which is assumed to come from this fishery. Analysis of the available NSAP data shows that species composition varies considerably by area, and may even be dominated by non-tuna species in some areas but is often in the range 30-60% skipjack, 40-60% yellowfin, and bigeye 2-4%. Trip length may be hours or up to 5 days eg Palawan. The average size of fish taken is 20-50cm LCF, with the occasional larger fish in some areas eg Masinloc.

Distribution of the NSAP sampled catch is shown in Figure 3.

2.2.3 Trolling (municipal)

Few data are available for troll catches, which can be made by single or two-boat troll multiple troll lines, and midwater trolling. The technique is used all over Philippines, takjng tuna and a range of other species, almost entirely by municipal vessels (bancas).

Figure 2. Distribution of average monthly catch for the handline ('large-fish') fleets, 1997-2002.

(Source: Williams, 2004. According to fishing grounds recorded in the NSAP port sampling data processed to date; NSAP sampling is conducted on roughly 33% of unloading days per month).

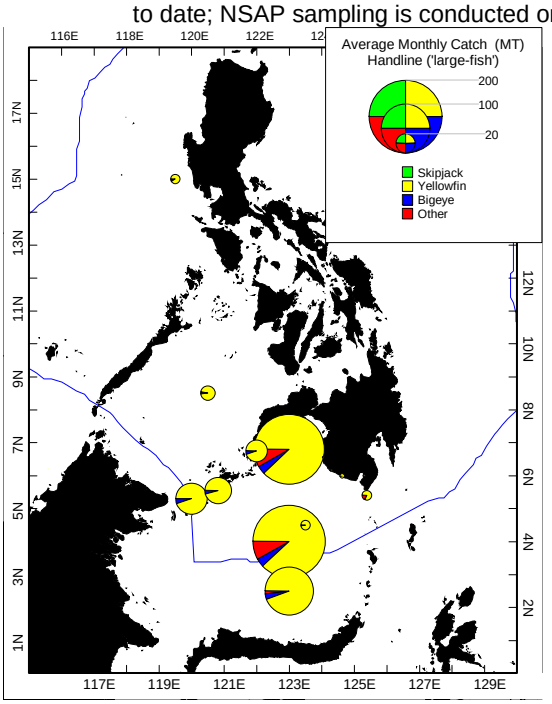
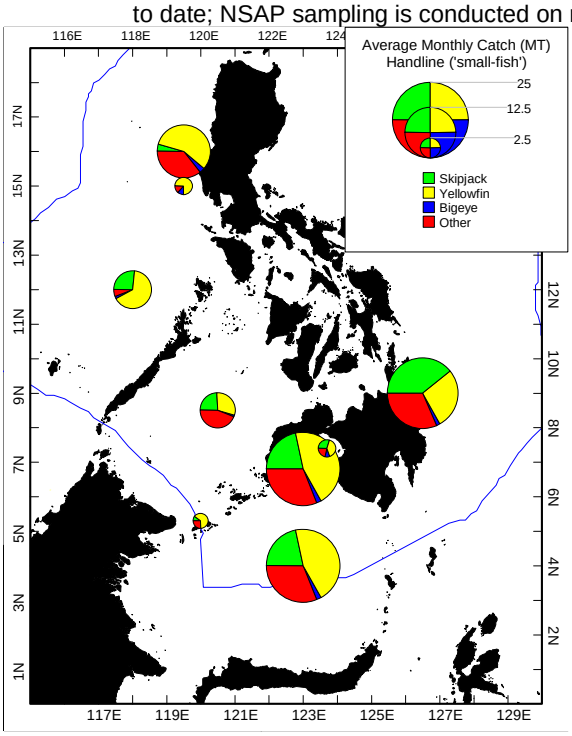


Figure 3. Distribution of average monthly catch for the Handline ('small-fish') fleets.

(Source: Williams, 2004. According to fishing grounds recorded in the NSAP port sampling data processed to date; NSAP sampling is conducted on roughly 33% of unloading days per month).



2.2.4 Estimates of hook-and-line catch (handline and troll)

The SPC Tuna Fishery Yearbook, drawing on data from BFAR and BAS, and estimating catch by species, by the method of Lawson and Williams (1998), and assuming proportions by gear type as for 1996, lists the hook catch by species (exclusive of longline) as below (Table 1). These estimates show a sharp dip in 1992-3, as a result of a drop in the yellowfin catch, but then recover steadily to total 70,000t in 2002, similar to that for 1991.
Assuming the large fish handline catch in 2002 was around 30,000t (see earlier) and the small fish handline catch around 30,000t (based on a skipjack catch of 10,000 and assuming a yellowfin/bigeye catch of twice that overall – 20,000t), this would leave an estimated catch of 10,000t taken by trolling, which would seem to be high. A realistic breakdown of the catch by gear in 2002, if these figures are to be believed, might therefore be as below:

Gear	Handline (large fish)	Handline (small fish)	Troll (various)	TOTAL
2002 est.	35,000t	30,000t	5,000t	70,000t

Table 1. Catch by species by the hook category, 1990 –2002
Source: SPC Tuna Fishery Yearbook, 2002, from BFAR and BAS sources.

	Skipjack	Yellowfin	Bigeye	TOTAL
1990	9,444	45,061	4,240	61,489
1991	9,598	53,113	4,998	67,709
1992	7,264	22,101	2,080	31,445
1993	8,351	24,139	2,271	34,761
1994	8,106	34,519	3,248	45,873
1995	11,655	32,595	3,067	47,317
1996	11,644	32,768	3,083	47,495
1997	11,654	36,009	3,388	51,051
1998	12,350	42,358	3,986	58,694
1999	11,514	48,314	4,546	64,374
2000	11,962	48,300	4,545	64,807
2001	11,880	51,574	4,853	68,307
2002	11,641	53,362	5,021	70,024

2.2.5 Longline (commercial)

Although a hook and-line gear, longline can be separated from handline and troll gears on the basis that it invariably involves larger commercial vessels, which typically fish for export.

Three categories of longlining operations are distinguished – domestic (vessels based in Philippines ports and fishing mostly in Philippines waters), distant water (large vessels fishing outside Philippine waters, and in other oceans) and foreign vessels unloading in Philippines ports. There is also believed to be a significant IUU longline catch in Philippines waters, possibly as much as 10,000t per year (PTRP, 1995).

Domestic longline

Few data are available on these operations, which have historically been overshadowed by handline vessels in targetting adult deep-swimming tunas in the Philippines. Table 2 below, from the SPC Tuna Fishery Yearbook and indirectly estimated, would suggest only 10-14 vessels have fished in the last decade, taking over 2,000t per year, or over 200t per vessel, a high catch rate. The vessels are believed be of Taiwanese origin, < 100 GRT, using milkfish (alive or dead) as bait, and making early morning sets.
The high proportion of skipjack in the catch (around 30%) is unusual for longline operations, and unless incorrect assumptions have been made concerning the species composition of the catch, suggests more detail is required on these operations.

Table 2. Domestic Philippines longline catches estimated from available data
Source: SPC Tuna Fishery Yearbook, 2002, from BFAR and BAS sources

	Number of vessels	Yellowfin	Bigeye	Skipjack	TOTAL
1990	26	2,105	190	932	3,227
1991	12	2,375	224	657	3,256
1992	10	1,114	105	717	1,936
1993	10	954	90	463	1,507
1994	10	1,291	121	1,102	2,514
1995	10	1,214	114	757	2,085
1996	10	1,220	115	755	2,090
1997	(10)	1,341	126	756	2,223
1998	9	1,578	148	801	2,527
1999	13	1,799	169	747	2,715
2000	14	1,799	169	776	2,744
2001	(14)	1,920	181	770	2,871
2002	(14)	1,997	187	755	2,939

Distant water longline

Distant water operations by Philippines joint-venture companies, fishing in all three oceans, seem to have commenced in 1998. Catches believed to have been taken in the Pacific Ocean, by tuna species of interest, are shown in Table 3 below. No detailed information is available on the number of vessels involved, or the spatial distribution of the catch, but up to 25 vessels are believed to be fishing at various times, with most activity in temperate high seas areas. The WCPO catch has gradually declined with a shift of operations to the other two oceans, with a shift seen in 2001 to targeting bigeye tuna. The catch by these vessels in other oceans is reported to the relevant RFMOs (IOTC and ICCAT) but not as yet to the emerging WCPFC for the WCPO. A small number of these vessels also fishes in equatorial high seas areas.

Table 3. Catches by main species (t) of Philippine DW vessels in the WCPO
Source: Industry data in confidence

Year	Yellowfin	Bigeye	Albacore	Total
1998	30.900	129.899	3,763.083	**3,932.882**
1999	215.936	619.914	3,665.064	**4,500.194**
2000	146.815	227.016	1,221.735	**1,673.546**
2001	355.892	1,067.460	629.041	**2,052.393**
2002	213.392	1,188.112	289.049	**1,690.553**
2003	133.196	615.117	SWO 85.900 OTH 3.700	**837.913**

SWO = swordfish

Foreign vessel unloadings

With the establishment of the Davao Fish Port Complex in 1995 as the only authorized transhipment point for foreign longline vessels, Taiwanese vessels (for the most part) have unloaded catch there, involving direct transhipment of high quality fish for airfreight export, with the remainder unloaded and retained for domestic sale and use.
The table below, from PIFDA (2004), lists the details for the period 1995-2003.
PFDA data suggest that sashimi exports comprise around 70% yellowfin, 20% bigye and small quantities of blue marlin and swordfish, whereas the retained catch was around 45-55% yellowfin, 15% bigeye, blue marlin and swordfish, and 30-40% sharks and unspecified frozen fish.
There is reason to believe that the unloaded catch may have been included in regional catch (landings) estimates (see later).

Table 4. Port Calls and Unloading Volumes by Foreign Longline Vessels, Davao Fish Port Source: PIFDA, 2004

YEAR	Port calls	Volume unloaded (t)	Transhipped (t)	Retained (t)
1995	419	1,465	1,122	343
1996	538	1,638	1,320	318
1997	344	1,002	744	258
1998	1,282	5,097	3,738	1,359
1999	1,248	4,543	3,681	862
2000	897	3,399	2,641	758
2001	932	5,318	3,073	2,245
2002	786	5,146	2,255	2,891
2003	643	5,065	1,885	3,180

2.2 6 Drift gillnet (municipal)

Gillnets are used in many regions, but especially in the Sulu Archipelago, to capture oceanic and neritic tunas. The nets, typically 600m by 10m deep, are set at night from bancas, in conjunction with lights, and regularly checked during the night. NSAP data from Jolo (Sulu Archipelago) suggest that skipjack and yellowfin, between 40 and 70cm LCF, make up only 20% of the catch, with the rest presumably neritic tunas. In other areas eg Visayan Sea, there may be little or no oceanic tuna in the catch.
The SPC Tuna Fishery Yearbook lists the gillnet catch as around 4,000t in most recent years, with yellowfin donating the tuna catch (60%), whereas skipjack seemed to dominate for a brief period in the early 1990s.

SURROUND NETS

Three categories of surround net are recognized here –

- *Ringnet* - a smaller surround net with a central bunt (sack) with rings, which is pursed from both ends, often manually; a large weight may be used to speed up the pursing process; ring nest are fished at night with lights around payaos, often relatively close to shore, from bancas or vessels usually < 100 GRT.
- *"Baby" purse seine* – a surround net with rings and the bunt at one end, which is pursed from the end opposite the sack, using a winch; fished at night with lights, often further offshore, from vessels < 250 GRT

- *Large purse seiners ("superseiners")* – larger version of the previous category, involving vessels >250 GRT, and often much larger. Fish mostly outside Philippine waters, both around payaos and on free schools;

2.2.7 Ringnet

Ringnet vessels fish sardines and small pelagics, as well as tuna. Ring netters operate in many areas of the Philippines, but mostly in southern waters (Figure 4). Species composition of the catch varies according to area, but often comprises 50% or less of oceanic tunas, with the rest neritic tunas and small pelagics eg round scads. There is a specialist sardine fishery based in Zambaonga del Sur and Zamboanga del Norte, taking over 150,000t of small pelagics per annum, mostly by ring net.

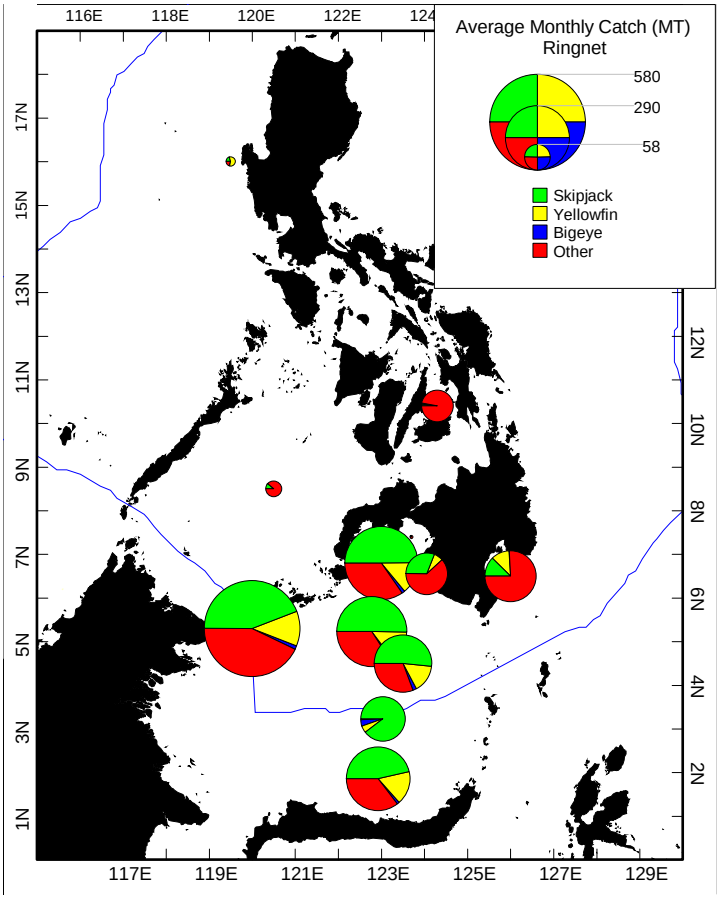
The SPC Tuna Fishery Yearbook lists the ringnet catch of oceanic tunas since 1990, as in Table 5 below. A sharp increase in catch appears in 1995, almost all attributable to a doubling of the skipjack catch. It is unsure if species estimation procedures changed at that time. Since then, the reported total catch of oceanic tunas in the ringnet catch has been stable at around 37,000t, with skipjack over 80% of the catch.

Table 5. Ringnet catch by Philippines domestic vessels, 1990-2002
Source: SPC Tuna Fishery Yearbook, 2002, from BFAR and BAS sources

	Skipjack	Yellowfin	Bigeye	TOTAL
1990	19,045	3,760	413	23,218
1991	14,612	4,431	487	19,530
1992	18,721	2,447	269	21,437
1993	19,231	1,411	155	20,797
1994	17,721	3,180	349	21,250
1995	31,166	3,472	381	35,022
1996	31,136	3,490	383	35,009
1997	31,162	3,835	421	35,418
1998	33,024	4,511	496	38,031
1999	30,789	5,145	565	36,499
2000	31,987	5,144	565	37,696
2001	31,768	5,492	604	37,864
2002	31,128	5,683	624	37,435

There are estimated to be around 200 ringnetters fishing in southern waters (Region 9 – 17, Region – 57, Region 12 – 87; BFAR CFVR data, which may also be incomplete). NSAP data shows the ringnet catch of skipjack and yellowfin to be mostly smalll fish between 20 and 40cm LCF. Figure 4 below shows the distribution of the catch sampled by the NSAP, mostly in southern waters.

Figure 4. Distribution of average monthly catch for ringnet fleets.
(Source: Williams, 2002. According to fishing grounds recorded in the NSAP port sampling data processed to date; NSAP sampling is conducted on roughly 33% of unloading days per month).



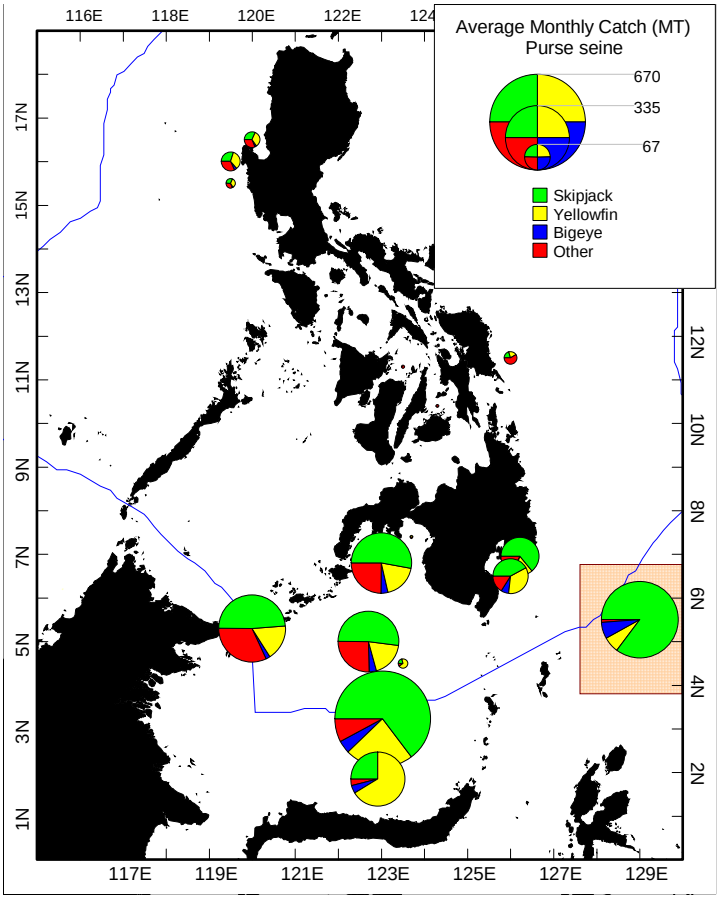
2.2.8 Small purse seine (< 250 GT)

There are estimated to be around 110 of these vessels, operated by at least ten companies, taking around 87,000t in 2002 (information provided by the SOKSARGEN Federation), at an average catch per vessel of 796t; about half of this catch may be taken outside Philippine waters but this has not been verified

As the large seiners fish almost entirely outside Philippine waters and their catch appear not be captured by the current statistical system (see later), existing BAS catch data and NSAP data probably refer in the main to these small seiners. The 2002 Yearbook lists the purse seine total catch as 85,490t, which would suggest that this is the case. Species composition of the catch by these vessels based in General Santos, which fish further offshore and catch fewer neritic and small pelagic species, seems to be around 70% skipjack, 25% yellowfin and 5% bigeye. Those in other areas have a higher proportion of neritic tunas in the catch.
NSAP data suggest that the 2001 catch by purse seiners landing in General Santos was 27,600t (and not including landings to private ports), with species composition and fish size similar to that of the ringnet catch, with perhaps more larger fish (>50 cm LCF) in

the purse seine catch. The reported area of catch is shown below in Figure 5, with much of it beyond Philippines waters.

Figure 5. Distribution of average monthly catch for (small) purse seine fleets.
(Source: Williams, 2004. According to fishing grounds recorded in the NSAP port sampling data processed to date; NSAP sampling is conducted on roughly 33% of unloading days per month; the catch in the shaded box represents catch in Papua New Guinea, International waters and "Boundary").



2.2.9 Large purse seine (> 250 GT)

Information provided by the Soksargen Federation indicates that, in 2002, there were 52 large purse seine vessels > 250 GRT currently fishing, operated by 11 companies, which took nearly 200,000t of tuna at an average catch of around 3,800t per vessel. The catch was spread between PNG (93,000t), high seas areas (37,600t), Indonesia (62,300t) and other areas, including Philippines, 4,000t.
Although much of these catch is landed in Philippines ports by carriers, it is probably not included in the official tuna statistics for the most part, even though this is required by the Philippines Fisheries Code. In 2004, the number of these vessel appear to have increased slightly to 56. A list detailing characteristic of these vessels is being compiled, with a view to initiating logsheet coverage of their operations (see later).
Size data from these vessels are only available from port sampling in PNG, but it is assumed that the size composition of the catch would ressemble that of the small seiners in the same areas.

LIFT NETS and other gears

2.2.10 Bagnet (municipal)
Bagnets,or basnigs, are fished by bancas and target mostly small pelagics attracted by lights at night; they are usually not associated with payaos, and take incidental catches of juvenile oceanic tunas. These catches are not well documented and when recorded, are probably included in the "unclassified" category, which in the Yearbook, accounted for around 10,000t of oceanic tunas in 2002. This contrasts with 1980, when bagnet catches of tuna comprised 12% of the total catch, or 24,000t.

Other gears taking tuna at municipal level and grouped in the "unclassified" category include beach seines (4% of the 1980 catch) and fish corrals (2%). Tuna catches form these sources may either be underestimated in municipal landings, or grouped with other small pelagic species .

2.3 Total Catch Estimates

Table 6 below list the best estimate, compiled from information in the preceding sections, of the catch by gear types for Philippine vessels in 2002. When the catches by large purse seine vessels and DW longliners are excluded, the estimate of the 2002 catch likely to have been included in the BAS estimates is 208,300t (see Table 6 below); this is remarkably close to the actual BAS estimate of 209,700.

Table 6. Best estimates of catch by gear for Philippine vessels, 2002
Source: preceding review

Catch /area / GEAR	MUNICIPAL		COMMERCIAL		
	Philippines	Overseas	Philippines	Overseas included	Overseas not included
Large handline	17,500	17,500			
Small handline	30,000				
Troll	5,000				
Longline (domestic)			3,000		
Longline (distant water)					1,700
Ring net			18,500	18,500	
Small p/ seine			43,500	43,500	
Large purse seine			1,300		196,500
Unclassified	10,000				
TOTAL	**62,500**	**17,500**	**66,300**	**62,000**	
	80,000		**128,300**		**198,200**
BAS figures (2002)	***63,300***		***146,400***		assume not included

The provisional total catch by Philippines - operated enterprises for 2002 is thus 406,500t.

The estimates of the *municipal* catch, from reconstructing the catch by gear, are 80,000t, if all the handline (large fish) catch is classified as municipal, even though many of the vessels are > 3 GRT, as noted. This compares with the BAS estimate of 63,300t, which may be underestimated, as noted.

The estimates of the *commercial* catch (125,300t) are somewhat lower than the BAS figure of 146,400t, but again, the attribution of all handline catches as municipal may be involved.

2.4 Seasonality

Most areas of the Philippines are affected by seasonal monsoons which influence both productivity and fishing success, with the result that catches in areas other than southern waters below most monsoonal influence are highly seasonal. In most areas, a north east monsoon blows from October to March, and may be associated with good fishing in lee areas eg South China Sea. A period of transition trade winds may occur during April to June, followed by the south-westerly monsoon which may blow from July to September, and is also the typhoon season in more northern areas. The SW Monsoon provides the best period of tuna fishing in many eastern areas eg Sulu Sea, Western Visayas.

2.5 Landings

Catch estimates (production data) are currently derived from sampling landings data (see section 3.2), underlining the need to document the pattern and volume of landings for municipal and commercial tuna fisheries.

2.5.1 Municipal catch

Most of the municipal tuna catch is landed as wet fish in thousands of landing sites all over the Philippines (BAS suggests there were over 8,000 landing centers in 2001). 217 municipal fish landings centers (MFLCs) were sampled from 50 top producing provinces in 2001.
Figures from these municipal surveys (below) show that Region 4 (Palawan, southern Luzon (Calbarzon)) accounted for one third of municipal oceanic tuna landings in 2002, with Regions 1, 7 and 9 also significant landing areas.

Region	1	2	3	4	5	6	7	8	9	10	11	12	AR	CA	**TOT**
YFT	3.5	0.3	0.7	11.8	2.7	2.2	3.2	0.8	4.8	0.7	1.7	1.1	1.6	1.7	**36.7**
SKJ	1.5	~	0.4	8.9	2.8	0.9	2.3	0.4	2.8	0.4	1.5	0.7	3.0	0.8	**26.6**

2.5.2 Commercial catch

The commercial catch, taken by vessels > 3 GT, is also landed in a large number of landings centers (BAS sampled 92 CLFCs in the 26 top provinces in 2001), as well as in fish ports managed by the Philippines Fisheries Development Authority (PFDA) and local Government units (LGUs), and privately managed Fish Landing Centres (PFLCs).
Annex 4 lists the estimated tuna landings by region, with regions 9 and 12 accounting for over 60% of these.

2.5.3 PFDA

Of the eight large ports managed by PFDA, three (Navotas, General Santos and Davao) account for most tuna landings. Some tuna landings data are also available for Lucena (Dalahican), but not for Sual, Iliilo, Zamboanga (Sangali) and Camaligan. Some tuna data are available from two of the three municipal ports managed by PFDA ie Rosario and Infanta ports.

Navotas

Navotas remains the largest fish port in the Philippines, with annual landings of around 200,000t, or 7% of national fishery production (including aquaculture). Tunas comprised 13% of these landings in 2003, with oceanic tuna landings 12,573t. The main season for tuna landings is February-April, with most fish originating from Palawan, Cuyo, and the Visayas. Oceanic tuna landings were around 13,000t in 2002, or 7% of total landings.

	Tuna (Yellowfin/bigeye)	Skipajck (Gulyasan)	Frigate/bullet (Tulingan)	Little Tuna (Katcharita)	TOTAL LANDINGS
2002	2,962	?	?	?	168,318
2003	1,503	11,580	11,567	95	192,717
2004 (to May)	669	6,722	5,999	41	86,345

General Santos

The General Santos Fish Port Complex opened in 1998, and is strategically located with respect to the main tuna fishing grounds of the southern Philippines. The fourth of four ports within the complex opened in July 2004. Tunas and tuna-like species comprise most of the landings (> 90%), with total landings in 2003 of over 61,000t including 53,500t of "tuna and tuna-like species". Landings continue to increase, and the 2004 landings by the end of July have already exceeded the 2003 total. GSFPC is now the easily the largest tuna port in the country, with annual landings of over 60,000t.
The "tuna-like species", locally pirit, are comprised of a mix of juvenile oceanic tunas, frigate tunas and little tunas, and considerably exceed the large tunas in volume unloaded. No detailed breakdown is available from PFDA, but is available from NSAP sampling (see later). Probably less than half of this catch of small "tuna like" species consist of oceanic tunas, with frigate and bullet tunas, eastern little tuna and round scad also included,

The "tunas" are essentially the handline landings of adult yellowfin and bigeye, with approximately one third classified as grade A (suitable for export) and the remainder as "local", for processing as frozen smoked fish or for local consumption. As noted earlier, not all handline landings appear to be made to the GSFPC.

Year	Tunas	Tuna-like	**Total "tunas"**	Total all species
2001	6,470	28,618	**35,098**	43,968
2002	4,432	32,815	**37,247**	49,975
2003	6,485	47,008	**53,493**	61,517
2004 (to August)	N/a	N/a	**57,444**	62,985

Davao

Information on tuna landings by foreign longline vessels in Davao Fish Port has been provided earlier (see Table 4 earlier). These total around 5,000t annually, of which more than half is retained for local processing and consumption. Data provided by PFDA suggest that the sashimi-grade exports comprised around 70% yellowfin, 20% bigeye and small quantities of blue marlin, swordfish and occasionally bluefin tuna; the retained catch unloaded (usually 40-60% of the total landings) consist of yellowfin (45-50%), bigeye (5-10%), variable quantities of unspecified frozen fish (0-30%), and small quamities of blue marlin, swordfish, and shark (5-15%).

Lucena

Tuna landings at Lucena (Dalahican) Port comprise around 10-15% of the total landings of 1,000t per month. The 2003 Annual Report indicates that 765t of skipjack and 97t of yellowfin were landed, with August to November the main season for oceanic tunas.

Rosario, Infanta

There are three ports which are jointly managed by PFDA and LGUs; data on tuna landings are available for two of these ports, and are tabled below. 2003 landings of tunas in the two ports totalled around 4,000t, of which 1,500t was oceanic tunas. These landings are covered by the BAS surveys.

2003 landings (PFDA data)	Skipjack (gulyasan)	Yellowfin (tambakol)	Tuna	Tulingan (Frigate tuna)
Rosario	369	939	91	822
Infanta		53	31	1,373
	370	**992**	**122**	**2,295**

Privately managed fish landing centers (PFLCs)

BAS monitored 65 marine fish landing centers (commercial and municipal) during 2004, of which 16 were PFDA landing points (often several landing pints in one port). With only 47 PFLCs thus currently monitored, providing information on a voluntary basis, it seems likely that total landings to the many PFLCs throughout the country are underestimated. Industry sources indicate that much of the overseas catch by large purse seiners is landed at such centers and transported from there to the canneries, explaining the non-representation of these landings in the official statistics.

Canneries

Direct landings to the 8 canneries in Mindanao probably account for a large proportion of the 250,000t of whole fish processed by these facilities. These landings are not currently monitored to any extent, with the exception of Region 9, where it appears that landings to the two canneries there may be included in commercial oceanic tuna production estimates for that region (46,800t in 2002). Landings to two canneries on General Santos may also be monitored to some extent.

Overseas landings

Landings by Philippine vessels, to overseas canneries in PNG and Indonesia are not currently monitored but may be close to 90,000t in total (PNG 30,000t, Indonesia (Bitung) 60,000t). These landings are likely to increase in future.

2.6 Post-harvest processing and marketing

Municipal catch

Apart from fresh fish market sales for direct consumption, much of the municipal catch is processed by drying, salting, smoking etc. No data are available on the disposal of the municipal catch after landing.

Little of the municipal tuna catch would enter large scale commercial processing, the exception being large handline-caught tuna processed by the tasteless smoke process, mostly in General Santos (see later), and possibly small amounts of tuna sold as wet fish direct to canneries. Decreasing quantities of higher quality handline-caught tunas are exported fresh/chilled to the Japanese sashimi market (estimated less than 2,000t per year now, compared with over 7,000t in the past).

Commercial catch

The commercial tuna catch is increasingly directed towards canning by domestic canneries, based in the Philippines and elsewhere, with lesser amounts to frozen smoked operations.

Canning

There are currently 8 tuna canneries operational in the Philippines, 6 in General Santos and 2 in Zamboanga, although there have been nine or more in the past. The total pack in 2002 was reportedly 10.5 million cases (Tuna Canners Association of the Philippines (TCAP)), the equivalent of 250,000t of raw product, virtually all oceanic tunas. Table 7 lists the annual throughput for the eight canneries, with some indication of the source of raw product. The canneries were estimated to be working at 57% capacity in 2002, and employing nearly 16,000 workers. Several have recently announced plans to expand plants and others are committed to the development of new product lines eg pouch packs.

There is also a Philippines-owned and operated cannery in Papua New Guinea processing around 30,000t per year, and two Philippines-operated canneries in Bitung, Indonesia processing around 60,000t of tuna per year.

Cannery production is increasing, with several General Santos canneries committed to increasing output, as well as expected increased throughput in the Indonesian canneries.

Frozen smoked tuna

Whereas much of the handline catch in the past (1980s) was exported to sashimi markets in Japan, an estimated 70% of the catch, along with landings from foreign longliners in Davao, is now processed using tasteless smoke by 12 factories, 9 of which are located in GenSan. This industry now exports USD 33 milllion of product per year (88% to the US, 12% to other countries) and provides 1500 factory jobs in the GenSan area. Supply of product is however becoming limiting as the handline fishery encounters increasing supply problems.

In former times, there was a katsuobushi plant in Zamboanga, processing skipjack and other tunas, but it is believed this is no longer operating. There were also small canneries in Zamboanga in the early days of the fishery, processing tuna caught by pole-and-line vessels

Table 7. Estimated production parameters of eight Philippine tuna canneries
Source: Industry interviews and estimates

Cannery	Capacity (t/day, and potential)	Annual throughput	Source of fish	Destination of product
GENERAL SANTOS				
General Tuna	200(220)	60,000t	92% Phils 8% foreign	40% export 60% local
Alliance (1st Dom/Prime)	90 (180)	30,000	90% Phils frozen 10% Phils fresh	100% export
Oceans	100	30,000	40% foreign, 60% Phils	100% export
Philbest	140	45,000	50% foreign 50% Phils	95% export 5% local
Seatrade	60	20,000	100% Phils fresh	100% export
Celebes	40 (90)	10,000	80% Phils o/seas 20% Phils fresh	
ZAMBOANGA				
Permex	100	30,000	90% Phils o/seas 10% Phils fresh	100% export (also sardines)
Miramar	80	26,000	100% Phils o/seas	Mostly export
TOTAL	**800t**	**~ 251,000t** (incl. 40,000 fresh?)	37,000 foreign 214,000t Phils	80% export 20% local

2.7 Exports and imports

Data on international trade in tuna products are compiled by the National Statistics Office (NSO) and provided to BAS for inclusion in the annual fisheries statistics .

These data, grouped by standard categories (fresh/frozen, canned etc) indicate that **fresh/frozen exports** of tuna in 2002 totalled 24,000t, of which 38% went to Japan, USA 23%, Indonesia 17%, and Thailand 10%. The available figures do not distinguish species, nor between sashimi-quality exports (mostly to Japan), tasteless smoke tuna and frozen tuna for canning and other uses. It is unclear what these statistics capture and what may not be included, and they are possibly in need of verification.
The 2003 exports are listed as 28,000t, of which 36% to the US, 35% to Japan. Other data suggest that the US imports were composed of 83% yellowfin, and the Japanese imports 45% yellowfin and 55% skipjack.

Fresh/frozen imports in 2002 totalled 30,000t, from Japan (19%), Indonesia (15%), Republic of Marshall Islands (12%), Taiwan (13%) and PNG (11%); 30,000t ? (86% frozen tuna) USA(36), Japan (35, down from 80% in 1995)

Canned exports for 2002 are listed as 10.7 million cases, with a USD value of 150 million. Dy (2004) suggests that USD 215 million is a more realistic value. There are conflicting figures on the destination of canned product, ranging from 58% to Europe, and 40% to USA, to US 39% and Europe 34%. The whole fish equivalent of the canned exports is around 250,000t, very close to the estimated cannery output in Table 7.

Total canned tuna sales are listed as US$172 million, suggesting that US$22 million is local sales. Industry sources indicate that around 10% of the toal pack is consumded locally,
The 2003 figures, which may be incomplete, indicate exports of 9.5 million cases, of which the US comprised 39% and EU 40%. This compares with the situation ten years earlier (1995) when the breakdown by export destination was 35% (US) and 33% (Europe) respectively, with a total value of USD 190 million.

In 2003, Philippines, along with Thailand and Indonesia, benefited from an EU quota at reduced tariff levels (12%) of 9,000t. This may increase gradually over time, but was fully taken up by existing inventory in Europe in 2003.

Table 8 below provides a summary of exports and imports since 1997.

Table 8. Summary of exports and imports of tuna products
Source : NSO data

TUNA EXPORTS (mt) BY QUANTITY (total value in brackets, billion pesos)

Source: BAS report, data from NSO

	Fresh/chilled/frozen[1]	Dried/smoked	Prepared/preserved[2]	TOTAL
1997	22,755	198	56,164	79,115 (5.103)
1998	46,154	187	52,120	99,461 (7.938)
1999	41,127	253	36,857	78,237 (5.267)
2000	42,068	591	36,458	79,117 (4.842)
2001	22,072	771	33,909	56,752 (5.871)
2002	23,621	705	47,970	72,296 (7.510)

[1] Includes fresh sashimi, frozen smoked, frozen bulk tuna for canning overseas
[2] Mostly canned
DESTINATION (2002):
Fresh/chilled/frozen - USA, Japan, Hong Kong; Canned – Canada, Singapore, Germany

TUNA IMPORTS (mt) BY QUANTITY

	Fresh/chilled/frozen	Dried/smoked	Prepared/preserved	TOTAL
1997	53,816		49	53,865
1998	69,343	18	41	69,402
1999	57,261		26	57,287
2000	34,482	21	44	34,547
2001	19,125	19	196	19,340
2002	30,524	N/a	N/a	
2003	51,914	N/a	N/a	

SOURCE (2002)
Japan, Indonesia, PNG

3. Review of current monitoring systems

Terms of Reference
The review of the current monitoring systems 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 of the current monitoring system will also address the ability of the system to meet the obligations of the Philippines to provide tuna fisheries data to the Commission, including estimates of annual catches, operational catch and effort data, unloading data, port sampling data and observer data.
BFAR will be actively involved in the review, with one BFAR staff member accompanying the consultant primarily to facilitate access to government and industry.
Recommendations for improvements in the current statistical system will be formulated in collaboration with BAS and BFAR.
The review will also examine the suitability of ports for the port sampling and survey programme and an observer programme.
The report of the project will include sections on: the review of the current monitoring system; the ability of the system to meet the obligations of the Philippines to provide tuna fisheries data to the Commission; recommendations for improvements in the monitoring system (formulated with BAS and BFAR); and the suitability of ports for the port sampling and survey programme and an observer programme.

In undertaking the review, the consultant made visits, in the limited time available, to the key commercial landing sites of Zamboanga (Region 9), Davao (Region 11) and General Santos (Region 12), as well as Regions 4a (Palawan)and 4b (Calbarzon), as examples of high municipal catch, and the NCR. Other productive landing sites within the above regions or elsewhere were not able to be visited for security reasons (eg Pagadian, Tukuran, Jolo, Sulu) or were too remote in the available time frame (eg Tandag) or involved seasonal tuna fisheries which occurred at other times of the year (eg Borongan). BFAR and BAS staff were visited and interviewed in all regions visited, along with staff in Government agencies in Manila and industry personnel in all landing sites. Annex 3 lists the itinerary of the review visit and Section 6 the persons contacted during the course of the study. The consue ltant was accompanied on all field trips by BFAR staff Francisco Torres Jr., with all visits facilitated by the BFAR Director Malcolm Sarmiento Jr.

A detailed fishery profile has been compiled for each region visited, but has not been included in this report for reasons of brevity.

3.1 Bureau of Fisheries and Aquatic Resources (BFAR)

The Bureau of Fisheries (BoF) was established in 1947, as the agency responsible for the management, development and conservation of the fishery resources of the Philippines; collection of fisheries statistics started in 1948, with the first official statistics on commercial vessel numbers, production by gear type, and exports and imports published in 1952. The BoF was however replaced by the Philippines Fisheries Commission, with essentially the same functions, in 1963. The Bureau of Fisheries and Aquatic Resources (BFAR) later established and has variously been an agency or department within various departments over the years, but is currently within the Department of Agriculture (DA), along with other key agencies BAS, PFDA and NFRDI. BFAR tuna statistics date back to at least 1970, but the methodology of estimating tuna catch in the early years is not well documented. Official annual fishery statistics were

published by the Bureau, usually two years after the end of the year concerned, for the period 1970-1981.
During the course of the South China Sea Fisheries Development and Coordinating Programme, which began in 1974, and the subsequent (1981) Indo-Pacific Tuna Development and Management Program (IPTP), a sampling programme to provide both production estimates and biological data from the fishery was initiated, involving four sampling sites in Mindanao (General Santos, Zamboanga, Davao, Opol) which accounted for a large proportion of the commercial tuna landings at that time. Raised production estimates were obtained from this sampling (Ganaden, pers.com).
The IPTP continued to publish tuna statistics for the Philippines (and other countries) up until 1991.
In 1987, the decision was taken, apparently in the interest of centralizing statistical data collection functions, to transfer the responsibility of fisheries data collection to the Bureau of Agricultural Statistics (BAS), with seven (7) BFAR staff transferred at that time to BAS. The role of BFAR in the generation and compilation of fisheries statistics was reduced to advisory and corroborative, contributing data collected from ongoing BFAR programmes and participating to varying degrees in the official verification and estimation process for national fisheries statistics, at regional level.
Later, it was also expected that BFAR would also contribute funding to the conduct of probability surveys by BAS to provide more realistic estimates of landings. The level of funding provided since 1999,and the provincial coverage achieved is tabled below.

Table 9. Funds released by BFAR for generation of fisheries statistics
Source: BAS

YEAR	SURVEY MONTHS	SURVEY COVERAGE		BUDGET RELEASED BY BFAR (Pesos)
		MUNICIPAL	COMMERCIAL	
1999	October-December	15 provinces	8 provinces	10,000,000
2000	-	0	0	0
2001	July-December	50 provinces	26 provinces	13,000,000
2002	April-December	15 provinces	7 provinces	7,080,000
2003	October-November	64 provinces	49 provinces	6,500,000
2004	?			?

BFAR was the primary oversight agency for the Fisheries Sector Program during1990-95, when the Philippines Tuna Research Project (PTRP) was carried out as a major component of the FSP. Implemented by consulting provider PRIMEX and with the assistance of the SPC /OFP, the PTRP executed a tuna tagging project leading to stock assessment of the oceanic tuna species, a statistical monitoring programme for tunas (the Landed Catch and Effort Monitoring Project, LCEM) at 16 landing sites around the country during 1993/94, a desk study of the extent of distant water fishing nation activity in Philippine waters, and a pilot observer programme in association with trial longlining. At the conclusion of the PTRP IN 1995, no additional funding was committed to the continuation of these important activities.
Website <bfar.da.gov.ph>

3.1.1 National Stock Assessment Project (NSAP)

The National Stock Assessment Programme (NSAP) started 1997, within the Marine Fisheries Research and Development Division of BFAR, to provide the scientific

information to support sustainable management of aquatic resources in the country, and as a response to "the lack of standardized and continuous information on fishery resources", a reference to the stop/start nature of fisheries data collection. Implemented by the National Fisheries and Development Institute within BFAR/DA, and partly a continuation of the approach developed by the LCEM, the NSAP involves data collection (sampling of landings) in all 15 regions of the country, with a Regional NSAP Project Leader in each region, and an annual budgetary commitment (around 2 million Pesos in recent years) provided to the BFAR Regional Director on a discretionary basis[2].

Funding fro NSAP was provided for an initial three year period, renewed in year 2000, and reviewed in late 2003. Although expected to cover all species of significant commercial importance, some of the more important species in the catch were selected for detailed study. These vary amongst regions, with small pelagics and tunas the main focus of the work, given their relative importance to the fishery. The "limited actual" sampling, involving more than 70 sites (compared to 4 during the IPTP and 16 during the LCEM for tuna-specific sampling), provides information on:

- Catch and effort by fishing ground and species, including types of gear, number of gear units, effort in units, total catch by gear, and trends in catch rates
- Biological data, including species composition, size distribution, seasonal and spatial distribution and reproductive biology.

The catch information was also supposed to supplement BAS activity, in "providing an adequate basis of estimation of the total fish production by BAS".

Annex 1 lists the assessments undertaken so far in regions, these being presented to the initial review of the NSAP in late 2003. As can be seen, a large amount of useful data on oceanic tuna species, plus some detailed tuna assessments, has been generated.
Whilst the NSAP is generally regarded as being successful in achieving its main objectives[3], there are some clear deficiencies with respect to the tuna data.

- Whilst data have been diligently collected at provincial level and in some cases utilized in assessments, not all data have been subsequently compiled in a central location (NFRDI), for use at national level. Much data is retained at the regional offices. A National Database has been established and an Intranet linking 8 NSAP regional offices to the NT server at BFAR Central Office Manila. There is also an FTP page established for data transfers but this remains underutilized. In practice, some regions lack the necessary hardware and capacity to harness it to full effectiveness. There are known instances of hard copy data being discarded as surplus to immediate requirements.
- There is clearly a need for data rescue (retrieving and entering hard copy data, or transferring existing data in Access or other formats to the National database) in some regions. This should be identified and the issue addressed as priority.
- There may also be hard copy data which has been consigned to Manila but remain in storage, unentered. Funding for data entry could be an associated constraint in the current financial climate, with the most recent entry of NSAP data being catalyzed by external funding from SPC/OFP.

[2] Not all of these funds are actually received, with 25% resumed initially, and release of the remainder often subject to lengthy delays.
[3] Outcomes of the review of the NSAP undertaken in late 2003 are not yet available

- All the above concerns would seem to underline the need for a integrated data management system and a data inventory, whereby all available data from each region could be tracked, from collection to entry and subsequent incorporation in the national database.
- The NSAP is beginning to suffer from being undermanned, with staff not being replaced as they retire or move on, especially with the current freeze on Government recruitment in place. The large number of sites being sampled (70) is not always adequately supervised in some cases. Similarly, necessary follow-up with the coordination and consolidation of data is not being undertaken.
- With funding shortfalls, most NSAP sampling activity was halted in mid 2002, and only resumed in early 2003. Apart from the significant data gap and the break in the time series from August 2002, few recent data also seem to have arrived at the national office and been entered to the National NSAP database since that time.

Williams (2004) has recently undertaken a thorough review of the available NSAP tuna data, which confirms these concerns and identifies additional issues to be addressed, including the sampling strategy and design (with respect to the choice of ports), the need for standardizing effort units used and fishing ground names, collection of positional data, and data raising issues.

Some of these concerns might be best dealt with by the appointment of a dedicated national coordinator responsible for tuna data collection, coordination, data entry, analysis and subsequent reporting at various levels. This is discussed later as a recommendation of this review.

It is clear also that provision of data to the national database needs to be established as routine priority activity at regional level, particularly in the case of tunas, where most data needs are at national and international level, rather than region level. Examples are provided by two regions where tuna stock assessments have been undertaken, drawing on large amounts of well organized sampling data, yet no data have been posted on the national database and were not examined during the NSAP review eg Region 13 (skipjack), Region 11 (small pelagics and tuna). A listing of data gaps could easily be drawn from the list of assessments undertaken and might represent a first step in the process of data rescue and centralization.

3.2 Bureau of Agricultural Statistics (BAS)

The history of BAS involvement in fisheries statistics is well described by Vallesteros (2002), as are the data collection systems used. Responsibility for the generation of statistics for the fisheries sector was transferred to BAS from BFAR, by Executive Order 116. Seven 7 BFAR staff were transferred to BAS at that time, but no additional operational budget was initially provided to supplement the existing BAS budget. From 1990-1995 inclusive, funding was provided under the Fisheries Sector Programme (FSP) to develop the National Fishery Information System (NFIS), but since that time, BAS had relied on funding support from BFAR to sustain this activity. An earlier table (Table 9 above) summarizes these contributions in recent years.

The Fisheries Statistics Division within BAS has the responsibility of fisheries data collection, compilation, analysis and dissemination, for all capture fisheries (marine and inland, municipal and commercial) and aquaculture. Whilst tuna figure prominently in the

sector (estimated 11% of total production), collection of tuna statistics is only part of the overall activity undertaken by the Division.

Data collection and initial processing
In generating estimates of the volume and value of production from the diverse and complex fisheries sector, BAS carries out probability (stratified random sampling by data collectors) and non-probablity (interviews by regular BAS staff) surveys, supplemented by secondary data from administrative sources eg PFDA landings. Surveys cover commercial and municipal fisheries (landing centres), inland fisheries (fishing households) and aquaculture (farm sites).

The *probability surveys for commercial fisheries* (vessels > 3GT) involve two-stage stratified random sampling design (province/landing center/vessel), with the landing centers stratified by volume of landings. A list of landing centres is maintained in 54 provinces but has not been updated since September 2000.
As the surveys are carried out by contracted data collectors from the area (barangay) concerned (P1,500 per month), the coverage of the surveys is determined by the funding available. In late 2001, 92 commercial fish landing centres (CLFCs)from 26 of the top producing provinces were sampled, and in 2003, 144 CLFCs.
During the sampling period, usually the second semester, data are collected every other day at the landing centers, through interview with senior vessel personnel, using standard questionnaires. Operational details (including effort and fishing ground), catch and value are recorded.
Non-probability surveys are undertaken on a monthly basis by regular BAS staff when funds are insufficient or their release is delayed. 114 commercial landing centres were sampled during late 2001, with key informants interviewed.
Secondary data are collected from PFDA ports (8), ports managed jointly by PFDA and and LGU (now < 10), and privately managed landing centers (around 70 ?), on a monthly basis, using standard forms.
Data manipulation – data are computerized at provincial level (input/review/validation), sent to regional centres for generation of regional summaries, which are then sent to the BAS central office.

The *probability surveys for marine municipal fisheries* cover more provinces (64), but are of similar design to those for commercial fisheries (two-stage stratified random sampling). In late 2001, 217 MFLCs from 50 top producing provinces were sampled.
Non-probability surveys are carried out as for commercial fisheries.
Collection of secondary data is not relevant to municipal fisheries.

The data review process
Survey data are reviewed initially at provincial level (comparison with previous periods, completeness, query of gross changes in variables). The data are then reviewed at regional level, on a quarterly basis, at a “Regional Data Review for Fisheries” with the involvement of PFDA and regional BFAR staff, plus key informants form the sector. A national review, also quarterly, is finally conducted at central office with the presence of regional BAS Statistical Officers.
Some NSAP data would usefully be incorporated in these quarterly summaries but are rarely if ever available within the timeframe established for BAS data compilation(21st of each month). It is possible that this might be done retrospectively, but would be difficult.

Quarterly reports (performance and situation) are then disseminated, and an annual handbook with a five year time series of data is published annually (although due to funding constraints, the 1998-2002 series has yet to be published).
Appendix Table 4 summarizes the estimates of 2002 tuna catch, by species and region, for commercial and municipal

Issues arising
The main problem identified with the present system is obviously the lack of adequate funding to properly carry out detailed probability surveys. Even with adequate funding, surveys are carried out for just two to three months per year, usually in the second semester. This raises the issue, amongst others, of how seasonal effects are accounted for in the estimates.
With funding support from BFAR seeming to be declining, as Government budgets become tighter or are cut, freezes on recruitment, replacement etc, there is greater reliance on non-probability surveys. These, by their nature, must come with very wide variance estimates and their reliability must be questioned.

Other issues which need to be addressed are:

- Commercial catches by large scale operations, which account for the majority of the catch, are probably not well captured at present; submission of information is voluntary, vessel (and company) coverage is almost certainly very incomplete, and catches are under-reported for various reasons. Given available estimates of the catch by large and small purse seine vessels, it seems clear that the present estimates generally do not include catches by Philippines flag vessels fishing outside Philippine waters but unloading most of their catch in Philippines ports or canneries
- The worst gaps are probably in Region 12, centred in General Santos, where most large scale fishing activity is based, and most unloading and processing occurs. (The estimated 2002 commercial tuna catch for region 12 was just 43,000t).This is generally recognized by BAS and industry, and a recent MOA between BAS, BFAR and the Soksargen Federation of Fishing and Allied Industries (SFAII) is attempting to address this.
- There is currently no monitoring of processing volumes and source of material – with much overseas (and even domestic) production landed direct to canneries, this is clearly a gap in current coverage. The possible exception may be Region 9, where landings to the two canneries there seem to be included in the commercial tuna catch estimates (46,000t in 2002).
- There is doubt that all commercial (private) landing sites are adequately covered, and this needs to be assessed, as part of a general need to re-assess the list of commercial and municipal landing centres (last updated in September 2000)
- The PFDA landings are an important source of secondary data and good liaison needs to be maintained with PFDA staff.
- Aside from the universal problem with bigeye tuna not being distinguished from yellowfin tuna in landings data, there is also the issue of how to deal with multi-species nature of the tuna catch, where there may be up to six species of neritic and oceanic tunas in landings from a single vessel (or even a single basket of fish). For practical reasons, in a sampling regime where tunas are only part of the huge range of species being sampled, the catch would be assigned to the perceived dominant species, or a species grouping (eg “pirit” for small tunas, in

GenSan). This unavoidably adds additional uncertainty to estimates of catch by species.

- Although information is currently gathered, during surveys, on fishing ground and rough measures of fishing effort, these data seem not be analyzed or utilized in any way; similarly, published data summaries no longer provide a breakdown of catch by gear, meaning that current estimates (eg in the SPC Yearbook) have to fall back on data from 1996 for partitioning into catch by gear.
- The handline tuna catch, an important component of the tuna catch in both volume and value, presents particular problems as noted earlier. Most vessels are assumed classified as municipal (despite being > 3 GT) but without information on catch by gear by category, it is difficult to ascertain what proportion of the catch is covered by the current estimates. It is also suspected that some of the catch is landed at sites or ports not covered by the current surveys.
- The landings by foreign longline vessels unloading and transhipping in Davao appear to be included in the commercial catch estimates for Region 11 (see Annex 4)
- With the restructuring of the administrative regions in 2002, primarily to split the old Region 11, to reconstruct a new Region 12 (Soksargen) centred on General Santos, and ARMM and CARAGA, the historical BAS records need to be adjusted to reflect this, otherwise the times series for the regions affected cannot be used for comparative purposes.
- The methodology adopted by BAS for the surveys seems acceptable, given the realities of working with such a complex fishery and funding limitations which apply. It has not been subject to detailed review here, but some issues eg raising procedures might need to be addressed in the future, especially as requirements for verified estimates of catch are enforced by the WCPF Commission.
- Similarly, it appears improvements could be made to the forms used to collect data during surveys. Although this has not been addressed, Williams (2004) recently presented a review of the forms to SCTB 17, recommending areas for improvement.
- There is a general need for greater involvement of BFAR and other key informants in the quarterly regional data reviews in some regions; this occurs to a healthy extent in some regions but not in others. Along with this, there is much to be gained in utilizing NSAP data to inform this process, especially at landing sites where both BAS surveys and NSAP sampling occurs. Indeed, considerable synergy and possibilities for corroboration would be achieved if this was incorporated into the sampling design by both agencies. This would be especially useful with respect to species composition data and catch by gear data.

Website <bas.gov.ph>

3.3 Other organizations involved in maritime governance and monitoring

3.3.1 PHILIPPINE FISHERIES DEVELOPMENT AUTHORITY (PFDA)

Since 1976, PFDA, a statutory authority within DA, has been mandated to support fishing industry development by providing fish ports (now 8 major ports – Navotas, Iloilo, Zamboanga, Camaligan, Lucena, Sual, Davao and General Santos), post-harvest facilities, ice plants, cold storage and other facilities, in support of handling and

distribution of fishery products. Data on the volume of catch (landings) by species, and value, are also collected in the PFDA managed ports.
These data, broken down by species, are useful sources of tuna landings data, as discussed in section 2.5.
PFDA also maintains ongoing involvement with LGUs in the joint operation of some smaller municipal ports around the country, although these now number 4 (Rosario, Infanta, Puerto Princesa, and Tukuran), as they are gradually taken over by the LGUs concerned. More than 20 municipal ports (26) have now been handed over to LGUs. The extent and quality of tuna landings data obtained from LGUs is not known.
The PFDA data are an important source of secondary data, accounting for tuna landings (tuna and tuna-like species) in excess of 70,000t per year.
Website <

3.3.2 MARINA

The Maritime Industry Authority (MARINA) within the Dept of Transport and Communication (DOTC) operates the register for Philippine flag vessels of more than 3 GT. MARINA approval is the first step in the registration of a commercial vessel. MARINA maintains the register of Philippine flag vessels which would be very useful in the corroboration and scoping/verification of declared catches.
Following MARINA approval, vessels then require a certificate of inspection by the Philippine Coast Guard (PCG) and registration of homeport, then to BFAR for the CFVGL (Certificate of Fishing Vessel and Gear Licence) and IFP (International Fishing Permit).
In practice, many vessels do not seek CFVGLs , despite having other certification and the BFAR CFVGL records are generally not useful in terms of characterizing fishing. vessel activity in a given region. The MARINA and PCG data, on the other hand, are possibly the best source of information on the scale of operations of the handline fleet.
MARINA operates a website at <marina.gov.ph>.

3.3.3 PHILIPPINE COAST GUARD

Also within the DOTC, the Coast Guard is the implementing and enforcement agency for maritime safety rules and regulations governing the safe operation of Philippine-flag vessels engaged in domestic trade.

3.3.4 NATIONAL TUNA INDUSTRY COUNCIL (NTIC)

DA Special Order No. 659, s. 2000 establishes the National Tuna Industry Council or the Tuna Council, for short, with the following functions:

(a) Formulate a Strategic Action Plan for the tuna industry;

- Standing policies on Philippine participation in, and implementation of, international fishery management conventions for tuna and tuna-related species
- Program of action for ensuring, maintaining and/or expanding Philippine access to tuna fishing grounds
- Integrated economic development plan for the tuna industry, from catchers to processors and marketers
- Agreed industry-government program of activities to carry out the Plan

(b) Review and recommend policies affecting the industry, including those that affect bilateral and multilateral fishing relations;

(c) Review and recommend policies affecting trade relations, including those that affect the global competitiveness of the industry;

(d) Call on any government agency or the academe to assist in the formulation of the Strategic Action Plan, review of the relevant, policies and implementation of projects and programs;

(e) Coordinate with private and public entities affected by the Action Plan;

(f) Recommend projects and programs that will benefit the industry; and

(g) Establish an integrative and inter-sectoral mechanism for collaboration for the above purposes.

The NTIC has a potentially useful role to play in determining policy, assessing industry needs, and coordinating industry cooperation and responses, which has yet to be fully harnessed. A resolution of the 2004 Tuna Congress requests the Office of the President to expand the membership of the existing council to include other concerned Government agencies. It was also announced during the Congress that NTIC would soon come under the authority of the Office of the President, adding considerable power to its role.

3.3.5 NATIONAL STATISTICS OFFICE (NSO)

The NSO, under the supervision of the National Economic and Development Authority (NEDA), maintains the official statistics on fishery exports and imports for the Philippines. These are ordered by standard categories, by species and value, and provide information vital to monitoring product flows and corroborating production figures. A summary table was provided earlier in section 2.5

NSO also coordinates the national Census of Fisheries (CF). Conducted every ten years, the CF is a large-scale government operation that gathers data and generates the latest statistics on fisheries. The National Statistics Office (NSO) expects to interview about 1.18 million municipal and commercial fishing operators and about 500 thousand aquaculture operators nationwide, when the Census of Fisheries (CF) is undertaken in 2004. Experts from BAS and BFAR serve as resource persons for the training. The CF generates useful background information to the municipal production data, but is less useful with respect to large scale commercial fishing production.
Website <census.gov.ph>

3.3.6 TUNA CANNERS ASSOCIATION OF THE PHILIPPINES (TCAP)

TCAP usefully maintains and distributes statistics on tuna cannery production, which consumes over 250,000t of tuna per year now, mostly from Philippines vessels operating outside Philippine waters.

3.3.7 FEDERATION OF FISHING ASSOCIATIONS OF THE PHILIPPINES (FFAP)

Established in 1974 to address concerns of a lack of industry involvement in Government policy and decisions, the National Federation’s role is not well understood, but it remains potentially a powerful lobby to see industry concerns are addressed.

3.3.8 SOKSARGEN FEDERATION OF FISHING AND ALLIED INDUSTRIES (SFFAI)

Established in 1999, enjoying increasingly wide participation by industry and strategically located at the centre of the Philippines tuna industry, SFAII is becoming an authoritative voice on a range of issues affecting the industry, domestic and international.
As noted, it has recently concluded an MOA with BAS and BFAR, to attempt to improve tuna fisheries statistics within it area of influence.

3.3.9 FISHERIES TECHNICAL WORKING GROUP (FTWG)

This group was formed within DA in 2000, involving BAS, BFRA and PFDA, to look at "issues and concerns related to fisheries statistics". Although the group initially met regularly, it now appears to meet only intermittently, but potentially could play a very useful role in particularly coordination of the activities of the three agencies relating to fisheries statistics.

3.3.10 MARINE AND OCEAN AFFAIRS CENTER (MOAC)

Established by EO 132 as the secretariat to the Cabinet Committee on Maritime and Ocean Affairs, the premier policy making body on maritime policy for the Philippines, MOAC coordinates participation of relevant agencies in international for a concerned with maritime affairs eg UNCLOS, WCPFC etc, develops national capacity in maritime and ocean affairs and maintains relevant databases, as well as "raising the national archipelagic consciousness and communicate, in a coordinated manner, and publicize national maritime and ocean interests and issues". A useful website can be found at <dfa.gov.ph/maritime/moac>

3.3.11 PHILIPPINE NAVY

The Philippine Navy is mandated under the Fisheries Code to enforce the provisions of the code and fishery regulations in the Philippines, and supports the Coast Guard in fishery protection activities and IIU fishing apprehensions.

3.4 Port Sampling Programmes

The topic of port sampling programmes has essentially been covered in the review of the NSAP programme earlier. In summary, the current programmes, if they can be maintained, are probably operating at an appropriate level of coverage, but various ways of more effectively coordinating data collection and better utilizing the data have been identified. Sampling priorities at regional level could also benefit from re-evaluation.

3.5 Observer Programmes

There are currently no observer programmes in operation, although there has been one pilot programme in the past (1993), associated with trial longline fishing under the FSP. As observer programmes will be required under the WCPFC for fishing on the high seas (or in multiple EEZs) involving Philippines vessels, there is also merit in considering the development of an initially small observer programme for selected domestic vessels, notably those which operate outside Philippine waters to varying extents.
The design, scope and operational details of such a programme are not considered here, but it is assumed that a degree of cost recovery would be required to fund that programme, that external assistance might be required to train a cadre of observers, and that procedures and standards applied elsewhere could be adopted to the Philippine situation. There has been some observer coverage of the Philippines vessels operating in PNG waters, both Philippines flag vessels under bilateral access, and locally-based Philippines and PNG flag vessels.

4. Compilation of Historical Catch and Effort Data

Terms of Reference
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.

The report of the project will include a section listing the catch and effort data sets that are compiled, including the source of the data and the gear types, geographic areas and time periods covered.

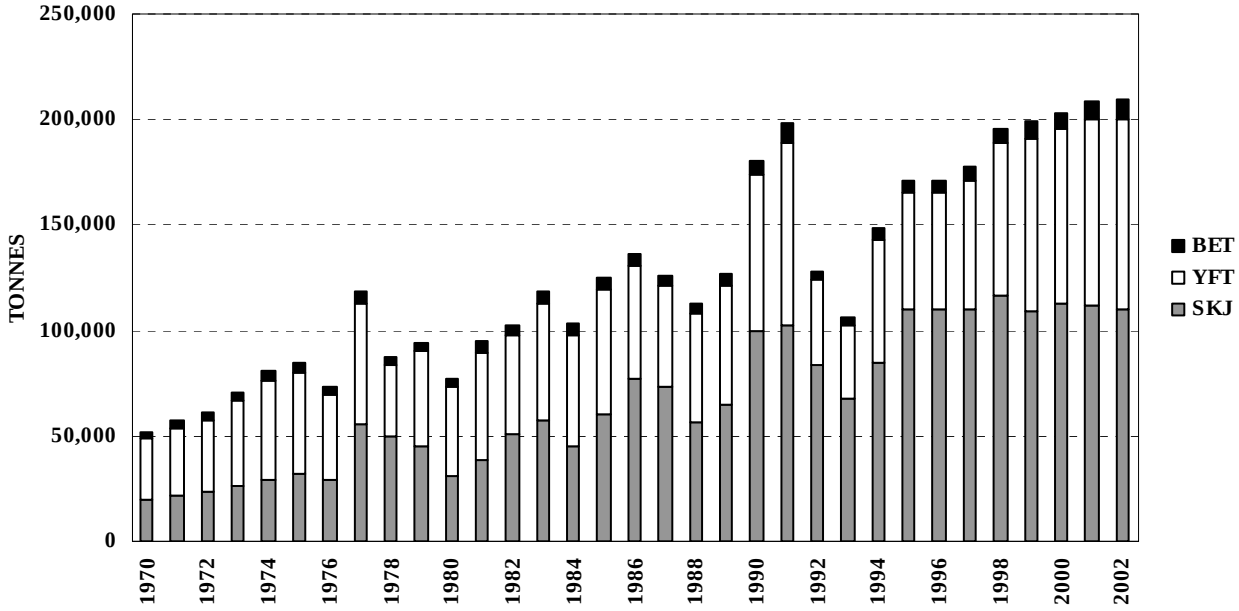
Before considering historical catch and effort data, and the possible compilation of such data sets, it is important to recapitulate the situation with current estimates of catch and what they represent. The Philippines Fisheries Code of 1998 (Art 2, Sec 32) states that "*Fishing vessels of Philippine registry may operate in international waters or waters of other countries which allow such fishing operations: … Provided, further, that the fish caught by such vessels shall be regarded as caught in Philippine waters and therefore not subject to all import duties and taxes only when the same is landed in duly designated fish landings and fish ports in the Philippines".*
Official estimates of the Philippines catch should therefore, under the Code, include landed catches by both Philippines-based and Philippine overseas-based vessels caught outside Philippine waters eg PNG, high seas, and Indonesia. In practice, this may occur with the official statistics to some degree, but as seen earlier, it is equally clear that they do not capture most of the landings by overseas Philippine fleets.
As such catches occur beyond the jurisdiction of the Philippines, they will not be regarded as Philippine catch by the WCPF Commission, but will need to be reported separately as part of flag state responsibility.

Recommendation
There is a need therefore to develop, with some urgency, a system whereby reliable estimates of catches in Philippine waters and catches by Philippine vessels outside Philippines waters and on the high seas can be documented separately and reported annually to the Commission.

Historical tuna catches

The most recent SPC Yearbook (2002) provides estimates of historical catch of skipjack, yellowfin and bigeye, for the **domestic** fisheries of the Philippines from 1970 to 2002, drawn mostly from BFAR and BAS sources, as well as some estimates of **distant water purse seine** catch, those for catches in PNG. "Domestic" is not anywhere defined, and there are some complexities with the definition of the "distant water" category (see below). Domestic catch is therefore assumed to be that taken in Philippine waters by Philippine flag vessels, and will not include, for example, an assumed significant IUU catch in the same area. These figures on the historical domestic catch of oceanic tunas are attached as Annex 5, and graphed in Figure 6 below.

Figure 6. Catches (tonnes) of skipjack (SKJ), yellowfin (YFT) and bigeye (BET) by Philippines domestic fisheries
Source: Tuna Fishery Yearbook 2002



The total domestic tuna catch fluctuates between 100,000 – 140,000t during the1980s, until 1990/91, when it jumps to 180,000-190,000t. It then returns to lower levels in 1993/94, before rising steadily to the current record high levels of around 209,000t. The sharp increase in 1990/91 seems to be associated with increased purse seine catches of skipjack (Δ =15-24,000t), gillnet catches of skipjack (Δ = 6,00t) and hook catches of yellowfin (Δ= 14-21,000t), plus some general increases in unclassified catches. It is not clear if the jump in 1990/91 is real or a statistical artifact, although 1991 in particular was marked by high skipjack catches all over the WCPO. Features of the total catches since 1992 have been the steady growth of the skipjack ringnet catch till the mid-1990s, the stability of the purse seine and ring net skipjack catch since 1995, the apparent recovery of the yellowfin hook catch to record high levels in 2002, and modest growth of the yellowfin catch by both purse seine and ringnet since 1994. Overall, there has been little increase in catch since 1998 (7,000t/year, or 4% p.a) and only 20,000t since the high 1991 catch. The yellowfin catch has doubled, after slumping in 1992 to below 40,000t, and is now at all-time highs (90,700t), not much below the skipjack catch (110,000t). The history of these catch estimates has been discussed earlier, and as they have been estimated by different agencies using different methodologies, it is probable that (a) there is a good deal of variance about the estimates and (b) estimates for different periods eg 1980-1987, 1988-1995 may not even be directly comparable. It would be very difficult if not impossible to attempt to reconstruct these official annual estimates, especially in the case of the municipal tuna catches.

The data on the **distant water purse seine** fishery derives from logbook data held at SPC, covering catches in mostly in PNG and Solomon Islands, but with about 20% of the catch, at least for 1992-98, reported to come from Indonesia and Philippines. All of

this data presumably comes from the two companies with operations based in PNG which seasonally fished in some years domestically, and/or in Indonesia.
As seen in section 2.2.8, there were however, in 2002, 52 large purse seiners fishing, and taking less than 2% of their catch in Philippines waters. These vessels, which took an estimated 200,000t in 2002, can all be regarded as distant water seiners, taking their catch in PNG, Indonesia and in high seas areas. A small number of the vessels are PNG flag (6) although Philippine owned and operated, and another 11 vessels are attributed to PNG in the SPC Yearbook on the basis of being PNG-based, and landing most of their catch there for canning. This then leaves another 35 vessels which should be included in the Philippines distant water purse seine category. There are 11 vessels currently listed in this category which fish almost entirely in PNG waters under access agreements, taking around 30,000t of tuna. By subtraction, there would seem to be another 24 vessels remaining, taking around 100,000t in Indonesian waters and in high seas areas.

It is probable that this catch of 100,000t is not currently captured elsewhere in WCPO statistics.

The recent Indonesian tuna statistics provided by DGF appear to have no specific purse seine catches, and these are estimated (or assigned) for the SPC Yearbook from the 1990 data, in terms of catch by gear at that time. These nominal estimates are in any case low (32,500t for 2002).

There is thus between 70,000 and 100,000t of catch by Philippines distant-water purse seine vessels not obviously accounted for in the present WCPO statistics compiled by SPC.

There is no known logsheet coverage of this fleet, and any reconstruction of historical catch would require access to company records.

Table 8. Estimated catch by area for large Philippine purse seine vessels, 2002

	No. of vessels	Est. catch	Area
PNG flag	6	20,000	PNG (> 90%)
PNG-based, classed as PNG catch	11	45,000	PNG
PNG access	11	30,000	PNG (> 90%)
Other	24	100,000	Indonesia (72,300), high seas (37,600)
TOTAL	**52**	**~ 195,000**	

The **distant water longline** fishery, involving a Philippines-Japanese joint venture operation and several Philippines companies, has been in operation since at least 1998, fishing mostly in higher latitudes in all three oceans, and targeting bigeye in recent years. Data have been supplied to ICCAT and IOTC for the Atlantic and Indian Ocean catch, but not as yet to any WCPO authority at this time, as no RFMO has existed. Catch levels have been discussed in section 2.2.7.

Catches in Philippine waters by other fleets (IUU fishing)

Apart from the catch in Philippines waters by Philippine flag vessels, there is also assumed to be unlicensed catch by foreign vessels. Under the Fisheries Code and Government policy, foreign fishing activity is not permitted in Philippine waters, and this would automatically be regarded as IUU catch A desk study (PTRP, 1995) summarizes catches in the area of the Philippines by foreign fleets, based primarily on SPC data holdings. It was concluded that longlining by Taiwanese offshore vessels was the likely main source of foreign fishing in Philippine waters, with possibly 40% of the catch by these vessels originating in Philippine waters at that time (1995). If that pattern has been maintained, this could represent an annual longline catch of 10,000t in Philippine waters, of which 4,000t may be yellowfin. Catches in Philippine waters by other vessel types (purse seine and distant water longline) appear to have been minor for some decades. With the development of a Chinese longline fleet, it is to be expected that catches by this fleet will be made in Philippine waters in the South China Sea. This is presumably also true of the developing Vietnam longline fishery, which is now reported to catch more than 20,000t per year.

The Philippine Navy has reported over 200 intrusion incidents in most recent years, mostly involving ROC, Malaysian and PRC vessels, in the northern and southern sectors. These are believed to represent only a fraction of the total infractions, given the severe constraints on surveillance activities.

Part of the Taiwanese longline effort seasonally targets spawning northern bluefin tuna (*Thunnus thynnus orientalis)* in the north-east corner of Philippines waters (15^0 – 21^0S, 123^0 – 129^0E, April to June) which may have some implications for Philippines, as this heavily fished valuable species is likely to subject to international management measures. The reported appearance (and capture in municipal fisheries) of juveniles along the east coast of Luzon coast afterwards may also need to be investigated.

Reconstruction of historical tuna catch record

It will be difficult to attempt to reconstruct an historical record of the Philippine catch, with no logsheet system currently in place, except perhaps for those vessels fishing under bilateral access agreements and completing these as a condition of access. It might however be possible, with the full cooperation of the 30-40 companies concerned, to reconstruct estimates of total catch and vessel numbers, with possibly some information on area fished, for the larger commercial operations (large and small purse seine, ring net). Even though several of the larger companies have indicated a willingness to cooperate, by providing access to office records, this would however be a considerable task. The companies also expressed doubt that data would go back for more than a few recent years.

An attempt to reconstruct the historical record might usefully commence with a compilation of the numbers of large purse seine vessels registered with MARINA. This is being attempted for the period 1992 onwards, with the cooperation of MARINA, but is far from complete. The MARINA records currently do not require a statement of the type of fishing vessel or gear type and are thus difficult to sort and assign a vessel/gear classification.

In anticipation of the introduction of a logsheet reporting system, commencing with the larger purse seiners, a list of these 52-56 vessels is currently being compiled.

5. Recommendations and Conclusions

5.1 Review of fisheries and catch estimates

The tuna fisheries of the Philippines are large and diverse, and range from small scale artisanal fisheries, involving tens of thousands of fishers throughout the Philippines and hundreds of landing sites, to international high seas purse seine fleets which rarely return to the Philippines. They are usually multi-species fisheries, with multiple landing points for municipal fisheries in particular, and pose particular challenges for accurate statistical data collection, with some activity undertaken on a quasi-legal basis, and not susceptible to close monitoring.

Based on a review of the fisheries by gear type and information contributed by industry, the total catch of oceanic tunas by Philippines-flag vessels is likely to have exceeded 400,000t in 2002, making it the one of the major (if not the top) tuna producers in the WCPO. Current official estimates of the oceanic tuna catch (commercial and municipal) are significantly below this, at ~ 210,000t (BAS, 2003), with the catch by purse seine fishery outside Philippines waters and mostly landed in the Philippines generally not captured by the current estimates. The catch within Philippine waters has probably been close to, or beyond sustainable levels for some time, with the increase in catch since1990 and possibly earlier, based on fleets expanding to other areas (PNG, Indonesia, high seas) and taking catches outside Philippine waters.

Purse seine and ring net vessels dominate the total catch, with an estimated 340,000t (85%) of the total catch, mostly taken outside Philippine waters. The handline catch, a large portion of which is also taken outside Philippine waters, is currently the least well documented sector of the tuna fishery, and to which the greatest uncertainty attaches.

It is likely that current estimates of the municipal tuna catch suffer from incomplete coverage of landings, and may be underestimated. There are also uncertainties, as with some of the commercial catch, arising from the multispecies nature of the catch by some gears eg ring net, small purse seine, small fish handline, with only the main species recorded, and species mis-identified or not distinguished eg bigeye not separated from yellowfin in most records.

Official statistics

These are currently produced annually, and published during the following year, by BAS, as *Fisheries Statistics of the Philippines,* as a five-year time series. They include fish production estimates and value, by sector (commercial, municipal, inland and aquaculture) and region, aquaculture production, fish production by species (top 30), fish prices and exports/imports (information supplied by NSO).
The statistics have however not been published since 2002 (statistics for 1997-2001), due to a lack of dedicated funds, although summary information is available on the BAS website, and the completed document awaits funding for its publication.

Along with other recommendation for secure funding for BAS activity,

it is here **recommended** *that dedicated funding be available annually to publish the official fisheries statistics of the Philippines and that consideration be given to publication of a separate set of tuna statistics, in partial fulfilment of the anticipated reporting requirements of the WCPF Commission*

Catch estimates – oceanic tuna species

The Fisheries Code (1998) requires that fish caught by Philippine flag vessels outside Philippine waters but landed in Philippine ports should be regarded as "caught in Philippine waters". At present, most of this catch is not included in the official statistics To meet WCPF Commission reporting requirements, official statistics will need to be disaggregated by area ie inside and outside Philippines waters, the latter documentation also required as part of flag state responsibility under the WCPF Convention. There will need to be changes to the current production data system to reflect this.

It is therefore **recommended** *that the BAS data collection system be modified to collect accurate information on tuna catches outside Philippine waters, with BFAR to ultimately report separately on such catches to the Commission and take overall responsibility for their collection.*

This will almost certainly require greater coverage of landings at canneries and private landing sites, as well as monitoring of cannery product inputs (imports and landings by flag vessels).

The Commission will ultimately also require annual catch estimates for archipelagic and non-archipelagic waters. Even though the Philippines' archipelgaic waters have yet to be formally declared, some preparation for this requirement should be considered.

Catch estimates – NTAD species

As noted in the review of current systems, few components of the tuna catch are discarded in domestic fisheries of the Philippines, and possibly also in distant water fisheries where there is opportunity to tranship by-catch.

Data are however not systematically collected on these other species, and many would be lost in the surveys of the multi-species catch by grouping under the dominant species. In the listing of the top 30 species in the fisheries sector total catch, none of the common by-catch species appear eg dolphin fish, rainbow runner, but it may be possible to recover some data, albeit very incomplete, on these species.

The NSAP data are the most likely source of information on domestic NTAD catches. Williams (2004) summarizes the available data by gear type, which seems to be very limited, suggesting that by-catch levels are very low, the occurrence of many species is not recorded, or some discarding at sea occurs.

- Species of special interest

Few data are available on species of special interest and future needs in this regard may need to be anticipated. Capture of marine mammals (dolphins), whale sharks and manta rays is prohibited under several FAOs (see Annex 2).

Shark catches are almost certainly poorly documented, as are catches of marine reptiles, and turtles in particular.

Vessel information

As a corollary to improving statistical coverage of the tuna fishery, it is necessary to maintain a register of commercial fishing vessels, by size, gear type, ownership and home port, to be updated on an annual basis. This should be done by MARINA and the Philippine Coast Guard, as at present, but the information made available on a regular basis to BFAR, and included in annual fisheries statistics. The current moratorium and inventory of commercial fishing vessels, due to commence on November 1st, should

provide a good basis for this. Similarly, plans to gazette a new fishery classification for handline vessels (Congress bill now before the house) will also assist the process.
As noted earlier, it would be helpful if the MARINA listings included information on gear used.

It is therefore **recommended** *that BFAR coordinate the inclusion of commercial fishery vessel data in the proposed official annual tuna statistics, in coordination with BAS and MARINA*.

5.2 Review of current systems and recommendations for improvement

BAS

Since 1988, BAS has been responsible, *inter alia*, for the collection and the production of the landings data which form the basis of the official tuna statistics, through probability and non-probability surveys and collection of secondary data.
This review finds that the survey methodology applied is acceptable but is greatly hampered by lack of necessary funds to carry out the survey work to the extent required. The increasing reliance on non-probability survey data as a result is leading to greater uncertainty and wide variance in the estimates.

Secure funding, supporting a tightly costed programme, and probably in the range of 15-20 million Peso per annum, is needed to improve the reliability of the fisheries production estimates, preferrably from recurrent core funding within the Government budget.

If not, then consider must be given restructuring of BAS mandate to collect official statistics, the possible return of this mandate to BFAR, should this increase the chances of securing long-term funding support. The former option would be preferrable

As tunas are only part of this total production, it is possible that a smaller amount of finding could be attached to survey activity specifically devoted to tuna production.

It is therefore **recommended** that funding, if available, should be dedicated to improving the quality of tuna fishery statistics by increased probability surveys at selected landings.

Cooperation of industry is needed to improve commercial catch estimates, especially those taken outside Philippine waters. Whilst a recent MOU signed by the Soksargen Federation, BAS and BFAR might provide a basis for this cooperation, along with similar cooperation from the FFAP,

it is **strongly recommended** *that establishment of a daily logsheet system, using regional standards, be implemented by BFAR as soon as possible, with data provided to BAS for compilation and inclusion in official statistics*. It is **further recommended** *that starting this process with large purse seiners, then gradually extending to small purse seiners, ring netters, then handliners would be a realistic approach.*

The logsheet system would provide, for the first time, regular information on effort, which is collected to some extent during BAS surveys but not systematically nor routinely analyzed. The system should specifically exclude municipal vessels (< 3 GT) at all stages of its implementation.

Effort data is collected during NSAP sampling, but this is limited, and not always analyzed.

It is recognized that a Fisheries Administrative Order may be required to implement the logsheet initiative, which would logically follow the current moratorium and inventory. Careful thought would need to be given to confidentiality and aggregation level provisions to be included in the scheme.

There is of course existing logsheet coverage of Philippine vessels fishing in PNG under access agreements and providing logsheets as a condition of this access. Efforts should be made to acquire this logsheet data, with the cooperation of SPC/OFP and the approval of PNG. This would provide considerable impetus to the establishment of a Philippine logsheet database as recommended.

In conjunction with the logsheet system would come the need to monitor product flows to and from processing facilities (canneries and frozen smoke plants), to corroborate and account for disposal of tuna landings from all sources.

Estimation of the municipal catch (excluding handline) poses inherent difficulties associated with the large number of landing sites and small catches by a variety of multi-species gears, taking a range of species as well as the 6 or 7 tuna species.
There is a need to revise the list of major landing sites on a more regular basis. Current estimates of municipal catch may be low, and this should be assessed. There is also uncertainty associated with some species identification by enumerators, and the implications of hailed species assignment of mixed species landings. There is a need to incorporate results of BFAR/NSAP port sampling to adjust existing estimates of catch by species for some gears in BAS surveys. Perhaps foremost amongst the species identification problems is the juvenile bigeye/yellowfin issue, with juveniles of the two species rarely being separated in catches. NSAP enumerators seem well versed with this issue but it is unclear how the BAS enumerators deal with this issue.

There is clearly scope for BFAR/NSAP inputs to the quarterly regional statistics reviews to confirm production estimates; whilst this occurs regularly in some regions, there is minimal contact between the two agencies in others. Timeliness of the NSAP data becoming available to meet BAS deadlines is however still an issue

It is therefore **recommended** *that mandatory quarterly workshops with BFAR participation occur at regional level, to derive agreed catch estimates from all available sources.*

The joint preparation of agreed annual tuna statistics by the two agencies would logically follow from this (see above).

BFAR

With the entry into force of the WCPF Convention, there will be a requirement for a national contact point to coordinate national reporting to the Commission. BAFR would logically fill that role, both in coordinating inputs from other agencies eg BAS, MARINA, and direct involvement in other issues.

Appointment of a national coordinator within BFAR dealing with all WCPFC reporting is therefore **recommended**.

There is a need, as noted, to reinvigorate the commercial vessel registration (CFVR) system at regional level, following the moratorium and vessel inventory, in conjunction with MARINA and PCG. BFAR should also encourage documentation of municipal vessels by LGUs at regional level, and make best efforts to fully implement current and future FAOs relating to fishery management regulation eg mesh size etc.
BFAR is seen as having the primary role in progressively implementing the proposed vessel logsheet system (see above), and the collection of effort and other operational level data for use in fishery monitoring and assessment.

NFRDI/NSAP

The NSAP is currently the only readily available source of effort data, species composition of the catch by gear, size distribution of the catch, and biological data from the tuna fishery, even though the programme does not focus exclusively on tuna.

It is recognized and **recommended** *therefore that the NSAP needs to continue as a high priority, subject to funding availability, as it remains the key source of information on trends in CPUE, species and size composition.*

The NSAP however needs to better interface with the BAS production data collection system, as noted above, with regular formal consultation, and data already available could, in some cases, be applied to refine existing production estimates by BAS.

Recommended actions for the NSAP, with respect to tuna data but possibly applicable to other fisheries are as follows:

- Particularly if additional funding should become available to strengthen BAS probability surveys at important tuna landing sites, at least one of these sites should ideally overlap with an NSAP site for corroboration purposes, especially with respect to species composition of the catch, and effort data.
- Data rescue is need with some urgency for uncollated information on tuna catches which remains in various regions, and possibly some submitted but unentered data in central NFRDI storage. This may require travel to specific regions by specialist IT staff, with SPC support if necessary for subsequent data entry and verification.
- Ensuring that all regions are fully equipped with necessary (standard) software and hardware, to facilitate timely submission of data to NFRDI, and receive necessary training in the use of these tools
- Appointment of one specialist person, possibly with external funding initially, to deal specifically with tuna data submission for the regions, its subsequent collation and analysis, and coordinate reporting to the Commission (National Tuna Coordinator)
- Investigate species identification uncertainty in some regions
- Consider also the more detailed recommendations of Williams (2004), following his review of available NSAP data holdings
- Consider also the outcomes of the formal review of NSAP held in late 2003, which should be available in early December 2004.

PFDA

As noted, the PFDA data on tuna landings are an important source of secondary data accounting for tuna landings in excess of 70,000t per year. There if therefore a need for BAS, BFAR and PFDA to liaise closely in the collection and compilation of tuna landings data, possibly within the confines of the FTWG, which could usefully be reactivated.

MARINA/COAST GUARD

Although the MARINA vessel registration system is well established, it remains underutilized as a source of information on commercial vessels numbers, status and characteristic at regional level, and there is scope to actively share this information with BFAR/BAS at regional level, and incorporate this information in both the proposed annual report on the sector and reporting to the WCPFC. This process would be aided if more information was made available in the registry on vessel gear type.
MARINA remains possibly the best source of information on commercial handline vessel numbers and will have an important re to play wit the forthcoming reclassification of handline vessels.

NSO

It may be useful to explore greater involvement with NSO in the process of compilation of official exports/import statistics, with respect to data corroboration and product flows.

NTIC

NTIC, as the premier advisory body for the sector, should be in a position to provide strong support for these initiatives at political level, especially as it is soon to be attached to the Office of the President. There remain several critical issues long outstanding, such as declaration of archipelagic waters, resolution of maritime boundaries, moratorium and vessel inventory, reclassification of handline vessels etc, as well as support for possible new initiatives eg introduction of daily logsheet system, initially for larger purse seine vessels,

TUNA MANAGEMENT PLAN

The development of a National Tuna Management Plan for the Philippines has been in preparation for some time, wit the involvement of various key stakeholders. A draft version of the Plan was presented to the 6th National Tuna Congress in September 2004. Whilst there is a considerable process of public consultation yet to be undertaken, as well as further elaboration of various aspects of the Plan, it will represent useful vehicle for supporting and consolidating various initiatives for improved data collection and meeting data reporting requirements to the Commission.

5.3 Port sampling and observer programmes

As indicated, the NSAP should continue as the primary port sampling programme for the tuna fishery, hopefully with the benefit of additional funding to specifically strengthen tuna data collection/port sampling efforts in selected priority areas, and to be better coordinated and with improved data collection, transmission and security.

Observer programmes remain to be developed, and have attracted little attention in the review. It is hoped their design and implementation, hopefully under some form of cost recovery, will be the subject of a separate study.

5.4 Capacity to meet obligations to the Commission

The reporting requirements for the WCPFC, as listed in Annex 1 of the UNFSA, could not currently be met by Philippines – verified annual catches by gear, species and weight are not readily available; effort data are largely lacking, and flag state vessel and catch data are not available (certainly in terms of catch and operational data), amongst other issues. The requirements of Arts 29 and 29, concerning observer programmes and monitoring of transhioment, could also not be met at present.

There is therefore a need to prepare for these requirements of the Commission, and it has been earlier suggested that a National Tuna Coordinator should be appointed to undertake the various tasks of coordination, collation and analysis of data, its assembly into a report in the require format,a nd initiation of new monitoring programmes as required. It was further suggested that this might be greatly facilitated by the commitment to the preparation of an annual tuna fishery report, containing all or most of the information required by the Commission. This would necessitate cooperation between all concerned agencies (BFAR, BAS, MARINA, PFDA, at the very least), with BFAR logically taking the lead role in this process.

5.5 Compilation of historical catch and effort data

Current listings of historical catch are not felt to be reliable, due the different methodology applied at various times during the past three decades to their collection. Reconstructing an historical time series for the tuna fishery would be a difficult for the commercial fishery, and virtually impossible for the municipal fishery. With the cooperation of the major commercial operators (30-40), it may however be possible to reconstruct estimated of total catch by the main commercial gears, number of vessels operating, and approximate distribution of catch, at least in term of inside or outside Philippine waters. Even this would not be possible without the total cooperation of industry and there would be key role for the industry associations in this process. Efforts are underway to attempt this, wit the cooperation of MARINA.

5.6 Summary of Recommendations and future plan of action

The outcomes of the preceding review, with its numerous recommendations, were presented to the Philippines Tuna Fishery Data Collection Workshop, held in Manila for 20th –21st October 2004, as part of the Indonesia and Philippines Data Collection Project (IPDCP) developed by the PrepCon. Presentations were also made by BAS, BFAR and SPC/OFP, with recommendations being synthesized into an agreed Plan of Action, supported with funding committed from the IPDCP. This is reproduced here as the summary outcome of the review process.

ACTION PLAN FOR IMPROVEMENTS TO THE CURRENT TUNA FISHERIES STATISTICAL SYSTEM IN THE PHILIPPINES

Recommended action	Activity	Responsible agency	Time Frame
Compile separate statistics for oceanic tuna catches inside and outside Phils waters (archipalagic and non-archipelagic waters in the future)	Obtain data from private landing sites not currently covered Obtain landings data from canneries, by source Obtain catch data from logsheet coverage, esp purse seine	**BAS, with BFAR support**	*Initiate new sampling in January 2005* Compile 2004 statistics in first half 2005 for publication of 2004 tuna stats (see below)
Implement logsheet system	Prepare sample forms Present to NTIC Nov. 2004 Distribute to large p/s vessels Send existing PNG logsheet data to BFAR	**BFAR** (National Tuna Coordinator)	November 2004 November 2004 January 2005 Discuss November 2004
Compilation of annual tuna statistics summary	Collate/ compile annual oceanic tuna statistics, including information on catches by area (inside/outside), vessel numbers, catch by gear and species etc	**BFAR/BAS** (National Tuna Coordinator)	Attempt to compile provisional 2004 by mid-2005
National Tuna Coordinator	Appoint NFRDI Director as NTC Recruit technical assistant to support	**BFAR**	*NTIC approval November 2004* Appoint TA January 2005
Historical time series of tuna catch	Reconstruct tuna catch time series from early 1990s	**BFAR/MARINA**	Check vessel numbers with MARINA November 2004 Approval NTIC November 2004
Data on vessel numbers	Compile data on vessel number by region and gear type	**BFAR/BAS/MARINA**	After inventory (mid 2004)
Handline data collection and	Implement operational data collection from newly classified handline category Seek time series catch data	**BAS/BFAR**	After reclassification (early 2005 ?) Attempt to rebuild historical time series 2005
Product flow data	Corroboration of logsheet and landings data (collection of data from secondary sources)	**BAS**	Initiate collection for new sources in early 2005
New frame survey	Revise list of MFLCs and CFLCs, identifying	**BAS**	2005, funding permitting

	major tuna landings sites		
Species mix	Address issue of mixed species in landings (pirit) Apply NSAP data where same sites sampled	**BAS**	2005
Catch by gear/area; effort data	Revisit possible breakdown of catch by gear type and area Assess value of available BAS effort data	**BAS**	To investigate
PFDA data	Check PFDA tuna landings data for selected ports Check if data on source of carrier landings available	**BAS**	2005
Inventory of NSAP data	Set up inventory of tuna data collected by NSAP regional centers, to track flow of these data	**NFRDI**	As soon as possible
Data rescue in selected regions	Retrieve NSAP tuna data from regions where data has not been entered or forwarded to NFRDI Manila	**NFRDI**	As soon as possible
Regional hardware/software support and standardization	Establish capacity for efficient submission of data to NFRDI Manila for centralized data entry and verification	**NFRDI**	As soon as possible

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8. ANNEXES

Annex 1. **List of assessments** (annotated; may not be complete)

All include vessel inventory, gears, catch by gear, landings; Elefan-based parameter estimates for selected species, MSY estimates where possible (by spp. and/or vessel type).

	Assessment	Role of Tunas
Region 1	An assessment of the Lingayen Gulf R. S. P. Gaerlan, N. Barut, B.C.Bugaoan, and F.G.A.Bucat	YFT dominant municipal (with mahi and SKJ); h'line; no par. ests (danish seine and trawl)
Region 2	Marine Fisheries Stock assessment in Batanes Waters V.D.Villarao and M.A. Aragon	Drift gill net, mostly flying fish; mahi by troll Limited tuna data
	Marine Fish Stock Assessment in Babuyan Channel V.D.Villarao, L.S.Palolan and M.A. Aragon	Danish seine, drift gillnet, handline Mahi data and assessment
Region 3	Fish stock assessment in northern Zambales coast L.M. Rueca, N.B.Bien, R.M.Bathan and G.B.Salamat	Skipjack, yellowfin (and bigeye) dominant spp.- p/s, h/l (small and large); no tuna parameter estimates;
Region 4	The Honda Bay Fisheries; an assessment. M.H.Ramos et al.	Some tuna data
Region 5	Assessment of Lagonoy Gulf Fisheries in Region 5 V.L. Olanao, M.B.Vergara and Fe Gonzales	H/l and ringnet most NB; SKJ (rn) and YFT (hl) No parameter estimates for tuna
	Assessment of Sorsogon Bay Fisheries V.L.Olanao, M.B. Vergara and Fe Gonzales	Mostly bottom fish; no tuna data
Region 6	Commercial Fishery Stock Assessment of Visayan Sea M.R. Guanco, H. Riomalos, M.P.Benjamino, M.C.Doyola and S.V.Mesa	Small pelagics (*Selaroides, Sardinella, Rastrelliger*)
Region 7	NSAP Project in the Visayan Sea, 1998-2002 P.B.Belga, L.B.Regis and D.F.M.Nunal	Small pelagics, few tuna
	NSAP Report – Camotes Sea, 1998-2002 P.B.Belga, L.R.Romena and D.F.M.Nunal	Small pelagics (*Decapterus, Selar, Rastrelliger)*
Region 8	Fishery Resource Stock Assessment in Leyte Gulf. R.A.Francisco et al.	No/few tuna
Region 9	Status of small pelagics in Moro Gulf, Sulu Sea and Illana Bay A.D.Sajili, H.C Ballovar and O.M.Maulidan	Small pelagics
Region 10	Fish stock assessment in Bohol Sea. G.A. Babanto et al.	Ring net; Auxis, some YFT
Region 11	Assessment of small pelagic fishery in Davao Gulf. Jose A. Villanueva	SKJ in top 5, declining; also YFT, Auxis; parameter estimates for SKJ
Region 12	Assessment of fish resources in Region 12 fishing areas adjacent to Illana Bay and Moro Gulf. Ambutong Pautong and A. Tarrabasa	Some tuna, small pelagics
Region 13	Assessment of tuna fishery of northern portion of Surigao Sea, Philippines E. Bolambao, J. Rojas and E. Bognor (34 pp)	Skipjack assessment, complete l/f data; also data on other species (yellowfin etc)
	Capture fisheries of Dinigat Sound and Hinatuan Passage Fishing Grounds, Caraga Region, with emphasis on danish seine fishery. E. Balamboa et al.	No tuna
ARMM	Fisheries stock assessment of the two major fishing grounds (Illana Bay and Sulu Sea) in the ARMM. M.D. Mamalangkap and U.K.Mokamad	Illana - p/s, bagnet; Sulu - ring net, drift gillnet Auxis dominant spp. - no parameter estimates

Annex 2. List of relevant Statutes and Fisheries Administrative Orders

LOI 1328	Banning of the operation of trawls and purse seine within 7 km from shorelines of all provinces	1983
PD 1599	Establishing the Philippine EEZ	June 1978
FAO 155	Regulating the use of fine mesh nets in fishing	September 1986
FAO 185	Ban on the taking or catching, selling, purchasing, transporting and exporting of dolphins	January 1993
FAO 188	Prohibiting operation of tuna purse seine nets with mesh size less than 3.5"	October 1993 (1998)
FAO 193	Ban on the taking or catching, selling, purchasing and possessing, transporting and exporting of whale sharks and manta rays	March 1998
FAO 198, s. 2000	Rules and regulations in commercial fishing	2000
FAO 199, s.2000	Guidelines on fish transhipment	2000
FAO 200, s.2000	Guidelines and procedures in implementing section 87 of the Philippines Fisheries Code of 1998	2000
FAO 201, s.2000	Ban on fishing with active gear	August 2000
FAO 204	Restricting the use of superlights in fishing	December 2003
FAO 223	Moratorium on the issuance of new commercial fishing vessel and gear license (CFVGL) as part of a precautionary approach to fisheries management	
FAO ?	Establishment of tuna productivity project in Davao Gulf	March 2004

LOI = Letter of Instructions
PD = Presidential Decree

Resolutions pending

Congress House Bill 5842 – An act defining commercial handling fishing and vessel, and providing regulations for utilizations thereof, amending for the purpose R.A. 8550 of the Philippines Fisheries Code of 1998

Annex 3. Itinerary of Philippines review

Date	Location	Activity
July 6th – 12th	Manila	Arrival; initial meetings and contacts with BFAR, BAS and industry; review of available information
July 12th – 15th	Zamboanga	Region IX (visit BFAR, BAS, canneries and landing sites in Zamboanga City, ring net operators, Sangali Port; other areas not permitted for security reasons)
July 15th – 18th	Davao	Region XI (visit BFAR, NSAP, BAS, landing sites, PFDA port (Daliao,Toril)
July 18th – 22nd	General Santos	Region 12 (visit BFAR, NSAP, BAS, PFDA, 8 canneries, frozen smoke processors, purse seine, ring net and handline operators, GenSan Fish Port, SOKSARGEN Federation, Indonesian cannery owners)
July 22nd – 23rd	Lucena	Region 4a (BFAR,NSAP, BAS, PFDA, Atimonan and Dalahican Fish Ports)
July 23rd – 25th	Manila	NTIC Seminar at Polo Club; visit to Navotas, discussions with industry, TCAP, BFAR.
July 26th – 28th	Palawan	Region 4b (BFAR, BAS, PFDA, landing sites (Jacana, Matahimik), handline operators and buyers)
July 29th – 30th	Manila	Final meeting with Director; commence write-up; final
July 31st		Depart Philippines
August	Australia	Writing up (5 days) - Brisbane
September 2nd-3rd	Gen San	6th Tuna Congress, General Santos
September 4th	Gen San	IUU Workshop
September 6th-7th	Manila	BAS/ BFAR discussions
October 16th –22nd	Manila	Workshop BFAR

Note:
All travel was undertaken with the strong support of the Director, BFAR, and accompanied at all times by BFAR staff Francisco Torres Jr.

Annex 4. Summary of tuna catches by region and category, 2002

Source: BAS data

Municipal tuna catches by region and species, 2002

Region	NCR	1	2	3	4	5	6	7	8	9	10	11	12	AR	C'GA	**TOTAL**
Yellowfin		3,499	268	730	11,787	2,661	2,165	3,162	843	4,768	696	1,736	1,138	1,569	1,721	**36,743**
Skipjack		1,539	37	441	8,919	2,840	905	2,303	387	2,812	383	1,483	725	3,041	777	**26,592**
Oceanic		5,038	305	1,171	20,706	5,501	3,070	5,465	1,230	7,580	1,079	3,219	1,863	4,610	2,498	**63,335**
Neritic		767	700	284	8,947	4,501	3,638	6,274	2,069	17,613	3,332	2,298	4,166	6,186	9,269	**70,044**
TOTAL		**5,805**	**1,005**	**1,455**	**29,653**	**10,002**	**6,708**	**11,739**	**3,299**	**25,193**	**4,411**	**5,517**	**6,029**	**10,796**	**11,767**	**133,379**

NOTE: 1)Yellowfin and bigeye are nor separated in the statistics and are grouped as yellowfin
2) Neritic tuna species include frigate tuna, bullet tuna and eastern little tuna
3) no municipal catches in the NCR

Commercial tuna catches by region and species, 2002

Region	NCR	1	2	3	4	5	6	7	8	9	10	11	12	ARMM	C'GA	**TOTAL**
Yellowfin	2,591	389	86	730	7,747	1,038	3,123	327	463	10,703	679	2,769	25, 039	7,194	173	**63,051**
Skipjack	9,982	2	205	3,220	6,004	1,413	1,770	2,010	561	36,111	100	174	18,761	2,935	137	**83,385**
Oceanic	12,573	391	291	3,950	13,751	2,451	4,893	2,337	1,024	46,814	779	2,943	43,800	10,129	310	**146,436**
Neritic	8,818	13	1,874	42	11,345	2,704	8,938	5,552	2,307	11,165	12,546	349	45,725	16,187	204	**127,769**
TOTAL	**21,391**	**404**	**2,165**	**3,992**	**25,096**	**5,155**	**13,831**	**7,889**	**3,331**	**57,979**	**13,325**	**3,292**	**89,525**	**26,316**	**514**	**274,205**

Total tuna catches by region, 2002.

Region	NCR	1	2	3	4	5	6	7	8	9	10	11	12	ARMM	C'GA	**TOTAL**
Oceanic	12,573	5,429	596	5,121	34,457	7,952	7,963	7,802	2,254	54,394	1,858	6,162	45,663	14,739	2,808	**209,771**
Neritic	8,818	780	2,574	326	20,292	7,205	12,576	11,826	4,376	28,778	15,878	2,647	49,891	22,373	9,473	**197,813**
TOTAL	**21,391**	**6,209**	**3,170**	**5,447**	**54,749**	**15,157**	**20,539**	**19,628**	**6,630**	**83,172**	**17,736**	**8,809**	**95,554**	**37,112**	**12,281**	**407,584**

Annex 5. Historical oceanic tuna catches for the Philippines, 1970-2002

Source: SPC Tuna Fishery Yearbook 2002

Skipjack catches (tonnes) by Philippines domestic fisheries.

Key: GILL gill net; HOOK hook-and-line; 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

Yellowfin catches (tonnes) by Philippines domestic fisheries.
Key: GILL gill net; HOOK hook-and-line; 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

Bigeye catches (tonnes) by Philippines domestic fisheries.
Key: GILL gill net; HOOK hook-and-line; 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