Annex 1

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

List of Participants

List of Participants

INDONESIA

Name Mrs. Putuh Suadela
Position Staff
Address Ministry of Marine Affairs and Fisheries
JL Medan Merdeka Timur No.16 Jarkarta Pusat
Tel +62 8569 011499
Fax +62 2134 53008
Email putuhsuadela@yahoo.co.uk, sdi.djpt@yahoo.com

MALAYSIA

Name Noraisyah Binti Abu Bakar
Position Fisheries Officer
Address Department of Fisheries Malaysia
State of Penang, Jalan Akuarium, 11700 Gulugor, Penang, Malaysia
Tel +60 4657 2777, +60 4626 1598
Fax +60 4657 2323, +60 4626 1497
Email noraisyah@dof.gov.my

MYANMAR

Name Mr. S. Julius Kyaw
Position Fisheries Officer
Address No. 208/212 Room (303) Kynn kyaung Street. Hun Thar Yeirmon Kamayut Township, Yangoon
Tel +95 192 876
Fax -
Email Joker007kyaw@gmail.com

PHILIPPINE

Name Ms. Elaine Garvilles
Position Aquaculturist I/Asst. Tuna Coordinator
Address Nat'l Fisheries Research & Development Institute Bureau of Fisheries & Aquatic Resources
940 Kayumanggi, BLDG. Quezon AVE, Quezou City Philippine 11033
Tel +63 372 5062
Fax +63 372 5063
Email egarvilles@yahoo.com

THAILAND

Name Mrs. Praulai Nootmorn
Position Director
Address Marine Fisheries Research and Technological Institute Department of Fisheries Kaset-klang, Chatuchak, Bangkok, 10900 THAILAND
Tel +66 2940 6559
Fax +66 2940 6559
Email nootmorn@yahoo.com

VIETNAM

Name Mr. Pham Viet Anh
Position National Tuna coordinator, Fishery officer
Address Department of Capture Fisheries and Resources Production
No 10 Nguyen Cong Hoan, Ba Dinh, Hanoi, Vietnam
Tel +84 4377 11579
Fax -
Email phvietanh2003@yahoo.com

Resource Persons

Name Mr. Hiroaki Okamoto
Position
Address National Research Institute of Far Seas Fisheries
5-7-1 Orido, ShimiZu-Ku, Shizuoka 424-8633
Tel +81 5433 66043
Fax +81 5433 59642
Email okamoto@affrc.go.jp

Name Mr. Noel C. Barut
Position Interim Deputy Executive Director
Address National Fisheries Research and Development Institute 940 Kayumanggi, Press Building I., Quezon Avenue, Quezon City 1103, Philippines
Tel +63 2410 9192, +63 2372 5063
Fax +63 2372 5063
Email nbarut@nfrdi.da.gov.ph, noel_c_barut@yahoo.com

Name Dr. Kamonpan Awaiwanont
Position Senior Fisheries Biologist
Address Department of Fisheries
Catch Certification Coordination Center
Marine Fisheries Research and
Development Bureau Department of
Fisheries, Kaset –Klang, Chatuchak
Bangkok Thailand
Tel +668 1442 8724
Fax -
Email kamonpana@fisheries.go.th

Name Mr. Pramuan Rakjai
Position Deputy Executives Director for Operation
Address Fish Marketing Organization
211 Charoenkrung 58 Yannawa, Sathorn
Bangkok
Tel +66 2211 0330
Fax +66 2211 6147
Email fishmarket@fishmarket.co.th

SEAFDEC/MFRDMD

Name Dr. Masaya Katoh
Position Deputy Chief of MFRDMD
Address Fisheries Garden, Chendering,
21080 Kuala Terengganu,
Malaysia
Tel +60 9617 5940
Fax +60 9617 4042
Email katoh@seafdec.org.my

Name Mr. Raja Bidin Raja Hassan
Position Senior Researcher
Address Fisheries Garden, Chendering,
21080 Kuala Terengganu,
Malaysia
Tel +60 9617 5940
Fax +60 9617 5136
Email rbidin@seafdec.org.my

SEAFDEC/SEC

Name Dr. Chumnarn Pongsri
Position Secretary-General
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 5682
Fax +66 2940 6336
Email sg@seafdec.org

Name Mr. Kenji Matsumoto
Position Deputy Secretary-General and JTF Manager
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6331
Fax +66 2940 6336
Email dsg@seafdec.org

Name Mr. Hidenao Watanabe
Position Assistant JTF Manager
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6334
Fax +66 2940 6336
Email watanabe@seafdec.org

Name Mr. Tadahiro Kawata
Position Technical Coordinator
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6328
Fax +66 2940 6336
Email kawata@seafdec.org

Name Dr. Somboon Siriraksophon
Position Policy and Program Coordinator
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6333
Fax +66 2940 6336
Email somboon@seafdec.org

Name Mrs. Virgilia T. Sulit
Position Fisheries Technical Officer
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email sulit@seafdec.org

Name Ms. Pattaratjit Kaewnuratchadasorn
Position Program Manager
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email pattaratjit@seafdec.org

Name Ms. Saivason Klinsukhon
Position Information Officer
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email saivason@seafdec.org

SEAFDEC/RFPN

Name Mr. Akhane Phomsouvanh
Position RFPN of Lao PDR
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email akhane@seafdec.org

Name Dr. Ahmadi
Position RFPN of Indonesia
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email ahmadi@seafdec.org

Name Mr. Joeren S. Yleana
Position RFPN of The Philippines
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email joeren@seafdec.org

Name Mr. Aung Nyi Toe
Position RFPN of Myanmar
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email aung@seafdec.org

Name Ms. Nopparat Nasuchon
Position RFPN of Thailand
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email nasuchon@yahoo.com,nopparat@seafdec.org

Name Ms. Halimah Binti Mohamed
Position RFPN of Malaysia
Address P.O.Box 1046, Kasetsart Post Office
Chatuchak, Bangkok 10903, Thailand
Tel +66 2940 6326
Fax +66 2940 6336
Email halimah@seafdec.org,
imahm@hotmail.com,
halimah@fri.gov.my

THAI UNION GROUP

Name Mr. Narin Niruttinanon
Position Deputy General Manager
Address Thai Union Group
979/13-16 M Floor SM Tower Phaholyothin
Rd. Samsennai, Phayathai Bangkok 10400
Tel +66 2298 0024-5
Fax +66 2298 0027-8
Email narin@thaiunion.co.th

SMDEC

Name Mrs. Thidarat Khangchai
Position Fisheries Biologist
Address Southern Marine Fisheries Research and
Development Center (Songkhla)
79/1 Wichianchom Rd. Bo-Yang, Muang,
Songkhla 90000 Thailand
Tel +66 7431 2595
Fax +66 7431 2495
Email Thidarat_dot@yahoo.com

SEAFDEC/TD

Name Dr. Worawit Wanchana
Position Capture Fishery Technology Division Head
Address P.O. Box 97, Phrasamutchedi, Samut Prakan , 10290, Thailand
Tel +66 2425 6140
Fax +66 2425 6100
Email worawit@seafdec.org

Name Ms. Penchan Laongmanee
Position Fishing Ground & Fishery Oceanography Section Head
Address P.O. Box 97, Phrasamutchedi, Samut Prakan ,10290, Thailand
Tel +66 2425 6141
Fax +66 2425 6100
Email penchan@seafdec.org

Name Ms. Woraluk Meesomwat
Position Fishing Ground Information Scientist
Address P.O. Box 97, Phrasamutchedi, Samut Prakan ,10290, Thailand
Tel +66 2425 6144
Fax +66 2425 6100
Email woraluk@seafdec.org

Name Ms. Nawinee Khumthong
Position Assistant Capture Fishery Technologist
Address P.O. Box 97, Phrasamutchedi, Samut Prakan ,10290, Thailand
Tel +66 2425 6144
Fax +66 2425 6100
Email nawinee@seafdec.org

Name Ms. Suwanee Sayan
Position Assistant Database Administrator
Address P.O. Box 97, Phrasamutchedi,
Samut Prakan ,10290, Thailand
Tel +66 2425 6144
Fax +66 2425 6100
Email suwanee@seafdec.org

Name Ms. Nathacha Sornvaree
Position Administrative Officer
Address P.O. Box 97, Phrasamutchedi,
Samut Prakan ,10290, Thailand
Tel +66 2425 6137
Fax +66 2425 6100
Email natha@seafdec.org

Annex2

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Opening Remarks

By

Chumnarn Pongsri

SEAFDEC Secretary-General

OPENING REMARKS

Dr. Chumnarn Pongsri
SEAFDEC Secretary-General

Special Meeting on Improvement of Tuna Information and Data Collection in Southeast Asia
Songkhla Province, Thailand, 7-9 September 2011

Distinguished Resource Persons and Participants,
Representatives from tuna producing countries in Southeast Asia,
Representatives from agencies collecting tuna data and information,
Representatives from tuna canners and exporters,
SEAFDEC Staff

Ladies and Gentlemen, Good morning.

On behalf of SEAFDEC, it is indeed a great pleasure for me to welcome all of you to this Special Meeting, which will endeavor to update the data and information on tuna production and trade as well as on management of tuna fisheries. We are all aware that tuna is one of the most economically important commodities in the Southeast Asia not only for domestic consumption but most especially for export. Based on available statistics, the Southeast Asian region in 2008 produced 1,592,118 metric tons of tuna accounting for about 38% of the world's total tuna production which was 4,224,319 metric tons. As a matter of fact, Asia which produced most of the tunas in the world contributed almost 58% to the global supply of tuna in 2008. Since production has been increasing the contribution of our region to the global tuna production could be higher in 2009 and 2010.

Since 1978 SEAFDEC has been compiling data and information on fishery statistics including data on production of major tuna and tuna-like species caught in the waters of our region, which are published in our SEAFDEC Fishery Statistical Bulletin. In the compilation of the statistics, SEAFDEC issues the corresponding questionnaires which had been harmonized with those of the FAO. Our compilation efforts especially on tuna production in the region will be reported at this Meeting.

As you will hear in our report later, in coming up with the Fishery Statistical Bulletin for our region, we are confronted with problems not only in terms of administrative matters but most especially on the technical aspects of collecting the necessary information. Since many organizations and agencies are also involved in compiling fishery statistics and information of the region, perhaps we can strengthen our collaboration and come up with practical technologies that could be extended to the region to enhance the capacity of the countries in the effective collection of their fishery statistics. We hope that this concern would be seriously considered during the discussion at this Meeting.

Ladies and gentlemen, as we all aware that several commercially-exploited aquatic species were listed in the CITES Appendices including Atlantic blue fin tuna and will be potentially discussed at the forthcoming CITES-COP16 in 2013. ASEAN and SEAFDEC considering the issues seriously since the commercially-exploited aquatic species are importance and closed relationship to traditional manner of fishers particularly small scale fisheries. However, due to lack of data for stock assessment and scientific evident in many countries it is too early to consider them into the CITES appendices where its measures may direct or indirect effect to the trade and livelihoods of fishermen.

In this connection, SEAFDEC plans to organize the follow-up meeting with this meeting which will be held in this Oct, the Regional Technical Consultation on Improvement of Technical Issues Related to CITES and Commercially-Exploited Aquatic Species with the aim to identify the technical problems on selected commercially-exploited aquatic species related to CITES issues. It is therefore, the results from this meeting will be used as an important input to be further discussed at the RTC CITES Meeting in October.

Finally, I would also like to take this opportunity to request all of you especially our resource persons to share your valuable ideas and experiences to enhance the overall outcome of this Meeting.

Ladies and Gentlemen, welcome once again to this Special Meeting, and I now declare the Meeting open. Thank you and have a very good day.

Annex 3

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Summary on the Status of World Tuna Productions

By

Somboon Siriraksophon

Policy and Program Coordinator

SEAFDEC/SEC

Summary on the Status of World Tuna Productions

Compiled by

Somboon Siriraksophon

Policy and Program Coordinator of SEAFDEC

I. INTRODUCTION

This paper was compiled based on the FAO Global fishery resources of tuna and tuna-like species" (FAO Fisheries Technical Paper. No. 483). The paper was presented at the Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia organized by SEAFDEC/TD from 7-9 September 2011 at BP Samilar Beach Hotel & Resort, Songkhla, Thailand with the aims to introduce the status of world tuna fisheries to the SEAFDEC member countries and to provide the awareness and requirements on tuna conservation and management in the Southeast Asian countries that are parts of world tuna fisheries.

II. RESOURCE STRUCTURE

The suborder Scombroidei is usually referred to as tuna and tuna-like species (Klawe, 1977; Collette and Nauen, 1983; Nakamura, 1985). It is composed of tunas (sometimes referred to as true tunas), billfishes and other tuna-like species. It includes some of the largest and fastest fishes in the sea.

The tunas (*Thunnini*) include the most economically important species referred to as the principal market tunas because of their global economic importance and the intensive international trade for canning and sashimi. In fact, the anatomy of some tuna species seems to have been purposely designed for loining and canning. Tunas are classified into four genera (*Thunnus, Euthynnus, Katsuwonus* and *Auxis*) with 15 species all together.

The principal market tunas from the genus *Thunnus* are albacore (*T. alalunga*), bigeye tuna (*T. obesus*), Atlantic bluefin tuna (*T. thynnus*), Pacific bluefin tuna (*T. orientalis*), Southern bluefin tuna (*T. maccoyii*) and yellowfin tuna (*T. albacares*). Skipjack tuna (*Katsuwonus pelamis*) is the seventh principal market tuna species.

As is evident from the geographic distribution of their catches (**Figure 1**), the principal market tunas are all oceanic, capable of long migrations or movements and constituting one or two stocks in each ocean. The exceptions are Atlantic and Pacific bluefins, which occur only in their eponymous oceans. Southern bluefin constitute a single stock extending in the Atlantic, Indian and Pacific Oceans.

The principal market tunas are frequently divided into tropical (bigeye, skipjack and yellowfin) and temperate (albacore and bluefin). However, this classification fails to describe precisely water temperature preferences in the case of bigeye, which are distributed throughout the tropics, but spends most time in the cooler waters near or within the

thermocline, thus in more “temperate” waters like albacore when it ventures to lower latitudes.

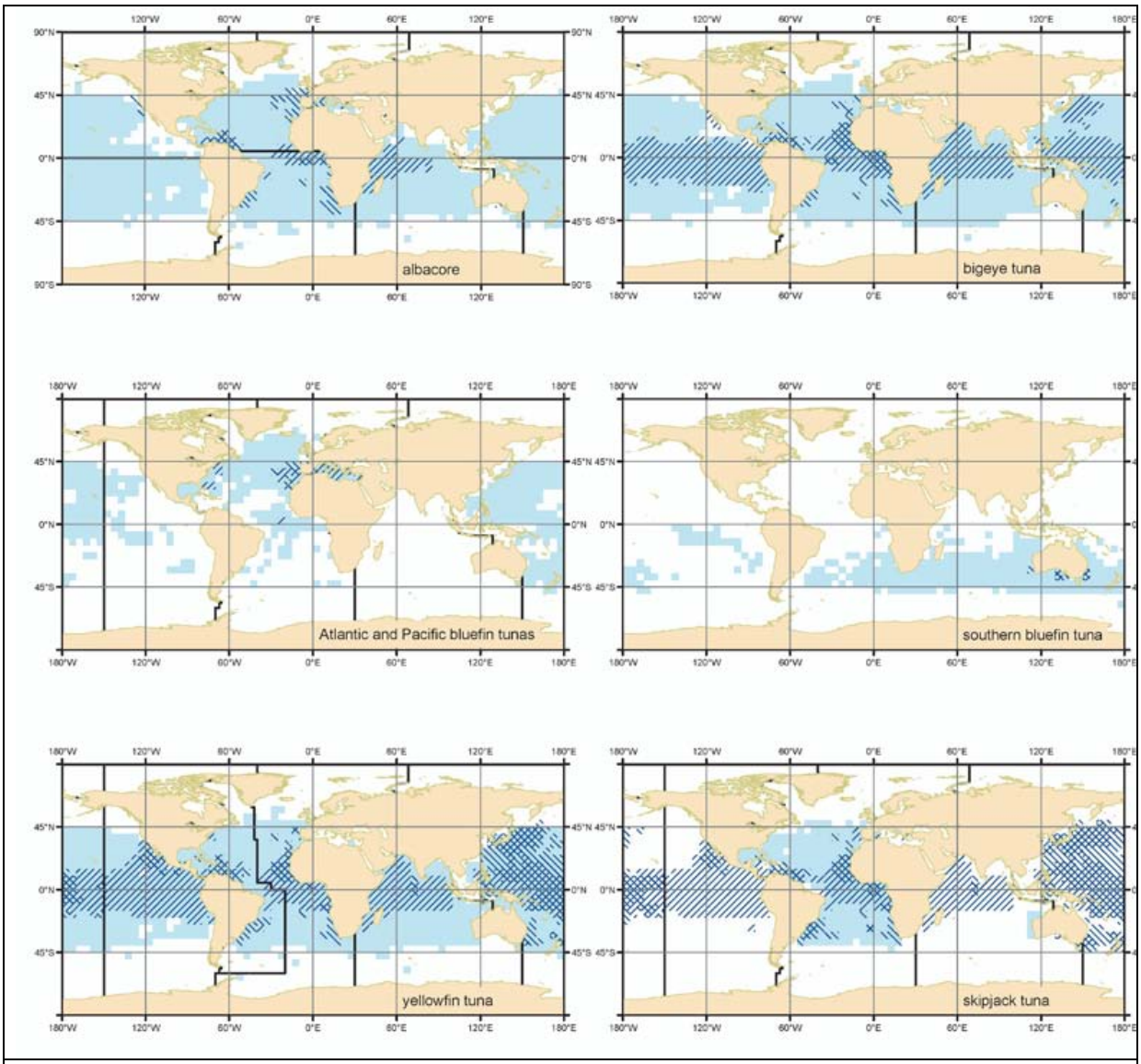


Figure 1 Geographic areas where catches of principal tunas were taken from 1994 to 2004

The tunas that are not the principal market species are more neritic, i.e. living in water masses over the continental shelf. They include longtail tuna, blackfin tuna (*T. atlanticus*), black skipjack (*Euthynnus lineatus*), kawakawa (*E. affinis*), little tunny (*E. alleteratus*), bullet tuna (*Auxis rochei*) and frigate tuna (*A. thazard*).

The billfishes (Istiophoridae) are composed of marlins (*Makaira spp.*), sailfish (*Istiophorus spp.*), spearfish (*Tetrapturus spp.*) and swordfish (*Xiphias gladius*, the only species in the genus). With the exception of two species (Mediterranean and roundscale spearfish), all billfishes have wide geographic distributions as is evident from the distribution of catches (**Figure 2**). Not all species occur in all oceans. Billfishes are mostly caught by longlines as bycatches, except for swordfish which is targeted in certain regions using longlines and

harpoons. Billfishes are also caught in sport fisheries, where they are greatly valued. They are all excellent seafood.

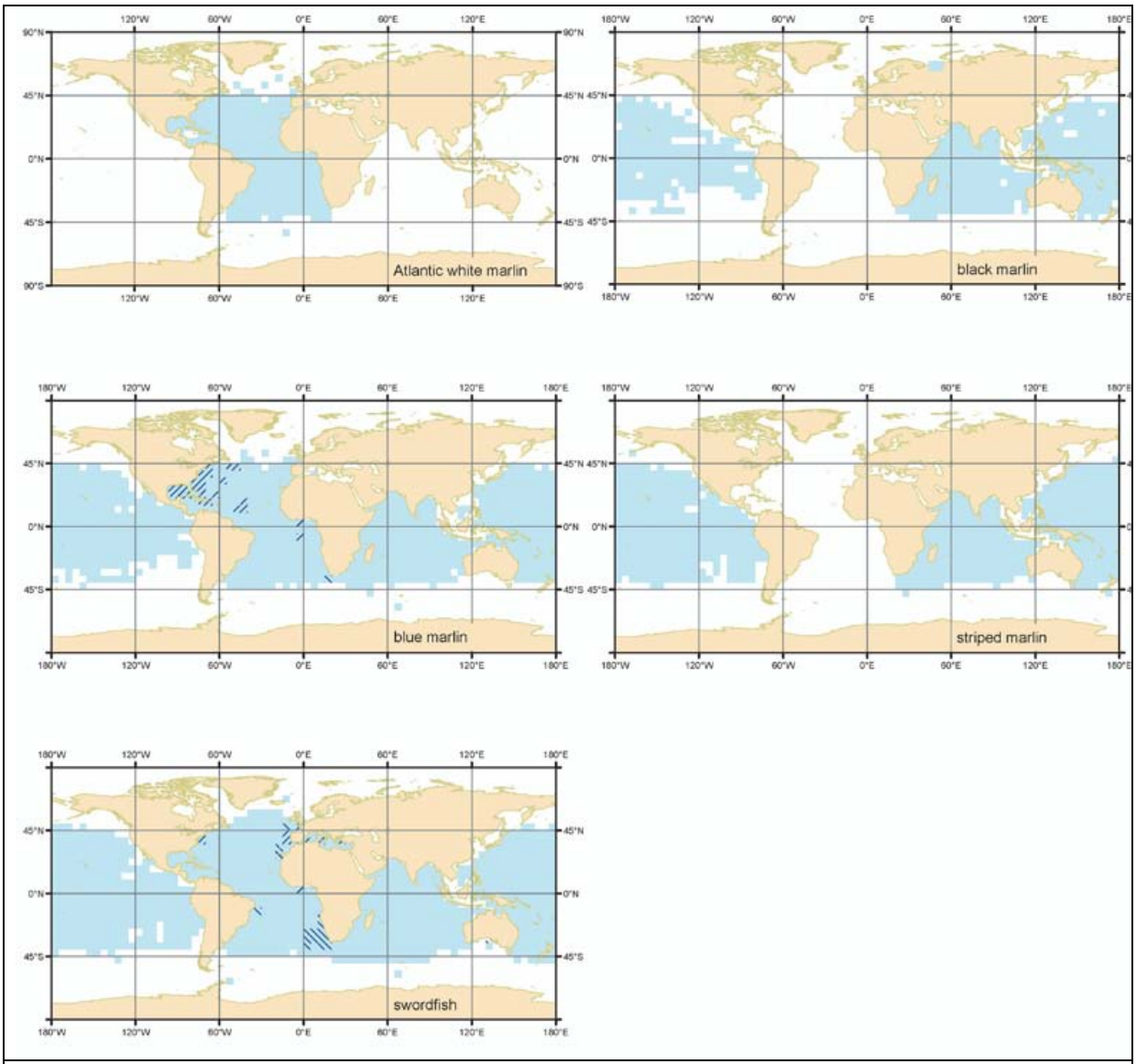


Figure 2 Geographic areas where catches of billfishes were taken from 1994 to 2004

Other important tuna-like species include slender tuna (*Allothunnus fallai*), butterfly kingfish (*Gasterochisma melampus*), wahoo (*Acanthocybium solandri*), bonitos (Cybiosarda, Orcynopsis and Sarda), Spanish and king mackerels, seerfish and sierra (*Scomberomorus spp.*). Their geographic distribution is given in Collette and Nauen (1983, **Figure 3**). These important species provide significant potential especially for developing countries where they are mostly caught in artisanal and recreational fisheries. Slender tuna and butterfly kingfish (with a circumpolar distribution in the Southern Ocean) are now caught mainly as by-catches of the Japanese longline fishery targeting southern bluefin tuna.

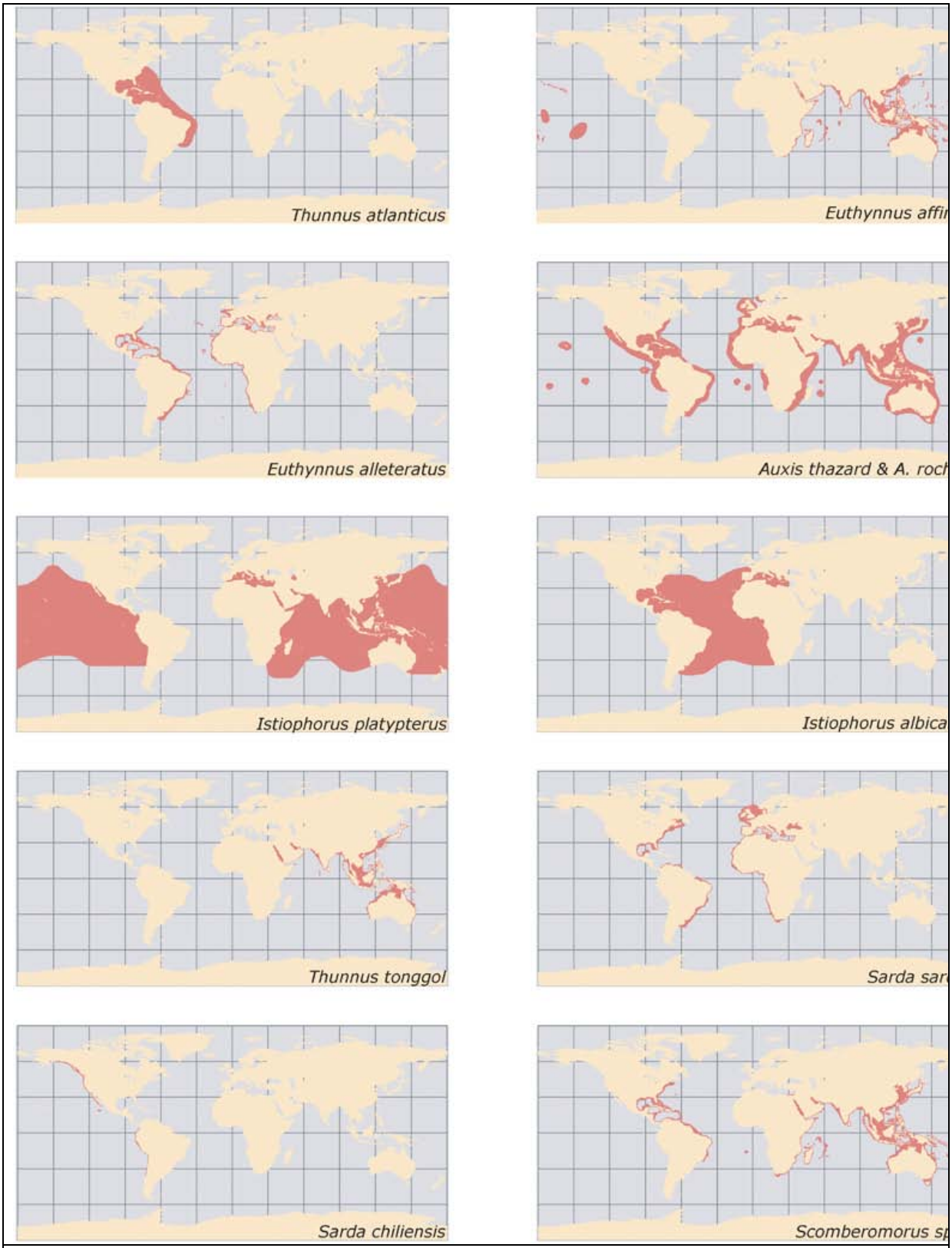


Figure 3 Distribution of billfishes and some small tunas for which there are no detailed data on locations of their catches

III. ASSESSMENT

Assessments of tuna abundance involve the concept of stocks and are carried out on these stocks, i.e. genetically or physically identifiable unique groups of fish that are “isolated” and managed as units: they reproduce and respond to fishing as single units of population with identifiable population parameters such as growth and mortality rates and biomass.

Such assessments are carried out using both simple and sophisticated mathematical and/or statistical models, accounting for general biological knowledge of the stocks. As a result of the fairly recent major advances in computing technologies, complex models can be applied for stock assessment of tuna and tuna-like species. They may be able to account better for inherent uncertainties in knowledge and in input data or test the sensitivity of results to these uncertainties. In the light of the extent of uncertainties, this is not to say that complex models are always better than simple ones, which still continue to be used.

Input data for stock assessment models or procedures may include:

- fisheries data such as those on:
- total catches in number or weight of the fish caught from stocks, their size, age and geographic distribution, and
- fishing effort
- data from tagging and recapture of fish
- data on oceanographic conditions.

It is not practical to carry out research surveys to estimate the abundance of those tuna and tuna-like species with a wide distribution. Therefore, data on catches and fishing effort and those from tagging provide the only means of estimating this abundance with the aid of stock assessment models or procedures.

Unfortunately, tagging programmes are extremely expensive and require cooperation by fishers to obtain and return information on recapture of tagged fish. Consequently, substantial tagging programmes have been carried out only occasionally.

International institutions and countries fishing tuna have devoted a great deal of effort to collecting relevant data. Yet in spite of this, the quality of the data is not sufficient even for some of the principal market tuna species. The introduction of management measures for tuna fisheries results unfortunately in deterioration of data quality. The presence of observers on board fishing vessels usually improves the quality of data, but programmes need to involve a significant number of vessels, if not all of them, and that is why they are so expensive.

There are many problems involved in obtaining indexes of tuna abundance from data on catches and fishing effort, mainly caused by difficulties in accounting for the considerable advances in fishing technology and for changes in oceanographic conditions.

IV. BIOLOGICAL STATE AND TREND

PRINCIPAL MARKET TUNAS

The following classification of the status of stocks is used throughout this document are based on the FAO Technical Paper. No. 483.

- **N** Not known or significantly uncertain.
- **M** Moderately exploited (some limited potential for sustainable increases in catches).
- **F** about Fully exploited (fishing at about an optimal yield with no expected room for further sustainable increases in catches).
- **O** Overexploited (fishing above a level which is sustainable in the long term [with a risk of stock depletion/collapse] and no potential room for further sustainable increases in catches).
- **D** Depleted (catches well below historical maximum levels irrespective of fishing effort exerted).

In this classification, most substantially overexploited stocks are distinguished by being classified as depleted. For stocks where it is unknown whether their status is, for example, moderately or about fully exploited, M-F is given. Similarly, F-O is given for stocks where it is uncertain whether they are about fully or overexploited.

Although these definitions do not explicitly mention maximum sustainable yields (MSYs) and the associated levels of stock biomass and fishing mortality, the stocks of the species could be similarly classified by explicitly using the concept of MSY. In particular, the actual levels of stock biomass and fishing mortality can be classified with regard to the levels associated with MSY (De Leiva Moreno and Majkowski, 2005). Such a two-dimensional classification gives precise information on the status of stocks, but it may prove complex for a non-technical audience to comprehend. For example, it could be said that a stock is not overexploited (biomass greater than that associated with MSY), but it is being overexploited (fishing mortality greater than that associated with MSY). For earlier reviews of the global status of tuna and tuna-like species, see Allen (2002); De Leiva Moreno and Majkowski (2005); Hinton (in press); Joseph (1998, 2000, 2004); Maguire et al. (2006); and Majkowski (2005).

Most tropical principal market tunas have reacted well to exploitation because of their high fecundity, wide geographic distribution, opportunistic behaviour and other population dynamics (such as a relatively short life span) that make them highly productive. These species include skipjack, yellowfin and bigeye. Another factor is that the first two species are used mostly for canning, with lower prices than those used for sashimi such as bluefin (the temperate species preferred) and bigeye. Generally, with proper fisheries management, tropical species are capable of sustaining high yields. However, the possibilities of overexploitation and stock depletion should not be underestimated.

Bluefin and albacore are both temperate species; but albacore that is used mainly for canning fetches much lower prices than bluefin, although higher than skipjack and yellowfin. Generally, stocks of temperate species are less productive and may be more susceptible to overexploitation.

There are still at least four of the stocks of the principal market tunas that are moderately exploited. This number may be five, in fact, if the stock classified as M-F (unknown whether the stock is moderately or about fully exploited) is included. Stocks moderately exploited are i) albacore in the South Atlantic and the South Pacific (two stocks); and ii) skipjack in the Pacific (two stocks) and, perhaps, in the Indian Ocean (also possibly about fully exploited).

Most stocks of principal market tunas are about fully exploited (at least, eight of the 23 stocks, but possibly ten of the 23, if the stocks classified as M-F and F-O are included). These stocks are i) albacore in the Indian Ocean and the North Pacific (two stocks); ii) bigeye in the

Atlantic and the Indian Ocean (two stocks); iii) Pacific bluefin; iv) yellowfin in all the oceans (four stocks), perhaps with the exception of that in the western and central Pacific (also possibly overexploited); and perhaps (v) skipjack in the Indian Ocean (also possibly moderately exploited).

A significant number of stocks are overexploited or depleted (at least, five of the 23 stocks, but possibly six, if the stock classified as F-O is included). Of these stocks, only two are classified as depleted. The latter are Atlantic bluefin in the western Atlantic and southern bluefin. Stocks classified as overexploited are i) albacore in the North Atlantic; ii) Atlantic bluefin in the eastern Atlantic and the Mediterranean Sea; iii) bigeye in the Pacific (possibly two stocks) and perhaps, iv) yellowfin in the western and central Pacific (also possibly fully exploited).

Of the principal market species, the status of three of the 23 stocks is unknown. These are albacore in the Mediterranean Sea and skipjack in the Atlantic (two stocks).

Knowledge and data on the principal market tunas are generally much better than those for other tuna and tuna-like species. The former have been studied for many years and more research effort has been devoted to them because of their economic importance. However, even for these species, significant uncertainties exist in basic biological knowledge and data. For example, relatively recent research indicates that the life span of southern bluefin tuna, one of the best studied species, may be considerably longer than previously believed. For Atlantic bluefin, another well studied species, officially reported catches may be significantly smaller than those actually taken, according to information from a trade-based statistical programme (Miyake, 1998) recently introduced by ICCAT. Additional research is needed to further advance biological knowledge of stocks.

However, despite uncertainties in knowledge and input data for stock assessment of the principal market tunas, scientists are usually able to reach some generally valid conclusions on the status of those stocks for which knowledge and data are reasonable.

Information on recent catches and the status of stocks of the principal market tunas is summarized in the table below. The catch estimates in the table were obtained from the FIGIS database Global Tuna Nominal Catches (FAO, 2002) in the second half of 2006. A status was assigned to each stock using the information available from reports of scientific meetings of CCSBT, IATTC, ICCAT, IOTC, ISC and WCPFC (see the chapter on Institutional frameworks for international collaboration in fisheries research). This information is available on the Web sites of these institutions.

Catches and state of stocks of the principal market tuna species (N= not known, M= moderately exploited, F= fully exploited, O= overexploited, D= depleted)

Species	Stock/area	Catch ('000 tonnes)					State of exploitation
		2000	2001	2002	2003	2004	
Albacore (*T. alalunga*)	Atlantic: Med. Sea	6	5	6	8	5	N
	Atlantic: North	34	25	23	26	25	O
	Atlantic: South	29	35	32	28	23	M
	Indian Ocean	38	41	33	25	23	F

	Pacific: North	84	98	109	100	92	F
	Pacific: South	40	53	63	62	56	M
	Total	231	257	266	249	224	
Atlantic bluefin tuna (*T. thynnus*)	Atlantic: eastern and Mediterranean Sea	34	35	35	32	32	O
	Atlantic: western	3	3	3	2	2	D
	Total	37	38	38	34	34	
Bigeye tuna (*T. obesus*)	Atlantic	103	96	76	83	76	F
	Indian Ocean	128	115	135	124	126	F
	Pacific: eastern	142	130	132	114	108	O
	Pacific: west. & cent.	120	117	134	122	129	O
	Total	493	458	477	443	439	
Pacific bluefin tuna (*T. orientalis*)	Pacific	29	17	17	16	22	F
Skipjack tuna (*K. pelamis*)	Atlantic: eastern	111	118	93	124	133	N
	Atlantic: western	29	31	22	24	27	N
	Indian Ocean	422	426	489	474	457	M-F
	Pacific: eastern	282	416	439	406	288	M
	Pacific: west. & cent.	1237	1136	1284	1295	1370	M
	Total	2081	2127	2327	2323	2275	
Southern bluefin tuna (*T. maccoyii*)	Southern Ocean	15	16	15	14	13	D
Yellowfin tuna (*T. albacares*)	Atlantic	134	160	139	125	120	F
	Indian Ocean	330	310	332	437	494	F
	Pacific: eastern	282	416	439	406	288	F
	Pacific: west. & cent.	433	427	419	447	413	F-O
	Total	1179	1313	1329	1415	1315	

- **SKIPJACK**

Among the principal market tunas, the tropical species of skipjack, which yields the largest catch among these species, is in a healthy state. It is only moderately exploited, possibly with the exception of: i) the Indian Ocean, where it is uncertain whether it is moderately or about fully exploited; and ii) the Atlantic, where its status is significantly uncertain. In the eastern Atlantic, but probably not in its western part, skipjack may be about fully exploited.

The status of skipjack is generally consistent with catches, tending to increase further, with the exception of those in the Atlantic (see **Figure 4**).

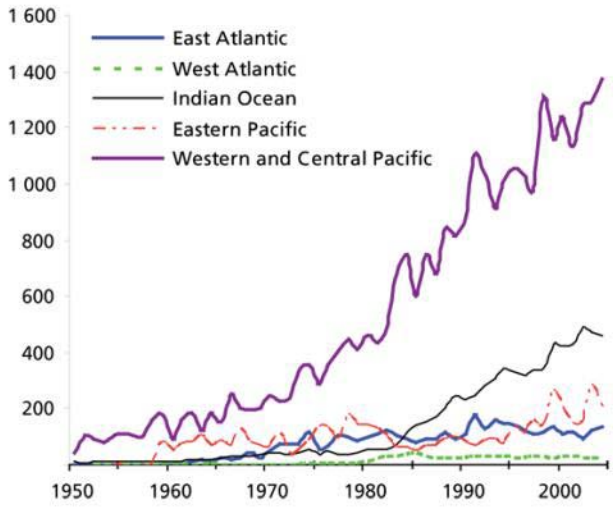


Figure 4 Annual catches of skipjack by stock ('000 tonnes)

❖ YELLOWFIN

With the possible exception of the western and central Pacific, stocks of yellowfin, another tropical species, are about fully exploited. In the western and central Pacific, there may be overexploitation, but this is not certain.

With the exception of the Indian Ocean, catches of yellowfin decreased in the last few years (see **Figure 5**). However, these changes may not be indicative of the status of their stocks, but rather of a high variability of recruitment and availability of yellowfin for fisheries. Catches seem to be determined mainly by environmental conditions rather than the intensity of past exploitation, at least, with the present intensity of fishing similarly as it is for skipjack. In the Atlantic, the decline in catches of yellowfin may reflect decreases in fishing intensity

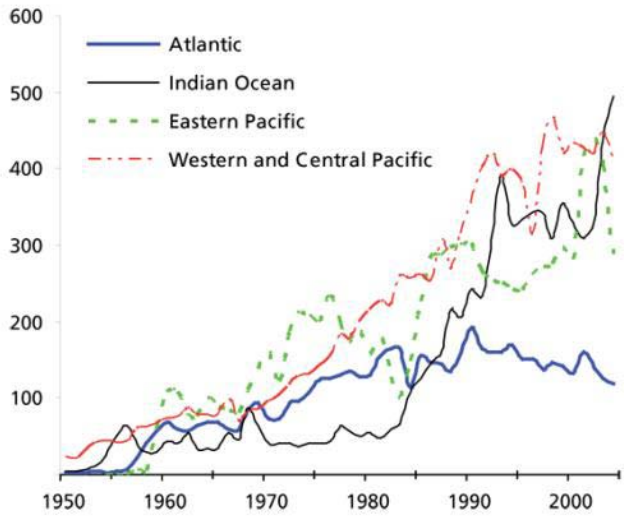


Figure 5 Annual catches of yellowfin by stock ('000 tonnes)

❖ BIGEYE

There is increasing concern about the status of bigeye. In the Atlantic and Indian Oceans, bigeye are about fully exploited. In the Pacific, it is not clear whether there is one stock or two, in the eastern part, and the western and central part. Therefore, as alternatives, one or two stocks are assumed in the assessment. However, each of the two assumptions leads to the conclusion of overexploitation. In addition to contributing to overfishing, the increasing purse seine catches of small bigeye in all oceans may negatively affect the longline catches of large bigeye, which fetch much higher prices.

For all stocks, catches are now smaller than their maximum, reached fairly recently (see **Figure 6**). In the Pacific and the Indian Ocean, these declines may be only temporary. In the Atlantic, the decline has been considerable

❖ ALBACORE

Stocks of the temperate species of albacore are moderately exploited in the South Pacific and the South Atlantic, about fully exploited in the Indian Ocean and in the North Pacific and overexploited in the North Atlantic. The status of albacore in the Mediterranean Sea is unknown.

Catches of albacore with the exception of those in the North Atlantic, the Mediterranean Sea and possibly the South Pacific seem to fluctuate without any clear trend (see **Figures 7 and 8**). The North Atlantic catches have generally been declining since the mid-1960s. Mediterranean catches of albacore are tending to increase. In the South Pacific, the albacore catch recently reached its absolute maximum and then slightly declined, peaking previously at lower values in the early 1970s and late 1980s.

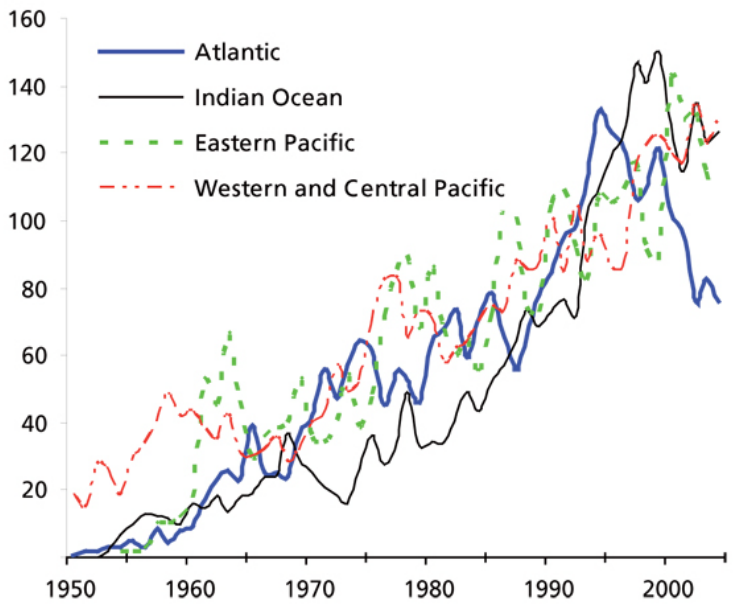


Figure 6 Annual catches of bigeye by stock ('000 tonnes)

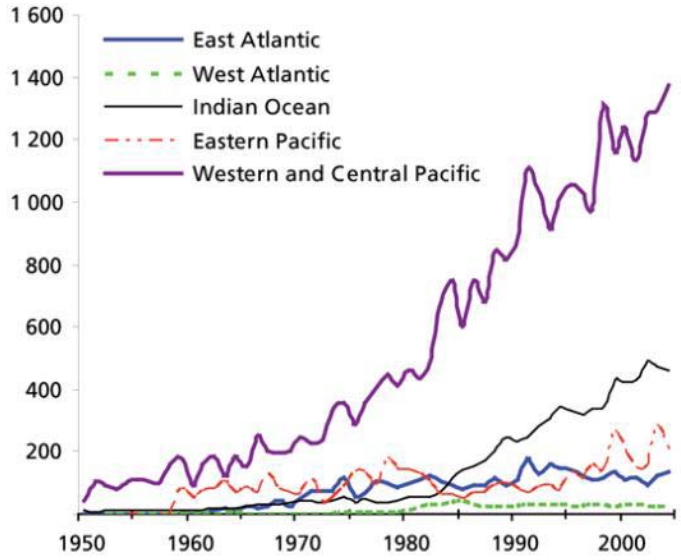


Figure 7 Annual catches of albacore in the Atlantic and Mediterranean by stock ('000 tonnes)

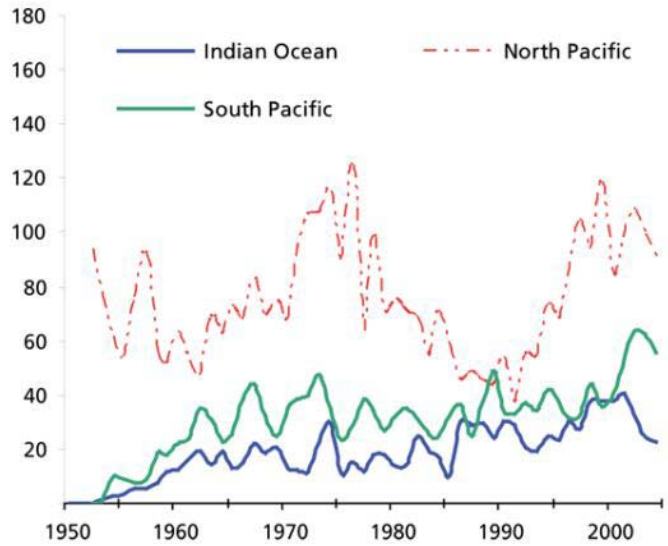


Figure 8 Annual catches of albacore in the Indian Ocean and Pacific by stock ('000 tonnes)

❖ BLUEFIN

The temperate species of bluefin, most sought after for sashimi, are overexploited, if not depleted, except for Pacific bluefin, which is about fully exploited. The yield per recruit for the Pacific stock could be increased if catches of small bluefin taken by trolling and purse seining were to be reduced. The western Atlantic bluefin stock is depleted as is the southern bluefin.

For depleted stocks, present catches are much smaller than their historical maximum (see **Figure 9**). The present catch of Atlantic bluefin in the east Atlantic and Mediterranean Sea may be much higher than that officially reported, which is close to the total allowable catch (TAC). According to ICCAT scientists, it may be close to its maximum. The catch of Pacific

bluefin has been recently fluctuating around a level significantly lower than the maximum reached in the mid-1960s and 1980s.

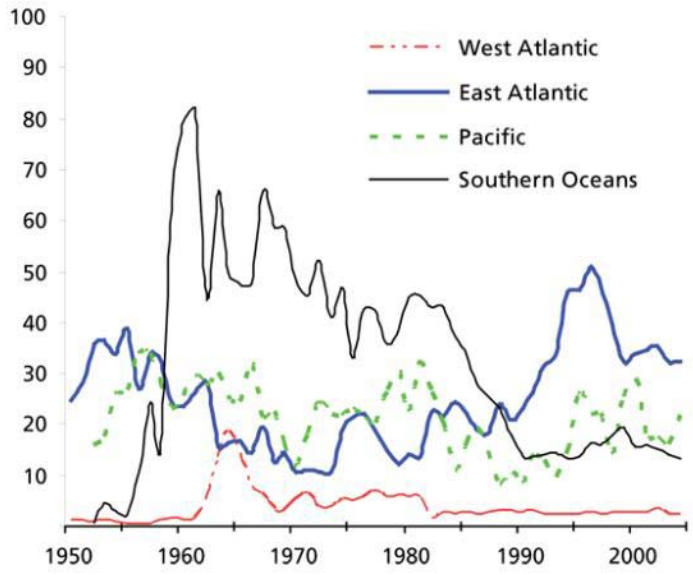


Figure 9 Annual catches of bluefin by stock ('000 tonnes)

OTHER TUNA AND TUNA-LIKE SPECIES

The status of many tunas other than principal market species and tuna-like species is highly uncertain or simply unknown. Therefore, there is concern over the intensification of their exploitation.

Nevertheless, because of commercial exploitation, more is known about swordfish than other billfishes. In the northeastern Pacific, swordfish is moderately exploited. In the North Atlantic and southeastern Pacific, it is about fully exploited. In the Indian Ocean, catches of swordfish are above MSY and consequently they are not sustainable in a long term, but the stock has not been reduced below the levels associated with MSY. The South Atlantic stock seems to be in a healthy state, but it is not known whether catches higher than those at present would be sustainable. The status of remaining stocks is unknown or significantly uncertain (i.e. in the Mediterranean Sea and the central, northwestern and southwestern Pacific).

Significant uncertainties about the status of many billfishes represent a serious conservation problem even though, with the exception of swordfish, most of them are not the main targets of commercial fisheries. In the Atlantic, blue and white marlins appear to be overexploited. Blue marlin is about fully exploited in the Pacific. The striped marlin is only moderately exploited in the eastern Pacific and about fully exploited in the western and central Pacific.

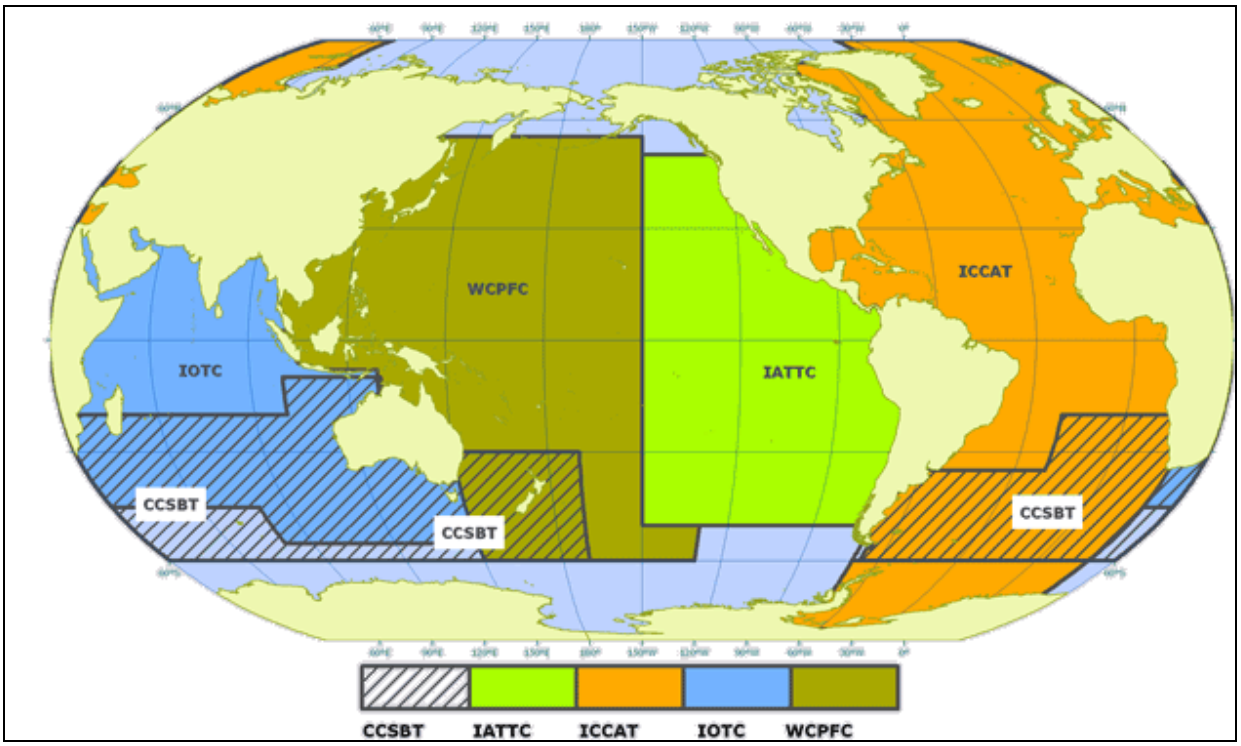
The status of the tuna and tuna-like species that are not principal market tunas and billfishes is generally unknown or little known. Little attention is generally given to these species by international institutions involved in fisheries research on tuna and tuna-like species even though some institutions such as ICCAT and IOTC have permanent working groups on small or neritic tunas, respectively. For most of these species, biological knowledge and catch and

fishing effort data are insufficient to carry out stock assessments. Consequently, further basic biological research and data collection are necessary before their status can be assessed.

V. OTHER INVOLVED INSTITUTIONS

In addition to the above-mentioned information, websites of the tuna fishery bodies and other international and national institutions have a lot of information on the species, particularly on regional scales. Tuna-org is as an informal framework for sharing information from the tuna bodies listed below.

- Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
- Inter-American Tropical Tuna Commission (IATTC)
- International Commission for the Conservation of Atlantic Tuna (ICCAT)
- Indian Ocean Tuna Commission (IOTC)
- Western and Central Pacific Fisheries Commission (WCPFC)



VI. CONCLUSION

If tuna fisheries continue to be profitable, the intensity of fishing may even increase as a result of fishing overcapacity unless it is effectively restrained by fisheries management measures. Such intensification would result in a significant deterioration in the status of stocks of tuna and tuna-like species. Even without the intensification, the status of some stocks that are presently being overexploited is likely to deteriorate unless the exploitation is reduced. This deterioration could eventually lead to a reduction in catches.

❖ Source of information

Jacek Majkowski . Fishery Resources Officer. “Global fishery resources of tuna and tuna-like species” . FAO Fisheries Technical Paper. No. 483. Rome, FAO. 2007. 54p.

Klawe, W.L. 1977. What is a tuna? Marine Fisheries Review, 11(39): 1–5. User Service Branch, Environmental Science Information Center, National Oceanic & Atmospheric Administration (NOAA), Rockville, MD20852, United States.

Collette, B.B. & Nauen, C.E. 1983. FAO species catalogue. Vol. 2. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date . FAO Fisheries Synopsis 125(2). 137 pp.

Nakamura, I. 1985. FAO species catalogue. Vol. 5. Billfishes of the world. An annotated and illustrated catalogue of marlins, sailfishes, spearfishes and swordfishes known to date. FAO Fisheries Synopsis 125(5). 65 pp.

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Annex 4

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Summary on the Status of TUNA Fisheries in the Western Central Pacific Ocean

By

Somboon Siriraksophon

Policy and Program Coordinator

SEAFDEC/SEC

Summary on the Status of TUNA Fisheries in the Western Central Pacific Ocean

Compiled by

Somboon Siriraksophon

Policy and Program Coordinator of SEAFDEC

I. Introduction

The Western and Central Pacific Fisheries Commission (WCPFC) was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention) which entered into force on 19 June 2004. There are 26 member countries, 8 participating Territories and 9 cooperating non-members.

This paper isdraftedbased on SEAFDEC's participation to the 7thRegular Session of the Scientific Committee (SC7) held from 9-17 August 2011 with the aims to observe the WCPFC'sworks on the Assessment of Tuna in the WCP Ocean (West Central Pacific Ocean) in which the Philippines as members while Indonesia, Vietnam and Thailand as Cooperating Non-member(s). The paper summarizes the outcomes assessment of tuna stock focusing bigeye tuna, yellow fin tuna, skipjack and albacore tuna and the proposed management advice for further consideration of its commission. The paper also concludesthe view/requirement of SEAFDEC member countries in term of human resources development and implication to the measures adopted by the WCPFC and others RFMOs.

This paper will be presented at the Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia organized by SEAFDEC/TD from 7-9 September 2011 at BP Samilar Beach Hotel & Resort, Songkhla, Thailand as well as at another SEAFDEC event with the aims to seek advice from SEAFDEC member countries on the establishing the tuna working group under the Regional Advisory Committee framework to support long-term assessment for both oceanic and neritic tuna at sub-regional areas such as the South China Sea and the Andaman Sea, etc.

II. Status of and Trends of Tuna Fisheries in WCPO and WCP-CA

Assessment of tuna stock in the Western and CentralPacific Ocean (WCPO) and WCP-Convention Area (CA)(Figure 1)has been done annually by groups of scientist using the scientific data available provided by members and cooperating non-members. Attempts by WCPFC to improve the data collection and methodology of stock assessment from the past to present make major changes to better understanding the status and trends oftuna stock and how developing of the tuna fisheries in the WCPO. Target species are 4 major tuna, i.e., bigeye (*Thunnusobesus*), yellowfin (*Thunnusalbacares*),albacore (*Thunnusalalunga*), skipjack (*Katsuwonuspelamis*), and tuna like species such as major billfish species, i.e., black marlin (*Makairaindica*), blue marlin (*Makairamazara*), striped marlin (*Tetrapturusaudax*) and swordfish (*Xiphiasgladius*). Main fishing gearsfor tuna fisheriesin the WCFO are purse seine (associated with drifting Fish Aggregating Devices (FAD), log, and free school), longline, pole and line, troll and others. Different types of fishing gear are used for different

tuna species, however number of By-catch from tuna fisheries are also take into consideration by the WCPFC on how fishing interaction to those by-catch species. In this paper, by-catch and tuna like-species are not included.

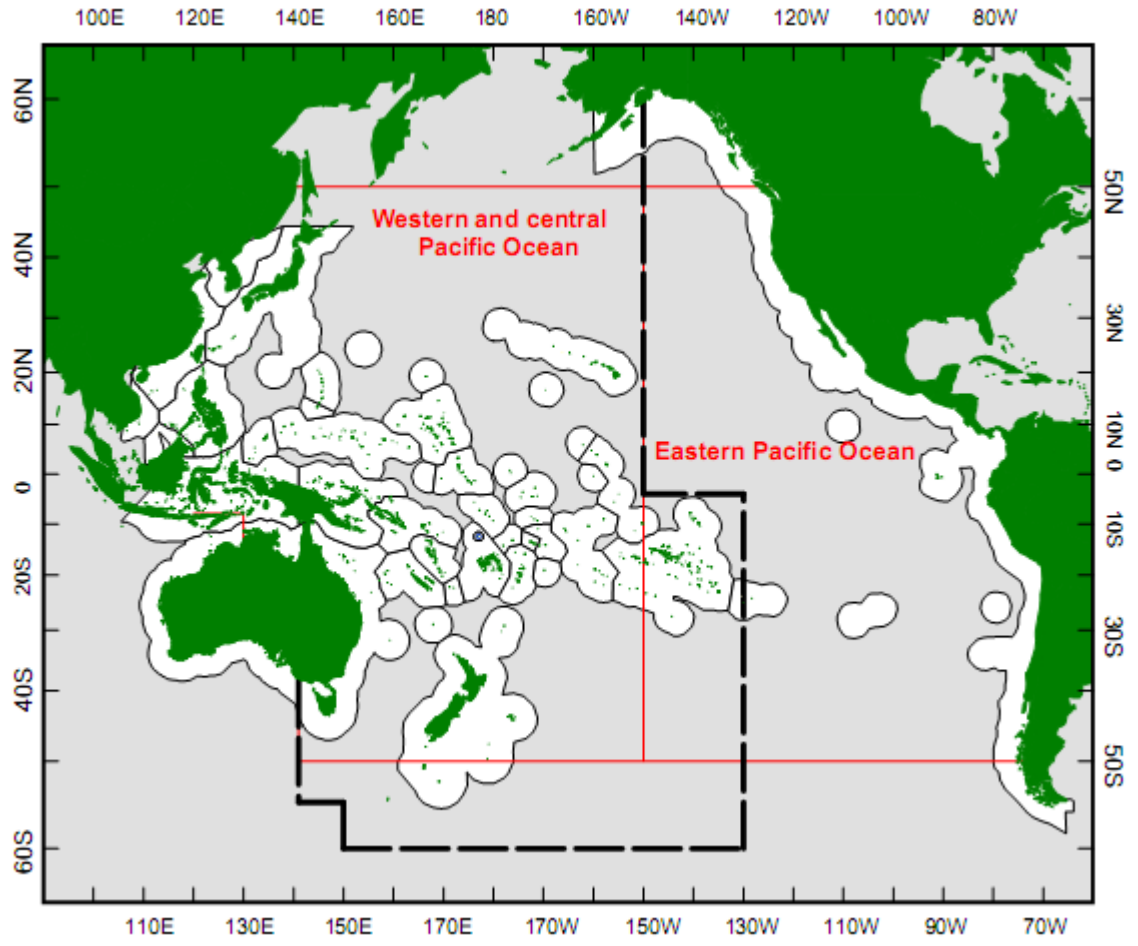


Figure 1. the Western and CentralPacific Ocean (WCPO) Area and the Eastern Pacific Ocean (EPO) Area

2.1 Annual Catches in the WCPFC Statistical Area

Estimates of annual catches in the WCPFC Statistical Area are presented for target tuna species, and major billfish species. Estimates of catches of southern bluefin tuna (*Thunnus maccoyii*) are compiled by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). The compilation of estimates of catches of Pacific bluefin tuna (*Thunnus orientalis*) commenced only recently and will be presented in future editions of this report once the gaps in the provision of historical catch estimates for this species have been resolved. Recent annual catches of tuna in the domestic fisheries of Vietnam may have amounted to about 19,000 tonnes of skipjack, 18,000 tonnes of yellowfin and 5,500 tonnes of bigeye, for a total of 42,500 tonnes (Lewis 2005). Regarding this, SEAFDEC under the JTF has supported on improving data collection particular oceanic tuna since 2008 in order to estimate the catch and effortof tuna fisheries and improving the tuna statistical system in

Vietnam as well as the WCPFC also provided its capacity building on data collection on port samplings since 2009 till present. This year, Vietnam compiled and provided an annual catch estimate for their longline fishery for 2010, and will endeavour to compile historical estimates in the coming years. Since there is a catch estimate for only one year covering the Vietnamese fisheries at this stage, their 2010 longline catch estimate has been ignored in the tables and figures presented below.

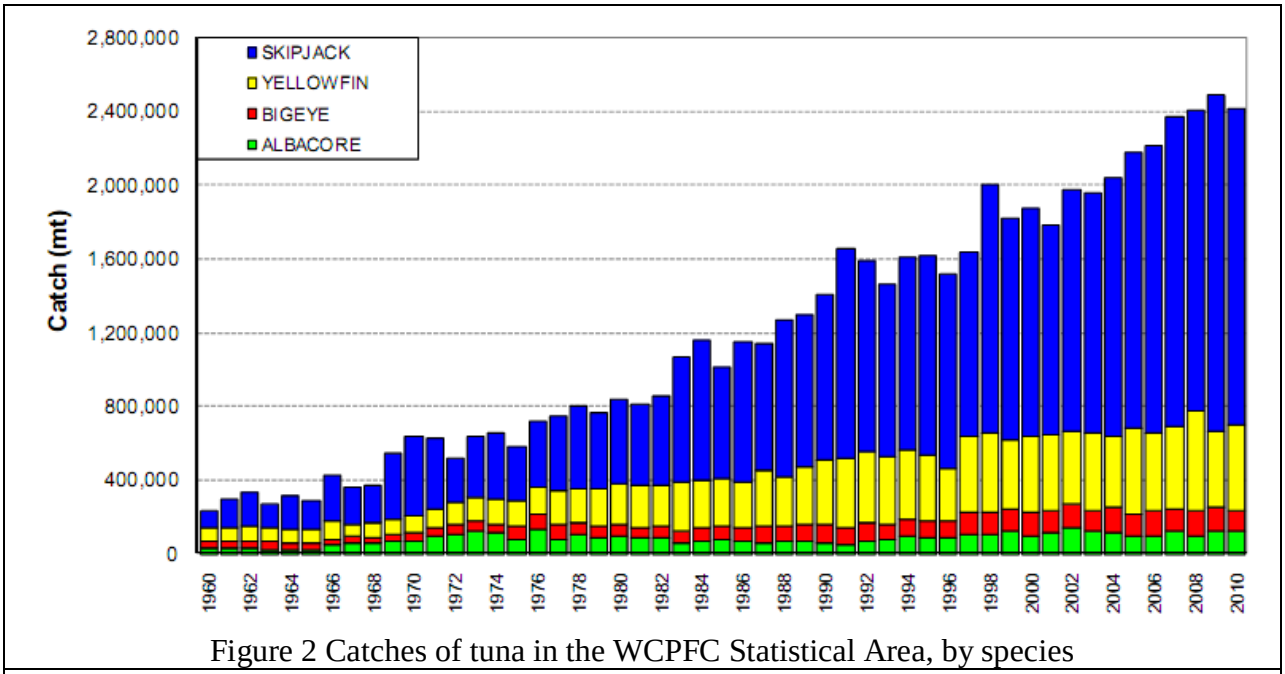


Figure 2 Catches of tuna in the WCPFC Statistical Area, by species

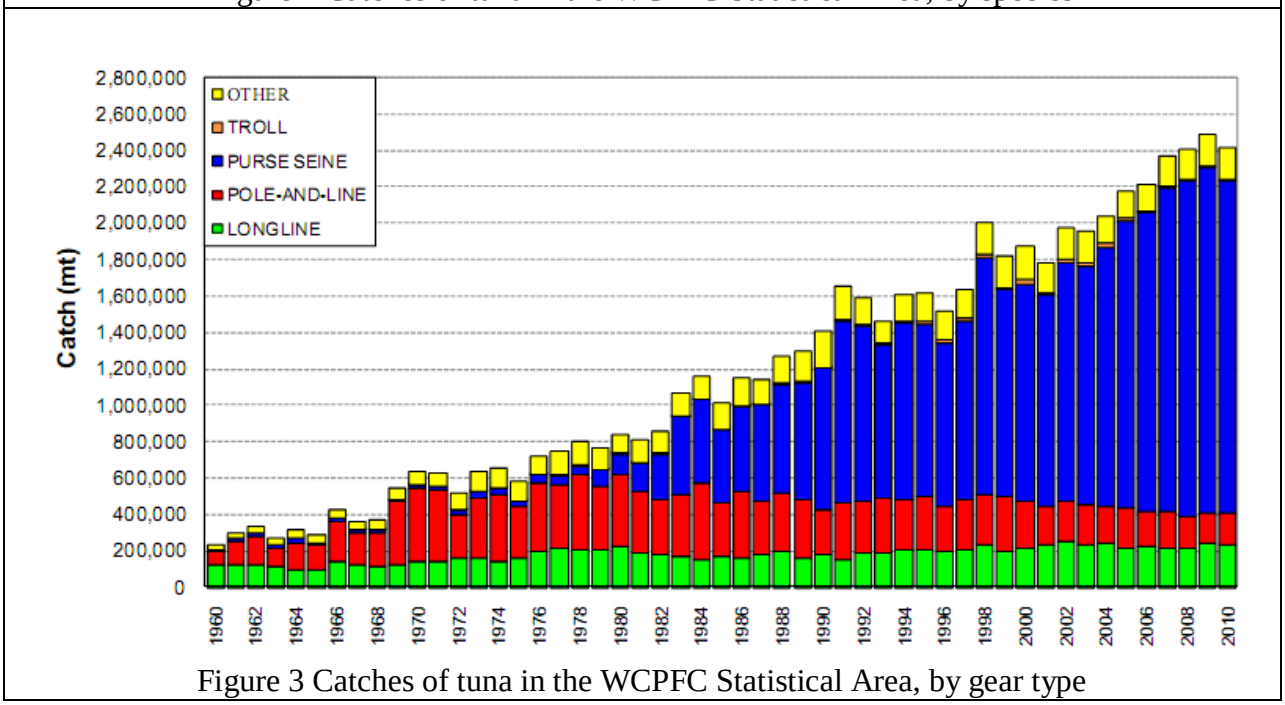


Figure 3 Catches of tuna in the WCPFC Statistical Area, by gear type

Figure 2 and 3 present estimates of annual catches of target tunas and a breakdown of recent catch estimates by gear in the WCPFC Statistical Area, respectively. Annual total catches of the four main tuna species (skipjack, yellowfin, bigeye and albacore) in the WCP–CA

increased steadily during the 1980s as the purse seine fleet expanded and remained relatively stable during most of the 1990s until the sharp increase in catch during 1998. Over the past 6 years, there has been an increasing trend in total tuna catch, primarily due to increases in purse-seine fishery catches. The provisional total WCP–CA tuna catch for 2010 was estimated at 2,414,994 mt, the second highest annual catch recorded and 80,000 mt lower the previous record in 2009 (2,494,112 mt). During 2010, the purse seine fishery accounted for an estimated 1,820,844 mt (75% of the total catch), with pole-and-line taking an estimated 171,604 mt (7%), the longline fishery an estimated 239,853 mt (10%), and the remainder (7%) taken by troll gear and a variety of artisanal gears, mostly in eastern Indonesia and the Philippines. The WCP–CA tuna catch (2,414,994 mt) for 2010 represented 84% of the total Pacific Ocean catch of 2,875,909 mt, and 60% of the global tuna catch (the provisional estimate for 2010 is 4,017,660 mt, which is the lowest for 8 years).

The 2010 WCP–CA catch of skipjack (1,706,166 mt – 71% of the total catch) was the second highest recorded, and 115,000 mt less than the previous record catch of 2009 (1,821,770 mt). The WCP–CA yellowfin catch for 2010 (470,161 mt – 19%) was more than 50,000 mt higher than the 2009 catch level, but still 70,000 mt lower than the record catch taken in 2008 (541,262 mt). The WCP–CA bigeye catch for 2010 (108,997 mt – 5%) was the lowest since 1996, mainly due to a drop in 2010 provisional estimates for the longline fishery. The 2010 WCP–CA albacorecatch (129,670 mt - 5%) was the second highest on record, with very good catches from the longline fishery.

2.2 Fleet and Effort in the WCPO

Taking into accounts the provisional 2010 purse-seine catch of 1,820,844 mt was the third highest on record for this fishery, at more than 80,000 mt lower than the record attained in 2009. The 2010 purse-seine skipjack catch (1,476,819 mt) was the second highest on record, but significantly lower (130,000 mt) than the record catch in 2009; the proportion of skipjack tuna in the logsheet-reported total catch (81%) was in line with the average for recent years. The 2010 purse-seine catch of yellowfin tuna (300,339 mt – 16%) rebounded (by 54,000 mt) from the relatively low catch of 2009, but was still significantly lower than the record catch taken in 2008 (391,152 mt). The provisional catch estimate for bigeye tuna for 2010 (43,389 mt) was the third highest on record but may be revised once all observer data for 2010 have been received and processed

Figure 4 present comparison between the annual purse seine effort and catches for the five main purse seine fleets operating in the tropical WCPFC Convention Area (WCP–CA) in recent years. The combined-fleet 2010 total catch and effort was the highest ever. The Chinese-Taipei fleet had been the highest producer in the tropical purse seine fishery until 2004, when it was surpassed by the combined Pacific Islands purse seine fleets fishing under the Federated States of Micronesia (FSM) Arrangement; from 20062007, the Korean and FSM Arrangement fleets were the highest producers. There was a hiatus in the FSM Arrangement fleet development in 2008 (when some vessels reflagged to the US purse-seine fleet) but catch/effort has since picked up again in 2009/2010. The fleet sizes and effort by the Japanese and Korean purse seine fleets have been relatively stable for most of this time

series. Several Chinese-Taipei vessels reflagged in 2002, dropping the fleet from 41 to 34 vessels, with fleet numbers stable since. The increase in annual catch by the FSM Arrangement fleet until 2005 corresponded to an increase in vessel numbers, and coincidently, mirrors the decline in US purse seine catch, vessel numbers and effort over this period. However, the US purse-seine fleet commenced a significant rebuilding phase in late 2007, with vessel numbers more than doubling in comparison to recent years, but still below the fleet size in the early-mid 1990s. The increase in vessel numbers in the US purse seine fleet is reflected in the sharp increase in their catch and effort since 2007, which is now in line with the other major purse seine fleets.

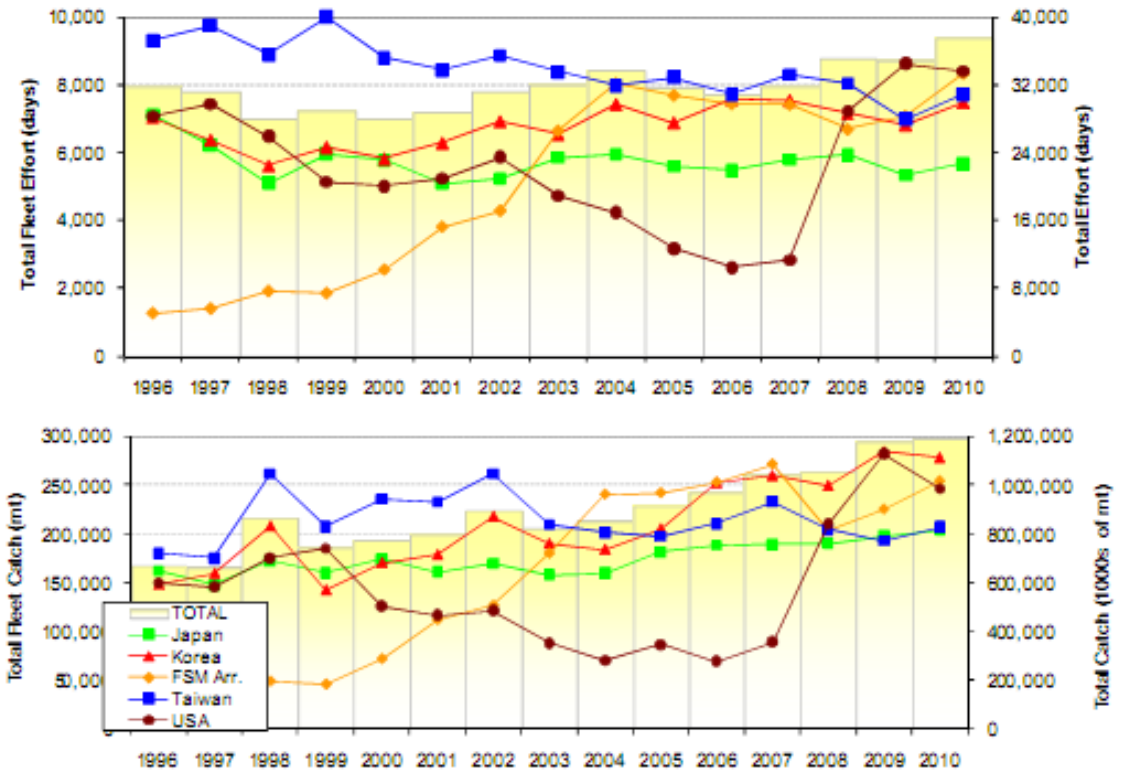


Figure 4 Trends in annual effort (top) and catch (bottom) estimates for the top five purse seine fleets operating in the tropical WCP–CA, 1996–2010.

WCPFC did not include the fleets and efforts operated by the Philippines and Indonesia in figure 4. There are a large number of ringnet and small purse seine vessels in the Indonesian, Philippines including Japan domestic fisheries which are not included in this total.

For the Philippines, as a member, the domestic Philippine purse-seine and ring-net fleets operate in Philippine and northern Indonesian waters, and prior to 2010, the high seas pocket between Palau, Indonesia, FSM and PNG, and have taken a combined catch of around 200,000 t in recent years (OFP 2011a). The high seas FADs closure in 2009 resulted in a decline in the domestic Philippine purse-seine catch for 2010, but with an increase in activities by Philippine-flagged vessels fishing in PNG under bilateral arrangements. The domestic Indonesian purse-seine fleet takes a similar catch level to the Philippines domestic fishery which means that these two domestic fisheries account for about 20-25% of the WCP-CA total purse seine catch.

2.3 Status of Tuna Stock in WCPO

The status of tuna stock in WCPO was assessed and discussed at the At the SC7 with the aim to project the real stock status of target tuna species based on many of the fundamental inputs to the models. This would lead for developing the management advise to the Technical Compliances Committee to come up with management measures under the WCPFC monitoring. In general of the Assessment, the data requires consist of catch, effort, length-frequency and weight-frequency data for the fisheries defined in the analysis, and tag release-recapture data conducted by either WCPFC or other agencies.

❖ Bigeye Tuna

Bigeye tuna are an important component of tuna fisheries throughout the Pacific Ocean and are taken by both surface gears, mostly as juveniles, and longline gear, as valuable adult fish. They are a principal target species of both the large, distant-water longline fleets of Japan, Korea, China and Chinese Taipei and the smaller, fresh sashimi longline fleets based in several Pacific Island countries and Hawaii. Prices paid for both frozen and fresh product on the Japanese sashimi market are the highest of all the tropical tunas. Total annual catch of bigeye tuna from the WCPO by fishing methods from 1952 to 2010 is appeared in Figure 5.

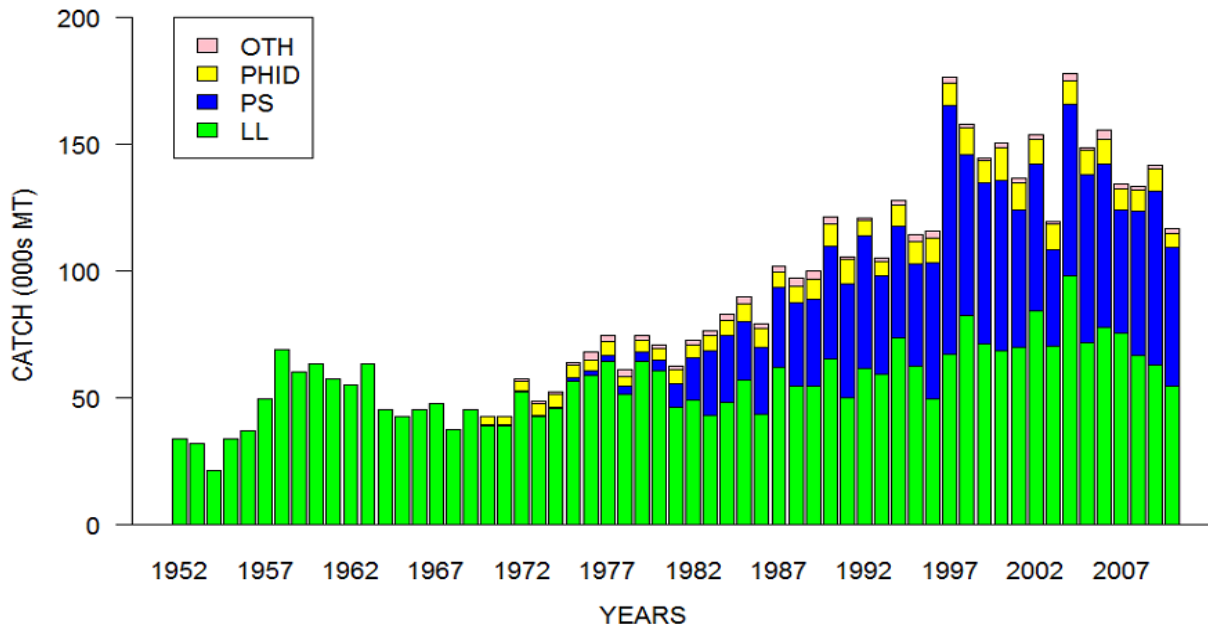


Figure 5. Total annual catch (1000s mt) of bigeye tuna from the WCPO by fishing method from 1952 to 2010 assumed in Run3j. These include purse seine catch estimates which have been corrected for grabsample bias.

Refer to the executive summary of the WCPFC-SC7-2011/SA- WP-02 by Nick Davies et al. (2011) presents the 2011 assessment of bigeye tuna in the western and central Pacific Ocean. The assessment is supported by several other analyses which are documented separately, but should be considered when reviewing this assessment as they underpin many of the fundamental inputs to the models. These include evaluation of paired spill / grab sample trials leading to observerbased species composition estimates with spill sampling correction for purse seine catch histories and size compositions, reviews of the catch statistics of the component fisheries, standardized CPUE analyses of operational level Japanese longline catch and effort data, standardized CPUE analyses of Taiwanese longline CPUE, an analysis

of tag reporting rates for the RTTP and PTTP programs, and the guidance of the Pre-Assessment Workshop held in April, 2011 by WFPFC.

The assessment includes a series of model runs describing stepwise changes from the 2010 assessment (run 3d) to develop a new ―reference case‖ model (Run3j – Ref.case) and then a series of ―one-off‖ sensitivity models that represent a single change from the Ref.case model run. A sub-set of key model runs was taken from the sensitivities that represent a set of plausible model runs and were included in a structural uncertainty analysis (grid) for consideration in developing management advice.

Besides updating the input data, the main developments to the inputs compared to the 2010 assessment were: including tagging data from the 2007-2010 PTTP program; standardized CPUE time series derived from operational-level catch-effort data for Japanese longline fisheries; weighting the Japanese longline size frequency data according to the estimated population relative abundance within regions; adjusting purse seine size frequency data using spill-samples to correct for grab-sample bias; and, including more reliable size composition data for Philippines and Indonesian domestic purse seine catches in offshore waters. The main developments to model structural assumptions were to define a separate Indonesian Philippines-based domestic purse seine fishery that operates beyond the national archipelagic waters and to the east of 125° E longitude.

The key assumptions from the "base case" model from the 2010 assessment were reviewed in light of the developments proposed for the Ref.case model for the 2011 assessment. These and the alternative assumptions in the other key model runs are provided below:

Component	2010 assessment (run 3d)	2011 assessment (run 3j)	2011 alternatives
Longline CPUE	Aggregate indices	Operational indices, temporal weighting of standardized effort	- Exclude all CPUE prior to 1975 - Aggregate indices
Steepness	Estimated	Fixed = 0.8	0.65, 0.95, and estimated
Purse-seine catches	Spill sample corrected	Spill sample corrected (including size data)	Grab sample (SBEST)
Tagging data	Excluded PTTP	Included PTTP	Exclude PTTP
Longline size data	Down-weighted	Full weight	Down -weighted
Natural mortality	Base	Base	Increased for juveniles

Taking into accounts, the Run3j is designated the "reference case" model for the purpose of structuring the modeling analyses, the most appropriate model run(s)for consideration in developing management advice.

The main conclusions of the current stock assessment of bigeye tuna (based upon WCPFC-SC7-2011/SA- WP-02 and recommendation by SC7) are as follows.

- The estimated increasing trend in recruitment from recent bigeye assessments appears to have been addressed to a small extent in the current assessment, but remains an issue in region 3 and is primarily the result of conflict (disagreement)

among the various data sources, in particular between the longline CPUE indices and the reported catch histories, and between and within some of the size composition data sets. The current assessment has indentified some of these conflicts and includes some model runs that begin to address them.

- As in previous assessments, recruitment in almost all models is estimated to have been high during 1995-2005. As suggested in the 2010 assessment, an analysis is presented that estimates the stock-recruitment relationship (with steepness fixed) for this latter period and applied it in the yield analyses. If one considers the recruitment estimates in the second half of the time series to be more plausible and representative of the overall productivity of the bigeye stock, the results of this analysis (Run21) could be used for formulating management advice. In this case $F_{\_current}/F_{\_MSY}$ was 1.58 and $SB_{\_current}/SB_{\_MSY}$ was 0.61 indicating that we would conclude that the stock is overfished and overfishing is occurring under this productivity assumption. The main reason for the much lower estimate of $SB_{_current}/SB_{_MSY}$is that $SB_{_MSY}$is approximately doubled because of the higher levels of recruitment being used to estimate it.
- Total and spawning biomass for the WCPO are estimated to have declined to about half of their initial levels by the mid-1970s, with total biomass remaining relatively constant since then ($B_{current}/B_0$= 44%), while spawning biomass has continued to decline ($SB_{current}/SB_{\_0}$=35%). Declines are larger for models that exclude the early periods of the CPUE time series.
- The attribution of depletion to various fisheries or groups of fisheries indicates that the purse seine and other surface fisheries have an equal or greater impact than longline fisheries on the current biomass. The purse seine and Philippines/Indonesian domestic fisheries also have substantial impact in region 3 and to a lesser extent in region 4. For the sensitivity analysis with lower purse seine catches, the longline fisheries are estimated to have a higher impact.
- Recent catches are well above the MSY level of 74,993 mt, but this is mostly due to a combination of above average recruitment and high fishing mortality. When MSY is re-calculated assuming recent recruitment levels and recent mix of fisheries persist, catches are still around 7% higher than the re-calculated MSY (131,400 mt). **Based on these results, we conclude that current levels of catch are unlikely to be sustainable in the long term even at the recent [high] levels of recruitment estimated for the last two decades.**
- Fishing mortality for adult and juvenile bigeye tuna is estimated to have increased continuously since the beginning of industrial tuna fishing. For all of the model runs $F_{current}/F_{MSY}$ is considerably greater than 1. For the grid median, the ratio is estimated at 1.42 indicating that a 30% reduction in fishing mortality is required from the 2006-09 level to reduce fishing mortality to sustainable levels. Using the Ref.case, if we consider historical levels of fishing mortality, a 39% reduction in fishing mortality from 2004 levels is required, and a 28% reduction from average 2001-04 levels. Larger reductions in fishing mortality are indicated when lower values of steepness are assumed. **Based on these results, we conclude that overfishing is occurring in the bigeye tuna stock**(Figure 6).
- The reference points that predict the status of the stock under equilibrium conditions are$B_{F_current}$)/B_{MSY} and $SB_{F\_current}/SB_{MSY}$. The model predicts that biomass would be reduced to 65% and 60% of the level that supports MSY. In terms of the reduction against virgin biomass the declines reach as low as 15% of spawning potential. Current stock status compared to these reference points indicate the current total and spawning biomass are higher than the associated

MSY levels (B_current/B_MSY =1.34 and $SB_{\_current}/SB_{\_MSY}$=1.37). The structural uncertainty analysis indicates a 13% probability that $SB_{current}<SB_{MSY}$. Based on these results above, and the recent trend in spawning biomass, **we conclude that bigeye tuna is approaching an overfished state.** We note however, that if recent recruitment is assumed to represent the true productivity of the bigeye stock (Run21), then the higher levels of B_{msy} and SB_{msy} implied would mean that bigeye tuna is alreadyin an overfished state ($B_{current}/B_{MSY}$ = 0.67 and $SB_{current}/SB_{MSY}$= 0.61).

- Analysis of current levels of fishing mortality and historical patterns in the mix of fishing gears indicates that MSY has been reduced to less than half its levels prior to 1970 through harvest of small juveniles. Because of that and overfishing, considerable potential yield from the bigeye tuna stock is being lost. **Based on these results, we conclude that MSY levels would rise if mortality of small fish were reduced which would allow greater overall yields to be sustainably obtained**(Figure 7).

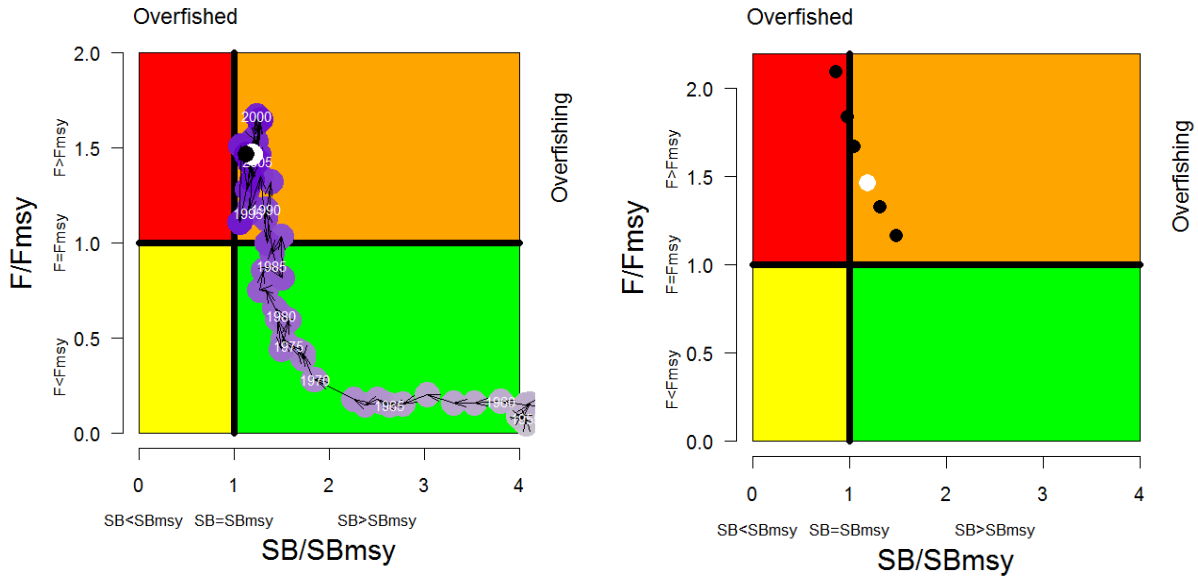
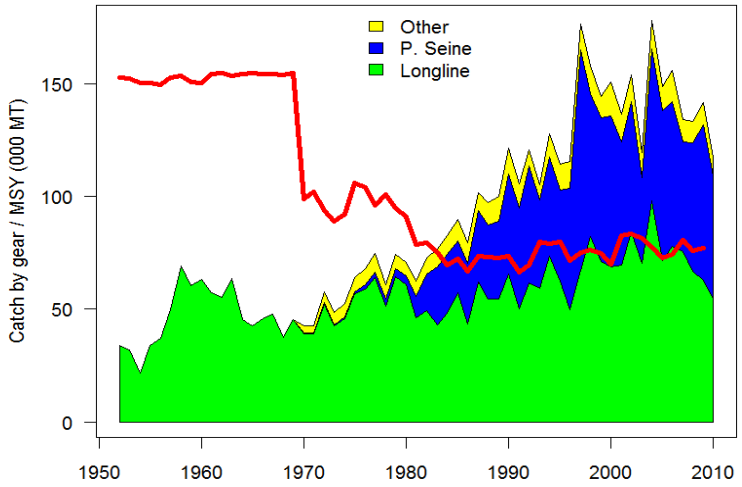


Figure 6: Temporal trend in annual stock status, relative to SB_{MSY} (x-axis) and F_{MSY} (y-axis) reference points for the reference case model (run 3j, top) and $F_{\_current}/F_{\_MSY}$ and $SB_{\_current}/SB_{\_MSY}$ for the reference case (run 3j – white circle) and the five combinations of steepness and longline CPUE series.

Figure 7 History of annual estimates of MSY compared with catches of three major fisheries sectors. Declining MSY results from the change in selectivity of fishing gear and increases in catches of small bigeye.	

❖ Yellowfin Tuna

Yellowfin tuna, an important component of tuna fisheries throughout the WCPO, are harvested with a diverse variety of gear types, from small-scale artisanal fisheries in Pacific Island and Southeast Asian waters to large, distant-water longliners and purse seiners that operate widely in equatorial and tropical waters. Purse seiners catch a wide size range of yellowfin tuna, whereas the longline fishery takes mostly adult fish. Figure 8 presents total annual catches (1000s mt) of yellowfin from the WCPO based on main fishing gears.

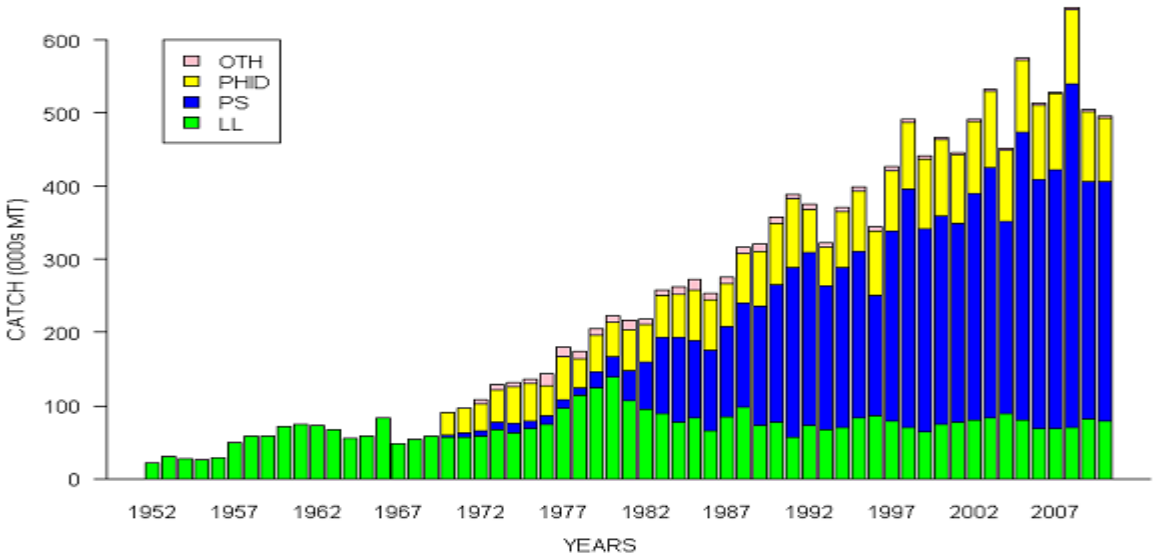


Figure 8: Total annual catches (1000s mt) of yellowfin from the WCPO included within the assessment model by fishing method from 1952 to 2010. The purse seine (PS) catches are the best available catch estimates (corrected for sampling bias). The annual catches from 2010 are incomplete.

The industrial purse-seine fishery accounts for a large proportion of the total yellowfin tuna catch. However, there remains considerable uncertainty regarding the accuracy of the purse-seine catch and official catch statistics may significantly under-estimate actual catch levels.

Reported catches have been corrected for the known sources of bias and the revised catches represent the primary catch data incorporated in the stock assessment.

The annual yellowfin tuna catch in the WCPO increased from 100,000 mt in 1970 to about 550,000 mt in recent years, with the exception of a record catch of 650,000 mt in 2008 (corrected catches). Purse seiners harvest the majority of the yellowfin tuna catch (68% in 2005-2009), while the longline fleet accounted for 13% of the catch in recent years. The remainder of the catch is dominated by the domestic fisheries of the Philippines and Indonesia, principally catching smaller fish using a variety of small-scale gear types (e.g. pole-and-line, ringnet, gillnet, handline and seine net) but also including small to medium sized purse seiners based in those countries and catching fish of sizes more typical of purse seine fisheries elsewhere.

Since the mid 1980s, annual catches by longline have remained relatively stable, at about 70,000–80,000 mt. This is well below the level of catch in the late 1970s – early 1980s (which peaked at about 110,000 mt), presumably partly related to changes in targeting practices by some of the larger fleets. Annual catches from the domestic fisheries of the Philippines and eastern Indonesia, are highly uncertain, particularly prior to 1990. Catches from these fisheries increased steadily from the 1970s, reaching approximately 100,000 mt in 2000 and remaining at that level in subsequent years.

This paper presents the 2011 assessment of yellowfin tuna in the western and central Pacific Ocean. The assessment uses the stock assessment model and computer software known as MULTIFAN-CL. The yellowfin tuna model is age (28 age-classes) and spatially structured (6 regions) and the catch, effort, size composition and tagging data used in the model are classified by 24 fisheries and quarterly time periods from 1952 through 2010. The assessment included a range of model options and sensitivities that were applied to investigate key structural assumptions and sources of uncertainty in the assessment. (see details in **WCPFC-SC7-2011/SA- WP-03,** Adam Langley, et al., 2011**).**

The main conclusions of the current assessment of yellowfin tuna are as follows.

i. For all analyses, there are strong temporal trends in the estimated recruitment series. Initial recruitment was relatively high but declined during the 1950s and 1960s. Recruitment remained relatively constant during the 1970s and 1980s, declined steadily from the early 1990s and then recovered somewhat over the last decade. Recent recruitment is estimated to be lower than the long-term average (approximately 85%).
ii. Fishing mortality for adult and juvenile yellowfin tuna is estimated to have increased continuously since the beginning of industrial tuna fishing. A significant component of the increase in juvenile fishing mortality is attributable to the Philippines and Indonesian surface fisheries, which have the weakest catch, effort and size data. There has been recent progress made in the acquisition of a large amount of historical length frequency data from the Philippines and these data were incorporated in the assessment. However, there is an ongoing need to improve estimates of recent and historical catch from these fisheries and maintain the current fishery monitoring programme within the Philippines. Previous analyses have shown that the current stock status is relatively insensitive to the assumed level of catch from these fisheries, although yield estimates from the fishery vary in accordance to the assumed levels of historical catch. **Therefore, improved estimates of historical and current catch from these fisheries are important in the determination of the underlying productivity of the stock.**

iii. The ratios $B_t / B_{t,F=0}$ provide a time-series index of population depletion by the fisheries. Depletion has increased steadily over time, reaching a level of about 50-55% of unexploited biomass (a fishery impact of 45-50%) in 2006-2009. This represents a moderate level of stock-wide depletion although the stock remains considerably higher than the equivalent equilibrium-based reference point ($\tilde{B}_{MSY} / \tilde{B}_0$ of approximately 0.35-0.40). However, depletion is considerably higher in the equatorial region 3 where recent depletion levels are approximately 0.30 for total biomass (a 70% reduction from the unexploited level). Impacts are moderate in region 4 (37%), lower (about 15-25%) in regions 1, 5, and 6 and minimal (9%) in region 2. **If stock-wide over-fishing criteria were applied at the level of our model regions, we would conclude that region 3 is fully exploited and the remaining regions are under-exploited. (**Figure 9 and 10**).**

iv. The attribution of depletion to various fisheries or groups of fisheries indicates that the associated purse-seine fishery and Philippines/Indonesian domestic fisheries have the highest impact, particularly in region 3, while the unassociated purse seine fishery has a moderate impact. These fisheries are also contributing to the fishery impacts in all other regions. Historically, the coastal Japanese pole-and-line and purse-seine fisheries have had a significant impact on biomass levels in their home region (1). In all regions, the longline fishery has a relatively small impact, less than 5%.

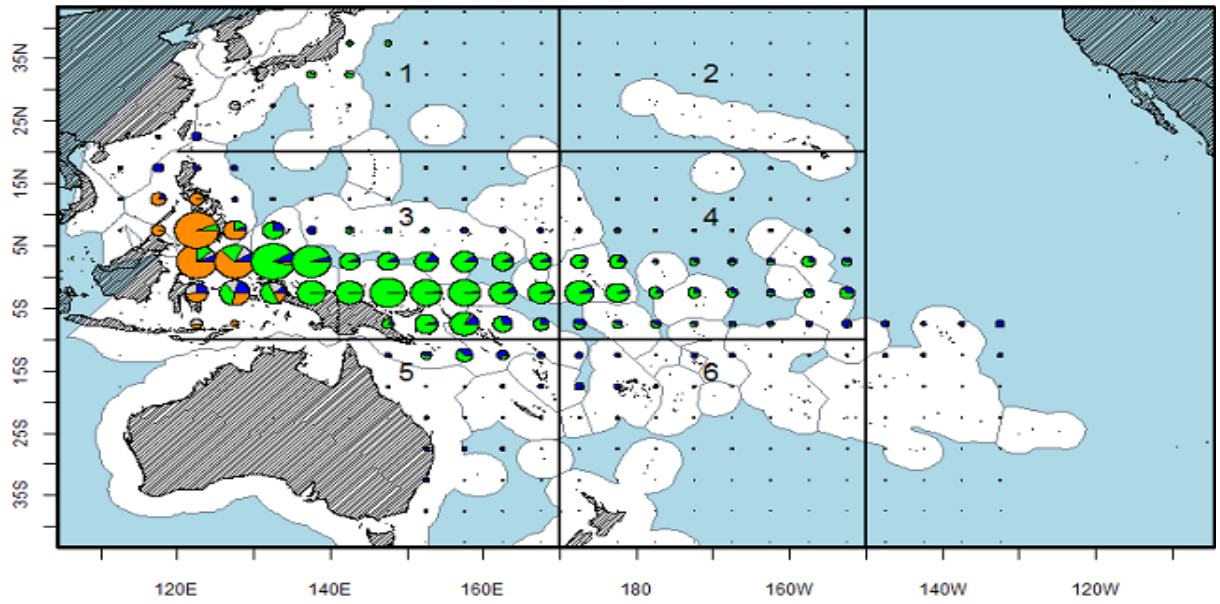


Figure 9: Figure 6. Distribution of cumulative WCPFC yellowfin tuna catch from 2000□2009 by 5 degree squares of latitude and longitude and fishing gear; longline (blue), purse-seine (green), pole-and-line (grey) and other (principally Indonesia and Philippines, dark orange). The grey lines indicate the spatial stratification of the assessment models.

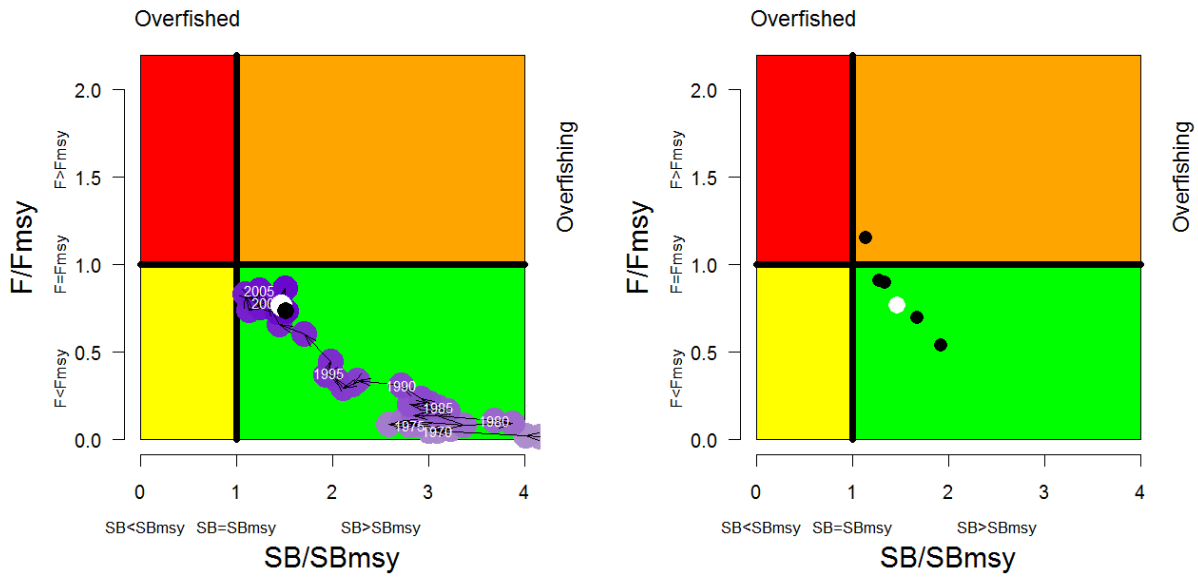


Figure 10: Temporal trend in annual stock status, relative to SB_{MSY} (x-axis) and F_{MSY} (y-axis) reference points for the reference case model (LLcpueOP_TWcpueR6_PTTP, top) and $F_{\_current}/F_{\_MSY}$ and $SB_{\_current}/SB_{\_MSY}$ for the reference case (LLcpueOP_TWcpueR6_PTTP – white circle) and the five combinations of steepness and tagging data sets included.

v. For the most plausible range of models, the fishing mortality based reference point $F_{current}/\tilde{F}_{MSY}$ is estimated to be 0.56–0.90 and on that basis conclude that **overfishing is not occurring**. The corresponding biomass based reference points $B_{current}/\tilde{B}_{MSY}$ and $SB_{current}/S\tilde{B}_{MSY}$ are estimated to be above 1.0 (1.25–1.60 and 1.34–1.83, respectively) and, therefore, the stock is **not in an overfished state**. The stock status indicators are sensitive to the assumed value of steepness for the stock-recruitment relationship. A value of steepness greater than the default value (0.95) yields a more optimistic stock status and estimates considerably higher potential yields from the stock. Conversely, for a lower (0.65) value of steepness, the stock is estimated to be approaching the *MSY* based fishing mortality and biomass thresholds**.**

vi. The estimates of MSY for the principal model options (480,000-580,000 mt) are comparable to the recent level of (estimated) catch from the fishery (550,000 mt). Further, under equilibrium conditions, the predicted yield estimates (YFcurrent) are very close to the estimates of MSY indicating that current yields are at or above the long-term yields available from the stock. Further, while estimates of current fishing mortality are generally below, any increase in fishing mortality would most likely occur within region 3 — the region that accounts for most of the catch. This would further increase the levels of depletion that is occurring within that region (see Figure 11).

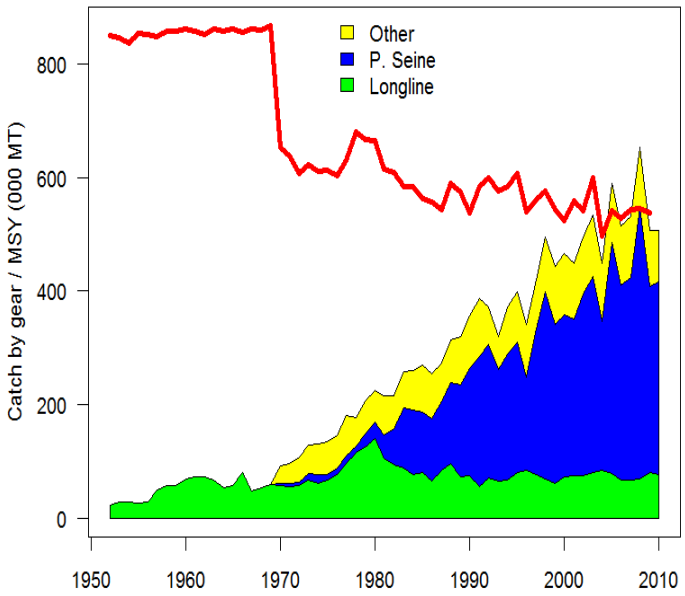


Figure 11: History of annual estimates of MSY compared with catches of three major fisheries sectors. Declining MSY results from the change in selectivity of fishing gear and increases in catches of small yellowfin.

❖ Skipjack Tuna

Skipjack tuna are harvested with a wide variety of gear types. Fisheries can be classified into the Japan distant-water and offshore poleand-line fleets, domestic pole-and-line fleets based in island countries, artisanal fleets based in the Philippines, eastern Indonesia and the Pacific Islands, and distant-water and Pacific-Island-based purse seine fleets.

The Japanese distant-water and offshore pole-and-line fleets operate over a large region in the WCPO. A domestic pole-and-line fishery occurred in PNG from 1970 to 1985 and active fisheries have occurred in Fiji and the Solomon Islands since 1974 and 1971, respectively.

A variety of gear types (e.g. gillnet, hook and line, longline, purse seine, ring net, pole-and-line and unclassified) capture skipjack in the Philippines and Indonesia. Small but locally important artisanal fisheries for skipjack and other tuna (using mainly trolling and traditional methods) also occur in many of the Pacific Islands.

Purse seine fleets usually operate in equatorial waters from 10N to 10S; although a Japan offshore purse seine fleet operates in the temperate North Pacific. The distant-water fleets from Japan, Korea, Taiwan and the USA capture most of the skipjack in the WCPO, although catches by fleets flagged to or chartered by Pacific Island countries have increased considerably in recent years. The purse seinefishery is usually classified by set type categories - sets on floating objects such as logs and fish aggregation devices (FADs), which are termed “associated sets” and sets on free-swimming schools, termed “unassociated sets”. These different set types have somewhat different spatial distributions, catch per unit effort (CPUE) and catch different sizes of skipjack and other tuna (see Figure 12and 13).

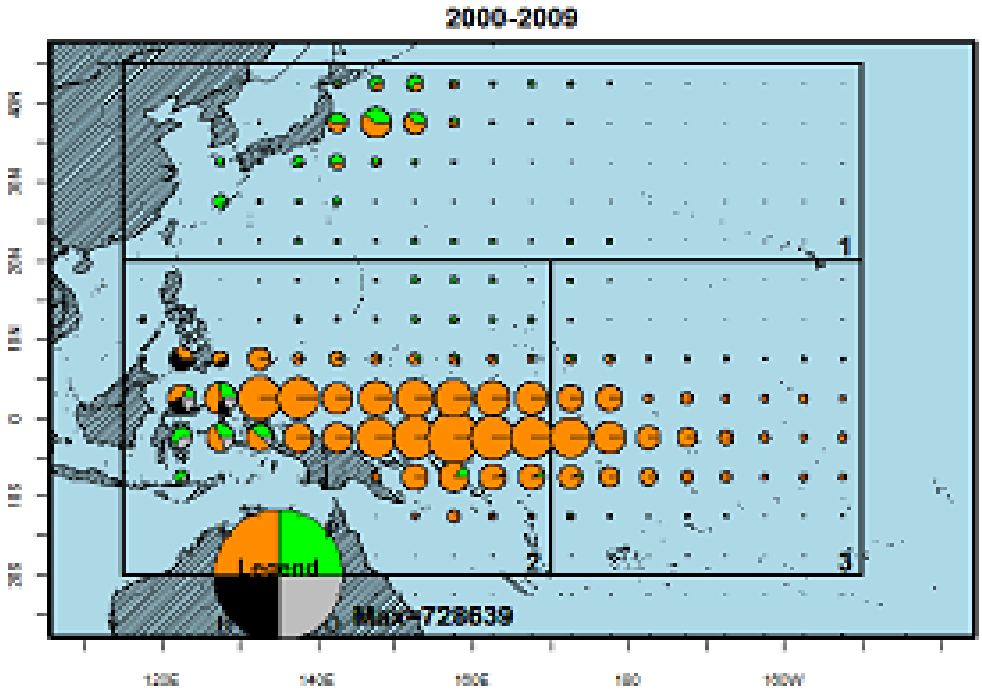


Figure 12: Distribution of total skipjack catches by method during 2000-2010 in relation to the 3-region spatial stratification used in the MULTIFAN-CL analysis. Method colours: Green, pole-and-line; Orange, purse-seine; Black: handline (small-scale); Gray, other.

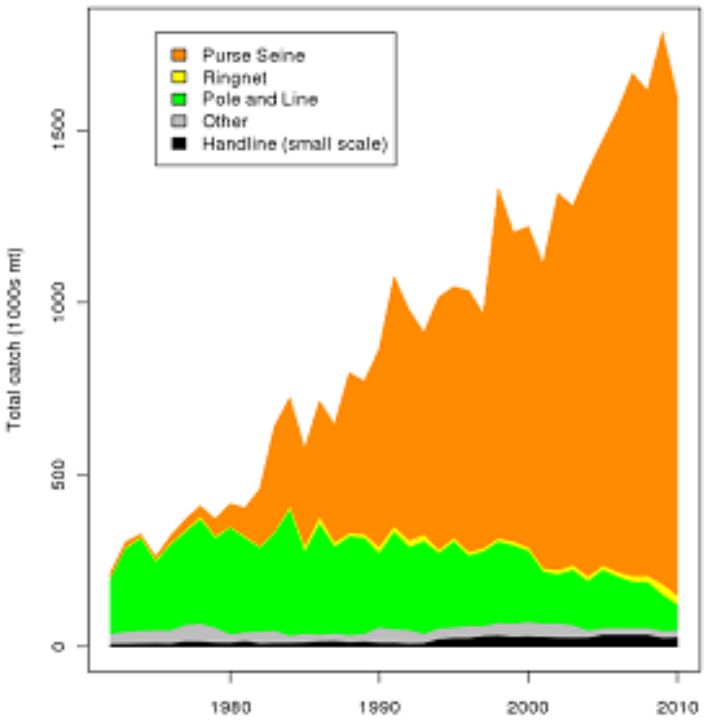


Figure 13: Annual skipjack tuna catch in the WCPO by method, 1972-2010.

Skipjack in the western and central Pacific Ocean (WCPO) are considered a single stock for assessment purposes (Wild and Hampton 1994). In the western Pacific, warm, poleward-flowing currents near northern Japan and southern Australia seasonally extend their distribution to 40°N and 40°S. These limits roughly correspond to the 20°C surface isotherm. A substantial amount of information on skipjack movement is available from tagging

program. In general, skipjack movement is highly variable (Sibert et al. 1999) but is thought to be influenced by large-scale oceanographic variability (Lehodey et al. 1997).

Estimates of natural mortality rate have been obtained using a size-structured tag attrition model (Hampton 2000), which indicated that natural mortality was substantially larger for small skipjack (21-30 cm FL, M=0.8 mo^{-1}) than larger skipjack (51-70 cm FL, M=0.12-0.15 mo^{-1}). The longest period at liberty for a tagged skipjack was 4.5 years. Skipjack tuna reach sexual maturity at about 40 cm FL.

Assessment of skipjack tuna in the western and central Pacific Ocean are based on the Simon Hoyle et al., (2011). The assessment uses the stock assessment model and computer software known as MULTIFAN-CL. The skipjack tuna model is age (16 quarterly age-classes) and spatially structured. The catch, effort, size composition, and tagging data used in the model are grouped into 18 fisheries (a change from the 17 fisheries used in the 2010 assessment) and quarterly time periods from 1972 through 2010.

Overall, the main assessment results of skipjack and conclusions are as follows.

- Estimates of natural mortality are strongly age-specific, with higher rates estimated for younger skipjack.
- The model estimates significant seasonal movements between the western and eastern equatorial regions. The performance of the fishery in the eastern region has been shown to be strongly influenced by the prevailing environmental conditions with higher stock abundance and/or availability associated with El Niño conditions (Lehodey et al. 1997). This is likely to be at least partly attributable to an eastward displacement of the skipjack biomass due to the prevailing oceanographic conditions, although this dynamic cannot be captured by the parameterisation of movement in the current model.
- Recruitment showed an upward shift in the mid-1980s and is estimated to have remained at a higher level since that time. This change in estimated recruitment is driven in the model by the CPUE data, and also by the tagging data, given the relative tag return rates from the SSAP and the RTTP tagging programmes. Recruitment in the eastern equatorial region is more variable with recent peaks in recruitment occurring in 1998 and 2004-2005 following strong El Niño events around those times. Conversely, the lower recruitment in 2001-2003 followed a period of sustained La Nina conditions. Recent recruitment is estimated to be at a high level, but is poorly determined due to limited observations from the fishery.
- The biomass trends are driven largely by recruitment and fishing mortality. The highest biomass estimates for the model period occurred in 1998-2001 and in 2005-2007, immediately following periods of sustained high recruitment within the eastern equatorial region (region 3).
- The biomass trajectory is influenced by the underlying assumptions regarding the treatment of the various fishery-specific catch and effort data sets within the model. The Japanese pole-and-line fisheries are all assumed to have constant catchability, with any temporal trend in efficiency assumed to have been accounted for by the standardization of the effort series. The CPUE trends are influential regarding the general trend in both recruitment and total biomass over the model period. In all regions there is a relatively good fit to the observed CPUE data, with some deterioration when PTTP tagging data are introduced.

- The model also incorporates a considerable amount of tagging data that provides information concerning absolute stock size during the main tag recovery periods. Including the PTTP tagging data in the model resulted in higher estimates of recent biomass and MSY. Initial analyses of the data suggest some conflict with inferences from the CPUE time series about trends in abundance. Further work on both data sources is recommended.
- Within the equatorial region, fishing mortality increased throughout the model period and is estimated to be highest in the western region in the most recent years. The impact of fishing is predicted to have reduced recent biomass by about 47% in the western equatorial region and 21% in the eastern region. For the entire stock, the depletion is estimated to be approximately 35%.
- The principal conclusions are that skipjack is currently exploited at a moderate level relative to its biological potential. Furthermore, the **estimates of** $F_{current}/\tilde{F}_{MSY}$ **and** $B_{current}/\tilde{B}_{MSY}$ **indicate that overfishing of skipjack is not occurring in the WCPO, nor is the stock in an overfished state.** These conclusions appear relatively robust, at least within the statistical uncertainty of the current assessment. Fishing pressure and recruitment variability, influenced by environmental conditions, will continue to be the primary influences on stock size and fishery performance.
- For the model assumptions investigated, there was only moderate variation in the estimates of stock status. The most influential assumptions involved steepness and growth. There are insufficient data to estimate steepness reliably within the assessment model and many of the key management quantities are strongly influenced by the values assumed. Growth and its variation in space, through time, and among individuals is not well understood. However, only a limited range of assumptions was investigated in this assessment, and as a result the true level of uncertainty is likely to be under-estimated. A range of other assumptions in the model should be investigated either internally or through directed research. Further studies are required to refine our estimates of growth and reproductive potential, including spatio-temporal variation; to examine in detail the time-series of size frequency data from the fisheries, which may lead to refinement in the structure of the fisheries included in the model; to consider size-based selectivity processes in the assessment model; to continue to improve the accuracy of the catch estimates from a number of key fisheries; to refine the methods used to adjust catch and size data in the purse seine fisheries; to refine the methodology and data sets used to derive CPUE abundance indices from the pole and line fishery; to refine approaches to integrate the recent tag release/recapture data into the assessment model; and to develop more formal and rigorous methods for prioritizing the many available research options.

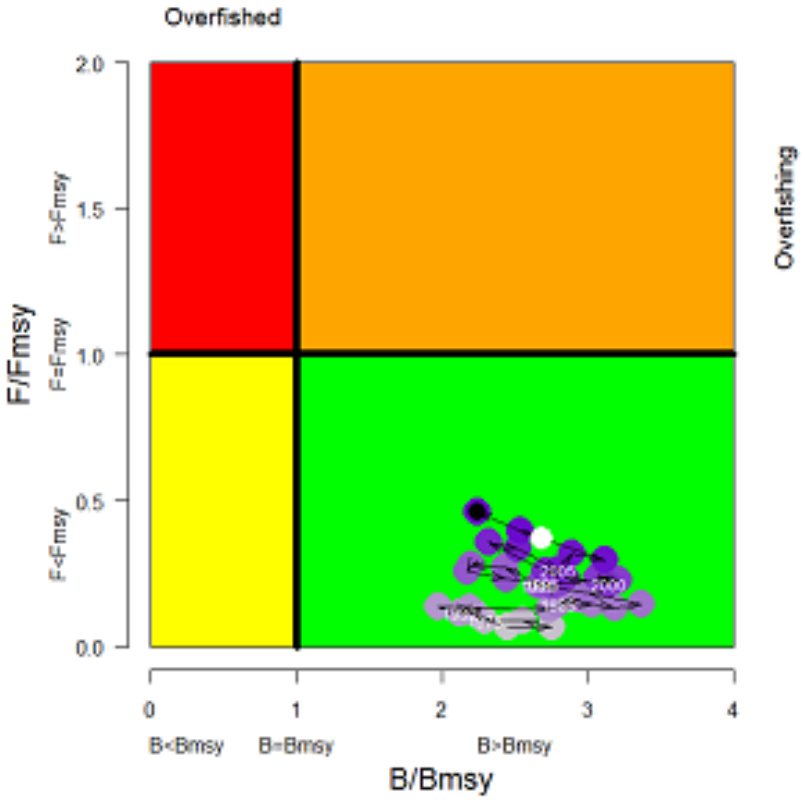


Figure 14:

Temporal trend in annual stock status, relative to B_{MSY} (x-axis) and F (y-axis) reference points, for the model period (1972-2010). The colour of the points is graduated from pale (1972) to dark purple (2010). The black circle represents the $B_{2010}/B_{MSY}$and the F2010/ FMSY, and the white circle represents the $B_{2006-2009}/B_{MSY}$ and $F_{2006-2009}/F_{MSY}$.

❖ Albacore Tuna

Albacore tuna comprise a discrete stock in the South Pacific (Murray 1994). Mature albacore — above a minimum fork length (FL) of about 80 cm — spawn in tropical and sub-tropical waters between latitudes 10S and 25S during the austral summer (Ramon & Bailey 1996). Juveniles are recruited to surface fisheries in New Zealand‘s coastal waters, and in the vicinity of the sub tropical convergence zone (STCZ, at about 40S) in the central Pacific, about one year later at a size of 45-50 cm FL.

From this region, albacore appear to gradually disperse to the north (Figure 15), but may migrate seasonally between tropical and sub-tropical waters. These seasonal migrations have been inferred from monthly trends in longline catch rates in subequatorial waters (Langley 2004). Catch rates in subequatorial waters peak during December–January and May–July, indicating that albacore migrate south during early summer, and north during winter. This movement tends to correspond with the seasonal shift in the 23-28C sea surface temperature isotherm location. Daily otolith growth increments indicate that initial growth is rapid, with albacore reaching 45-50cm (FL) in their first year (Leroy &Lehodey 2004;Kerandel et al. 2006). Subsequent growth is slower, at approximately 10 cm per year from ages 2–4, declining thereafter (Labelle et al. 1993;Farley& Clear 2008). Maximum recorded length is about 120 cm (FL). Analyses of new biological data (SPC-CSIRO unpublished data) suggest that males grow to a larger size than females.

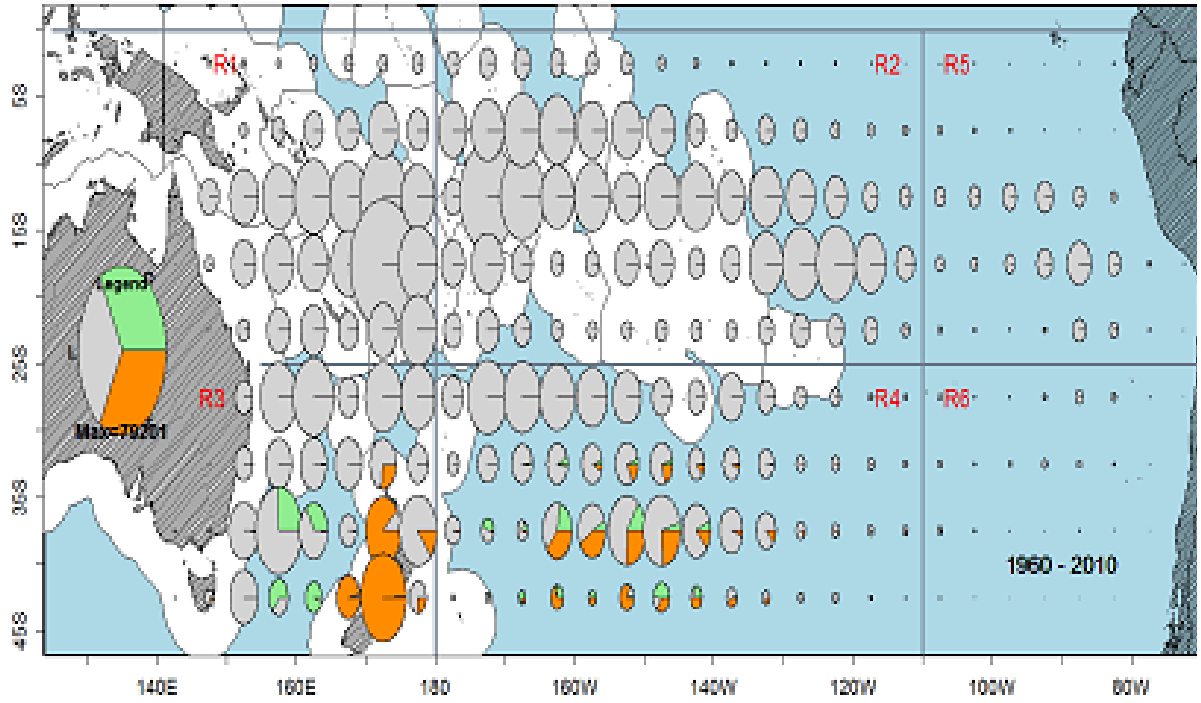


Figure 15: Map showing model regions 1 to 6, and the total catches (1960 to 2008) by 5°squares of latitude and longitude by the longline, troll, and driftnet fisheries.

The current stock assessment of albacore tuna (*Thunnus alalunga*) in the South Pacific Ocean was reported by Simon Hoyle (2011). The stock status was sumarized in terms of well-known reference points, such as the ratios of recent stock biomass to the biomass at maximum sustainable yield (MSY) ($B_{2007\text{-}2009}/B_{MSY}$)and recent fishing mortality to fishing mortality at MSY($F_{2007\text{-}2009}/F_{MSY}$). The methodology used for the assessment is commonly known as MULTIFAN-CL (or MFCL). MFCL is a software program that implements a size-based, age- and spatially-structured population model. Model parameters are estimated by maximising an objective function, consisting of both likelihood (data) and prior information components.

The following conclusion on the Stock status of Albacore tuna in the South Pacific are:

- Biological research indicates that male and female albacore have quite different growth curves, which are not included in the model. Growth curve errors can bias estimates of biomass and fishing mortality. Estimated management parameters should therefore be viewed with caution.
- There is considerable uncertainty about the early biomass trend, but this has negligible effect on the management parameters, or advice to managers regarding the status of the stock.
- Estimates of $F_{2007\text{-}2009}/F_{MSY}$ and SB_{2009} / SB_{MSY} do not indicate overfishing above F_{MSY}, nor an overfished state below SB_{MSY}
- Results from the 2009 assessment suggest that much variation in management parameters
- *MSY*is attributable to steepness, which we have no information about. This variation makes management advice based on MSY relatively uninformative. Alternative metrics such as the expected CPUE, relative to a target CPUE, may be less affected

by uncertainty. They may also be more relevant to the management needs of the fishery.

- There is no indication that current levels of catch are causing recruitment overfishing, particularly given the age selectivity of the fisheries.
- Longline catch rates appear to be declining, and catches over the last 10 years have been at historically high levels. This CPUE trend may be significant for management.

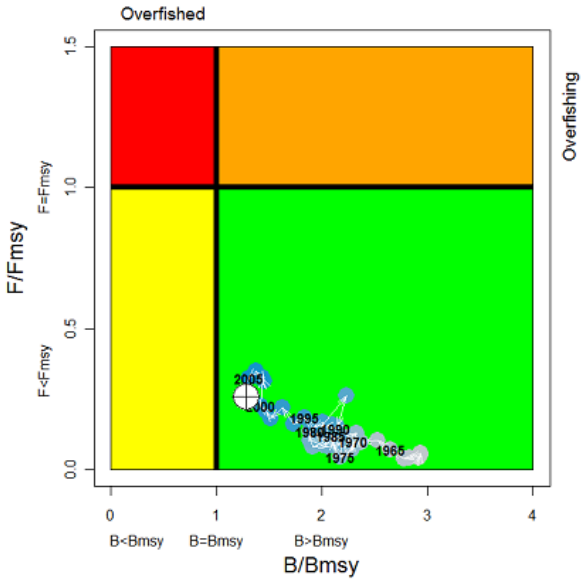


Figure 16
Temporal trend in annual stock status, relative to B_{MSY}(x-axis) and F_{MSY} (y-axis) reference points, for the model period (starting in 1960). The color of points is graduated from pale blue (1960) to blue (2009), and points are labeled at five-year intervals. The last year of the model (2010) is excluded because it is highly uncertain.

III. Conservation and Management Measures of the Western and Central Pacific Fisheries Commission

Symbol	Title	Date of Issue
CMM 2004-01	Record of Fishing Vessels and Authorization to Fish (Replaced by CMM 2009-01)	8 December 2004
CMM 2004-02	Cooperating Non-Members (Replaced by CMM 2008-02)	8 December 2004
CMM 2004-03	Specifications for the Marking and Identification of Fishing Vessels	8 December 2004
CMM 2004-04	Resolution on Conservation and Management Measures	8 December 2004
CMM 2005-01	Conservation and Management Measures for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean (Replaced by CMM 2008-01)	16 December 2005
CMM 2005-02	Conservation and Management Measure for South Pacific Albacore (replaced by CMM 2010-05)	16 December 2005

Symbol	Title	Date of Issue
CMM 2005-03	Conservation and Management Measure for North Pacific Albacore	16 December 2005
CMM 2006-01	Conservation and Management Measures for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean (Replaced by CMM 2008-01)	15 December 2006
CMM 2006-02	Conservation and Management Measure to Mitigate the Impact of Fishing For Highly Migratory Fish Stocks on Seabirds (Revised and replaced by CMM 2007-04)	15 December 2006
CMM 2006-03	Conservation and Management Measure for Swordfish in the South West Pacific (Replaced by CMM 2008-05)	15 December 2006
CMM 2006-04	Conservation and Management Measure For Striped Marlin in the Southwest Pacific	15 December 2006
CMM 2006-05	Conservation and Management Measure for Sharks in the Western and Central Pacific Ocean (Replaced by CMM 2008-06)	15 December 2006
CMM 2006-06	Commission Vessel Monitoring System (Revised and replaced by CMM 2007-02)	15 December 2006
CMM 2006-07	Conservation and Management Measure for the Regional Observer Programme	15 December 2006
CMM 2006-08	Western and Central Pacific Fisheries Commission Boarding and Inspection Procedures	15 December 2006
CMM 2006-09	Conservation And Management Measure To Establish A List Of Vessels Presumed To Have Carried Out Illegal Unreported And Unregulated Fishing Activities In The Western And Central Pacific Ocean (replaced by CMM 2007-03)	10 December 2006
CMM 2007-01	Conservation and Management Measure for the Regional Observer Programme	7 December 2007
CMM 2007-02	Commission Vessel Monitoring System	7 December 2007
CMM 2007-03	Conservation and Management Measure to Establish a List of Vessels presumed to Have Carried out Illegal, Unreported and Unregulated Fishing Activities in the WCPO (Replaced by CMM 2010-06)	7 December 2007
CMM 2007-04	Conservation and Management Measure to Mitigate the Impact of Fishing for Highly Migratory Fish Stocks on Seabirds	7 December 2007
CMM 2008-01	Conservation and Management Measure for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean	12 December 2008

Symbol	Title	Date of Issue
CMM 2008-02	Cooperating Non-Members (Replaced by CMM 2009-11)	12 December 2008
CMM 2008-03	Conservation and Management of Sea Turtles	12 December 2008
CMM 2008-04	Conservation and Management Measure to Prohibit the use of Large Scale Driftnets on the High Seas in the Convention Area	12 December 2008
CMM 2008-05	Conservation and Management of Swordfish (Replaced by CMM 2009-03)	12 December 2008
CMM 2008-06	Conservation and Management of Sharks (Replaced by CMM 2009-04)	12 December 2008
CMM 2009-01	WCPFC Record of Fishing Vessels and Authorization to Fish	9 November 2010
CMM 2009-02	Conservation and Management Measure on the Application of High Seas FAD Closures and Catch Retention	11 December 2009
CMM 2009-03	Conservation and Management for Swordfish	11 December 2009
CMM 2009-04	Conservation and Management for Sharks (Replaced by 2010-07)	11 December 2009
CMM 2009-05	Conservation and Management Measure Prohibiting Fishing on Data Buoys	11 December 2009
CMM 2009-06	Conservation and Management Measure on Regulation of Transhipment	11 December 2009
CMM 2009-07	Conservation and Management Measure for Pacific Bluefun Tuna (Replaced by CMM 2010-04)	11 December 2009
CMM 2009-08	Charter Notification Scheme	11 December 2009
CMM 2009-09	Conservation and Management Measure for Vessels without Nationality	11 December 2009
CMM 2009-10	Conservation and Management Measure to Monitor Landings of Purse Seiners at Ports so as to Ensure Reliable Catch Data by Species	11 December 2009

Symbol	Title	Date of Issue
CMM 2009-11	Cooperating Non-Members	11 December 2009
CMM 2010-01	Conservation and Management Measure for North Pacific Striped Marlin	10 December 2010
CMM 2010-02	Conservation and Management Measure for the Eastern High-Seas Pocket Special Management Area 04112011	10 December 2010
CMM 2010-03	Conservation and Management Measure for Compliance Monitoring Scheme	10 December 2010
CMM 2010-04	Conservation and Management Measure for Pacific Bluefin Tuna 04112011	10 December 2010
CMM 2010-05	Conservation and Management Measure for South Pacific Albacore 04112011	10 December 2010
CMM 2010-06	Conservation and Management Measure to establish a List of Vessels presumed to have carried out Illegal, Unreported and Unregulated fishing activities in the WCPO 04112011	10 December 2010
CMM 2010-07	Conservation and Management Measure for Sharks	10 December 2010

IV. JTF Support to WPEA under the WCPFC Frameworks (2010-2011)

Beneficiary Member(s)	Contact	Title Summary	US$
Indonesia and Vietnam (2010)	SungKwonSohSungkwon.soh@wcpfc.int	Data collection of tuna catches from port sampling in Indonesia and Viet Nam West Pacific East Asia Oceanic Fisheries Management Project (WPEA) has, in its work plan for 2010, detailed port sampling programmes in Indonesia, Philippines and Viet Nam. Because of budget limits, data collection from port sampling and review of data collection and catch estimation was planned partially at each	30,000.00

		country. Supplementary funding support from Japanese Trust Fund will be applied to extend port sampling and review catch estimates, two areas of primary focus for the WPEA project.	
Philippines (2011)	Alma Dickson alma_dickson@yahoo.com	Training Program for the Operationalization and Implementation of the Vessel Monitoring System This project aims to develop a competent manpower complement for the operation of the Vessel Monitoring System in the Philippines and in Regional level for the proper implementation of fisheries management conservation measures. This project will hold one VMS training workshop in Manila and budget requested will cover travel costs of VMS experts and workshop facilities.	31,809.00
Indonesia (2011)	AgusBudhiman Budhiman@indosat.net.id	Pilot project of Indonesian observer training programme As a cooperating non-member, Indonesia would like to contribute to the efforts of implementing observer programme and proposed to have an observer workshop to design the programme consistent with WCPFC requirements and a 10-day training course to train ten observers as a pilot study. The budget proposed will support travel cost of the invited international experts and workshop facilities.	29,500.00
Indonesia, Philippines, Vietnam (2011)	SungKwonSoh sungkwon.soh@wcpfc.int	Capacity Building in Tuna Data Monitoring and Ecosystem Monitoring and Stock Assessment through the West Pacific East Asia Oceanic Fisheries Management Project The Commission supports WPEA Project for the collection of tuna catch data	18,000.00

		and capacity building in science to the WPEA participating countries. Since 2009, JTF supported WPEA and this is the extension of the support for their capacity building in data collection and understanding in tuna science. The requested budget supports travel cost of the WPEA member staff to the Tuna Data WS and stock assessment WS hosted by the SPC.	

V. Conclusion

- ✓ **For bigeye tuna** based on model Run3j adopted by SC7, we concluded that **overfishing is occurring in the bigeye tuna stock**. However taking into account the model Run 21, where predicting that the bigeye tuna is approaching an overfished state**,** this result could be used for formulating management advice.
- ✓ **For yellowfin tuna**, conclude that **overfishing is not occurring**. The corresponding biomass based reference points $B_{current}/\tilde{B}_{MSY}$ and $SB_{current}/S\tilde{B}_{MSY}$ are estimated to be above 1.0 (1.25–1.60 and 1.34–1.83, respectively) and, therefore, the stock is **not in an overfished state**. However a significant component of the increase in juvenile fishing mortality is attributable to the Philippines and Indonesian surface fisheries, which have the weakest catch, effort and size data. Therefore Therefore, improved estimates of historical and current catch from these fisheries are important in the determination of the underlying productivity of the stock**.**
- ✓ **For skipjack** is currently exploited at a moderate level relative to its biological potential. Furthermore, the **estimates of** $F_{current}/\tilde{F}_{MSY}$ **and** $B_{current}/\tilde{B}_{MSY}$ **indicate that overfishing of skipjack is not occurring in the WCPO, nor is the stock in an overfished state.**
- ✓ **For Albacore,** estimates of F 2007-2009/FMSY and SB2009 / SBMSY **do not indicate overfishing above FMSY, nor an overfished state below SBMSY**
- ✓ Continuation of the work to refine both the species composition and total catches from the domestic fisheries that occur in Indonesia and the Philippines.
- ✓ Noting the uncertainty in purse-seine species composition, the SC7 urged the commission to continue improving estimates of PS composition data. SC7 requested CCMs, Port states, flag states and vessel operations to support efforts for paired spill and grab sampling together with the effort to collect landing cannery data.

VI. References

1) John Hampton and Peter Williams : Analysis of purse seine set type behavior in 2009 and 2010, CPFC-SC7-2011/MI-WP-01.

2) Peter Williams, 2010: Changes To The Data Available For Stock Assessments, WCPFC-SC7-2011/SA IP-03.

3) Oceanic Fisheries Program (OFP) and Secretariat of the Pacific Community (SPC), 2011: Estimates Of Annual Catches In The WCPFC Statistical Area, WCPFC-SC7-2011/ST IP-1.

4) OFP. 2010. WCPFC Tuna Fishery Yearbook, 2009. Western and Central Pacific Fisheries Commission, Pohnpei, Federated States of Micronesia.

5) Nick Davies et al. (2011):Stock Assessment of Bigeye Tuna in The Western and Central Pacific Ocean, WCPFC-SC7-2011/SA- WP-02.

6) Adam Langley, et al., 2011. Stock Assessment of Yellowfin Tuna in The Western and Central Pacific Ocean, WCPFC-SC7-2011/SA- WP-03.

7) Simon Hoyle et al., 2011. Stock Assessment of Skipjack Tuna in The Western and Central Pacific Ocean, WCPFC-SC7-2011/SA-WP-04.

8) Wild,A. and Hampton,J. 1994. A review of the biology and fisheries for skipjack tuna, *Katsuwonuspelamis*, in the Pacific Ocean. FAO Fisheries Technical Paper (FAO).

9) Sibert,J.R., Hampton,J., Fournier,D.A., and Bills,P.J. 1999. An advection-diffusion-reaction model for the estimation of fish movement parameters from tagging data, with application to skipjack tuna (*Katsuwonuspelamis*). Can.J.Fish.Aquat.Sci. 56: 925-938.

10) Lehodey,P., Bertignac,M., Hampton,J., Lewis,A., and Picaut,J. 1997. El Ni±o Southern Oscillation and tuna in the western Pacific. Nature 389: 715-718.

11) Simon Hoyle, 2011. Stock Assessment of Albacore Tuna in The South Pacific Ocean, **WCPFC-SC7-2011/SA-WP-06.**

12) Lehodey,P., Bertignac,M., Hampton,J., Lewis,A., and Picaut,J. 1997. El Nino Southern Oscillation and tuna in the western Pacific. Nature 389: 715-718.

<<<<<<<<<<<<<<<<<<<< >>>>>>>>>>>>>>>>>>>>

Annex 5

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

COMPILATION OF REGIONAL TUNA STATISTICS IN SOUTHEAST ASIA: STATUS, ISSUES, AND THE WAY FORWARD

By

Saivason Klinsukhon

SEAFDEC/SEC

COMPILATION OF REGIONAL TUNA STATISTICS IN SOUTHEAST ASIA: STATUS, ISSUES, AND THE WAY FORWARD

SEAFDEC Secretariat

I. INTRODUCTION

Since its establishment, SEAFDEC has been continuously taking the leading role in the compilation of fishery statistics in the region based on statistics collected by countries at the national levels, with a view of providing information that could be used as basis for policy planning and management for sustainable fisheries. Parallel with the compilation of fishery statistics, SEAFDEC also initiated activities to improve the statistics framework covering the countries in the Southeast Asian region and making use of the international standards, classifications and definitions of fishery statistics, in order to facilitate the compilation, exchange and analysis of the statistics both within and outside the region.

The fishery statistics compiled by SEAFDEC also include statistics on production of major tuna and tuna-like species that are caught by countries in the region. Although there had also been many other initiatives aiming to collect data and information on tuna fisheries, in which the data may be collected in a more detailed manner, the importance of collecting the statistics should not be undermined as it could provide long-term figures on production trends, and such statistics could also be utilized by incorporating with other relevant data and information in order to come up with better picture of the status of tuna resources in the region.

It should however be noted that in order to come up with statistics for management purposes as mentioned earlier, the quality of statistics collected at the local and national level is considered one of the very important prerequisites. This requires further regional initiatives and efforts in order to strengthen the capacity of countries in collecting and providing the statistics for compilation at the regional or even at the global level.

II. COMPILATION OF FISHERY STATISTICS IN THE SOUTHEST ASIAN REGION

The compilation of regional fishery statistics has been continuously pursued by SEAFDEC since 1978 in the form of the “Fishery Statistical Bulletin for the South China Sea Area”. In 2004, SEAFDEC started the initiative of revising the framework for collection of regional fishery statistics to cover all countries of Southeast Asia and harmonized the standard definitions and classifications of fishery statistics to be consistent with the current regional requirements as well as with the international standard definitions and classifications. The harmonization process was initiated in 2007, and henceforth the new statistics framework has been used for the compilation of fishery statistics in Southeast Asian countries starting from 2008 onwards. In addition to the harmonization of statistics, the reporting process of fishery statistics from the countries to SEAFDEC and FAO has also been streamlined in order to reduce the burden of countries, and minimize certain overlapping of data compiled by the two organizations. Moreover, focal points of the respective member countries, usually the senior statistics-related officer, were also identified to facilitate communication between the countries and with SEAFDEC and FAO, and clarify technical problems that may arise in the compilation of the statistics.

Despite the harmonization of statistics questionnaire and reporting process between SEAFDEC and FAO, certain differences could be noted from those compiled by FAO with those of SEAFDEC. Specifically for capture fishery statistics, while statistics compiled by FAO cover all countries in the world with focus on the total fisheries production by species (Quantity and Value) as well as import and export by country (Quantity and Value), the statistics compiled by SEAFDEC cover the Southeast Asian countries' production (quantity and value) by species, fishing area, and fishing gear, with more detailed information on the number of fishing boats, fishing unit by type of boats, fishers, fish price,
among others.

In culling the fishery statistics from the countries, the time reference of the statistics compiled by SEAFDEC (similar to those of FAO) is based on the calendar year starting from 1 January to 31 December. The statistics should be submitted by countries based on the sets of questionnaires (that have also been harmonized between SEAFDEC and FAO) by August of the year following the statistics year (*e.g*. statistics of 2010 should be submitted by August 2011).

III. TUNA STATISTICS IN SOUTHEAST ASIA

3.1 SEAFDEC Questionnaires for Collecting Statistics Relevant to Tuna Production

In the compilation of regional fishery statistics on tuna and tuna-like species, the species classification adopted is based on the International Standard Statistical Classification for Aquatic Animals and Plants (ISSCAAP), but focuses on selected species caught by countries in the region as shown in **Annex 1**. The map showing the marine fishing areas in the region which is used in reporting and compilation of statistics appears as **Annex 2**.

The questionnaires used by SEAFDEC in gathering statistics on tuna and tuna-like production include: i) Questionnaire for Capture Production by Species (**Annex 3**); and ii) Questionnaire for Marine Capture Production by Type of Fishing Gear and by Species (**Annex 4**).

3.2 Report on Tuna Statistics from Southeast Asian Countries

Tuna (and tuna like species) is an important commercial fishery resource in the exclusive economic zones (EEZ) of the countries in Southeast Asia, as well as throughout the oceans of the world. These are taxonomically grouped in the family Scrombridae, which includes about 50 species. The important tuna species (in terms of production quantity and value) that are caught in the region include the skipjack tuna (*Katsuwonus pelamis)*, yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), albacore tuna (*T. alalunga*), bluefin tuna (*T. thynnus*, *T. orientalis*, and *T. macoyii)*, and the tuna-like species such as the longtail tuna (*T. tonggol*), frigate tuna (*Auxis thazard*), bullet tuna (*A. rochei*), and kawakawa (*Euthynnus affinis*).
In the responses received by SEAFDEC to the questionnaires, six countries were able to provide statistics data on tuna production (both by species and gear type), namely: Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand. The other three countries such as Cambodia, Myanmar and Vietnam, although are generally known to a certain extent, to conduct tuna fisheries, the relevant statistics are currently not provided. Lao PDR of course is an exception being the only landlocked country in the region.

Based on statistics data of 2009 (with data provided by Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand), the total tuna production of Southeast Asia in quantity was 1,641,354 MT. Indonesia was the leading tuna producer with 925,660 MT or 56.4% of the region's total tuna production, followed by the Philippines with 612,008 MT contributing 37.29%, Malaysia with 56,012 MT accounting for 3.41%, and Thailand with 47,490 MT providing 2.9% of the total production. The total production quantity of tuna and tuna-like species contributed 11.61% to the total production from marine fisheries in the Southeast Asian region.

The data on the region's total tuna production by species showed that skipjack tuna (*Katsuwonus pelamis)* had the highest production at 564,338 MT accounting for 34.38% of the total tuna production of the region, of which most of the production was reported by Indonesia and the Philippines. This was followed by frigate tuna (*Auxis thazard)* at 287,538 MT contributing 17.52%, kawakawa (*Euthynnus affinis*) at 282,425 MT providing 17.2%, and yellowfin tuna (*Thunnus albacores*) at 258,419 MT accounting for 15.74% of the region's total tuna production.

In terms of tuna production by Fishing Area, the statistics reported by concerned countries could be classified into FAO Fishing Area 57 (Indian Ocean, Western) and Area 71 (Pacific, Western Central), of which the production figures are mostly based on landing but not on catching area. In 2009, the total tuna production from Fishing Area 57 was 314,180 MT accounting for 19.1% of the region's total tuna production while production from Fishing Area 71 provided the remaining 80.9% with production of 1,327,174 MT. The species providing the highest production in Area 57 were kawakawa, skipjack tuna and frigate tuna, while skipjack tuna, frigate tuna, yellowfin tuna and kawakawa were mostly produced in Area 71. Although the SEAFDEC statistics framework also allows the countries to report their respective production based on the detailed SEAFDEC sub-areas (**Annex 2**), but at this stage no country has reported the statistics by species and by SEAFDEC sub-area. Nevertheless, it should also be noted that there is no report of the tuna catch in Fishing Area 61 (Pacific, Northwest) since Vietnam which is the only adjacent to this fishing area, was unable to provide the statistics on tuna production.

As for tuna production by fishing gear, the data were provided only by Brunei Darussalam, Malaysia, Myanmar, and Singapore, where the available data showed that substantial amounts of tuna were caught by purse seine, gill net, hook and line, trawl, and seine net. In addition, there were also small amount of tuna caught by other gears, such as traps, shellfish and seaweed collecting gear, and lift net although the quantities are not significant.

The statistics data on tuna production of Southeast Asia by country and by species in 2009 is summarized in **Table 1**; the data on total tuna production (Quantity and Value) of Southeast Asia by species is shown in **Table 2**; the data on total tuna production (Quantity) of Southeast Asia by FAO Fishing Area and by species is summarized in **Table 3**; and the data on total tuna production (Quantity) of Southeast Asia by fishing gear is indicated in **Table 4**.

Table 1. Tuna production of Southeast Asia by country and by species in 2009

Scientific name	Common name	Quantity (MT)						Total (MT)
		Brunei	Indonesia	Malaysia	Philippines	Singapore	Thailand	All countries
Auxis thazard	Frigate tuna	0.03	135,200	...	152,338	...	...	287,538.03
Auxis rochei	Bullet tuna	...	5,310	...	...	...	...	5,310.00
Euthynnus affinis	Kawakawa	54.60	189,260	20,960	49,973	...	22,177	282,424.60
Katsuwonus pelamis	Skipjack tuna	80.29	300,740	4,460	251,524	2	7,532	564,338.29
Thunnus tonggol	Longtail tuna	47.31	98,920	27,561	...	...	14,106	140,634.31
Thunnus alalunga	Albacore tuna	...	37,380	203	...	...	24	37,607.00
Thunnus maccoyii	Southern bluefin tuna	...	800	...	...	...	...	800.00
Thunnus albacores	Yellowfin tuna	...	103,390	1,403	152,437	...	1,189	258,419.00
Thunnus obesus	Bigeye tuna	...	54,660	1,425	5,736	...	2,462	64,283.00
Total		**182.23**	**925,660**	**56,012**	**612,008**	**2**	**47,490**	**1,641,354.23**

Table 2. Total tuna production of Southeast Asia by species (quantity and value) in 2009

Scientific name	Common name	Quantity (MT)	Value (1,000 US$)
Auxis thazard	Frigate tuna	287,538	237,449
Auxis rochei	Bullet tuna	5,310	6,599
Euthynnus affinis	Kawakawa	282,425	197,504
Katsuwonus pelamis	Skipjack tuna	564,338	336,390
Thunnus tonggol	Longtail tuna	140,634	84,789
Thunnus alalunga	Albacore tuna	37,607	20,260
Thunnus maccoyii	Southern bluefin tuna	800	990
Thunnus albacores	Yellowfin tuna	258,419	293,437
Thunnus obesus	Bigeye tuna	64,283	40,622
Total		**1,641,354**	**1,218,040**

Table 3. Total tuna production of Southeast Asia by FAO Fishing Area and by species in 2009

Scientific name	Common name	Quantity (MT)		Total (MT)
		Fishing Area 57	Fishing Area 71	All areas
Auxis thazard	Frigate tuna	55,170	232,368	287,538
Auxis rochei	Bullet tuna	4,460	850	5,310
Euthynnus affinis	Kawakawa	97,280	185,145	282,425
Katsuwonus pelamis	Skipjack tuna	63,782	500,556	564,338
Thunnus tonggol	Longtail tuna	36,821	103,813	140,634
Thunnus alalunga	Albacore tuna	9,467	28,140	37,607
Thunnus maccoyii	Southern bluefin tuna	800	…	800
Thunnus albacores	Yellowfin tuna	26,183	232,236	258,419
Thunnus obesus	Bigeye tuna	20,217	44,066	64,283
Total		**314,180**	**1,327,174**	**1,641,354**

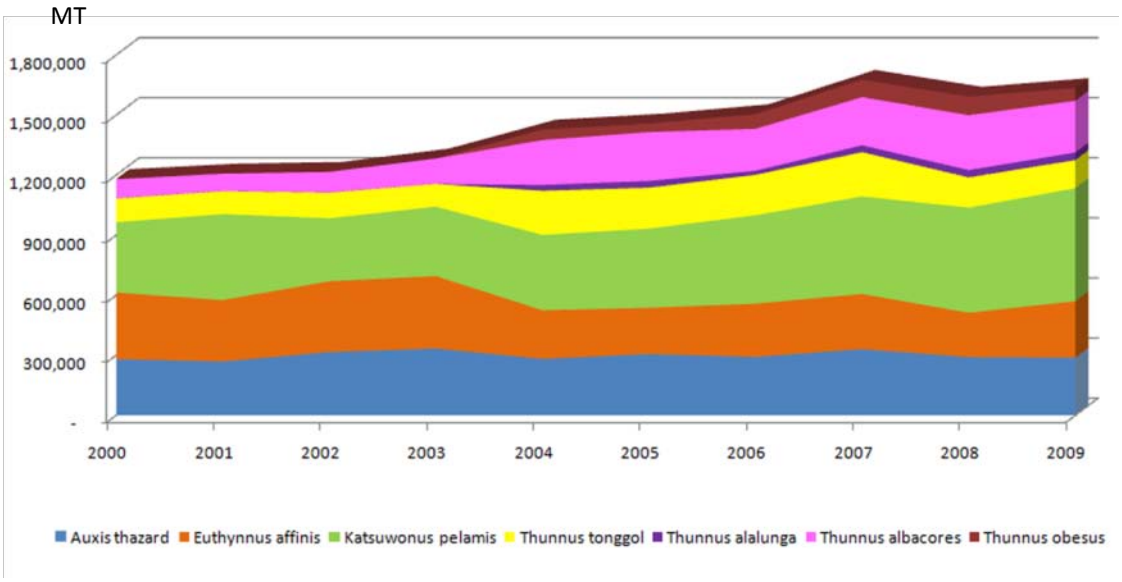
Table 4. Tuna production of Southeast Asia* by fishing gear in 2009

Type of Gear	Quantity (MT)
Purse seine	42,348
Seine net	352
Trawl	1,163
Lift net	1
Gill net	4,936
Traps	18
Hooks and line	2,509
Shell fish and seaweed collecting gear	2
Others	0.1

***Note:** Data was provided only by Brunei Darussalam, Malaysia, Myanmar, and Singapore

The trend of the total tuna production of the Southeast Asian countries from 2000 to 2009 in terms of quantity (using the statistics compiled by SEAFDEC and FAO), has been increasing (**Fig. 1**). The total production in 2009 of 1,641,354 MT indicated a 39% increase from the total production of 1,180,562 MT in 2000.

Figure 1. Total tuna production of Southeast Asia by species from 2000 to 2009



3.3 Challenges in Collection and Compilation of Fishery Statistics (including Tuna Statistics)

In the collection and compilation of fishery statistics in the Southeast Asian region, certain common problems and constraints have been identified especially in the collection of statistics at ***national level*** as expressed by several countries. These include budget and manpower limitations not only for the collection of statistics but also for the conduct of relevant surveys, resulting in low reliability of statistics particularly on capture fisheries thus, most statistics are generally under-reported. Specifically, the inadequate capacity of countries in the collection of statistics, *e.g.* in terms of staff capacity, statistics collection methodologies particularly for small-scale fisheries, survey techniques at local level, and the inadequate IT facilities for processing and submission of the statistics to central government in timely manner have affected the real-time compilation of statistics for management purposes.

At the ***regional level***, the compilation of fishery statistics by SEAFDEC is currently based on the new regional framework of fishery statistics, which had been harmonized with the international standard definitions and classification, to facilitate compilation and sharing of data both within and with other regions. However, the quality and timeliness of regional statistics still rely heavily on the submission of statistics from the countries. In addition, considering the relatively slow development of statistical systems of many countries in the region, the regional fishery statistics compiled by SEAFDEC including tuna statistics could still include data that are very much under-reported. Thus, information from non-routine sources such as project-based research should also be incorporated to provide better picture of the status and trend of the fishery resources in the region.

Specifically for ***tuna statistics***, different countries use different approaches in collecting the statistics. However, it should be noted that statistics from most countries had been reported based on landing places and not by fishing areas. The concerns expressed by the countries on the collection of tuna statistics could be exemplified in the case of the ***Philippines***. As one of the major tuna producer of the region, the statistics reported by the country were derived from *probability surveys* comprising data collection using a two-stage stratified random sampling, with the province as the domain, the fish landing centers as the first-stage units and the fishing boat as the second-stage units. Landing centers are stratified into three (3) strata. The probability surveys include the requirements for data on catch by species and gear, although more detailed and accurate information from other means could also be reported such as from non-probability surveys which only require subjective monthly catch estimates by species from key informants from selected landing sites. The data collected from the non-probability surveys are used to determine the percentage change from the same quarter in previous year, which is then used to produce the estimate for the current year.

IV. FUTURE CONSIDERATIONS AND WAY FORWARD

Significant progress has been made by SEAFDEC in harmonizing the collection and compilation of fisheries data and information from the countries in the region, and in coming up with the **Fishery Statistical Bulletin for the South China Sea Area** which became the **Fishery Statistical Bulletin of Southeast Asia** starting with the 2008 fishery data and information. In 2008, SEAFDEC also came up with the Regional Framework for Fishery Statistics of Southeast Asia which focuses on the basic requirements that can be achieved by the countries in the region without putting much burden on the agencies responsible for the collection and compilation of fishery statistics. The countries in the region have been providing SEAFDEC with the necessary fishery data and information based on the questionnaires which had been standardized and harmonized with the requirements of FAO.

The efforts of SEAFDEC and the Member Countries have been strengthened with the adoption in June 2011 of the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020, which specified the need to "Strengthen knowledge/science-based development and management of fisheries through enhancing the national capacity in the collection and sharing of fisheries data and information" (RES 10), which is elucidated in the Plan of Action (A3, A4, A5).

Specifically, for the regional compilation of statistics on tuna and tuna-like species which is based on the national statistics collected by individual countries, relevant international/regional organizations should consolidate their collective efforts in developing appropriate and practical methodologies and modules that could be extended to countries in

order to enhance the capacity of countries in the collection, analysis, and reporting of statistics. SEAFDEC for its part could expand its collaboration especially with the Western and Central Pacific Fisheries Commission (WCPFC) which is tasked to conserve and manage highly migratory fish stocks in the Western and Central Pacific and includes Indonesia, Japan and Philippines among its members and also with the Indian Ocean Tuna Commission which manages tuna and tuna-like species in the Indian Ocean and adjacent seas and includes Indonesia, Japan, Malaysia, Philippines, and Thailand as its members. Cooperation would also be established or strengthened with other organizations at the regional and sub-regional levels to be able to improve the collection and compilation of tuna statistics in the Southeast Asian region.

Moreover, it is also necessary to enhance the capacity of the countries in the region for the identification of important tuna species in order that statistics can be appropriately collected and reported at species level. The use of information technologies and web-based tools in collection, sharing and exchange, as well as analysis of data and information should be enhanced both at the national and regional levels. This is envisaged to minimize human errors that could occur during the relevant processing of information, and could also enhance timeliness in submission of statistics within the countries as well as for the compilation of the data by relevant regional organizations.

A number of scientific research studies had already been conducted on the stock assessment of tuna and tuna-like species, information from such research could be exchanged, shared and disseminated in the region through the regular conduct of workshops and seminars, similar to this workshop. The processed information compiled through such studies could be used as reference for the management of tuna and tuna-like species in the Southeast Asian countries. Furthermore, although the regional statistics on tuna production is generally under-reported while the quality and reliability of the data is very much dependent on national statistics collected/estimated and provided by the concerned countries, collection of statistics on a routine basis should be sustained and mobilized to provide the necessary initial picture of the production trend of the species. The trend could then be enhanced, by incorporating the information with other non-routine data, such as those from research projects in order to generate more useful information on and get better perspective of the status of tuna stocks to support policy planning and management of tuna fisheries.

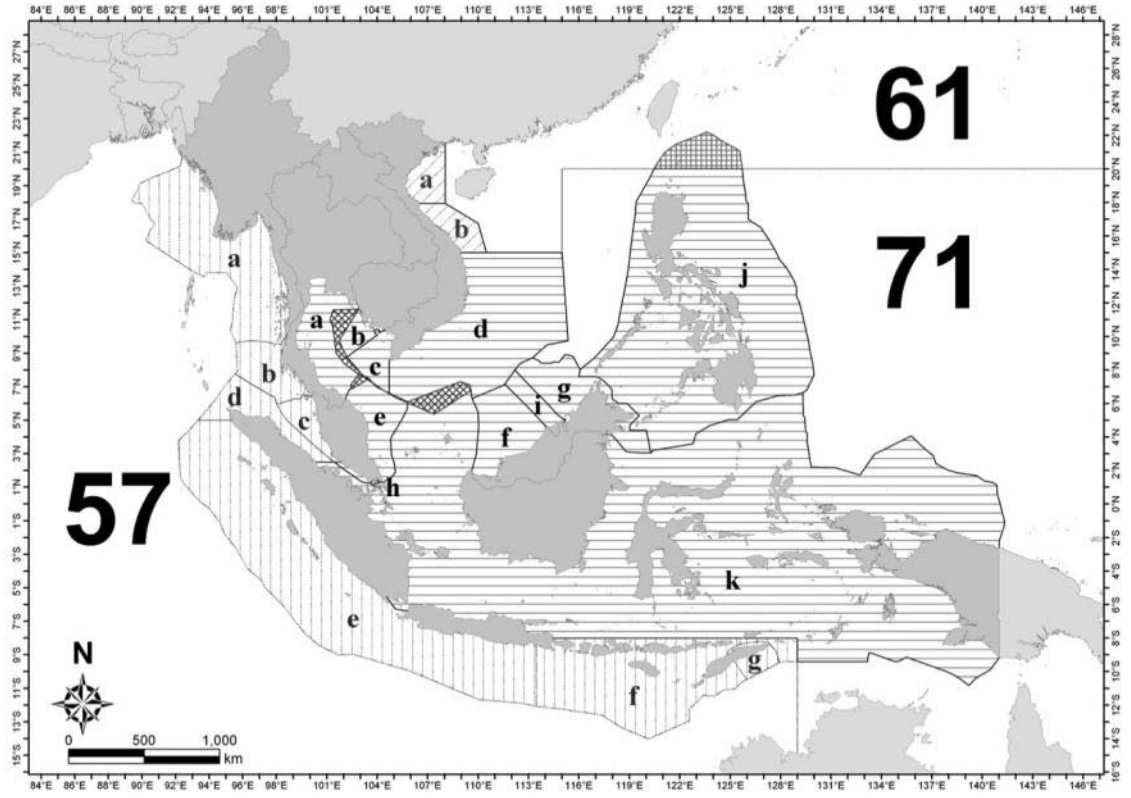
Annex 1

LIST OF TUNA AND TUNA-LIKE SPECIES
(Selected tuna and tuna-like species, based on International Standard Statistical Classification for Aquatic Animals and Plants (ISSCAAP)

Code	Group of Species
3	**Marine fishes**
36	Tunas, bonitos, billfishes
36.010	*Auxis thazard, A.rochei*
36.020	*Euthynnus affinis*
36.030	*Katsuwonus pelamis*
36.040	*Thunnus tonggol*
36.050	*Thunnus alalunga*
36.060	*Thunnus maccoyii*
36.070	*Thunnus albacares*
36.080	*Thunnus obesus*

Annex 2

MARINE FISHING AREAS



The marine fishing areas of the Southeast Asia countries are identified under Area 57 (Indian Ocean, Eastern), Area 71 (Pacific, Western Central) and Area 61 (Pacific, Northwest). Countries and their sub-areas to be used in marine fishery statistics are as follows:

Countries	Sub-areas for marine fishery statistics	FAO Marine Fishing Area	SEAFDEC Sub-areas
a) Brunei Darussalam		71	71 i
b) Cambodia		71	71 b
c) Indonesia		57, 71	
	West Sumatra	57	57 e
	South Java	57	57 e
	Malacca Strait	57, 71	57 d, 71 k
	East Sumatra	71	71 k
	North Java	71	71 k
	Bali-Nusa Tenggara	57	57 f
	South-west Kalimantan	71	71 k
	East Kalimantan	71	71 k
	South Sulawesi	71	71 k

	North Sulawesi	71	71 k
	Maluku-Papua	71	71 k
d) Malaysia		57, 71	
	West Coast of Peninsular Malaysia	57	57 c
	East Coast of Peninsular Malaysia	71	71 e
	Sabah	71	71 f
	Sarawak	71	71 g
e) Myanmar		57	57 a
f) Philippines		71	71 j
	Luzon	71	71 j
	Visayas	71	71 j
	Mindanao	71	71 j
g) Singapore		71	71 h
h) Thailand		57,71	
	Gulf of Thailand	71	71 a
	Indian Ocean	57	57 b
i) Timor Leste		57	57g
j) Vietnam		61,71	
	North Vietnam	61	61 a
	Central Vietnam	61	61 b
	Southwest Vietnam	71	71 c
	Southeast Vietnam	71	71 d

Annex 3

SEAFDEC QUESTIONNAIRE FORMS RELEVANT TO TUNA CATCH

Q2: Questionnaire for Capture Production by Species

Q2: STAT-SEAFDEC Capture Production by Species and SEAFDEC Sub-areas YEAR _____

COUNTRY NAME	3-ALPHA CODE	SCIENTIFIC NAME	FAO ENGLISH NAME	FISHING AR CODE	SEAFDEC Sub-areas	Unit	2004	2005	2006	2007	2008	2009	2010	Value 1,000 USD
	FRZ	Auxis thazard, A. roche	Frigate and bullet tunas	71		t								
	KAW	Euthynnus affinis	Kawakawa	71		t								
	SKJ	Katsuwonus pelamis	Skipjack tuna	71		t								
	ALB	Thunnus alalunga	Albacore	51		t								
	YFT	Thunnus albacares	Yellowfin tuna	31		t								
	YFT	Thunnus albacares	Yellowfin tuna	34		t								
	YFT	Thunnus albacares	Yellowfin tuna	41		t								
	YFT	Thunnus albacares	Yellowfin tuna	47		t								
	YFT	Thunnus albacares	Yellowfin tuna	51		t								
	YFT	Thunnus albacares	Yellowfin tuna	57		t								
	YFT	Thunnus albacares	Yellowfin tuna	71		t								
	BET	Thunnus obesus	Bigeye tuna	31		t								
	BET	Thunnus obesus	Bigeye tuna	34		t								
	BET	Thunnus obesus	Bigeye tuna	41		t								
	BET	Thunnus obesus	Bigeye tuna	47		t								
	BET	Thunnus obesus	Bigeye tuna	51		t								
	BET	Thunnus obesus	Bigeye tuna	57		t								
	BET	Thunnus obesus	Bigeye tuna	71		t								

Annex 4

Q4: Questionnaire for Marine Capture Production by Type of Fishing Gear and by Species

Q4: Marine Capture Production by Type of Fishing Gear and by Species YEAR _____

Country

SEAFDEC CODE	3-ALPHA CODE	Scientific Name	FAO ENGLISH Name	SEAFDEC Sub-areas	Quantity by type of fishing gear (t)																				
					Purse seine			Seine Net			Trawl					Falling net				Trap						
					All purse seines	Anchovy purse seine	Fish purse seine	All seine nets	Boat seine	Beach seine	All trawls	Beam trawl	Otter board trawl	Pair trawl	Lift net	All falling nets	Anchovy falling net	Squid falling net	Gill net	All traps	Stationary trap	Portable trap	Hook and lines	Push/Scoop net	Shell fish and seaweed collecting gear	Others
					PS			SX	SV	SB	TX	TBB	OT	PT	LN	FS			GN	FIX			LX			MIS
36.010	FRZ	*Auxis thazard, A.rochei*	Frigate and bullet tunas		0			0			0					0				0						
36.020	KAW	*Euthynnus affinis*	Kawakawa		0			0			0					0				0						
36.030	SKJ	*Katsuwonus pelamis*	Skipjack tuna		0			0			0					0				0						
36.040	LOT	*Thunnus tonggol*	Longtail tuna		0			0			0					0				0						
36.050	ALB	*Thunnus alalunga*	Albacore		0			0			0					0				0						
36.060	SBF	*Thunnus maccoyii*	Southern bluefin tuna		0			0			0					0				0						
36.070	YFT	*Thunnus albacares*	Yellowfin tuna		0			0			0					0				0						
36.080	BET	*Thunnus obesus*	Bigeye tuna		0			0			0					0				0						

Annex6

Special Meeting on Improvement of Tuna Information and Data Collection

in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

STRATEGIC PLAN OF ACTION ASEAN TUNA WORKING GROUP 2011-2014

By

Putuh Suadela
The Ministry of Marine Affairs and Fisheries
Indonesia

STRATEGIC PLAN OF ACTION ASEAN TUNA WORKING GROUP
2011-2014

STRATEGIC THRUST 1 : JOINT PRODUCT PROMOTION IN INTERNATIONAL MARKET				
ISSUES	**ACTION PROGRAMME**	**ACTIVITIES**	**WORK SCHEDULE**	**COORDINATOR*)**
Increasing global demand of tuna products	Tuna product promotion in international market	- Organize joint negotiation and collective bargaining - Reviewing issues and problem among members in international market - Develop promotion and information in e-comm including develop joint tuna web site. - Develop and join the ASEAN seafood trade fair (ASEAN Seafood Expo and business meeting)	2011 – 2014	Thailand and Vietnam
	Joint efforts to counter campaign against ASEAN tuna products	- Promote and real action on implementation of the best practices of sustainable and 'blue" tuna fisheries industry - Sharing experiences between the ASEAN countries on the implementation of the best practices of sustainable and 'blue" tuna fisheries industry - Develop an ASEAN Tuna database and information centre [eg. Website, mailing list]	2011 - 2014	Indonesia [and proposed: Philippines]

Note : *) Proposed in the the First ASEAN Tuna Working Group Meeting

STRATEGIC THRUST 2 : ENHANCEMENT OF COMPETITIVENESS OF TUNA PRODUCT				
ISSUES	**ACTION PROGRAMME**	**ACTIVITIES**	**WORK SCHEDULE**	**COORDINATOR*)**
Tariff and Non Tariff Barrier	Enhancement of extra ASEAN trade and long-term competitiveness of ASEAN's Tuna products/commodities.	- Convening regularly to have joint position and modalities for tariff trade barriers (such as subsidy counter vailing duty) and non-tariff trade barriers (such as promotion and action to improve sustainable tuna fisheries), which implicate ASEAN member countries and following up with join forging position to dealt with. - Joint effort in negotiation [eg. with EU and Japan] for reduction of tariff for tuna product from ASEAN Countries	2011 – 2014 (for example once in 6 months)	Thailand
Industry efficiency and productivity	Enhancement of intra ASEAN trade and long-term competitiveness of ASEAN's tuna products/commodities. (e.g fuel issues)	- Strengthening co-operation in human resources development both in the upstream and downstream tuna industry - Intensifying co-operation in technology development & transfers especially in value added technology. - Accelerating the harmonization of standards, in accordance with international standards through joint effort with major partners - Strengthening joint capacity development in the implementation of sanitary and phytosanitary measures to promote trade competitiveness of ASEAN Members States.	2011 – 2014	Indonesia

Note : *) Proposed in the the First ASEAN Tuna Working Group Meeting

STRATEGIC THRUST 3 : ENHANCEMENT OF INTRA-ASEAN TRADE				
ISSUES	**ACTION PROGRAMME**	**ACTIVITIES**	**WORK SCHEDULE**	**COORDINATOR*)**
The need of increasing intra ASEAN trade on tuna products	Intensifying consultation and information exchange on tuna industry	- Consultations and exchange of experiences and information on trade and investment policies and strategies. - Develop mutual recognition on export and import arrangements - Co-operation on border and non-border measures to supplement & complement efforts towards liberalizing trade and investment to include reciprocal recognition of test and certification, removal of barrier and fair competition. - Co-operation efforts in downstream and value added activities.	2011 – 2014	Vietnam and Indonesia

Note : *) Proposed in the the First ASEAN Tuna Working Group Meeting

STRATEGIC THRUST 4 : DEVELOPMENT AND ACCELERATION OF TRANSFER AND ADOPTION OF NEW TECHNOLOGY

ISSUES	ACTION PROGRAMME	ACTIVITIES	WORK SCHEDULE	COORDINATOR*)
Sustainability: Unsustainable fishing practices	Transformation to sustainable tuna fishing practices	- Raise awareness building on eco-friendly fishing gear - Identification and adoption of existing eco-friendly fishing gears - Fishing gear adjusment (e.g reducing by catch) - Adapting to the Regional Fisheries Management Organization (RFMO) measures on fishing capacity	2011-2014	Indonesia [and Malaysia proposed]
Sustainability: Unregulated deployment of Fish Aggregating Device (FAD) and reduce the juvenile tuna (Yellow Fin Tuna & Big Eye Tuna) catches	Adapting to the RFMO measures on FAD and juvenile tuna (Yellow Fin Tuna & Big Eye Tuna)	- Review of existing regulations and set up new regulations on FAD and juvenile tuna - Joint promotion and implementation of catch certificate and other scheme	2011-2014	Thailand [and The Philippines]
Post harvest losses	The development of cold chain system	- Capacity development on the implementation of cold chain system	2011-2014	Vietnam
Quality and safety of products	Improvement of handling and preservation practices	- Modification of fish hold - Dissemination and adoption of the modified fish hold - Conduct survey on the existing practices - Enhancement of food safety certification program	2011-2014	Thailand [and proposed: Malaysia]
	Tuna product Development	- Strengthening the cooperation in capacity development of tuna product diversity program especially in the context of tuna product	2011-2014	Vietnam

		technology		
Sustainable tuna fisheries management	Strengthening joint position in addressing non-trade issues at international fora to protect the interest of ASEAN Member Countries	- Developing working group on tuna ecolabeling issues	2011-2014	
	Reducing IUU Fishing in the regions	- Joint effort in combating IUU fishing practice	2011-2014	Indonesia
STRATEGIC THRUST 5 : ENHANCEMENT OF PRIVATE SECTOR INVOLVEMENT				
The need to enhance cooperation between private and public sector in tuna industry (Public Private Partnership)	Continuous consultation with the private sector at all activities and meetings of ASEAN tuna working group.	- Building awareness among stakeholders especially tuna association to participate in the ASEAN Tuna WG. - Strengthening network development among tuna association in the country and abroad (such as ASEAN tuna business forum/association/summit). - Member States shall assist and facilitate the private sector initiatives in fisheries management including catch data submission	2011 – 2014	Vietnam

Note : *) Proposed in the the First ASEAN Tuna Working Group Meeting

Annex 7

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Introduction of Japanese Tuna Fisheries and Data Collecting System

By

Hiroaki Okamoto
The National Research Institute of Far Seas Fisheries
Japan

Introduction of Japanese Tuna Fisheries and Data Collecting System

CONTENTS

September 2011
National Research Institute of Far Seas Fisheries
Hiroaki Okamoto

1

1. Overview of Japanese Tuna Fishery

- Longline Fishery

Started since the early 1910's in the Pacific. Expanded to tropical area before the WWII. Fishing area was limited after the WWII until abolition of MacArthur line in 1952 after when Japanese distant longliner expanded rapidly to all Oceans.

- Pole and Line Fishery

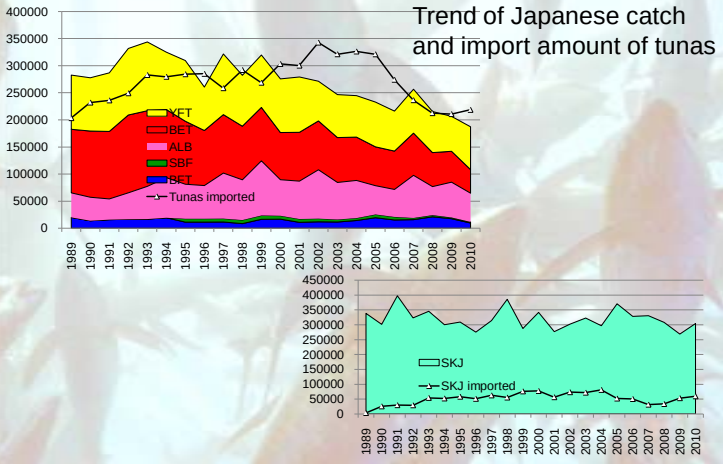
Oldest tuna fishery targeting mainly on skipjack tuna started at least 300 years ago.

- Purse Seine Fishery

Large scale tuna purse seine fishery of Japan was started in 1960's and expanded through 1970's and 1980's.

2

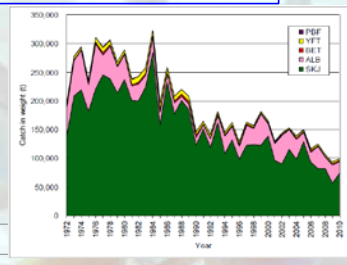
Trend of Japanese catch and import amount of tunas

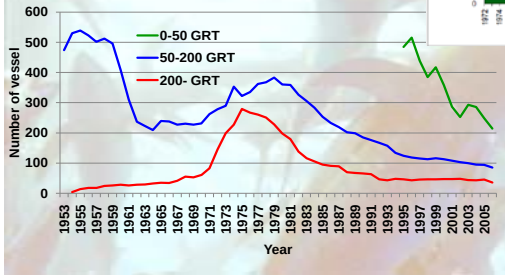


3

Pole and line fishery

- Coastal LL (less than 20 GRT)
- Offshore LL (20-120 GRT)
- Distant Water LL (>120GRT ~ 500 GRT)





4

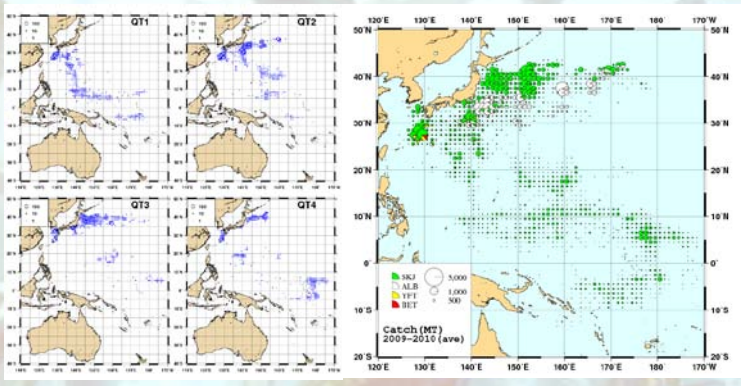
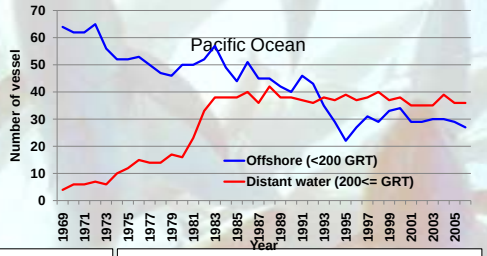


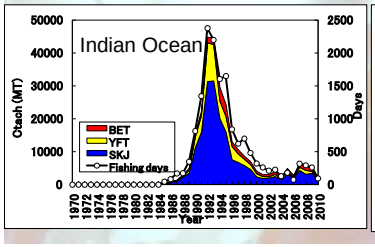
Fig. Quarterly distributions of fishing effort (Fishing days, Left Fig.) and catch by species (Right Fig.) of Japanese pole and line fishery.

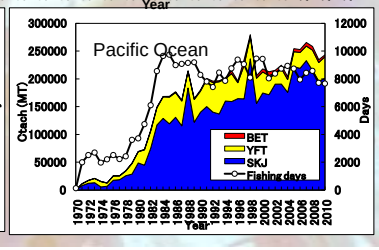
5

Purse Seine Fishery

- Offshore PS (<200 GRT)
- Distant Water PS (200GRT<)







6

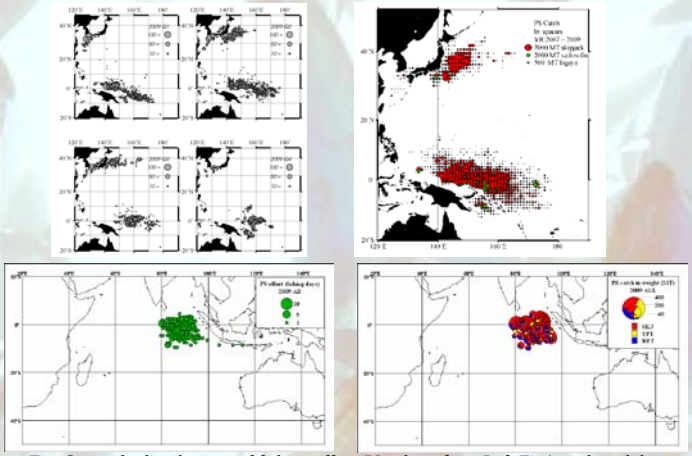
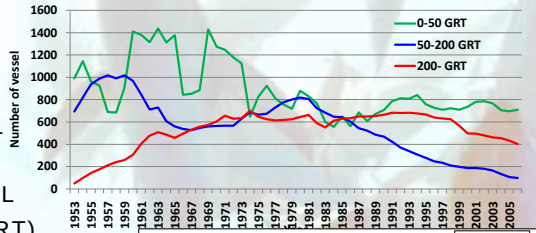


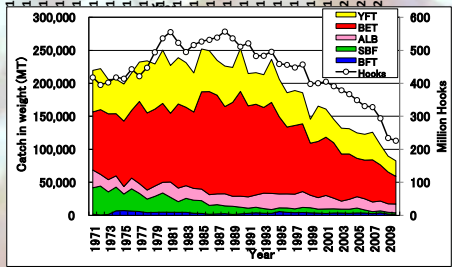
Fig. Quarterly distributions of fishing effort (Number of set, Left Fig.) and catch by species (Right Fig.) of Japanese purse seine fishery.

7

Longline Fishery (categorized into 3)

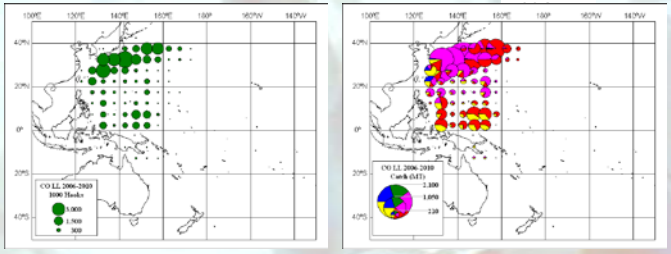
- Coastal LL (- 20 GRT)
- Offshore LL (10-120 GRT)
- Distant Water LL (120- GRT)



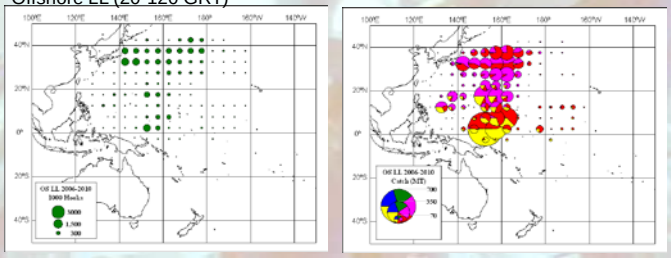


8

Coastal LL (< 20 GRT)

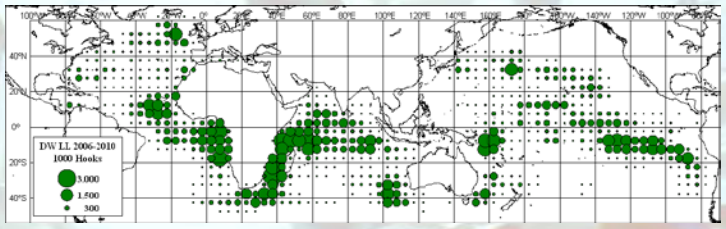


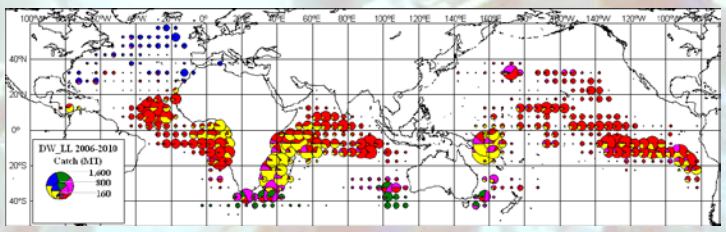
Offshore LL (20-120 GRT)



9

Distant water LL (200GRT<=)





10

2. Data Collecting System

Obligations of submitting logbook

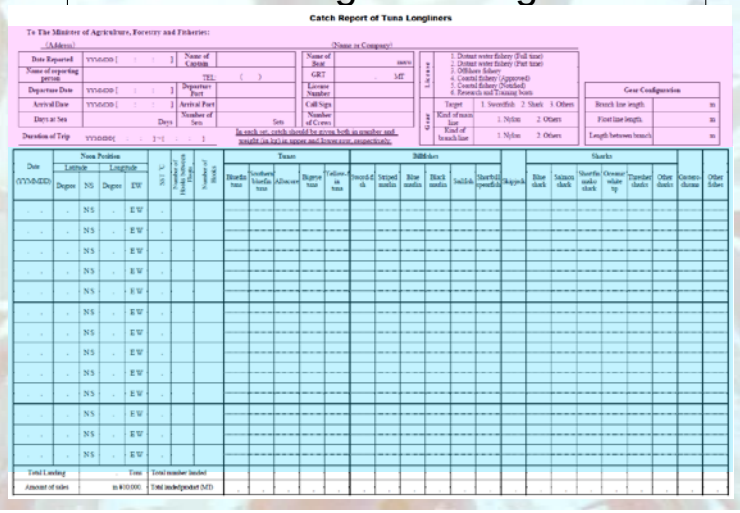
Longline case as a example:

・Logbook should be submitted by the owner of fishing vessel larger than 10 GRT after its completion of trip (within 30 days).

・Since 2008, distant water longliners have been required to submit it every ten days.

11

Tuna Longline Logbook



12

Instruction for filling out logbook

Catch by species for tunas, billfishes, sharkes and other fishes : Fill number of catch by species in upper row and processed weight in kg in lower row. Refer to Talble 1 for the classification of shark species.

Table 1 Classification of shark species.

As each shark species have several local name, it is important to instruct fishermen the relationship between local name and standard name to be recorded into logbook.

Standard name	Local name (Japanese)
Blue shark	Mizubuka, Ao, Aota, Aobuka, Guda, Mizuzame
Shortfin mako shark	Ao, Aoyagi, Katsuozame, Katsuzame, Maira, Moro
Salmon shark, Porbeagle	Mouka, Rakudazame, Goushika, Nezumi, Rakuda
Oceanic whitetip shark	Hiragashira, Mobuka, Nagarebuka
Thresher sharks	Onaga, Nezumi, Ginnezumi, Dobunezumi, Hataori, Chuuta

13

Data Compilation(logbook) For Longline Statistics

Number of sets are about:

90,000 for distant water LL,

10,000 for offshore LL,

40,000 for coastal LL.

However, the coverage is not 100%. Averages are 92%, 90% and 90% for distant, offshore and coastal LL, respectively.

Therefore, estimates are required to be raised to get total statistics.

14

Data Compilation(logbook) For Longline Statistics

1. For raising to estimate total catch, it is essential to get information on total effort to know the coverage of logbooks.
2. Total effort information was available through the industry for DW LL until 2003, and through the Department of Information and Statistics (DIS), Ministry of Agriculture, Forestry and Fisheries for OS LL until 2006.

   -> Changed to VMS information

3. For coastal LL, only total catch by species is available through the DIS.

15

Data Check for LL Logbook

Logbook includes a lot of errors in various types !!

- Vessel characteristics (call sign, name, license number, etc) are checked with register.
- Briefly viewed by the scientists (to check species reported are OK or not according to the knowledge and experience.
- Finally, error check program are used to detect possible mis-reporting such as wrong date, too fast movements, sets on land, wrong average weight, too high CPUE, out-of-bounds values.

16

- Fishing data of Japanese PL and PS are also collected by the similar logbook system. As for these fisheries coverage of logbook is 100% and raising is not needed.
- In the case of smaller vessels which the submission of logbook is not required, the fishing data of them are collected by staff of statistical section in the Ministry of Agriculture, Forestry and Fisheries mainly using landing statistics at local ports.

- As for the PS fishery, it is difficult to estimate the precise catch by species onboard. Then, the catch by species recorded in the logbook should be corrected using the unloading data.
- However, as bigeye and yellowfin are mixed in the small size categories, it is necessary to know the mixture rate in these categories.

17

3. Japanese PS Port sampling

We have conducted port sampling since 1995 in Yaizu, Makurazaki and Yamagawa markets, where almost of catch are unloaded.

Purposes

1. Research on the market categories
   To confirm the accuracy of species identification and to estimate the catch by species

2.Research on informative fish from a fish well
   To collect useful size data, which are associated with the fishing date, position, school type

18

Operation (20 - 60 days per a trip)

Post the log sheet after their return port

Landing at five ports

Log-sheet

Coverage: 100 %

Inaccurate onboard estimation of catch by species

Coverage: 98.6 %
(3543 / 3593 cruises)

Market slip

Accurate estimation of catch by species at unloading

The species composition of both data sets are cross checked

19

port	species		market category	number of sampling times*	number of specimen	average number of fish in one sampling	%frequency	species composition (YFT/(YFT+BET))	
							number of occurrence of mixture / number of sampling times	%number	%weight
Yaizu	SKJ	B / PS	1.8 down	311	33387	107	0.0%		
			1.8 up	310	32760	106	0.0%		
			2.5 up	313	32903	105	0.0%		
			4.5 up	297	30072	101	0.0%		
			7.0 up	133	11342	85	0.0%		
			KIZU	6	886	148	0.0%		
	YFT		1.5 down	300	32993	110	92.0%	81.6%	81.0 %
			1.5 up	299	32193	108	90.6%	76.0%	75.8 %
			2.5 up	304	30099	99	19.1%	99.3%	99.6 %
			10.0 up	275	22590	82			
			KIZU, OOKIZU, OSARE and TSUGISINA	0	-	-			
	BET		2.5 up	301	28061	93	9.6%	1.3%	0.3%
			10.0 up	2	52	26			

20

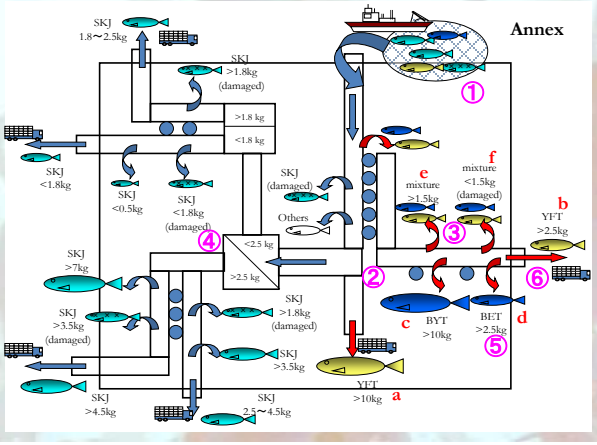
Research on the market categories
Process of sorting and scaling by size

Fishes scooped from vessel and transported on conveyors to sorting and scaling selections (Fig 1).

Fig 1 Fish are scooped by net

21

- Each species are sorted by market categories and contain into the metal cage by categories.



22

Fig. 2 Each sorted and categorized fish are carried with a metal box to a flat space for sampling purpose.

Fig. 3 In general, **one hundred fish** for each category are loaded on the floor for identifying species and weighing by species. Occasionally the number of specimen did not reach 100 (Table 1).

23

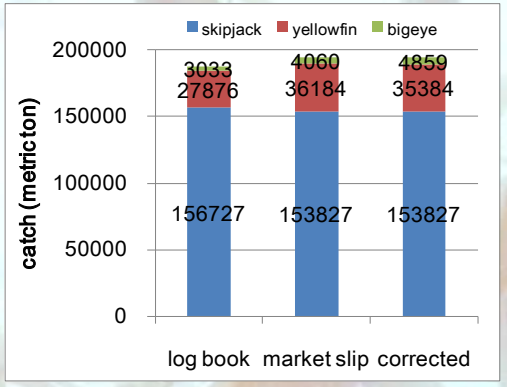
YFT ratio = weight of YFT / (weights of YFT +BET)
Actual bigeye catch landed = BET catch + YFT catch * (1-YFT ratio)

YFT ratios by quarter and market category calculated by 78 times port sampling from 2006 to 2008.

The ratios were applied to correct the catch amount.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Yaizu 1.5 down	0.874	0.841	0.835	0.878
Yaizu 1.5 up (1.5 - 2.5)	0.746	0.889	0.890	0.807
Makurazaki / Yamagawa 1.5 down	0.908	0.992	0.810	0.947

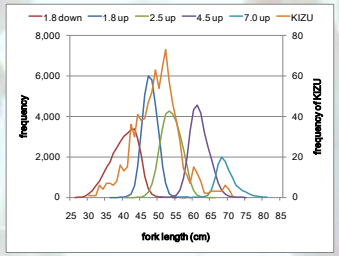
24

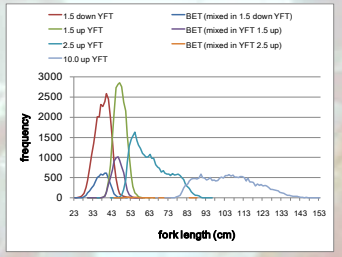


corrected / log book
Bigeye 1.60, yellowfin 1.27, skipjack 0.98, total 1.03

Fig 22. Comparison of species composition between the log book and the corrected catch.

25





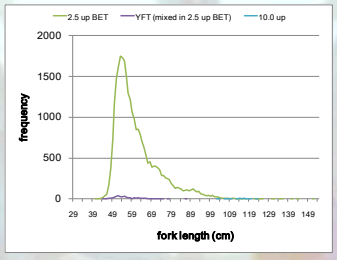


Fig. Length frequency of skipjack, yellowfin and bigeye of each market category of Yaizu based on result of port sampling from 1995 to 2010.

26

Research on a fish well

1. Receive the hatch plan
   The vessel notify us of name of the port it intends to enter and date of its entry, and also send the hatch plan (Fig. #), which included the hatch name, fishing date, position and school type.

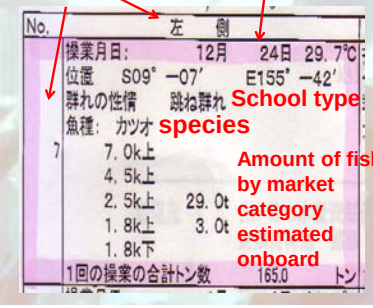


Fig. 14 Example of the hatch plan. In the red rectangle, the free-swimming fish were caught in 24 Dec. 2009 at S09 °07', E155°42'. The fish are stored in the No.7 fish well of port side, and the amount of the fish is 32.0 t, which are composed of skipjack of 2.5 up and 1.8 up. The total amount of catch of the set was 165 t.

27

Fishes are scooped from the selected well by the net three times and then loaded on the floor for identifying species and weighing by species.
We investigate three wells at the maximum per one sampling .

28

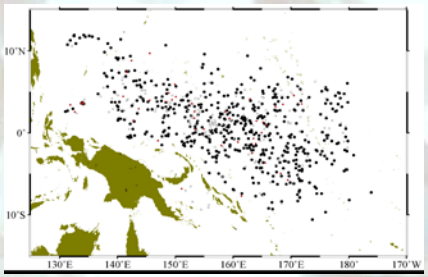
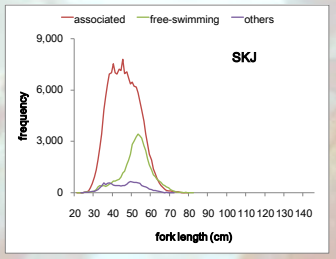
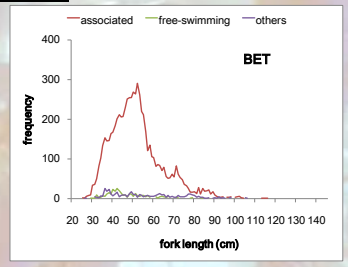


Fig. Geographical distribution of fishing positions of the port sampling for the fish well from 1995 to 2010.
● : associated school, ○ : free-swimming school, red circle : others (associated with animal, unknown)





29

4. Data Sampling at Cannery in Thailand

Back ground:

- For a precise stock assessment, accurate catch by species and size and effort data are fundamentally needed.
- As explained before, it is difficult for PS fishery to know accurate catch by species by onboard estimation.
- Although observer sampling program is effective to estimate species and size composition of catch but is not necessarily good method to estimate total catch by species.
- Then, It must be effective to utilize the unloading or cannery data to know the accurate catch by species.

30

The tuna canning industry in of Kingdom of Thailand

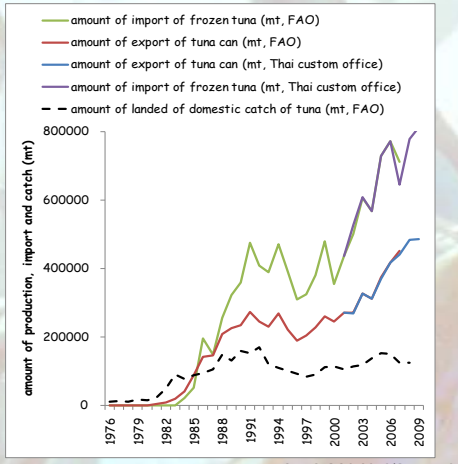
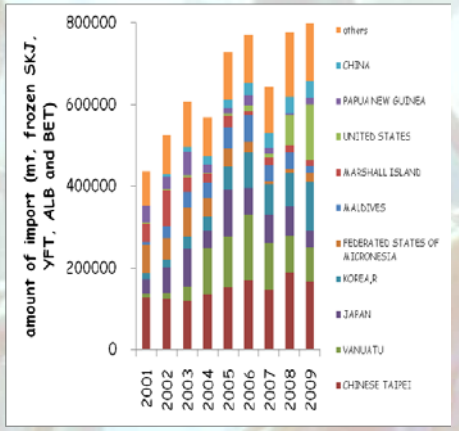


Fig. 1 Annual changes of amount of import of frozen four tuna species (skipjack, yellowfin, bigeye and albacore) and export of tuna canning of Thai.

31

Thai's import trading partners



Among 79 countries and regions during last nine years

The top five occupied about 60 %

Chinese Taipei (14%),
Vanuatu (8%)
Japan (6%)
Republic of Korea (5%)
Federates of Micronesia (4%)

32

If we can know the amount of purse seine catch transported to each of the main countries of canning industry by using cannery report, it would be possible to grasp total catch of small sized bigeye tuna caught by purse seine fishery.

For this purpose, we should start from Thailand, where the large part of purse seine catch are imported.

The aims of this project were:
(1) to know species mixture rates of market categories of the canneries;
(2) To estimate of accuracy of species identification in these canneries.

33

METHODS

Selection of canneries

The number of major cannery is over 30 (as of 2010, Thai Food Processors' Association) in Thai.

T**hree largest canneries** (A, B and C) were selected for this research.

In recent years, the market share of these three packers in Thailand has been about **60 %**, which was calculated by the proportion of amount of receiving fish per day as of 2006. (personal information).

34

METHODS

Five market categories for each species
1.4 kg down, 1.4 - 1.8 kg, 1.8 - 3.4 kg, 3.4 - 9.0 kg
9.0 kg up (excluding for following measurement)
Species identification
Up to 100 individuals for each market category in general
Length and body weight
Up to 20 individuals
Species mixture rates by market category and by factory
% of BET (or YFT) / (YFT+BET) in number and in weight
Corrected catch by species
Multiply the species mixture rates by catch reported in market receipt

This sampling project was conducted in 20th to 23rd April, 2010, under full support and collaboration of Thai SEAFDEC, and cooperation with Cannery and Trading companies.

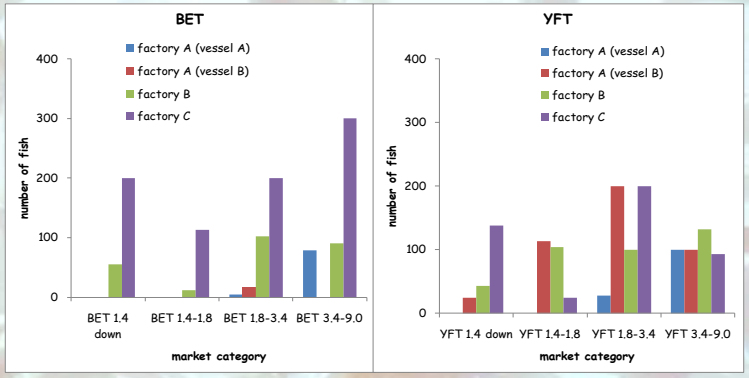
35

36

37

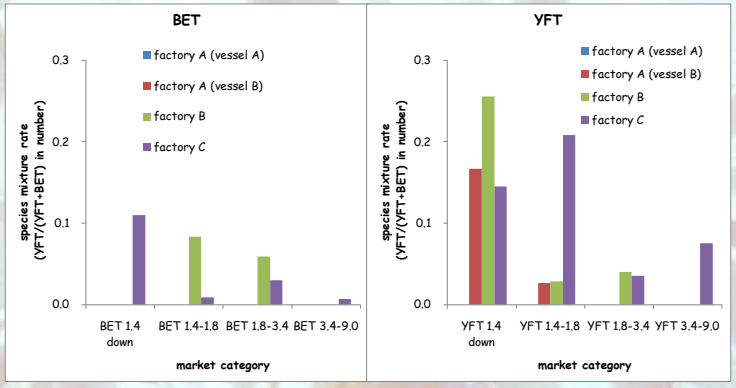
38

39



The number of specimen for measurement by cannery and market category

40



The species mixture rate (ratio of BET (or YFT) / (YFT+BET) in number) by cannery and market category

41

sampling cannery	fishing vessel	BET (corrected catch / market report)	YFT (corrected catch / market report)
A	A	100.0 % (1,269 kg / 1,268 kg)	100.0 % (4,525 kg / 4,525 kg)
	B	100.9 % (1,922 kg / 1,905 kg)	99.9 % (18,038 kg / 18,055 kg)
B	C	113.3 % (6,539 kg / 5,769 kg)	98.0 % (36,970 kg / 37,740 kg)
C	D (Japanese vessel)	98.7 % (105,445 kg / 106,820 kg)	105.1 % (28,340 kg / 26,965 kg)

The estimated accuracy of market reports (corrected catch / market report) in weight base were from 98.7 % to 113.3 % for bigeye, and from 98.0% to 105.1 % for yellowfin

42

port	market category	species mixture rate	average	range
Makurazaki	BET 1.5 up	5.3%	1.7%	0.3 - 5.3 %
Yaizu	BET 2.5 up	1.3%		
Makurazaki	BET 3.0 up	1.5%		
Makurazaki	YFT 1.5 up	1.3%		
Yaizu	YFT 2.5 up	0.7%		
Makurazaki	YFT 3.0 up	0.3%		
Thai_B	BET1.4-1.8	7.5%	2.4 % (except for YFT1.4-1.8 in Thai_C)	0.0 - 7.5 % (except for YFT1.4-1.8 in Thai_C)
Thai_C	BET1.4-1.8	0.8%		
Thai_A	BET1.8-3.4	0.0%		
Thai_A	BET1.8-3.4	0.0%		
Thai_B	BET1.8-3.4	4.6%		
Thai_C	BET1.8-3.4	2.7%		
Thai_A	YFT1.4-1.8	2.6%		
Thai_B	YFT1.4-1.8	2.8%		
Thai_C	YFT1.4-1.8	20.3%		
Thai_A	YFT1.8-3.4	0.0%		
Thai_A	YFT1.8-3.4	0.0%		
Thai_B	YFT1.8-3.4	4.0%		
Thai_C	YFT1.8-3.4	3.4%		

43

port	market category	species mixture rate	average	range
Yaizu	BET 1.5 down	19.0%	19.4%	14.9 - 24.0 %
Yaizu	BET 1.5 up	24.2%		
Makurazaki	BET 1.5 down	14.9%		
Thai_B	BET_1.4 down	0.0%	12.6%	0.0 - 21.7 %
Thai_C	BET_1.4 down	11.6%		
Thai_A	YFT_1.4 down	15.1%		
Thai_B	YFT_1.4 down	21.7%		
Thai_C	YFT_1.4 down	14.7%		

44

Discussion

The amount of catch by species in market report in the three Thai canneries seems to be accurate in general.

However, the accuracy is would change depending on the amount of catch of smallest market categories, where the species mixture rates are relatively high.

It is difficult to identify the species between small yellowfin and small bigeye in one glance in sorting line. The high mixture ratio in smaller categories would indicate that both species may not necessarily be identified in those size categories.

In order to estimate accurate amount of catch by species from market report, it is needed further investigation to know how the species in the smallest categories are treated at other canneries.

45

March 11, 2010
Japanese Earthquake and Tsunami

15,735 lives were lost
4,467 are still missing

The number of fishing vessel which suffered critical damage seems to be more than 25 thousand.

END

46

Annex8

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

The Status of Tuna Fisheries and Data Collection System of Indonesia

By

Putuh Suadela
The Ministry of Marine Affairs and Fisheries
Indonesia

COUNTRY REPORT – INDONESIA

I. TUNA FISHERIES IN INDONESIA

1. Estimated number of tuna fishing fleet

Type	Tonnage or Engine Power	Estimated number of boats	Fishing grounds	Target Species	By-catch Species
Long line		10.345		Multi Species (large pelagic Species including tuna and tuna-like species)	-
Purse Seine		18.423			
Pole and Line		12.727			
Hand line		67.444			
Others (Troll Line, drift gill net, etc)		186.050			
TOTAL		294.989			

2. Major tuna and tuna-like species caught and landed
   Major tuna and tuna like species caught and landed in Indonesia are Yellowfin Tuna, Bigeye Tuna, Skipjack Tuna, and Albacore.

3. Estimated national annual production

	2004	2005	2006	2007	2008	2009	2010*
Albacore	29.135	33.790	0.293	34.335	36.538	25.621	31.190
Yellowfin Tuna	94.904	110.163	94.406	103.655	102.765	114.163	128.410
Southern Bluefin Tuna	665	1.831	747	1.079	891	641	450
Bigeye Tuna	52.292	37.360	43.958	52.489	53.979	62.844	72.280
Skipjack	233.319	252.232	277.388	301.531	296.769	338.034	345.100
TOTAL	**410.315**	**435.376**	**436.792**	**493.089**	**490.942**	**541.303**	**577.430**

*=temporary data

4. Major types of tuna fishing fleets (boats)
   Major types of tuna fishing fleet in Indonesia are Long line, Purse Seine, Pole and Line, Hand line, and Others (Troll Line and drift gill net). Hand line is the most widely use fishing gear to catch tuna in Indonesia, because most of Indonesia fishermen are small scale fishermen with fishing vessel size under 5 GT.

5. Major landing site (s) of tuna and tuna-like species
   Major landing sites of tuna and tuna like species in Indonesia are Benoa – Bali, Jakarta, Bitung – North Sulawesi, Cilacap – Central Java, Kendari – Southeast Sulawesi, Bungus – West Sumatera, and Sibolga – North Sumatera.

6. Major type of production of tuna and tuna-like species
   Major type of production of tuna and tuna-like species are Yellowfin tuna, and Skipjack tuna. Skipjack is tuna product that mostly catches in Indonesia tuna fisheries. It potency is still moderate, so there is still opportunities to utilize it.

7. Estimated number of tuna processing units and their capacity
   Until 2011, there are 157 fish processing units with capacity 559.227 ton/year for tuna and skipjack product. They produce in fresh, frozen, canning, boil, and smoke product.

8. National mechanism and responsible agency for collecting tuna data/information:
   a. Boat registration
      Responsible agency for >30GT is central government c.q Directorat General of Capture Fisheries, 10 – 30 GT is province government, 5 – 10 is district government, and < 5 GT recorded by district government
   b. Landing (species and volume)
      Responsible agency is by fishing port.
   c. Import tuna raw materials for processing
      Responsible agency is Directorate General of Fish Processing and Marketing and Fish Quarantine, Quality Control and Fisheries Product Safety Agency.
   d. Export volume and target exporter,
      Responsible agency is Directorate General of Fish Processing and Marketing and Fish Quarantine, Quality Control and Fisheries Product Safety Agency.

9. Regulation and laws related to management of tuna fisheries

   There is no law and regulation that specific for tuna management, but we have law and regulation for fisheries management in general that also cover tuna fisheries management such as:
   - Law No. 5 year 1983 on Indonesia Exclusive Economic Zone
   - Law No. 6 year 1996 on Indonesian waters
   - Law No. 31 year 2004 on Fisheries as amended by Law No. 45 year 2009
   - Law No. 43 year 2008 on State Region
   - Government Regulation No. 15 year 1984 on Management of Biological Natural Resources in IEEZ
   - Government Regulation No. 54 year 2002 on Fisheries Business
   - MMAF Regulation. Kep.30/Men/2004 on Installation and Utilization of Fish Aggregating Device

- MMAF Regulation No. Per.16/Men/2006 on Fishing Port
- MMAF Regulation No. Per.05/Men/2008 on Capture Fisheries Business
- MMAF Regulation No. Per.08/Men/2008 on Utilizing of Gill Net in IEEZ
- MMAF Regulation No. Per.01/Men/2009 on Fisheries Management Area of Republic of Indonesia
- MMAF Regulation No. Per.03/Men/2009 on Fishing and /or Fish Carrying in High Seas
- MMAF Regulation No. Per.11/Men/2009 on Utilizing of Fish Net IEEZ
- MMAF Regulation No. Per.12/Men/2009 on Amendment on MAAF Regulation No. Per.05/Men/2008 on Capture Fisheries Business
- MMAF Regulation No. Per.18/Men/2010 on Fishing Log Book
- DGCF Decree No. KEP.8/DJ-PT/2010 on Temporary Discharge of License Issuing for New Certain Fishing Gear and Fishing Auxiliary Device

II. ISSUES ON COLLECTING TUNA FISHERY

Indonesia waters with area approximately about 5,8 million $km^{2,}$ and divided into 11 fisheries management areas that cover 33 provinces. By then, it carried out the division of authority in fisheries management in Indonesia. Relating to the capture fisheries, the authorities for fisheries management are based by size of vessel and fishing line. For vessel size 30 GT and above are under the authority of central government, and under 30 GT are under the authority of local government.

There are some constraints in collecting fisheries data, such as limited of enumerators in the field especially in the remote area; lack of fishermen understanding about the importance of data, etc. Meanwhile, the number of fishermen spread among the region in 2009 is 2.169.279 fishers, with 603.856 units of fisheries vessels. So it needs great effort and time to compile statistical data nationally.

There are limited data in the Indonesian fisheries statistical data related to the data request that often necessary. Such as, the Indonesia fisheries statistical data is still not based by fishing ground, but by fish landing place; also it hasn't described for fishing gear per vessel size and catch per fishing gear.

Logbook program development was started since 2007 and implemented in 2010. There is some constraints in logbook implementation, such as not all the fishermen are aware about the need of the logbook. There are some cases in the field such as the fishermen didn't return the logbook, or the logbook didn't fill in correctly etc.

To address IUU fishing issue, it refers to Law no. 31 year 2004 on Fisheries as amended by Law No. 45 year 2009. We haven't adopted the definition and classification IUU fishing according to IPOA – IUU Fishing by FAO nor the RFMOs into national law and regulation. But we already socialize about the rules and sanctions to the stakeholders, to ensure that they avoid the activities that are included

in the definition and classification IUU fishing according to IPOA – IUU Fishing by FAO and the RFMOs.

Indonesia is involved in the Regional Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing in the Region along with other 10 member countries (Australia, Brunei Darussalam, Cambodia, Indonesia, Malaysia, Singapore, Thailand, Timor Leste, Vietnam, The Philippines and Papua New Guinea). The National Plan of Action to Promote Responsible Fishing Practices including Combating IUU Fishing in the Region is being prepared. Indonesia is also preparing for the Port State Measures Agreement ratification and the infrastructure in the designed port.

III. CONSLUCION AND RECOMMENDATION

Constraint and challenges in tuna data collection system in Indonesia are more to the size of the management area and the number of fishermen who have to be managed, compared with the inadequate number of personnel and capabilities in the field.

Recommendation is necessary to strengthen the institutional capability as for the central government, province government, district government, and also for the fishermen through training, technical guidance, simulation and other activities that relate directly to the field.

ANNEX I

NATIONAL STOCK ASESSMENT PROGRAM FOR COASTAL TUNA

To conduct stock assessment, there are several data and institutions are needed. Types of data needed are survey research data and commercial fishery data / statistical data. Institutions related are Directorate General of Capture Fisheries (DGCF), Research Center for Fisheries Management and Conservation (RCFMC), and National Commission for Fish Resources Assessment (NCFRA).

Methodologies that already use are (1) Analytic Model, (2) Production Surplus Model Surplus, (3) Tagging Method, (4) Population Discrimination, (5) Otholimetric Technique, (6) Trawl surveys, (7) Marine Technology Application, (8) Remote Sensing System Application, (9) Eggs and Larva Survey, (10) Direct Census survey techniques, and (11) Deep Seas Fish Resources Exploration Survey

Stock assessment implementation process begins with the Research Center for Fisheries Management and Conservation (RCFMC) collect primary data through research and Directorate General of Capture Fisheries (DGCF) provide statistical data as the secondary data. RCFMC process and analyze the primary data and secondary data, which in turn will be delivered to National Commission for Fish Resources Assessment (NCFRA) for further analysis and consideration. Furthermore, NCFRA will submit their recommendation to the Ministry of Marine Affairs and Fisheries for further legalize through regulation.

Problem and constrain involving in the assessment process:
1. Budget constraint.
2. Fisheries characteristic: multi species and multi gear.
3. Required data is not optimal.
4. Difference perception on stock assessment between institutions.

Recommendation:
1. Improving statistical and research data.
2. Good implementation of logbook and observer program to provide more accurate and reliable data.
3. Need working network to make the same perception about stock assessment and research activity needed, improving the efficiency of inter-institutional, and to do open comprehensive consolidation, evaluation, and assessment.

ANNEX II

FISHING LOGBOOK IN TUNA FISHERIES

1. Implementation process

    a. **Year 2007 – 2009:** Consultation on fishing logbook program with RFMOs, Sweden, Fishing Port Officer and Stakeholders to simplified the fishing logbook form
    b. **Year 2007 – 2010:** Consultation on fishing logbook program in fishing port to socialized logbook program, filling logbook assistance, and logbook distribution
    c. **Year 2010:** Ministry of Marine Affairs and Fisheries Regulation No. PER.18/MEN/2010 on Fishing Logbook
    d. **Year 2011 – 2012:** Socialization on MMAF Regulation No. PER.18/MEN/2010 on Fishing Logbook, implementation fishing logbook program and designing logbook application for entry data and analysis.

2. Current tuna fishing logbook (format)

    a. Logbook for Tuna Long Line and Hand-line.
    b. Logbook for Purse-Seine and Pole and Line, also Troll Line.
    c. Logbook for other fishing gears.

3. Problem/constraint involving in the implementation and/or promotion on the use of fishing logbook onboard tuna fishing vessels
    a. Large number of Indonesian fishing fleet (Statistic 2009: 603.856 units)
    b. Large area of fisheries management area, which divided into 11 fisheries management areas.
    c. Fisheries characteristic: multi species and multi gear.
    d. Perception about the importance of data and sustainable fishery (mostly orientation is focus to increasing production)
    e. Capacity Building for central government, local government officers and stakeholders.

Annex 9

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Tuna Fisheries in Malaysia

By

Noraisyah Binti Abu Bakar

Fisheries Officer of the Department of Fisheries

Malaysia

Tuna Fisheries in Malaysia

By

Noraisyah bt Abu Bakar and

Raja Bidin b Raja Hassan

Introduction

Tuna and tuna-like species belong to the sub-order Scombroidei, which is composed of tuna, billfishes, swordfishes and other related species (Collete and Nauen, 1983). Tunas are large fast-growing pelagic fish, which constitute important commercial and recreational fisheries throughout the major oceans of the world. Many tuna species (*i.e. Thunnus albacares, Katsuwonus pelamis* and *Thunnus obesus*) were found in tropical waters such as in the South China Sea (SCS), Indian Ocean and Pacific Ocean. However, few species (*i.e. Thunnus alalunga* and *Thunnus maccoyii*) were also found in temperate waters such as in the Atlantic Ocean and southern part of Australia.

The South China Sea (SCS) comprises the waters of Vietnam, Thailand, east coast of Peninsular Malaysia, Brunei, Sabah and Sarawak (East Malaysia), the west coast of the Philippines, and some parts of Indonesia. They are parts of the FAO (Food and Agriculture Organization) statistical area 71 (Figure 1).

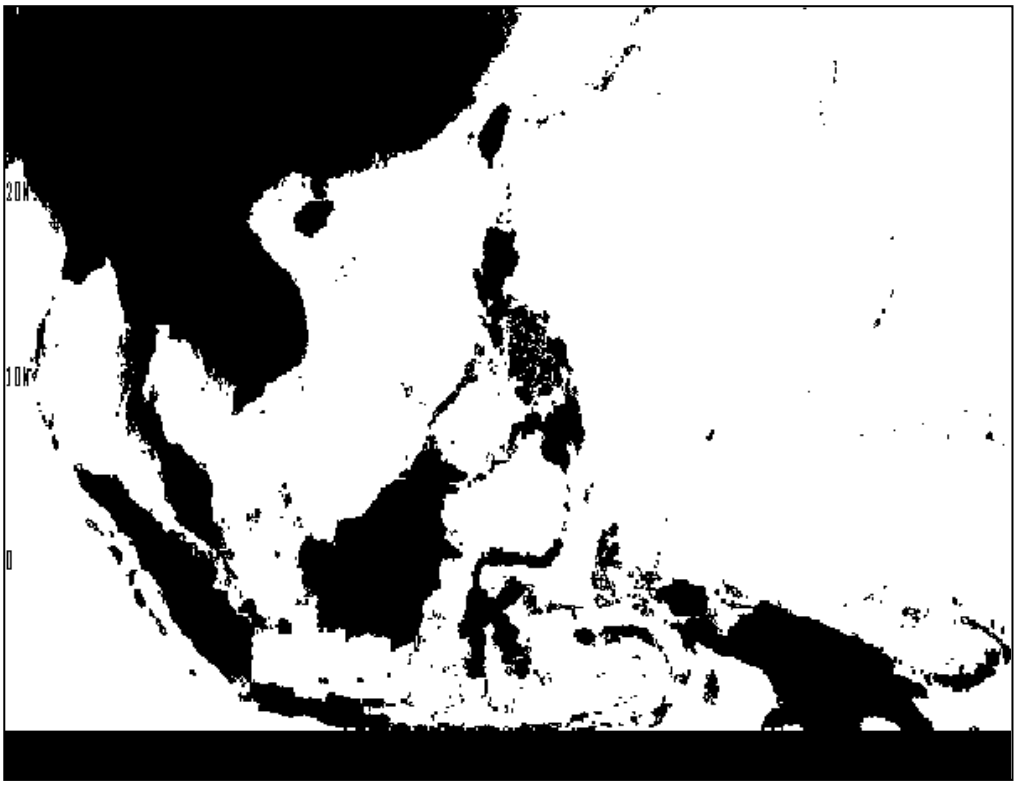


Figure 1. Modified FAO statistical area 71 (edited from FAO year book, fishery statistics, 1993)

Malaysia is a maritime nation, surrounded by four seas; namely the Straits of Malacca, South China Sea, Andaman Sea and Sulu Sea. Given the vast areas of its EEZ and international waters (Indian Ocean and West Pacific Ocean) adjacent to it, the potential for fisheries production is enormous.

With the declaration of the EEZ in 1980, Malaysian waters have increased tremendously from 47,000 to 160,000 square nautical miles. With this expansion, there is an intense encouragement and promotion by the government to develop deep-sea fishing of which the tuna industry has become one of the primary concerns of the government.

Emphasis by government at present is given to the development of tuna fisheries both in the coastal waters as well as in the offshore waters within the Exclusive Economic Zone (EEZ) of Malaysia (Richard and Raja Bidin, 1992) and Indian Ocean. Furthermore Malaysia has become a full member of the Indian Ocean Tuna Commission (IOTC), so given more opportunity for Malaysian to fish in the Indian Ocean.

Under the National Agricultural Policy, Balance of Trade on Food Sector Plan and since the Ninth Malaysian Plan, exploitation of tuna becomes one of the main agenda whereby tuna is targeted to be the main contributor of fish production and contribute to Malaysia's endeavor to be among the net exporter of food.

Tuna Species Composition

There are three main species of neritic or coastal tuna found in the Malaysian waters. (In addition another three species of oceanic tuna were also found in Sabah and Sarawak (East Malaysia).) A list of these species with their scientific names is given in Table 1.

They are found in both continental shelf of SCS and the SOM. In the deeper waters, within EEZ of SCS and Celebas Sea, East Coast of Sabah, tropical tuna are also abundantly found. The species commonly found are Yellowfin, The tuna like species such as marlin, swordfin, sailfish and Spanish Mackerel are also found.

Table 1. List of tuna species found in Malaysian waters

Scientific Name	**English Name**	***FAO/IPTP* code**	**Local Name**
Neritic species			
Euthynnus affinis	Eastern little tuna	KAW	Aya Kurik
Thunnus tonggol	Longtail tuna	LOT	Aya Hitam
Auxis thazard	Frigate tuna	FRI	Aya Selasih
Oceanic species			
Thunnus albacores	Yellowfin tuna	YFT	**Tuna Sirip Kuning**
Katsuwonus pelamis	Skipjack tuna	SKJ	Tuna Jepun
Thunnus obesus	Bigeye tuna	BET	Tuna Mata

Figure 2 shows the tuna species composition caught in Malaysia in 2009. Longtail tuna remain the most abundant species (490%) followed by Kawakawa (34%). Starting in 2008, more detail composition was recorded in our national fisheries statistics, which include also oceanic species and skipjack tuna.

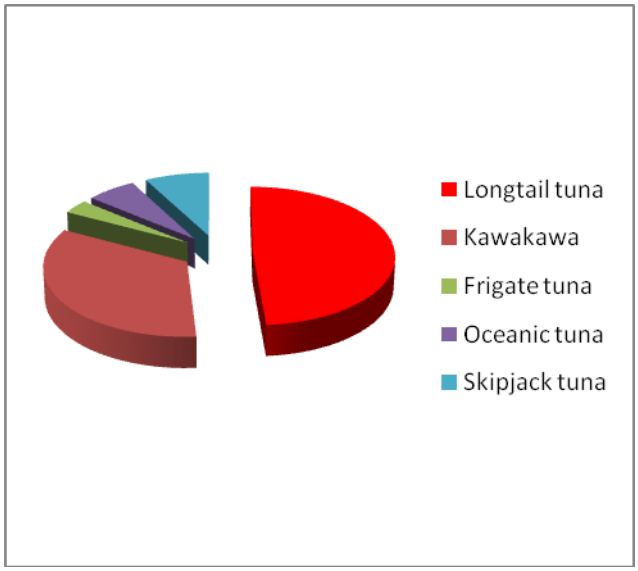


Figure 2: Species composition of tuna caught in Malaysia in 2009

Major tuna like species caught and landed in Malaysia are :

Name	Scientific Name	FAO/IPTP Code
Marlin	*Makaira indica,* *Tetrapturus audax*	MAR
Todak	*Xiphias gladius*	SWO
Layaran	*Istiophorus platypterus*	SFA
Tenggiri	*Scomberomorus commerson*	COM
Wahoo	*Acanthocybium solandri*	WAH

Trend of tuna landings

The annual trend of tuna landings in Malaysia within the period 2000 to 2009 showed an increase from 59,337 tonnes to 67,224 tonnes in 2000 dan 2008 respectively (Malaysia, 2000 and, 2008). However in 2009 the tuna landing was slightly decreased to 56,480 tonnes from previous landing in 2008 (Figure 3). More than 90% of the tuna landing in Malaysia comprises species *Euthynnus affinis* and *Thunnus tonggol*. The bulk of this landing, in recent years, was actually caught in the West Coast of Peninsular. In Sabah, landings were observed stable from the year 2005 onward ranged from 10,000 to 12,000 tonnes. The highest landing was recorded in 2004 at 12,647 tonnes.

Tuna Landing in Malaysia

Year	Neritic Tuna (mt)	Oceanic Tuna (mt)	TOTAL (mt)
2000	55,520.40	3,816.60	59,337.00
2001	51,663.70	4,447.30	56,111.00
2002	61,885.30	2,773.70	64,659.00
2003	52,654.55	2,174.45	54,829.00
2004	43,958.75	733.25	44,692.00
2005	41,564.80	3,400.20	44,965.00
2006	54,046.28	1,494.72	55,541.00
2007	51,326.94	1,693.06	53,020.00
2008	64,214.64	3,006.36	67,221.00
2009	53,466.06	3,013.94	56,480.00
2010	57,966.13	1,625.22	59,591.35

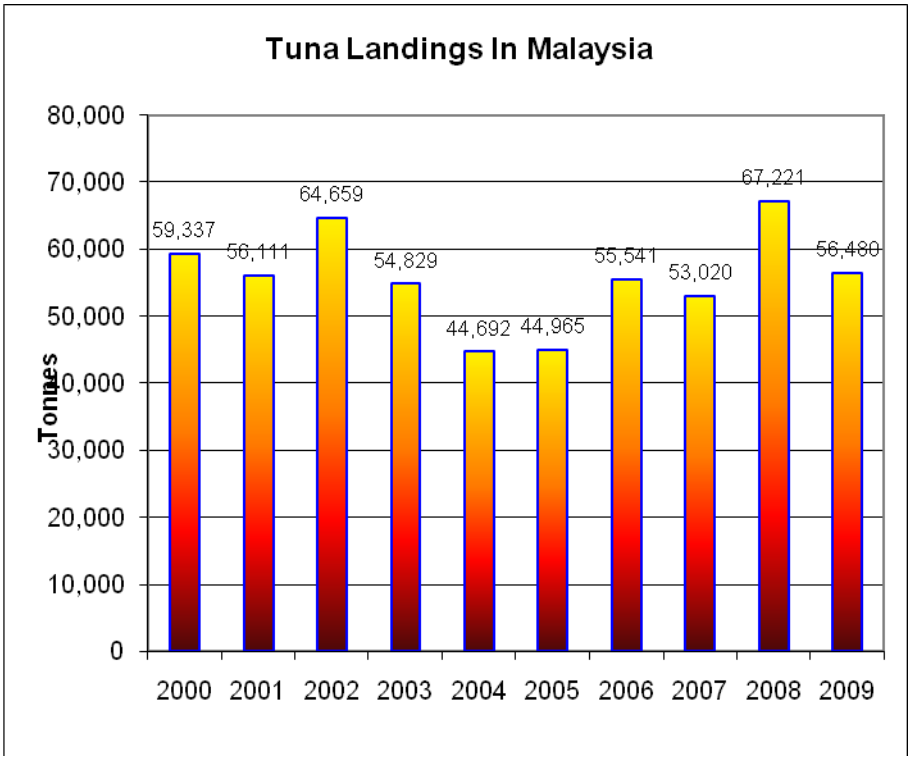


Figure 3. Trend of tuna landings by area in Malaysia

Numbers Of Tuna Fishing Fleets

Type	Tonnage or Engine	Estimated number of	Fishing grounds	Target species	By-catch spesies
Longline					
• Longliner	<200 GRT	33	Indian Ocean	Yellowfin Bigeye	Marlin Swordfish Albacore Wahoo
	>200 GRT	6			
Purse Seine					
• Small	<70 GRT	518	South China Sea Straits of Malacca	Longtail Tuna Eastern Little Tuna Frigate Tuna	Round Scad Sardine Others
• Large	>70 GRT	378 228(Sabah, S'wak and Labuan)			

Major Types Of Tuna Fishing Fleets (Boats)

Most of the tuna in Malaysian waters are caught by hooks & line and purse seine. Some are landed by gill netters as by-catch.

In Indian Ocean, longline is the main gear used to catch oceanic species like bigeye and yellowfin tuna.

Major Landing Site

Neritic Tuna – South China Sea and Straits of Malacca

Currently, exploitation of tuna resources in Malaysia is concentrated in Sarawak, Sabah/Labuan and East Coast of Peninsular Malaysia. The major landing sites for neritic tuna are in state of Sabah/Labuan, Sarawak, Perlis, Perak, Kelantan, Terengganu and Pahang.

The landing sites are at the LKIM's complexes' that managed by Fisheries Development Authority of Malaysia (LKIM) and some are managed by private sectors.

Oceanic Tuna – Indian Ocean

Malaysian International Tuna Port (MITP) is the only port that handles Oceanic Tuna landings from the Indian Ocean. The MITP is located in Penang and it is jointly managed by a private company and government agency (LKIM - Fisheries Development Authority of Malaysia)

Tuna Processing

Tuna processing activities such as canning and value added products are small in nature and insignificant and the most of tuna caught are consumed fresh. It is because; the fish consumption in Malaysia is relatively high.

Sales for canned tuna are relatively low as compared to other canned fish such as sardines and mackerels.

Some of the local tuna products processors are as below:

No.	Company	Products
1.	Rex Canning Sdn. Bhd. Kawasan Perindustrian Juru Seberang Perai Selatan Penang	Canned fish (Brand named : Rex, Cinta)
2.	Tropical Canning Corp. Sdn. Bhd. Jalan Mengkuang, Penanti Seberang Perai Utara Penang	Canned tuna (Brand named : TC Boy, Bintang, Tropical)
3.	Protigam Food Industries Sdn. Bhd. Jln. Chain Ferry Seberang Perai Tengah Penang	Canned Fish

National Mechanism And Responsible Agency

Department of Fisheries Malaysia (DOF)
Fisheries Development Authority of Malaysia (LKIM))

Regulation And Laws Related

Fisheries Act 1985 is commonly used in regards of fisheries matters.

National and International Guideline and Legislation

- Merchant shipping ordinance1952
- Code of conduct for responsible fisheries
- United Nations Convention of the Law of the Sea 1962
- Convention on Facilitation of International Marine Traffic (FAL) 1965
- International Convention on Load Lines, 1966 and Protocol of 1988
- International Convention on Tonnage Measurement of Ships 1969
- Convention on International Regulations for Preventing Collisions at Sea, 1972
- International Convention for the Prevention of Pollution from Ships 1973, as modified by its Protocols if 1978, MARPOL 73178
- International Convention for the Safety of Life at Sea (SOLAS) 1974

Issues In Collecting Tuna Fishery Information

The issues in collecting tuna fishery information are yet to be solved are as follows:

- Lack of staff / human capacity
- Lack of financial resources to conduct a tuna survey, etc.
- Lack of skilled staff in data collection (well trained)
- The need to strengthen the inter-agency coordination (with all the relevant agencies)
- Lack of appropriate and cost effective data collection systems

Conclusion and Recommendations

- Sufficient fund to conduct survey on resource and etc. and sufficient fund for collecting data.
- Well trained and skilled manpower in order to enhance the human capacity
- The development of comprehensive and standardized data collection system
- Complete training to relevant staff in data collection, analyzing data and etc.
- Full commitment and coordination with relevant agencies.

Tuna Stock Assessment

Traditionally stock assessment was based on aggregate data through a logbook system and routine sampling. However, fisheries scientists have realized that tagging experiments might be useful to solve certain issues related to the tuna resources management such as their migration routes and growth. Tuna tagging has provided during the last 30 years (in Pacific and Indian Ocean) a considerable amount of information on tuna biology and stock structure and is the basic tool for estimating the importance of interactions and competitions between fisheries as well as tuna population size and mortality rates (IPTP, 1988). According to Kleiber and Fonteneau (1991) the degree of interaction between fisheries depends on the exploitation rate, that is, the fraction of total population turnover that is due to fishing mortality. Interaction between geographically separated fisheries depends additionally on movement of fish from one fishing zone to another. Tagging data contain powerful information on both turnover and movement. Tagging experiments were also initiated in order to answer more specific questions relating to fishery interactions, yield-per-recruit and schooling behavior (Hampton, 1990).

The Malaysian Marine Fishery Resources Development and Management Department (MFRDMD) has carried out neritic tuna tagging programmes in 1990, 1992, 1994, 1996 and 1998 to provide information on migration and its growth.

Tuna Fishing

Fishing for neritic tunas such as *Euthynnus affinis*, *Thunnus tonggol* and *Auxis thazard* is mainly confined to the coasts of the Peninsular Malaysia, with only small fisheries off Sabah and Sarawak. This is due to the continental shelf areas being limited in both of these states. Fishing grounds here are generally deep which ranging from 200 m up to 2,000 m. Tuna catching on the east coast of Peninsular Malaysia is still predominantly an artisanal activity, where trolling is the major fishing gear for catching tuna. However, recently some landings are coming from commercial gears such as purse seine and longlines. In Sabah and Sarawak, most of the landings came from drift or gill-netters. Detailed descriptions of the fishing gears used to catch tunas in the South China Sea can be found in Okawara *et al.,* (1986).

Fishing survey conducted earlier by training vessel KL PAUS has shown that these areas were dwelled by oceanic tuna, species *Katsuwonus pelamis* and *Thunnus albacares* which are currently under exploited. Lack of technology and expertise among local fishermen has resulted in these resources being unexploited to their optimum level (MSY).

The neritic tuna species in Malaysia was found associate with any floating objects in sea. These floating objects could be floating logs or different types of Fish Aggregating Devices (FAD) (Sakri, 1991). Application of FAD has facilitate and increase efficiency for tuna fishing. FAD was made up with 4 major structures, namely bamboo tree (floating object), main line, coconut leaves and weight that were illustrated as Fig. 4. Sometimes Styrofoam floats are also used as floating objects. However the bamboo tree was more popular, because of low cost and its abundance in fishing villages. The main line was made of polyethylene (PE) size no. 12. Coconut leaves are also used as luring material; this normally decomposed after 2 weeks in water. It produces odor and ultimately developed an ecosystem, which attracted small fish as well as tuna. Usually sand bags are used as weight, to straighten the main line vertically in water. Some research works on FADs technologies were described by Sakri (1991) and Ahmad (2000).

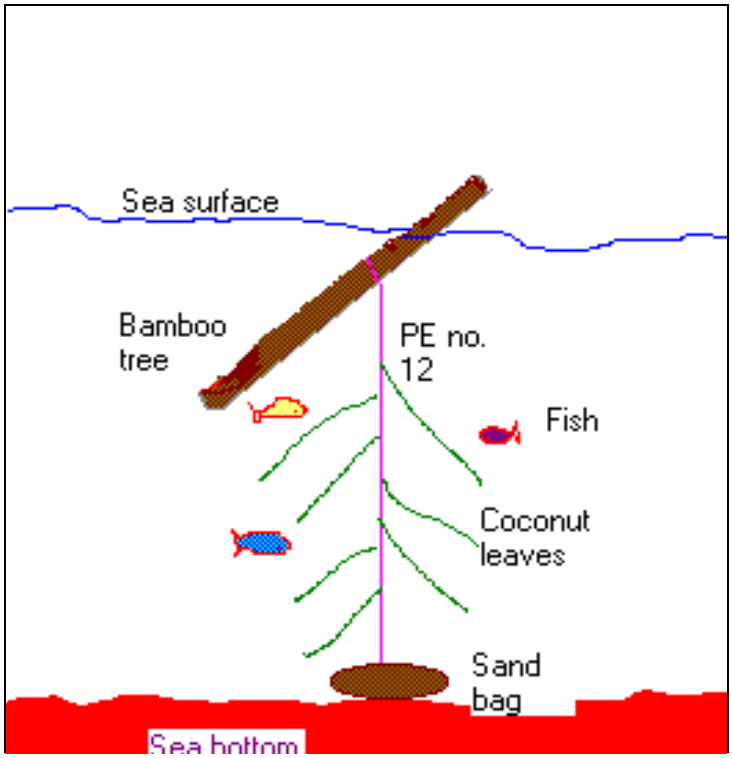


Figure 4. Structure of the traditional FAD used for pelagic fishing

REFERENCES

Ahmad, A, 2000. Ketahanan dan Keberkesanan Unjam Untuk Perikanan Rekreasi Marin. A Thesis Submitted in Fulfilment of the Requirements for The Master Science in The Faculty of Science and Technology, Kolej Universiti Terengganu, Universiti Putra Malaysia. 2000.

Collette, B. and C.E. Nauen, 1983. Scombrids of the world. FAO, Rome Italy. FAO species catalogue. Vol. 2. 137 p.

Hampton, J. 1990. Tag shedding by southern bluefin tuna *Thunnus maccoyii*. In *Fishery Bulletin*, Vol. 88. No. 2. 1990. pp 313-321.

Kleiber, P. and Fonteneau, A. (1991). Assessment of skipjack fishery interaction in the eastern tropical Atlantic using tagging data. In *Proceeding of the first FAO expert consultation on interactions of Pacific tuna fisheries*, Vol. 1. Interaction of Pacific tuna fisheries. 3-11 December 1991.

Malaysia**,** Ministry of Agriculture (2000-2009) *Annual Fisheries Statistics*. Kuala Lumpur: Ministry of Agriculture.

Okawara, M., A. Munprasit, Y. Theparoonrat, P. Masthawee, and B. Chokesanguan. 1986. Fishing gears and methods in Southeast Asia: 1. Thailand. Southeast Asian Fisheries Development Center, Training Dept. Bangkok: 327pp.

Raja Bidin, R.H. (1990). Preliminary result of tuna tagging programme in Malaysia. In *Proceeding of the fourth Southeast Asian Tuna Conference*, Bangkok, Thailand, 27-30 November 1990.

Raja Bidin R. H. and Richard R. (1992) . Some Aspect On Longtail and Kawakawa In Malaysia. In *Proceeding of the fifth Southeast Asian Tuna Conference*, General Santos Philippines 1-4 September 1992.

Raja Bidin, R.H. and Taupek, M.N.(1995). Status of fisheries exploitation and potential yield of neritic tuna in the region. Paper presented at the second regional workshop on shared stock in the South China Sea area, Kuala Terengganu, Malaysia 18-22 July 1995.

Raja Bidin, R.H., Ambak, M.A., Taupek, M.N., Sakri, I., and Khalid, S. 2001. Status and migration of neritic tuna in the waters off the east coast of Peninsular Malaysia. Paper presented at the 52nd Tuna Conference, California, USA 21-24 May 2001.

Richard, R. and Raja Bidin R. H. (1992) . Status Report For The Tuna Fishery Of Malaysia. Paper Presented at The Fifth Southeast Asian Tuna Conference, General Santos Philippines 1-4 September 1992.

Sakri, I. 1991. Proper Construction and Set Up of Malaysian Fish Aggregating Devices (unjam). A Thesis Submitted in Fulfilment of The Requirements For The Degree of Doctor of Philosophy in the Faculty of Fisheries and Marine Science, Universiti Pertanian Malaysia, 1991.

Annex 10

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Present Status of Off-shore Fishery Resources and Information on Tuna Fishery in MYANMAR.

By

Julius Kyaw

Department of Fisheries

MYANMAR

Introduction

This paper gives a quick overview of offshore or deep-sea fishery resources and highlights the current status and overall trends for big pelagic fish, deep-sea lobster, deep-sea shrimp, deep-sea squid and deep-sea fishes. Data and information from series of deep-sea fisheries research programs or experimental fishing programs are the main source for this paper.

The Union of Myanmar is situated on the mainland Southeast Asia and has a total land area 676,577 sq.km. It has a long coastline, which stretches approximately 3000 km. It shares common maritime boundaries with Bangladesh and India in the Bay of Bengal and with India and Thailand in the Andaman Sea. Myanmar Continental shelf covers an area of approximately 230,000 sq. km with a relatively wider portion in the central and southern parts. The exclusive economic zone (EEZ) is about 486,000 sq. km. Myanmar coastline can be divided into three coastal regions, the Rakhine Coastal Region, the Ayeyarwady and Gulf of Mottma (Gulf of Martaban) Region (the Delta Zone) and the Tanintharyi Coastal Region.

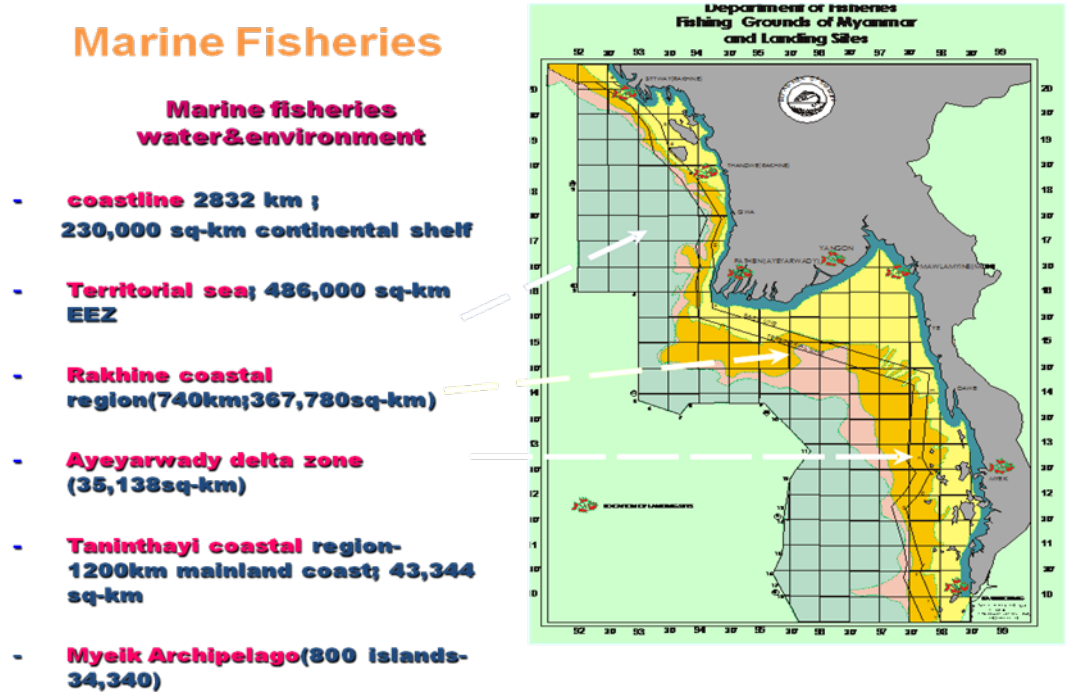
The Rakhine Coastal Zone stretches 740 km from the Naff River to Mawdin Point and covers an area of 367,780 sq. km. Bordering the Bay of Bengal with a narrow shelf and few islands. The upper part of the coastline is shallow and deltaic. The southern part is more or less rocky.

The Ayeyarwady Delta Zone lies between Mawdin point and the Gulf of Mottama (Gulf of Martaban). Ayeyarwady River enters the Andaman Sea by nine principal mouths together with Sittaung and Thanlwin Rivers. The Delta Zone lies at the central of the coastal zone with an area of 35,138 sq. km. Network of tributaries of the Ayeyarwady Rivers together with the Sittaung and Thanlwin deposited enormous quantities of sediments. The annual sediments discharge of the Ayeyarwady River has been estimated at 250 million tons. The delta is building seaward at the rate of 5 km every hundred years, and the seaward advance of the Gulf of Mottama at its 40 – meter depth contour is estimated at 35 km. every hundred years.

Tanintharyi Coastal Zone covers an area south of the Gulf of Mottama up to the mouth of Pakchan River and includes Myeik (Merguie) Archipelago and Andaman Sea. The length of the mainland coast is about 1200 km., and the total land area is about 43,344 sq. km.

The marine territorial extend about 486,000 square kilometres with Exclusive Economic Zone (EEZ) and provides considerable large fisheries resources. There are approximately 770 finfish species identified in Myanmar. Among these, 470 species are of marine species including 67 commercially important pelagic species. Several species remain to be identified.

Marine fisheries water of Myanmar



Physical characteristics of the offshore area

The Department of Fisheries of Myanmar has created an appropriate legal framework and has formulated and implemented various strategies for the sustainable development and management of marine fisheries. Myanmar endowed with huge fisheries potential marine waters in which fishing zones are located. The territorial fishing zones is within 12 nautical miles offshore from the baseline and the EEZ covers 200 nautical miles offshore from the baseline. The total marine fisheries area in Myanmar including exclusive economic zone (EEZ) is about 486,000 square kilometres.

From the marine fisheries surveys undertaken, it was noted that a biomass of about 1.0 million tones of pelagic fish and 0.8 million tones of demersal fish existed in Myanmar marine fishery waters. Out of this total biomass, 0.5 million tones of pelagic fish and 0.55 million tones of demersal fish (totaling 1.05 million tones of marine fish) were estimated as the Maximum Sustainable Yield, MSY.

Total Biomass and MSY in Myanmar Marine waters.

Area	Biomass			MSY		
	Demersal	Pelagic	Total	Demersal	Pelagic	Total
Rakhine	0.194	0.175	0.369	0.16	0.087	0.247
Delta (Yangon, Ayeyarwady, Mon)	0.334	0.505	0.839	0.22	0.252	0.472
Thanintharyi	0.256	0.295	0.551	0.17	0.147	0.317
Total	0.784	0.975	1.759	0.55	0.486	1.036

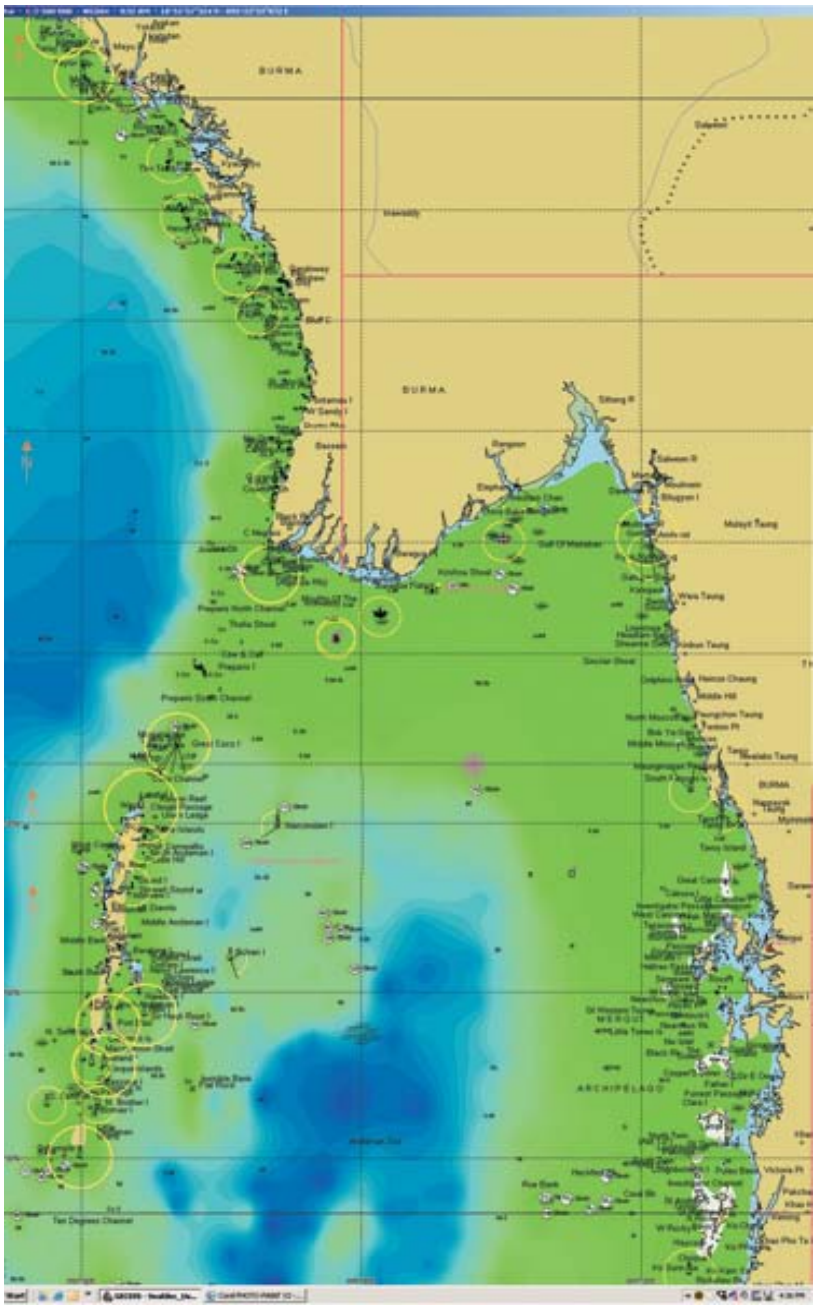
It is to be mentioned that the survey was conducted only within the 200 nautical mile depths (225,696 km^2) and more surveys are to be undertaken in the high seas.

The marine fish production from capture fisheries has reached maximum sustainable yield (MSY). The possible fish resources still available in order to increase production are the oceanic fish resources and the EEZ.

The EEZ of Myanmar occupies the eastern part of Bay of Bengal and northern part of Andaman Sea with area of about 486,000 square kilometres. The physical features of seabeds vary from the inshore to the deep sea. There are large areas of mangroves and coastal mudflats interphase with sandy beaches substrates in the inshore area. The continental shelf with an area of 230,000 sq-km slopes to 200- meter depth, while continental slope dips from 200 to 800 meters depth.

Within the EEZ of Myanmar with its diversity of habitats are rich in multi-species fish resources. Recent research surveys have indicated that one of the main fish resources that is abundance and still not fully exploited is the small pelagic fish. There is an urgent need to develop this resource to increase fish production from the deep sea.

Map showing Continental Shelf and Offshore areas.



Management arrangements of the offshore area

In Myanmar marine capture fisheries can be categorized into two main types, namely "inshore fisheries" and "offshore fisheries". Offshore fisheries mean the capture fisheries being operated active fishing gears (e.g. trawl nets, purse seine nets. etc) with fishing vessels more than thirty-feet in over all length and engine power more than 12 H.P. The offshore fishery fishing grounds are from outer area of demarcated in-shore fishery area to end of EEZ. (In-shore fishery areas are the area five nautical miles away from the shore in Rakhine coast and ten nautical miles away from Ayeyarwady and Tanintharyi coast.)

Number of National off-shore fishing vessels in Myanmar (2009-2010)

No	Type of Gear	Number of Vessels
1	Trawl	895
2	Purse seine	163
3	Stow net (Set Bag Net)	458
4	Drift Net (Gill net)	148
5	Long Line	3
6	Squid Cast Net	35
7	Fish Trap	112

Myanmar Government has promulgated "Law Relating to The Fishing Rights of Foreign Fishing Vessels (1989)" and "Myanmar Marine Fisheries Law(1990)". Under the marine fisheries law, the national fishermen are given priority to fish in all fishing zones. Local offshore fishing vessels are allowed to operate outer area of inshore to the territorial while the operating under fishing rights agreement and foreign joint venture company are allowed to fish from the territorial line to exclusive economic zone (EEZ)

The Department of Fisheries has established an appropriate legal framework and formulated and implemented various strategies for the sustainable development and management of marine fisheries. Fisheries management is pursued by proper licensing, prescribing exploitable species, designating environmental friendly fishing gears and

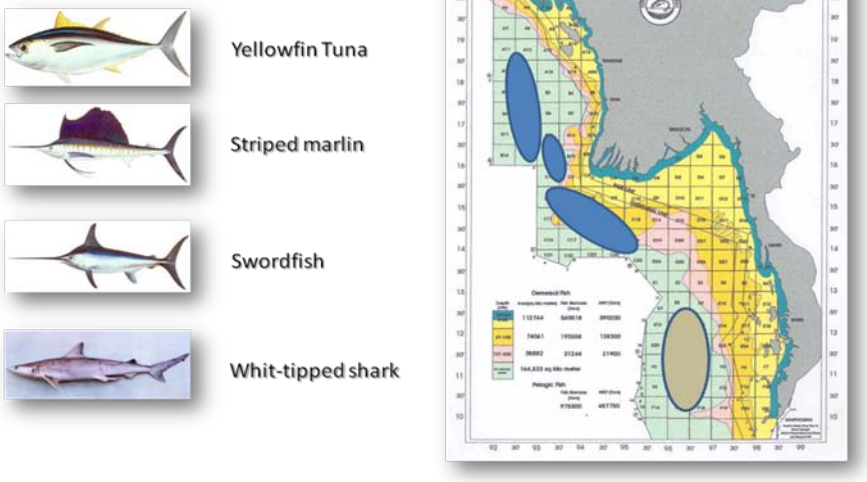
methods, imposing closed area and seasons, etc. The introduction of a Monitoring, Control and Surveillance (MCS) programme for fishery management is another measure taken up by DoF. This program should provide effective and efficient scientific data acquisition for resources evaluation and management of fisheries in Myanmar. It also provides the basis for effective monitoring and control of fisheries enforcement activities, to ensure that only authorized or licence-holding fishing vessels operate within the designated area in the national EEZ. Enforcement of fishing activities involves Myanmar Navy; Myanmar Coast Guard; Department of Fisheries; Myanmar Customs Department; and Myanmar Police Force. Overall, the Myanmar Navy coordinates surveillance efforts.

Since there are no fishing vessels working in high sea's areas, Myanmar has nothing to discuss about the management arrangement for our country's vessels outside EEZ in high sea area.

Research surveys and experimental fishing

Due to heavily exploited in coastal fisheries resources in the Southeast Asian region, the ASEAN-SEAFDEC program on Harvesting of under-exploited resources has been developed to support plan of action on sustainable fisheries for food security. Since Andaman Sea is assumed as one of the areas where fisheries resources are under-exploited, to investigate potential of large pelagic fish resources in Andaman Sea for a new fishing ground is also one of the main objectives in this program. Therefore, SEAFDEC proposed to conduct the joint research survey on Pelagic Fisheries Resources in the Andaman Sea where depth of water beyond 700 meters in 2004. Since the right of ownership of Andaman Sea belongs to 4 countries namely Indonesia, Malaysia, Myanmar and Thailand, the joint survey was conducted by scientists from theses countries except Malaysia.

This survey aims to investigate potential of large pelagic fish by using pelagic long line gear together with proper fishing technique and oceanographic parameters consideration. Determine the relative abundance and size composition of the commercially important species. The results from this survey indicated that some commercially important species, such as Swordfish (***Xiphias gladius***), Yellowfin Tuna (***Thunnus albacares***), Striped marlin (***Tetrapturus audax***) and Sainfish (***Istiophorus platypus*** **)** are inhabiting in Myanmar offshore waters. Bigeye Thresher (***Alopias pelagicus***), Whit-tipped shark (***Carcharhinus longimanus***), Escolar, Pelagic stingray (***Dasyatis sp:***), Common dolphin (***Coryphaena bipinnulata***) and Snake mackerel (***Gympylus surpens***) were also found as by-catch in this survey.



Tuna fishing ground of Myanmar.

The similar survey results were also found in 2007 when " The Collaborative Marine Fishery Resources Survey in Myanmar Water " was jointly conducted by scientists from SEAFDEC and Myanmar. From these two survey results, Swordfish is the most dominant species in Myanmar Offshore waters and it can be considered as one of the commercial fishes for offshore fisheries in future.

Commercial offshore fishing

The offshore fishery for large pelagic in Myanmar has initiated and developed gradually during the last decade, and is currently producing nearly 200 tons of fish per annum. Long lining in the Myanmar EEZ started with the issuing of experimental licenses to 12 freezer vessels in 1999-2000. Initially the catch rates were good and in 2001-2002 the number of licensed vessels rose to 110. The license fee collected for this fisheries is 30 US $ / GRT / Month. Currently, 48 vessels from two foreign fishing companies were still operating for tuna in the EEZ of Myanmar and India. According to " Law Relating to Fishing Rights for Foreign Fishing Vessels" tuna long-ling fishing operation is permitted only in the outside of the territorial sea in Myanmar EEZ to all fishing vessels. The target species for this fishery is Yellowfin tuna, even sword fish, marlin and sharks are caught as by catch.

Number of Foreign Tuna Long-line Fishing Vessel Engage in Myanmar Water and production (2000 – 2011)

Sr.No	Year	Number of Vessel	Production		
			Tuna (YF)	Other	Total
1	2003-2004	4	39.50	16.50	56.00
2	2004-2005	15	87.50	30.50	118.00
3	2005-2006	34	310.15	103.00	413.15
4	2006-2007	47	195.78	65.20	261.04
5	2007-2008	11	47.48	15.80	63.28
6	2008-2009	36	91.60	25.50	117.10
7	2009-2010	49	561.75	150.00	711.75
8	2010-2011	109	1123.50	648.50	1772.00

Foreign Tuna Long liner in Myanmar check point

Tuna Landing Site

All of the Tuna catch by foreign long line fishing vessel, they are not landing at Myanmar ports. There is no Tuna market in Myanmar. According to the size of Tuna, foreign Tuna fishing vessels are landed/ sale at as follow;

No	Size of Tuna	Landed / Export Countries
1	15 – 20 Kg	Phuket, Thailand and Penang, Malaysia
2	21 – 28 Kg	Phuket, Thailand and Penang, Malaysia
3	28 – 30 Kg	Phuket, Thailand and Penang, Malaysia
4	Over 30 Kg	To Japan

Technological feasibility

Since only foreign fishing vessels is operating in the offshore zones of Myanmar, there is no fishing vessels and fishing gears which are suitable for offshore or deep-sea fishing in Myanmar national yet. Currently, most of the fishing vessels are operating in the waters less than 100-meter depth, due to lack of technology, lack of suitable fishing gear, and lack of fisheries resources information. In this regards, appropriate fishing technology, fishing gear and fishing vessels are the major constraints for the development of offshore fisheries or deep-sea fisheries in Myanmar.

Constrain

Due to inadequate facilities for undertaking effective monitoring control and surveillance (MCS) illegal fishing activities are prevalent. In marine fisheries, the most common incident is fishing in undesignated fishing ground. Other offences are contravention of the reporting procedure, over limited fishing day, transhipment at the sea and encroachment of fishing vessels. In inshore fisheries and inland fisheries, fisher can easily fish using traditional method everywhere which water exist. Poverty and lack of knowledge drives illegal fishing in these fisheries. DOF uncover the IUU fishing because of lack of manpower, difficult transporting and long and vast area.

IUU fishing vessels are seized by Coast Guard in Myanmar water.(2010-2011)

Sr.No	Name of vessels	Remark
1	PANUTAN-1	IUU
2	HUNG FA NO-128	"
3	SURYA TERBIT- 02	'
4	SURYA TERBIT – 98	'
5	HER YIFA CT – 3-4779	'
6	MING JING YIH CT-3-4738	'
7	KM FAVORIT	'
8	LESTARE WIJAYA – 28	'
9	KM REHAN – 105	'
10	KARYA WIJAYA - 201	'

Conclusions

Today the world is facing with many fisheries issues, such as over-fishing, over-fishing capacity, decreasing of fishery resources, decreasing of fish landing, etc. in many areas of coastal zones. In this regards, offshore or deep-sea areas is the only promising areas for sustainable fisheries development and food security for the present and new generation in very near future. For this reasons, almost all of the coastal states are considering to seek good opportunities from their EEZ to exploited offshore or deep-sea fishery resources for sustainable fisheries development and food security for their people as well as people from the whole world.

Since offshore fisheries / deep-sea fisheries is still experimental scale Myanmar there is not very much to say about this. According to the results obtained from the series of resources survey research program and experimental fishing program for offshore fisheries or deep sea fisheries in last two decades, we are sure that some commercially important offshore / deep-sea fish resources, such as tuna, sword fish, marlin, deep-sea lobster, deep-sea shrimp, deep-sea squid, grouper, snapper. etc is existing in Myanmar waters. All these

living resources are still in underexploited and it is a good potential for sustainable fisheries development and food security for the people in Myanmar as well as people from the whole world in very near future.

Since offshore fisheries or deep-sea fisheries is existing in the deep sea and far away from the shore, facilities, infrastructure and technologies for fishing vessels and fishing gears are more complicated and more costly than coastal fisheries. In this regards, more investment and human resources are needed to fulfil these requirements. Processing, handling, trading, marketing, etc for this fisheries are also needed to change according to its requirements. All these issues are great challenges for developing country like Myanmar.

To exploit underutilized fishery resources from offshore or deep-sea of Myanmar for sustainable fisheries development and food security for the people in this region, Myanmar will try to make good coordination and cooperation with international / regional organizations, such as ASEAN, BIMSTEC, FAO, SEAFDEC, etc. to obtain technologies, knowledge and experiences. Foreign investment and joint venture program with foreign fishing vessels will also invite according to our fisheries laws and investment law to develop this fisheries in Myanmar.

Annex 11

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Philippine Initiatives Concerning Tuna Information Collection/Reporting

By

Elaine G. Garvilles
Asst. Tuna Coordinator of the National Fisheries Research and Development Institute (NFRDI)
Philippine

1

Overview

- Fishery is a key component of the Philippine economy
- Over 1M people of the country's labor force depend on fishery for livelihood
- The fishing industry's contribution to the Philippine economy:
  - ✓an average of 4% to GDP
  - ✓ 19% to gross value added in agriculture, fishery and forestry

2

Overview

- **Municipal Sector**
  - ✓ vessels < 3 GT
  - ✓ under the jurisdiction of the Local Government Units (LGUs)
  - ✓ number of municipal vessels is not well documented
- **Commercial Sector**
  - ✓ vessels > 3GT)
  - ✓ fish beyond 15km off the shoreline
  - ✓ secure commercial fishing vessel and gear license (CFVGL) at BFAR
- RA 9379 or the Handline Fishing Law
  - ✓ gives a separate category for the handline vessels

3

Philippine Tuna Fleet registered in WCPFC

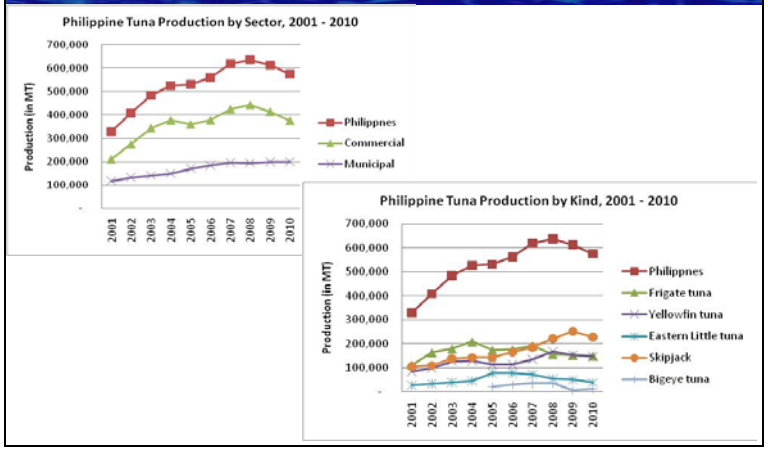
Source: WCPFC Website, as of 12 April 2011

Type of Vessel	Number of Vessels Registered				Fishing Ground	Target Species	By-Catch Species
	<250 GT	> 250GT	>500GT	Total			
Longline	7	8	9	**24**	WCPO/ Phil EEZ	Yellowfin tuna	
Handline	1			**1**	WCPO/ Phil EEZ	Yellowfin tuna, marlin	Opah, swordfish, sailfish
Purse Seine	66	36	28	**130**	WCPO/ Phil EEZ	Skipjack tuna & other small pelagics	
Fishing Vessel (not specified)	8	2	1	**11**	WCPO/ Phil EEZ	Skipjack tuna & other small pelagics	
Multi-purpose Vessel	8			**8**	WCPO/ Phil EEZ		
Bunker			1	**1**			
Fish Carrier	111	51	26	**188**			
Support Vessel	242	4	4	**250**			
Total	**443**	**101**	**69**	**613**			

4

Philippine Tuna Production, 2001 - 2010

Source: BAS



5

Tuna exports by commodity, 2006 –2010

Source: NSO data, in BAS Fisheries Statistics for 2006 – 2010

Tuna commodity, by volume (MT)	2006	2007	2008	2009	2010
Fresh/chilled/frozen	24,406	26,854	32,365	23,504	33,688
Dried/smoked	42	0.4	17		
Canned	45,611	48,284	76,910	83,604	76,801
TOTAL VALUE (million USD)	136.05	218.55	395.94	346.40	359.38

6

Major landing site/s of tuna and tuna-like species

- BAS suggests that in 2001 there are about 8,455 landing centers
  - ✓ commercial – 455
  - ✓ municipal - 8,000

- General Santos City
  - ✓ major tuna landing area
  - ✓ also known as the tuna capital of the Philippines
  - ✓ For 2010, General Santos City Fishport Complex caters 143,000MT of fish unloading majority of the unloaded catch are mainly tuna and tuna-like species (~80%).

7

Major landing site/s of tuna and tuna-like species

- Other tuna landing areas:
  - ✓ Pangasinan and La Union
  - ✓ Zambales
  - ✓ Palawan
  - ✓ Mindoro Occidental
  - ✓ Bicol
  - ✓ Aklan, Iloilo and Antique
  - ✓ Eastern Samar
  - ✓ Zamboanga
  - ✓ Davao
  - ✓ Surigao del Sur
  - ✓ Sulu
  - ✓ Maguindanao

8

Estimated number of tuna processing units and their capacity

- Seven (7) tuna canneries operational in the Philippines:
  - six (6) of which are in General Santos City
    - ✓General Tuna Corporation
    - ✓ Alliance Tuna International Inc.
    - ✓ Ocean Canning Corporation
    - ✓ PhilBest Canning Corporation
    - ✓ Seatrade Canning Corporation
    - ✓Celebes Canning Corporation
  - one (1) in Zamboanga
    - ✓ Permex Canning Corporation
  - total production capacity :
    - ✓900 – 1,000 metric tons per day

9

National mechanism and responsible agency for collecting tuna data/information

- **Bureau of Fisheries and Aquatic Resources (BFAR)**

  ✓ In 1997, the National Stock Assessment Program (NSAP) started. The aim of the program is to provide scientific information to support sustainable management of aquatic resources in the country, as a response to lack of standardized and continuous information on the fishery resources.

  ✓ In 2008 BFAR launched the catch documentation scheme:
  - PS and RN logsheet data
  - Cannery unloading data

10

National mechanism and responsible agency for collecting tuna data/information

- **Bureau of Fisheries and Aquatic Resources (BFAR)**

  ✓ In 2010, BFAR also issues catch certificates in compliance to EU export requirements which also includes catch information.

  ✓ Fisheries Observer Program (FOP)

  ✓ BFAR is also responsible for the issuance
  - Certificate of Fishing Vessels and Gear License (CFVGL)
  - International Fishing Permit (IFP)
  - Renewal of licence is done every three (3) years.

11

National mechanism and responsible agency for collecting tuna data/information

- **Bureau of Agricultural Statistics (BAS)**

  ✓ Executive Order 116 transferred the responsibility of generating statistics for the fisheries sector to BAS from BFAR.

  ✓ 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.

  ✓ Tuna statistics is only part of the overall activity.

12

National mechanism and responsible agency for collecting tuna data/information

- **Bureau of Agricultural Statistics (BAS)**

  ✓ In generating estimates of the volume and value of production from the diverse and complex fisheries sector, BAS carries out :

  - ❖ **probability survey** *(stratified random sampling by data collectors)* and
  - ❖ **non-probability survey** *(interviews by BAS staff)*

  ✓ supplemented by secondary data from administrative sources like PFDA landings

13

National mechanism and responsible agency for collecting tuna data/information

- **Bureau of Agricultural Statistics (BAS)**

  ✓ Survey data are reviewed initially

  - ❖ at the **provincial level**
  - ❖ at **the regional level** on a quarterly basis with the involvement of PFDA, regional BFAR staff and key informants from the sectors.
  - ❖ **National Review** is also conducted quarterly at the Central Office with the regional BAS Statistical officers.

✓The main problem with the present monitoring system is obviously the lack of adequate funding to properly carry out detailed probability surveys. This raises an issue on how seasonal variations/effects are accounted in the estimates.

14

National mechanism and responsible agency for collecting tuna data/information

- **Philippine Fisheries Development Authority (PFDA)**

  ✓ Since 1976, PFDA has been mandated to support fishing industry development by providing fish ports, post-harvest facilities, ice plants, cold storage and other facilities, in support to handling and distribution of fishery products.

  ✓At present, there are seven major ports managed by PFDA (Navotas, Iloilo, Zamboanga, Lucena, Sual, Davao and General Santos)

  ✓Data on the volume of catch by species and value are also collected in the PFDA managed ports.

15

National mechanism and responsible agency for collecting tuna data/information

- **Maritime Industry Authority (MARINA) and**
- **Philippine Coast Guard**

  ✓ The Maritime Industry Authority under the Department of Transportation and Communication (DOTC) approves **the registration of Philippine flag vessels of more than 3 GT** that operates in the country.

  ✓ MARINA maintains a list of registered Philippine fishing vessels.

  ✓After the approval of MARINA registration, vessels are required to secure a **certificate of inspection and registration of homeport** issued by the **Philippine Coast Guard**.

16

National mechanism and responsible agency for collecting tuna data/information

- **National Statistics Office (NSO)**

✓maintains the official statistics on fishery exports and imports in the Philippines.

❖classified by standard categories by species and value

✓ also provides information vital to monitoring product flows and corroborating production figures

✓ responsible for conducting national census every ten (10) years

17

National mechanism and responsible agency for collecting tuna data/information

- **Tuna Canners Association of the Philippines (TCAP)**

✓ maintains and distributes statistics on tuna cannery production

✓ tuna canneries consume over 250,000 tons of tuna per year, mostly from Philippine vessels operating outside the Philippine waters.

18

National mechanism and responsible agency for collecting tuna data/information

- **SOCSKSARGEN Federation of Fishing and Allied Industries, Inc. (SFFAII)**

✓ main mandate of the federation is to unite the diverse subsectors of the tuna industry, serve as forum to discuss problems and how to resolve them, and the key voice of the local tuna fishery in lobbying for policy reforms and other concerns that affect the industry.

✓SFFAII is also helping improve tuna fisheries statistics within its area of influence.

19

National mechanism and responsible agency for collecting tuna data/information

- **Fisheries Technical Working Group (FTWG)**

✓ This group was formed in 2000 involving three agencies under the Department of Agriculture (DA), namely, BAS, BFAR and PFDA.

✓ This group was formed to look into the issues and concerns related to fisheries statistics.

✓At present the group, meet on an ad hoc basis, but could play a very useful role in coordination of activities of the three agencies relating to fisheries statistics.

20

Regulation and laws related to management of tuna fisheries

- **Philippine Fisheries Code of 1998 (RA 8550)**
- **Fisheries Administrative Orders (FAO):**

  FAO NO. 236: Series of 2010
  Rules and Regulations on the Operations of Purse Seine and Ring Net Vessels Using Fish Aggregating Devices (FADs) locally known as *Payaos* during the FAD Closure Period as Compatible Measures to WCFPC CMM 2008-01

  FAO NO. 233: Series of 2010
  Aquatic Wildlife Conservation

  FAO NO. 226: Series of 2008
  Regulation on the Mesh Size of Tuna Purse Seine Nets and Trading of Small Tuna

21

Regulation and laws related to management of tuna fisheries in your country

FAO NO. 224: Series of 2004
Establishment of Tuna Productivity Project in Davao Gulf

FAO NO. 198: Series of 2000
Rules and Regulations on Commercial Fishing

FAO NO. 188: Series of 1993
Regulations governing the operation of commercial fishing boats in Philippine waters using Tuna Purse Seine Nets.

- **National Plans**
  - ✓ National Tuna Management Plan
  - ✓ National Plan of Action to Deter Illegal, Unreported and Unregulated Fishing (NPOA-IUUF)
  - ✓ National Tuna Fish Aggregating Device (FAD) Policy of the Philippines *(Draft)*

22

Conclusions and Recommendations

➢ **Funding Support:** There is a need to look for alternative funding to support various activities such as:

- ✓ i) expansion of National Stock Assessment Program activities and sustain ongoing activities;
- ✓ ii) conduct national inventory on the number of fishing vessels and gears engaged in tuna fishing activities; and
- ✓ iii) conduct training/s for enumerators, observers and key data informants on species identification and data gathering protocols.
- ✓ There is also a need to augment the budget of the Bureau of Agricultural Statistics (BAS) to introduce the improved sampling frame/questionnaires and to conduct probability surveys that will help generate better catch estimates.

23

Conclusions and Recommendations

➢ **Support and Cooperation from Industry Stakeholders**

- ✓ There is a need for continued coordination, support and cooperation from industry stakeholders on the
  - ❖ implementation of fisheries observer activities,
  - ❖ timely provision of operational logsheets and cannery unloading data to BFAR-NFRDI.

24

Conclusions and Recommendations

- **Capacity Building**
  - ✓ There is a need to support activities that will develop skills of enumerators, observers and BAS key data informants on species identification and data gathering protocols.
  - ✓ There is also a need to enhance capability of fisheries data coordinators to conduct data audit on port sampling data, logsheets data and observer data to improve data quality.
- **Establishment of Database**
  - ✓ There is need to develop or further enhance database systems to cater the needs of end-users.

25

Conclusions and Recommendations

- **Annual Tuna Catch Estimates Review Workshop**
  - ✓ There is a need for continued support and cooperation from various agencies (BFAR-NFRDI, BAS, PFDA, NGOs) and industry to support the conduct of annual tuna catch estimates review workshop to come-up with best possible catch estimates by species and gear type and to exclude catches of foreign-flag vessels that are unloaded in the Philippines which at present are accounted in the national fisheries statistics.

26

Conclusions and Recommendations

- **Increase Coverage of Data Collection**
  - ✓ It is envisage that logsheets data provision should cover not just the purse seine and ringnet vessels but also other tuna fishing gears in the future.
  - ✓ The Fisheries Observer Program (FOP) is also expected to cover more fishing operations with industry's cooperation and support even outside the prescribe closure period.

27

Conclusions and Recommendations

- **Data Sharing and Integration**
  - ✓ BFAR-NFRDI and BAS in the future should collaborate to use the aggregated catch data generated from logsheets and fisheries observer program (FOP) as basis for generating better tuna catch estimates.
  - ✓ Data from the National Stock Assessment Program (NSAP) should be effectively integrated in the sampling/monitoring system of the Bureau of Agriculture Statistics (BAS) to improve tuna statistics.
  - ✓ There is a need for BAS, BFAR-NFRDI and other interested parties to explore the possibility of developing a proposal to conduct better survey methodology for the municipal fisheries sector to accurately determine the level of tuna catch by species and gear.

28

Annex 12

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Improvement of Tuna Information and Data Collection in Thailand

By

Praulai Nootmorn

Department of Fisheries

Thailand

Improvement of Tuna Information and Data Collection in Thailand

Praulai Nootmorn[1]Thumawadee Jaiyen[2] and Supachai Rodpradit[2]

[1] Marine Fisheries Research and Technological Development Institute

Kaset-Klang, BangKhen, Bangkok 10900 Thailand

E-mail: nootmorn@yahoo.com

[2]AndamanSea Fisheries Research and DevelopmentCenter

Muang District, Phuket 83000 Thailand

1. Introduction

Rapid development of Thailand's fisheries in the past two decades has successfully put the country into the world's frontrunner in fishery industry. In 2007, total fishery production was 3 million tons, marine fishery accounted for 56% of the total production, of which from the Gulf of Thailand had 70% share and the AndamanSea contributed 30% of capture. Nevertheless, the leap and bound of fishery development has led to fishery resources over exploitation particularly demersal fishes and invertebrates. At the same time, catch of pelagic fish population has increased significantly. During the period of 1985-2008, the share of pelagic fish accounted for 24%-36% of the marine fishery harvest. The Gulf of Thailand and AndamanSea were 394,792-700,149 tons and 59,428-309,814 tons, respectively.

Among these, neritic tuna are gaining more important economically. They had become the main target species for Thai fishermen since 1982 because of attractive prices offered by tuna canneries. According to Department of Fisheries (DOF) statistics, figure 1 show the trend of neritic tuna in Thai waters. The total catches of neritic tunas (King mackerel, Longtail tuna and Kawakawa) in Thailand was 138,075 tons in 1996, then the trend of catch was decline until 2001 (116,454 tons), and climbed up again from 2002 (130,770 tons) to 2005 (166,946 tons) and declined again during 2006 to 2008 (148,392 to 46,646 tons). Catch from the Gulf of Thailand show increasing since 1996 to 2005 and decline during 2006 to 2008 (131,423 to 32,081 tons), however the catch from Andaman Sea was decreased since 1997 to 2008 (DOF; 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1995, 1996, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009 and 2010). Presently, Thailand is the main supplier of canned tuna to foreign markets throughout the world. Anyhow, the rapid development may lead to the deterioration of tuna fisheries in Thailand. Thus, the studies on tuna stock urgent in finding out the current problems, situation occurred and status of tuna fish in Thailand.

Data collection

(1) Availability of census

The National Statistical Office, with collaboration of DOF, conducts the marine fisheries census every 10 years. The latest marine fisheries census was conducted in 1995. In 2000, their conducted 2000 Intercensus Survey of Marine Fishery.

Fishermen and fishing companies must register their fishing vessels to the Harbor Department (at present their have changed to be Marine Department), the

Ministry of Transportation, if their vessels are larger than 10m long. Fishermen and fishing companies also must register their fishing gears to the Provincial Fisheries Office every year to get fishing permission for vessels of any size, although many of them do not register their small vessels. The registration of trawling vessels (otter board trawl, pair trawl, beam trawl and push net) is conducted more strictly than other types of fishing gear, as DOF is controlling the number of trawling vessels in an attempt to avoid over-exploitation of demersal resources. In the decentralization policy by the Thai government, Sub-district (Tumbon) Offices, instead of Provincial Fisheries Offices, will take over responsibility of fishing vessel registration and collection of registration fee from 2004.

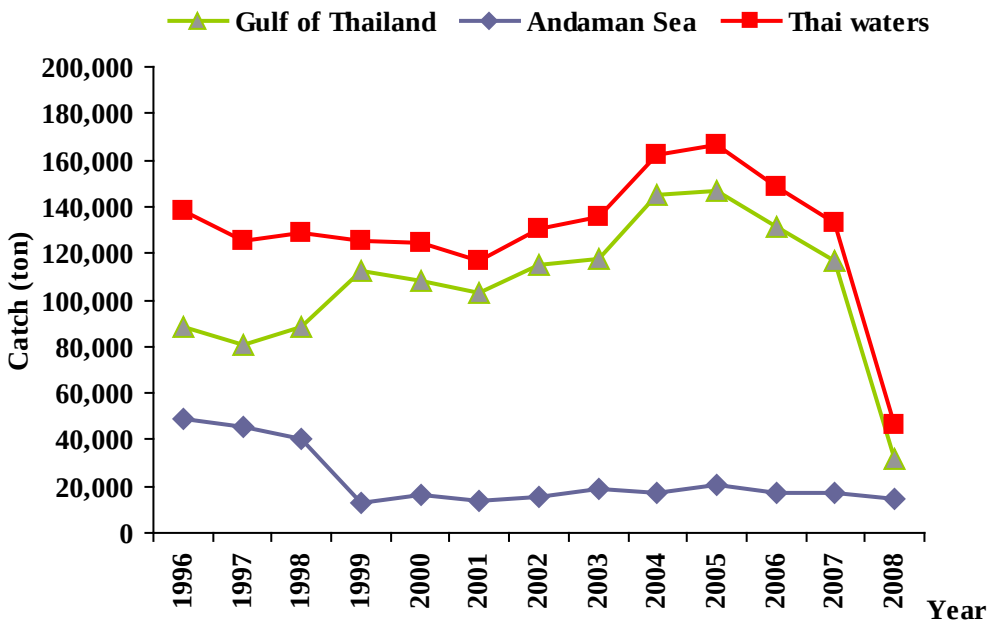


Figure 1. Neritic tuna and seer fish catch production in Thai Waters during 1996 to 2008.

(2) Type and source of data collected and coverage of fisheries

There are two organizations that are collecting, processing, analyzing, and reporting fish landing data, namely, the Fisheries Statistics Analysis and Research Group (FSARG) and Marine Fisheries Research and Development Bureau (MFRDB). FSARG is collecting data throughout the country, for national fisheries statistics, while MFRDB is collecting data of large to middle-scale fisheries in Thai Waters for research purpose.

The main landing places of marine fisheries are located at 19 provinces, namely:

South Thai (Gulf of Thailand); Pattani, Songkhla, Nakhorn Si Thammarat, SuratThani, Chumphon.

South Thai (AndamanSea); Ranong, Phangnga, Phuket, Krabi, Trang, Satun

Central Thai; PrachupKhiri Khan, Chonburi, Samutprakan, Samutsakhon, Phetchaburi

East Thai; Rayong, Chanthaburi, Trat

Annex 1 illustrates the fishing grounds of Thai fishing vessels covering Thai waters and adjacent waters of Cambodia, Vietnam, Malaysia, Myanmar, Indonesia and India.

FSARG survey for national fisheries statistics

FSARG is collecting two types of data in collaboration with Provincial Fisheries Offices, namely, (a) marine fisheries statistics based on the sample survey (logbook survey) and (b) marine fisheries statistics by landing place.

Marine fisheries statistics based on the sample survey means that landing of a fishing vessel (distinguished to be sample) is counted on the province where her fishing gear is registered wherever the vessel actually landing her catches. Survey on this type of data is conducted by logbook survey for large to middle-scale fisheries FSARG started this survey in 1964.

Marine fisheries statistics by landing place means that landing of a fishing vessel is counted on the landing place where she actually unloads her catch. FSARG has been conducting the survey of this type at 37 selected landing places along Thai coasts since 1974.

(a) Marine fisheries statistics based on the sample survey (logbook survey)

In vessel sampling survey for large-scale fisheries, FSARG samples vessels at the following sample rate for each fishing gear based on the Fishing Vessels Registration Statistics of the year.

Otter board trawl	<14m long	10%
	14-18m long	10%
	19-25m long	10%
	>25m long	15%
Pair trawl	<14m long	30%
	14-18m long	10%
	>18m long	15%
Beam trawl		30%
Purse seine		10%
Anchovy purse seine		10%

King mackerel gill net	10%
Mackerel encircling gill net	15%
Push net	15%
Bamboo stake trap	15%

The sampling rate is decided based on the variation of catches of each fishing gear. Random sampling is employed for selecting sample vessels in principle. However, when the owner of a vessel is not cooperative to the statistical survey, that vessel is not sampled. The list of vessels sampled in this way for each province is sent to respective Provincial Fisheries Office.

The enumerator of the Provincial Fisheries Office visits owners of sampled fishing vessel monthly and fills the datasheet prepared by FSARG. When the enumerator is not able to obtain sufficient data by the interview survey, he/she collects Fish Tickets (records of fish landing prepared by fish traders who buy fish from the owner, fish brokers who intermediate fish trade between fishermen and fish trader, or Fish Marketing Organization or Fishermen's Cooperatives who manages fish landing places) to obtain further information to fill the datasheet. In many cases, only records in Fish Tickets are available later.

(b) Marine fisheries statistics by landing place

FSARG has selected 37 major landing places along Thai coasts (Annex 2). Provincial enumerators collect data on amount and value by species landed at selected landing places one from the Fish Marketing Organization who controls fish trade at landing places and other landing places are selected from copy Fish Tickets. FSARG will use the statistic data of this survey for the cross-check with total marine production of Fisheries Statistics of Thailand. The coverage percentage of this method will be 14 % of total landing.

<u>MFRDB survey for fisheries resource research</u>

MFRDB is conducting two types of landing statistics survey, namely (a) survey on landings by Thai vessels, and (b) survey on landing by foreign vessels.

(a) Survey on landing of Thai purse seine and trawl vessels

(i) Purse seine: MFRDB has been conducting landing survey on local purse seine from 1985 to present at 22 major landing places along Thai coasts. There are eight type local purse seine in Thailand, namely, Thai purse seine (TPS), Light luring purse seine (LPS), purse seine with payoa (FADs), Chinese purse seine (CPS), Green purse seine (GPS), Tuna purse seine (TUNA), anchovy light luring purse seine (APS) and Anchovy falling net (AFN). Survey team members will visit each landing place once a month and interview master fishermen to obtain information such as vessel name, fishing gear, fishing days, total weight and species composition of catch. They collect the pelagic fish sample, including neritic tuna sample from the landing and take measurement of total length/fork length. They collect the fish landing records monthly from the Fish Market Organization, who owns and manages the landing place; to obtain data on the total number of vessels unloaded their

catches and total weight of fish landed by species for each fishing gear. From the landing records, they also obtain data of monthly landed weight of fish by species for each fishing vessel.

(ii) Trawl: MFRDB has been conducting landing survey on local trawler from 1973 to present. There are three type local trawler in Thailand, namely, otter board trawl, pair trawl and baby-bream trawl. Since 2000, the survey has been conducting along the Thai coasts (20 landing places). The largest in fish composition for trawler is trash fish which is composed of juvenile/young of economic fish and true trash fish, followed by demersal fish, cephalopods, pelagic fish, shrimp and other invertebrate species. The neritic tuna are unable caught by the trawler.

(b) Survey on landing by foreign vessels

(i) Industrial Tuna purse seine: Industrial tuna purse seine vessels (foreign vessels and a Thai vessel which was operated only during 1998-2001) started to land their catches at Phuket since 1993. In recent years, the number of industrial tuna purse seine vessels operating in the Eastern Indian Ocean has declined and only one Japanese research vessel "Nippon Maru" is operated there and land her catches at Phuket in 2001.

Andaman Sea Fisheries Research and Development Center (AFRDEC) has been conducting port sampling and landing survey on those industrial tuna purse seine vessels at Phuket deep-sea port since 1993. The logsheet of AFRDEC's data collection includes information concerning vessel (name, flag, and registration number), the port of unloading, the vessel's agent in the port of unloading, the dates of unloading, fishing days per trip, and the amount and value of the fish unloaded by species. The logsheet was improved in 1999 to include information related to fishing trips and fishing operation. The trip data include the dates and ports of departure and return, and the number of net shooting per trip. The operation data include the time, location, and target species for each net shooting.

AFRDEC also collects some specimen from the landed catches and conducts detail biological examination, including measurements of fork length and weight, stomach contents, determination of sex and reproductive stage and otolith taking.

(ii) Tuna longline: Tuna longline vessels of Taiwan, China and Indonesia started to unload their catches at Phuket fishing port in 1994, 1996 and 1999, respectively. AFRDEC has been conducting landing and biological data collection on tuna, tuna-like and by-catch species unloaded by those tuna longline vessels. The data collection includes vessel information (name, flag and registration number), fishing ground, vessel's agent, date of unloading, and amount and value of fish unloaded by species. AFRDEC collects data and related information through interviewing master fishermen, checking records of the agent, Fish Marketing Organization and Custom Office of Phuket. In addition, AFRDEC issues the "Certificate of Origin" based on those data and information.

(3) Data collected at the primary level

FSARG survey

(a) Species/aggregation

FSARG has classified fish and shellfish into 60 species and groups as shown in the list attached as Annex 3. The list includes only 3 species of neritic tuna and tuna like species, namely, king mackerel, longtail tuna and eastern little tuna. Thai fishing vessels catch young oceanic tuna only accidentally in negligible quantity.

(b) Weight/number, size-frequency
FSARG collects only data on weight and value landed by species.

(c) Effort
FSARG is collecting data on fishing day, number of fishing operation and fishing hours per trip, as well as size of fishing gear, as effort data. Those effort data are shown in the Marine Fisheries Statistics Base on the Sample Survey.

MRFDB survey

(a) Species/aggregation
Fish species caught by local purse seiner and trawler are classified into 24 and 324 species /groups, respectively.

Fish species caught by foreign vessels are classified into species level as species composition of their catch is simple except for sharks which are aggregated as "sharks" whatever species are included.

(b) Weight/number, size frequency
MRFDB obtains data of total weight by species in all surveys. Furthermore, they obtain weight and length data for specimens collected from landed fish. Therefore, size frequency data is available for tuna and tuna-like species.

(c) Effort
MRFDB obtains number of fishing trips, fishing-days and fishing operations for Thai purse seiners, while number of fishing trips, fishing day, fishing operation and fishing hours for Thai trawlers.

For foreign longliner, AFRDEC obtains number of trips and day per trip, while number of trip, day per trip, and operation by fishing ground for foreign purse seiner.

Data processing and reporting

FSARG survey

Each Provincial Fisheries Office sends all datasheets filled by the enumerator or person in charge to FSARG at Bangkok. Staffs of FSARG input those data into computers and processes by methods shown in Annexes 4 to 6. FSARG produces five publications each year, namely, Fisheries Statistics of Thailand, Marine Fisheries Statistics Base on the Sample Survey, The Landing Place Survey and Thai Fishing Vessels Statistics and Fishing Community Production Survey. Those publications are distributed to all DOF organizations.

MRFDB survey

All data collected by staffs of MRFDB are input, processed and analyzed by methods shown in Annex 7 while reported and published as the technical paper of MRFDB.

2. Data collection based on the enumerator at the selected tuna landing sites from January 2009 to April 2010 from domestic fleets

Landing survey was conducted to collect fishing information of tuna, tuna-like and by-catch species: e.g., type of fishing gears, catch (tons), effort (number of trip). The staffs of MFRDB and FMO have conducted the samplings monthly at SamutPrakarn, Samutsakhon, PrachupKhiri Khan, Chonburi, Chanthaburi, Trat, Pattani, Rayong, Songkhlaand Phetchaburi Provinces in the Gulf of Thailand for neritic tuna from domestic fishing vessel, whereas neritic tuna from domestic fishing vessel have conducted the sampling monthly at Ranong, Phang-Nga, Phuket, Krabi, Trang and Satun Provinces. In addition, oceanic tuna from foreign fishing vessels was conducted to collect data information at PhuketProvince. The methodology employed and all the forms used in fishery interviews same as the above mention.

Purse seine

Gulf of Thailand: Four species of neritic tuna, namely Longtail tuna (*Thunnustonggol*), Kawakawa (*Euthynnusaffinis*) and Frigate tuna (*Auxisthazard*)and Bullet tuna (*Auxisrochei*)caught from TUNA, TPS, FADs, APS LPS and AFN in 10 fishing grounds (1-5, A, B, BA, BB and BC) show in the Annex 1.Longtail tuna was the highest abundance in the Gulf of Thailand, followed by Kawakawa. The main fishing ground of Longtail tuna and Kawakawa in area BB caught from TUNA, in June 2009 and September 2009 show the highest catch as 1,182 and 696 tons, respectively. Frigate tuna caught in areas 1-5, A and B while show the high abundance in area5 fromFADs in April 2009 (Table 1).

Table 1 Catch (tons) and percentage of tuna by type of fishing gears in the Gulf of Thailandduring January 2009 to April 2010.

Gear	Frigate Tuna	Kawakawa	Skipjack Tuna	Bullet Tuna	Longtail Tuna	Total	%
AFN	5.87	0.47	0.00	0.00	5.73	12.07	0.034
APS	2.64	5.84	0.00	0.00	1.46	9.94	0.028
FADs	133.72	149.82	0.00	0.20	15.84	299.58	0.835
LPS	15.28	2,169.21	0.00	0.00	2,444.99	4,629.48	12.91
TPS	33.66	5,167.10	0.00	0.00	9,389.19	14,589.94	40.69
TUNA	0.00	6,020.79	0.00	0.00	10,295.51	16,316.29	45.5
Total	**191.17**	**13,513.22**	**0.00**	**0.20**	**22,152.72**	**35,857.30**	**100**
%	**0.53**	**37.69**	**0.00**	**0.00**	**61.78**	**100.00**	

Andaman Sea: Five species of tuna namely, Kawakawa, Frigate tuna, Bullet tuna (*Auxisrochei*), Longtial tuna and Skipjack tuna (*Katsuwonuspelamis*) caught from light luring purse seine (LPS), FADs, TUNA ,TPS, CPS and APS in areas 6, 7, D and E, show in the Annex 1.Frigate Tuna was the highest abundance (28.69 % of total catch) in the AndamanSea, followed by Bullet Tuna (27.97 %), Kawakawa (25.73 %), Longtial tuna (14.02 %) and Skipjack tuna (3.60 %). Frigate tuna was the high abundance in area 6 from LPS in December 2009. Kawakawa tuna was the high abundance in area 6 fromLPS in November 2009. Bullet tuna caught in areas 6 from LPS in April 2010, while Longtail tuna was high abundance from LPS in area 6 in October 2009. Skipjack tuna was the high abundance from APS during February 2010 in area 6 (Table 2).

Table 2. Catch (tons) and percentage of tuna by type of fishing gears in the AndamanSeaduring January 2009 to April 2010.

Gear	Frigate Tuna	Kawakawa	Skipjack Tuna	Bullet Tuna	Longtail Tuna	Total	%
APS	225.91	516.96	403.42	0.00	810.27	1,956.56	6.92
CPS	0.00	0.05	0.00	0.00	0.00	0.05	0.00
FADs	1,088.16	1,401.51	0.00	16.72	42.50	2,548.89	9.01
LPS	6,574.93	4,946.77	401.61	7,112.42	1,993.92	21,029.64	74.38
TPS	157.81	231.77	3.98	766.96	328.35	1,488.87	5.27
TUNA	80.00	177.52	206.34	0.00	786.15	1,250.00	4.42
Total	**8,126.80**	**7,274.58**	**1,015.34**	**7,896.10**	**3,961.19**	**28,274.02**	**100.00**
%	**28.74**	**25.73**	**3.59**	**27.93**	**14.01**	**100.00**	

Figure 2 show catch per species in each month and landing places along the Gulf of Thailand and AndamanSea. Rayong, Trat, Samutprakan, Chanthaburi and PrachuapKhiri Khan Provinces sampling sites show the lowest of landing neritic tuna because these data were estimated from only sampling, their weren't raise to be total catch cause of lack of the total number of fishing vessel at there. Kawakawa and Frigate tuna were the main composition, where were the main fishing ground in areas 4 and 3 landing at Samutprakan and RayongProvinces, respectively. Pattani and SongkhlaProvinces showed the highest production of Longtail tuna (22,128.72 tons) and Kawakawa (13,329.74 tons) where the fishing grounds were in areas 4, BA, BB and BC. PhangngaProvince reported the highest production of tuna (19,117.64 tons) in the AndamanSea, the fishing grounds were in the areas 6 and D, followed by Phuket landing place reported 5,141.66 tons of neritic tuna caught in area 7. Ranong, Krabi and SatunProvinces reported neritic tuna catch as 2,484.90 tons, 325.91 tons and 917.69 tons, where the fishing grounds in area 7 for Krabi and SatunProvinces while RanongProvince reported areas 6, D and E (Annex I).

Gulf of Thailand

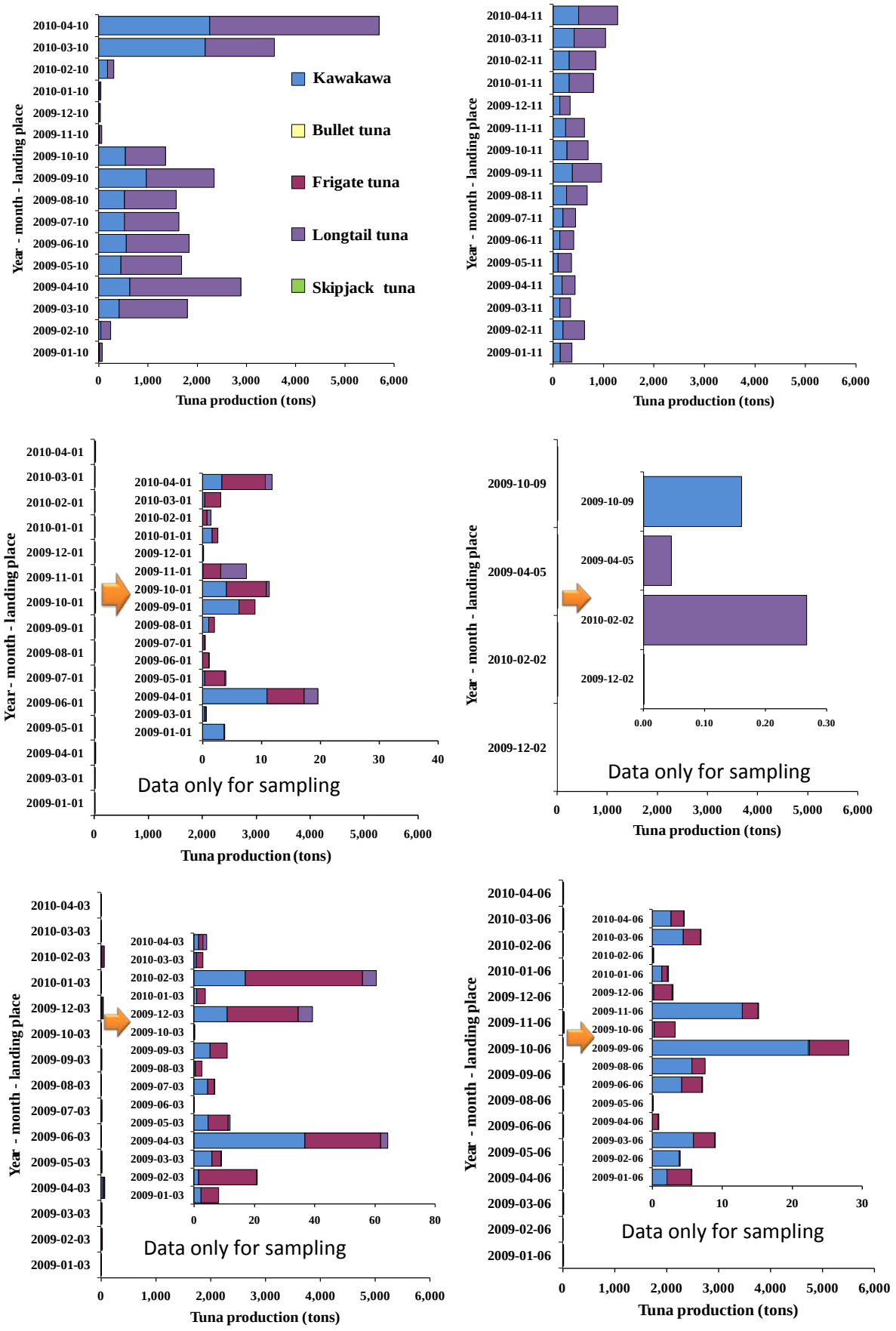


Figure 2. Catch per species per month in each landing places along the Gulf of Thailand and AndamanSea during January 2009 to April 2010.

(Remark: Landing place 1=Trat Province, 2=ChanthaburiProvince, 3=RayongProvince, 5 = Chonburi Province, 6=SamutprakanProvince, 9=PrachuapKhiri KhanProvince, 10 = SongkhlaProvince, 11=PattaniProvince, 12=RanongProvince, 13=Phang-ngaProvince, 16 = PhuketProvince, 17=KrabiProvince, 18=TrangProvince, 21 = SatunProvince)

AndamanSea

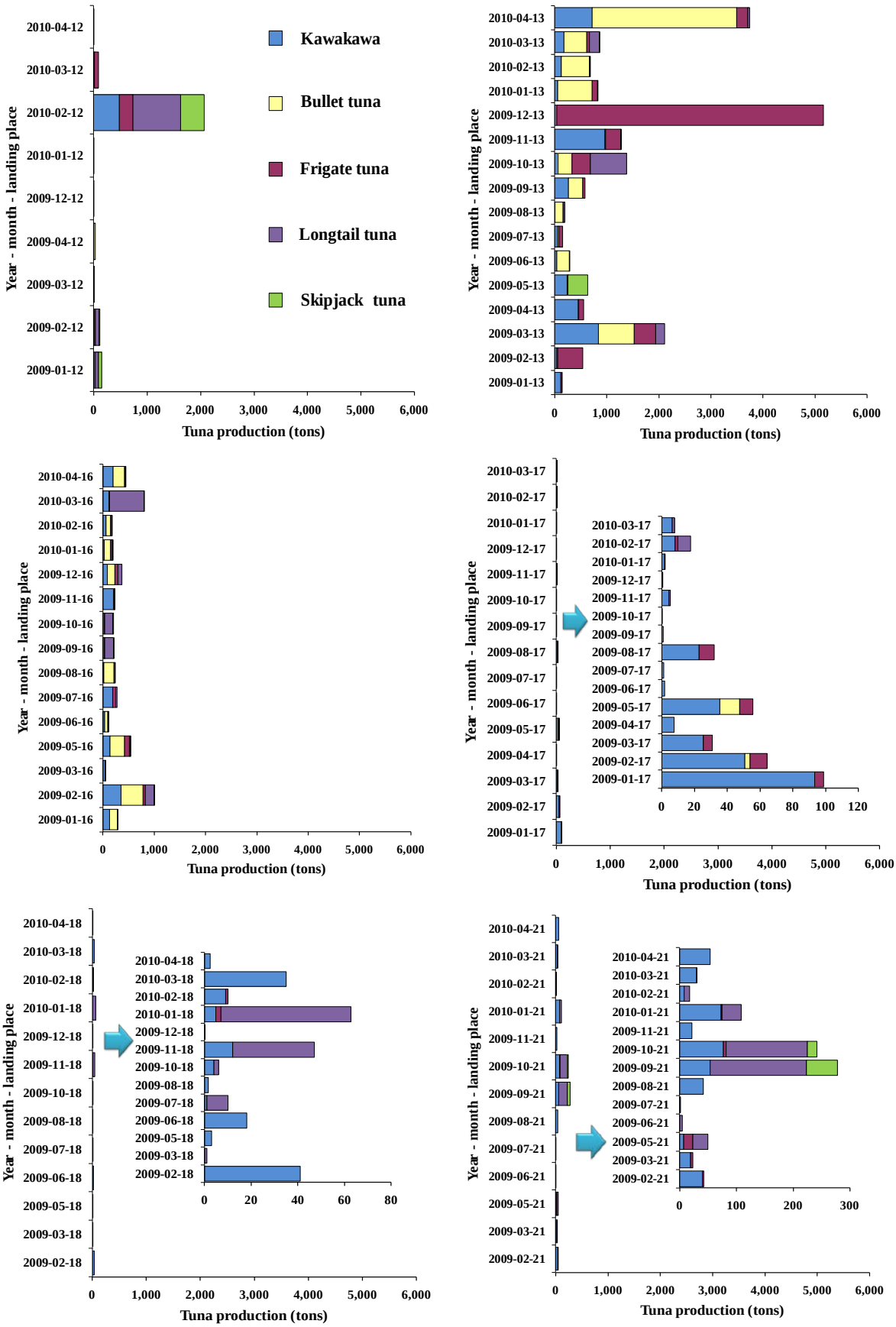


Figure 2.con't

(Remark: Landing place 1=Trat Province, 2=ChanthaburiProvince, 3=RayongProvince, 5 = Chonburi Province, 6=SamutprakanProvince, 9=PrachuapKhiri KhanProvince, 10 = SongkhlaProvince, 11=PattaniProvince, 12=RanongProvince, 13=Phang-ngaProvince, 16 = PhuketProvince, 17=KrabiProvince, 18=TrangProvince, 21 =

3. Data collection based on the enumerator at the selected tuna landing sites from during 1995 to 2010 from Foreign Fleets

Tuna longline from 16 nations; namely Taiwan, Indonesia, India, China, Japan, Philippines, Papua New Guinea, Seychelles, Fiji, Pakistan, Belize, Malaysia, Singapore, Panama, United State, Vanuatu was imported and landed at Phuket Province during January 2009 to April 2010. This information was collected from the reference documents for Certificated of Origin. The information showed 3 landing places, namely Bangkok, Phuket and SongkhlaProvinces. In case of landing at Bangkok and Songkhal, the processing company will carry frozen tuna by refrigerator truck to Phuket. The purpose of import tuna were for export chilled tuna to foreign country, and to be raw material of tuna processing plants for prepare tuna loin, steak, saku, then export again. Phuket was the main tuna landing for chilled tuna caught from Taiwan, Indonesia and India fleets in the Indian Ocean and Pacific Ocean. Bangkok and Songkha were landing frozen tuna from Taiwan, China, Indonesia, India, Philippines, Japan, Papua New Guinea, Pakistan, Seychelles fleets, Belize, Malaysia, Singapore, Panama, United State, Vanuatu and Fiji, operated in Indian Ocean and Western and Central Pacific Ocean. Taiwan fleet was pronounced the highest number of fishing vessels (580 vessels) that landed at Phuket.

The fishing effort increased steadily from 187 trips in 1995 to the peak of 883 trips in1999, after then it fluctuated in narrow scope and continuously decreased into 575 trips in 2010. The whole figure of total landing catch during 1995 to 2010 showed the increasing trend (1,416 to 9,230 tons) although it showed some distinct decreased in between, which decreased from 4,373 tons in 1999 to 3,118 tons in 2000 and decreased from 5,953 in 2005 to 4,830 tons in 2006. The landing per trip decreased opposite with the total landing catch and the fishing effort during 1995 to 1996 (from 8 into 5 tons/trip) after then it's steady until 2001 and increased continuously into 13 tons in 2009 (Figure 3 and 4). Due to fuel crisis since July 2003 to 2010, the longliners reduced their cost by transshipment at sea with other contracting fishing vessel, for this reason the fishing vessel could stay and fish longer at sea. The main species composition were yellowfin tuna (YFT), bigeye tuna (BET), bill fish (BILLs) (Makaira spp., Tetrapturusspp, Istiophorus spp.) and swordfish (SWO) with the average composition 63 22 5 and 4% of total landing respectively, while miscellaneous species (MCS) (Sharks, Lepidocybium spp., Coryphaena spp., Thunnusalalunga, Molar spp., Ruretluspretiosus, Sphyraena spp. and Taractichtis spp.) contributed 6% of the total landing during 1995 to 2010. The total landing of yellowfin tuna, bigeye tuna, bill fish and swordfish in 2010 were 7,425 371 76 and 4 tons, respectively (Figure 5). Taking in to account of the percentage of main target species, yellowfin tuna fluctuated during 1995 to 2002 with the peak of 80.8% of total landing in 1998, while the percentage of bigeye tuna fluctuated opposite with yellowfintuna during 1995 to 2002 with the peak of 49.7% of total landing in 2002, after then, it continued downward trend to 11.8% of total landing in 2007, increased to 22.9% in 2008 and decreased lowest to 4% in 2010. It was to be remarked that the declaration of sharks were disappear since 2000 while the miscellaneous fish was declared as frozen mixed fish and indicated more significant. In 2010, the frozen mixed fish accounted 14.7% of the total landing catch (Figure 6).

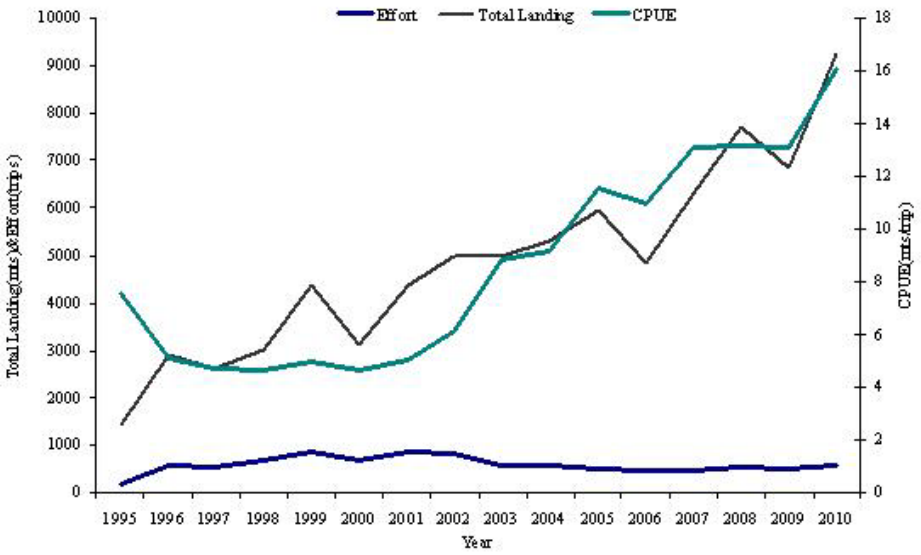


Figure 3 Change of fishing effort, total landing catch (mts), and CPUE (mts/trip) of longliner from 1995 to 2010.

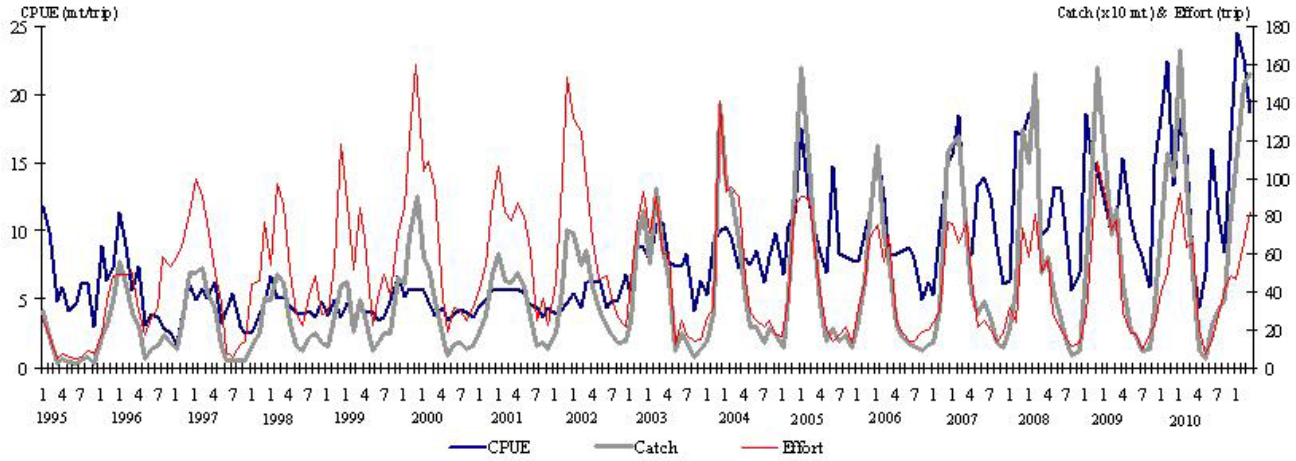


Figure 4 Changes of CPUE (mts/trip), total landing catch (mts) and fishing effort (trip) of longline fleets from 1995 to 2010

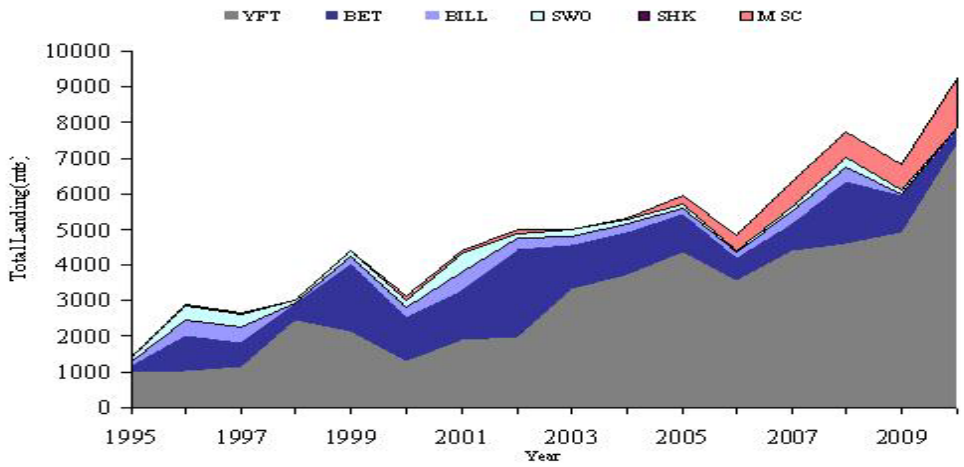


Figure 5 Total landing catch from long liners categorized by species, during 1995 to 2010

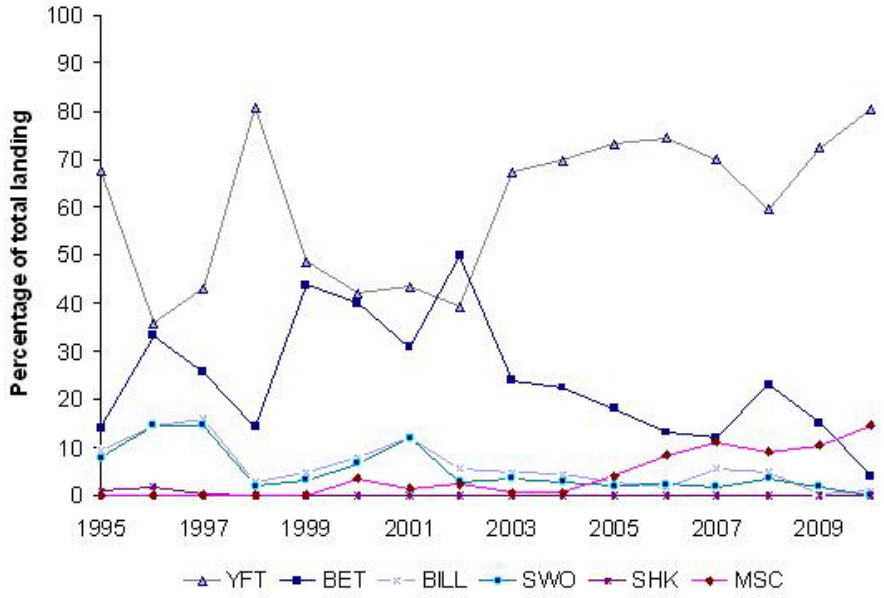


Figure 6 Total landing catch from longliners categorized by main target species, during 1995 to 2010.

There were only Japanese tuna purse seiners landed in Phuket during the last six years which were the six vessels of the size range 349-477 (GRT, Gross Ton Net) 63.24-75.97 m (LOA, length overall). Type of preservation was brine and fish was kept as frozen. During 2003 to 2006, there was only Nippon Maru landed for 2-6 trips/year. In the later year, 2007, they were five vessels with totally landed of 12 trips. In 2008 there were five vessels with totally unloaded of 10 trips. In 2009 there were two vessels with totally landed of 8 trips and only Nippon Maru was landed of 3 trips in 2010 (Table 4).

Table 4 Number of foreign tuna purse seines landed in Phuket during 2003 - 2010.

Type of vessel	Number of landing								
	2003	2004	2005	2006	2007	2008	2009	2010	**Total**
Tuna Purse Seiners	4	3	6	2	12	10	8	3	**48**

Fishing Ground

The tuna purse seiners operated in the fishing grounds between latitude 05 00′ N to 10° 41′ S and longitude 59° 12′ E to 98° 48′ E. The most intensive fishing effort were operated in the West of Indonesia and the areas around Maldives and Chagos while there were scantily fishing in the East of Somalia and around Seychelles. During 2003 to 2010 the tuna purse seiners operated only the fishing grounds where were near by the landing site, West of Indonesia and the areas around Maldives and Chagos. Thus it saved the cost of fuel (Figure 7).

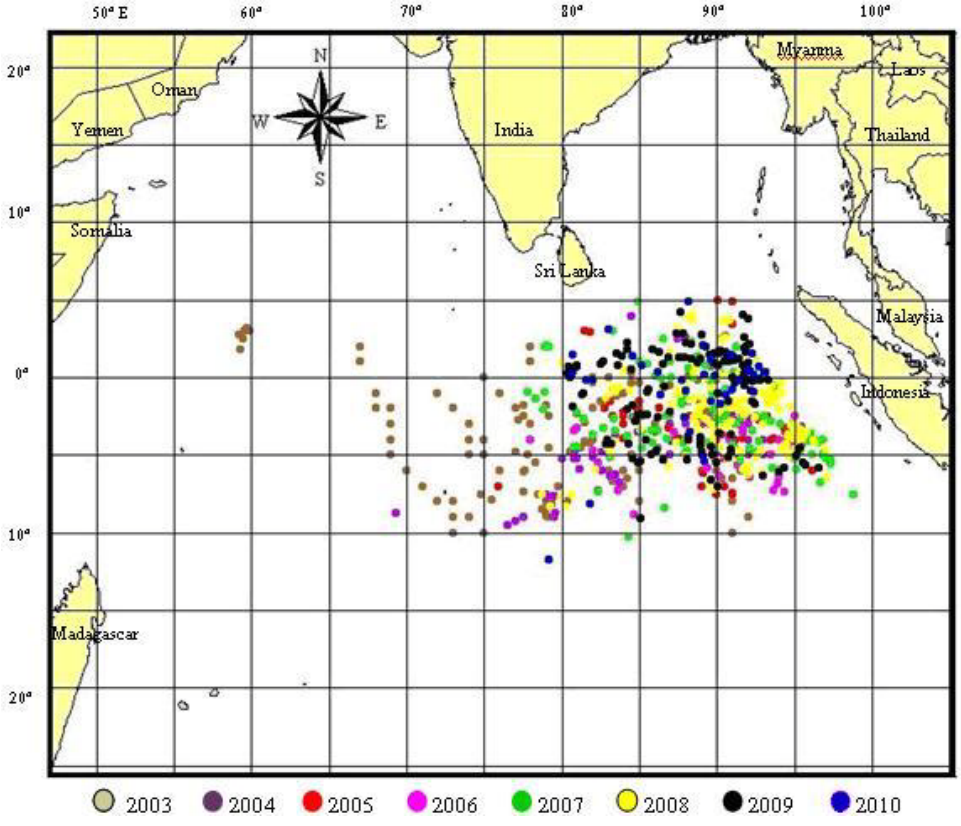


Figure 7. Fishing grounds of Japanese tuna purse seiners during January 2003-December 2010

Species composition, Catch and Value

Catch and percentage composition of skipjack, yellowfin tuna and bigeye tuna during 2003 to 2010 were 17,089 (62.4%), 4,475 (16.5%) and 5,659 mts (21.1%) with the value of 582.6, 189.7 and 209.7 million baht, respectively. The total catch of the three species during 2003 to 2010 were 27,223 mts with the value of 980.0 million baht (Table 5). There was a few of bycatch which the most frequented observed species was triggerfish, Abalistesstellaris.

AFRDEC pursued the port sampling continuously and it has the consistent improvement in the sampling activity. The sampling coverage during the last eight year was 83.7% or 41 samples of totally 49 landings while 89.8% or 44 copied logbooks were received (Table 6). About eightthousand of individual fish were measured fork length and weight while 356 samples were measured LD1, 9,842 samples were identified and counted as well. The sampling size of each species showed in Table 7.

Table 5 Catch and value of tunas caught by foreigners purse seine landed in PhuketProvinceduring 2003 - 2010

Year	Catch (mts) and Value (million bath)										
	SKJ			YFT			BET			total	
	Catch		Value	Catch		Value	Catch		Value	Catch	Value
	Mts	%	Million	Mts	%	Million	Mts	%	Million	Mts	Million
2003	1,755	61.6	52.6	465	16.3	13.4	630	22.1	18.5	2,850	84.6
2004	1,602	66.8	47.6	324	13.5	10.2	474	19.8	14.8	2,400	72.6
2005	3,246	65.7	108.2	998	20.2	33.5	696	14.1	24.1	4,940	165.9
2006	895	66.3	32.5	220	16.3	10.1	235	17.4	10.8	1,350	52.2
2007	3,074	62.8	121.3	754	15.4	42.7	1,066	21.8	49.4	4,894	212.4
2008	2,435	60.7	114.9	874	21.8	52.9	703	17.5	37.3	4,012	205.1
2009	3,170	62.9	72.6	529	10.5	14.1	1,343	26.6	35.0	5,042	121.7
2010	912	52.6	32.9	311	17.9	12.8	512	29.5	19.8	1,735	65.5
Total	17,089	62.4	582.6	4,475	16.5	189.7	5,659	21.1	209.7	27,223	980.0

Table 6 Number of foreigners purse seines landed at Phuket Deep Sea Port and percentage of port sampling during 2003 to 2010

Flag	Number of Landing								Total
	2003	2004	2005	2006	2007	2008	2009	2010	
Total Landing	**4**	**3**	**6**	**2**	**12**	**10**	**8**	**4**	**49**
Port Sampling	3	3	3	2	9	9	8	4	41
%	75.0	100.0	50.0	100.0	75.0	90.0	100	100	83.7
Provided Logbook	4	2	3	2	11	10	8	4	44
%	100.0	66.7	50.0	100.0	91.7	100.0	100	100	89.8

Table 7 Size range and number of samples size of tunas caught by tuna purse seiners during January 2003 to 2010.

Species	Fish Size						Sampling size (No. of individual fish)			
	(Weight, kg)			(Fork length, cm)			Measuring			Counted
	Min.	Max.	Average	Min.	Max.	Average	Weight	FL	LD1	
SKJ	0.2	12.0	2.1	24.0	70.0	44.7	2,288	2,351		9,703
YFT	0.5	40.2	5.4	25.2	151.1	57.7	1,710	1,784	275	62
BET	0.3	25.8	3.3	8.0	108.9	50.1	4,397	4,520	81	77
Total Samples							8,395	8,655	356	9,842

4. Recommendation on the future work on tuna information collection in this project.

Present issue	Suggestions for improvement
1. Insufficientenumerator and budget for the Costal Provincial Fisheries Office. 2. Delay in National Statistics Reporting. 3. To Strengthen Capability of sub-districtOffices.	DOF will emphasize its work on the suppression of illegal practices which is along the line of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU). Since 1st January 2010, DOF have developed and implemented on Catch Certificate Exemption Statement by apply Catch Certificate and Fishing Logbook. Six urgent and necessary activities have conducted: 1. Inspection of marine fish capture at Landing place and certification 2. Compliance fishing practice followed the IUU regulations 3. To improve hygienic of fishing boats and fishing Wharf. 4. Establish the Data and InformationCenter of marine capture certificate 5. To release of IUU regulation 6. Establish the coordinator center of marine capture certification
4. Insufficienton accuracy in number of fishing vessels and fisheries data information.	1. Try to join between MFRDB and FSARG
5. Lack of Accuracy in species breakdown of National Statistic. 6. Insufficient on number of sampling of tuna fisheries. 7. No up-to-date information and status of neritic tuna in Thailand	1. On 2012, MRFDB has Neritic Tuna Project. Research biological, fisheries and stock assessment along the Gulf of Thailand and the AndamanSea. 1. Thailand will be study on “Neritic Tunas Resource in Thai Waters” in 2011 to 2013.

Reference

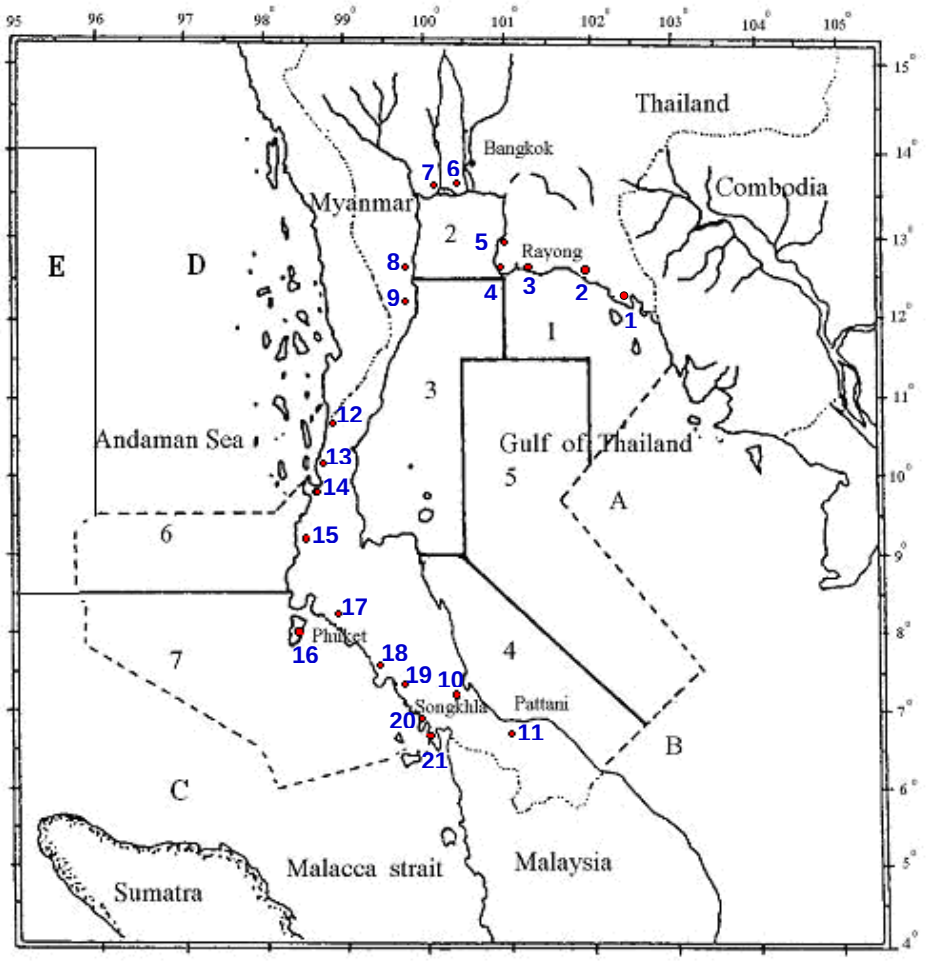
Department of Fisheries (DOF). Landing Place Survey (1996-2008). Ministry of Agriculture and Cooperative, Government of Thailand*(In Thai)*

Department of Fisheries (DOF). Marine Fisheries Statistic based on the sampling survey (1996-2008).Ministry of Agriculture and Cooperative, Government of Thailand *(In Thai)*

Department of Fisheries (DOF).Fisheries Statistics of Thailand (1985-2008).Ministry of Agriculture and Cooperative, Government of Thailand *(In Thai)*

Nootmorn, P, 2010.Challenges of Thai Fisheries policy in Indian Ocean. AndamanSea Fisheries Research and DevelopmentCenter, Marine Fisheries Research and Development Bureau, Department of Fisheries.10 p.

Annex 1. Fishing grounds and Landing place of Thai fishing Vessels.



1. LaemNgop, TratProvince
2. Thamai, ChanthaburiProvince
3. Muang, RayongProvince
4. Sattahip, ChonburiProvince
5. Sriracha, ChonburiProvince
6. Pak Nam, SamutprakanProvince
7. Muang, SamutsakhonProvince
8. Cha-Um, PhetchaburiProvince
9. Pranburi, PrachuapKhiriKhanProvince
10. Muang, SongkhlaProvince
11. Muang, PattaniProvince
12. Muang, RanongProvince
13. Kuraburi, Phang-nga Province
14. Takuapa, Phang-nga Province
15. Taimuang, Phang-nga Province
16. Muang, PhuketProvince
17. Muang, KrabiProvince
18. Kantang, TrangProvince
19. Palian, TrangProvince
20. La-nga, SatunProvince
21.Munag , SatunProvince

Remark : Fishing ground BA: Thailand and Malaysia

BB: Malaysia and Indonesia

BC: ThailandMalaysia and Indonesia

Annex 13

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Tuna Data Collection in Vietnam

By

Pham Viet Anh

Ministry of Agriculture and Rural Development

Vietnam

SPECIAL MEETING ON IMPROVEMENT OF TUNA INFORMATION COLLECTION IN SOUTHEAST ASIA

7-9 September 2011, Songkhla Province, Thailand

TUNA DATA COLLECTION IN VIETNAM

1

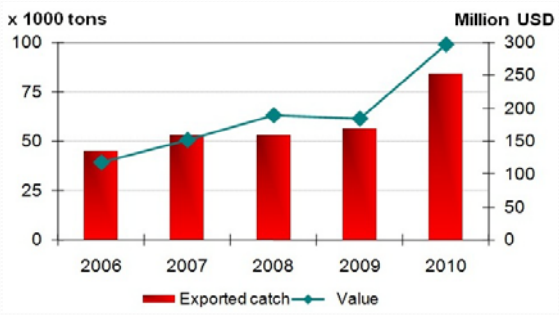
OVERVIEW OF TUNA FISHERIES IN VIETNAM

- Oceanic fish stocks are providing livelihoods, food security and economic development opportunities for many countries in over the world.
- Three main fisheries catching oceanic tuna species are longline, gillnet and purse seine fisheries.
- Target species: longline (BET and YFT) gillnet and purse seine (SKJ).
- Fishing season: + longline: Sep (Oct) - Mar (Apr)
  - + PS and GN: year around

2

OVERVIEW OF TUNA FISHERIES IN VIETNAM

Total exported tuna products of Vietnam from 2006 to 2010 by volume and value (source: VASEP, 2011)



3

TUNA FISHERIES DATA COLLECTION

West Pacific East Asia Oceanic Fisheries Management Project

- Strengthen national capacities in fishery monitoring and assessment;
- Improve knowledge of oceanic fish stocks and reduce uncertainties in stock assessments;
- Strengthen national capacities in oceanic fishery management, with participant countries contributing to the management of shared migratory fish stocks;
- Strengthen national laws, policies and institutions, to implement applicable global and regional instruments.

4

TUNA DATA COLLECTION PROGRAMMES

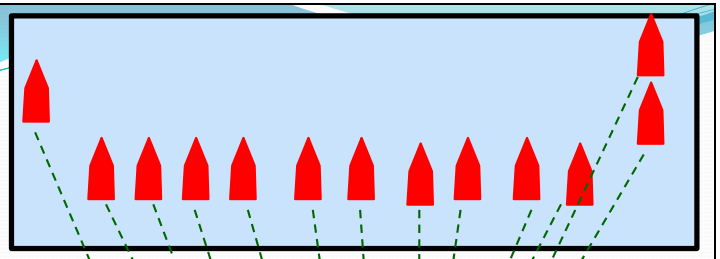
Unloading data

Port sampling data

Logsheet data: Circular No. 48/2010/TT-BNNPTNT

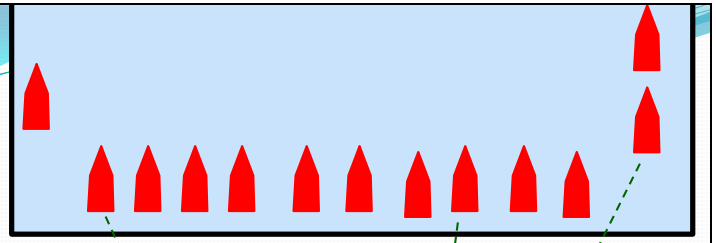
Observer data

5



Landings data collection
All vessels
100% coverage

6



Port Sampling data collection
Selected vessels
Representative sample
20% target coverage …

7

DATA COLLECTION SYSTEM/PROTOCOLS

Necessary legislation or agreement established describing obligation to collect data

Fishing Companies are aware of the importance/usefulness of these data

Instructions provided with data collection forms (how to fill out form)

Trainings

Establish Contact points
- who are the recorders, providers and receivers of data

Establish SCHEDULE for provision of data
- Monthly, quarterly, etc. ?

Establish Data quality control procedures
- Regular review/audit of data (by receiver)
- Review meetings (provide feedback on problems)
- Determine if coverage is complete …

8

TUNA DATA COLLECTION PROGRAMMES

Total collected samples

Types of data	2010						2011				Total
	Jul	Sep	Oct	Nov	Dec	Total in 2010	Jan	Feb	Mar	Total in 2011	
Unloading	266	40	162	44	120	632	263	267	158	688	1,320
Logsheet	0	0	102	34	20	156	3	0	0	3	159
Port sampling	103	20	76	15	54	268	65	107	42	214	482
Observer (trips)											6

9

OVERVIEW OF TUNA FISHERIES IN VIETNAM

Annual catch (mt) in the Vietnam's EEZ by species for the LONGLINE fishery

Species	2006	2007	2008	2009	2010
YELLOWFIN	N/A	N/A	N/A	N/A	9,513
BIGEYE	N/A	N/A	N/A	N/A	2,441
BLUE MARLIN	N/A	N/A	N/A	N/A	230
BLACK MARLIN	N/A	N/A	N/A	N/A	1,793
ALBACORE	N/A	N/A	N/A	N/A	4
SWORDFISH	N/A	N/A	N/A	N/A	820

Source: Annual report to the WCPFC

10

DATA COLLECTION SYSTEM/PROTOCOLS

Typical problems in data collection

- Lack of legal frameworks: Requirement (e.g. legislation) to collect information does not exist
- Awareness – fishing companies not aware of importance/obligations
- Obtaining low coverage …
  - System should support for collection of data from all landings…
- Compliance (non- and under-reporting)…
  - Landings of EXPORTS recorded only (longline)
  - Main tuna species catches only recorded (LL - need other species)
  - Landings of large YFT unloaded elsewhere and not recorded
- Unloading data may be linked to revenue and tax … incentive to under-report !

11

DATA COLLECTION SYSTEM/PROTOCOLS

Typical problems in data collection

- Sampling problems…
  - Measuring equipment not calibrated (non-standard measurements)
  - Use of inadequate instruments (e.g. tape measures)
  - Species identification problems
  - Sampling non-random landings – samplers not aware !
  - Not sampling the entire catch or not accounting for entire catch on data forms… (required for LL sampling)
  - Missing/erroneous information on data collection forms
- Problems with compliance (non- and under-reporting)…
  - Problems in catches identified when cross-checking with other types of data
  - Misreported positions (when cross-checking with VMS data)
  - Main tuna species catches only recorded (LL - need other species)

12

DATA COLLECTION

Future recommendations

- Provide more raising awareness activities to enhance participation of relevant stakeholders in data collection and related work;
- Convening training workshops to improve capacity of fisheries agencies related to oceanic tuna fisheries especially for DECAFIREP, and local Sub-DECAFIREPs;
- Enhance and support sufficient legal frameworks for data collection and tuna fisheries management;
- Support development and implementation of Tuna Fisheries Management Plan

13

THANK YOU FOR YOUR ATTENTION

14

Annex 14

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

The Data Requirements of the WCPFC for Tuna Stock Assessment in WCPO

By

Noel Barut

National Fisheries Research and Development Institute

Philippine

The Data Requirements of the WCPFC for Tuna Stock Assessment in WCPO

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia
BP Sumila Beach Hotel, Songkhla Province, Thailand
7-9 September 2011

Noel C. Barut

1

The Western and Central Pacific Fisheries Commission (WCPFC)

Western and Central Pacific Fisheries Commission

- The Western & Central Pacific Fisheries Commission
  - Established in 2004 under the Convention on the on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, 2000
  - Headquarters in Pohnpei, Federated States of Micronesia

… ***to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific ocean…"***

2

WCPFC STRUCTURE

- The Commission supports three subsidiary bodies;

- Scientific Committee (SC)
- Technical and Compliance Committee (TCC)
- Northern Committee (NC)

  - meet once during each year
  - the meetings of the subsidiary bodies are followed by a full session of the Commission
  - the work of the Commission is assisted by a Finance and Administration Committee.

3

WCPFC Members

1. Australia
2. Canada
3. People's Republic of China
4. Cook Islands
5. European Union
6. France
7. Fiji
8. Federated States of Micronesia
9. Japan
10. Kiribati
11. Republic of Korea
12. Marshall Islands
13. Nauru
14. New Zealand
15. Niue
16. Palau
17. Papua New Guinea
18. Philippines
19. Samoa
20. Solomon Islands
21. Chinese Taipei
22. Tonga
23. Tuvalu
24. USA
25. Vanuatu

4

WCPFC Participants

Participating Territories

1. American Samoa
2. French Polynesia
3. Guam
4. New Caledonia
5. Northern Mariana Islands
6. Tokelau
7. Wallis & Futuna

"… all such participants shall be entitled to participate fully in the work of the Commission, including the right to be present and to speak at the meetings of the Commission and its subsidiary bodies" *Art.43(2)*

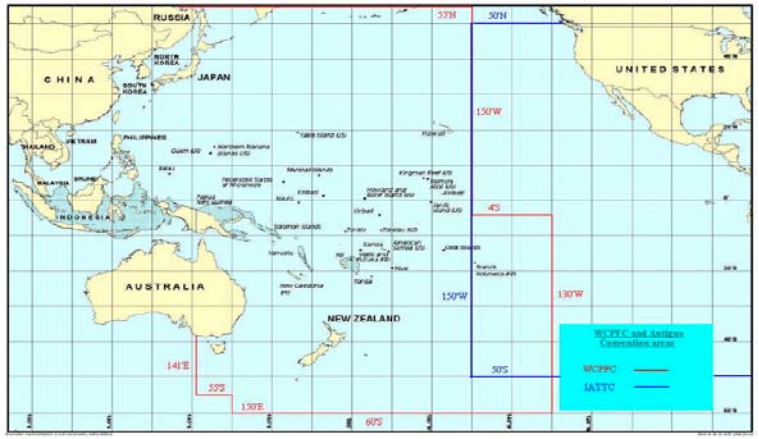
Cooperating Non-Members

1. Belize
2. Ecuador
3. El Salvador
4. Indonesia
5. Mexico
6. Panama
7. Senegal
8. Thailand
9. Vietnam

- Not members of the Commission, but have agreed to be bound by the Convention and all Conservation and Management Measures adopted by the Commission
- Permitted to participate in the work of the Commission, except decision-making

5

Map Convention Area



6

Target Species in WCPO

Multiple target species and gears complicates fisheries management decision making. Management measures to deal with one species generally have implications for the fisheries for other target species also.

7

Scientific Data Requirements:

1. *Estimates of annual catches*

- bigeye
- skipjack
- yellowfin
- blue marlin
- black marlin

in (i) the WCPFC Statistical Area,
(ii) the portion of the WCPFC Statistical Area east of the 150º meridian of west longitude

8

Scientific Data Requirements

- Albacore
- Striped marlin
- Swordfish
- Pacific bluefin tuna

in (i) the Pacific Ocean south of the Equator,
(ii) the Pacific Ocean north of the Equator,
(iii) the WCPFC Statistical Area north of the Equator,
(iv) the WCPFC Statistical Area south of the Equator,
(v) the portion of the WCPFC Statistical Area east of the 150º meridian of west longitude

9

Scientific Data Requirements

2. *Number of vessels active in the WCPFC Statistical Area during each calendar year*
   - by gross registered tonnage
     (i) Longline: 0-50, 51-200, 201-500, 500+
     (ii) Pole-and-line: 0-50, 51-150, 150+
     (iii) Purse seine: 0-500, 501-1000, 1001-1500, 1500+

3. *Operational level catch and effort data*
   3.1 Name of vessels, country of registration, registration number, international call sign,
   3.2 Trip information for all gear types,
   3.3 Information on operations by longliners,
   3.4 Information on operations by pole-and-line vessels and related gear types,
   3.5 Information on operations by purse seiners and related gear types
   3.6 Information on operations by trollers and related gear types,

10

Scientific Data Requirements

4. *Catch and effort data aggregated by time period and geographic area*

If the operational catch and effort data is less than100%, then catch and effort data aggregated by time period and geographic area that have been raised to represent the total catch and effort shall be provided.

(i) Longline – operational catch and effort data by month and area of 5º longitude and 5º latitude,
(ii) Purse seine/ringnet - operational catch and effort data by month, areas of 1º longitude and 1ºlatitude and type of school association,
(iii) Other surface fisheries targeting tuna – operational catch and effort data by month, areas of 1º longitude and 1º latitude

Note: The statistical methods used to derive the aggregated catch and effort data shall be reported to the Commission with reference to the coverage rates of the operational catch and effort data, and the types of data and method used to raise the catch and effort data.

11

Scientific Data Requirements

5. *Size composition data*

- Length and weight composition data,
  (i) representative of catches by the fisheries,
  (ii) Finest possible resolution of time period,
  (iii) Geographic area at least as fine as periods of quarter and areas of 20º longitude and 10º of latitude

12

Model used by the WCPFC in Tuna Stock Assessment – MULTIFAN-CL

MULTIFAN-CL (MFCL) is a statistical, age-structured, length-based model routinely used for stock assessments of tuna and other pelagic species. The main parameters estimated by the model include initial numbers-at-age, the number in each class 1 (the recruitment), growth parameters, natural mortality-at-age, selectivity-at-age by fishery, catch, effort deviations for each fishery, initial catchability and catchability deviations for each fishery.

Particular data sets are collected throughout the WCPO to allow particular model process parameters to be estimated.

13

MULTIFAN-CL'S data requirements

(i) Recruitment – length frequency data, environmental parameters

(ii) Growth - Otoliths, length-and-weight-frequency data, mark recapture (tagging) data

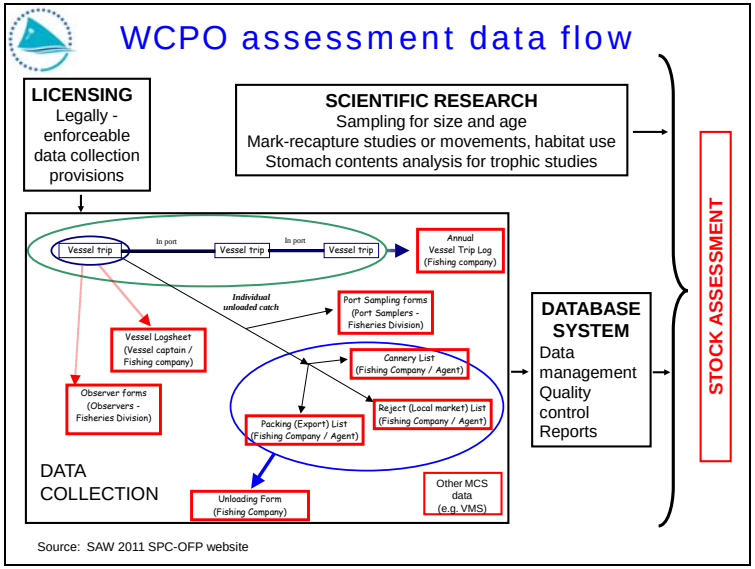
(iii) Fishing mortality - Logsheets and landings data standardised catch-per-unit-effort (CPUE) abundance indices

(iv) Natural mortality - Mark-recapture data

(v) Movement - Mark-recapture data

14

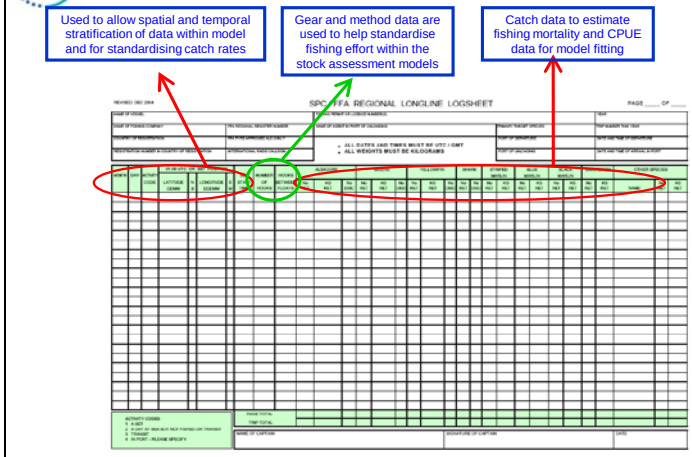
WCPO assessment data flow



Source: SAW 2011 SPC-OFP website

15

Catch-effort log data

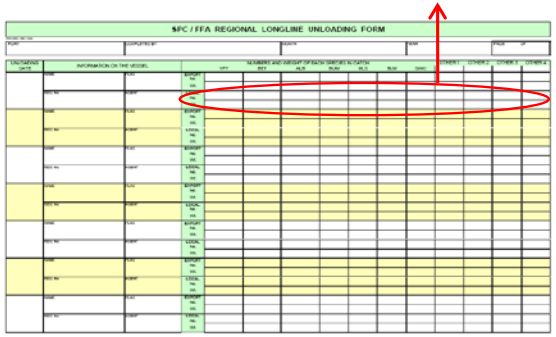


Source: SAW 2011 SPC-OFP website

16

Landings or unloadings data

Unloadings data are used to validate the logbook data used in the assessments

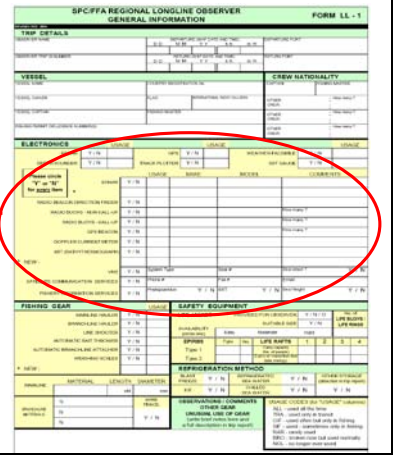


Source: SAW 2011 SPC-OFP website

17

Observer data: catch-effort data

Gear and method data are used to standardise fishing effort to feed effort data into the tuna stock assessment models. Effort data are critical to the accurate estimation of the catch

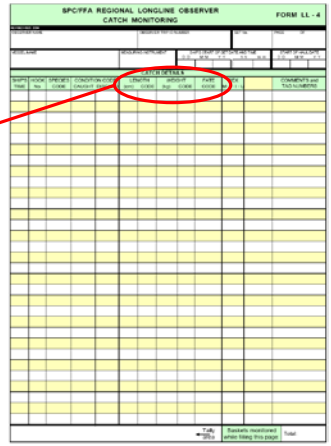


Source: SAW 2011 SPC-OFP website

18

Observer data: catch composition

Size and other catch-composition data are critical for estimating growth and mortality and for separating age classes within the catch, and population size structure, all of which are needed within an age-structured stock assessment model



Source: SAW 2011 SPC-OFP website

19

Observer data: biological sampling

For collection of biological samples by observers, scientists provide separate sampling forms to fill in, but which are linked to the standard observer forms

Often, scientific observers programmes are the only practical way to collect certain kinds of data from the catch

Source: SAW 2011 SPC-OFP website

20

Port sampling data

Overview

1. Port-sampling data: data collected by port sampling staff at points (ports) of unloading

2. Data collected: (i) cover a broad area of fishing; (ii) catch by species for the entire trip; and (iii) the composition of the target species catch (length-frequency and other data)

3. Requires liaison with locally-based fishing companies and agencies and government departments (e.g., Customs Dpts). Coverage of unloadings data by vessel is not complete—there are problems covering all ports.

4. DWFNs (Government Departments and companies) also compile their own data (mainly from unloadings) and provide annual catch estimates to the OFP.

Source: SAW 2011 SPC-OFP website

21

Port sampling data

Overview

5. The data contain more than 15 million length measurements collected from a variety of sources since 1960s.

6. The data are used to (among other things):

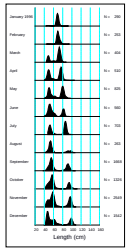
- **Validate logsheet data**
  (E.g., unloaded weights by species)
- **Quantify or characterise fishery trends**
  (E.g., length frequency data)
- **Stock assessment model inputs**
  (E.g., from which other different but related quantities such as the catch age composition may be estimated)

Source: SAW 2011 SPC-OFP website

22

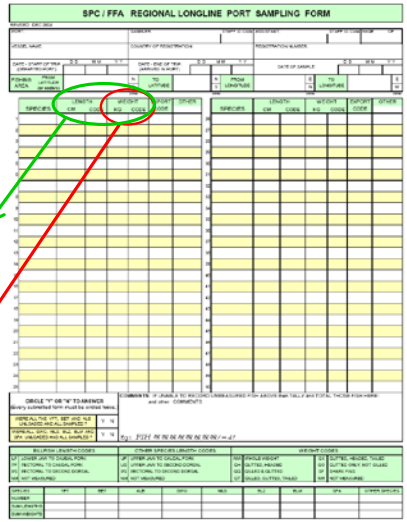
Port sampling data

$B_{t+1}=B_t+R+G-M-C$



Size data are critical to estimation of growth and mortality, and for separating age classes, in age structured models

Weight data for validating logbook catch estimates outside of assessment model



Source: SAW 2011 SPC-OFP website

23

Mark-recapture data

Overview

1. Mark-recapture or "tagging" experiments can potentially produce a variety of information for stock assessments:

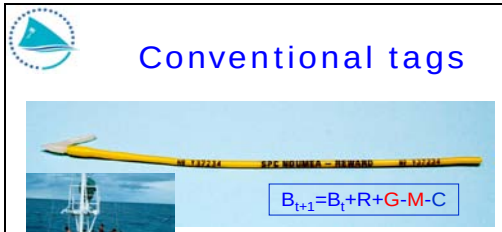
- **Movement**
- **Natural mortality**
- **Growth**
- **Exploitation rates (total and fishing mortality)**

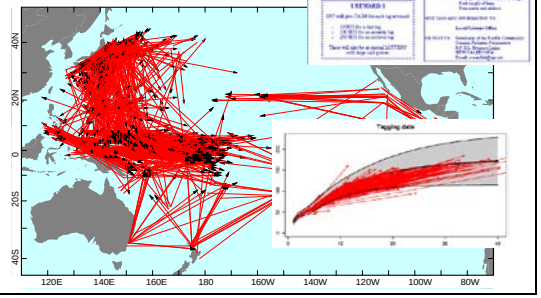
2. Different kinds of tags have different uses: c.f., "conventional" tags and modern, electronic tags (e.g., PSAT, SPOT, acoustic). However, the latter are ***much*** more expensive. (Why is this a problem? What are the implications of this?)

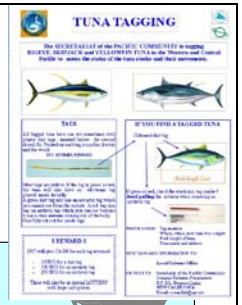
Source: SAW 2011 SPC-OFP website

24

Conventional tags



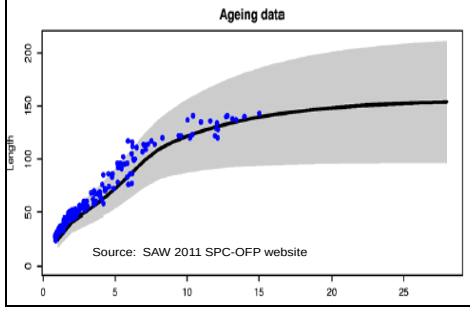




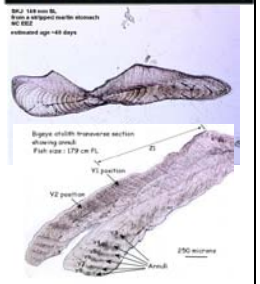
25

Age and growth data

In an age-structured model, the collection of age data is critical to estimation of all parameters. Fish age is estimated through analyses of seasonal growth rings (annuli) in hard body parts (e.g., otoliths or ear stones in tuna and fin spines in marlin), with these being collected by observers, port samplers or directly by scientists. (What structures might we use in sharks?)



Source: SAW 2011 SPC-OFP website



26

Reproductive data

Understanding fecundity and, in particular, size and age at maturity is critical to the estimation of adult spawning biomass (which is used to estimate recruitment) within an age-structured model.

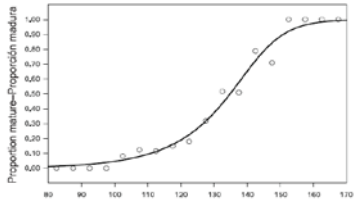
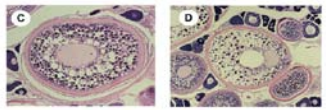


FIGURE 6. Relationship between proportion of female bigeye tuna mature and length. The circles represent the observed value in each 5-cm length interval. The curve is for the Richards



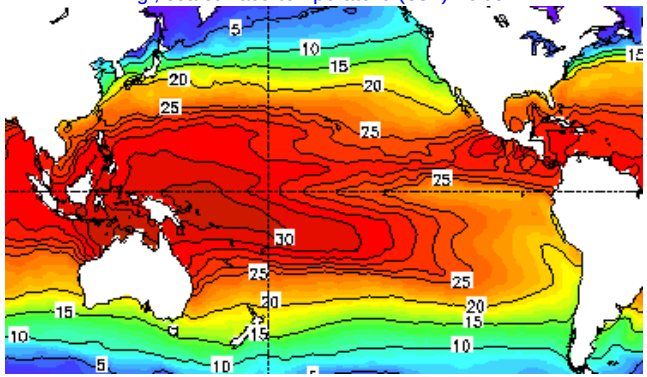
Schaefer et al. (2005)
REPRODUCTIVE BIOLOGY OF BIGEYE TUNA (THUNNUS OBESUS) IN THE EASTERN AND CENTRAL PACIFIC OCEAN. INTER-AMERICAN TROPICAL TUNA COMMISSION BULLETIN VOL 23, No. 1.

Source: SAW 2011 SPC-OFP website

27

Environmental data

E.g., sea surface temperature (SST) fields



Modern remote sensing (satellite) technology allows environmental data to be gathered on an ocean-basin or global scale in near to real time cost-effectively. However, such data are not (yet) used directly in the WCPO tuna assessments.

Source: SAW 2011 SPC-OFP website

28

Summary

1. Many types of data are collected for use in WCPO tropical tuna stock assessments. Most data are produced by or are associated with the fishing process ("fishery-dependant")

2. Data types collected include catch-effort and landings logsheets, fishing method data, fish size and other biological data, and environmental and oceanographic data.

3. The ongoing collection of such data **is vital** for future assessments of the tropical tuna stocks in the WCPO. **Data series length and continuity is everything.**

4. However, data quality is just as important as data quantity or coverage. There is a need to compromise between data information content and collection expense.

Source: SAW 2011 SPC-OFP website

29

Summary

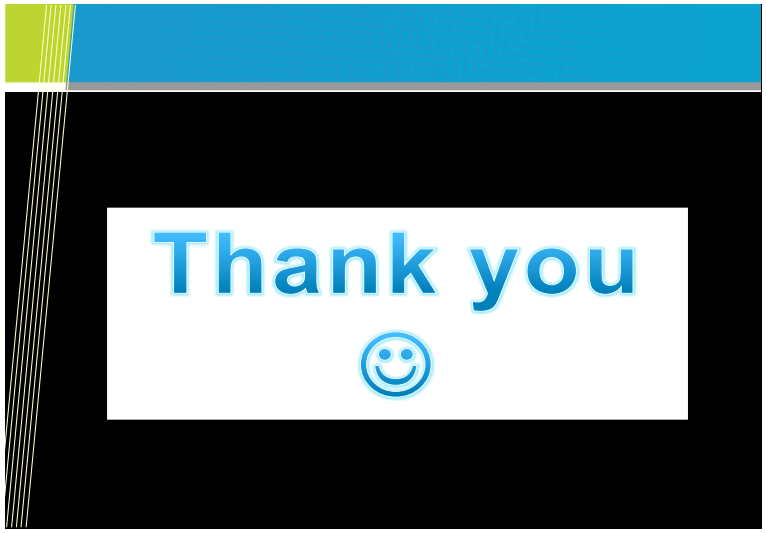
5. Every data collection programme should have clearly-stated objectives. Data accuracy and precision can be difficult to achieve but should always be tested.

6. The data collected in the WCPO permit WCPO tuna scientists to undertake comprehensive tuna stock assessments to provide information regarding the status of the target tuna stocks, information which is critical to the management of the tuna resources in the region

5. However, there is a particular need for more mark-recapture ("tagging") data to assist with understanding stock structure, likely present and future fishing and natural mortality levels, fish movement and growth. Hence the ongoing tuna tagging programme being run by SPC.

Source: SAW 2011 SPC-OFP website

30



31

Annex 15

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Update Information on Tuna Fisheries of IOTC

By

Praulai Nootmorn

Department of Fisheries

Thailand

Update Information on Tuna Fisheries of IOTC

Praulai Nootmorn

Marine Fisheries Research and Technological Development Institute

Marine Fisheries Research and Development Bureau,

Department Of Fisheries, Kaset-Klang, BangKhen, Bangkok 10900 Thailand

E-mail: nootmorn@yahoo.com

This report present the summary, conclusion, recommendation and IOTC's process work from the thirteenth session of the Scientific Committee that held at Victoria, Seychelles during 6-10 December 2010.

Executive Summary

The Thirteenth Meeting of the Scientific Committee (SC) was opened on 6 December 2010, in Victoria, Seychelles, by the Chairperson Dr. Francis Marsac (EU). Representatives from 14 Members, one Cooperating non-Contracting Party, FAO and four observers from inter-governmental and non-governmental organizations attended the meeting.

The SC noted that 15 national reports were presented, an improvement relative to previous years, although still represented less than half the number of Contracting and Cooperating non-Contracting Parties.

The SC expressed its satisfaction to the Secretariat for the amount and quality of the work undertaken during the year, noting the contributions to the scientific activities, including data preparation and analyses for the Working Parties. However, it considers that the staffing level is still insufficient and reiterated its past recommendations for the Commission to provide additional resources to the Secretariat.

Four working party meetings were held in 2009 (Billfish, Ecosystems and Bycatch, Tropical Tunas and Data Collection and Statistics). Complete stock status and technical advice for all IOTC species are provided in the main body of the report, and a summarised version is provided in a table on the following page.

Revised stock assessments for yellowfin tuna, bigeye tuna and swordfish were received and the following advice is provided:

For bigeye tuna: Given the uncertainty on estimated MSY values and the levels of error in the nominal catch data for bigeye, the SC recommended than catches are kept at a level not above the catch estimated at the moment of the assessment for 2009, *i.e.* 102,000 t. This value should give low probability of catches exceeding MSY.

For yellowfin tuna: The SC considers that the stock of yellowfin has recently become overexploited or is very close to being overexploited. Management measures should be continued that allow an appropriate control of fishing pressure to be implemented. At this moment, the effect of time-area closures cannot be directly translated into management quantities of direct effect on the status of the stock, such as catches or fishing mortality, so their possible effect on the future evolution of the stock cannot be evaluated. The SC

recommends that catches of yellowfin tuna in the Indian Ocean should not increase beyond 300,000 t in order to bring the stock to biomass levels that could sustain catches at the MSY level in the long term. If recruitment continues to be lower than average, catches below 300,000 t would be needed to maintain stock levels.

For swordfish: If the recent declines in effort continue, and catch remains substantially below the estimated MSY of 29,000 t, then there is probably no urgent need to introduce restrictive management actions to the Indian Ocean as a whole. However, continued monitoring is required to manage the uncertainty. It is recommended that catches in the south west should be maintained at levels at or below those observed in 2008 (6,426 t)

The SC agreed that three options should be considered for amendment of Resolution 08/04 concerning the recording of the catch by longline fishing vessels in the IOTC area in order to improve data collection and statistics on sharks that would allow the development of stock status indicators. The SC noted with concern the lack of progress in the reporting of data by CPC‘s on by-catch species.

The SC reviewed the state of implementation of the Regional Observer Scheme, noting that most countries are still in the initial phases of implementation. The SC adopted minimum data requirements, as well an observer report template to be used until they are open for revision next year.

The SC reviewed the impact of piracy in the western Indian Ocean where decreases in fishing effort, combined with displacement from traditional fishing grounds and changes in fishing practices, have had an effect on total catches, as well as on species and size composition of the catches.

In order to improve the quality of the scientific advice supplied, the SC also agreed to start a process that includes, but is not limited to, the development of a management strategy evaluation, and agreed to updated guidelines for the presentation of the scientific results.

The SC recommended also a schedule of Working Party meetings for 2010 and 2011.

STOCK STATUS SUMMARY FOR THE IOTC SPECIES

Stock	Indicators	Prev. Asm[1]	2010 Asm[2]	Stock status comments	Advice to Commission
Major stocks: These are the main stocks under exploitation by industrial and artisanal fisheries throughout the Indian Ocean, both in the high seas and in the EEZ of coastal countries. These stocks are the ones that have received, in general, the highest fishing pressure in the region.					
Albacore *Thunnus alalunga*	Average catch 2005-2009: 39,100 t Catch 2009: 40,700 t MSY: 28,260 t – 34,415 t F_{2009}/F_{MSY}: 0.48-0.91 B_{2009}/B_0: > 1	2007		Stock size and fishing pressure were considered to be within acceptable limits in 2008. Since then, a revision of the catch data for recent years has resulted in much higher catch estimates over the past five years compared with the historical average. Mean weight and catch rates of albacore have been stable for over 20 years.	Stock status is uncertain and should be closely monitored to assess the impact of recent changes in catch levels.
Bigeye tuna *Thunnus obesus*	Average catch 2005-2009: 114,600 t Catch 2009: 102,200 t MSY: 114,000 t (95,000 t – 183,000 t) F_{2009}/F_{MSY}: 0.79 (0.50 – 1.22) SB_{2009}/SB_{MSY} 1.20 (0.88 – 1.68)	2008	2009	The stock is probably not overfished, and overfishing is probably not occurring. However, the stock is probably near full utilization, and the possibility of overfishing cannot be ruled out given the existing uncertainty, and the continuing observed decline in catch rates.	Bigeye catches in the Indian Ocean should be kept at or lower than the 2009 level of 102,000 t.
Skipjack tuna *Katsuwonus pelamis*	Average catch 2005-2009: 502,200 t Catch 2009: 440,600 t MSY: - F_{2009}/F_{MSY}: - SB_{2009}/SB_{MSY} -			Skipjack is a highly productive species and robust to overfishing. However, this does not exclude completely the possibility for skipjack to become overfished. Recent trends in certain fisheries suggest that the situation of the stock should be closely monitored.	Stock status is uncertain and should be closely monitored.
Yellowfin tuna *Thunnus albacares*	Average catch 2005-2009: 371,200 t Catch 2009: 288,100 t MSY: 320,000t[3] (258-347,000 t)[4] F_{2009}/F_{MSY}: 0.993 (0.85 – 1.39)[4] SB_{2009}/SB_{MSY} 1.113 (0.93 – 1.25)[4]	2008	2009	Stock is likely to be currently in, or approaching, an overfished state and overfishing has probably been occurring in recent years. If fishing effort displaced because of the piracy problem returns to traditional fishing areas an increase in catches could be expected.	Yellowfin catches in the Indian Ocean should not increase beyond 300,000 t in order to bring the stock to biomass levels that could sustain catches at the MSY level in the long term. If recruitment continues to be lower than average, catches below 300,000 t would be needed to maintain stock levels.
Swordfish *Xiphias gladius*	Average catch 2005-2009: 27,100 t Catch 2009: 22,100 t MSY: 29,000 t (19,000 t–46,000 t) F_{2009}/F_{MSY}: 0.79 (0.58-0.84) SB_{2009}/SB_{MSY}: 1.31 (1.13-1.46)	2007	2008	The overall stock size and fishing pressure are estimated to be within acceptable limits and the overall level of reduction in stock size probably does not represent a conservation risk. If the southwestern region is analysed as containing a separate stock, results indicate that a substantive decline took place in that area, although recent declines in catch and effort might have brought fishing pressure to sustainable levels.	If the recent declines in effort continue, and catch remains below MSY, then there is no need to introduce restrictive management actions in the Indian Ocean as a whole. Catches in the southwest region should not exceed 2008 levels of 6,400t

Stock	Indicators	Prev. Asm[1]	2010 Asm[2]	Stock status comments	Advice to Commission
Billfish (other than swordfish) *: This category includes species that are not directly targeted by most fleets, but are caught as by-catch of the main industrial fisheries. They could be important, however, for localised small-scale and artisanal fisheries (e.g. sailfish in the northern Arabian Sea and the Persian Gulf) or as targets in recreational fisheries (e.g. marlins)*					
Blue marlin *Makaira nigricans*	Average catch 2005-2009: 9,350 t Catch 2009: 8,583 t			No quantitative stock assessment is currently available for any of these species in the Indian Ocean and only preliminary stock indicators can be used. Aspects of the biology, productivity and fisheries for these species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern.	Stock status is uncertain
Black marlin *Makaira indica*	Average catch 2005-2009: 5,069 t Catch 2009: 5,410 t				Stock status is uncertain
Striped marlin *Tetrapturus audax*	Average catch 2005-2009: 2,780 t Catch 2009: 2,500 t				Stock status is uncertain
Indo-Pacific Sailfish *Istiophorus platypterus*	Average catch 2005-2009: 24,768 t Catch 2009: 23,220 t				Stock status is uncertain
Neritic tunas: *These are important species for small-scale and artisanal fisheries in the region, almost always caught in the EEZs of IO coastal states. They are caught only occasionally by industrial fisheries, almost never in the high seas. Catches are often reported as aggregates of various species, therefore making it difficult to obtain for stock assessment analyses.*					
Bullet tuna *Auxis rochei*	Average catch 2005-2009: 4,302 t Catch 2009: 4,317 t			No quantitative stock assessment is currently available for bullet tuna in the Indian Ocean, therefore the stock status is uncertain. Catches of bullet tuna are variable but relatively low compared to the other neritic species. The reasons for this are not clear: it may be problem related to reporting, or it may be a normal fluctuation in the fishery. Bullet tuna is a relatively productive species with high fecundity and rapid growth and this makes it relatively resilient and less prone to overfishing. Nevertheless, bullet tuna appears to be an important prey species for other pelagic species including the commercial tunas.	Stock status is uncertain
Frigate tuna *Auxis thazard*	Average catch 2005-2009: 33,240 t Catch 2009: 33,550 t			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Narrow-barred Spanish mackerel *Scomberomorus commerson*	Average catch 2005-2009: 110,800 t Catch 2009: 108,600 t			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Kawakawa *Euthynnus affinis*	Average catch 2005-2009: 119,900 t Catch 2009: 129,850 t			No quantitative assessment is available. Catches have been relatively stable for the past 10 years.	Stock status is uncertain
Longtail tuna *Thunnus tonggol*	Average catch 2005-2009: 103,800 t Catch 2009: 122,400 t			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Indo-Pacific king mackerel *Scomberomorus guttatus*	Average catch 2005-2009: 38,000 t Catch 2009: 42,330 t			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Sharks: *Although they are not part of the original list of species under the IOTC mandate, sharks are frequently caught in association with other species as by-catch, and often they are as much a target as tuna for some fleets. As such, IOTC Members and Cooperating non-Contracting Parties are expected to report information at the same level of detail as for regular IOTC species, although there is still insufficient information for formal assessments. The following are the main species caught in tuna fisheries, but the list is not exhaustive.*					
Blue shark *Prionace glauca*	Average catch 2005-2009: Uncertain Catch 2009: Uncertain			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Silky shark *Carcharhinus falciformis*	Average catch 2005-2009: Uncertain Catch 2009: Uncertain			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Oceanic whitetip shark *Carcharhinus longimanus*	Average catch 2005-2009: Uncertain Catch 2009: Uncertain			No quantitative assessment is available. No reliable indicators	Stock status is uncertain

Stock	Indicators	Prev. Asm[1]	2010 Asm[2]	Stock status comments	Advice to Commission
Shortfin mako *Isurus oxyrinchus*	Average catch 2005-2009: Uncertain Catch 2009: Uncertain			No quantitative assessment is available. No reliable indicators	Stock status is uncertain
Scalloped hammerhead shark *Sphyrna lewini*	Average catch 2005-2009: Uncertain Catch 2009: Uncertain			No quantitative assessment is available. No reliable indicators	Stock status is uncertain

Key to the colour coding		
	Stock overfished (SB_{year}/SB_{MSY} less than 1)	Stock not overfished (SB_{year}/SB_{MSY} larger or equal to 1)
Stock being overfished (F_{year}/F_{MSY} larger or equal to 1)		
Stock not being overfished (F_{year}/F_{MSY} less than 1)		

Recommendations to the Commission-General

The following recommendations are addressed specifically to the Commission and/or relate to the work of the Secretariat.

1. The SC congratulated the Secretariat on the work conducted during 2010 and continues to strongly support the reinforcement of the Secretariat as indicated in previous years and as recommended by the IOTC Performance Review Panel in 2009.

On Billfish

2. The SC recommended that the Commission consider appropriate Conservation and Management Measures to control and/or reduce effort on the swordfish stock in the south-west Indian Ocean.

On Bycatch Data

3. The SC urged all Contracting parties and cooperating non-contracting parties (CPCs) to comply with data collection and reporting requirements as outlined in the relevant Resolutions relating to ecosystems and bycatch. The SC stressed that this recommendation is made by the WPEB and endorsed the SC every year since 2006 and, therefore, asked the Commission to consider appropriate mechanisms to encourage members to comply with reporting requirements, and to provide historical data.

4. The SC recommended that the actions described in sharks, seabirds, marine turtles and marine mammals respectively, be taken by CPCs to improve the standing of the data on non-tuna species held by the Secretariat.

On Sharks

5. The SC recalled its previous advice that the fins to body ratio requirement has no clear scientific basis as a conservation measure for sharks in the Indian Ocean, rather it appears to be aimed at slowing down the rate of fishing or to deter finning.

6. Consensus was not reached as to replace the current 5% fin to body ratio rule by the landing of sharks with fins naturally attached. The majority of the SC members agreed that the best way to reduce or avoid the practice of shark finning, ensure accurate catch statistics, and facilitate the collection of biological information is to ensure that all sharks are landed with fins naturally attached to the trunk.

7. The SC encouraged IOTC to take the lead in introducing innovative measures for discussion at this joint TRFMO technical working group.

8. Although the SC could not reach consensus on a single approach, the SC proposed three options to be envisaged by the Commission to progress on this issue.

☐**Option 1**: The list of shark species contained in Resolution 08/04, requiring mandatory reporting in longline logbooks, be revised to include eight additional species and species groups as follows:

Under Resolution 08/04	Under new proposal	
	Common name	Scientific name
Blue shark	Blue shark	*Prionace glauca*
Mako shark	Mako sharks	*Isurus* spp.
Porbeagle	Porbeagle	*Lamna nasus*
	Great white shark	*Carcharodon carcharias*
	Crocodile shark	*Pseudocarcharias kamoharai*
	Thresher sharks[9]	*Alopias* spp.
	Tiger shark	*Galeocerdo cuvier*
	Oceanic whitetip shark	*Carcharhinus longimanus*
	Other Requiem sharks	*Carcharhinus* spp.
	Hammerhead Sharks	*Sphyrna* spp.
Other sharks	Other sharks	
	Pelagic stingray	*Pteroplatytrygon violacea*

Option 2: A second list of shark species to be included in Resolution 08/04 as a separate section requesting CPCs to report on these additional species/groups on a voluntary basis until CPCs have the capacity to better train crew to identify these shark species/groups. This option would not require changing the current logbook:

Under Resolution 08/04	Under new proposal	
No list to be recorded on a voluntary basis in the current Resolution	Common name	Scientific name
	Great white shark	*Carcharodon carcharias*
	Crocodile shark	*Pseudocarcharias kamoharai*
	Thresher sharks[Error! Bookmark not defined.]	*Alopias* spp.
	Tiger shark	*Galeocerdo cuvier*
	Oceanic whitetip shark	*Carcharhinus longimanus*
	Other Requiem sharks	*Carcharhinus* spp.
	Hammerhead Sharks	*Sphyrna* spp.
	Pelagic stingray	*Pteroplatytrygon violacea*

Option 3: The list of shark species contained in Resolution 08/04, requiring mandatory reporting in longline logbooks, to be revised to include eight additional species and species groups, as in option 1, EXCEPT for CPCs having a sufficient observer coverage that would be absolve of reporting on this new extended list.

9. The SC noted requests made by several coastal states for technical support in obtaining training materials to improve shark identification, and recommended that the identification cards under current development by the Secretariat are finalized and circulated in 2011.

10. The SC recommended that shark assessment experts be identified by the Secretariat for participation at the next WPEB and for consideration to be given to funding their attendance.

11. The SC recommended that the remaining CPCs provide updates on the progress of developing or implementing NPOA-sharks at the WPEB in 2011.

12. The SC recommended that the IOTC should continue to collaborate with the CMS MoU on sharks

On Seabirds

13. The SC, with the exception of Japan, China and Korea, agreed that in the absence of any scientific information on the effectiveness of line shooters in reducing incidental mortality of seabirds, line

shooters should be removed from the list of accepted seabird bycatch mitigation measures in the Resolution 10/06 on reducing the incidental bycatch of seabirds in longline fisheries.

14. The SC agreed that a revisited line weighting regime should be pushed forward as an efficient mitigation measure but recommended that more experiments are conducted in order to assess the impact on target species.

15. The SC, with the exception of Japan, Korea and China, recommended that in the absence of any scientific observation on the effectiveness of offal discharge management in reducing the incidental mortality of seabirds, that it could be removed from the list of mitigation measures in Table 1 of the Resolution 10/06.

16. From the above (paragr.84, 87 and 91), the SC will recommend a major revision of the current Resolution 10/06 on reducing the incidental bycatch of seabirds in longline fisheries once line weighting options are assessed.

17. The SC urged the Secretariat to complete the seabird identification card project for the consideration of the WPEB in 2011.

18. The SC encouraged the CPCs to develop systems, such as retention of carcasses for later identification, or establish photo identification processes, to improve identification of seabirds to species level, and recommended for this to be reflected in paragraph 7 of Resolution 10/06.

19. The SC noted that 4 CPCs have developed and implemented NPOA-seabirds and that 1 is in the process of finalizing its NPOA-seabird (Appendix VIII).

On Marine Turtles

20. The SC recommended that the IOTC Secretariat, its CPCs and IOSEA, increase cooperation, in particular with regard to reviewing and exchanging available information on tuna fisheries-marine turtle interactions and mitigation, and that the Secretariat should attend the International Symposium on Circle Hooks in Research, Management and Conservation‘ to be held in Miami, USA from 4-6 May 2011, and to report to be to the WPEB in 2011.

21. The SC recommended that distant water fishing nations should join the IOSEA MoU, which had initially been directed toward Indian Ocean coastal countries.

22. The SC recommended that the marine turtle identification sheets be finalized by the Secretariat before the next Session of the WPEB, in cooperation with other relevant organizations.

23. The SC recommended that more marine turtle experts should participate at the next Session of the WPEB.

24. The SC recommended that marine mammal experts, for example from NGOs and IGOs with an interest in the Indian Ocean such as International Whaling Commission, to be encouraged to participate in future meetings of the WPEB.

On Data Collection and Statistics

25. The SC endorsed the recommendations from the WPDCS, as presented in Appendix IV of the WPDCS Report. In particular, the SC expressed some concerns about the timeliness of reporting of statistics from some CPCs and the quality of datasets for some fisheries. The SC reiterated its concerns that late reporting compromises the use of catches from recent years for stock assessment and provision of advice to the Commission based on the most recent information. The SC expressed further concern that some parties have failed to address recommendations for a number of years, recommending that these issues are brought to the attention of the Compliance Committee.

26. The SC agreed on the usefulness of implementing a scoring system to assess the quality of the statistics available at the IOTC, as proposed by the WPDCS, encouraging the IOTC Secretariat to continue with this work. The SC requested the Secretariat to present a first attempt to the next meeting of the WPDCS or, if time allows, to the next meeting of the

27. The SC endorsed the minimum data requirements for gillnet and pole-and-line fisheries. In order to complete this work, the SC recommended that this minimum requirement are translated into proposal of Resolutions for the recording of catch by gillnet and pole-and line fisheries in the IOTC area for presentation at the next meeting of the Commission.

On Progress in Addressing Recommendations of the KOBE II Workshops and of the Performance Review Panel

28. Regarding bycatch, the SC strongly endorsed the proposed concept of a Bycatch Joint Working Group, and recommended the Secretariat and WPEB make all efforts to expedite its formation. The SC fully supported participation that would facilitate better coordination and avoidance of duplication between t-RFMOs. However, the SC reminded that such a Bycatch Joint Working Group will not replace or undermine the work of the WPEB of the IOTC. The SC strongly endorsed the proposal made that a Bycatch officer should be hired as a permanent staff member of the Secretariat of each of the 5 tuna RFMOs, and developed ToR for such an officer to be recruited at the IOTC Secretariat (Appendix IX). This specialist should attend, with the Chairman of the WPEB, future Kobe Bycatch meetings, and meetings of the Bycatch Joint Working Group.

29. The SC strongly supported the recommendation to increase the IOTC staff resource and the proposal of the Secretariat for a budget for the 2011-2012 biennium that would include additional professional staff.

On the Regional Observer Scheme

30. The SC endorsed the recommendation of the technical workshop that a list of accredited scientific observers should be submitted to the Secretariat and recommended that CPCs do so within the best delays.

31. The SC examined the Observer Trip Report Template produced by the technical workshop, however, recognizing the difficulties for some CPCs to fill all the data fields as required, the SC recommended that this template report should be used until it is revised at the next Session of the WPDCS in 2011

Recommendation to the Commission- On the status of the stocks

The following recommendations were extracted from Section 9 of this report. A table summarizing he status and management advice relating to IOTC species is provided in the Executive Summary of this report.

Tunas

Albacore tuna (*Thunnusalalunga*)

The SC acknowledged the preliminary nature of the albacore tuna assessment in 2008, but noting the available stock status information considers that the status of the stock of albacore is not likely to change markedly over the next 2-3 years and if the price of albacore remains low compared to other tuna species, no immediate action should be required on the part of the Commission. However, new information and estimation for the Indonesian longline fishery has increase the total catch at levels above the estimated MSY.

The SC recommended that a new albacore tuna assessment be presented to the Scientific Committee at the latest in 2011.

Bigeye Tuna (*Thunnusobesus*)

Given the uncertainty on estimated MSY values and the levels of error in the nominal catch data for bigeye, the SC recommended than catches are kept at a level not above the catch estimated at the moment of the assessment for 2009, i.e. 102,000 t. This value should give low probability of catches exceeding MSY.

Skipjack Tuna (*Katsuwonuspelamis*)

Given the limited nature of the work carried out on the skipjack in 2010, no management advice is provided for the stock.

Yellowfin Tuna (*Thunnusalbacares*)

The SC considers that the stock of yellowfin has recently become overexploited or is very close to be so. Management measures should be continued that allow an appropriate control of fishing pressure to be implemented.

At this moment, the effect of time-area closures cannot be directly translated into management quantities of direct effect on the status of the stock, such as catches or fishing mortality, so their possible effect on the future evolution of the stock cannot be evaluated.

The SC recommends that catches of yellowfin tuna in the Indian Ocean should not increase beyond 300,000 t in order to bring the stock to biomass levels that could sustain catches at the MSY level in the long term. If recruitment continues to be lower than average, catches below 300,000 t would be needed to maintain stock levels.

The SC recommends that the situation of this stock is closely monitored.

Southern Bluefin Tuna (*Thunnusmaccoyii*)

Manage by the CCSBT.

Billfish

Swordfish (*Xiphiasgladius*)

If the recent declines in effort continue, and catch remains substantially below the estimated MSY of 29,000 t, then there is probably no urgent need to introduce restrictive management actions to the Indian Ocean as a whole. However, continued monitoring is required to manage the uncertainty.

It is recommended that catches in the south west should be maintained at levels at or below those observed in 2008 (6,426 t), until either *i)* there is clear evidence that substantial rebuilding is occurring (through recruitment or immigration) or *ii)* further analyses indicate that the current assessment is inappropriate.

Black Marlin (*Makairaindica*)

No quantitative stock assessment is currently available for black marlin in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore the stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Blue Marlin (*Makairanigricans*)

No quantitative stock assessment is currently available for blue marlin in the Indian Ocean, and due to a lack of data for several gears, only preliminary stock indicators can be used. . Therefore the stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Striped Marlin (*Tetrapturusaudax*)

No quantitative stock assessment is currently available for striped marlin in the Indian Ocean, and due to a lack of fishery data for several gears, only preliminary stock indicators can be used. Therefore the stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Indo-Pacific Sailfish (*Istiophorusplatypterus*)

No quantitative stock assessment is currently available for Indo-Pacific sailfish in the Indian Ocean, and due to a paucity of data there a no stock indicators that are considered to be reliable, therefore the

stock status is uncertain. However, aspects of the biology, productivity and fisheries for this species combined with the lack of data on which to base a more formal assessment is a cause for considerable concern. Research emphasis on improving indicators and exploration of stock assessment approaches for data poor fisheries are warranted.

Neritic Tuna

Bullet Tuna (*Auxisrochei*)

No quantitative stock assessment is currently available for bullet tuna in the Indian Ocean, therefore the stock status is uncertain. The SC notes the catches of bullet tuna are typically variable but relatively low compared to the other neritic species. The reasons for this are not clear: it may be problem related to reporting, or it may be a normal fluctuation in the fishery. Bullet tuna is a relatively productive species with high fecundity and rapid growth and this makes it relatively resilient and less prone to overfishing. Nevertheless, bullet tuna appears to be an important prey species for other pelagic species including the commercial tunas.

The SC recommended that bullet tuna be reviewed at the first meeting of the IOTC Working Party on Neritic Tunas.

Frigate Tuna (*Auxisthazard*)
No quantitative stock assessment is currently available for the frigate tuna in the Indian Ocean, therefore the stock status is uncertain. This species is a relatively productive species with high fecundity and rapid growth and this makes it relatively resilient and not prone to overfishing. Nevertheless, frigate tuna appears to be an important prey species for other pelagic species including the commercial tunas.
The SC recommended that frigate tuna be reviewed at the first meeting of the IOTC Working Party on Neritic Tunas.

Indo-Pacific King Mackerel (*Scomberomorusguttatus*)
No quantitative stock assessment is currently available for the Indo-Pacific king mackerel in the Indian Ocean, therefore the stock status is uncertain. This species is a relatively productive species with high fecundity and rapid growth and this makes it relatively resilient and not prone to overfishing.
The SC recommended that Indo-Pacific king mackerel be reviewed at the first meeting of the IOTC Working Party on Neritic Tunas.

Kawakawa (*Euthynnisaffinis*)
No quantitative stock assessment is currently available for kawakawa in the Indian Ocean, therefore the stock status is uncertain. The SC notes that catches have been relatively stable for the past 10 years.
The SC recommended that kawakawa be reviewed at the first meeting of the IOTC Working Party on Neritic Tunas.

Longtail Tuna (*Thunnustonggol*)
No quantitative stock assessment is currently available for longtail tuna in the Indian Ocean, therefore the stock status is uncertain. The SC notes the catches of longtail tuna are increasing.

The SC recommended that longtail tuna be reviewed at the first meeting of the IOTC Working Party on Neritic Tunas.

Narrow-Barred Spanish Mackerel (*Scomberomoruscommerson*)
No quantitative stock assessment is currently available for narrow-barred Spanish mackerel tuna in the Indian Ocean, therefore the stock status is uncertain. The SC notes that Spanish mackerel is a relatively productive species with high fecundity and this makes it relatively resilient and less prone to overfishing.
The SC recommended that narrow-barred Spanish mackerel be reviewed at the first meeting of the IOTC Working Party on Neritic Tunas.

Sharks

The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on sharks.

The SC agreed that three options should be considered for amendment of Resolution 08/04 *concerning the recording of the catch by longline fishing vessels in the IOTC area* in order to improve data collection and statistics on sharks that would allow the development of stock status indicators. The 13th SC report have provided the executive summary of the status of blue sharks ((Prionaceglauca), Silky sharks (*Carcharhinusfalciformis*), oceanic whitetip sharks (*Carcharhinuslongimanus*), shortfinmako sharks (*Isurusoxyrinchus*), scalloped hammerhead sharks (*Sphyrnalewini*).

Marine Turtles

The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on marine turtles. The SC also recalled its recommendation from 2009 that Resolution 09/06 does apply to leatherback turtles in its entirety, and that the term _hard-shelled' should be removed from Resolution 09/06 when the resolution is revised. Overview of the marine turtle species (green turtle (*Cheloniamydas*), hawksbill turtle (*Eretmochelysimbricata*), leatherback turtle (*Dermochelyscoriacea*), loggerhead turtle (*Carettacaretta*), olive ridley turtle (*Lepidochelysolivacea*), flatback turtle (*Natatordepressus*), was available in the 13th SC. The information on the interactions between marine turtle and fisheries for tuna and tuna-like and IOTC's approach to enhance the conservation of marine turtles was reported in this 13th SC.

Seabirds

The SC recommended that mechanisms are developed by the Commission to encourage CPCs to comply with their reporting requirement on seabirds.

The SC recommended that a major revision of the Resolution 10/06 *on reducing the incidental bycatch of seabirds in longline fisheries* should be considered, in the near future, once its impact is examined. Such revision may include the removal of the use of line shooters and offal management from the list of seabird mitigation measures.

Guidelines for the Presentation of Stock Assessment Models

A set of guidelines for the presentation of stock assessment models and results was agreed by the SC. These guidelines attempt to ensure greater transparency and facilitate peer-review of models

employed in the provision of advice on the status of the stocks. Scientists presenting model runs should provide to the Secretariat a copy of all input and output files and of the executable file or files used. These will be archived for future testing and replication. Scientists are encouraged to freely share the source code of the methods used.

Documents should describe the available data and mention, if necessary, data sources or observations not included in the analysis. When referring to datasets provided by the Secretariat, the date, coverage and precise database should be mentioned. Data sources not previously seen by a Working Party might need their own document presenting them. This includes standardized CPUE series or other data sources processed prior to use.

The population dynamics that are modelled and the techniques used should be clearly presented including a description of the partition, annual cycle, and other relevant population processes.

Alternative scenarios and retrospective analyses should ideally be carried and, if included, a description of the motivation for the selection of base and alternative cases should be added, giving detail of how the alternative case assumptions differ from those of the base case. The description of any retrospective analyses should cover the assumptions involved and results obtained. Projections should be similarly documented.

Documentation guidelines

Software inspection and archival

☐ Input and output files of all alternative runs or scenarios presented should be made available during the meeting for inspection by interested members and for later archiving by the Secretariat. Ideally, these should be stored together with a copy of the software used in the analysis. When this is not possible due to licensing issues, a complete reference of the versions of both software and operating system employed should be made. Similarly, confidential inputs need not be provided but they should be documented and identified.
☐ Software used should ideally be open sourced using an appropriate license, or at least be made available to interested parties for inspection under a limited license. If closed source software is used, this should be clearly justified and sufficient tests as to its validity and reliability, under similar circumstances as those under which it will be used in IOTC-related work, should be carried out and its results made available.
☐ Comprehensive testing, including regression testing and testing of the influence of various assumptions, is greatly encouraged in all cases.

Observations

☐ Describe the available data and mention, if necessary, data sources or observations not included in the analysis. When referring to datasets provided by the Secretariat, indicate the date, coverage (years, fleets, areas), and precise database (*e.g.*NC, CE).
☐ Data sources not previously seen by a Working Party might need their own document presenting them. This includes standardized CPUE series or other data sources processed prior to use.

Standardized CPUE indices of abundance

☐ Description of data pre-processing (*e.g.* treatment of outliers, selection of core areas if applicable)
☐ Efforts should be made to describe temporal and spatial patterns in the data, identifying gaps or sudden operational changes that that lead to an unbalanced design.

☐ Software and specific function calls
☐ Standard diagnostic plots (residuals, leverage plots, etc)
☐ Parameter values, including error estimates
☐ For complicated models, a stepwise progression from simpler models should be documented to help identify confounding, and a distinction between statistical significance and practical significance.
☐ Efforts should be made to circulate these analyses well in advance of the relevant working party to allow discussion, and timely implementation in the stock assessment analyses.

Population dynamics ☐ Describe the population dynamics that are modelled and the techniques used including a description of the partition (age/length/sex groups, maturity, spatial structure, movement dynamics, if necessary), annual cycle (time steps, growth assumptions, natural and fishing mortality functions, recruitment, and sequence of those), and relevant population processes. Fixed parameters should be identified and documented. Emphasis should be placed in describing the formal statistical methods applied, including modelling methods, and form, limits and assumptions of both free and derived parameters.

Statistical methods

☐ Describe of the formal statistical methods, including

1. Software name, version number, bibliographic references and source

2. Maximum likelihood or objective function

3. Bootstrap assumptions and McMC algorithm, if used.

☐ Describe the free parameters used by the model, including

1. Name and description of the parameter

2. Details of the estimation bounds/functional relationships with other parameters

3. Details of the prior assumed (if any), and source of the prior

4. Weightings for likelihood terms

5. Adjustment of variance by scaling/adding process error

6. Penalties

☐ Describe the derived parameters used by the model, including

1. Name, description and definitions of derived parameters (be precise with those that have alternative definitions, *e.g.*, B0, MSY, BMSY)

2. Details of any bounds/functional relationships with other parameters.

3. Details of any priors assumed (including source).

Scenarios and retrospective analyses

☐ Alternative scenarios and retrospective analyses should be carried when possible and, if included, a description of the motivation for the selection of base and alternative cases should be added, giving detail of how the alternative case assumptions differ from those of the base case. Description of any retrospective analyses, should cover the assumptions involved and results obtained. Projections should be similarly documented.

Annex 16

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

National Fish Stock Assessment Program

By

Putuh Suadela

Ministry of Marine Affairs and Fisheries
Indonesia

NATIONAL FISH STOCK ASSESSMENT PROGRAM

BY: PUTUH SUADELA, S.PI

SPECIAL MEETING ON IMPROVEMENT OF TUNA INFORMATION
AND DATA COLLECTION IN SOUTHEAST ASIA
7 – 9 SEPTEMBER 2011, SONGKHLA PROVINCE, THAILAND

DIRECTORATE OF FISH RESOURCES AND MANAGEMENT
DIRECTORATE GENERAL OF CAPTURE FISHERIES
MINISTRY OF MARINE AFFAIRS AND FISHERIES - REPUBLIC OF INDONESIA

1

PURPOSE
Fish Stock Assessment

- Fish stock assessment research purposes is at making quantitative predictions about the reactions of fish populations that are dynamic on a number of alternative management by using a number of methods and statistics and also mathematical calculations
- Fish stock assessment research carried out to determine the structure and stock size, productivity (including age, growth, mortality, recruitment) and distribution of fish resources, the estimated results sustainable fish resources and the assessment of risk arising from the arrest of the options that applied.

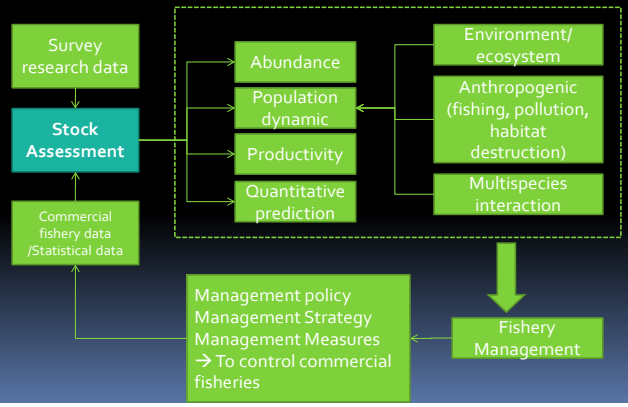
2

Institution

- Marine and Fisheries Research and Development Agency (MFRDA)
- Directorate General of Capture Fisheries (DGCF)
- National Commission for Fish Resources Assessment (NCFRA)

3

Relation of Stock Assessment in Fishery Management



4

Stock Assessment Measures

- Determination of stock definition by biologically and geographically (fish resources classification, fisheries management area)
- Determination of sampling technique and data collecting activities (using enumerators and observer)
- Determination of stock assessment model including the parameters (growth, mortality) and carry out the assessment
- Result presentation

5

Methodology

1. Analytic Model
2. Production Surplus Model Surplus
3. Tagging Method
4. Population Discrimination
5. Otholimetric Technique
6. Trawl surveys
7. Marine Technology Application
8. Remote Sensing System Application
9. Eggs and Larva Survey
10. Direct Census survey techniques
11. Deep Seas Fish Resources Exploration Survey

6

Methodology

1. Analytic Model
   - apply for species with high abundance in competitive area.
   - Lemuru (*Sardinella longiceps*) - Bali Strait, Layang (*Decapterus russelli, D. macrosama*) – Java Sea, Kembung (*Rastrelliger kanagurta*) – Java Sea, White Prawn (*Penaeaus merguensis*) – Arafura Sea.
2. Production Surplus Model
   - Mostly use as relatively fast model to get picture about stock status.
   - As initial indicator to use in have utilization status in fish resources stock assessment.
   - Use statistical data which designed to monitor fisheries production and afterward use for quick descriptive calculation.
3. Tagging method
   - Skipjack in pole and line fisheries – eastern part Indonesian waters
   - Not continued because of operational technique obstacle.

7

Methodology

4. Population discrimination
   - Small pelagic species
   - Morphometric and meristic analysis, blood analysis, population genetic
5. Otholimetric Technique
   - Specimen collected → microscopic analysis in France lab.
   - Tuna → cooperation with CSIRO
6. Trawls Survey
   - Begin 1974 until 1979 in Java Sea.
   - This method still in use, but need to renew the media.

8

Methodology

7. Marine technology application
   - Begin 1972
   - Use fish finder, sonar and middle trawl
   - Bali Strait, Java Sea, Sunda Strait, Eastern part of Java,
8. Remote Sensing System Application
   - Fish tracking in off shore.
   - Information: pelagic fish abundance estimation position mapping, fish movement pattern.
9. Eggs and larva survey
   - Sunda Strait in 1999 → small pelagic larva
   - Labuha Bay in 1996 → skipjack eggs and larva

9

Methodology

10. Direct Census survey techniques
    - Season movement and number fishing fleet estimation for mini purse seine in northern part of Java – 1996.
11. Deep Seas Fish Resources Exploration Survey
    - Inventories deep sea species, not yet for utilization opportunity.

10

Stock Assessment Data

- Commercial fishery data:
  - Volume of catch
  - Species and catch size composition
  - Catch per unit effort
- Survey research data
  - Volume of catch
  - Species and catch size composition
  - Catch per unit effort
  - Biological data such as life history data (food and feeding habits, reproduction), population dynamic (recruitment rate, mortality, recruitment growth)

11

Stock Assessment Activities by Marine Fisheries Research Office

YEAR	ACTIVITIES
1997	9 FMA
2000	3 FMA
2001	4 FMA
2002	4 FMA
2003	4 FMA
2004	?
2005	Demersal fish and Penaeid Shrimp in South China Sea and Makassar Strait
2006	Demersal fish and Penaeid Shrimp in South China Sea, Java Sea and Makassar Strait
2007	-
2008	-Large pelagic and small pelagic fish resources in Sulawesi Sea and Pacific Sea - Demersal fish resources and importance economic species in Malacca Strait and Eastern Part of Sumatera
2009	-Demersal fish resources and importance economic species in Malacca Strait and Eastern Part of Sumatera - Large pelagic and small pelagic fish resources in Sulawesi Sea and North Irian Pacific Ocean

12

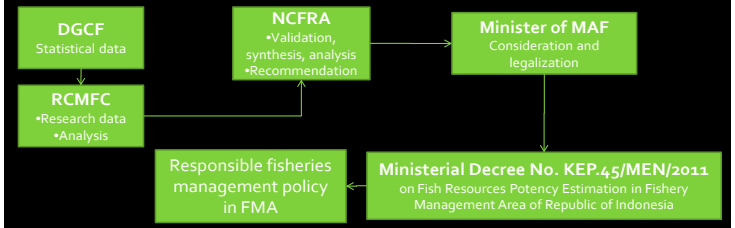
Stock Assessment Result

- Fish abundance estimation (volume, biomass) → MSY and TAC for fish resources in each FMA and national.
- Population dynamic → utilization level of fish resources by FMA and national
- Management alternative → development opportunity and fishing effort control

1.

13

Implementation Process



- Directorate General of Capture Fisheries (DGCF) provide statistical data and submit to MFRDA.
- Marine and Fisheries Research and Development Agency (MFRDA) collect research data .
- MFRDA process and analyze the primary data and secondary data, which in turn will be delivered to National Commission for Fish Resources Assessment (NCFRA) for further analysis and consideration.
- Furthermore, NCFRA will submit their recommendation to the Ministry of Marine Affairs and Fisheries for further consideration and legalize through regulation.

14

Problem and constrain involving in the assessment process

- Fisheries characteristic: multi species and multi gear.
- Limited time series fisheries data.
- Difficulties on doing stock assessment research full in one year (so it can cover two main season and two transition session in Indonesia)
- Limited research vessel in quantity and also in quality (cruise ability and equipment, sampling gear, hydro-acoustic tools, etc)
- Limited stock assessment biologist expert in quantity and quality
- Difference perception on stock assessment between institutions.
- Budget constraint.

15

Recommendation

- Every stock assessment shall be follow by monitoring program to collect data, including information on catch and effort, as assessment substance on effectiveness of management strategy.
- Assessment shall be conduct along the year to detect season variation of abundance, fish density per unit area or volume, biomass per unit area, average of fish size, etc.
- Need working network to make the same perception about stock assessment and research activity needed, improving the efficiency of inter-institutional, and to do open comprehensive consolidation, evaluation, and assessment.

16

Annex 17

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Coastal Tuna Stock Assessment Methodology

By

NoraisyahBinti Abu Bakar

Department of Fisheries

MALAYSIA

COASTAL TUNA STOCK ASSESSMENT METHODOLOGY

DEPARTMENT OF FISHERIES
MALAYSIA

1

Tuna Stock Assessment

Background

- Traditional stock assessment
  – data on logbook system
  - Routine sampling

Fisheries scientists realized that tagging
– useful to solve certain issues related to the tuna resources management such as their migration routes and growth

2

Tuna Stock Assessment

- Tagging
  - During 30 years (Pacific and Indian Ocean) – provided information on tuna biology and stock structure
  - Basic tool for estimating the importance of interactions and competitions between fisheries as well as tuna population size and mortality rates

3

Tuna Stock Assessment

- For Malaysia, we didn't conduct any specific stock assessment on neritic tuna.
- Only observed status annual landing of neritic tuna to determine the present stock
- Neritic tuna tagging proggramme – to get information on
  - Migration/movement
  - Biological parameters
    - Growth
    - Exploitation rates
    - Length infinity

4

Tuna Stock Assessment

- The Malaysian Marine Fishery Resources Development and Management Department (MFRDMD)has carried out neritic tuna tagging programmes in :
  - 1990
  - 1992
  - 1994
  - 1996
  - 1998

  To provide information on migration/movement and its growth. Also provide information on exploitation.

5

Collation of Recovery Data

- Tagged fish are normally returned by public or individual fishermen
- RM15 for each tag returned (USD5)
- Publicity – Local radio, newspaper and posters

6

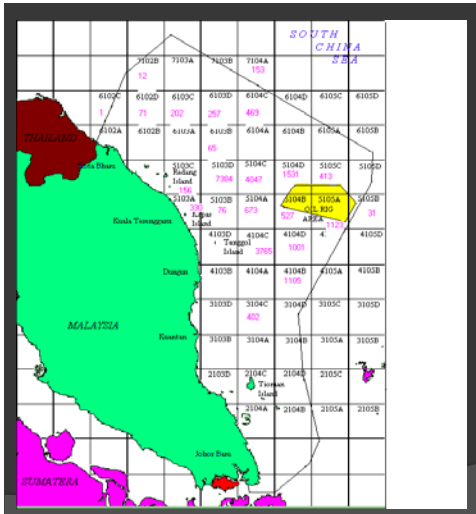
Tagging Information

Information recorded includes;

- Date of tagging
- Tag ID
- Species
- Total Length (release)
- Location by GPS
- Fish condition
- Fishing gear

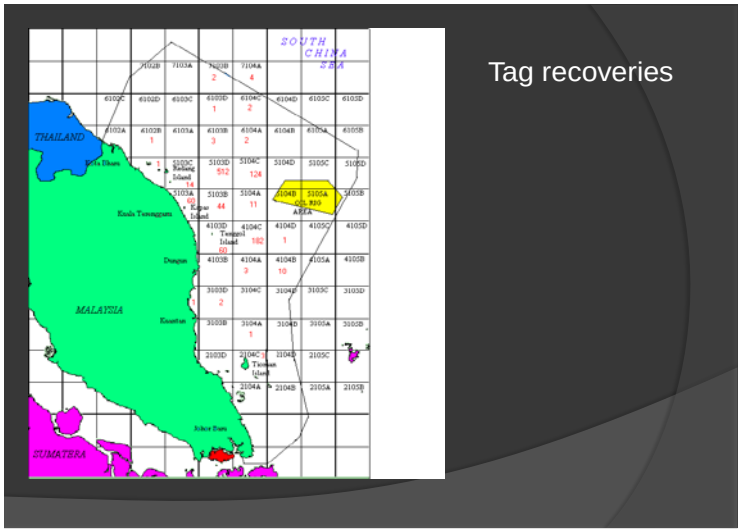
- Date of recapture
- Tag ID
- Species
- Total Length recapture
- Recapture location
- Fish body weight
- Recapture gear

7



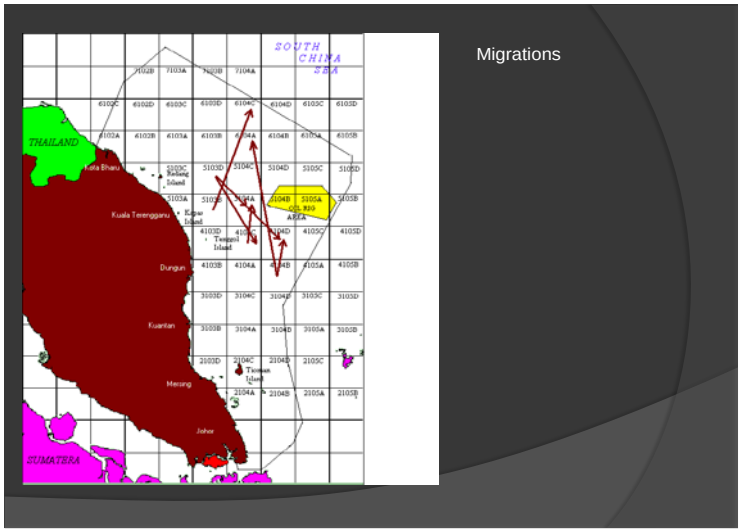
Tagging Info

8



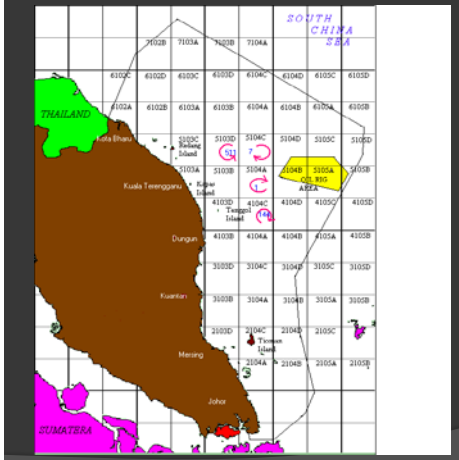
Tag recoveries

9



Migrations

10



Static movements

It also indicated static or less movement of small pelagic due to high fishing pressure in those grid areas

11

THANK YOU

12

Annex 18

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

National Stock Assessment Program (NSAP) Methodology

By

Noel Barut

National Fisheries Research and Development Institute

PHILIPPINES

National Stock Assessment Program (NSAP)

Methodology

1

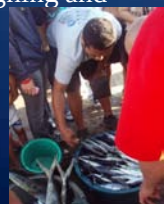
Background

- The National Stock Assessment Program (NSAP) was conceptualized due to the lack of standardized and continuous information on fishery resources, e.g. fishery statistics, which is fundamental to fishery management.
- The program was introduced in 1983 and formally implemented nationwide in January 1997.
- Data collection in major and minor landing sites of the identified study areas of each of the 14 political regions of the country is being conducted and supervised by a Regional NSAP Project Leader and Assistant Project Leader.

2

Scope of NSAP

- **1) Orientation and Training**
  - a) Identification of Sampling site of fishing ground to be assessed
  - b) Training of Enumerators/Encoders
    - ✓ Fish identification
    - ✓ Sampling methods
    - ✓ Sample collection: sorting, weighing and raising
    - ✓ Fish Measurements
    - ✓ Filling up of forms
    - ✓ Data encoding



3

Scope of NSAP

- **2) Implementation**
  - a) Boat and gear inventory
  - b) Sampling
  - c) Sorting/Identification
  - d) Fish measurement
  - e) Filling up of forms

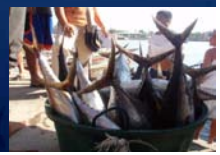
4

Scope of NSAP

❖ **3) Reporting**

a) Generation of tables and graphs
b) Determination of population parameters
c) Data analysis and interpretation of results
d) Technical report writing
e) Publication

❖ NSAP technical reports are available through the NFRDI website:
http://nfrdi.da.gov.ph/publication.html



5

Data Gathered

1) Volume of catch by gear
2) Species composition by gear
3) Fishing effort by gear
4) Length sizes by species and gear
5) Boat and gear particulars (through boat and gear inventory)

6

Methodology

❖ **Data Collection**

➢ Data collection method is done through **random sampling** whereby samples are acquired in a random manner. In such sampling operation, all observations in the population are given the same probability of being sampled the population.

7

Methodology

❖ **Data Collection**

➢ There is a standard sampling schedule for NSAP. Sampling day is scheduled every after two-days in each landing site regardless of Saturdays, Sundays and Holidays. There will be at least 10-11 sampling days each month per landing area.

DAYS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

C/Mj – Commercial or Major landing site

M/Mr – Municipal or Minor landing site

R – Rest day

8

Methodology

❖ NSAP Data Forms

- ➢ NSAP Form 1 : Monthly Report (Landing by Gear & Length Frequency)
- ➢ NSAP Form 2 : Fish Landing Survey Form (Catch & Effort)
- ➢ NSAP Form 2a : Landed Catch & Effort Monitoring (Weight Measurement)
- ➢ NSAP Form 2b: Landed Catch & Effort Monitoring (Length Measurement)
- ➢ NSAP Form 3 : Length Frequency Tally Sheet
- ➢ NSAP Form 4 : Boat Particulars
- ➢ NSAP Form 5 : Gear Particulars

9

Methodology

❖ NSAP Form 1

Monthly Report

NSAP Form 1

National Stock Assessment Program
Region ____

Monthly Report

Fishing Ground ______________ Month ______________
Landing Center ______________ Enumerator(s) ______________

Sample Dates 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

1. Landing by gear

Gear	Date											Total
	Boats											
	Catch											
	Boats											
	Catch											
	Boats											
	Catch											

2. Length Frequency

	Date											Total
SAMPLE	Boats											
	Boxes											
	Kg.											
NO. OF FISH MEASURED												

Comments : ______________

Enumerator(s) ______________
Noted :
Project Leader ______________

10

Methodology

❖ NSAP Form 2

Catch & effort statistics

NSAP Form 2

National Stock Assessment Program
REGION ____

FISH LANDING SURVEY FORM
(Catch and Effort)

Date ______________ Enumerator(s) ______________
Landing Center ______________
Fishing Ground ______________ No. of Samples ______________

Sample Serial Number	Boat Name	Fishing Effort	Fishing Gear	Total Boat Catch		Total Sample		Catch Comp-Market Categories (Boxes/kg)							
				No. of Boxes	Wt. In kg.	No. of Boxes	Wt. In kg.								

Boats
Total no.of fishing boats landing that date (including night landing)

C						
M						

Catch
Total landed catch by gear type (boxes, kg. etc.)

	C	M

Remarks ______________

Fishing Gear Code
RN - Ringnet
GN - Gillnet
BN - Bagnet
DS - Danish Seine
T - Trawl
J - Jigger
TL - Troll line
HL - Hook & Line
DGN - Drift Gillnet
PS - Purse Seine
MHL - Multple Hook & Line

Signature of Enumerators
Noted :
Project Leader

11

Methodology

❖ NSAP Form 2a:

(Landed Catch & Effort Monitoring (Weight Measurement)

NSAP Form 2a

National Stock Assessment Program
Region ______

LANDED CATCH AND EFFORT MONITORING
(Weight Measurement)

Fishing Ground ______________ Fishing Ground ______________
Landing Center ______________ Landing Center ______________
Sampling Date ______________ Sampling Date ______________
Fishing Boat ______________ Fishing Boat ______________
Fishing Gear ______________ Fishing Gear ______________
Total weight of sample ______________ Total weight of sample ______________
Sample Serial No. ______________ Sample Serial No. ______________
Enumerator(s) ______________ Enumerator(s) ______________

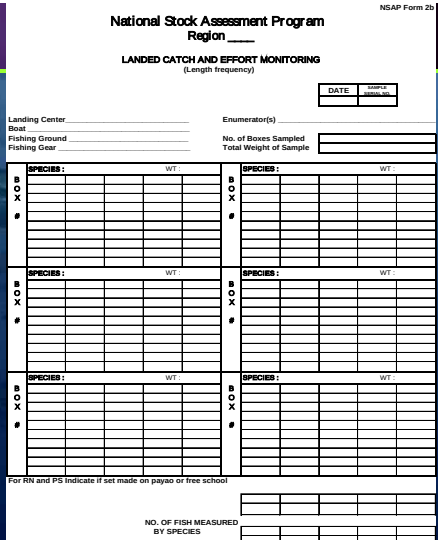
S P E C I E S	WEIGHT (g)

S P E C I E S	WEIGHT (g)

12

Methodology

❖ NSAP Form 2b:
Landed Catch & Effort Monitoring (Length Measurement)



NSAP Form 2b

National Stock Assessment Program
Region ____

LANDED CATCH AND EFFORT MONITORING
(Length frequency)

DATE | SAMPLE SERIAL NO.

Landing Center
Boat
Fishing Ground
Fishing Gear

Enumerator(s)

No. of Boxes Sampled
Total Weight of Sample

BOX # — SPECIES : — WT :

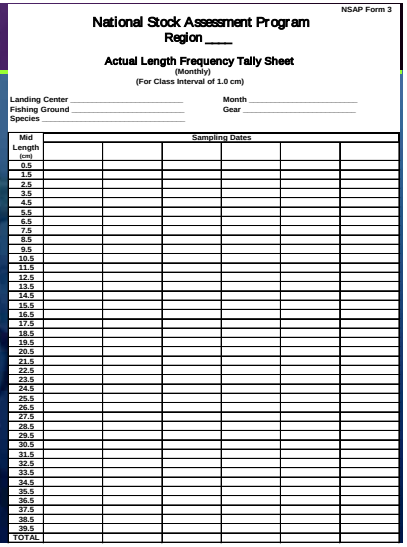
For RN and PS indicate if set made on payao or free school

NO. OF FISH MEASURED BY SPECIES

13

Methodology

❖ NSAP Form 3:
Length Frequency Tally Sheet



NSAP Form 3

National Stock Assessment Program
Region ____

Actual Length Frequency Tally Sheet
(Monthly)
(For Class Interval of 1.0 cm)

Landing Center
Fishing Ground
Species

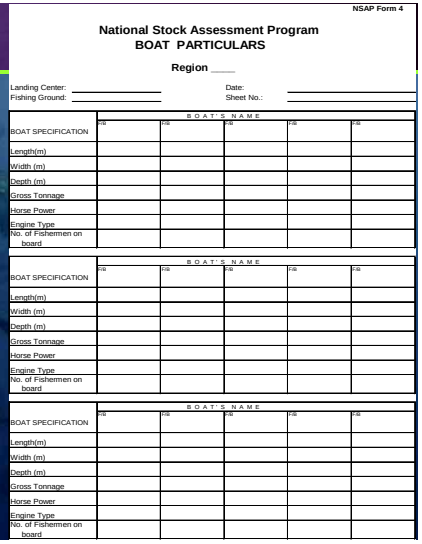
Month
Gear

Mid Length (cm)	Sampling Dates					
0.5						
1.5						
2.5						
3.5						
4.5						
5.5						
6.5						
7.5						
8.5						
9.5						
10.5						
11.5						
12.5						
13.5						
14.5						
15.5						
16.5						
17.5						
18.5						
19.5						
20.5						
21.5						
22.5						
23.5						
24.5						
25.5						
26.5						
27.5						
28.5						
29.5						
30.5						
31.5						
32.5						
33.5						
34.5						
35.5						
36.5						
37.5						
38.5						
39.5						
TOTAL						

14

Methodology

❖ NSAP Form 4:
Boat Particulars



NSAP Form 4

National Stock Assessment Program
BOAT PARTICULARS

Region ____

Landing Center:
Fishing Ground:

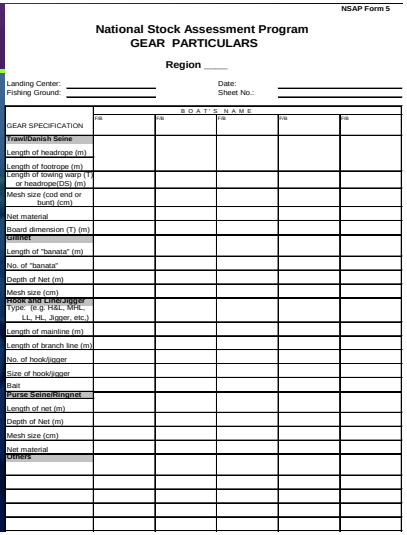
Date:
Sheet No.:

BOAT SPECIFICATION	BOAT'S NAME				
	File	File	File	File	File
Length(m)					
Width (m)					
Depth (m)					
Gross Tonnage					
Horse Power					
Engine Type					
No. of Fishermen on board					

15

Methodology

❖ NSAP Form 5:
Gear Particulars



NSAP Form 5

National Stock Assessment Program
GEAR PARTICULARS

Region ____

Landing Center:
Fishing Ground:

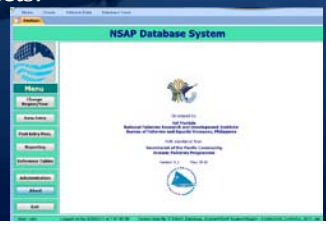
Date:
Sheet No.:

GEAR SPECIFICATION	BOAT'S NAME				
	File	File	File	File	File
Trawl/Danish Seine					
Length of headrope (m)					
Length of footrope (m)					
Length of towing warp (T) or headrope(DS) (m)					
Mesh size (cod end or bunt) (cm)					
Net material					
Board dimension (T) (m)					
Gillnet					
Length of "banata" (m)					
No. of "banata"					
Depth of Net (m)					
Mesh size (cm)					
Hook and Line/Jigger					
Type: (E.g. HBL, MHL, LL, HL, Jigger, etc.)					
Length of mainline (m)					
Length of branch line (m)					
No. of hook/jigger					
Size of hook/jigger					
Bait					
Purse Seine/Ringnet					
Length of net (m)					
Depth of Net (m)					
Mesh size (cm)					
Net material					
Others					

16

Methodology

- At the end of each sampling day, the number of boats that landed and their catch equivalent by species for the day are raised and totaled.
- Separate catches for commercial (C) and municipal (M) landings by fishing gear.
- Data gathered are encoded in the NSAP Database System or MS Excel spreadsheets.



17

Methodology

- **Fisheries Stock Assessment Tools (FiSAT)**
  - a program package developed mainly for the analysis of length-frequency data, but also enables related analyses, of size-at-age, catch-at-age, selection and other analyses.
  - Population parameters (L∞, K, E, Z, etc.)

18

Methodology

- But for tuna stock assessments data are provided to Western and Central Pacific Fisheries Commission (WCPFC) to be incorporated and analyzed using the **MULTIFAN-CL.** The tuna stock assessment analysis is being done by the Secretariat of the Pacific Community-Oceanic Fisheries Program (SPC-OFP) scientists and presented yearly during the WCPFC Scientific Committee Meeting.

19

Challenges

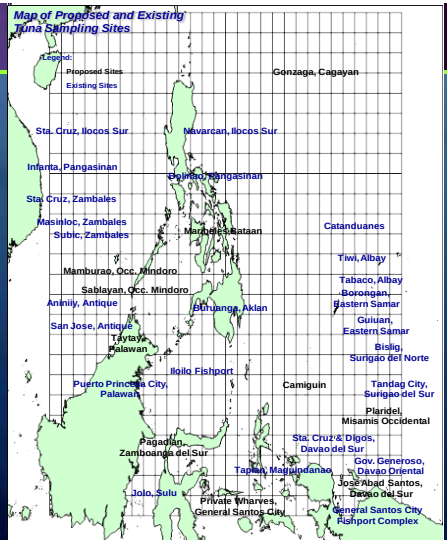
- There are tuna landing areas which are not covered by the NSAP monitoring activities due to budgetary constraints.
- There is a fast turn-over of personnel involved in NSAP that makes implementation more challenging. With this there is a need to continually train/develop personnel involved in NSAP activities.
- There is also a need to conduct a country-wide boat and gear inventory in the municipal and commercial sectors to cover not just the NSAP sites but also the non-NSAP sites to have a better estimate of the number of boats and gears engage in tuna fishing activities.

20

Future Plans

- Continuation of NSAP activities to establish the trends in catches in terms of catch by gear, catch composition, average size etc.
  - This data will provide for the necessary information on the status of the resources, which is always asked for to support the formulation of management actions.
- Expansion of NSAP monitoring activities focusing on tuna monitoring is expected with additional funding support.
- Additional activities will be undertaken to determine other biological features of major species in each of the study areas (e.g. sex and maturity stages, fecundity, length and weight correlation)

21



22

23

Methodology

For class interval of **1.0 cm**

(Example: *Decapterus macrosoma* – Shortfin scad)

Length interval	Midlength	Frequency
0 - 0.999	0.5	
1.0 - 1.999	1.5	
2.0 - 2.999	2.5	
3.0 - 3.999	3.5	
4.0 - 4.999	4.5	
5.0 - 5.999	5.5	3
6.0 - 6.999	6.5	6
7.0 - 7.999	7.5	8
8.0 - 8.999	8.5	10
9.0 - 9.999	9.5	22
10.0 - 10.999	10.5	20
etc. . . .		

24

Methodology

For class interval of **0.5 cm**

(Example: *Leiognathus bindus* – Orangefin ponyfish)

Length interval	Midlength	Frequency
0 - 0.499	0.25	
0.5 - 0.999	0.75	
1.0 - 1.499	1.25	
1.5 - 1.999	1.75	
2.0 - 2.499	2.25	
2.5 - 2.999	2.75	
3.0 - 3.499	3.25	
3.5 - 3.999	3.75	
4.0 - 4.499	4.25	1
4.5 - 4.999	4.75	
5.0 - 5.499	5.25	1
5.5 - 5.999	5.75	3
6.0 - 6.499	6.25	14
6.5 - 6.999	6.75	22
7.0 - 7.499	7.25	11
7.5 - 7.999	7.75	18
8.0 - 8.499	8.25	10
8.5 - 8.999	8.75	10
9.0 - 9.499	9.25	15
9.5 - 9.999	9.75	8
10.0 - 10.499	10.25	5
10.5 - 10.999	10.75	
etc. . . .		

25

Methodology: Raising

- Unsorted or mixed catch

$$\textbf{Raising factor 1 (Rf)} = \frac{\text{Wt. of species/genus group}}{\text{Total sub-sample weight}} \times \text{Total boat catch (weight)}$$

- Pre-sorted Catch (by family, genus or species)

Rf 2 = Weight of container of species A **x** Number of containers

26

Annex 19

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Coastal Tuna Stock Assessment Methodology

By

Praulai Nootmorn

Department of Fisheries

THAILAND

Coastal Tuna Stock Assessment Methodology

PraulaiNootmorn

Marine Fisheries Research and Technological Development Institute

Marine Fisheries Research and Development Bureau,

Department Of Fisheries, Kaset-Klang, BangKhen, Bangkok 10900 Thailand

E-mail: nootmorn@yahoo.com

Thailand is one of the ten top ranking countries of marine fishery production in the world. Its total production from capture fisheries and coastal aquaculture totalled 2.64 MT in 2004. Fifty-six percent of landings were recorded within the country‟s EEZ, the remaining catches were from distant fisheries. Thailand‟s marine fisheries are classified into 2 main categories, i.e. small-scale fisheries (vessel < 5.0 GT, with or without engines < 30 h/p and operated within 5 km from shore) and commercial fisheries. From the census carried out in the year 2000, it appeared that 57,801 families and 158,166 fishermen are engaged in full-time fishing, some supplementing with aquaculture. Fishing gear can be classified into two major groups: small-scale (gillnet 54.8%), and commercial fishing gears (mostly trawls and purse seines). There were 58,119 fishing vessels, with outboard engines (72.7%), inboard engines (22.8%) and no engines (4.5%). Thailand‟s fishing grounds are mainly in the Gulf of Thailand and AndamanSea.

The status of the fisheries in Thailand showed a continuous decrease since the trawl fishing was introduced into Thailand. The catch rate declined enormously from 177.42 kg/hr in 1966 to 17.9 kg/hr in 1998. During the last 3 decades, six important species/groups of pelagic resources, as indicated by the state of the sardines (*Sardinella*spp.), are in an overfishing state. Indo-Pacific mackerel (*Rastrelligerbrachysoma/neglectus*) and bigeyescad (*Selarcrumenophthalmus*) are also fully exploited. Round scads (*Decapterus*spp.) and anchovies (*Stolephorus*spp.) are heavily exploited. Neritic tunas resources (*Thunnustonggol*, *Euthynnusaffinis*and *Auxisthazard*) were estimated to be at the MSY level. Indian mackerel (*Rastrelligerkanagurta*) did not seem overfished. Demersal fish and shrimp had been estimated to be heavily exploited for a long time and cephalopods were estimated to be fully exploited. Thai fisheries face 3 main issues: economic - too high investment, social - conflict between different groups of fishermen, and political - inadequate fishery regulations.

Recommendations made at national and regional levels required primary attention on the development of fishery strategic plans and the periodical determination of total allowable fishing effort and catch. Amendments to the existing fisheries regulations covered the conservation and management of fishery resources and environment, as well as the improvement of fisheries information of catch statistic, both inside and outside Thai waters, and including improvement of socio-economic information. Fishing technology to reduce by-catch and discards is promoted.

In order to manage the straddling fisheries resources in Thai and neighbouring waters, two levels of management policy, i.e. at national and regional levels, should be established.

Collaboration on training on new technologies, establishing data sharing and exchanging mechanism and sharing management experiences among the member countries should be initiated. Management of shared resources will require compatibility of measures across jurisdictions, consensus among the countries and funds should be made available for the necessary mechanisms to be put in place.

Neritic tunas Resource in Thai Waters Project will be study during 2011-2014. The main project will be 4 sub-projects as followed

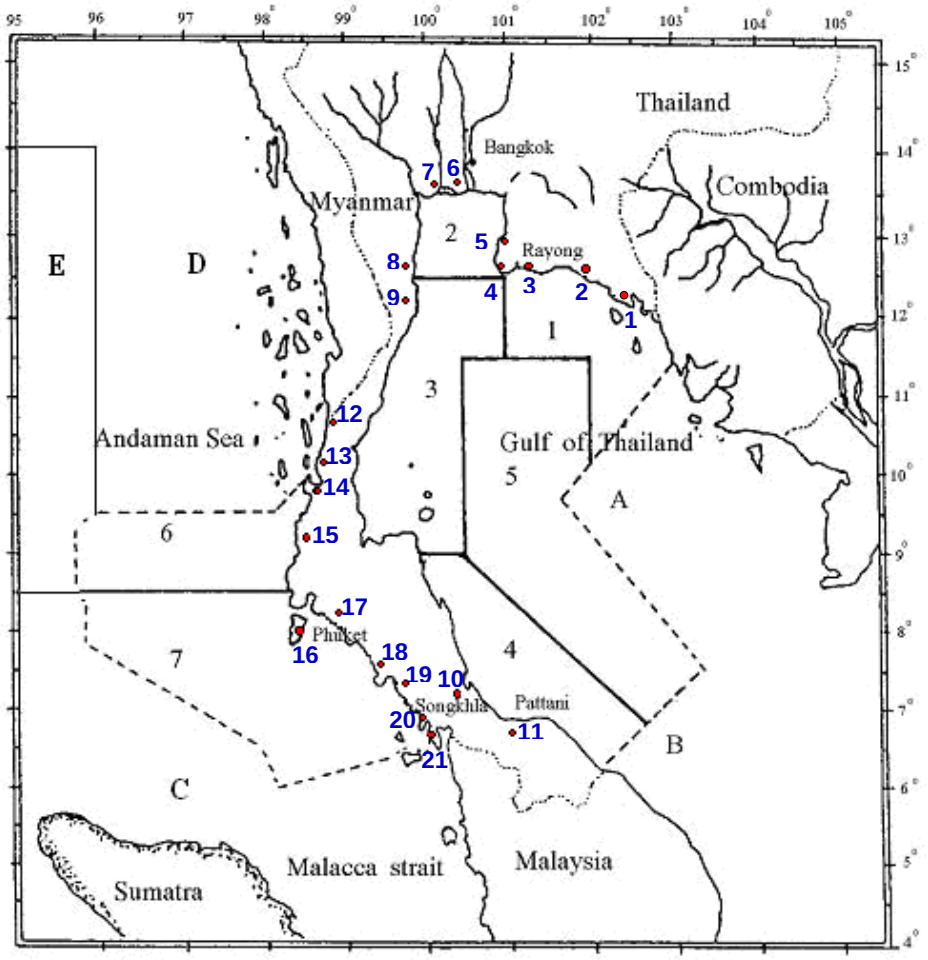
- Neritic tunas ResourceStatus and Fisheries in the Gulf of Thailand

- Neritic tunas Resources Status and Fisheries in the Andaman Sea Coast of Thailand

-Reproductive Biology of the Eastern little tuna, Frigate tuna and Longtail tuna in the Gulf of Thailand

-Reproductive Biology of the Eastern little tuna, Frigate tuna and Longtail tuna in the Andaman Sea Coast of Thailand

Data collection will be port sampling at landing sites along the Gulf of Thailand and the AndamanSea (Figure 1). The main fishing gears of neritic tunas is purse seines and king mackerel gillnet, then enumerator will be interview fishing information such as fishing ground, fishing efforts, catch per trip from crew or fishing master by monthly in each landing site. Neritic tunas will be sampling from these gears, then identify and measure weight and size individually.



1. LaemNgop, TratProvince
2. Thamai, Chanthaburi Province
3. Muang, RayongProvince
4. Sattahip, Chonburi Province
5. Sriracha, Chonburi Province
6. Pak Nam, SamutprakanProvince
7. Muang, SamutsakhonProvince
8. Cha-Um, PhetchaburiProvince
9. Pranburi, PrachuapKhiriKhanProvince
10. Muang, Songkhla Province
11. Muang, PattaniProvince
12. Muang, RanongProvince
13. Kuraburi, Phang-nga Province
14. Takuapa, Phang-ngaProvince
15. Taimuang, Phang-nga Province
16. Muang, PhuketProvince
17. Muang, KrabiProvince
18. Kantang, TrangProvince
19. Palian, TrangProvince
20. La-nga, Satun Province
21.Munag , Satun Province

Remark : Fishing ground BA: Thailand and Malaysia

BB: Malaysia and Indonesia

BC: ThailandMalaysia and Indonesia

Figure 1. Fishing grounds and landing place of Thai fishing Vessels

Methodology to analysis data

-Catch Per Unit Effort, CPUE

$$\overline{CPUE} = \frac{\sum_{i=1}^{n} cpue_i}{n}$$

When $\overline{CPUE}$ = average catch (kg/day)

$cpue_i$ =Catch from sampling vessel$_i$ ((kg/day)

n = Number of sampling vessel

-Percentage of neritic tunas and Total catch (number of fish) that applied from length and weight relationship.

-Estimate Growth parameters following von Bertalanffy equations.

$$L_t = L_\infty (1 - e^{-K(t - t_0)})$$

เมื่อ L_t = Length at age t (cm)

L_∞ = Asymptotic length (cm)

K = Growth parameter coefficient (per year)

t_o = Age of neritic tunas at L_0 (year)

t = Age of neritic tunas (year)

L_∞ appliedfromPowell-Wetherall and K estimated by applying ELEFAN-Imodule in FISAT program.

-Estimate natural mortality coefficient (M) followed Pauly' s empirical formula and estimate Total mortality coefficient (Z)using linearized length converted catch curve and fishing mortality coefficient (F)will be equal

$$F = Z - M$$

The exploitation ratio (E) equal:

$$E = \frac{F}{F + M} = \frac{F}{Z}$$

-Estimate length structure virtual population analysis is using Jones' Length-based Cohort AnalysisModel

-Estimate total catch in number of fish each month as follow equation:

$$H_i = \left[(L_\infty - L_i) / (L_\infty - L_{(i+1)})\right]^{(M/2K)}$$

-Number of survivor is using equation:

$$N_{Li} = C_i / E_i$$

-Calculated the fishing mortality, (F_i) is

$$F_i = M * (F_i / Z_i) / (1 - F_i / Z_i)$$

-Calculated total mortality and mean body weight, then estimated yield (Y_i)

-The prediction of status of neritic tunas stock is using length based Thompson and Bell Analysis

Annex 20

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

EU regulation related to tuna production

By

Pramuan Rugjai

Deputy Director of Fish Marketing Organization

THAILAND

EU regulation related to tuna production

Pramuan Rugjai
Deputy Director of Fish Marketing Organization

1

Tuna Industries

- Tuna and tuna-like species are of great economics importance and represent a significant source of food
- Approximately 40 species occurring in the Atlantic, Indian and Pacific Oceans and in the Mediterranean Sea
- 5 major commercial species are bigeye,albacore,skipjack,yellow fin and bluefin(north and south)

2

Tuna Industries

- The Global production has increased from less than 0.6 million MT in 1950 to over 4 million MT in 2007 according to FAO
- Tuna catches are taken from the Pacific ocean 69% ,the Indian ocean 21% ,the Atlantic ocean and the Mediterranean sea 10 %

3

Tuna Industries

- The main internationally traded tuna forms are
  (1) raw material for canning (fresh,frozen, and frozen pre-cooked loins)
  (2) tuna for direct consumption (fresh/chilled and frozen)
  (3) canned (solid pack,chunks,flakes,grated)
- Other tuna commerdities include dried and smoked tuna, tuna steaks, tuna burgers, tuna sausage and tuna roe

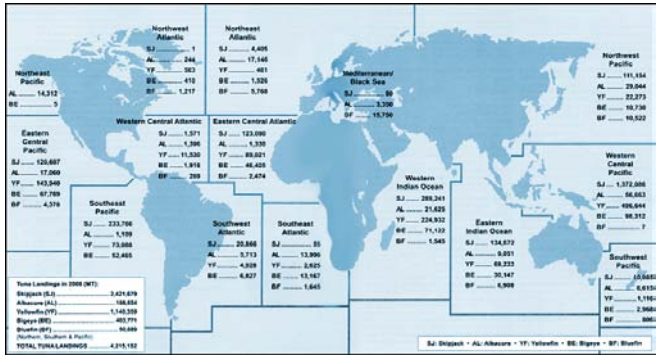
4

Tuna Industries

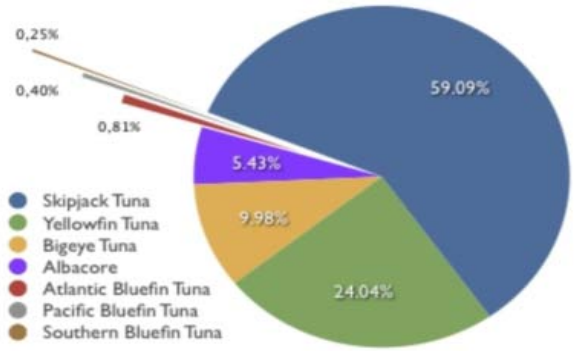
- Japan is the main world market of tuna for direct consumption
- USA and EU are the main world market for canned tuna
- Main imported tuna commodities are frozen skipjack and frozen yellowfin in terms of quantity ,while frozen bigeye and yellowfin in terms of value
- Main importers of fresh,chilled and frozen tuna are Thailand and Japan
- Main world exporters of fresh, chilled and frozen tuna are Taiwan province of China, Spain , France , and Republic of Korea
- Main world exporters of canned tuna are Thailand , the Philippines

5

World Tuna Catches by Species and FAO Fishing Areas 2008 (in MT)



6



7

8

EU Market for Fisheries Products

- Europe was the world's largest market for fish and aquaculture products in 2007
- European consumption represented US$ 66.5 billion ahead of Japan with US$ 65 billion and the USA on US$ 14 billion
- Japan showed the highest per capitar fish bought at 17.4% of the food budget ,with the EU second on 6.5% and the US on 2.4%
- Two-thirds of EU expenditure was in three countries : Spain ,France , Italy

9

EU Regulation

- Food Safety
  - Regulation (EC) No 178/2002 :Establishing the European Food Safety Authority
  - Council Directive 91/493/EEC :Health condition for the production and marketing of fishery products
- Food Security
  - Council Regulation (EC) No 1005/2008 of 29 September Establishing a community system to prevent,dater and eliminate illigal,unreported and unregulated fishing , amending Regulations(EEC) No 2847/93,(EC) No 604/2004 and repealing Regulations(EC) No 1093/94 and (EC) No 1447/1999

10

EU Regulation

- IUU Regulation
- Legal Base: Council Regulation (EC) No 1005/2008
- Implementing Regulation:Commission regulation(EC) No 1010/2009
  - Reg.No 202/2011 : as regard prior notification templates,benchmarks for port inspection and recognised catch documentation schemes adopted by regional fisheries management organization
  - Reg.No 86/2010 : exchange of information on inspections of third country vessels and administrative arrangements on catch certificate
  - Reg.No 395/2010 :as regard administrative arrangements on catch certificate
  - Reg.No 468/2010: establishing the EU list of vessels engaged in IUU fishing
  - Reg.No 724/2011 : amending Reg.No 468/2011

11

Issues of the world fisheries today

- Overcapacity
- Combating IUU Fishing
- Making members of RFMO accept their full responsibility

12

Annex 21

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Ensuring long term supplies of longtail tuna (*Thunnustonggol*) – benefits for fishers, canners, suppliers and consumers

By

Pattaratjit Kaewnuratchadasorn

Program Manager

SEAFDEC-Sida

Ensuring long term supplies of longtail tuna (*Thunnus tonggol*) – benefits for fishers, canners, suppliers and consumers.

A joint project of stakeholders in Thailand's tonggol canning industry.

Duncan Leadbitter, Sustainable Fisheries Partnership
Maria Åberg, Abba Seafood AB

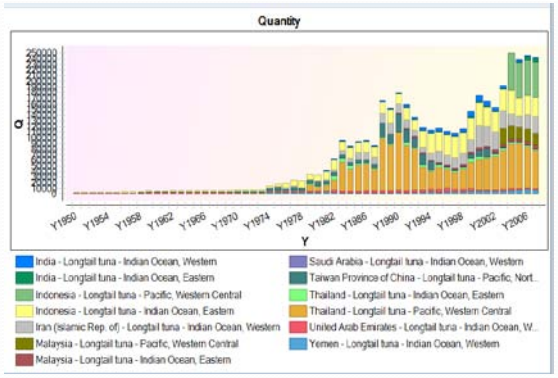
1

Good fisheries management is good business

- Abba Seafood has been a buyer of tonggol from Thailand for over thirty years. We have a well established market in Europe that is based on continuing supplies of quality fish to consumers with a growing interest in sustainability.
- Abba has a commitment to working with partners and stakeholders to ensure that good resource management benefits all interested parties.
- Abba believes that the private sector can and should play a positive role in ensuring that fish resources are effectively managed for future generations.

2

Catches have grown steadily in the past forty years. Thailand, Indonesia and Malaysia are dominant players

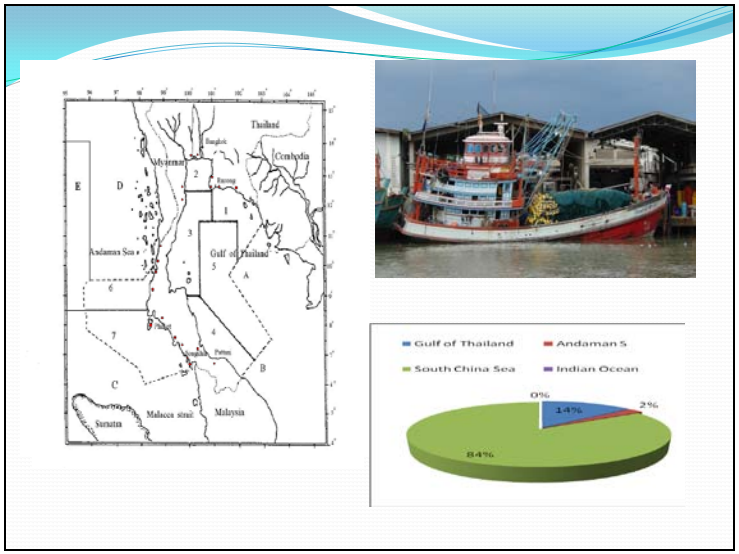


3

Fishery characteristics

- 193 tuna purse seiner around >20 m
- Use mesh size 45 cm
- Fish in the Gulf of Thailand (>90% of total tonggol supply); and Andaman Sea (<10% of total supply)
- Tonggol accounts for 65% of the total PS catch, kawakawa remaining 35%. Both are commonly referred to as neritic tunas. Other species interactions are low
- Fishing trips are from 3-20 days
- Major reductions witnessed in supply flows following loss of access to other country waters..Legitimate landings gauged to be around 11,000 t, when once around 80,000 t.
- Only a marginal corresponding reduction in fleet size
- Most catches potentially taken outside the Thai EEZ, some of which in a Joint Access area, shared with Malaysia
- Some evidence of declining CPUE (Andaman Sea). No equivalent data for the GoT

4



5

What have we done to date?

- Over the past two years Abba has taken the following steps:
  - Discussed its intended project with canneries, fishers, middlemen, the Thailand Fisheries Department, SEAFDEC, FAO and NGOs.
  - Formed a partnership with Sustainable Fisheries Partnerships
  - Created a stakeholder committee, based in Thailand
  - Received project funding from the Swedish International Development Agency (SIDA)
  - Conducted an evaluation of the status of the fishery as the basis for creating a Fishery Improvement Plan

6

Stakeholders

- ABBA Seafood AB
- Department of Fisheries, BKK
- Marine Fisheries Research and Development Bureau (DoF)
- Fish processing and exporting companies
- Fishermen and middlemen
- Thai Fishermen's Union
- NGOs (Sustainable Fisheries Partnership)
- RFMO (Indian Ocean)
- Surrounding countries – Malaysia, Indonesia (Philippines, Myanmar, India)

7

The planning process

- Abba and SFP have embarked on this process as we believe that we can assist government and others to address gaps in information availability and other areas.
- The fishery evaluation was commissioned by the stakeholder committee and was conducted by an international fisheries consulting company – Poseidon. It is available on request (English and Thai)
- The evaluation will be used as the basis for a fishery improvement plan – a draft has been prepared and is to be discussed and approved by the stakeholder committee
- The evaluation has identified a number of areas where investments in research or management would be beneficial.

8

Why is information important to us?

- This workshop is focused on information and so this presentation will cover only the information aspects of the fishery evaluation
- Easy access to timely and accurate information is vital to Abba's business. We need information on the status of stocks and trends in stock size, for example, for business planning and to answer customer inquiries.
- We know that timely and accurate information is central to good fisheries management which is also vital for our long term investments.
- If our assessment is missing some information please provide this and we will make the necessary changes.

9

What have we found to date?

- It is likely that the stock(s) is/are over-exploited but much better information is required on stock distribution and status.
- High quality information is collected but seemingly not made publicly available or used to provide input to management decisions
- The status of other species retained by the fishers (e.g. kawakawa, bonito) is unknown.
- Information on ecosystem interactions is required.

10

Opportunities for collaboration

- The project provides some valuable opportunities for stakeholders and government to work together to improve the fishery. For example:
  - canneries can assist with biological sampling, retrieving tags (if tagging conducted) etc
  - The project can allocate funds to particular data collection activities (e.g. genetic sampling)
  - Some stakeholders can encourage collaboration with other governments
  - The project can seek funding or support agency funding applications.

11

Next steps

- Tonggol is clearly an important species for both people and businesses in Thailand. Abba wants a long term business in Thailand and investing in good fisheries management is part of this.
- A draft Fishery Improvement Plan will be discussed with stakeholders over the next couple of months.
- Once stakeholders have agreed on priorities and discussed these with government an action plan will be prepared
- The plan will be implemented

12

Annex 22

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Tuna Industry Situation and Outlook in Thailand

By

Narin Niruttinanon

Deputy General Manager of Thai Union Group

THAILAND

Tuna Industry Situation and Outlook in Thailand

August 2011

1

TOPICS

1. THAI'S EXPORT OF TUNA PRODUCTS(INCLUDING TUNA PET FOOD) IN 2008-2010
2. CANNED TUNA AND TUNA LOIN SITUATION IN 2008-2010
   - 2.1 EXPORT OF THAI TUNA PRODUCTS
   - 2.2 EXPORT OF THAI TUNA PRODUCTS TO THE EU
     - EU's Import Value of Thai's Top 10 Processed Fishery Products in 2008-2010
     - EU's Import of Tuna Loin from Top 10 Countries
   - 2.3 EXPORT OF THAI TUNA PRODUCTS TO THE MIDDLE EAST AND AFRICA
   - 2.4 EXPORT OF THAI TUNA PRODUCTS TO THE SOUTH AMERICA
3. THAI'S IMPORT OF FROZEN RAW TUNA IN 2008-2010
4. CURRENT SITUATION Jan-Jun 2011
   - 4.1 THAI'S IMPORT OF FROZEN RAW TUNA
   - 4.2 THAI'S EXPORT OF TUNA PRODUCTS

2

1. THAI'S EXPORT OF TUNA PRODUCTS (INCLUDING TUNA PET FOOD) IN 2008-2010

Tuna Products	Quantity (ton by net wt.)			% Growth	Value (million US$)			% Growth
	2008	2009	2010	09/10	2008	2009	2010	09/10
Canned Tuna +Tuna Loin	506,097	534,700	588,727	10	1,960	1,684	1,879	12
Tuna Pet Food	90,928	80,520	69,885	-13	218	193	165	-15
Total	597,025	615,220	658,612	7	2,178	1,877	2,044	9

Source : www.customs.go.th

3

2. CANNED TUNA AND TUNA LOIN SITUATION IN 2008-2010

- 2.1 EXPORT OF THAI TUNA PRODUCTS
- 2.2 EXPORT OF THAI TUNA PRODUCTS TO THE EU
  - EU Import Value of Thai's Top 10 Processed Fishery Products in 2008-2010
  - EU's Import of Tuna Loin from Top 10 Countries
- 2.3 EXPORT OF THAI TUNA PRODUCTS TO THE MIDDLE EAST AND AFRICA
- 2.4 EXPORT OF THAI TUNA PRODUCTS TO THE SOUTH AMERICA

4

2.1 EXPORT QUANTITY OF THAI TUNA PRODUCTS IN 2008-2010

COUNTRIES	QUANTITY (tones)			% GROWTH	% SHARE
	2008	2009	2010	09/10	2010
USA	94,911	112,730	117,352	4	22
EU	79,890	67,728	71,380	5	13
MIDDLE EAST	61,891	60,364	63,157	5	12
CANADA	56,370	30,753	28,835	-6	5
AUSTRALIA/ NEW ZEALAND	44,496	36,946	46,006	25	9
JAPAN/ TAIWAN	1,492	26,024	25,433	-2	5
NEW MARKETS	167,047	159,777	183,317	15	34
WORLD	506,097	494,322	535,480	8	100

Source : www.customs.go.th

5

2.1 EXPORT VALUE OF THAI TUNA PRODUCTS IN 2008-2010

COUNTRIES	Value (Mil. US$)			% GROWTH	% SHARE
	2008	2009	2010	09/10	2010
USA	382	360	387	8	23
EU	331	212	235	11	14
MIDDLE EAST	237	183	197	8	12
CANADA	262	109	108	-1	6
AUSTRALIA/ NEW ZEALAND	195	144	180	25	11
JAPAN/ TAIWAN	6	118	114	-3	7
NEW MARKETS	547	424	459	8	27
WORLD	1,960	1,550	1,680	8	100

Source : www.customs.go.th

6

2.2 EXPORT OF THAI TUNA PRODUCTS TO EU

COUNTRIES	VALUE (Mil.US$)			% GROWTH	% SHARE	QUANTITY (Tones)			% GROWTH	% SHARE
	2008	2009	2010	09/10	2010	2008	2009	2010	09/10	2010
UNITED KINGDOM	64	53	52	-2	69	15,801	16,954	13,961	-18	58
GERMANY	21	11	17	55	23	6,609	4,068	5,496	35	23
FINLAND	21	19	21	11	28	5,528	6,019	6,727	12	28
SWEDEN	15	12	11	-8	15	3,975	3,804	3,475	-9	14
NETHER LANDS	14	15	21	40	28	4,012	5,070	7,676	51	32
DENMARK	8	5	6	20	8	1,802	1,487	1,705	15	7
FRANCE	32	33	30	-9	40	6,507	9,495	7,579	-20	31
AUSTRIA	6	2	2	0	3	1,334	657	496	-25	2
OTHERS EU 27	150	62	75	21	100	34,522	20,174	24,265	20	100
TOTAL EU 27	331	212	235	11	313	79,890	67,728	71,380	5	294

Source : www.customs.go.th

7

EU's Import Value of Thai's Top 10 Processed Fishery Products in 2008-2010

Unit : 1,000 EURO

Product code	Product label	EU 27's imports from Thailand			% Proportion in 2010
		2008	2009	2010	
160414	Tunas, skipjack & Atl bonito	176,110	203,492	179,166	40
160520	Shrimps and prawns	90,785	135,188	171,296	38
160420	Other fish prepared or preserved, except whole or in pieces	57,258	47,417	58,827	13
160590	Molluscs and other aquatic invertebrates	15,738	11,555	12,869	3
160413	Sardines, sardinella & brislg o sprats	12,756	11,049	11,895	3
160411	Salmon	8,010	5,537	5,366	1
160510	Crab	6,830	4,656	7,538	2
160419	Other fish, whole or in pieces, but not minced	3,393	1,913	3,108	0.7
160415	Mackerel	2,452	2,291	2,192	0.5
	Others	1,033	218	126	0.03
Total of processed fishery products covering code 1604 and 1605		374,365	423,262	452,383	100

Source : http://exporthelp.europa.eu

8

EU's Import of Tuna Loin (code 1604 14 16) from Top 10 Countries

COUNTRIES	VALUE (Mil.Euro)			% Growth 09/10	% Share 2010	QUANTITY (Tones)			% Growth 09/10	% Share 2010
	2008	2009	2010			2008	2009	2010		
ECUADOR	130,192	140,445	130,146	- 7	37	34,675	43,916	37,212	-15	39
MAURITIUS	43,429	41,130	48,498	18	14	9,303	11,738	12,503	7	13
THAILAND	23,800	65,406	35,240	-46	10	7,298	16,919	12,187	-28	13
GUATEMALA	6,400	18,854	33,167	76	9	1,468	5,736	8,659	51	9
EL SALVADOR	53,912	51,033	32,206	-37	9	12,362	13,106	7,587	-42	8
KENYA	23,384	11,209	15,475	38	4	4,825	3,152	3,686	17	4
CHINA	6,527	15,519	15,214	-2	4	1,989	4,441	5,418	22	6
MADAGASCAR	-	-	14,283	N/A	4	-	-	3,138	N/A	3
CÔTE D'IVOIRE	1,908	1,438	16,659	1,058	5	555	403	3,428	751	4
GHANA	9,148	12,655	9,664	-24	3	2,946	3,376	2,700	-20	3
TOTAL	298,700	357,689	350,552	-2	100	75,421	102,787	96,518	-6	100

Source : exporthelp.europa.eu

9

2.3 EXPORT OF THAI TUNA PRODUCTS TO THE MIDDLE EAST AND AFRICA

COUNTRIES	VALUE (Mil.US$)			% Growth	% Share	QUANTITY (Tones)			% Growth	% Share
	2008	2009	2010	09/10	2010	2008	2009	2010	09/10	2010
LIBYA	123	97	69	-29	22	33,755	33,604	23,679	-30	20
EGYPT	97	94	116	23	36	34,605	40,579	51,933	28	43
SAUDI ARABIA	77	51	60	18	19	19,585	16,882	19,064	13	16
JORDAN	15	14	14	0	4	4,326	4,664	4,969	7	4
SYRIA	16	36	28	-22	9	4,573	13,181	9,404	-29	8
YEMEN	16	17	18	6	6	4,507	5,368	6,292	17	5
SUDAN	3	2	2	0	1	1,282	830	842	1	1
IRAN	3	3	8	167	3	593	828	2,279	175	2
OMAN	2	2	2	0	1	679	561	812	45	1
TURKEY	0.4	1.1	0.5	-55	0	85	270	196	-27	0
TOTAL	352	317	318	0.1	100	103,990	116,767	119,470	2	100

Source : www.customs.go.th

10

2.4 EXPORT OF THAI TUNA PRODUCTS TO THE SOUTH AMERICA

COUNTRIES	VALUE (Mil.US$)			% GROWTH	% SHARE	QUANTITY (tones)			% GROWTH	% SHARE
	2008	2009	2010	09/10	2010	2008	2009	2010	09/10	2010
ARGENTINA	17	17	27	59	48	8,232	7,718	15,355	99	53
CHILE	13	12	19	58	34	4,289	4,710	8,006	70	28
BRAZIL	4	4	6	50	11	1,751	2,329	3,365	44	12
URUGUAY	1	2	1.5	-25	3	486	768	845	10	3
PARAGUAY	0.4	0.7	1	43	2	228	392	554	41	2
OTHERS	1	-1	2	-314	3	174	278	635	128	2
TOTAL	36	35	56	60	100	15,160	16,195	28,760	78	100

Source : www.customs.go.th

11

3. THAI'S IMPORT OF FROZEN RAW TUNA IN 2008-2010

Raw Material	Quantity (ton by net wt.)			% Growth	Value(million US$)			% Growth
	2008	2009	2010	09/10	2008	2009	2010	09/10
Albacore	32,792	39,573	48,892	24	82	104	130	25
Yellow fin	130,399	92,712	103,538	12	246	128	159	24
Skipjack	605,670	669,286	650,448	-3	1,026	772	804	4
Big eye	6,151	11,041	14,091	28	10	12	16	33
Total	775,012	812,612	816,970	1	1,363	1,016	1,108	9

Source : www.customs.go.th

12

4.1 THAI'S IMPORT OF FROZEN RAW TUNA IN 2010-2011 (JAN-JUN)

PRODUCTS	Quantity (tons by net wt.) (JAN-JUN)		% GROWTH	Value (million US$) (JAN-JUN)		% GROWTH
	2010	2011	(JAN-JUN)	2010	2011	(JAN-JUN)
Albacore	21,601	19,628	-9	56	55	-1
Yellow fin	47,541	36,753	-23	75	65	-13
Skipjack	349,249	402,111	15	401	613	53
Big eye	12,690	3,425	-73	14	6	-57
Total	431,081	461,916	7	545	739	36

Source : www.customs.go.th

13

4.2 EXPORT OF THAI TUNA PRODUCTS IN 2010-2011 (JAN-JUN)

PRODUCTS	Quantity (tons by net wt.) (JAN-JUN)		% GROWTH	Value (million US$) (JAN-JUN)		% GROWTH
	2010	2011	(JAN-JUN)	2010	2011	(JAN-JUN)
Canned Tuna +Tuna Loin	297,383	299,926	1	905	1,096	21
Tuna Pet Food	35,779	32,968	-8	82	83	1
Total	333,162	332,894	-0.1	987	1,179	19

Source : www.customs.go.th

14

Industry Challenges

- Stock management measures
- Sustainability and Traceability
- Rising price of tuna and reducing supply

15

Stock Management Measures

- Issues
  a) RFMOs is not effective – Too much politics and interests. No real collective desire from member countries to address problems. Too many measures, very limited results (so far).
  b) Bigeye and Yellowfin stocks under pressure - Overall catching effort must be reduced to turnaround the stocks. Skipjack supply will be affected.
  c) Lack of accurate catch data – Measures are being introduced based on inaccurate catch data from fishing log books.

16

Sustainability and Traceability

- Brands around the world are under pressure from NGOs, specifically Greenpeace, to source tuna from sustainable sources.

(Greenpeace's position

- Cut total catching capacity by 50%
- No IUU fish
- Reduce juvenile tuna catches
- Reduce by-catches
- Provide fair economic benefits to resource owners)

Problem: When the RFMOs/industry are not taking appropriate actions, NGOs gain grounds and create confusion among consumers. The brands need to protect their images by giving in and adopt the seemingly more "Green" pole and line or FAD free tuna.

17

Sustainability and Traceability

- Traceability of fish from can code back to fishing vessel has become the standard requirement essentially to prove that the fish is from a sustainable non-IUU source.

Problem: Not all flag states have the capability to monitor and control their fishing vessels' activity. There are still weaknesses of the traceability in the supply chain of tuna raw material.

- Tonggol and Bonito do not have any real stock assessment or management.

Problem: No stock management = no sustainability. Brands are considering discontinuing the items.

18

Rising Price of Tuna and Reducing Supply

- While over all world tuna consumption is on the rise, markets are finding solutions to the fast rising price of tuna raw material. It is still to be seen the impact of higher price closer to chicken and other seafood.
  - Value added products can help, but success is limited to some markets.
- World total tuna production capacity is increasing, but long term supply will be gradually reduced so it will be a challenge for all tuna packers to maintain the business.

19

Thank you.

20

Annex 23

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Highly Migratory Species Information Collection

By

Penchan Laongmanee

SEAFDEC/TD

THAILAND

Highly Migratory Species Information Collection

Indonesia, Philippines, Thailand , Vietnam

SEAFDEC/TD

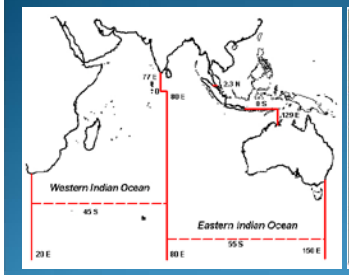
1

Key Issues

- Tuna stock in the high sea has depleted;
- Attempt of the Tuna RFMOs to estimate the tuna stocks;
- Insufficient technical information on the tuna captures in the Southeast Asian waters which are identified by RFMOs;
- Technical support to MCs/RFMOs on information collection of tuna captures from the Region; and
- Attempt to assess potential tuna production in the various sea areas of the region.

2

IOTC



Member
Indonesia, Philippine
Thailand

WCPFC

Member
Philippine,
Cooperating Non-member(s)
Indonesia and Vietnam

3

Points & Challenge…Project's Framework

- Clarification
  - tuna fishing areas (tuna landings)
  - production of tuna captured in EEZ of SEA Countries by distinguishing between those from high-sea.
- For countries who does not have fishery statistic system, fishing licensing system may be used as management tools to support information collection through catch documents such as logbook, etc.

4

Background and objectives

- Year 2008 ~

Objectives

- Review status of tuna fisheries/productions in Southeast Asian Waters;
- Develop a regional database using information from selected sites in SEA countries;
- Develop and promote the use of logbook or documentation system

5

5

Progress of Activities

- 1st Working Group Meeting, 2008
  - Plan of Activity in Participating Countries (IPTV)
  - Selected sites for tuna information collection
- 2nd Working Group Meeting, 2009
  - 10 years period data on tuna production submitted
  - Information collected at selected landing sites
- 3rd Working Group Meeting, 2010
  - Information collected at selected landing sites
  - Brain storming for future improvement.

6

6

Selected sites for tuna information collection

Indonesia

- Banda Aceh
- Kupang
- Gorontalo
- Pelabuhan ratu

7

7

Data Verification on Tuna Production at the Selected Fishports and Tuna Landing Sites of Philippine

Main fishport

- General Santos fishport
- Navotas fishport

Tuna landing areas

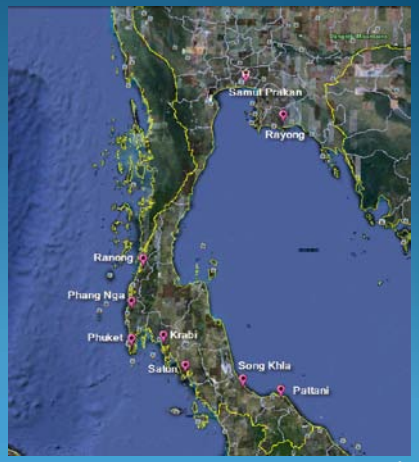
- Palawan
- Eastern Samar
- Zambales,
- Pangasinan
- La Union and
- Ilocos Sur
- Zamboanga

8

8

Data Verification on Tuna Production at the Selected Sites of Thailand

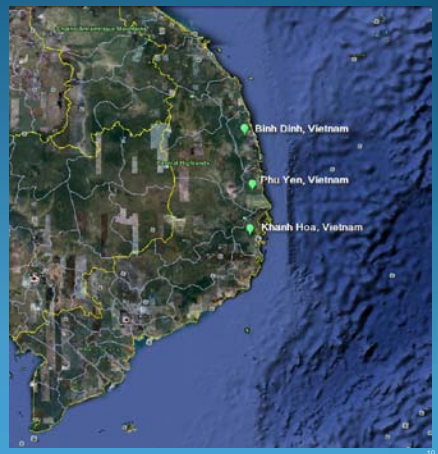
- Samutprakan
- Rayong
- Songkhla
- Pattani
- Ranong
- Phannga
- Phuket
- Krabi
- Satul



9

Selected sites for tuna information collection

Vietnam
- Binh Dinh
- Phu Yen
- Khanh Hoa



10

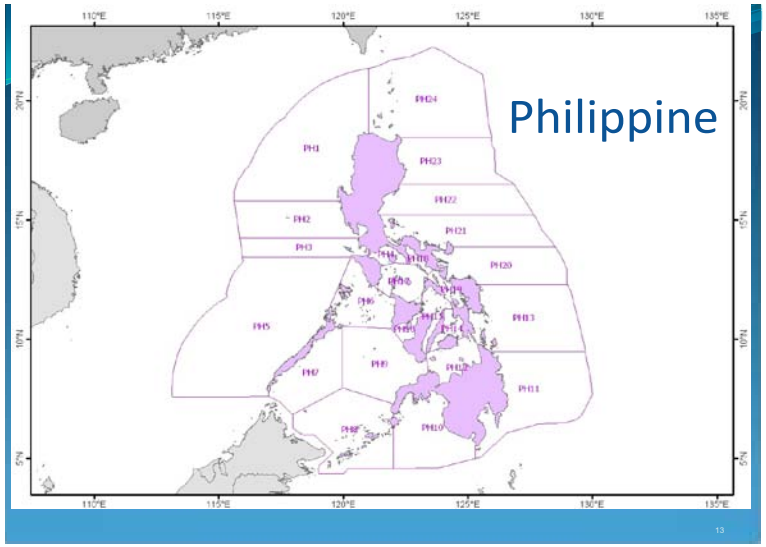
2nd Working Group Meeting, 2009

- 10 years period data on tuna production submitted
- Information collected at selected landing sites

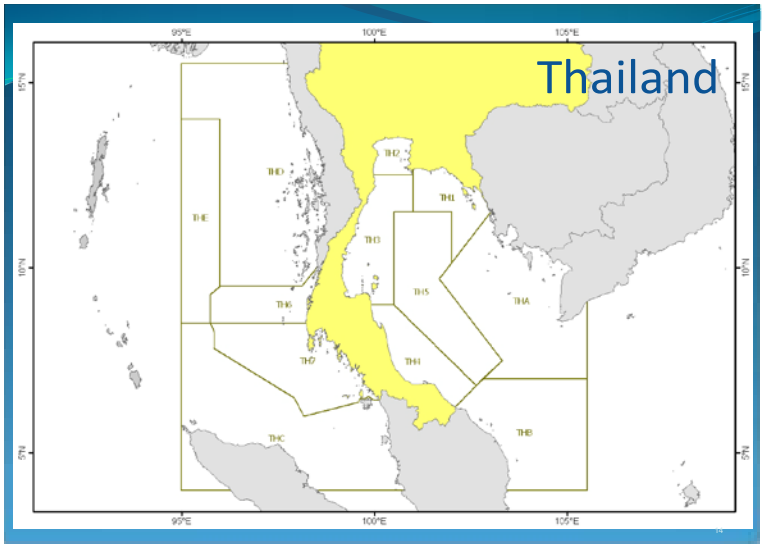
Review status of tuna fisheries/productions in Southeast Asian Waters by sub-area

11

12

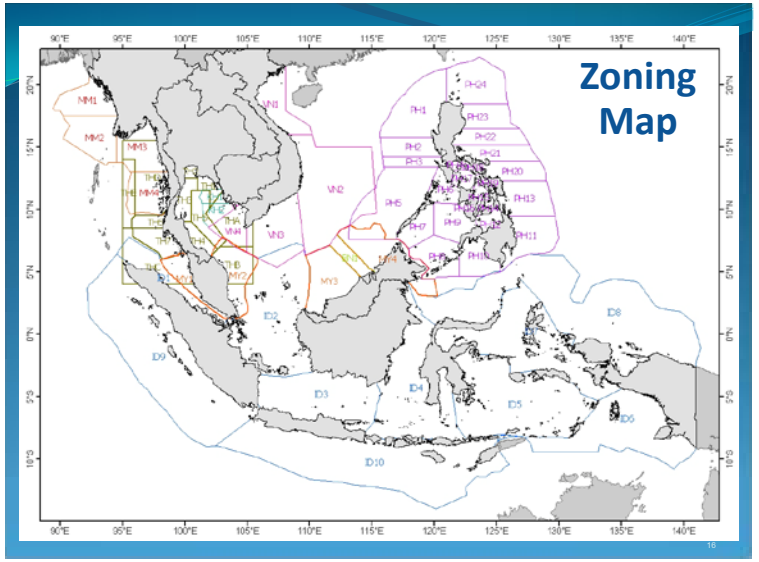


13

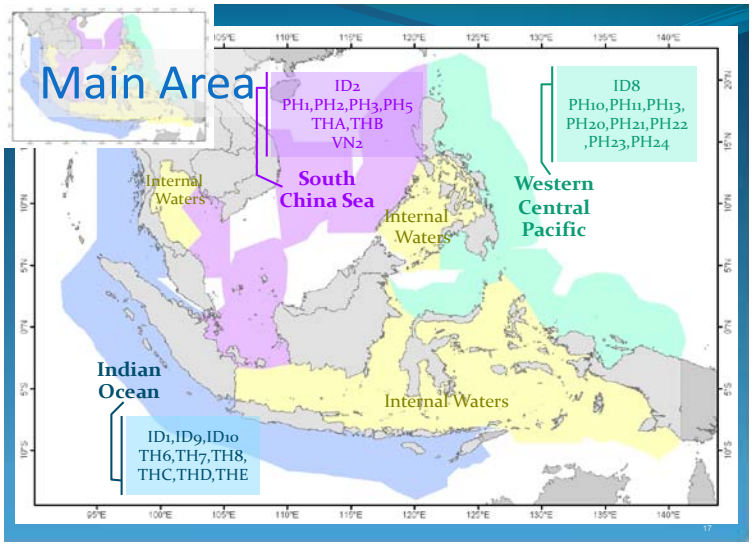


14

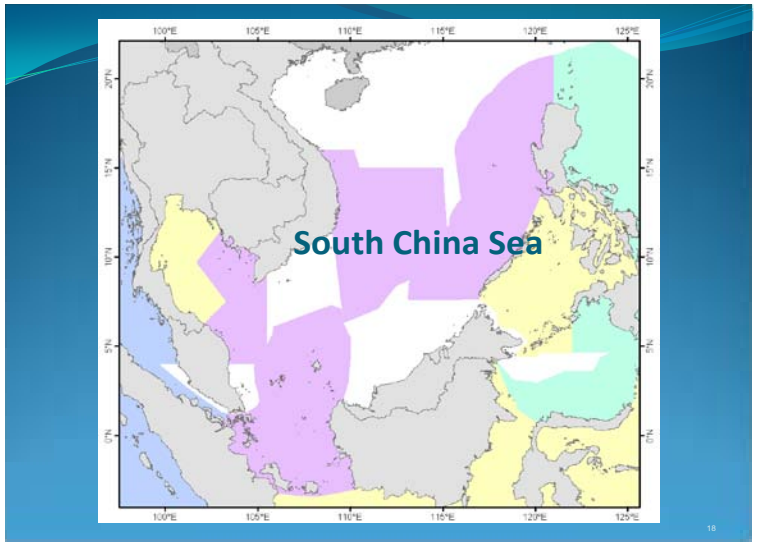
15



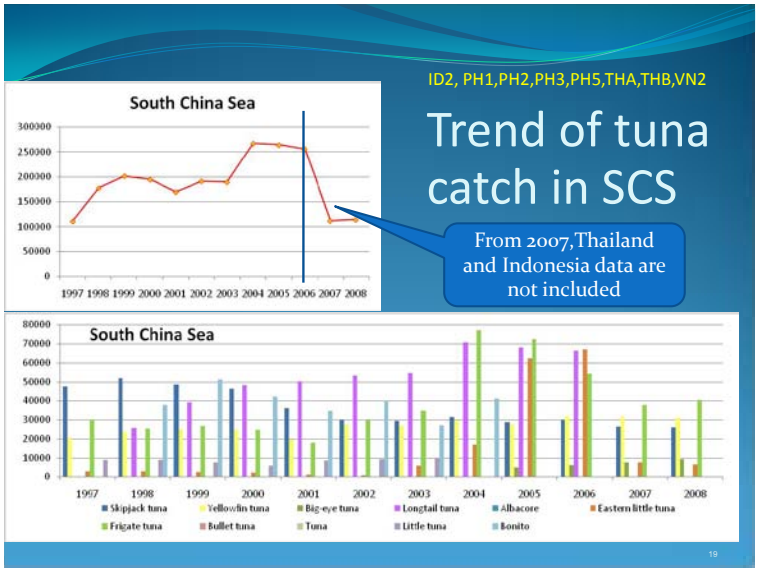
16


Main Area
ID2
PH1,PH2,PH3,PH5
THA,THB
VN2
ID8
PH10,PH11,PH13,
PH20,PH21,PH22
,PH23,PH24
Internal Waters
South China Sea
Internal Waters
Western Central Pacific
Indian Ocean
Internal Waters
ID1,ID9,ID10
TH6,TH7,TH8,
THC,THD,THE

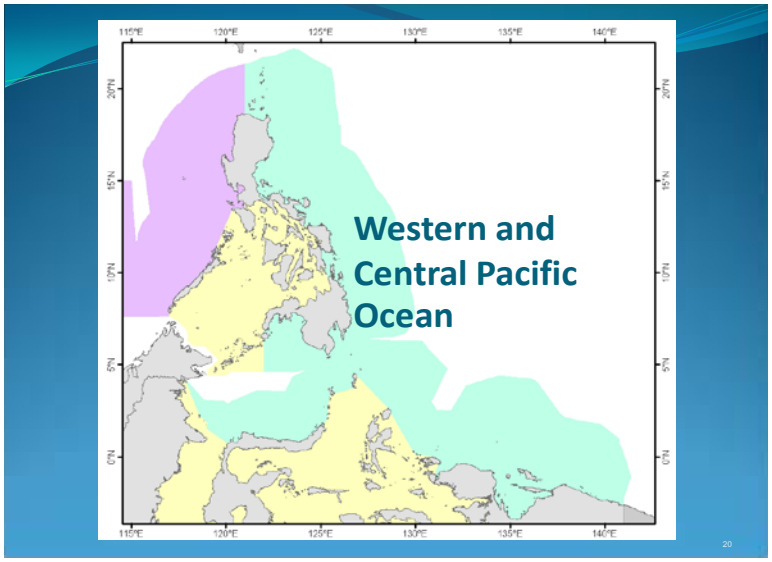
17


South China Sea

18

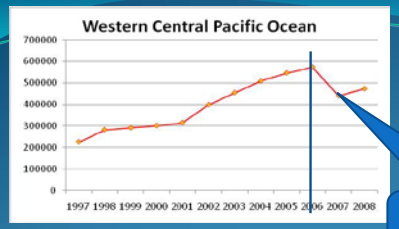

ID2, PH1,PH2,PH3,PH5,THA,THB,VN2
Trend of tuna catch in SCS
From 2007,Thailand and Indonesia data are not included
South China Sea
300000
250000
200000
150000
100000
50000
0
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
South China Sea
80000
70000
60000
50000
40000
30000
20000
10000
0
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
Skipjack tuna
Yellowfin tuna
Big-eye tuna
Longtail tuna
Albacore
Eastern little tuna
Frigate tuna
Bullet tuna
Tuna
Little tuna
Bonito

19


Western and Central Pacific Ocean

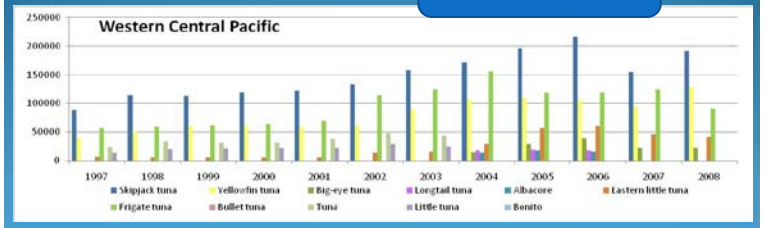
20

By Sea Area Western Central Pacific Ocean [WCP]



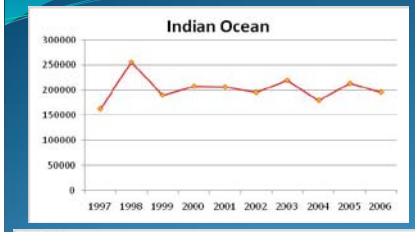
From 2007,Indonesia data are not included

ID8,PH10,PH11,PH13,PH20,PH21,PH22,PH23,PH24

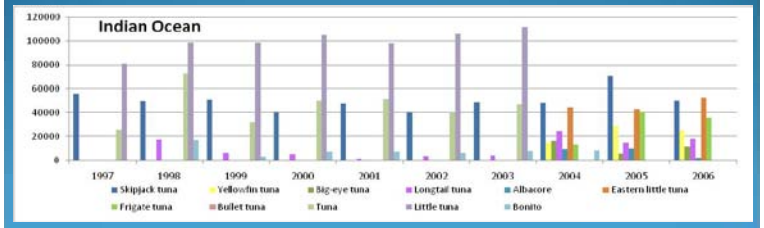


21

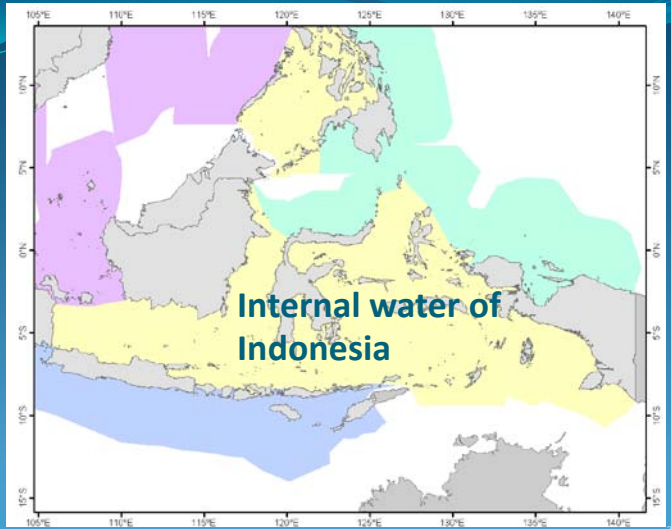
By Sea Area Indian Ocean [IDO]



ID1,ID9,ID10
TH6,TH7,TH8, THC,THD,THE



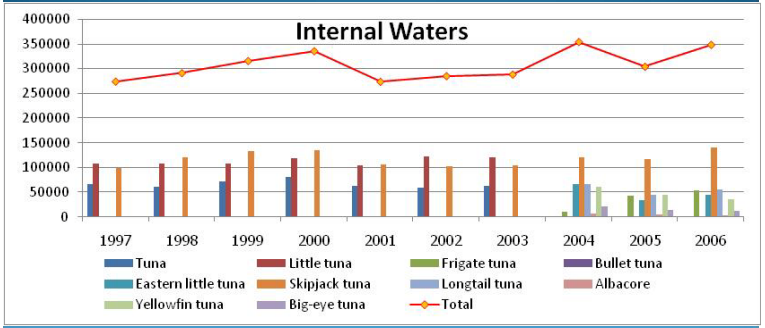
22



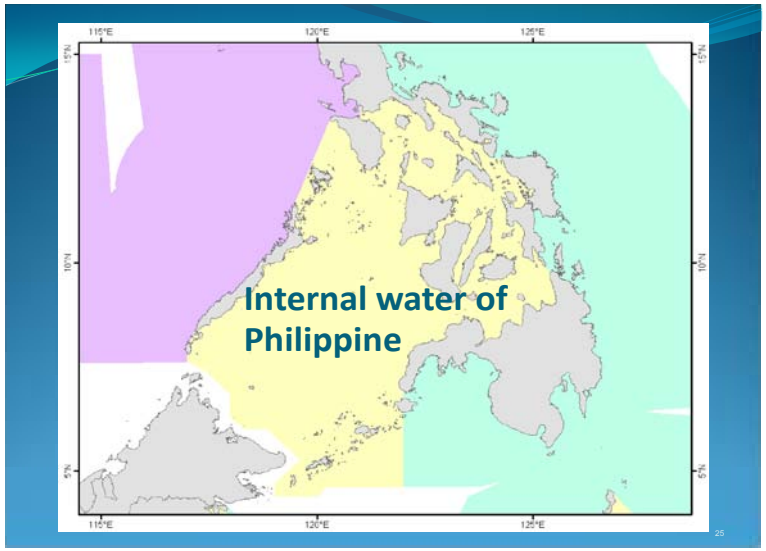
Internal water of Indonesia

23

By Sea Area ,Internal Water: Indonesia

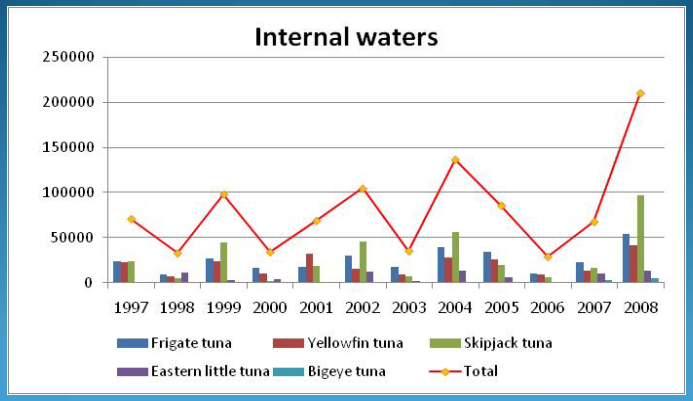


24



25

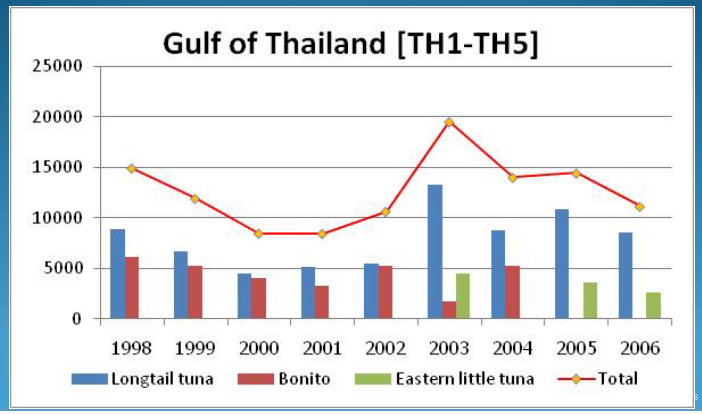
By Sea Area ,Internal Water: Philippine



26

27

By Sea Area ,Internal Water: Thailand



28

Conclusion

Area	Trend of catch (1997-2006)
South China Sea	↑
Western and Central Pacific	↑
Indian Ocean	↔
Internal water : Indonesia	↔
Internal water: Philippine	↔
Internal water: Thailand	↔

29

29

3rd Working Group Meeting

- Report result of information collection at selected sites in participating countries
- Suggest for project future planning of activity in order to support the national work on tuna information collection, etc.
- Others

30

30

Ways to Improve Information Collection on Tuna Production/Statistics in SEA Waters

- Strengthen fishing license system
- Improve recording on number of fishing boats (small- and commercial scale)
- Promotion on the use of logbook
- Strengthen/establish cooperation and coordination with key private sector (exporters)
- Support estimation of neritic tuna in SEA waters

31

31

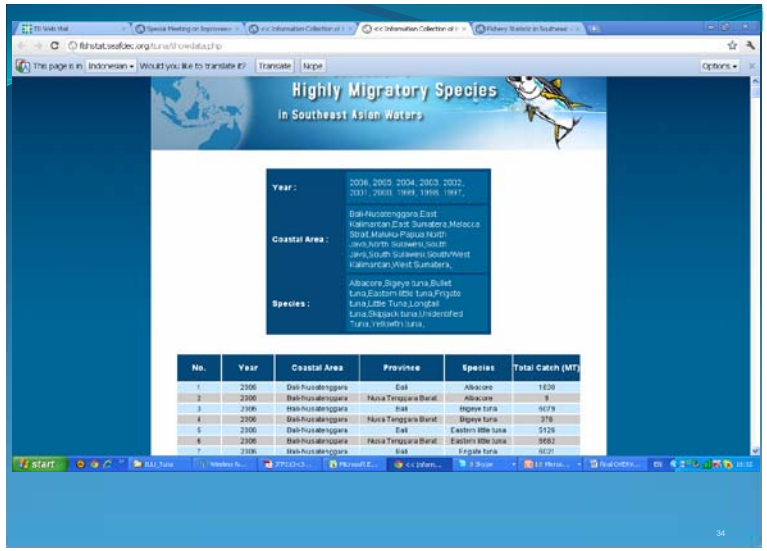
Database of tuna data

32

32


Information Collection of
Highly Migratory Species
in Southeast Asian Waters
Home
Indonesia
Philippines
Thailand
Vietnam
Tuna Capture production from Indonesia since 1997
Year
Coastal Area
Species
Select All
2006
2005
2004
2003
2002
2001
2000
1999
1998
1997
Bali-Nusatenggara
East Kalimantan
East Sumatera
Malacca Strait
Maluku-Papua
North Java
North Sulawesi
South Java
South Sulawesi
South/West Kalimantan
West Sumatera
Albacore
Bigeye tuna
Bullet tuna
Eastern little tuna
Frigate tuna
Little Tuna
Longtail tuna
Skipjack tuna
Unidentified Tuna
Yellowfin tuna
Submit
Cancel
start

33


Highly Migratory Species
in Southeast Asian Waters
Year :
Coastal Area :
Species :
No.
Year
Coastal Area
Province
Species
Total Catch (MT)
start

34


Thank you

35

Annex 24

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Lesson Learn in Implementing Fishing Logbook

By

Putuh Suadela

Ministry of Marine Affairs and Fisheries

INDONESIA

LESSON LEARN
IN IMPLEMENTING FISHING LOGBOOK

BY: PUTUH SUADELA, S.PI

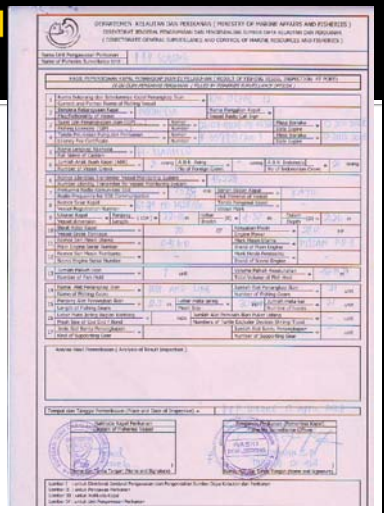
SPECIAL MEETING ON IMPROVEMENT OF TUNA INFORMATION
AND DATA COLLECTION IN SOUTHEAST ASIA
7 – 9 SEPTEMBER 2011, SONGKHLA PROVINCE, THAILAND

DIRECTORATE OF FISH RESOURCES AND MANAGEMENT
DIRECTORATE GENERAL OF CAPTURE FISHERIES
MINISTRY OF MARINE AFFAIRS AND FISHERIES - REPUBLIC OF INDONESIA

1

LOG BOOK FORM 2002

- Log Book 2002 based on Ministry Decree No: KEP.03/MEN/2002 on fishing and fish carrying log book.
- Surveillance concerns
- Not include the fishing activities data which required for the biological parameters.



2

LOG BOOK PROGRAM DEVELOPMENT

- Backgrounds:
  - In order to support optimal and sustainable fish resources management policy, need accurate fisheries data and information related to fishing activities in fishing log book.
  - In order to increase the fishing master daily report activities and facilitate the harbor master's duty at fishing port on fishing log book implementation.

→Necessary to review Ministry Decree No: KEP.03/MEN/2002 on fishing and fish carrying log book.
→Develop fishing log book program.

3

LEGAL BASED

4

OBJECTIVE OF LOG BOOK PROGRAM IMPLEMENTATION

- Log Book as ***Landing Declaration*** of fishing master, or declaration letter about the fish that landed at port.
- Fishing Log Book to support fisheries statistical data (fishing ground, species, volume)
- Fishing Log Book records fishing license data (fishing gear), vessel registration data (GT; LOA; power engine), fishing port base → Register vessel
- To support evaluation and analysis for fish resources management:
- Insight biological parameter, from the early indicator of data logbook, that need to followed with observer program and research.

5

Workshop and consultation to built and simplified the fishing logbook form :

a. Workshop between DGCF – MMAF, RFMO (WCPFC, CCSBT and IOTC), OFCF, Fishing Port Officer and Stakeholders in May 2009
b. Workshop between DGCF – MMAF, Sweden, Fishing Port Officer and Stakeholders in 2007 – 2009
c. Consultation on fishing logbook program in several fishing ports from 2007 – 2010 to socialized logbook program, consultation for logbook form, filling logbook assistance, and logbook distribution:

   2007 : 6 fishing ports

   2008: 52 fishing ports (1 workshop)

   2009: 8 fishing ports

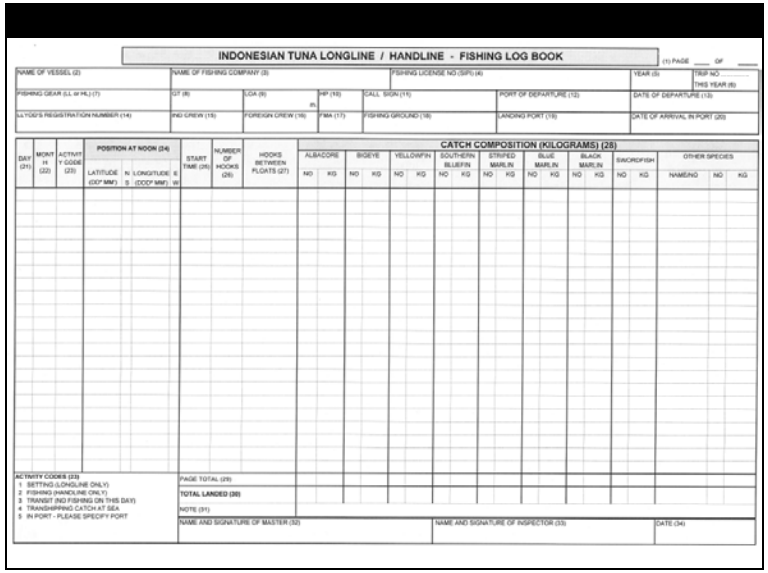
6

PRESENT FISHING LOGBOOK

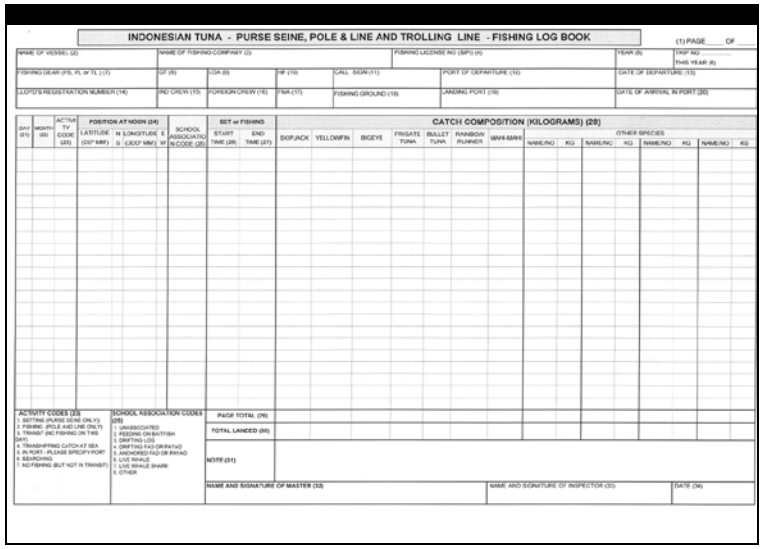
REGULATION:
Year 2010: Ministry of Marine Affairs and Fisheries Regulation No. PER.18/MEN/2010 on Fishing Logbook
→Ministry Decree No: KEP.03/MEN/2002 on fishing and fish carrying log book **replaced** .

3 FISHING LOG BOOK FORMS:
- Logbook for Tuna Long Line and Hand-line.
- Logbook for Purse-Seine and Pole and Line, also Troll Line.
- Logbook for other fishing gears.

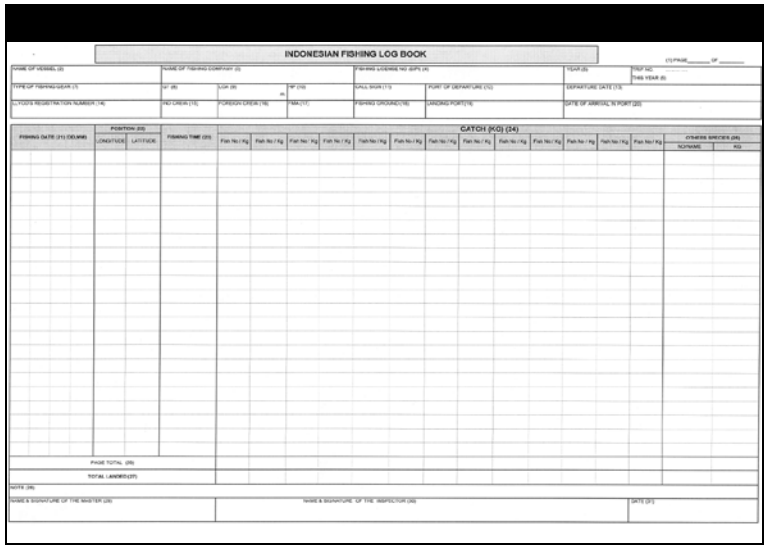
7


INDONESIAN TUNA LONGLINE / HANDLINE - FISHING LOG BOOK

8



9



10

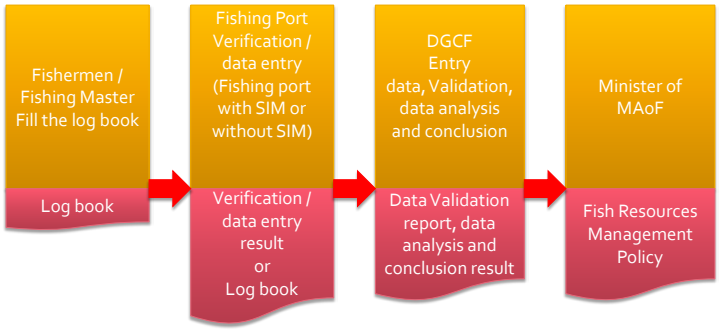
Information in log book

Type of Information

- Fishing vessel data
- Fishing gear data
- Fishing operation data
- Fishing ground
- Catch data

11

Fishing Logbook Collecting Data Scheme



12

Obligation to fill the logbook:

- Obligate for fishing vessel that have fishing license
- Obligate to conduct in each and every fishing operation
- Fishing Master responsibility

13

Data Confidentiality

- DGCF responsible for implementation and data confidentiality to each fishing vessel.
- DGCF prepares save tools to keep and maintain the fishing log book data.

14

IMPLEMENTATION

- **Year 2011 - 2012:**
  - Socialization on MMAF Regulation No. PER.18/MEN/2010 on Fishing Logbook,
  - implementation fishing logbook program, and
  - designing logbook system information management (SIM) application for entry data and analysis.
  - Target participant: fishing port officers, fishing master, fishing vessel owner, fishermen association, others related stakeholders.

15

EXPECTED OUTPUT

A. Display form as the result from data process:
   1. MAP
   2. GRAPHIC
   3. TABLE

16

EXPECTED OUTPUT LANJUTAN

B. Information of data processing result:
   1. *Total Annual Catch*
   2. Catch production trend by species and fishing gear type
   3. Catch production trend by species and area (FMA)
   4. Catch production trend by species and fishing season (monthly) in each FMA
   5. Non-target species catch production trend by fishing gear, species and area (FMA)

17

EXPECTED OUTPUT LANJUTAN

6. ERS catch production trends.
7. Hook Rate historical data and CPUE by species and fishing gear (monthly, yearly) in each FMA.
8. Stock condition estimation, MSY, and TAC by species in each FMA.
9. active vessels identification by area (FMA).
10. Fishing vessel productivity by fishing gear and area (FMA).

18

CONSTRAINT

- Need time to socialize to all related stakeholders.
- Limited infrastructure in fishing port
- Data base system is still being processed for development
- Reward and punishment for logbook program

19

OPPORTUNITY AND CHALLENGE

1. High number of fishing fleet *(Statistic 2009: 603.856 Units)*
2. Wide Fisheries Management Area in Indonesia (11 FMA)
3. High number of fishing port (968 ports: 6 Oceanic Fishing Ports, 13 Archipelagic Fishing Ports, 47 Coastal Fishing Ports, 900 Fish Landing Place, 2 private fishing ports)
4. Multi species fisheries characteristic.
5. Perception on the importance of data and sustainable fisheries (focus orientation on increasing production)

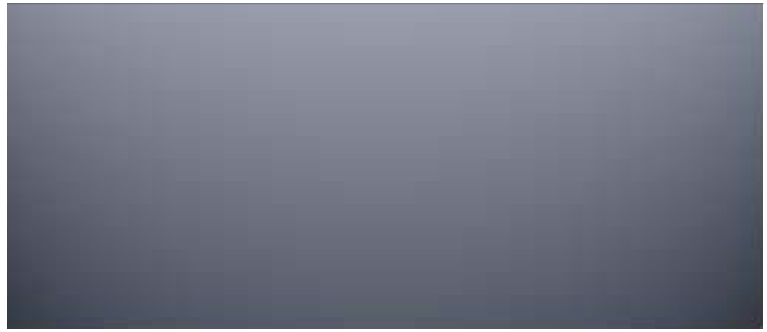
20

RECOMMENDATION

- *Capacity Building* : DGCF (fishing port managed under the central government), Province/District Government (local fishing port) and stake holder.
- Developing infrastructure in fishing port
- Well incentives and credit points for fishing port officers who handled the log book implementation

21

OBSERVER



22

TRAINING OF OBSERVER ON BOARD

- Training on observer by the Indonesia Government Budget year 2007 (follow by 22 civil servant)
- Training on observer cooperation between Indonesia with OFCF year 2008 and 2009
  - Phase I : 3 civil servant, 12 private (ex vessel crew)
  - Phase II : 2 civil servant, 7 private (ex vessel crew)
  - Phase III : 2 civil servant, 7 private (ex vessel crew)
  - Phase IV : 5 civil servant, 7 private (ex vessel crew)
- Training on observer cooperation between Japan, in May 2011
  - Observer trained: 10 persons (ex vessel crew)

23

NUMBER OF OBSERVER TRAINED UNTIL 2011

Number of observer on board = **77 persons**

- MMAF civil servant = 34 persons
- Private (ex vessel crew) = 43 persons

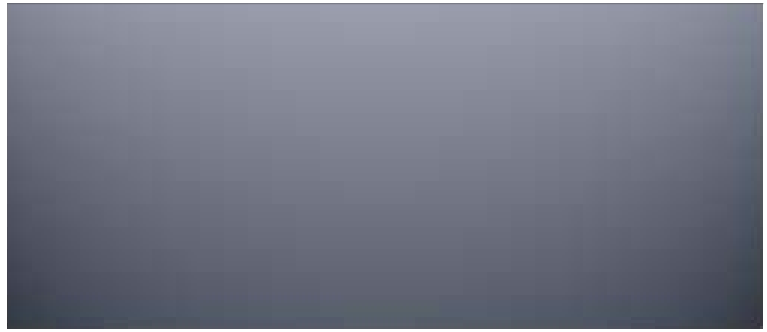
24

LATEST PROGRESS

1. Develop institutional system include legal base, operational base and organization.
2. Draft of the Ministry Regulation on Observer is already prepared and being discussed.

25

Thank you



26

Annex 25

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Lesson Learned in Implementing Fishing Logbook and/or Observer Program

By

NoraisyahBinti Abu Bakar

Department of Fisheries

MALAYSIA

LESSON LEARNED IN IMPLEMENTING FISHING LOGBOOK AND/OR OBSERVER PROGRAM

DEPARTMENT OF FISHERIES MALAYSIA

1

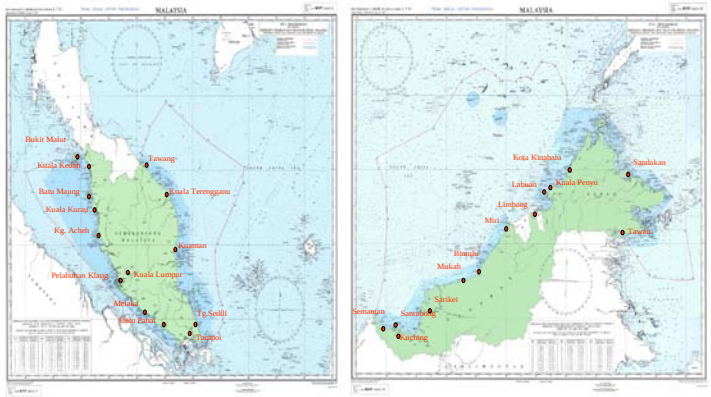
BACKGROUND

- The tuna resources for Malaysia (Neritic tuna and Oceanic tuna in Indian Ocean) need to be sustainably exploited.
- At the same time, the captured operations have to closely monitored in order to ensure that there won't be negative impact to the tuna resources.
- These 2 factors can contribute to the good economic outcomes for Malaysia in a long term.

2

MALAYSIA

- FISHERIES DISTRICT: 84 FOR MARINE AND AQUACULTURE



3

- The Department of Fisheries Malaysia had identified 3 main holistic monitoring components of fishing vessels :

  1) Information on vessels' operation – through "Vessels' Operation Report" (LOV)

  - organized fisheries data collection programmes

  2)Vessel monitoring – through "Vessel Monitoring System" (VMS)

  3)Monitoring entrepreneurship level

4

VESSEL OPERATION REPORT

Fish landing data collection system (LOV)

- Estimation calculation for total fish landed by the fishing vessels
  - Calculation for Landing of Marine Capture Fisheries for the vessels < 70 GRT – still using stratum specific sampling
    - 35% landing data collection
  - For deep sea vessels – 100% landing data collection

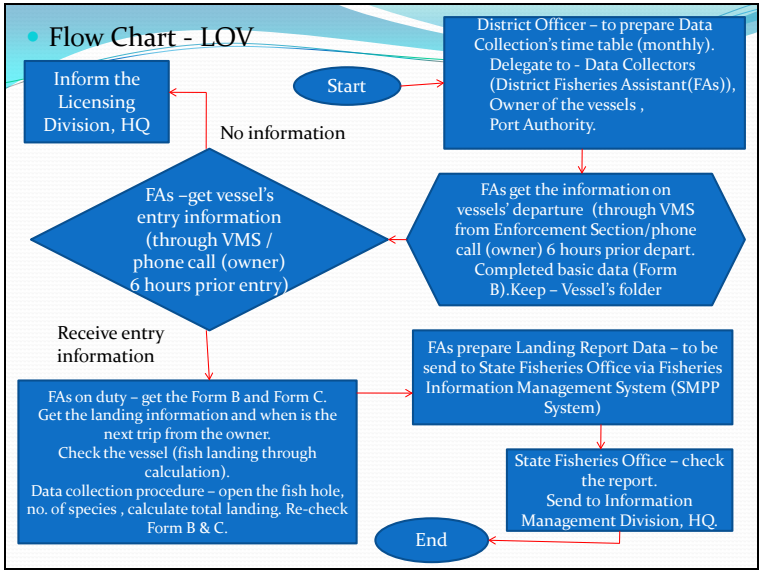
5

- As for deep sea vessel - due to the difference in shape and mass sizes
- Estimation – base on numbers of fish hole and also volumetric capacity of the fish hole :

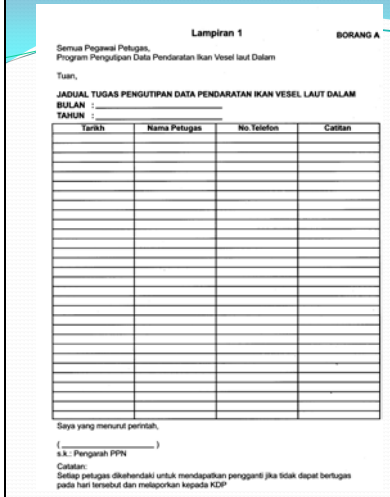
Gears	B-form	C-form
Purse-seine	-obtain the profile from each vessels -obtain the numbers of fish hole and each sizes -get the coefficient - from "inquiry" Coefficient (X) = weight (kg) / Volume (Y) Weight (kg) = (X x Y) kg • The volume (Y) will be determined by the Engineering Section	Fish Landing Receipt
Tuna Longline	- Weight of the fish	Fish Landing Receipt

6

- Flow Chart - LOV



7


Lampiran 1

BORANG A

Semua Pegawai Petugas,
Program Pengutipan Data Pendaratan Ikan Vesel laut Dalam

Tuan,

JADUAL TUGAS PENGUTIPAN DATA PENDARATAN IKAN VESEL LAUT DALAM
BULAN :
TAHUN :

Tarikh	Nama Petugas	No.Telefon	Catitan

Saya yang menurut perintah,

( )
s.k.: Pengarah PPN

Catatan:
Setiap petugas dikehendaki untuk mendapatkan pengganti jika tidak dapat bertugas pada hari tersebut dan melaporkan kepada KDP

Timetable for data collection

- Will delegate a week before the next month to :
  - Data Collectors (District Fisheries Assistant) - FA
  - Owner of the vessels
  - Port Authority

8


Lampiran 2 BORANG B

LAPORAN OPERASI DAN PEN DARATAN IKAN VESEL LAUT DALAM

VESSEL OPERATION AND FISH LANDING REPORT

- To be prepare with basic information by District Fisheries Assistant (FA)
- Upon landing – re-check and completed the form
- Completed form will be kept in vessel's folder.

9


Lampiran 3 Borang C

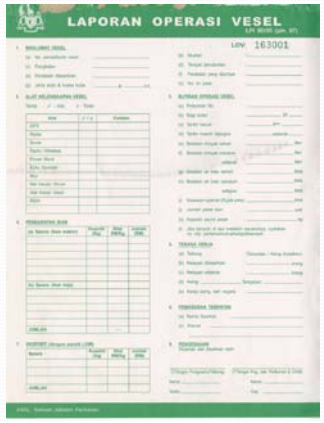
REKOD PENDARATAN IKAN LAUT VESEL LAUT DALAM

FISH LANDING REPORT

- Done by Fisheries Assistant on duty
- Get information – from the vessel's owner
  - Checking – through calculation
  - Completed the form

10

VESSEL OPERATION REPORT


LAPORAN OPERASI VESEL

LOV 163001

- Example of LOV
  - Mainly use for tuna vessels.
  - for licensing purpose
  - Minimum tonnage per year – 100 mt for each vessels

11

12

OBSERVER PROGRAM

- Has not been implemented yet.

PROBLEMS AND CONSTRAINTS

- Lack of financial resources (insufficient fund) to implement the observer programs
- Lack of staff / human capacity
- Communication problem (captain and crew – foreigner)

13

THANK YOU

14

Annex 26

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Lessons Learned in Implementing and Collecting Operational Logsheets Information

By

Elaine G. Garvilles

National Fisheries Research and Development Institute (NFRDI)

PHILIPPINE

Lessons Learned in Implementing and Collecting Operational Logsheets Information

Special Meeting on Improvement of Tuna Information and Collection in Southeast Asia
7 – 9 September 2011
Songkhla Province, Thailand

1

Overview of Logsheets Data Implementation

- In 2008, the Bureau of Fisheries and Aquatic Resources (BFAR) launched the catch documentation scheme which includes the gathering of operational logsheet data for purse seine and ringnet catcher vessels.
- Data gathered from logsheets includes
  - ✓ vessel name and company name of the catcher vessel
  - ✓the volume of catch by species
  - ✓type of gear (PS/RN)
  - ✓ type of fishing activity
  - ✓ type of fishing set
  - ✓position (latitude and longitude)
  - ✓country of registration
  - ✓ registration number
  - ✓fishing permit or license number
  - ✓ time of set (start and end)
- Tuna Fisheries Data Management system (TUFMAN)

2

Logsheets Data Implementation

- The initial phase of loghseets data implementation, we encountered major challenges which include
  - ✓ **Low compliance** due to lack of support, cooperation, understanding and appreciation from the industry players.
  - ✓ There was also fast turn-over of staff assigned in logsheets data preparation and submission.
  - ✓ Problem on filling-up of logsheets forms
    - Not on a daily operation (e.g. only record data when there is a fishing set)
    - Different local names
  - ✓ To remedy these issues we try to conduct consultation meetings with industry stakeholders as often as possible to clarify issues and explain the importance of this initiative.
  - ✓ Requirement for the issuance of EU community catch certificate

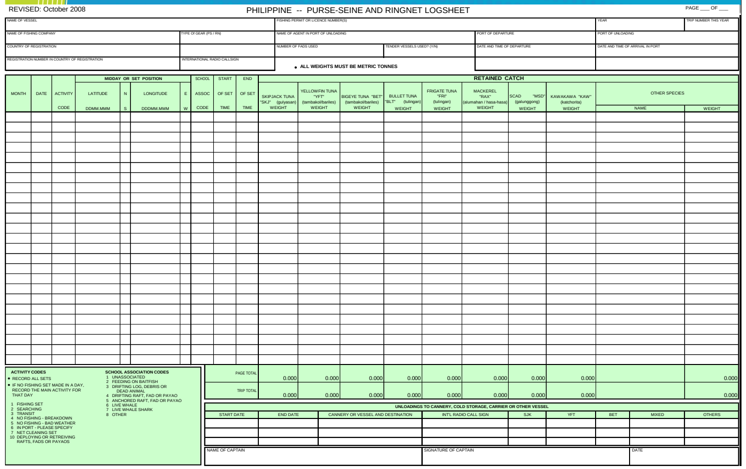
3

Recommendations on Logsheets Data Implementation

- ✓It will be a continuing activity for the Bureau to continue introducing this initiative in other areas.
- ✓ We will tentatively conduct another consultation meeting/s on logsheets data requirement with tuna purse seine and ringnet industry players in Luzon, Visayas and Mindanao before the end of this year.
- ✓ It is expected that in the future there will be amendments in the law to complement timely compliance on logsheets data submission (e.g. Licensing requirements)
- ✓ Translate logsheets to local language *(if needed/requested)*

4

Philippine Purse Seine and Ringnet Logsheet



5

Overview of Cannery Unloading Data Implementation

- BFAR also introduced the gathering of monthly cannery unloading data.
- Data gathered from canneries includes
  - ✓Vessel name
  - ✓Gear
  - ✓Flag
  - ✓Registration number
  - ✓Fishing area
  - ✓Unloaded weight by species
  - ✓State of unloaded catch (fresh, chilled or frozen)
- Philippine Cannery Data Management System (PECAN)

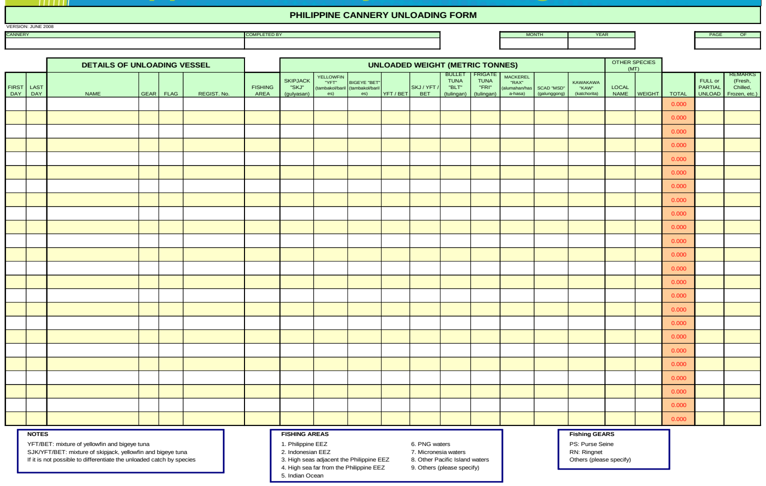
6

Cannery Unloading Data Implementation

- This initiative gained more compliance and acceptance from industry players. It was easy for us to introduce this initiative since we only need to discuss this activity to seven (7) canneries that are also very supportive and cooperative.
- This initiative is considered a good means in validating volume of catch by fishing area and by flag.
- We expect to continue this activity in the future with the support and cooperation of industry players.

7

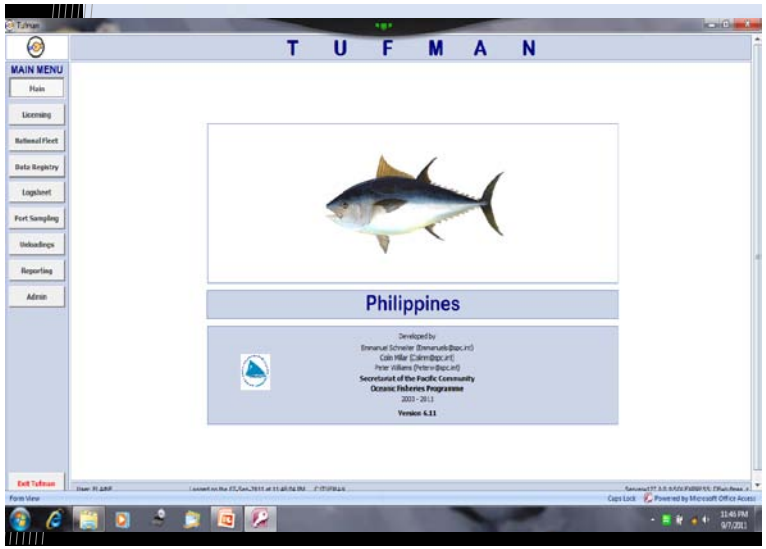
Philippine Cannery Unloading Form



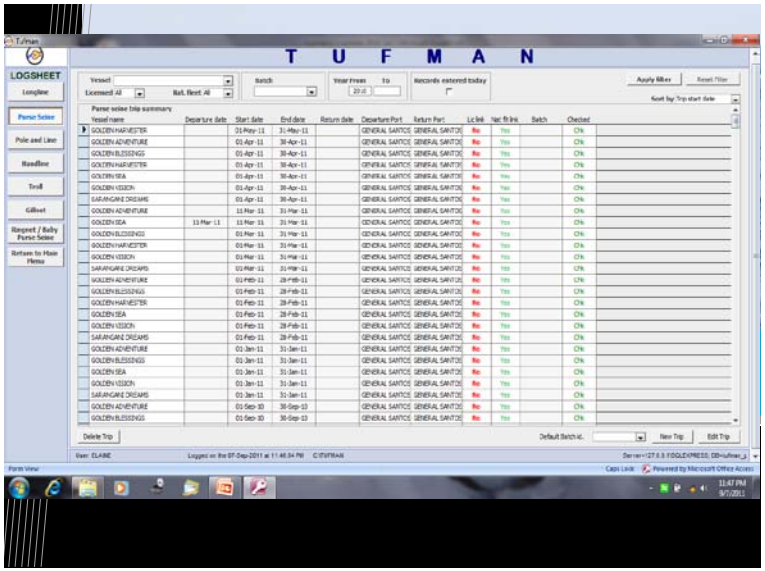
8


☺ Maraming Salamat ☺

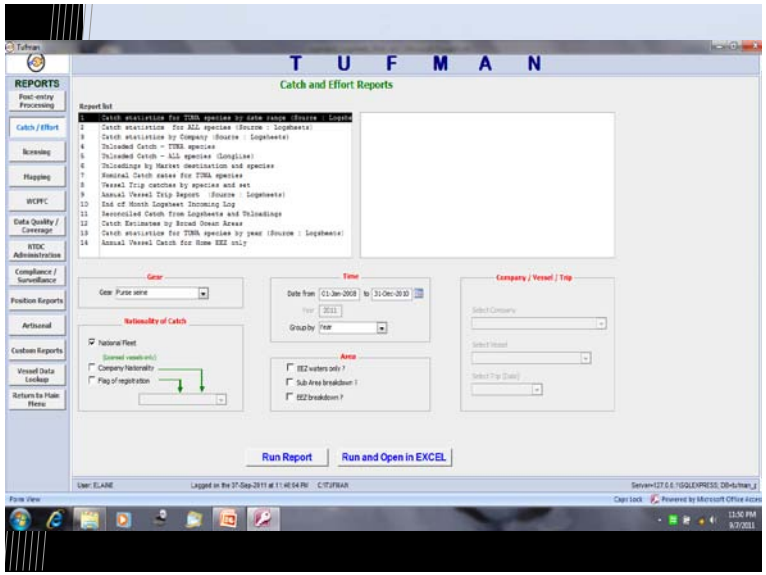
9


T U F M A N
MAIN MENU
Philippines

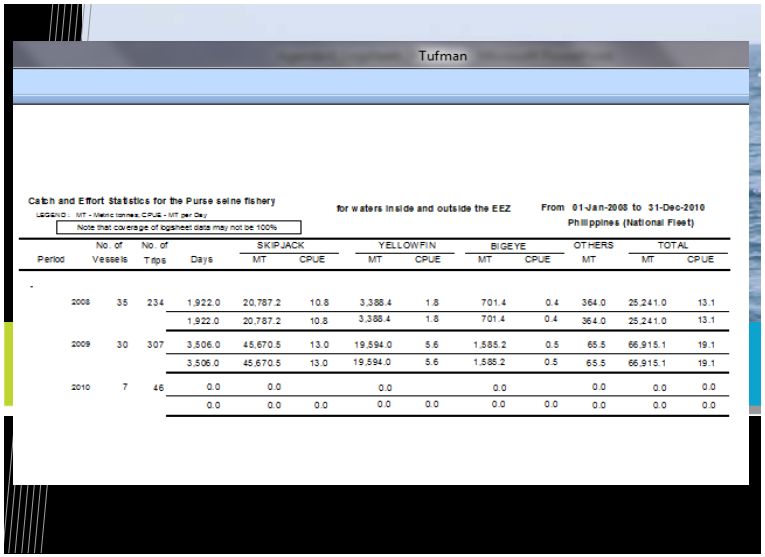
10


T U F M A N
LOGSHEET

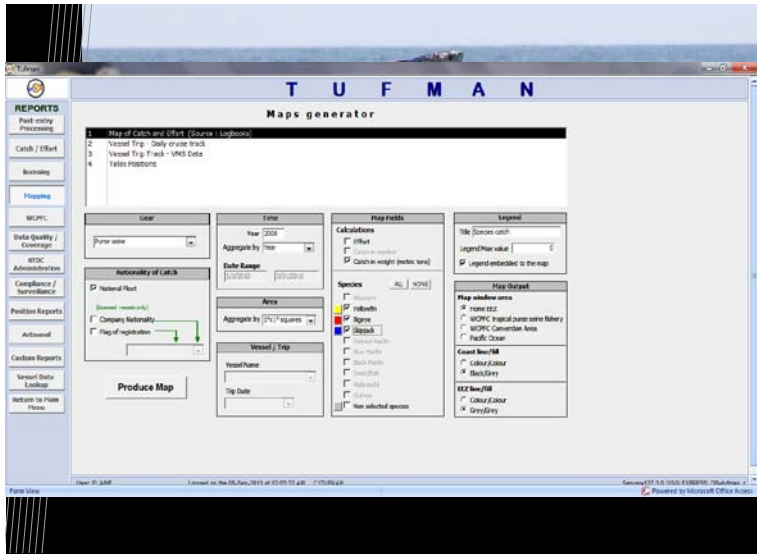
11


T U F M A N
REPORTS
Catch and Effort Reports
Run Report
Run and Open in EXCEL

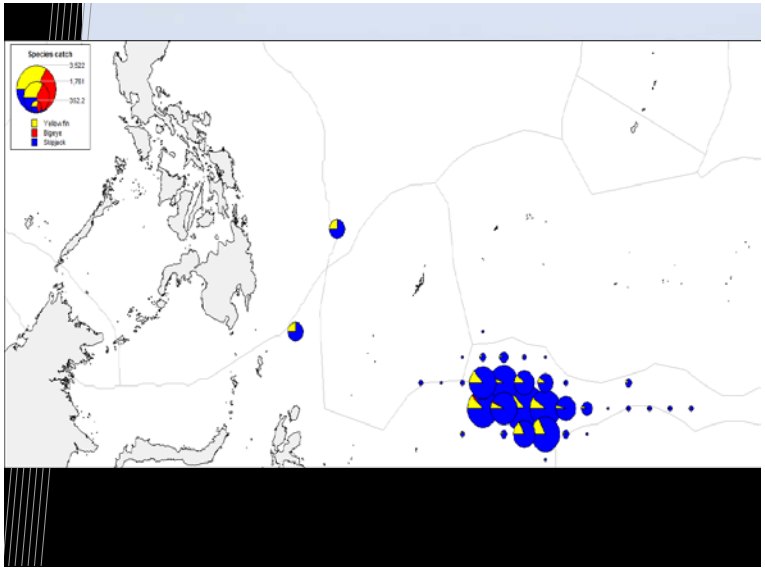
12


Tufman
Catch and Effort Statistics for the Purse seine fishery
for waters inside and outside the EEZ
From 01-Jan-2008 to 31-Dec-2010
Philippines (National Fleet)
Note that coverage of logsheet data may not be 100%
Period | No. of Vessels | No. of Trips | Days | SKIPJACK MT | SKIPJACK CPUE | YELLOWFIN MT | YELLOWFIN CPUE | BIGEYE MT | BIGEYE CPUE | OTHERS MT | TOTAL MT | TOTAL CPUE
2008 | 35 | 234 | 1,922.0 | 20,787.2 | 10.8 | 3,388.4 | 1.8 | 701.4 | 0.4 | 364.0 | 25,241.0 | 13.1
1,922.0 | 20,787.2 | 10.8 | 3,388.4 | 1.8 | 701.4 | 0.4 | 364.0 | 25,241.0 | 13.1
2009 | 30 | 307 | 3,506.0 | 45,670.5 | 13.0 | 19,594.0 | 5.6 | 1,585.2 | 0.5 | 65.5 | 66,915.1 | 19.1
3,506.0 | 45,670.5 | 13.0 | 19,594.0 | 5.6 | 1,585.2 | 0.5 | 65.5 | 66,915.1 | 19.1
2010 | 7 | 46 | 0.0 | 0.0 | | 0.0 | | 0.0 | | 0.0 | 0.0 | 0.0
0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0

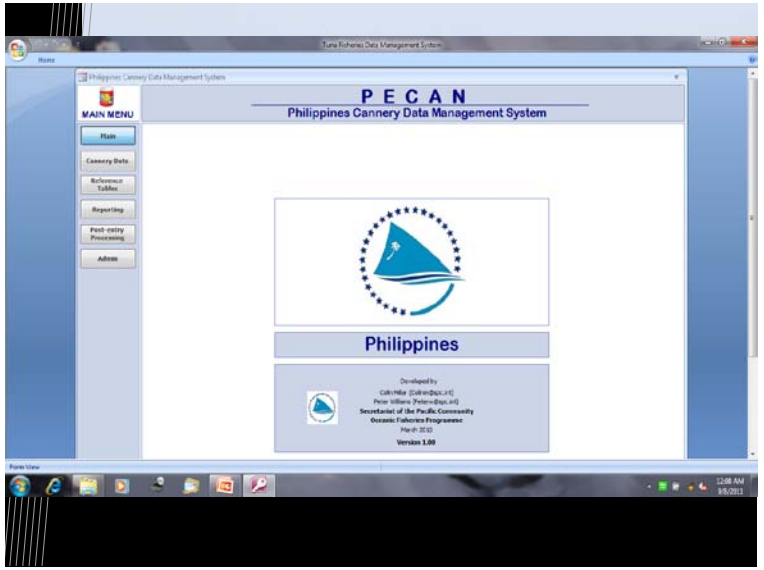
13


T U F M A N
Maps generator
REPORTS
Produce Map

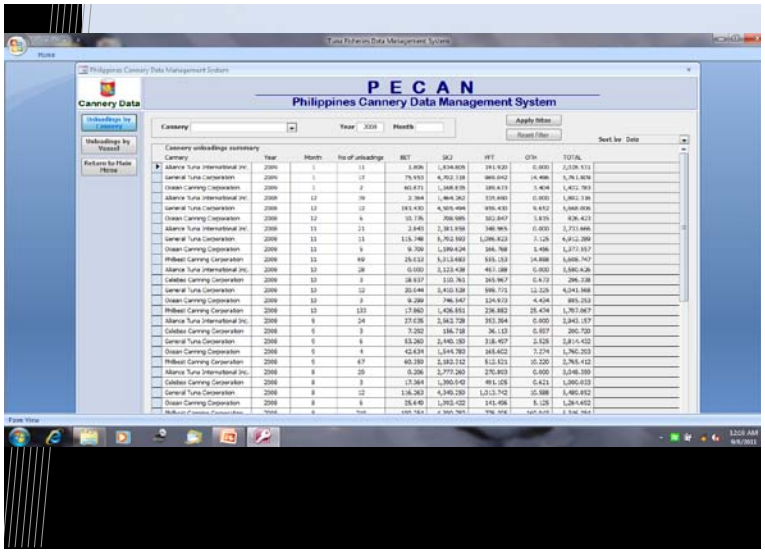
14


Species catch
Yellowfin
Bigeye
Skipjack

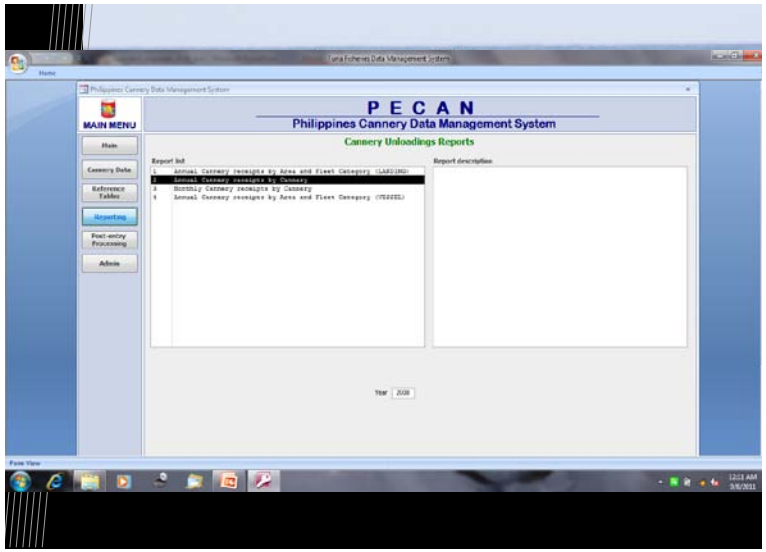
15


P E C A N
Philippines Cannery Data Management System
MAIN MENU
Philippines

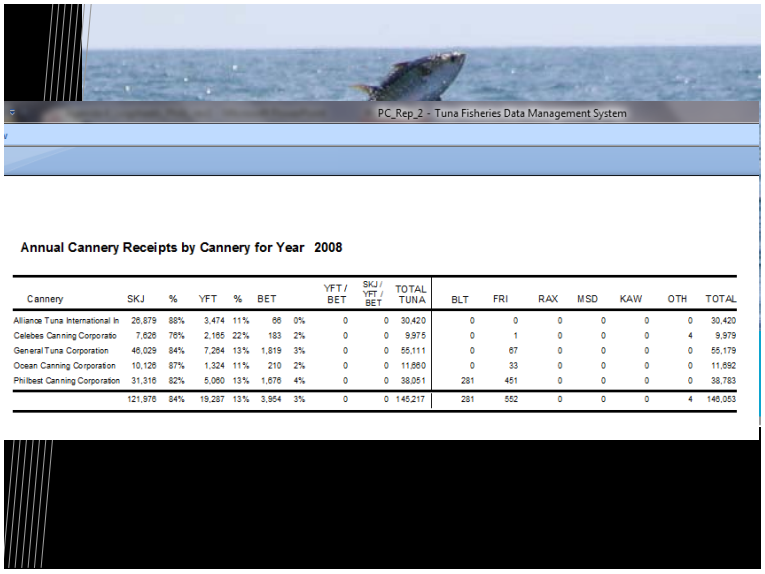
16



17



18



Annual Cannery Receipts by Cannery for Year 2008

Cannery	SKJ	%	YFT	%	BET		YFT / BET	SKJ / YFT / BET	TOTAL TUNA	BLT	FRI	RAX	MSD	KAW	OTH	TOTAL
Alliance Tuna International In	26,879	88%	3,474	11%	66	0%	0	0	30,420	0	0	0	0	0	0	30,420
Celebes Canning Corporatio	7,626	76%	2,165	22%	183	2%	0	0	9,975	0	1	0	0	0	4	9,979
General Tuna Corporation	46,029	84%	7,264	13%	1,819	3%	0	0	55,111	0	67	0	0	0	0	55,179
Ocean Canning Corporation	10,126	87%	1,324	11%	210	2%	0	0	11,660	0	33	0	0	0	0	11,692
Philbest Canning Corporation	31,316	82%	5,060	13%	1,676	4%	0	0	38,051	281	451	0	0	0	0	38,783
	121,976	84%	19,287	13%	3,954	3%	0	0	145,217	281	552	0	0	0	4	146,053

19

Annex 27

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

The status of the Philippines Fisheries Observer Programme

By

Joeren S. Yleaña

Member of the Regional Fishery Policy Network

PHILIPPINE

PHILIPPINES FOP FISHERIES OBSERVER PROGRAMME

Dr. Alma C. Dickson
Head, NMFDC
Philippine National Fisheries Observer Programme Coordinator

Marlo B. Demo-os
Training Coordinator, PFOP

Presented by:
Joeren S. Yleana
RFPN, Philippines

Special Meeting on Improvement of Tuna Information and Data Collection in Southeast Asia
7-9 September 2011, Songkhla Province, Thailand

1

BACKGROUND..1

- In accordance with **Article 28 of the Western and Central Pacific Fisheries Commission (WCPFC) Convention**...in which Philippines is a member...
- WCPFC adopted CMM 2007-01 - establishment of Regional Observer Program and CMM 2008-01 - conservation and management of Bigeye and Yellowfin tuna in the WCPO.

2

BACKGROUND...2

- As compatible measure, **BFAR passed Fisheries Administrative Order 236 ...**.
- - **can serve as an information provider of primary and secondary production** including scientific information on catch and effort, stock assessment
- shall **promote responsible fisheries** and will play an important role in the conduct of MCS activities.

3

Program RATIONALE

"The fundamental purpose is to provide fisheries managers, research organizations, environmental agencies, the fishing industry with independent, reliable, verified and accurate information on the fish catch, effort and practice of Philippine flagged vessels."

4

FOP for TUNA DATA COLLECTION

- - **offers scientific data** directly from fishing operations
- Provide **data on fishing gear efficiency**, comparison on net depth and distribution of catch per fishing ground/area.
- - can **monitor compliance** to fishing regulations imposed by BFAR and other Regional Fisheries Management bodies (WCPFC).

5

PFOP Training

Six major components:

1. Preparation for safety, basic navigation , seamanship and Radio Communication Skills;
2. International and Philippine Regulations
3. Duties and responsibilities and Terms of Reference of observers as well as the vessel operators and crew;
4. Instructions for the different forms/cards and reporting
5. Data Collection and Verification
6. Practical and shipboard operation (M/V DA-BFAR)

6

Standard Qualifications for Observers

- **Bachelor's degree in natural sciences** (preferably B.S. Fisheries and Marine Biology)
- **One college level subject each in math and statistics**
- **Must be physically and mentally fit to work in any type of sea conditions.**
- **Adequate computer skills**

7

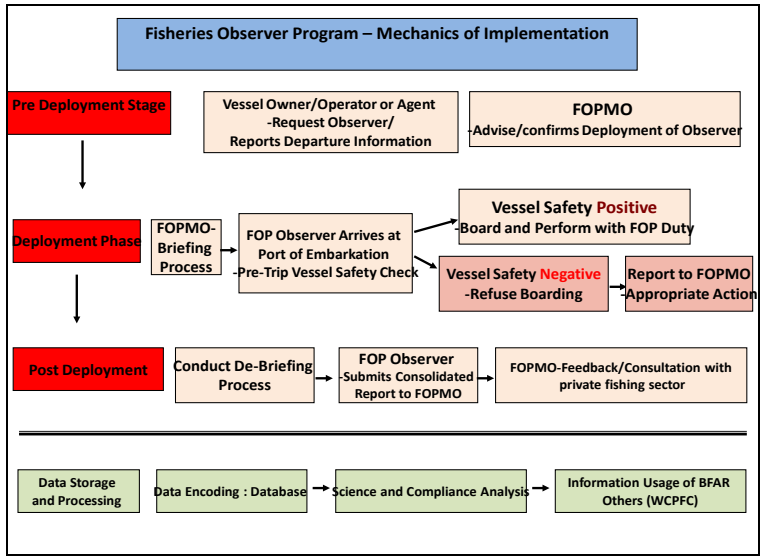
8

9

PFOP Deployment

10

Fisheries Observer Program – Mechanics of Implementation



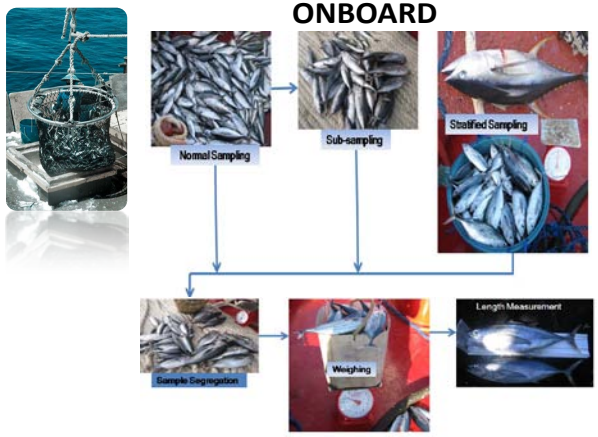
11

OBSERVER FORMS

1. Form FOP-PS-1 – **General Vessel** Minimum Data Standards
2. Form FOP-PS-2- **Daily activity** Minimum Data Standards
3. Form FOP-PS-3- **Set and Catch** Information
4. Form FOP-PS-4- **Length Measurement** Minimum Data Standards
5. Form FOP-GEN-1- **Vessel and Aircraft sightings** Minimum Data Standards
6. Form FOP-GEN-2- **Species of Special Interest**
7. Form FOP-GEN-3-Vessel **Trip Report**
8. Form FAD-1- **Fish Aggregating Device** Information Record

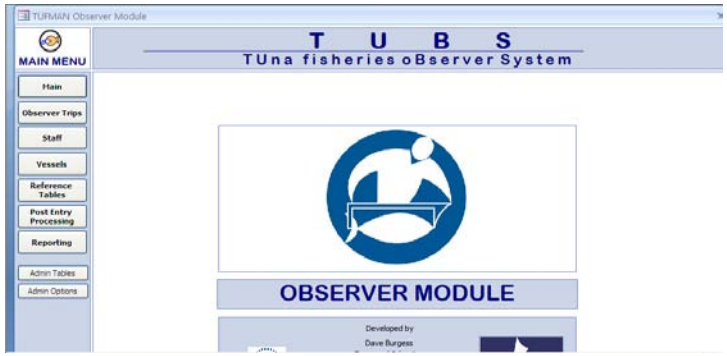
12

SAMPLING METHOD FOR OBSERVERS ONBOARD



13

Database



14

Major Data Gathered…

- Catch Composition, Length Frequency & CPUE (other sci. data)
- FAD distribution
- Fishing Ground Productivity
- Catch Rate/Percentage Bigeye and Yellowfin (vs. gears and fishing grounds)
- Vessel Compliance (others)

15

ACCOMPLISHMENTS 2009-2011:

- **Trained 106 observers (2009-2011)**
- Covered **117 Observer Trips** in Jul-Sept 2010 (deployed 48 observers)
- Deployed **38 observers in Jul-Aug this year (ongoing)**
- **Presented the Preliminary Data to the 7th Scientific Committee Meeting by the WCPFC (Aug 2011)**
- **audited and given full authorization by the Commission (Sept. 2010)**
- **Acquired Fisheries Observer Data-TUBS (Tuna Fisheries Observer System) ..**

16

Plans and Recommendations:

1. Phased-implementation in tuna fishing fleet (i.e. 20% for 2011, 50% for 2012) and deployment to other fishing gears…
2. Provide and deploy fisheries observers in carrier vessels…
3. Human Resource Development of Debriefers to review observers data and reports.
4. Continuing training/re-training of observers prior to deployment and refinement and updating of Observer Manuals/Workbook

17

Thank You!

18

Annex 28

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Lesson Learn in Implementing and promoting the use of Tuna Fishing Logbook in Thailand

By

KamonpanAwaiwanont

Department of Fisheries

THAILAND

Lesson Learn in Implementing and promoting the use of Tuna Fishing Logbook in Thailand

KamonpanAwaiwanont, Ph.D.
Senior Fisheries Biologist
Catch Certification Coordination Center
Marine Fisheries Research and Development Bureau
Department of Fisheries, Thailand

The Council regulation (EC) No. 1005/2008 of 29 September 2008 establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing has been initiated in 2010. In 2009 and 2010 the fishery products from Thailand were exported to other countries equal 1,883,579.67 and 2,058,353.73 metric ton with value 224,541.88 and 236,902.25 million baht respectively. This quantities and values were 260,703.07 and 251,443.58 metric ton with 33,581.01 and 34,969.88 million baht were exported to the European community.

Supply of Raw material:

Raw materials for fishery products of Thailand which are exported to the European Community derived from the following 2 channels;

1. Catching from Thai vessels which have been conducting fishing activities in Thai waters, foreign waters, and in the high seas.
2. Importation from foreign countries, tuna and tuna-like species are the main imported raw fish materials for processing and then exporting.

Combat IUU Fishing

To combat IUU fishing 3 methods are consider as follow

1. From illegal to become legal by vessel registration, fishing license, fishing under Thai laws/regulations) Right area,right fishing gear,right period(.
2. **From unreported to become reported by fishing Logbook (Thai Flag), fishing Logbook (RFMO).**
3. From unregulated to become regulated by fisheries laws and regulation, fisheries Act Notification of Ministry of Agriculture and Cooperatives, Notification of Department of Fisheries e.g. Determination of spawning area, prohibit area for trawler, mesh size control, fishing record, RFMO regulations.

Fishing Logbooks (FLB)

Reported on 6 Types of Thai Fishing Logbook for various fishing gears are

1 Fishing Logbook for trawler and push net

2 Fishing Logbook for purse seine (Annex 1-3)

3 Fishing Logbook for gill net

4 Fishing Logbook for lift net

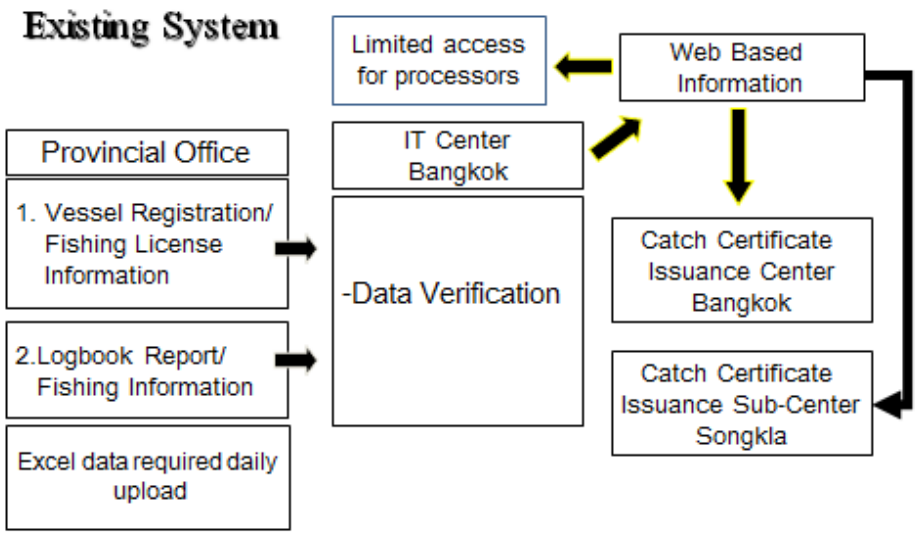
5 Fishing Logbook for trap

6 Fishing Logbook for other gears

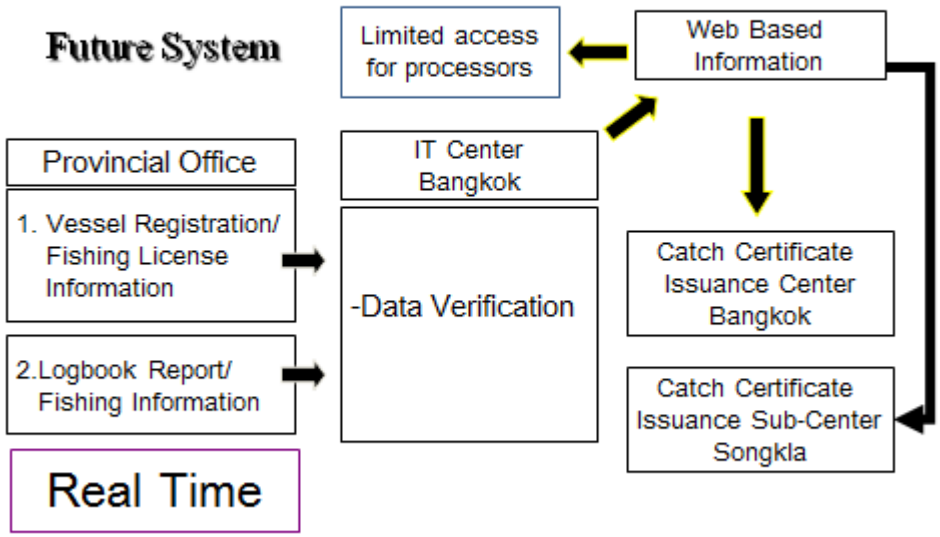
Including reported on the RFMO Fishing Logbook.

Thai fishing vessels have to submit their Fishing Logbook to report their fishing activities in order to collect fishing period, area and volume of capture fish data and statistic. The DOF has established data computerized network centers. Fishing operators have to arrange their fishing activities data and record in Fishing Logbook with their certification of the catches that are no involved with IUU fishing. Besides, the filling Fishing Logbook form has to be submitted to the Provincial Fishery Office to computerize fishing record and enable the access of fishing data network system.

IT System for Certification Scheme



IT System for Certification Scheme



Thailand Catch Certification Scheme

Department of Fisheries (DOF) was assigned from Royal Thai government to be a Competent Authority (CA) for handling combating IUU Fishing.

The 2 types of Catch Certification and 1 processing statement are provided;

1. Catch Certification (CC) Issued for large scale fishing vessels (> 20 GT).

2. Simplified Catch Certification (SCC) Issued for small scale fishing vessels (categorized in the EC IUU Regulation), especially < 20 GT.

3. Processing Statement (Annex IV)Issuance Issued for exporters / processors whom import marine catch with a catch certificate for further processed and exported to the EU.

Catch Documentations compose of;

1 Fishing Logbooks (FLB)

As mentioned above

2 Marine Catch Transshipping Document (MCTD)

This document provide for the transship vessel that carry aquatic animals from the capture fishing vessels outside through the fishing port. The transship vessel has to prepare the MCTD form and collect the FLBs from capture fishing vessels. After landed, both MCTD and FLBs were submitted to the Provincial Fishery Office.

3 Marine Catch Purchasing Document (MCPD)

A movement of aquatic animal which has been caught from Thai fishing vessel to the factory is controlled via a MCPD to facilitate a traceability system. MCPD is as a record of the transshipment operation through fish landing at a landing port, collectors, and frozen storage to processing plants. Eventually the MCPD documents will be transmitted along with the aquatic animals, and gathered at the processing plant. The document will be used as a database to provide an attachment list of respective fishing vessels for requesting a catch certificate from the DOF. However, the fishery products do not undergo the processing operations more than such data declared on the vessel's fishing logbook.

Manual for Implementation

1. EC Regulation on IUU Fishing (Thai Version)
2. Manual for Officers (Thai)
3. Manual for Fish Collectors and Processing Operators (Thai)
4. Manual for Fishermen (Thai)
5. Promotion Documents and Posters

Problem/constraint involving in the implementation use of Fishing Logbook onboard tuna fishing vessels.

1. Some fishers do not want to report their fishing activities.
2. Some fishers reported small number of their total catches.

Thailand implementation on EC Regulation to combat IUU Fishing is just beginning. The collaboration among sectors of fishers, collectors, processing plants and exporters are needed for fishery products exporting to EC. While the international collaboration of ASEAN region is also importance for combating IUU fishing aim the sustainable of fishery resources.

Annex 1

แบบ บทป.2

ข้อมูลนี้กรมประมงจะเก็บรักษา
ไว้เป็นความลับทางราชการ

สมุดบันทึกการทำการประมง

(Fishing Logbook)

อวนล้อมจับ

ไว้ประจำเรือ .....*ทะเบียน*.....

ปี .....ส่งสำเนาให้ประมงอำเภอหรือประมงจังหวัด
หลังจากนำสัตว์น้ำมาขึ้นท่าแล้ว

จังหวัด..... *เล่มที่* _ _.53/0001

Annex 2

คำแนะนำการใช้สมุดบันทึกการทำการประมง

อวนล้อมจับ

- สมุดบันทึกการทำการประมง แบ่งตามเครื่องมือทำการประมงที่ใช้ แต่ละเล่มมี 50 ชุด
- 1 ชุด มี 2 แผ่น ต้นฉบับเป็นกระดาษสีขาว สำเนาเป็นกระดาษสี
- เล่มที่/No….. ใส่ชื่อย่อจังหวัด ตามด้วยปี พ.ศ. 2 หลักท้าย / เลขเรียงลำดับเล่มที่ (ซึ่งระบุไว้แล้วที่ปกด้านหน้า) เช่น กทม.53/01 รย.53/123 ภก.53/456 สข.53/0007 เป็นต้น
- ชื่อผู้ควบคุมเรือ หมายถึงไต๋เรือ กัปตัน หรือผู้รับผิดชอบในเรือ
- อาชญาบัตร เล่มที่ เลขที่ ให้ใช้ตัวเลขแถวบนสุดของใบอาชญาบัตร พร้อมระบุชื่ออำเภอที่ออกอาชญาบัตรนั้น เช่น เล่มที่ 455 เลขที่ 13 อำเภอเมืองสมุทรสงคราม / หรือแปลงเป็นตัวเลข 12 หลัก
- เมืองท่าที่ออกหรือเข้า ใส่ชื่อจังหวัดที่ออกจาก หรือเข้าเทียบท่า เช่น สมุทรปราการ หรือ ระนอง
- พื้นที่ทำการประมง ให้ใส่ (X) ใต้ช่องอ่าวไทย หรือทะเลอันดามัน หรือน่านน้ำอื่นๆ พร้อมระบุ เช่น น่านน้ำพม่า น่านน้ำโอมาน
- เครื่องมือทำการประมง ให้ใส่ (X) ใต้ช่องเครื่องมือที่ใช้ เช่น อวนล้อมปลาโอ หรืออวนล้อมปลาทู หรืออวนล้อมกะตัก หรืออวนล้อมอื่นๆ
- สัตว์น้ำที่จับได้รวม หมายถึงสัตว์น้ำที่จับได้ทั้งหมดเมื่อนำสัตว์น้ำขึ้นท่า
- ครั้งที่วางอวน หมายถึง ครั้งที่ทำการประมงในแต่ละวัน เช่นวางอวนวันละ 3 ครั้ง ให้ระบุเป็นครั้งที่ 1 หรือ 2 หรือ 3 ของแต่ละวัน
- ตำบลที่ ละติจูด ลองจิจูด หมายถึงตำบลที่ทำการประมงในแต่ละครั้ง ระบุตาม GPS หรือดาวเทียม หรือเครื่องมือหาตำแหน่งที่เรือ
- สัตว์น้ำที่จับได้แต่ละชนิดเป็นกก. ให้ระบุเฉพาะสัตว์น้ำที่จับได้หลัก หรือที่สามารถแยกได้แล้วประมาณน้ำหนักแต่ละชนิดที่แยกได้เป็นกิโลกรัม
- ลงชื่อผู้ควบคุมเรือ ให้ไต๋เรือ กัปตัน หรือผู้รับผิดชอบในเรือลงชื่อเพื่อรับรองว่าสัตว์น้ำนี้ได้มาจากการทำประมงที่ถูกต้อง และไม่เกี่ยวพันกับการทำประมงที่ผิดกฎหมาย
- เมื่อทำการประมงแต่ละครั้ง ผู้ควบคุมเรือกรอกข้อมูลการจับสัตว์น้ำในสมุดบันทึกการทำการประมงและเมื่อนำสัตว์น้ำขึ้นมาจำหน่าย ต้องส่งสำเนาบันทึกการทำการประมงให้สำนักงานประมงจังหวัดหรือสำนักงานประมงอำเภอ
- เมื่อสมุดบันทึกการทำการประมงที่ใช้อยู่หมด หรือไม่เพียงพอ ให้นำสมุดดังกล่าวไปขอแลกเปลี่ยนสมุดบันทึกการทำการประมงเล่มใหม่ได้ที่สำนักงานประมงจังหวัด หรือสำนักงานประมงอำเภอที่ขอต่ออาชญาบัตร
- กรณีถ้ามีการฝากสัตว์น้ำมากับเรือขนถ่าย (เรือฝาก เรือทัวร์) จะต้องส่งสำเนาบันทึกการทำการประมงมาพร้อมกับสัตว์น้ำที่ฝากด้วย

☐ ต่ำกว่า 20 ตันกรอส

ขนาดเรือ ☐ 20 ตันกรอสขึ้นไป

Annex 3

กรมประมง

Department of Fisheries

บันทึกการทำการประมง (FISHING LOGBOOK) (แบบบทป.2)

อวนล้อมจับ(PURSE SEINE)

เล่มที่/No. _ _.53/000

หน้า/Page... 01.....

ชื่อเรือ Name of Fishing vessel	ชื่อผู้ควบคุมเรือ Name of Master Fisherman	พื้นที่ทำการประมง / Fishing ground			ปี Year
		อ่าวไทย	ทะเลอันดามัน	น่านน้ำอื่นๆ(ระบุ)	
ทะเบียนเรือเลขที่ Vessel registration number	อาชญาบัตร เล่มที่ เลขที่ออกให้ ณ อำเภอ License number				สัตว์น้ำที่จับได้รวม(กก.) Total catch (kg)
เมืองท่าที่ออก/ Port of departure วันที่ / Date	เมืองท่าที่เข้า/ Port of arrival วันที่ / Date	เครื่องมือทำประมง / Fishing gear			
		อวนล้อมปลาโอ	อวนล้อมปลาทู	อวนล้อมปลากะตัก	อวนล้อมอื่นๆ(ระบุ)	อวนอื่นๆ (ระบุ)

เดือน Month	วันที่ Date	ครั้งที่วางอวน Setting no.	ตำบลที่ / Position		สัตว์น้ำที่จับได้ เป็น กก./ Catch in kg																	หมายเหตุ Remark
			ละติจูด Latitude	ลองจิจูด Longitude	ทูน่าท้องแถบ Skipjack	โอดำ Longtail	โออื่นๆ Other bonitoes	ทูแขก Round scad	ทู-ลัง Indian mackerel	สีกุน Carangids	หลังเขียว Sardine	กะตัก Anchovy	ปลาอื่นๆ Other fishes ระบุ						หมึกต่างๆ Cephalopod	รวม Total	
รวมTotal																						

ข้าพเจ้าขอรับรองว่าสัตว์น้ำที่จับได้ทั้งหมดได้มาจากการทำประมงที่ถูกต้อง และไม่ได้เกี่ยวพันกับการทำประมงที่ผิดกฎหมาย ขาดการรายงาน และไร้การควบคุมใดๆเลย

I CERTIFY THAT ALL THE CATCHES CAME FROM LEGAL FISHING AND NOTHING INVOLVED WITH ANY ILLEGAL, UNREPORTED AND UNREGULATED FISHING

..../...../.....

ลงชื่อผู้ควบคุมเรือ/Signature of Master Fisherman วันที่/Date

Annex 29

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Current Situation of Tuna in the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES)

By

Noel Barut

National Fisheries Research and Development Institute

PHILIPPINE

Current Situation of Tuna in the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES)

Special Meeting on Improvement of Tuna Information and Data Collection in Southeast Asia

Songkhla, Thailand

7-9 September 2011

Noel C. Barut

1

What is CITES

The Convention on International Trade of Endangered Species of Wild Fauna and Flora CITES is an international agreement between governments established on March 3, 1973 when 80 countries agreed at a meeting in Washington DC, USA. The Convention entered into force on July 1, 1975. This international agreement aims to ensure that international trade of wild animals and plants does not threaten their survival. States that have agreed to this Convention are known as Parties. While Parties are to implement CITES and is legally binding on the Parties, it does not take the place of the national law. Rather it provides a framework for the Parties to take up its own domestic legislation to ensure the implementation of CITES at the national level.

Today CITES has now a membership of 175 Parties and has more than 30,000 species of animal and plants with varying level of protection listed in the three appendices of CITES.

2

CITES Appendices

Appendices I, II, and III to the Convention are lists of species afforded different levels or types of protection from over-exploitation

APPENDIX I lists species that are the most endangered among CITES-listed animals and plants. They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial, for instance for scientific research. In these exceptional cases, trade may take place provided it is authorized by the granting of both an import permit and an export permit (or re-export certificate). The Convention provides for a number of exemptions to this general prohibition.

3

APPENDIX II

Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. It also includes so-called "look-alike species", i.e. species of which the specimens in trade look like those of species listed for conservation reasons of the Convention). International trade in specimens of Appendix-II species may be authorized by the granting of an export permit or re-export certificate. No import permit is necessary for these species under CITES (although a permit is needed in some countries that have taken stricter measures than CITES requires). Permits or certificates should only be granted if the relevant authorities are satisfied that certain conditions are met, above all that trade will not be detrimental to the survival of the species in the wild.

4

APPENDIX III

Appendix III is a list of species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation. International trade in specimens of species listed in this Appendix is allowed only on presentation of the appropriate permits or certificates.

5

15th Meeting of the Conference of the Parties (CoP), Doha (Qatar) March 13-15, 2010

- Monaco presented the proposal to include North Atlantic bluefin tuna on Appendix I of CITES and the relevant report, stressing the population of tuna has drastically declined and current exploitation driven by international trade is having a severe impact on the species and its capacity to recover.
- Indonesia, UAE, Venezuela, Chile, Republic of Korea, Senegal, Grenada, Morocco, Namibia and Turkey that the management of the fish species should rest with the RFMOs

6

15th CoP

- Canada argued that a CITES listing would not stop the decline, as domestic trade would continue and other parties could put a reservation on the listing.
- Japan's argument was that delisting is virtually impossible and also that the listing could represent a precedent for other species of tuna.
- EU supported the proposal and suggested an annotation for delaying the application of the listing until May 2011
- US supported the proposal and said the EU amendment warranted more discussion.

7

15th CoP

- FAO noted the findings of its expert advisory panel, indicating the majority supported the Monaco proposal and all agreed bluefin tuna met the criteria for listing under Appendix II
- Norway supported the proposal and suggested adding a clause to the draft resolution to the effect that if tuna were not delisted within ten years, it would be automatically removed from the Appendices at the following CoP unless parties decided to maintain the listing

8

15th CoP

- Libya opposed the proposal claiming it contained "false information" and requested an immediate vote.
- Following the Rules of Procedures, a vote was called on whether to put the Monaco proposal to a vote, and this was accepted.
- The EU-amended proposal was rejected with 43 in favor, 72 opposed, and 14 abstentions. The Monaco proposal was also rejected with 20 in favor, 68 against and 30 abstentions
- ***Final Outcome:*** The CoP rejected the proposal

9

CITES Animal Committee Meeting

15-20 March 2012, Geneva, Switzerland

- The Meeting will address number of agenda:
  Sharks
  Snakes
  Sturgeons
  Corals
  - Listings of commercially exploited aquatic species.

10

THANK YOU

11

Annex 30

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Study Tour to The Fish Landing Port of Fish Market

Fish Marketing Organization

Songkhla Province

THAILAND

Study Tour to The Fish Landing Port of Fish Market

Annex 31

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Study Tour to Songkhla Deep Sea Port

Songkhla Province

THAILAND

Study Tour to Songkhla Deep Sea Port






Annex 32

Special Meeting on Improvement of Tuna Information and Data Collection in the Southeast Asia. 7-9 September, 2011. Songkhla Province, Thailand.

Closing Remarks

By

Kenji Matsumoto

SEAFDEC Deputy Secretary-General

CLOSING REMARKS

Mr. Kenji Matsumoto
SEAFDEC Deputy Secretary-General

Special Meeting on Improvement of Tuna Information and Data Collection in Southeast Asia
Songkhla Province, Thailand, 7-9 September 2011

Distinguished Resource Persons and Participants,
Representatives from tuna producing countries in Southeast Asia,
Representatives from agencies collecting tuna statistics and information,
Representatives from tuna canners and exporters,
SEAFDEC staff,

Ladies and Gentlemen, Good afternoon!

After almost three days of discussion, I would like to extend our sincere gratitude and appreciation to all the participants especially the resource persons and tuna stakeholders for making this Special Meeting a great success. I would also wish to thank all those who have worked hard for the smooth arrangements of this Meeting here in Songkhla.

Ladies and Gentlemen, after our deliberation, we have come up with very significant information on tuna fisheries in our region, which we can use as important materials for discussion during our consultations in preparation for the negotiations in the forthcoming ASEAN-SEAFDEC RTC on CITES and the CITES COP-16. As you may be already aware of, the Atlantic bluefin tuna has been already proposed for listing in the CITES Appendix in 2010. However, we are not yet sure whether another proposal for listing tuna in the CITES Appendix would be raised again. The information and experiences shared during this Meeting are indeed very valuable not only to SEAFDEC but also to the countries in our region.

On behalf of SEAFDEC, I would like to express our gratitude for your active participation especially in sharing and exchanging experiences on the effective collection and compilation of tuna statistics and fisheries in our region.

Ladies and Gentlemen, as I now declare the workshop closed, I wish to thank all of you once again for your valuable inputs and the good cooperation that we all had during the Meeting. We hope that such cooperation would be sustained for the sustainable development of tuna fisheries in our region. We wish you Good luck in your future endeavors towards the improvement of tuna fisheries in our region. Lastly, I wish that we will all have very safe journey back home. Good day.