Report of the Technical Experts Meeting on Management of Transboundary Species for Southern Andaman Sea

Bangkok, Thailand

4-5 April 2018

THE SECRETARIAT

SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER

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REPORT OF THE TECHNICAL EXPERTS MEETING ON MANAGEMENT OF TRANSBOUNDARY SPECIES FOR SOUTHERN ANDAMAN SEA

4-5 April 2018, Bangkok, Thailand

EXECUTIVE SUMMARY

The Technical Experts Meeting on Management of Transboundary Species for Southern Andaman Sea was held on 4-5 April 2018 in Bangkok, Thailand which was organized and facilitated by SEAFDEC-Sweden Project. Total 27 participants from Indonesia, Malaysia and Thailand, SEAFDEC Secretary-General, SEAFDEC/Marine Fishery Resources Development and Management Department (MFRDMD), SEAFDEC Secretariat, SEAFDEC/Training Department (TD) and members of Regional Fisheries Policy Network (RFPN) participated in the Meeting.

The objectives of the Meeting were to identify existing data on anchovies, mackerels and Neritic tunas that can be used to produce maps of these features covering the Southern Andaman Sea. The meeting focused on data on spawning grounds, spawning seasons, other biological data, habitats and migration patterns as well as existing fisheries regulations. The resulting maps could serve as inputs to future coordination of national fisheries measures.

The Meeting agreed on a roadmap to produce digital maps of the biological features and fisheries regulations for anchovy, mackerel and Neritic Tuna the Southern Andaman Sea. Other supporting information such as catch statistics would also be collected. The main action points in the roadmap are listed below.

- The three countries agreed on a list of maps they would be likely to have data for and will collect and compiled these existing data for anchovies, mackerels and Neritic tunas in collaboration and coordination with other agencies, research institutions and universities.
- The data will be sent to SEAFDEC/Training Department (TD) in accordance with a number of deadlines but at the latest 15 June 2018. SEAFDEC/TD will make a first set of draft maps based on the data provided by the countries.
- SEAFDEC will send the draft maps to the participants in advance of the follow up meeting which is planned by the end of July. At the meeting the draft maps will be discussed and needs for revision identified. Depending on data quality the meeting will also study possible future needs for coordination of fisheries measures, based on the maps.

INTRODUCTION

1. The Technical Experts Meeting on Management of Transboundary Species for Southern Andaman Sea was held on 4-5 April 2018 in Bangkok, Thailand. The Meeting was organized and facilitated by the SEAFDEC-Sweden Project. The Meeting was attended by 27 participants representing Indonesia, Malaysia and Thailand, as well as the Secretary-General, officials of SEAFDEC Secretariat, SEAFDEC/Marine Fishery Resources Development and Management Department (MFRDMD), SEAFDEC/Training Department (TD) and members of Regional Fisheries Policy Network (RFPN). The list of participants appears as **Annex 1**.

2. The Meeting was convened as follow-up to the recommendations made at the Sub-regional Consultative Meeting on the Joint Fisheries Management around the Southern Andaman Sea which

was held on 21-22 November 2017 in Bangkok. In that meeting, it was recommended that the transboundary species of anchovies, mackerels and Neritic tunas would be targeted for cooperation and collaboration between Indonesia, Malaysia and Thailand. Therefore, the objectives of this Meeting were to identify existing data for spawning grounds, spawning seasons, other biological data, habitats and migration patterns as well as existing fisheries regulations of anchovies, mackerels and Neritic tunas. These data would be used to produce maps covering the Southern Andaman Sea. The resulting maps could serve as inputs to future coordination of national fisheries measures.

I. OPENING OF THE MEETING

3. The Secretary-General of SEAFDEC, *Dr. Kom Silapajarn* welcomed the participants and thanked everyone for attending the Meeting. His opening remarks appears as **Annex 2.**

II. BACKGROUND AND OBJECTIVES OF THE MEETING

4. *Dr. Bamroongsak Chatananthawej*, Andaman Sea and Mekong River Basin Sub–region Coordinator, briefly explained the background, objectives, agenda and expected outputs of the Meeting. The background, prospectus and agenda appear as **Annex 3** and **Annex 4**.

III. AVAILABLE DATA AND INFORMATION ON THE TARGET TRANSBOUNDARY SPECIES IN THE SOUTHERN ANDAMAN SEA

In this section the existing information on anchovies, mackerels, and Neritic Tunas was presented by the countries and SEAFDEC/MFRDMD.

3.1 Anchovies

- Indonesia

5. *Mr. Suwarso*, Senior Researcher, Center of Fisheries Research, Ministry of Marine Affairs and Fisheries, Indonesia, presented the available data and information on anchovies. Anchovy contributes a significant value for fisher's income. The catch areas of anchovy are distributed in eleven (11) areas all over Indonesia. In southern Andaman Sea, the Fisheries Management Area (FMA) is area 571, ranging from Malacca strait to northern Aceh. The total annual catch is about 42,000 Metric Ton (MT) or 21% of total national catch. The statistical data in 2015 reflected that 36,000 MT or 92% of Malacca strait anchovy were landed at north Sumatra Province. Their scientific names were not identified, but belonges to small pelagic group, which contributes about 23% of the total small pelagic catch in the area.

6. The anchovy fishing operations are commonly conducted by small scale fishermen using fish net (pukat teri) and stow bag set net (pukat apung). Anchovy constitutes about 4% of the catch in fish nets. The maximum annual catch was recorded in 2012 which was about 7,554 MT while the average catch is about 3,250 tons.

7. The monthly peak season for anchovy capture is April-July and the avergae CPUE) from the Belawan and Tanjung Balai fishing ports is 30.4 and 26.4 tons/year/fishing boat. There was no information about fishing grounds or the anchovy yearly migration route. There are indications of that the spawning season of anchovy is July-August. There is no data on spawning ground, spawning period and monthly catch data for anchovy and genetic studies on stock structure have not yet been performed. His presentation appears as **Annex 5**.

8. The Meeting suggested that there may be additional data on anchovy from other universities and research institutions that are working in the same area (north Sumatra).

- **Malaysia**

9. *Mr. Abd Haris Hilmi Ahmad Arshad*, Senior Fisheries Officer, Fisheries Research Institute, Department of Fisheries, Malaysia, presented Malaysian data on anchovies. Anchovies contribute 1.2% of the total marine annual capture fisheries in Malaysia. The yearly landings of anchovy during 1990-2016 fluctuated between 15,000 and 40,000 MT annually. The fishing gear is dominated by anchovy purse seine and lift net, others are trawl net, bag net, drift gill net and stationary trap. The monthly catch per unit effort (CPUE) in 2016, peaked in January (800 kg/trip) but averaged at about 300 kg/trip.

10. There are four dominant species of anchovy in the Malaysian fishery, *Encrasicholina punctifer, E. heteroloba, Stolephorus indicus* and *S. commersonii*. The body length is 5.5 cm; 7.0 cm; 12.0 cm and 9.5 cm respectively and spawning peaks during March, September and November. The main fishing gounds are Pangkor, Pulau Singa Besar, Pulau Langawi, Pulau Pangkor and Pulau Sembilan. His presentation appears as **Annex 6**.

-Thailand

11. *Ms. Thanawan Somjit*, Fisheries Biologist, Department of Fisheries **(**DoF**),** Thailand, presented the available data and information on anchovies of Thailand. There are three major species found in Thailand namely: *Encrasicholina heteroloba, E. punctifer and E. devisi.* Most fishing gears used are anchovy falling net with light luring and anchovy purse seine. The major fishing grounds of anchovy in southern Andaman Sea (Area7) are Phang Nga, Phuket, Krabi, Trang and Satun Province.

12. Based on the research by DoF, Thailand, the size at first maturity of three species is between 6.09-7.21 cm. Its spawning season is all year but peak season of *E. heteroloba* and *E. devisi* is June and July while for *E. punctifer* it is January. The spawning and nursery grounds of anchovies are mostly distributed in water with depth ranging from 12-60 m on western and eastern of Phuket Province and western and southern of Tarutao Island. The fishing ground has water depth ranging from 10-40 m around the Yao Island, Rok Island and Tarutao Island. Reports showed a decreasing trend of anchovy catch in the peak catching season from 40,000 MT in 1993 to about 13,000 MT in 2017. Thailand have also calculated the Maximum Sustainable Yield (MSY) for anchovy for the whole Thai Andaman Sea area. The presentation appears as **Annex 7**.

13. The Meeting pointed out that this detailed data on spawning grounds in Thailand could also be useful for Indonesia and Malaysia, where data could be extrapolated to have an idea as to where the spawning and nursery grounds can be located.

14. The Meeting noted that Malaysia uses gonad stage maturity to identify spawning ground, while Thailand uses eggs and larvae identification. There are different methods used in the countries and its up to each country to choose a suitable method depending on national regulations and budget. However a harmonized method between the three countries would improve the quality of the data and this could possibly be a useful consideration for the countries in the future.

- SEAFDEC/MFRDMD

15. *Mr. Mohammad Faisal bin Md. Salleh*, Research Officer, SEAFDEC/MFRDMD, presented the dominant species of anchovy in the Southern Andaman Sea. The main species of anchovy along the coast of Thailand are *Encrasicholina punctifer, E. heteroloba* and *E. devisi,* while in the west coast of Peninsular Malaysia, *E. punctifer, E. heteroloba, Stolephorus commersonii* and *S. indicus* dominate. The major fishing gear for anchovy in the Southern Andaman Sea is anchovy purse seine (Malaysia & Thailand) and anchovy lift net (Indonesia).

16. The peak season for spawning of *E. punctifer* is January and sex ratio is 1:0.7. The peak season for *E. heteroloba* is July and sex ratio is 1:0.8, while the peak season for *E. devisi* is June and sex ratio is 1:0.7. The presentation appears as **Annex 8**.

2.2 Mackerels

- Indonesia

17. The Meeting took note of the available data and information on mackerels of Indonesia, presented by *Mr. Suwarso*. Catches of mackerel constitute about 79% of the total catch in Malacca strait, 49% in Belawan Port and 30% in Tanjung Balai port. The fishing gears that used are gill net (especially at Tanjung Balai) and purse seine. The total number of purse seine vessels operated in the Malacca strait is 777 vessels. The dominant species are *Rastrelliger brachysoma* (short mackerel) and *R. kanagurta* (Indian mackerel) but also *Decapterus ruselli*, *D. macarellus* and *Selar crumenopthalmus* are caught in the area.

18. The mean size of Indian mackerel is 20.4 cm and short mackerel 16.9 cm while the size at first maturity for Indian mackerel is 21-22 cm and for short mackerel 17-18 cm. The spawning season of both species is July-August and spawning grounds have been identified along Berhala Island, Salahnama Island and Jemur Island. There is no available information related to their migration path. The presentation appears as **Annex 9**.

19. The Meeting discussed the steep declines of Indian mackerels, short mackerels landing in southern Andaman Sea and *Mr. Suwarso* replied that the landed catch is a mix of Indian and short mackerels which both are declining. On the population of Indian mackerels along southern Andaman Sea, the most dominant species is short mackerel in almost all areas.

20. The Meeting also identified that there is information on mackerels based on a study implemented by Bay of Bengal Large Marine Ecosystem Project (BOBLME) and this could be an additional source of information.

- Malaysia

21. *Mr. Sallehudin bin Jamon*, Senior Fisheries Officer, Fisheries Research Institute, Department of Fisheries (DoF), Malaysia, presented the data information on mackerels. The two dominating species of mackerels are Indian mackerel (*Rastrelliger kanagurta*) and short mackerel (*Rastrelliger brachysoma*). The average landing for the last 13 years in west coast Peninsular Malaysia (WCPM) for the *R. kanagurta* is about 27,000 MT, while *R. brachysoma* it is about 115,000 MT. The three (3) fishing gears used are purse seine (58.8% of *R. kanagurta*); drift net (57.7% of *R. brachysoma*) and trawl net (no data presented). The land based survey data in 2014, showed the Indian mackerel was caught dominantly in sub-area 1, and the short mackerel in sub-area 2.

22. The fishing area information reported as part of the landing data is received from logbooks and data from Vessels Monitoring System (VMS). Indian mackerel is caught in offshore areas, about 30-70 nautical mile (NM) from the shore line with depth ranging between 40-80 m, while short mackerel is caught in coastal areas, less than 30 NM from the coast. The spawning season of *R. kanagurta* in WCPM, is presently studied in Kuala Perlis, Bagan Panchor and Hutan Melintang, where the percentage of mature fish sampled shows a fluctuation throughout the study duration but final results are still pending. The occurrence of mature fishes year round indicates that spawning is a continuous process. Other information sources indicate that the spawning season is September and

February (MFRDMD, 2014), while October and April are pointed out in Pathansali (1967). The presentation appears as **Annex 10**.

23. Spawning areas cannot be determined at the moment, by using gonad maturation only and fishing area to locate the spawning areas, it must be validated with fish larval survey to have accurate data on the abundance and distribution of fish larvae. Nonetheless, the Meeting recommended to use location of fishing ground and preliminary spawning season information as a preliminary data to be used in producing a map, as no available information was presented.

- Thailand

24. *Ms. Nipa Kulanujaree*, Fisheries Biologist, DoF Thailand, presented the available data information on mackerels. There are two species of mackerels caught in Thailand, *Rastrelliger brachysoma* (short mackerel) and *R. kanagurta* (Indian mackerel). The short mackerel has peak spawning seasons in November-May and July-September while the Indian mackerel has peak spawning seasons in December-March and August-September. The fishing ground of Indian mackerel is further offshore than short mackerel. Spawning and nursery grounds of mackerels have been identified near the estuary of Phang Nga Bay. In general Indian mackerel catches have been larger than those of short mackerel but in 2010, the trends reversed with short mackerel catches higher than those for Indian mackerel. The presentation appears as **Annex 11**.

25. The Meeting discussed the life cycle and migration of mackerels, and noted the possibility of overlapping young mackerels in the boundary of Malaysia and Krabi area, along the west coast. The Meeting was also informed of a previous study done in collaboration between Thailand and Malaysia under the BOBP (The Bay of Bengal Programme) project. However, Malaysia also pointed out that some data on pelagic fishing areas south of Langkawi that needs further analysis. Malaysia will also conduct a tagging project for Indian and short mackerel where Thailand has also shown interest.

- SEAFDEC/MFRDMD

26. *Mr. Mohammad Faisal bin Md Saleh,* presented the available data information on mackerels for Malaysia and Thailand. The landings of Indo-pacific mackerel by purse seine during 2000-2015 fluctuated and decreased for all three countries. The length at first maturity of fish in Thailand shows that females are longer than males. The length at first maturity in Malaysia is longer compared to Thailand and Indonesia.

27. The spawning season of *Rastrelliger brachysoma* in Thailand is all year round with peak season in November-May and July-September. For *Rastrelliger kanagurta* spawning peak season for Indonesia is May-October while in Malaysia it is in September-February and Thailand from December-March and August-September, sex ratios were the same in three countries 1:0.9.

28. On the restriction of fishing regulations, Indonesia prohibits net mesh size < 25 mm on small pelagic for purse seine; Malaysia prohibits net mesh size < 38 mm in trawls and Thailand prohibits net mesh size less than 25 mm during night time and for light luring method of purse seine. Thailand has 3 months closed, 1 April to 30 June, starting in 2007 for all commercial fisheries. The presentation appears as **Annex 12**.

3.3 Neritic Tunas

- Indonesia

29. *Mr. Suwarso* presented the data on Neritic tuna in Indonesia. There are 10 dominant species identified, but more than 35% of total volume were *Thunus tonggol* (longtail tuna) and

T. scomberomorus. Two other species of Neritic tuna, *Auxis thazard* and kawakawa (*Euthynus affinis*), are also common. The landings of Neritic tuna at Malacca strait was about 35,560 tons/year or 70% of total big pelagic. They were landed at Aceh (62%) and Belawan (35%).

30. Yearly catches of kawakawa declined from about 20,000 tons in 2009 to about 10,000 tons in 2015, while the longtail tuna was stable at about 2,000-7,000 tons. Average body length (L_{50}) of kawakawa was 34.5 cm; longtail tuna 38.9 cm. The exploitation rate of both species (kawakawa and longtail tuna) was 0.5.

31. For total big pelagic species in Malacca strait, its stock size was about 101,969 tons, total landings about 81,575 tons, and exploitation rate 0.89 (fully exploited). No information available to indicate the spawning ground and its spawning season. The presentation appears as **Annex 13**.

- Malaysia

32. *Mr. Sallehudin bin Jamon*, Senior Fisheries Officer. The Neritic tuna fisheries is part of offshore fisheries segment (>30 NM distance operation) and the dominant species are kawakawa (*Euthynnus affinis)*, longtail tuna (*Thunnus tonggol)* and frigate tuna *(Auxis thazard).* They contribute 5-6% of total marine fisheries or about 1,486,051 MT.

33. The fishing area, based on vessel monitoring data, are offshore areas > 300 NM with depth 40-80 m. The fishing gears used are purse seine by > 70 GT vessel, with fish aggregating device and light luring. The annual landing during 2008-2016, showed kawakawa increased about 2,000 MT to about 10,000 MT in 2012 and thereafter stable at about 8,000 MT. Frigate tuna catches were about 1,000 MT while longtail tuna decreased from about 14,000 MT to 6,000 MT.

34. Kawakawa in the WCPM region is considered under exploited with the exploitation rate at about 26% below the F_{msy} and the total biomass is 29% higher than B_{msy}. The longtail tuna is over exploited. The size distribution of each species showed kawakawa range is 160-580 mm with the maximum frequency at 280-340 mm; L_m 390 mm; 85% catch is below L_m; larger size is caught in November. Longtail tuna range is 220-540 mm; L_m 410 mm, 92% caught below L_m and larger size is caught September to October, while for frigate tuna range is 170-410 mm; L_m is 328 mm and 91% caught below L_m. The presentation appears as **Annex 14**.

- Thailand

35. *Ms. Praulai* provided information on the Neritic tuna data from Thailand. In the Thai part of Andaman Sea 4 species are caught: *Auxis thazard* (frigate tuna), *Auxis rochei* (bullet tuna), *Euthynnus affinis* (kawakawa) and *Thunnus tonggol* (longtail tuna). The gears used in this fishery are: purse seine with fish aggregating devices, light luring purse seine, Thai purse seine and tuna purse seine. Fishing occurs along the whole west coast of Andaman Sea. The presentation appears as **Annex 15**.

- SEAFDEC/MFRDMD

36. *Mr. Mohammad Faisal bin Md Saleh,* presented the data that exists at MFRDMD. Regarding kawakawa, catches in southern Andaman Sea during 2000-2015 was higher in Indonesia compared to Malaysia and Thailand. Longtail tuna landings in southern Andaman Sea during 2000-2015 have been decreasing in all three countries.

37. There are data on size at first maturity and length-weight relationships for both species. The spawning season of *Auxis thazard*, is January to March and August to November, sex ratio is 1:1.2. For *Euthynnus affinis*, spawning season is January to May and October to December, sex ratio is 1:0.7. The presentation appears as **Annex 16**.

38. The Meeting concluded that all three (3) countries had similar signals of decreasing landings and CPUE, according to FAO data. A discussion was also held on the need for harmonizing the units for CPUE which differs between the countries. This leads to difficulties for example at stock assessment calculations. The meeting agreed that for this data compilation countries should provide data calculated as yearly average catch per vessel and day. If possible also monthly average should be provided.

IV. DISCUSSION ON THE NEED AND AVAILABILITY OF ADDITIONAL DATA AND INFORMATION

39. *Dr. Worawit*, SEADEC/Secretariat, presented a template for data and information inputs. The template was meant as a support to the countries on data that are useful to identify features such as spawning grounds and could be used by the countries to submit the relevant data for map layers as well as supporting data. Some adjustments to the template were done after comments from the meeting. The presentation appears as **Annex 17**.

V. COUNTRY PRESENTATION OF EXISTING MANAGEMENT MEASURES RELATING TO MACKERELS, ANCHOVIES AND NERITIC TUNAS

- Indonesia

40. The representative from Indonesia informed the Meeting that Indonesia is divided into 11 Fisheries Management Areas (FMA) and the Southern Andaman Sea is covered by FMA 571 that includes Malacca Strait (eastern Sumatra) and Andaman Sea. Three (3) Indonesian provinces are covered by this FMA: Nanggroe Aceh Darussalam (NAD), North Sumatra and Riau. Ten (10) fishing gears are allowed to be used by the commercial fisheries in this area. The control of the issuance of licenses for every fishing vessel and fishing activity is one of the strategies for controlling the fishing effort in every FMA. The presentation appears **Annex 18**.

- Malaysia

41. *Ms. Masazurah binti A. Rahim*, presented the fisheries management measures of pelagic species in Malaysia. There are two main parts: the control of fishing effort and zoning system. Malaysia implements management measures that include monitoring, control and surveillance program for fishing management, fishing gear prohibition by zone by time period (on anchovy light luring purse seine in the night, other close season).

42. Malaysia conducts programs on rehabilitation of fishing resources, such as artificial reef, and also prohibits some fishing activities. There is a management plan for anchovy and the country has implemented the Vessel Monitoring System and Automatic Identification System for monitoring vessels and other fishing activities. The MSY in Malaysia is currently assessed by Department of Fisheries researchers but not for Total Allowable Catch. The presentation appears as **Annex 19**.

- Thailand

43. *Ms. Praulai* gave a presentation on legal framework and fisheries management plan (FMP) of Thailand. Thailand has developed a traceability system, where all information on fish and fishery products must be cross-checked before issuing a Catch Certificate.

44. Andaman Sea vessels are separated in three groups: commercial scale (10 to >60 GT), main gear is purse seine, small scale (5 to <10 GT) and artisanal fishing vessels (5 to ≤10 GT). The law and regulation enforcement is under the National Council for Peace and Order (NCPO), Ministerial Notification, the Royal Ordinance on Thai vessels and navigation. The Department of Fisheries (DoF) works with Royal Thai navy in patrolling and surveillance.

45. The Meeting noted that Thailand have declared a marine protected area (MPA) in the Gulf of Phang Nga and areas in Krabi and Phuket as well as some areas of Trang and Satun Province. Commercial fisheries are also closed between 1 April to 30 June every year. In addition, DoF of Thailand has also declared that anchovy purse seine is only allowed to fish outside coastal area and only at daytime with mesh size restriction not smaller than 0.6 cm. The presentation appears as **Annex 20.**

VI. DISCUSSION ON DATA FORMATS AND NEEDS FOR THE PRODUCTION OF THEMATIC (GIS BASED) MAPS

46. *Mr. Sukchai Arnupapboon*, Officer of SEAFDEC/TD, presented data formats and needs for the production of thematic (GIS based) maps. There are several data formats in which the countries can send their map data in order for TD to produce digital maps. The preferable way is of course if digital maps already exist and then these data files can be sent directly. Countries can also provide Latitude and Longitude position in WGS84 format in Microsoft Excel/Word/Text files or similar. The third option is to send maps in paper format where the relevant areas can be indicated by hand or printed and TD can also use these to digitalize the maps. The Meeting also emphasized that not all information can be put in a map and this information will be summarized in a supplementing document to the maps. The presentation appears as **Annex 21**.

47. The Meeting was noted that countries can coordinate or collaborate with other research institutions, universities and NGOs to collect more information to ensure that every detail is included. The Meeting informed that all the data should be verified or validated by the countries before sending to TD but countries will also be able to review and revise the draft maps at the planned follow up meeting in June.

VII. DETAILED WORKPLAN FOR PRODUCING THEMATIC MAPS

48. The Meeting reviewed a draft set of map layers and supporting data that had been prepared by the SEAFDEC/Secretariat during the meeting and agreed on a list of map layers and supporting data that should be produced. The supporting data and map layers will be thematic covering different features of the transboundary species discussed at the Meeting and will cover the whole southern Andaman Sea with the three countries data compiled for each feature. This list of map layers is attached as **Annex 22**.

49. After the discussion on the type of data and information needs, the Meeting agreed that all existing data to be sent to SEAFDEC before 15 April 2018, while regulatory data on different fisheries regulations relevant to the three (3) species group to be sent by 30 May 2018 and deadline to be sent to SEAFDEC/TD is 15 June 2018 (see also **Annex 22**). If countries can deliver the data on time TD will strive to produce draft maps by 15 July 2018 which will then be sent to the participants for reviewing. The meeting agreed that the next meeting for transboundary species for southern Andaman Sea will be convened in fourth week of July 2018.

VIII. NEXT STEPS AND WAY FORWARD

50. The Meeting agreed on timelines of the data submission to SEAFDEC. If the countries submit the data and information timely to SEAFDEC, a progress meeting is expected to be organized by end of July 2018 to discuss, revise and agree on the draft maps. Depending on the quality of the maps this meeting is also expected to have a first discussion based on the maps, on possible future issues that should be addressed by the countries with the regards to measures for the sustainability of the transboundary species. The result of this discussion could provide the outline for developing a draft plan in support of the conservation of transboundary species during the second half of 2018.

IX. CLOSING OF MEETING

51. *Dr. Kom Silapajarn*, the Secretary-General of SEAFDEC expressed his appreciation to all participants for their active participation and providing valuable inputs during the two-day meeting in which a good exchange of information and views among participants. He affirmed that this Meeting could be an important first step to coordinate measures for the sustainability of the transboundary species. With that note, he then declared the Meeting closed.

Annex 1

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Annex 2

OPENING REMARKS

By *Dr. Kom Silapajarn,*
SEAFDEC Secretary-General

Distinguished experts from Indonesia, Malaysia and Thailand
Distinguish participants and SEAFDEC officials,
Ladies and Gentlemen

Good morning to all of you!

Firstly, I would like to express my warm welcome to all of you for participating in the Technical Experts Meeting on Management of Trans-boundary Species for the Southern Andaman Sea.

The fisheries in the Southern Andaman Sea is an important economic sector for among Indonesia, Malaysia and Thailand since it provides food, jobs and revenues for the countries. A part of this fishing is done on fish species that move between the national waters of two countries, the so called trans-boundary species. Since countries fish on the same stocks it would be beneficial to adopt a coordinated approach on how these species are managed. Such an approach could guarantee that the stocks would be able to provide food and revenue also in the future.

The *Southern Andaman Sea Sub-regional Technical Meeting on Effective Fisheries Management* was held in November 2017 in Bangkok. The outcome of the November 2017 meeting showed a strong commitment by participants from Indonesia, Malaysia and Thailand to strengthen cooperation.

As a result of the meeting, Indonesia, Malaysia and Thailand recommended that the three countries should compile existing data on Anchovies, Mackerels and Neritic tuna in the Southern Andaman Sea. The compiled data should then be used as a basis for a trilateral discussion on how the management of these species could be coordinated.

Based on the recommendations from Indonesia, Malaysia and Thailand, SEAFDEC is organizing this meeting to draft a work-plan to compile data and produce joint maps of the biological features of these species in the Southern Andaman Sea.

The important work you will start during this meeting will form the scientific basis for future coordination of the management which will be a key step to secure a sustainable fisheries in the sub-region.

Finally, I would like to thank Sweden for funding this work including this meeting and not the least the participating national experts and the SEAFDEC Secretariat team for their preparations for this meeting.

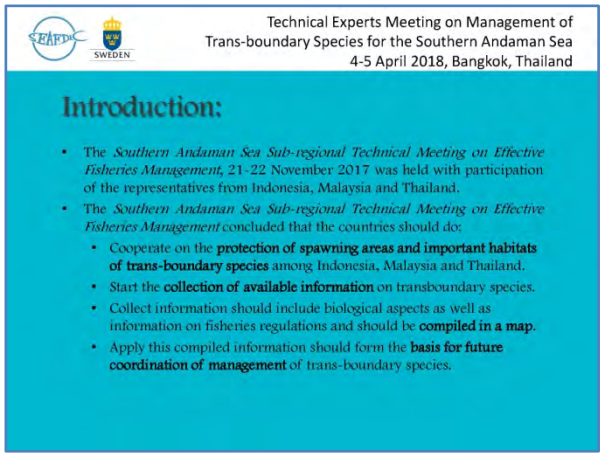
Once again, I wish you a successful meeting and enjoy the Bangkok hospitality.

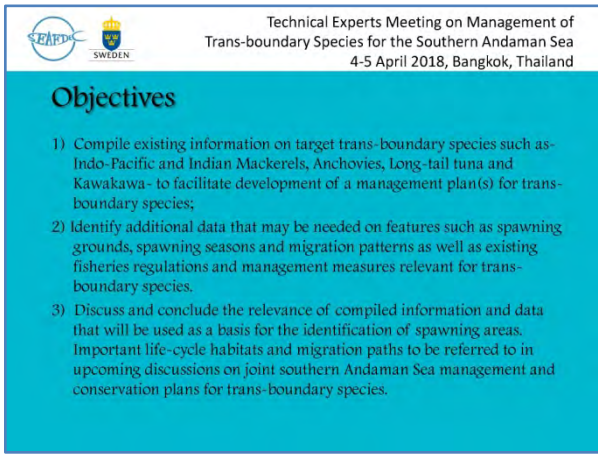
Thank you.

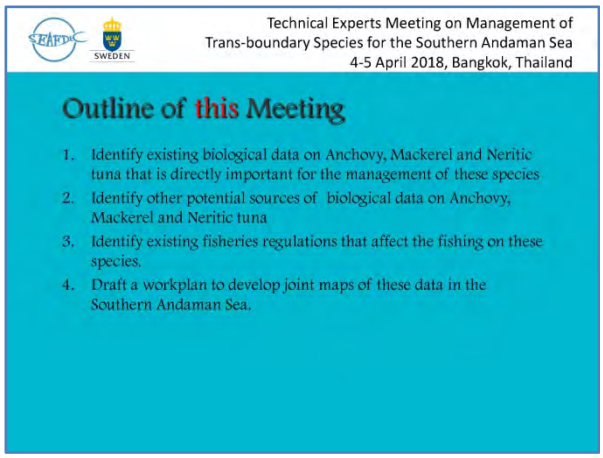
Annex 3

BACKGROUND AND OBJECTIVES OF THE MEETING

By *Dr. Jacob Hagberg*







Technical Experts Meeting on Management of Trans-boundary Species for the Southern Andaman Sea
4-5 April 2018, Bangkok, Thailand

II. ROADMAP & WORKPLAN

Roadmap & Work Plan

Trans-boundary species

January	DOF	Appoint TFP for Core Planning Group of each country
TBA meeting April	1st Meeting of "Technical Experts on Trans-boundary species among Indonesia, Malaysia and Thailand"	- Identify existing data and documentation on transboundary species - Agree on work-plan to develop digital maps
April - July		- Delivery of map data to SEAFDEC - Development of first draft map layers in ARC GIS
July	2nd Meeting of "Technical Expert on Trans-boundary species among Indonesia, Malaysia and Thailand"	- Review first draft maps and agree on need for minor revisions - Development of first draft Trans-boundary species Joint Management Plan for Southern Andaman Sea

Roadmap & Work Plan

July-October	-Discussion on possible recommendations for regional agreements of national measures	
October	Bilateral Meeting possibly under the future MCS Network Consultation in the Southern Andaman Sea	-Discussion, revision and possibly adoption of joint Indonesia, Malaysia and Thailand Fisheries Management Plan for trans-boundary stocks

Technical Experts Meeting on Management of Trans-boundary Species for the Southern Andaman Sea
4-5 April 2018, Bangkok, Thailand

Meeting Agenda

4 April 2018

- **Agenda 1**: Opening of the Meeting
- **Agenda 2**: Introduction on background, objectives and agenda of the Meeting
- **Agenda 3**: Countries presentation on the available data and information on the target species Indo-Pacific and Indian Mackerel, Anchovy, Long-tail Tuna and Kawakawa by species

5 April 2018

- **Agenda 4**: Discussion on the Need and Availability of Additional Data and Information
- **Agenda 5**: Country Presentation of Existing Management Measures relating to Mackerels, Anchovies and Neritic Tuna
- **Agenda 6**: Discussion on Data Formats and Needs for the Production of Thematic (GIS based) Maps
- **Agenda 7**: Drafting a Detailed Workplan for Producing Thematic maps
- **Agenda 8**: Next steps and way forward
- **Agenda 9**: Closing of the Meeting

SWEDEN

THANK YOU

Annex 4

PROSPECTUS

I. Background

Since 2009, the SEAFDEC-Sweden Project organized the Andaman Sea Sub-regional Meetings which one of the activity for the effort to strengthen the sub-regional cooperation among countries around the Andaman Sea sub-region (Myanmar, Thailand, Malaysia and Indonesia) and other relevant institutions with regards to integrate fisheries and habitat management as well as to manage fishing capacity. By the SEAFDEC-Sweden Project, with different ecological features, Andaman Sea sub-region is divided into the northern and southern part in terms of fisheries activities and trans-boundary fisheries resources management. During the course of the Project, the promotion of bilateral cooperation to improve management of fishing capacity, including the initiation of sub-regional MCS Networks together with development of port monitoring capacity and coordinated efforts to combat IUU fishing in the north Andaman Sea and trilateral cooperation in the south Andaman Sea has been recognized in events organized by SEAFDEC, FAO (BOBLME) and others.

The recommendations from the 3rd Andaman Sea Meeting (2016, Bangkok) reinforced the importance to strengthen the bi- and multilateral cooperation in line with meetings earlier organized in the northern and southern parts of the Andaman Sea with facilitation from SEAFDEC and supported by the SEAFDEC-Sweden Project. In follow-up to those recommendations, the *Southern Andaman Sea Sub-regional Technical Meeting on Effective Fisheries Management* which was held on 21-22 November 2017 in Bangkok with participation of the representatives from Indonesia, Malaysia and Thailand provided a framework in support of strengthened trilateral cooperation on priority trans-boundary species (Indo-Pacific and Indian Mackerel, Anchovy, Long-tail tuna and Kawakawa).

In addition, the outcome of the November 2017 meeting, strong commitment by participants from Indonesia, Malaysia and Thailand in strengthening cooperation among countries including the appointed working groups to continue dialogues and consultations to develop joint/coordinated fisheries management plans. It was agreed that countries should facilitate and ensure the appointment of (1) a technical focal points and expert group for priority trans-boundary species, and (2) a national technical group for the coordination of MCS related activities (the group should consist of members from existing national MCS coordination units).

This meeting is the first in a sequence of meeting and consultations to develop joint/coordinated fisheries management plans that would look for management recommendations to be provided on the conservation and management of important habitats and spawning areas for mackerels and related species. Based on available information digitized reference maps should be prepared for the management planning with regards to critical areas (spawning, etc.) in the life cycle of target species together with indication of migration paths. Cross-border migration paths highlight the trans-boundary nature of target species and related fishing activities. Transboundary migration and the need to conserve sensitive areas are important indication on the need coordinate efforts on monitoring, control and enforcement of rules and regulation by authorities in Indonesia, Malaysia and Thailand.

II. OBJECTIVES OF THE MEETING

The Technical Experts Meeting on Management of Transboundary Species for the Southern Andaman Sea will be organized by SEAFDEC-Sweden Project for facilitating sub-regional cooperation among Indonesia, Malaysia and Thailand. The objectives of the Meeting are to:

1) Compile existing information on target transboundary species such as (Indo-Pacific and Indian mackerels, anchovies, longtail tuna and kawakawa) to facilitate development of a management plan (s) for transboundary species;
2) Identify additional data that may be needed on features such as spawning grounds, spawning seasons and migration patterns as well as existing fisheries regulations and management measures relevant for transboundary species;
3) Discuss and conclude the relevance of compiled information and data that will be used as a basis for the identification of spawning areas, important life-cycle habitats and migrations paths to be referred to in upcoming discussions on joint southern Andaman Sea management and conservation plans for transboundary species.

III. EXPECTED OUTPUTS

- Sets of existing data collected on target species and compiled data and information for drafting maps of spawning area, fish migratory patterns, fisheries management measures, etc. which are necessary for developing management plans of the target transboundary species in the area of the Southern Andaman Sea;
- Documentation provided with comments on the value and relevance of existing data as input to management planning;
- Outline provided on inputs to the management plan(s) and maps with indication of any additional data needs for determining spawning area, spawning season and to confirm migration patterns as a basis for continued development of management plans;
- Agreed work plan for developing digital maps for the target transboundary species in the Southern Andaman Sub-region Countries.

IV. EXPECTED OUTCOMES

1) Digital maps that can be used as a basis for the development of joint management plans. The content of the maps should be agreed by Indonesia, Malaysia and Thailand;
2) Development of draft joint management plans initiated for the target transboundary species based on the agreed maps and other relevant information. This process should be developed under the remit of a future MCS coordinating body;
3) Agreement by Indonesia, Malaysia and Thailand on the continued development of management plans for the target transboundary species. The plans could include protection of spawning areas and measures or regulations of monitoring, controlling and surveillance on fishing capacity.

V. PARTICIPANTS OF THE MEETING

Approximately total participants 20-22 persons

- Appointed TFPs for each country (max. 3 persons), Indonesia, Malaysia and Thailand, total 9 persons
- SEAFDEC Secretariat/TD/MFRDMD (6-9 persons)
- Regional Fisheries Policy Network (RFPN) (3 persons)
- Resources persons should have experience in related issue (1)

TIMETABLE AND AGENDA

4 APRIL 2018 (WED)	
08.30	Registration
09.00-09.15	Agenda 1: Opening of the Meeting
09.15-09.30	Agenda 2: Introduction and Objectives of the Meeting and Adoption of Agenda
09.30-10.45	Agenda 3: Presentation on Available Data and Information on the Target Trans-boundary Species in the Southern Andaman Sea 3.1 Anchovies - Indonesia (Malacca Strait, North Sumatra) - Malaysia (Perak, Penang, Kedah, Langkawi) - Thailand (Satun, up to Phuket) - SEAFDEC/MFRDMD (Southern Andaman Sea) *Note: Time will be allocated for 15 minutes for each country to make a presentation on the available data and information of Anchovies, including data on spawning areas, migration routes and stock structure, catch data, etc. with specific area of the Southern Andaman Sea. Then, time will be for 15 minutes for the discussion.*
10.45-11.00	*Coffee break and group photo*
11.00-12.00	Agenda 3: Presentation on Available Data and Information on the Target Trans-boundary Species in the Southern Andaman Sea 3.2 Mackerels (Indo-pacific Mackerel and Indian Mackerel) - Indonesia - Malaysia *Note: Time will be allocated for 30 minutes for each country to make a presentation on the available data and information of Mackerels, including data on spawning areas, migration routes and stock structure, catch data, etc. with specific area of the Southern Andaman Sea.*
12.00-13.30	*Lunch*
13.30-14.45	Agenda 3: Presentation on Available Data and Information on the Target Trans-boundary Species in the Southern Andaman Sea 3.2 (con't) Mackerels (Indo-pacific Mackerel and Indian Mackerel) - Thailand - SEAFDEC/MFRDMD *Note: Time will be allocated for 30 minutes for each country to make a presentation on the available data and information of Mackerels, including data on spawning areas, migration routes and stock structure, catch data, etc. with specific area of the Southern Andaman Sea. Then, time will be for 15 minutes for the discussion.*
14.45-17.00	3.3 Neritic Tunas (Long-tail Tuna, Kawakawa) - Indonesia - Malaysia - Thailand - SEAFDEC/MFRDMD *Note: Time will be allocated for 30 minutes for each country to make a presentation on the available data and information of Neritic Tunas, , including data on spawning areas, migration routes and stock structure, catch data, etc. with specific area of the Southern Andaman Sea. Then, time will be for 15 minutes for the discussion.*
18:30-20:30	*Reception dinner* by SEAFDEC

5 APRIL 2018 (THU)	
09.00-10.30	Agenda 4: Discussion on the Need and Availability of Additional Data and Information *Note: SEAFDEC will present the Template on required data and information (such as Biological Information (larvae abundance and distribution, spawning ground and season, migratory pattern, etc.), Oceanographic parameters, Fisheries Information (catch and landing, fishing efforts, fishing vessels, fishing gear targeting the trans-boundary species). After the presentation, the Meeting will discuss on the need and available of additional data and information, identify type of data, and how to obtain the missing data and suggestion on how to obtain the data and information from other institutions such as responsible agencies, universities, projects, Worldfish, etc.*
10.30-11.00	*Coffee break*
11.00-12.00	Agenda 5: Country Presentation of Existing Management Measures relating to Mackerels, Anchovies and Neritic Tunas - Indonesia - Malaysia - Thailand *Note: Country will present the current management measures relating to the target species Mackerels, Anchovies and Neritic Tunas (such as closed areas and seasons, vessel limitations, gear restrictions, catch limitations, etc.) including observations on threats and issues/problems involved in the conservation and management of trans-boundary species.*
12.00-13.30	*Lunch*
13.30-15.00	Agenda 6: Discussion on Data Formats and Needs for the Production of Thematic (GIS based) Maps *Note: SEAFDEC present on the sample of expected final product. The Meeting will discuss data format requirement, thematic (GIS based) mapping based on available data and information as provided in the previous Agendas (3 – 5) such as spawning areas, migration routes, nursery areas, existing closed areas, gear regulations and similar relevant features. Furthermore, the Meeting will indicate possible problems or "threats" in obtaining necessary information including reluctance or restrictions to share (mapped) information.* *The Meeting will be requested to provide feedback and agreed on the Template accordingly.*
15.00-15.30	*Coffee break*
15.30-16.30	Agenda 7: Drafting a Detailed Workplan for Producing Thematic maps *Note: SEAFDEC will present the draft detailed workplan for producing the thematic map (final product) on target trans-boundary species that will form the basis for the joint fisheries management plan for southern Andaman Sea. The Meeting will decide on what data should be compiled and included, if any additional data should be sought from external sources, responsible persons, timeline and deadlines – including potential upcoming threats and problems.*
16.30-17.00	Agenda 8: Next steps and way forward
17.00-17.10	Agenda 9: Closing of the Meeting

Annex 5

ANCHOVIES: INDONESIA

By *Mr. Suwarso*

AGENDA 3.1:
Available Data and Information on Target Trans-boundary Species in the Southern Andaman Sea

ANCHOVY

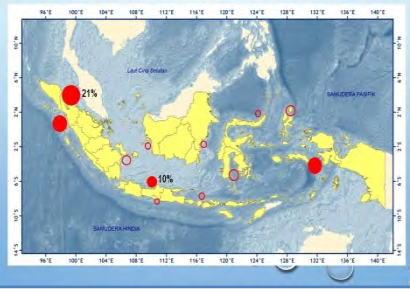
Suwarso
RESEARCH INSTITUTE FOR MARINE FISHERIES, MMAF
BOGOR, INDONESIA

"The Technical Experts Meeting on Management of Trans-boundary Species for the Southern Andaman Sea"

BANGKOK, 4-5 April 2018

DISTRIBUTION OF ANCHOVY IN INDONESIA

Production in FMA 571 42,000 ton (21%)



INTRODUCTION

- ANCHOVY PRODUCTION: Malacca Strait: 42,000 tons (21% of the national Anchovy production). North Sumatera is 36,000 tons (92% of the total Anchovy landing from Selat Malaka, or 23% of total Small Pelagic in 571 (National Statistic, 2015)
- Small scale Fishery
- Fishing Gear : PUKAT TERI (define as **Fish Net**, Belawan), PUKAT APUNG (**Stow bag set Net**, Tanjungbalai)
- Anchovy contribute 4% in the total catch of fish net (PPS Belawan, 2009)
- Annual Catch is fluctuated (Fish Net)

FISHERY DATA AVAILABLE

CATCH DATA:

- Catch per boat (Pukat Apung/Stow bag set net): Tanjungbalai, 2012-2015
- Catch per boat ((Pukat Teri/Fish Net): Belawan, 2013-2016
- Monthly Catch of Anchovy (2013-2016)
- Fishing Gear dimension (Pukat Apung)
- No. of Boat active (Unit)
- No. of Trips

Annual Catch of Anchovy in Belawan (average 3250 ton) (2002-2015)

(SOURCE PPS Belawan)

MONTHLY CATCH OF ANCHOVY (Pukat Teri)

Anchovy caught all the year. Peak season may between April-Juli

(SOURCE: 5 Group of Fishermen in Belawan)

SUMMARY DATA OF "PUKAT APUNG/TERI"
(Anchovy is one of the target)

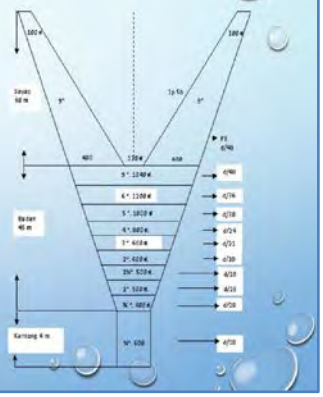
GEAR	Vessel Unit	Trip	Catch (TON)	CPUE (Ton/unit)
PUKAT APUNG	165	1142	7,204	43.7
Pukat Hela	111	235	1,681	15.1
Pukat Ikan	2	2	8	4.0
Pukat Kantong	29	63	452	15.6
Total	307	1442	9,345	30.4

BELAWAN (2016)

Alat Tangkap	Vessels Unit	Trip	Catch (TON)	CPUE (Ton/unit)
PUKAT APUNG	292	5758	8,998	30.8
Pukat Hela dasar berpapan	78	608	841	10.8
Pukat Kantong (payang)	3	5	8	2.7
Total	373	6371	9,844	26.4

TANJUNGBALAI (2016)

DESIGN OF PUKAT APUNG IN TANJUNGBALAI
TARGET: ANCHOVY



BIOLOGY DATA

- NOT YET AVAILABLE

THANK YOU FOR YOUR ATTENTION

Annex 6

ANCHOVIES: MALAYSIA

By *Mr. Abd Haris Hilmi Ahmad Arshad*

Available Data and Information on
Target of Trans-boundary Species for the Southern Andaman Sea

Anchovy

Abd Haris Hilmi Ahmad Arshad
Capture Fisheries Research Division
Fisheries Research Institute, Kampung Acheh Sitiawan Perak
Department of Fisheries Malaysia

Technical Experts Meeting on Management of the Trans-boundary Species for the Southern Andaman Sea,
Bangkok, Thailand 4-5 April 2018

Anchovy Industries

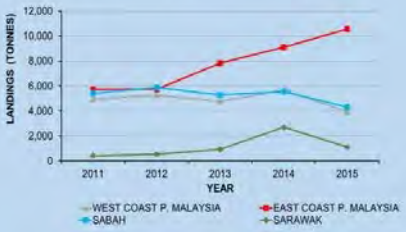
- Landing of anchovies contributed about 1.2 % of marine total landing of Malaysia (Annual Fisheries Statistic, 2010-2015)
- There are many products based on anchovy such as dries anchovies, crispy, anchovy sauce (budu) and anchovy fish stock
- In the year 2015, exports of dried anchovy was 324.2 tonnes (RM 4.4 Million), especially to Indonesia (42.8%) and Singapore (34.6%). Malaysia also imported 10,440.6 tonnes dried anchovy mostly from Thailand and Viet Nam.


Anchovy sauce (Budu)

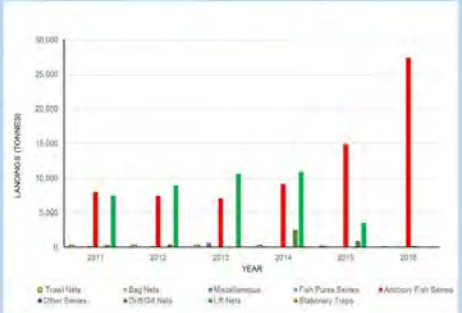

Dried anchovy

Total Landing of Anchovies in Malaysia

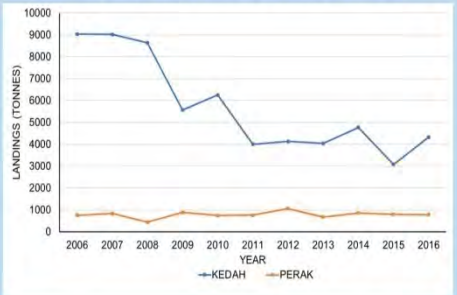
Total Landing of Anchovies by Areas

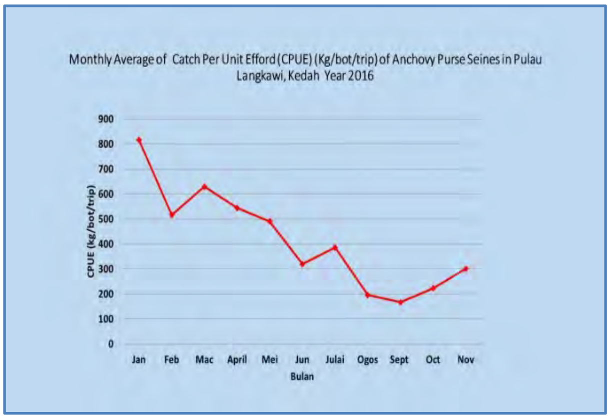


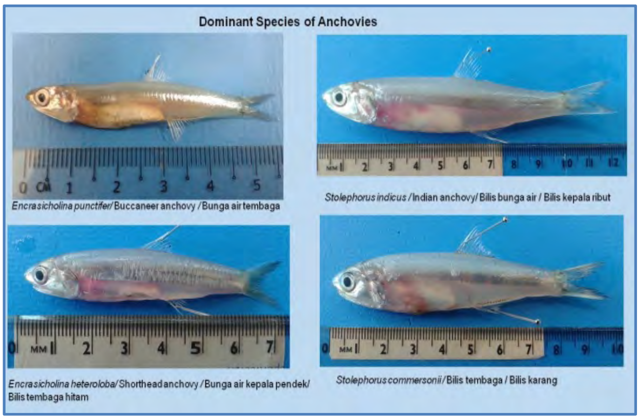
Landing of Anchovies by Type of Fishing Gears in Malaysia

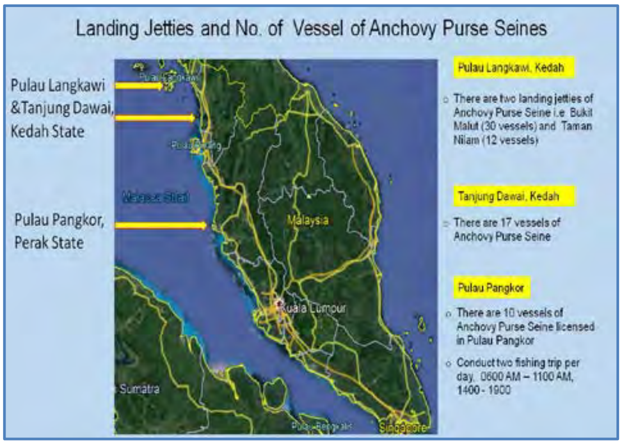


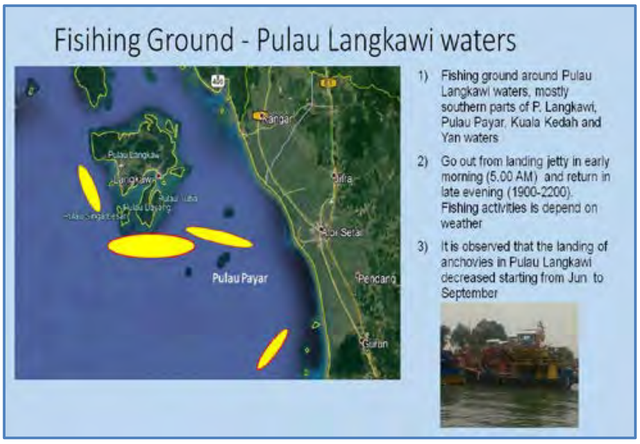
Landings of Anchovies in Kedah and Perak

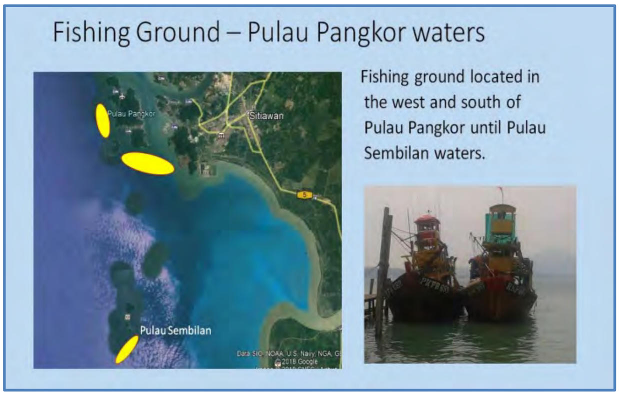


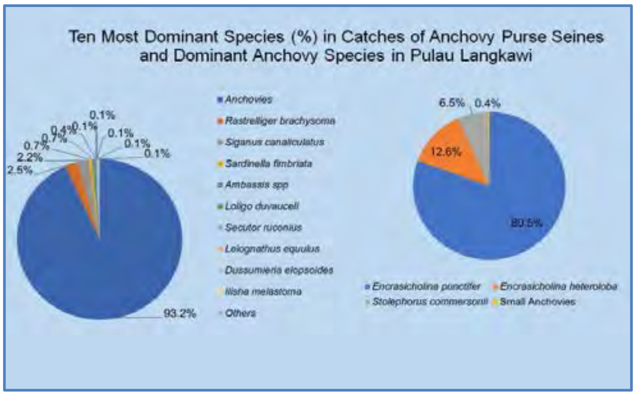

Monthly Average of Catch Per Unit Efford (CPUE) (Kg/bot/trip) of Anchovy Purse Seines in Pulau Langkawi, Kedah Year 2016
CPUE (kg/bot/trip)
900
800
700
600
500
400
300
200
100
0
Jan
Feb
Mac
April
Mei
Jun
Julai
Ogos
Sept
Oct
Nov
Bulan


Dominant Species of Anchovies
Encrasicholina punctifer/ Buccaneer anchovy / Bunga air tembaga
Stolephorus indicus / Indian anchovy/ Bilis bunga air / Bilis kepala ribut
Encrasicholina heteroloba/ Shorthead anchovy / Bunga air kepala pendek/ Bilis tembaga hitam
Stolephorus commersonii / Bilis tembaga / Bilis karang


Landing Jetties and No. of Vessel of Anchovy Purse Seines
Pulau Langkawi &Tanjung Dawai, Kedah State
Pulau Pangkor, Perak State
Malaysia
Kuala Lumpur
Sumatra
Singapore
Pulau Langkawi, Kedah
There are two landing jetties of Anchovy Purse Seine i.e Bukit Malut (30 vessels) and Taman Nilam (12 vessels)
Tanjung Dawai, Kedah
There are 17 vessels of Anchovy Purse Seine
Pulau Pangkor
There are 10 vessels of Anchovy Purse Seine licensed in Pulau Pangkor
Conduct two fishing trip per day, 0600 AM – 1100 AM, 1400 - 1900

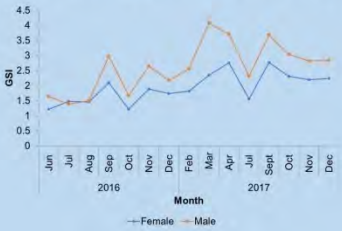

Fisihing Ground - Pulau Langkawi waters
Kangar
Pulau Payar
Pendang
Gurun
1) Fishing ground around Pulau Langkawi waters, mostly southern parts of P. Langkawi, Pulau Payar, Kuala Kedah and Yan waters
2) Go out from landing jetty in early morning (5.00 AM) and return in late evening (1900-2200). Fishing activities is depend on weather
3) It is observed that the landing of anchovies in Pulau Langkawi decreased starting from Jun to September


Fishing Ground – Pulau Pangkor waters
Sitiawan
Pulau Sembilan
Fishing ground located in the west and south of Pulau Pangkor until Pulau Sembilan waters.


Ten Most Dominant Species (%) in Catches of Anchovy Purse Seines and Dominant Anchovy Species in Pulau Langkawi
93.2%
2.5%
2.2%
0.7%
0.7%
0.4%
0.1%
0.1%
0.1%
0.1%
0.1%
Anchovies
Rastrelliger brachysoma
Siganus canaliculatus
Sardinella fimbriata
Ambassis spp
Loligo duvaucelli
Secutor ruconius
Leiognathus equulus
Dussumieria elopsoides
Ilisha melastoma
Others
80.5%
12.6%
6.5%
0.4%
Encrasicholina punctifer
Encrasicholina heteroloba
Stolephorus commersonii
Small Anchovies

Ten Most Dominant Species (%) in Catches of Anchovy Purse Seines and Dominant Anchovy Species in Pulau Pangkor

Gonado Somatik Indeks (GSI) Species *E. punctifer* Male and Female in Pulau Langkawi Waters

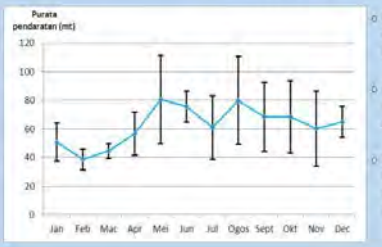


Trend of GSI for male and female were same and value of GSI increased in Mar, September and November. This value decreased July, October and December.

Size at First Maturity for Anchovy Species

Location	Species	Male			Female			Bil sample, n	
		First maturity,M (mm)	M_U (mm)	M_L (mm)	First maturity,M (mm)	M_U (mm)	M_L (mm)	Male	Female
P. Langkawi	*E. punctifer*	73.9	75.3	72.6	78.8	79.3	78.7	623	450
	S. commersonii	70.6	71.7	69.5	81.0	81.8	80.2	257	137
	E. heteroloba	65.7	66.5	65.0	72.4	73.6	71.3	74	33
P. Pangkor	*E. punctifer*	76.3	76.8	75.7	87.2	87.8	86.6	223	168
	S. commersonii	70.9	73.6	68.2	86.9	94.2	80.0	95	66

Purata Pendaratan Bulanan Bilis di Pulau Pangkor Tahun 2010-2015



- Pendaratan ikan bilis adalah rendah pada awal tahun (Jan – Mac)
- Pendaratan mula meningkat dari April – Okt sebelum menurun pada Nov-Dis.
- Pendaratan tertinggi pada bulan Mei dengan 80.42 ± 30.79 mt. Pendaratan terendah ialah pada Februari dengan 38.58 ±7.41 mt.

THANK YOU FOR YOUR ATTENTION
TERIMA KASIH

Annex 7

ANCHOVIES: THAILAND

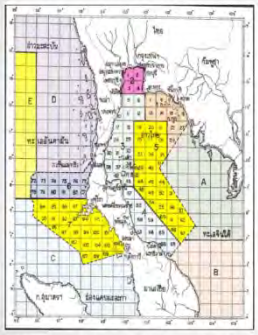
By *Ms. Thanawan Somjit*

The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Mrs. Praulai Nootmorn Senior Expert in Marine Fishery
Miss. Nipa Kulanujaree Fishery Biologist, Practitioner Level
Miss. Thanawan Somjit Fishery Biologist, Practitioner Level

ANCHOVY

Map of Fishing area in Thailand



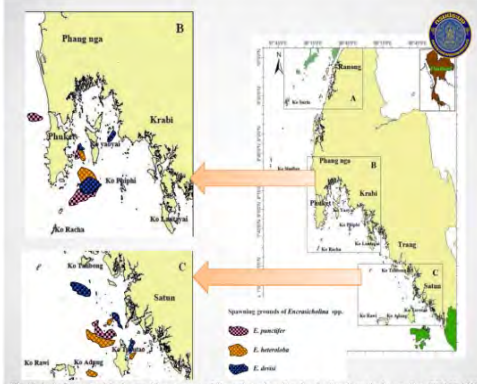
Andaman Sea

Northern Andaman Sea (Area 6): Ranong - Upper part of Phang Nga Province

Southern Andaman Sea (Area 7): Phang Nga, Phuket, Krabi, Trang and Satun Province

Encrasicholina heteroloba (R.ppell, 1837)	Shorthead anchovy	
Encrasicholina punctifer Fowler, 1938	Buccaneer anchovy	
Encrasicholina devisi (Whitley, 1940)	Devis' anchovy	

	total length (cm) (area 6 + area 7)	size at first maturity (cm) (area 6 + area 7)	
		male	female
E. heteroloba	3.50-9.50	6.09	6.44
E. punctifer	3.20-9.80	6.19	6.47
E. devisi	3.60-9.00	6.44	7.21



Spawning season

Encrasicholina heteroloba	found all year, while the peak showed in July.
Encrasicholina devisi	found all year, while the peak showed in June.
Encrasicholina punctifer	found all year, while the peak showed in January.

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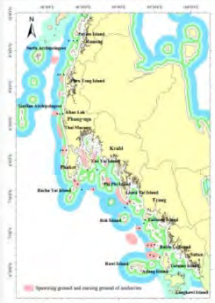
Spawning ground and nursing ground of anchovies (2010)



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Anchovy falling net with light luring

Anchovy purse seine

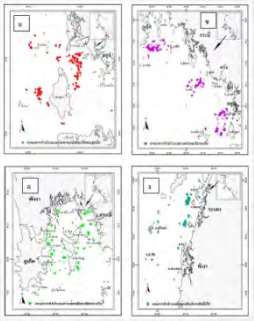
Fishing ground

Anchovy falling net with light luring (small size)

Anchovy falling net with light luring (size 14-18 m)

Anchovy purse seine

Anchovy purse seine with light luring



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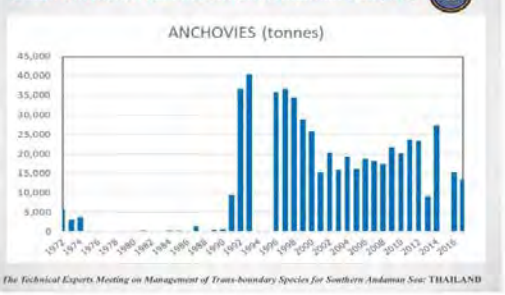
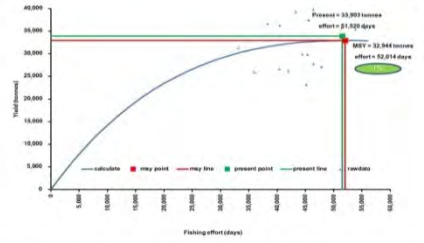
Catch of Anchovies in Southern Andaman Sea (area 7)



The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

MSY Assessment by Fox model (data 1996-2014)



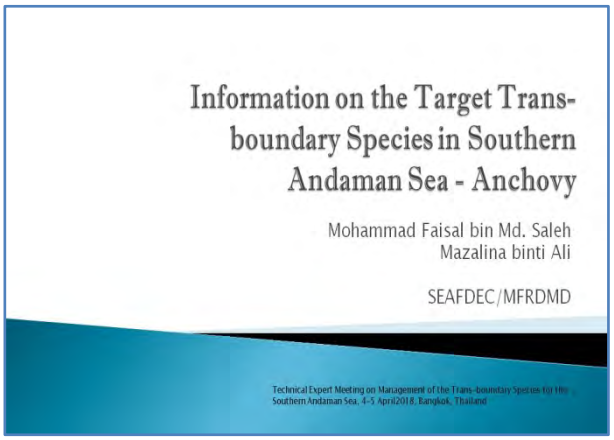
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

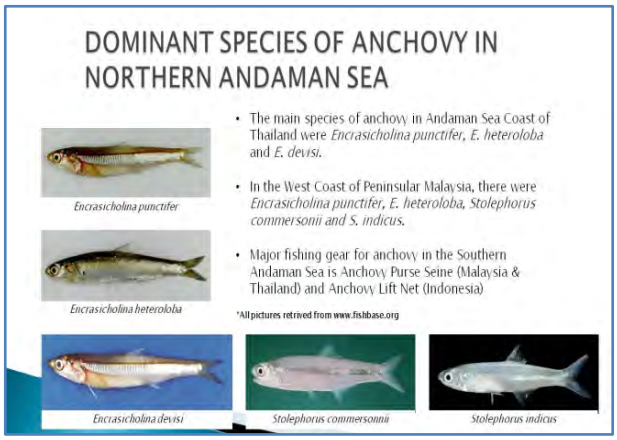
Thank you

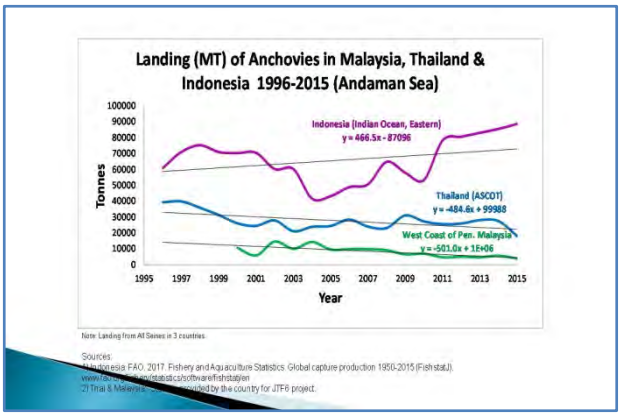
Annex 8

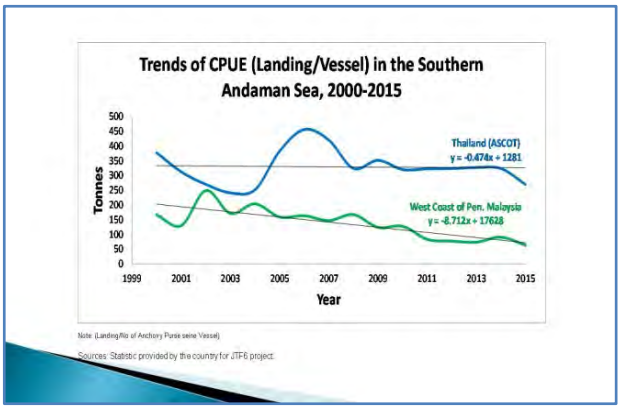
ANCHOVIES: SEAFDEC/MFRDMD

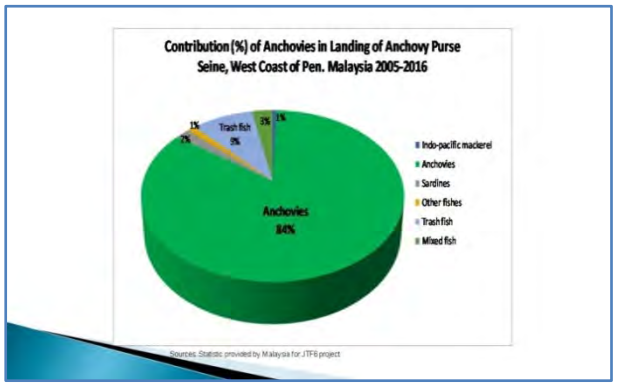
By *Mr. Mohammad Faisal bin Md. Saleh*

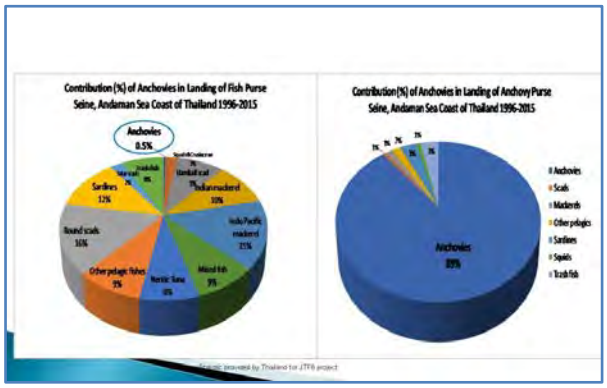












Length at 1st Maturity

Species	Sex	Length at 1st maturity (cm)
Encrasicholina punctifer	M	6.19[a]
	F	6.47[a]
Encrasicholina heteroloba	M	6.09[a]
	F	6.44[a]
Encrasicholina devisi	M	6.44[a]
	F	7.21[a]
Stolephorus commerson		7.3[b]
Stolephorus indicus		9.0[b]

Sources:
[a]Yakoh et al. (2014)
[b]Fishbase

Length-weight Relationship

Species	Sex	Length-weight relationship (n; r)
Encrasicholina punctifer	M	$W = 0.0047TL^{3.2437}$ (1,680; 0.9833)
	F	$W = 0.0050TL^{3.2191}$ (1,171; 0.9831)
Encrasicholina heteroloba	M	$W = 0.0042TL^{3.2762}$ (1,911; 0.9806)
	F	$W = 0.0041TL^{3.2917}$ (1,595; 0.9719)
Encrasicholina devisi	M	$W = 0.0039TL^{3.3185}$ (1,145; 0.9823)
	F	$W = 0.0039TL^{3.3177}$ (788; 0.9843)

n: Number of samples; *r*: Correlation coefficient
Source: Yakoh et al. (2014)

Spawning Season and Sex Ratio

Species	Spawning season (peak season)	Sex ratio (M:F)
Encrasicholina punctifer	YR (Jan)[b]	1:0.7[a]
Encrasicholina heteroloba	YR (Jul)[b]	1:0.8[a]
Encrasicholina devisi	YR (Jun)[b]	1:0.7[a]

Sources:
[a]Yakoh et al. (2014)
[b]Yakoh et al. (2016)

MAJOR FISHING GEAR

- Major fishing gear for anchovy in the Southern Andaman Sea is Anchovy Purse Seine (Malaysia & Thailand) and Anchovy Lift Net (Indonesia)
- Anchovy purse seines boats are two boats seine operated in very shallow waters inshore areas.

Terima kasih
Thank You

Annex 9

MACKERELS: INDONESIA

By *Mr. Suwarso*

AGENDA 3.2:
Available Data and Information on Target Trans-boundary Species in the Southern Andaman Sea

MACKERELS

Suwarso
RESEARCH INSTITUTE FOR MARINE FISHERIES, MMAF
Bogor, Indonesia

"The Technical Experts Meeting on Management of Trans-boundary Species for the Southern Andaman Sea"

BANGKOK, 4-5 April 2018

INTRODUCTION

- Total 79% of fish from Malacca Strait was landed in Belawan (49%) and Tanjungbalai (30%). Small pelagic fish is more dominant landed in Belawan and Tanjungbalai, while large pelagic was dominant in Aceh
- Main fish gear is Purse Seine, exist in all location; whereas "Jaring Kembung" (Gill Net) found arround Tanjungbalai
- Research and data collection was done in 5 Main Fisheries Bases in the FMA 571 Malacca Strait and Andaman Sea: Aceh and Lampulo, Idi, Langsa, Belawan, and Tanjungbalai (Aceh and North Sumatera Prov.)
- LANDING SYSTEM: 1) PPP, PPI (*legal landing sites*: Aceh-Lampulo, Idi, Langsa) 2) Tangkahan/gudang ikan/ **Fish storage**, is a personal or company landing sites; is common in Tanjungbalai, Belawan, and Sibolga (*illegal landing sites*)

5 FISHERIES BASES & DATA COLLECTION OF SMALL PELAGIC FISHERIES (included "Mackerel")

1. Tanjung Balai Asahan
2. Belawan
3. Langsa
4. Idi
5. Banda Aceh/Lampulo

SPECIES TARGETS

No. Of Unit Purse Seine active arround Malacca Strait

GT	Tanjung Balai	Belawan	Kuala Langsa	Kuala Idi	Lampulo
< 10	3	6	21	60	32
10 - 30	78	161	20	12	50
30 - 50	8	15	25	50	50
50 – 100	77	22	6	26	32
100 – 200	11	7			
> 200	5				
Total	182	211	72	148	164
Sumber	PSDKP (2015)	PPS (2015)	PPP (2014)	PPP (2016)	PPP (2014)

Gill Net for Kembung estimate 200 units (Fisheries Office Tanjungbalai), may be more units

STANDARD DATA COLLECTION

1) CATCH, LANDING AND EFFORT DATA
2) OPERATIONAL ASPECTS
3) FISHING CAPACITY
4) BIOLOGY (length-frequency distribution, visual maturity condition, population structure, batch fecundity)
5) SEA SURVEY (accoustic biomass and density, oceanography, plankton and larvae)

(The DATA in detail see META DATA)

DATA AND OUTPUTS

	DATA	OUTPUTS	REMARKS
I	CATCH/LANDING and EFFORT	1) CPUE, catch fluctuation, fish and fishing seasons 2) Fisheries profile, Proportion of fish landing by each location 3) Catch composition 4) Effort status (fishing units, trips)	Purse Seine
II	OPERASIONAL ASPECTS	1) Fleet structure 2) Dimension of fishing fleet & gear 3) Distribution of fishing grounds 4) Number of fishing days	Purse Seine and Gill Nets
III	FISHING CAPACITY	Fishing efficiency of Purse Seine (input and output), indicator of fishing efficiency	Purse Seine
IV	BIOLOGY	1) Genetic population structure of Indian-mackerel around Indonesia BOBLME Region and South Cina Sea areas 2) Growth parameters and Population dynamics (include mean-size of population $L_{50\%}$, exploitation rate estimation E=F/Z) 3) Reproductive biology and **spawning season** estimation 4) Batch Fecundity of Mackerel	2 Species: Indian Mackerel and Short-bodied Mackerel
V	SEA SURVEY	1) Biomass and MSY estimation and distribution of abundance of Small Pelagis Fishes (accoustic data) 2) Oceanographic condition (physical) and Biological oceanographic (plankton, larvae) 3) Spawning areas prediction	*The limited data of larvae is not enough to explain the main spawning areas of Mackerel*

SOME INFORMATIONS

- Others small-pelagic Species were also studied (*Decapterus russelli, D. macarellus, S. crumenophthalmus*)
- Total Fish Landing was may be underestimate since the existing of fish-storage / tangkahan in Tanjungbalai and Belawan are very closed, so to assess the data is more difficult
- A violations of fishing zones by the large ships (> 30 GT) in the traditional fishing zones
- **BIOLOGY OF MACKEREL**. Mean-size ($L_{50\%}$): Indian-mackerel 20.4 cm (FL); Short-mackerel 16.9 cm. Length at first maturity (Lm): Indian-mackerel 21-22 cm; Short-mackerel 17-18 cm. Spawning season: in late east season. Spawning areas predicton: arround the islands in the eastern Tanjungbalai (Berhala Isl., Salahnama Isl., Pulau Jemur). Need to clarify
- In the surface layer is the main habitat of small pelagic fish (size between 5-29 cm). Approximately 40% of individuals are juveniles (5-10 cm), consist of Rastalliger, Decapterus, Selar, Sellaroides, Auxis, Scomberomoru). The dominant size 23-25 cm
- Generally, the fishing activity of Purse Seine is still in an optimal efficiency, but some vessels shown have an in-efficiency condition, mainly during the east season with the longer fishing days
- In this year, RIMF try to collect the data landing, operational aspects and biology through the NATIONAL PORT SAMPLING since the difficulty data collect within the "tangkahan". The sampling will be conduct in Tanjungbalai, Belawan and Idi

RESEARCH NEED

1. Fishery and Biology data collection in Aceh Province
2. Larvae Survey in Malacca Strait according to spatial and temporal condition
3. Inventarisasi alat tangkap jaring kembung di Tanjungbalai

TERIMA KASIH BANYAK

Cibinong, 1 April 2018.

Annex 10

MACKERELS: MALAYSIA

By *Mr. Sallehudin bin Jamon*

SWEDEN

COUNTRY REPORT
MALAYSIA

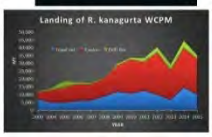
Indian Mackerel /Kembong Borek

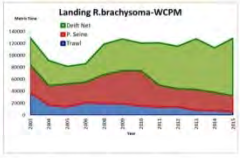
Fisheries Research Institute
Kampung Acheh
Perak, MALAYSIA

THE TECHNICAL EXPERT MEETING ON MANAGEMENT OF TRANS-BOUNDARY SPECIES FOR THE SOUTHERN ANDAMAN SEA
4-5 APRIL 2018
BANGKOK THAILAND

INTRODUCTION

- In Malaysia, the fishing region are divided into five main fishing region that is WCPM, ECPM, SARAWAK AND West & East SABAH.
- Location: (MFRDMD, 2014)
  - Kuala Perlis – Perlis
  - Bagan Panchor – Perak
  - Hutan Melintang Perak
- On going study:
  - Kuala Perlis
  - Bagan Panchor
  - Tok Bali Kelantan
  - Kuantan Pahang
  - Endau Johor

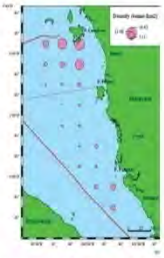




- There are two species of mackerel:
  Indian mackerel (*Rastrelliger kanagurta*) and Short mackerel (*Rastrelliger brachysoma*)
- **Landing in WCPM**: (ave-13 years)
  - 27,000 MT – *R.kanagurta*
  - 115,000 MT- *R brachysoma*
- **Main fishing gear**: (ave-13 years)
  - Purse seine (58.8%) – *R. kanagurta*
  - Drift net (57.7%) – *R. brachysoma*

Summary of small pelagic resources status in WCPM-2014

Item(s)	Unit	West coast PM
Area	km^2	31,579
Average Density (D)	$MTkm^{-2}$	7.45
Total biomass (Q) (Be)	MT	235,264
Natural mortality (M)	$year^{-1}$	1.84
Current yield (Y)	MT	130,213
Potential yield – MSY	MT	112,684



- The fish density at 7.45 MTkm-2 with total biomass of 235,264 MT.
- Estimated potential yields of small pelagic 112,213 MT
- Current yield (2014) of purse seine gear is 130,213 MT- current yield was exceeded the potential yield
- Higher densities was observed in the Northern area.
- Data collected from land base surveys shows that *R. kanagurta* was dominating the catch in Sub area 1
- *R.brachysoma* dominating the catch in sub area 2

Fishing area

- **Fishing areas**:
  - Interviews with the relevant fishing vessel skippers and
  - Data from the Vessels Monitoring System (VMS)
- **Fishing activities**:
  - Indian mackerel- Offshore
    - 30 nm to 70 nm from the shore
    - Depth ranging from 40-80 meter
  - Short mackerel – Coastal
    - Less than 30 nm.

Four main fishing areas for *Rastrelliger kanagurta* on the west coast of Peninsular Malaysia

Sex Ratio (M:F)

R. kanagurta

- Sex ratio is important in understanding stage of population, environmental and relationship between individuals.

	M : F
• WCPM (overall)	1 : 0.92
• Kuala Perlis	1 : 0.87
• Bagan Panchor	1 : 1.03
• Hutan Melintang	1 : 0.91

Average Size:

R. kanagurta

Location	Female, cm (Avg.± Stdev)	Male, cm (Avg.± Stdev)
Kuala Perlis	22.32 ± 1.63	22.02 ± 1.59
Bagan Panchor	21.90 ± 1.38	21.69 ± 1.29
Hutan Melintang	21.31 ± 1.45	21.25 ± 1.35

- Size for both sex at Kuala Perlis is larger than Bagan Panchor and Hutan Melintang, and size of both sex at Bagan Panchor is larger than Hutan Melintang.
- The different in size might be due to Kuala Perlis is near to fishing area of Andaman Sea compared to Strait of Malacca for Bagan Panchor and Hutan Melintang.

Length at first maturity, (Lm)

R. kanagurta

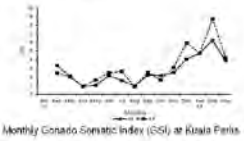
- Analysis by UDUPA Method revealed that the mean length at first maturity,

	Lm_1	Lm	Lm_2
(MFRDMD, 2014)			
• Lm for female		23.2 - 23.5 -23.8 cm	
• Lm for male		22.8 - 23.0 -23.3 cm	
• Mansor *et. al* (1996)			
• female		23.4 - 23.8 - 24.7 cm	
• Lm for male fish was		23.6 - 24.2 - 24.7 cm	

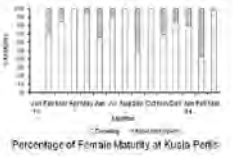
Gonado Somatic Index (GSI) Pattern

(K.Perlis)

- The GSI patterns for both male and female fish at Kuala Perlis were similar throughout the study period.
- The highest values :
  - Female-December to February
  - Mele-December to March.
  - Distinct peak of GSI occurred in February for both male and female
- Maturity percentage - fluctuated throughout study duration
- Higher percentages recorded between September 2013 and February 2014



Monthly Gonado Somatic Index (GSI) at Kuala Perlis



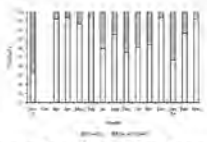
Percentage of Female Maturity at Kuala Perlis

Gonado Somatic Index (GSI) Pattern

(Bagan Panchor)

- The GSI for both male and female have similar patterns throughout the study period at Bagan Panchor.
- The highest value:
  - December to February for both male and female
  - Distinct peak of GSI occurred in February for both sex
- Maturity percentage of female -fluctuated throughout study duration.
- Higher percentage - between July 2013 and February 2014.

Monthly Gonado Somatic Index (GSI) at Bagan Panchor

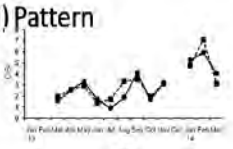


Percentage of Female Maturity at Bagan Panchor

Gonado Somatic Index (GSI) Pattern

(Hutan Melintang)

- GSI for both male and female at Hutan Melintang were similar throughout the study period.
- The highest value:
  - January to February for both male and female.
  - Distinct peak of GSI occurred in February 2014 for both sex.
- Maturity percentage - fluctuated throughout study duration.
- Higher percentage- February 2014.



Monthly Gonado Somatic Index (GSI) at Hutan Melintang

Percentage of Female Maturity at Hutan Melintang

Spawning season

R. kanagurta in WCPM

- The percentage of matured fish (ripe and spent) of male and female at the three sampling sites shows a fluctuation throughout the study duration.
- The occurrence of mature fishes throughout the year indicates that maturation is a continuous process.
- **Spawning season:**
  - (MFRDMD, 2014) - September and February
  - Pathansali (1967) - October and April
- **The spawning areas:**
  - Could not be determined at this stage
- Apart from using gonad maturation and fishing area to locate the spawning areas, it would be better to verify the area with fish larval survey. Fish larval surveys will give more accurate data on the abundance and distribution of fish larvae.

THANK YOU

Annex 11

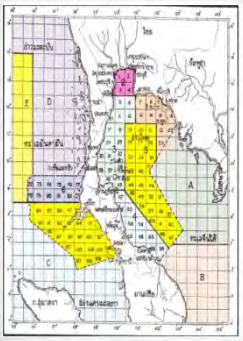
MACKERELS: THAILAND

By *Ms. Nipa Kulanujaree*

The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Mrs. Praulai Nootmorn Senior Expert in Marine Fishery
Miss. Nipa Kulanujaree Fishery Biologist, Practitioner Level
Miss. Thanawan Somjit Fishery Biologist, Practitioner Level

Map of Fishing area in Thailand



Andaman Sea

Northern Andaman Sea (Area 6): Ranong - Upper part of Phang Nga Province

Southern Andaman Sea (Area 7): Phang Nga, Phuket, Krabi, Trang and Satun Province

Auxis thazard (Lacepède, 1800)	(Frigate Tuna)	
Euthynnus affinis (Cantor, 1849)	(Eastern Little Tuna, Kawakawa)	
Thunnus tonggol (Bleeker, 1851)	(Longtail tuna)	

	Size (Folk length: cm) (area 6 + area 7)	L_{50} (area 6 + area 7)
Auxis thazard (Frigate tuna)	10.20-44.50	Male = 26.57 Female = 28.88
Euthynnus affinis (Eastern Little tuna, Kawakawa)	7.00-60.00	Male = 37.74 Female = 39.71
Thunnus tonggol (Longtail tuna)	7.00-64.00	Male = 41.46 Female = 43.76

Spawning season/Spawning grounds: *Auxis thazard* (Frigate Tuna)

throughout the year with 2 peaks of spawning season including January-March and August-November

Spawning season/Spawning grounds: *Euthynnus affinis* (Kawakawa)

throughout the year with 2 peaks of spawning season including January-May and October-December

Spawning season/Spawning grounds: *Thunnus tonggol* (Longtail tuna)

throughout the year with peak of spawning in April

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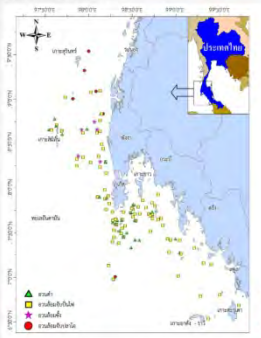
Fishing grounds of Tunas

The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Fishing grounds of Tunas



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Fishing gears of Tunas

Purse seine with fish aggregating devices (FADs)

Purse seine

Light luring purse seine (LPS)

Thai purse seine (TPS)

Tuna purse seine (TUN)

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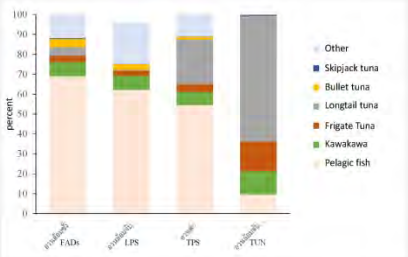
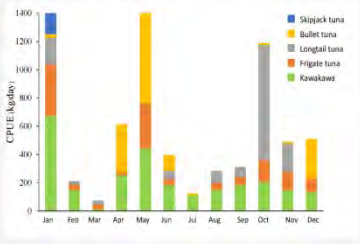
Percentage of catch composition from purse seine in Andaman Sea in 2012



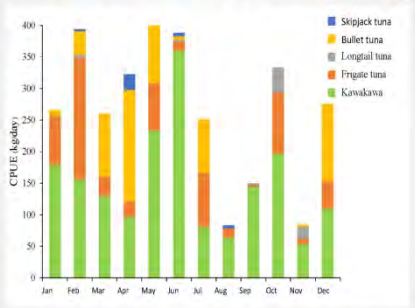
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Composition of tuna species from purse seine with fish aggregating devices (FADs) in Andaman Sea in 2012



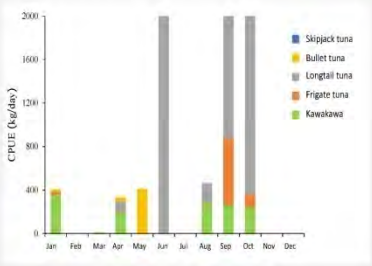
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Composition of tuna species from purse seine with light luring in Andaman Sea in 2012



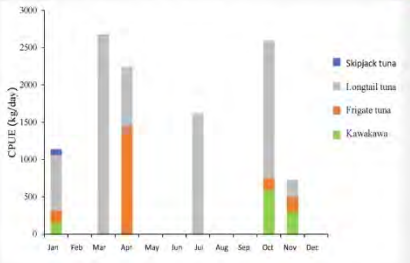
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Composition of tuna species from Thai purse seine in Andaman Sea in 2012



The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Composition of tuna species from tuna purse seine in Andaman Sea in 2012



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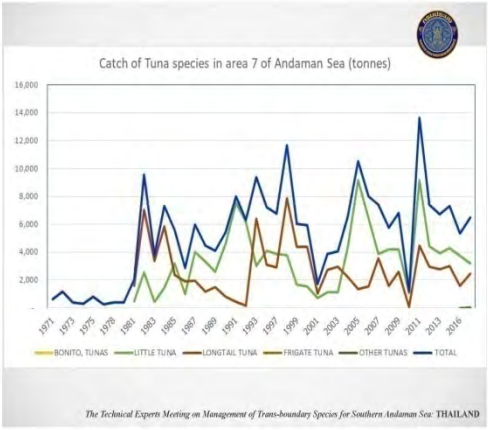

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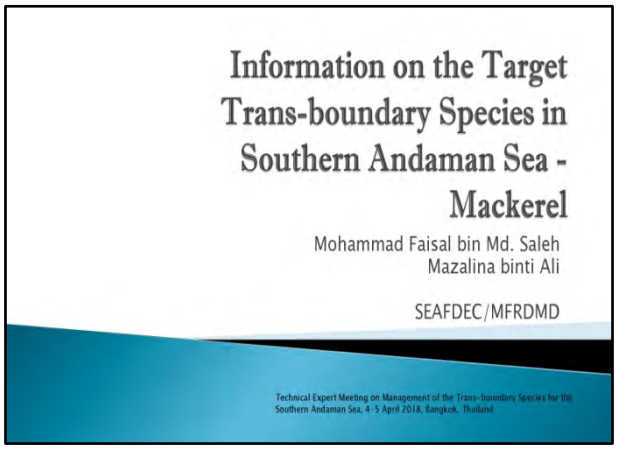
Thank you

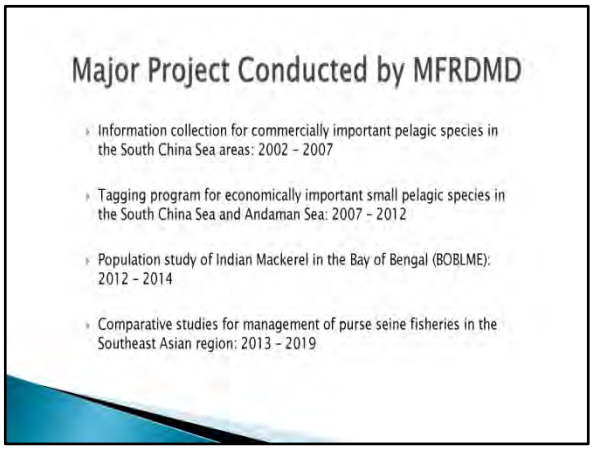
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

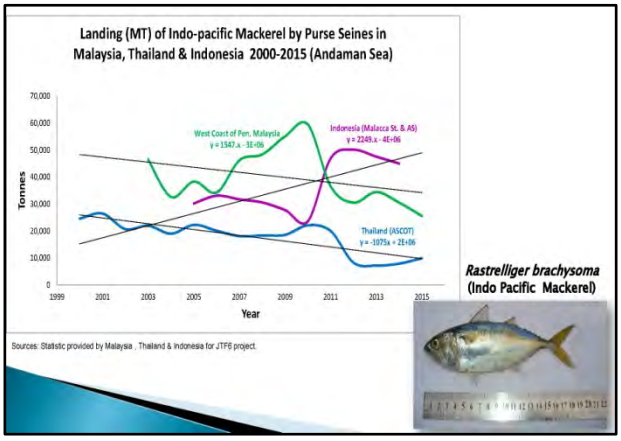
Annex 12

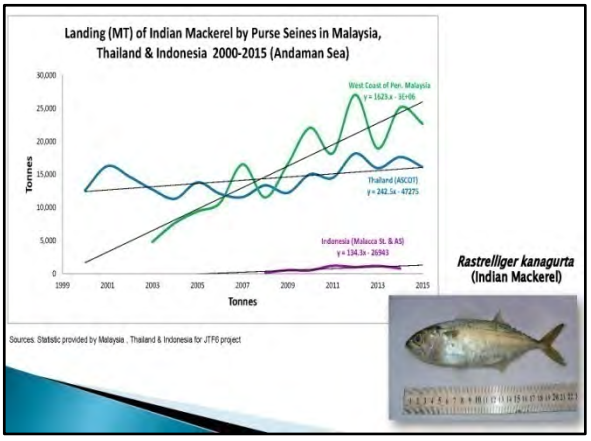
MACKERELS: SEAFDEC/MFRDMD

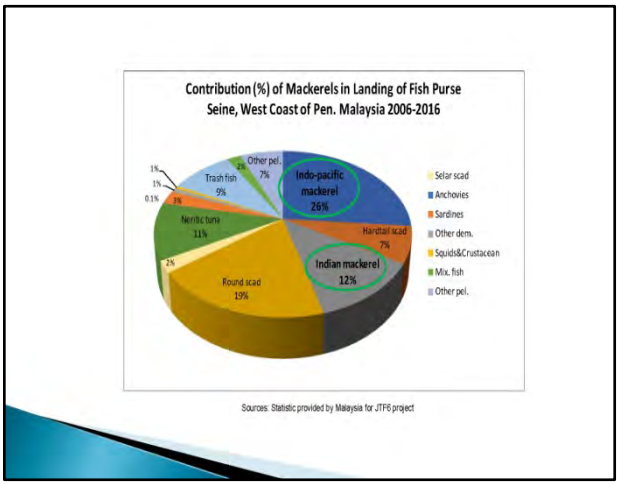
By *Mr. Mohammad Faisal bin Md. Saleh*

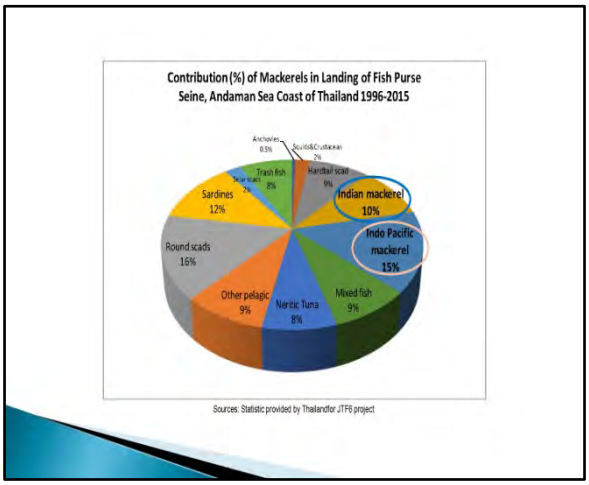












Length at 1st Maturity

THAILAND

Species	Sex	Length at 1st maturity (cm)
Rastrelliger kanagurta	M	17.83
	F	18.92
Rastrelliger brachysoma	M	16.09
	F	15.33

Krajangdara *et al.* (2007)

MALAYSIA

Species	Length at 1st maturity (cm)	
Rastrelliger kanagurta	22.8-23.8	Unpublished Malaysia report (2015)
	18-19	Abu Talib *et al* (2009)
	20.6	Munsor (1996)
Rastrelliger brachysoma	17.8-18.1	

INDONESIA

Species	Length at 1st maturity (cm)	
Rastrelliger kanagurta	17	Haryati *et al* (2005)

Length-weight Relationship

Species	Sex	Length-weight relationship (n; r)
Rastrelliger branchysoma	M	$W = 0.0110TL^{3.0290}$ (1,068; 0.9208)
	F	$W = 0.0193TL^{2.8339}$ (913; 0.8935)
Rastrelliger kanagurta	M	$W = 0.0156TL^{2.9102}$ (2,035; 0.9103)
	F	$W = 0.0139TL^{2.9503}$ (1,784; 0.9040)

Krajangdara *et al.* (2007)

n: Number of samples; *r*: Correlation coefficient

Spawning Season and Sex Ratio

Species	Country	Spawning season (peak season)	Sex ratio (M:F)	Sources
Rastrelliger brachysoma	Thailand	Nov-May/Jul-Sep	1:0.9	Krajangdara *et al.* (2007)
Rastrelliger kanagurta	Indonesia	May-Oct		Haryati *et al* (2005)
	Malaysia	Sep-Feb		Unpublished Malaysia report (2015)
	Thailand	Dec-Mar/Aug-Sep)	1:0.9	Krajangdara *et al.* (2007)

Rastrelliger brachysoma (Indo Pacific mackerel)

	SCS	AS
No. of tagged fish	5220	5975
No. of recaptured	12	33
Recovery rate (%)	0.23 %	0.55 %

Rastrelliger kanagurta (Indian mackerel)

	SCS	AS
No. of tagged fish	7642	6636
No. of recaptured	16	8
Recovery rate (%)	0.21 %	0.15 %

Source: Extracted from Book 'Tagging Program For Economically Important Small Pelagic Species In SCS And AS, 2013)

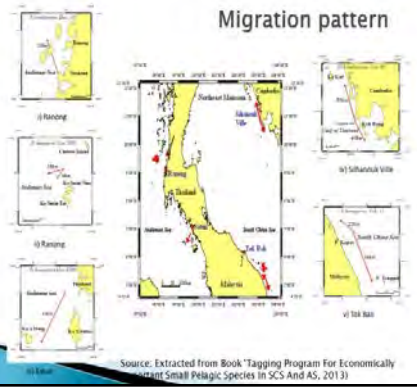
Released and recovered tagged Indo Pacific mackerel (*Rastrelliger brachysoma*) by monsoon in the Andaman Sea, 2008 to 2011

Country	Site	Season	Individuals released	Number of Recovery	Rate of Recovery (%)	Longest period between release and recovery (days)
Malaysia	Kuala Perlis/Pangkor Island	Northeast	1,119	0		
		Southeast	811	0		
Myanmar	Bokz Pyin	Southwest	214	1	0.47	67
		Northeast	2,981	23	0.77	139
	Kaw Thaung	Southwest	86	0		
		Northeast	28	7	25	19
Thailand	Ranong	Northeast	124	2	1.61	34
	Satun	Southwest	319	0		
		Northeast	293	0		
		Northeast	**4,545**	**32**	**0.70**	**139**
		Southwest	**1,430**	**1**	**0.07**	**67**
		All	**5,975**	**33**	**.55**	**139**

Released and recovered tagged Indian mackerel (*Rastrelliger kanagurta*) by monsoon in the Andaman Sea, 2008 to 2011

Country	Site	Season	Individuals released	Number of Recovery	Rate of Recovery (%)	Longest period between release and recovery (days)
Indonesia		Southwest	489	0		
Malaysia	Kuala Perlis/Pangkor Island	Northeast	1	0		
		Southwest	271	0		
Myanmar	Bokz Pyin	Southwest	338	0		
		Northeast	2,409	0		
	Kaw Thaung	Southwest	245	0		
		Northeast	1,072	0		
Thailand	Ranong	Southwest	141	7	1.14	20
		Northeast	615	0		
	Satun	Southwest	248	0		
		Northeast	787	1	0.13	5
		Northeast	**4,384**	**8**	0.16	20
		Southwest	**1,752**	**0**		
		All	**6,636**	**8**	**0.12**	**20**

Migration pattern



Source: Extracted from Book 'Tagging Program For Economically Important Small Pelagic Species in SCS And AS, 2013)

Additional Information: Local Knowledge of mackerel and scad (Based on Tagging of Small Pelagic Fish in the SCS & AS, Regional Project Terminal Report)

1) Higher catch season of small pelagic fish (Month)

Knowledge		Andaman Sea											
Local knowledge : Mackerel and Scad	Country	Jan	Feb	Mar	Apr	May	Jun	Jul	June	Aug	Sept	Oct	Nov	Dec
Rastrelliger kanagurta	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													
Rastrelliger brachysoma	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													

Additional Information: Local Knowledge of mackerel and scad (Based on Tagging of Small Pelagic Fish in the SCS & AS, Regional Project Terminal Report)

2) Lower catch season of small pelagic fish (Month)

Knowledge		Andaman Sea											
Local knowledge : Mackerel and Scad	Country	Jan	Feb	Mar	Apr	May	Jun	Jul	June	Aug	Sept	Oct	Nov	Dec
Rastrelliger kanagurta	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													
Rastrelliger brachysoma	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													

Additional Information: Local Knowledge of mackerel and scad (Based on Tagging of Small Pelagic Fish in the SCS & AS, Regional Project Terminal Report)

3) Higher composition of juvenile/small size fish (month)

Knowledge		Andaman Sea											
Local knowledge : Mackerel and Scad	Country	Jan	Feb	Mar	Apr	May	Jun	Jul	June	Aug	Sept	Oct	Nov	Dec
Rastrelliger kanagurta	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													
Rastrelliger brachysoma	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													

Additional Information: Local Knowledge of mackerel and scad (Based on Tagging of Small Pelagic Fish in the SCS & AS, Regional Project Terminal Report)

4) Higher composition of spawner/big size fish (month)

Knowledge		Andaman Sea											
Local knowledge : Mackerel and Scad	Country	Jan	Feb	Mar	Apr	May	Jun	Jul	June	Aug	Sept	Oct	Nov	Dec
Rastrelliger kanagurta	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													
Rastrelliger brachysoma	Indonesia													
	Malaysia													
	Thailand													
	Myanmar													

LOCAL KNOWLEDGE

(Extracted from Book 'Tagging Program For Economically Important Small Pelagic Species In SCS And AS, 2013)

ASPECT	MALAYSIA - WEST COAST	INDONESIA -ANDAMAN SEA	THAILAND - ANDAMAN SEA	MYANMAR
Perception: Small pelagic fish resource will be extinct if catch and fishing effort is not controlled	Most fishermen agreed	Most fishermen very agreed	85% of local fishermen agreed	Did not agreed
Perception: Closed season will increase fish resource	Most fishermen agreed	Most fishermen very agreed	95% of local fishermen agreed	Did not agree
Perception: The destructive fishing gear	N.S	Light Luring PS, Trawls	Anchovy PS with Light, Pair Trawl, Push Net, Otter board Trawl.	Purse Seine with Light, Fishing with Explosion, Small mesh size

* NS= Not stated

Restriction of Fishing Gear & Technique

Indonesia

- Prohibit net mesh size less than 25mm in small pelagic PS

Malaysia

- Prohibit net mesh size < 38 mm in trawls.

Myanmar

- Prohibit net mesh size less than 2.5 inch in fish purse seines.

Thailand

- Prohibit net mesh size less than 25mm during night time and for Light Luring Method of Purse Seine

Close season

Indonesia

- In progress at Banda Acheh Province

Malaysia

- No close season

Myanmar

- 2 months (1st Apr- 30th May)

Thailand

- 3 months (1st April – 30th June) started 2007.
- Expanded 1955 km2 to 4,353 km2
- 1 patrol office (at Krabi)

Terima kasih
Thank You

Annex 13

NERITIC TUNAS: INDONESIA

By *Mr. Suwarso*

AGENDA 3.3:
Available Data and Information on Target Trans-boundary Species in the Southern Andaman Sea

NERITIC TUNA

Suwarso
RESEARCH INSTITUTE FOR MARINE FISHERIES, MMAF
Bogor, Indonesia

"The Technical Experts Meeting on Management of Trans-boundary Species for the Southern Andaman Sea"
BANGKOK, 4-5 April 2018

INTRODUCTION

- Produksi Neritic Tuna di WPP 571 35,560 ton atau 70% dari total Pelagis Besar; pendaratan utama di Aceh (62%) dan Belawan (35%) (National Statistic, 2015)
- Fishing ground in the northern Malacca Strait and Andaman Sea
- Of the 10 dominant species of large pelagic; >35 % is *T. tonggol* and *Scomberomorus*
- Fishing gear for neritic tuna are Purse Seine (all location), and Gill Net (Langsa)
- LANDING SYSTEM: 1) PPP, PPI (*legal landing sites*: Aceh-Lampulo, Idi, Langsa) 2) Tangkahan/gudang ikan/**Fish storage**, is a personal or company landing sites; is common in Tanjungbalai, Belawan, and Sibolga (*illegal landing sites*)
- Research and data collection was done in 5 Main Fisheries Bases in the FMA 571 Malacca Strait and Andaman Sea: Aceh and Lampulo, Idi, Langsa, Belawan, and Tanjungbalai (Aceh and North Sumatera Prov.)

1. Tanjung Balai Asahan
2. Belawan
3. Langsa
4. Idi
5. Banda Aceh-Lampulo

LOCATION / SAMPLING SITES

ANNUAL CATCH OF NERITIC TUNA IN MALACCA STRAIT
(Ignasius & Zamroni, 2017)

- FISHERIES DATA (Catch, Effort)
- GEAR AND OPERASIONAL
- BIOLOGY (Length Frequency, Biology Maturity)
- ACCOUSTIC

DATA COLLECTION

No.		DATA	TANJUNGBALAI	BELAWAN	LANGSA	IDI	ACEH / LAMPULO
I		**CATCH - EFFORT**					
	1	Catch per boat by species (PS)	2013 - 2015	2013 - 2016	2013 - 2014	2016 (Jan-Oct)	2009, 2014 (Jan-Jun)
	2	Monthly/Annual Landing by Species (PS)	2012-2015	2012 - 2016	2013 - 2015	2007-2015	2008-2012 / 2005-2012
II		**OPERATIONAL ASPECTS**					
	1	Fishing boats and Gear Dimension & Characteris (PS)	2016	2016		2016	
	2	Fleet and Fleet Structure (PS)	2016	2016	2015	2015 - 2016	
	3	Fishing Ground (Purse Seine, GPS)		2016			
	4	Fishing Ground Gill Net (GPS)		2016			
III		**BIOLOGY (Neritic Tuna)**					
	1	Length-frequency Distribution					
		EUTHYNNUS AFFINIS			2015 (3-4-5-6-7-8-9)		
		THUNNUS TONGOL			2015 (3-4-5-6-7-8-9-10-11)		
	2	Biology Maturity (visual)					
		EUTHYNNUS AFFINIS			2015 (1-3-4-5-7-8-9-11)		
		THUNNUS TONGOL			2015 (1-3-4-5-7-8-9)		
	3	Structure Population (genetic)					
		THUNNUS TONGOL					Sample
IV		**SEA SURVEY**					
	1	Acoustic Biomass	Jun - Jul and Dec 2015				
	2	Oceanography	Jun - Jul and Dec 2015				

AVAILABLE DATA OF NERITIC TUNA

1. Total 79% of fish from Malacca Strait was landed in Belawan (49%) and Tanjungbalai (30%). Large pelagic fish was dominant in Aceh, 13% in Belawan, 34% in Idi
2. 3 Species of Neritic Tuna: *Thunnus tonggol*, *Auxis thazard* and *Euthynnus affinis*
3. **BIOLOGY**: E. affinis: Mean-length ($L_{50\%}$) 34.5 cm; E=F/Z=0.5. T. tongol: Lm= 40.3 cm; L50%= 38.9 cm; E=0.5. Not enough biological data for estimate the spawning season and predict the spawning areas

SOME INFORMATIONS

Location		Large Pelagic (Exc. Tuna and Skipjack)
Malaca Strait	**Potential (ton)**	**101,969**
	TAC (ton)	**81,575**
	Exploitation Rate	**0.89 Fully Exploited**
West Sumatra	Potential (ton)	364,830
	TAC (ton)	291,864
	Exploitation Rate	1.29 Over Exploited
South China Sea	Potential (ton)	198,994
	TAC (ton)	159,195
	Exploitation Rate	0.42 Moderate Exploited

STOCK STATUS
(Ministerial Decree No. 47/Kep Men-KP/2016)

Genetic study of *T. tonggol* in 2013:

Using 16srRNA universal primer.

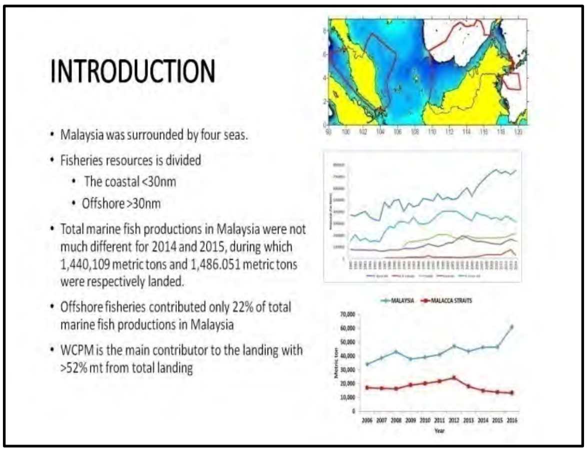
There was no significant difference of DNA observed between Pemangkat (South China Sea) and Pekalongan (Java Sea)

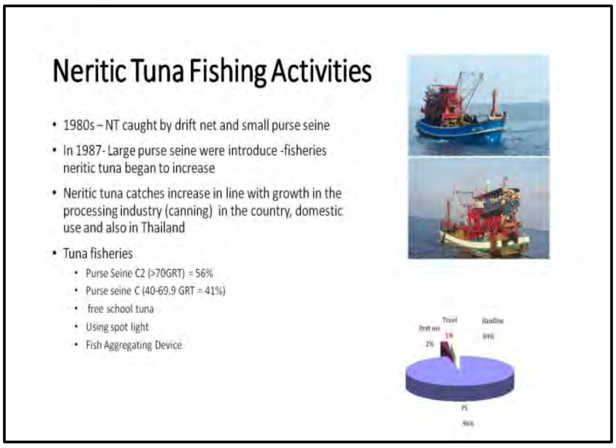
THANK YOU FOR YOUR ATTENTION

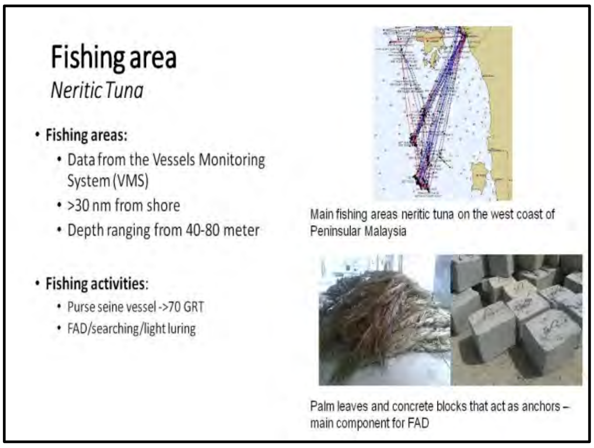
Annex 14

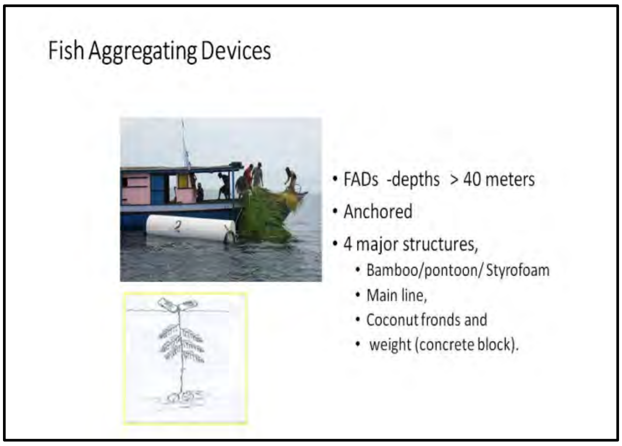
NERITIC TUNAS: MALAYSIA

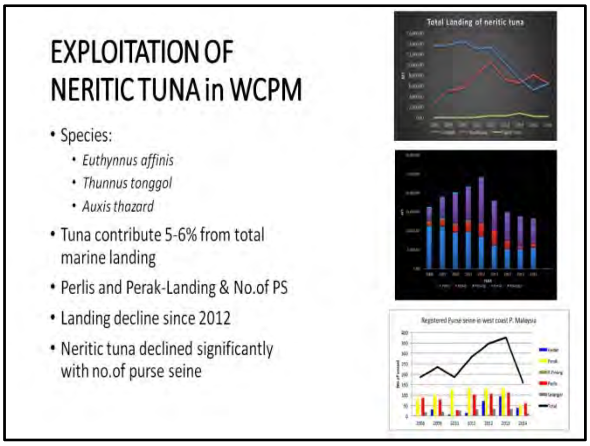
By *Mr. Sallehudin bin Jamon*





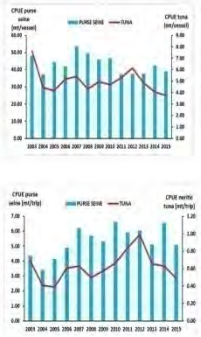






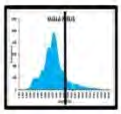
CPUE- Purse seine

- CPUE (mt/vessel)
  - PS- Range 37.3-49.7 mt/ vessel
  - NT - Range 4.37-6.57 mt/vessel
- CPUE (mt/trip)
  - PS - 3.76-7.64 mt/trip and
  - NT- 0.39-0.99 mt/trip

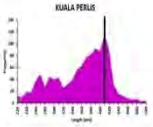


The length frequency distribution

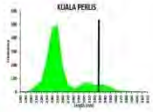
Neritic Tuna



- Kawakawa (*E. affinis*)
- Range-160-580 mm
- Peak= 280-340
- Lm 390 mm (UDUPA)
- 85% caught below Lm
- Large size - November



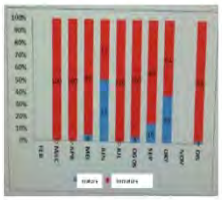
- Longtail (*T.tonggol*)
- Range - 220-540 mm
- 2 Mode -260-310/390-420mm
- Lm- 410 mm (Fishbase)
- 92% caught below Lm
- Large size – Sept/Oct



- Frigate tuna (*A.thazard*)
- Range - 170-410 mm
- Lm 328 mm (Fishbase)
- 91% caught below Lm

Morphological studies of ovary

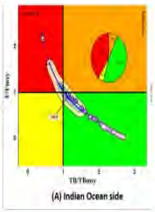
- Sample Kawakawa in Kuala Perlis
- Immature stage 1 & 2
- Mature stage 3
- Need Further analysis



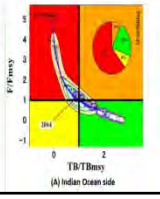
Summary of neritic tuna resources status in WCPM

Kobe Plot

- 2014- stock status of kawakawa in the South East Asia (Indian Ocean side) is in the green zone .
- Fishing (F) is 26% lower than MSY level and Total Biomass (TB) is 29% higher than its MSY level.
- It is recommended that both fishing pressure and catch should be control



- Longtail tuna in the Indian Ocean side by Nishida et al. (2016), the current stock status (2014) is in the red zone of the Kobe plot (overfished and still overfishing),
- Catch in 2011 was the peak, but afterwards it decreased to 2014. Hence the stock status has been slightly recovered in 2014.



Survei status of neritic tuna -2016

Growth parameters of kawakawa, longtail tuna and frigate tuna in Kuala Perlis

FiSAT II

Spesies	Common name	Location	L_{∞} (mm)	K	Ø	Z	M	F	E
Euthynnus affinis	Kawakawa	Kuala Perlis	604.28	0.26	4.98	0.80	0.33	0.47	0.59
Auxis thazard	Frigate tuna	Kuala Perlis	436.28	0.33	4.80	1.24	0.42	0.82	0.66
Thunnus tonggol	Longtail tuna	Kuala Perlis	520.28	0.93	5.40	2.49	0.79	2.15	0.73

THANK YOU

Annex 15

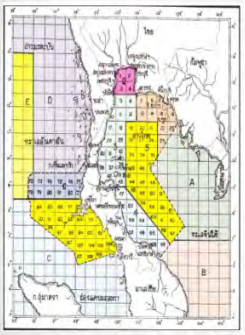
NERITIC TUNAS: THAILAND

By *Ms. Praulai Nootmorn*

The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Mrs. Praulai Nootmorn Senior Expert in Marine Fishery
Miss. Nipa Kulanujaree Fishery Biologist, Practitioner Level
Miss. Thunawan Somjit Fishery Biologist, Practitioner Level

Map of Fishing area in Thailand



Andaman Sea

Northern Andaman Sea (Area 6): Ranong - Upper part of Phang Nga Province

Southern Andaman Sea (Area 7): Phang Nga, Phuket, Krabi, Trang and Satun Province

Auxis thazard (Lacepède, 1800)	(Frigate Tuna)	
Euthynnus affinis (Cantor, 1849)	(Eastern Little Tuna, Kawakawa)	
Thunnus tonggol (Bleeker, 1851)	(Longtail tuna)	

	Size (Folk length: cm) (area 6 + area 7)	L_{50} (area 6 + area 7)
Auxis thazard (Frigate tuna)	10.20-44.50	Male = 26.57 Female = 28.88
Euthynnus affinis (Eastern Little tuna, Kawakawa)	7.00-60.00	Male = 37.74 Female = 39.71
Thunnus tonggol (Longtail tuna)	7.00-64.00	Male = 41.46 Female = 43.76

Spawning season/Spawning grounds: *Auxis thazard* (Frigate Tuna)

throughout the year with 2 peaks of spawning season including January-March and August-November

Spawning season/Spawning grounds: *Euthynnus affinis* (Kawakawa)

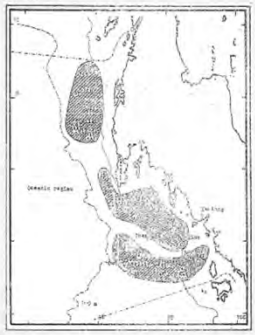
throughout the year with 2 peaks of spawning season including January-May and October-December

Spawning season/Spawning grounds: *Thunnus tonggol* (Longtail tuna)

throughout the year with peak of spawning in April

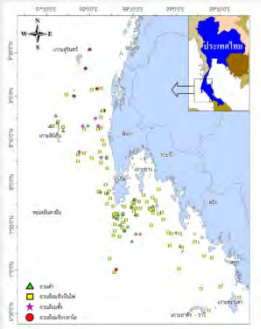
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Fishing grounds of Tunas



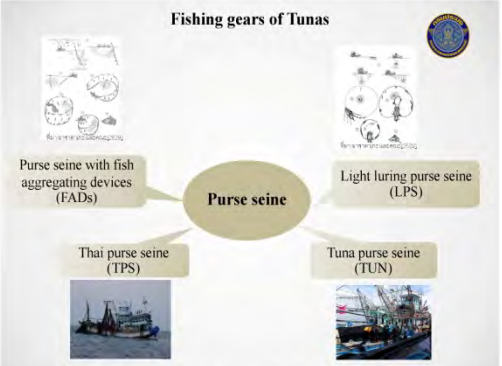
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Fishing grounds of Tunas



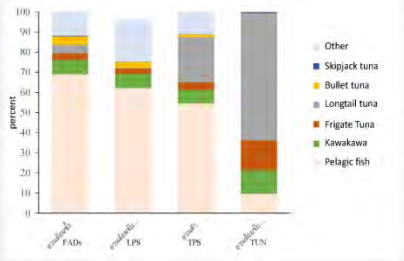
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Fishing gears of Tunas



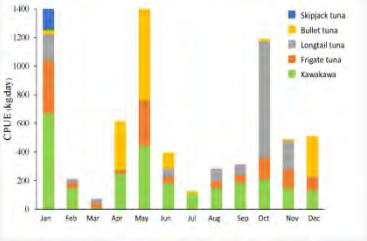
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

Percentage of catch composition from purse seine in Andaman Sea in 2012



The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

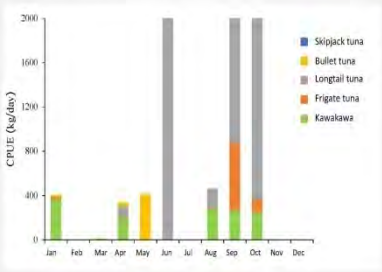
Composition of tuna species from purse seine with fish aggregating devices (FADs) in Andaman Sea in 2012



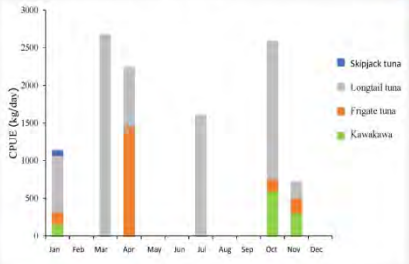
The Technical Experts Meeting on Management of Trans-boundary Species for Southern Andaman Sea: THAILAND

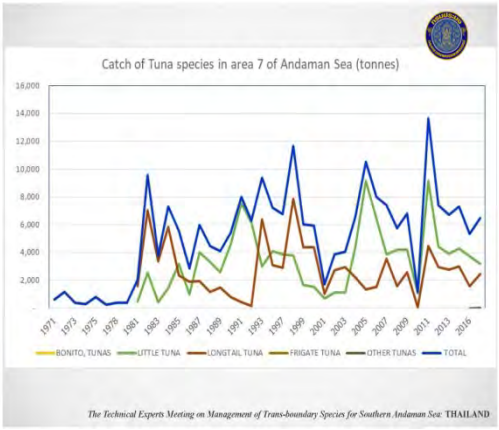
Composition of tuna species from purse seine with light luring in Andaman Sea in 2012

Composition of tuna species from Thai purse seine in Andaman Sea in 2012



Composition of tuna species from tuna purse seine in Andaman Sea in 2012



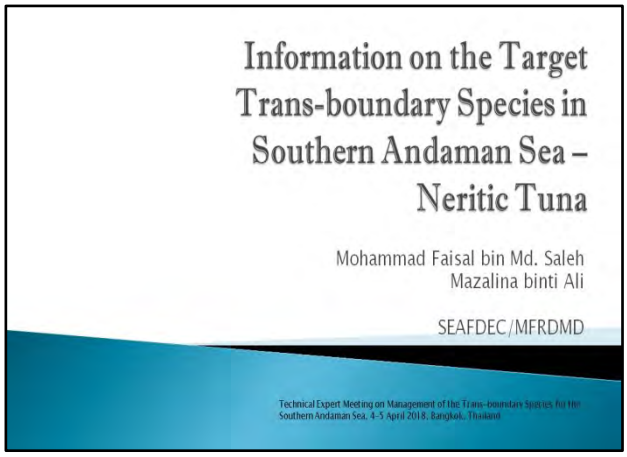


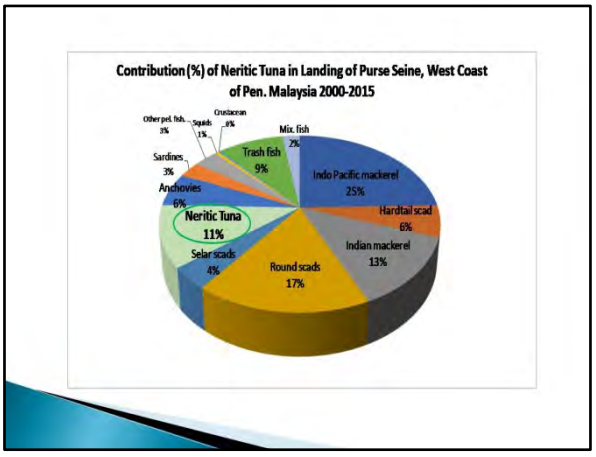
Thank you

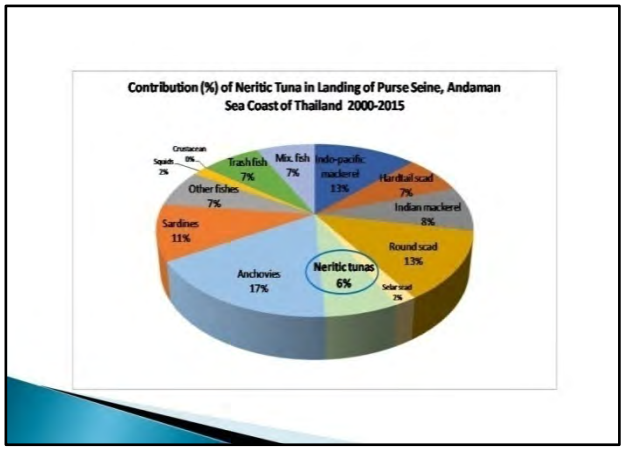
Annex 16

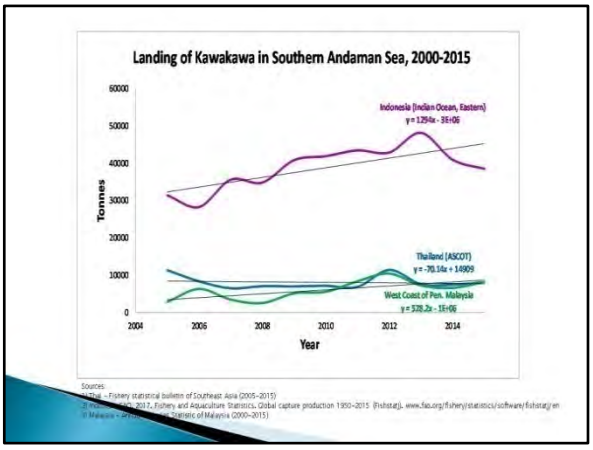
NERITIC TUNAS: SEAFDEC/MFRDMD

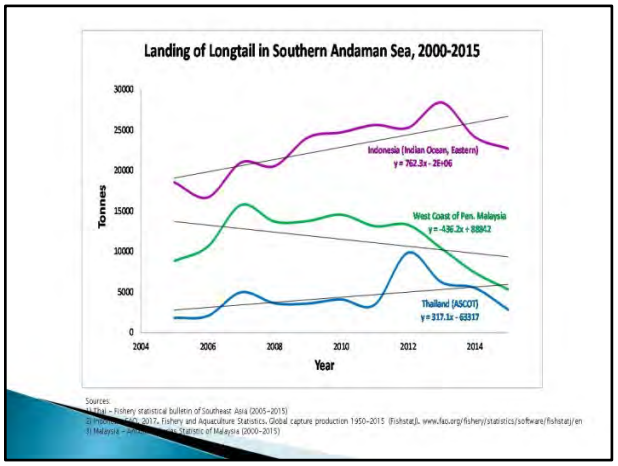
By *Mr. Mohammad Faisal bin Md. Saleh*

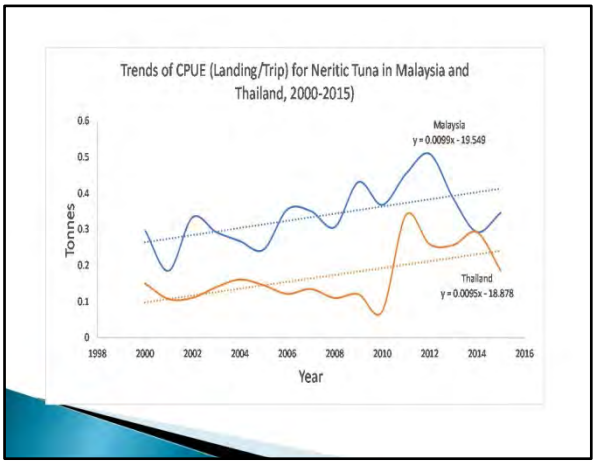












Length at 1st Maturity

Species	Sex	Length at 1st maturity (cm)
Auxis thazard	M	26.57
	F	28.88
Euthynnus affinis	M	37.74
	F	39.71

Source:
Yaleh et al. (2016)

Length-weight Relationship

Species	Sex	Length-weight relationship (n; r)
Auxis thazard	M	$W = 0.0176FL^{3.0036}$ (647; 0.9864)[f]
	F	$W = 0.0231FL^{2.9313}$ (480; 0.9823)[f]
Euthynnus affinis	M	$W = 0.0057FL^{3.3293}$ (492; 0.9764)[f]
	F	$W = 0.0049FL^{3.3708}$ (565; 0.9837)[f]

Source:
Yaleh et al. (2016)

Spawning Season and Sex Ratio

Species	Spawning season (peak season)	Sex ratio (M:F)
Auxis thazard	YR (Jan-Mar/Aug-Nov)	1:1.2[f]
Euthynnus affinis	YR (Van-May/Oct-Dec)	1:0.7[f]

Source:
Yaleh et al. (2016)

Terima kasih
Thank You

Annex 17

THE NEED AND AVAILABILITY OF ADDITIONAL DATA AND INFORMATION

Template for Technical Inputs from the Technical Working Group

Species Name ……..
Information provided by…….. (name of person)
Country ……..

Table 1: General Information

Data	Indonesia	Malaysia	Thailand
Major fishing gear catching this species	*Provide name list of the fishing gear which are mainly used for catching this species.*	*Provide name list of the fishing gear which are mainly used for catching this species.*	*Provide name list of the fishing gear which are mainly used for catching this species.*
Size, engine power, and special device of the fishing vessels catching this species	*Provide information on:* *1. Length of the fishing vessels, can be more than one range.* *2. Engine power of such fishing vessels* *3. Give more information if the vessel using special device, e.g. luring light (how many watt, etc.)*		
Dominant species	*In case of there are more than one species, such as the case of anchovy*		
Major Fishing ground/area	*Provide information on:* *1. depth of water* *2. location of the fishing ground*		
Fishing seasons	*What month (by period) of the year that is considered "peak season" to catch this species.*		
Annual landing	*Total amount of landing per year*		
Fishing efforts	*Information on the effort of such fishing gear catching this species.* *e.g.* *Trawl net: total weight per haul; weight per hour of towing, etc.* *Purse seine: total weight per day per boat.* *Gillnet: total weight per trip; how many days for a trip, caught weight per one unit of length, etc.*		
Size at first maturity of this	*Length of the species at first mature*		

species	*stage, male and female*		
Sex ratio	*Ratio of male and female caught by such fishing gears*		
Fecundity	*Total number of eggs per 1000 cc* *This parameter is subject to be different by season.*		
Percentage of Egg Stage Distribution	*Percentage of fishes sampled with egg forming stage:* *Stage 1 (%)* *Stage 2 (%)* *Stage 3 (%)* *Stage 4 (%)*		*e.g. stage 4 of Rastrelliger brachysoma*
Spawning ground/area	*Location of the spawning ground/ground*		
Spawning seasons	*Period of spawning in a year?* *Period of spawning from what month to what month.*		
Eggs and larvae distribution	*Name of the <u>location</u> of larvae distribution* *<u>How far from shore</u> that the larvae of this species can be found.* *<u>Depth of water</u> that the larvae of this species can be found* *What <u>period</u> in the year that larvae of this species are abundance*		
Post-harvest utilization	*Type of post-harvest utilization, e.g. salted fish, dry, etc.*	*Type of post-harvest utilization, e.g. salted fish, dry, etc*	*Type of post-harvest utilization, e.g. salted fish, dry, etc.*
Remarks			

Table 2: Fisheries Management Measures

	Indonesia	**Malaysia**	**Thailand**
Fisheries management measures 1	*Information on existing fisheries management measure for this species*		
Fisheries management measures (2)	*More information if there are more than one measures*		
Fisheries management measures (3)	*More information if there are more than one measures*		

Table 3: Total number of fishing vessels catching the species

Species Name……

Vessels	Year (1) (*more column if you have more than one years*)	Year (2)
Fishing Gear (1)		
Fishing Gear (2)		
Fishing Gear (3)		
total		

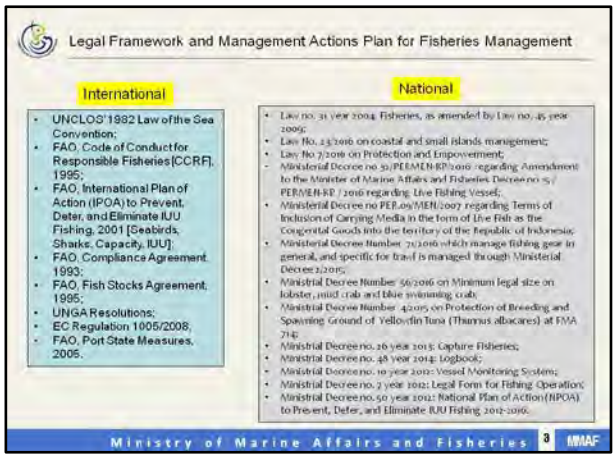
Table 4: Fishing efforts of catching *(species name)* in Southern Andaman Sea

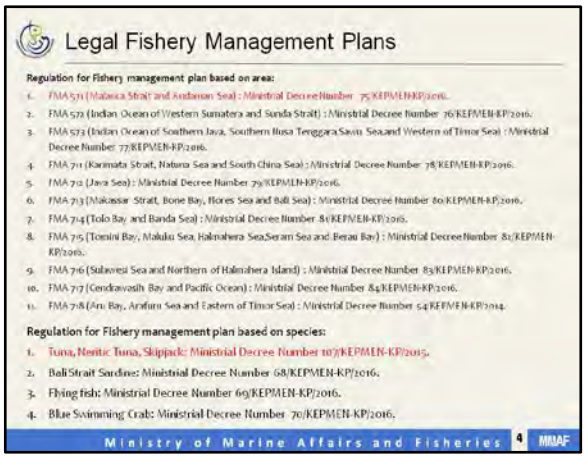
Items	Fishing Vessel type 1	Fishing Vessel type 2	Fishing Vessel type 3	Fishing Vessel type 4
Average CPUE				

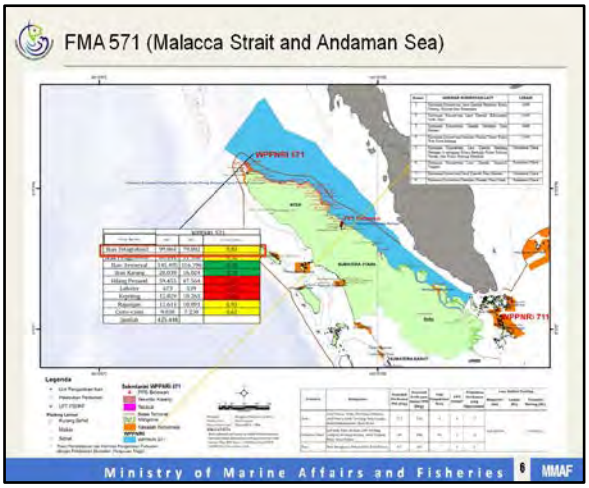
Annex 18

PRESENTATION OF EXISTING MANAGEMENT MEASURES RELATING TO MACKERELS, ANCHOVIES AND NERITIC TUNAS: INDONESIA

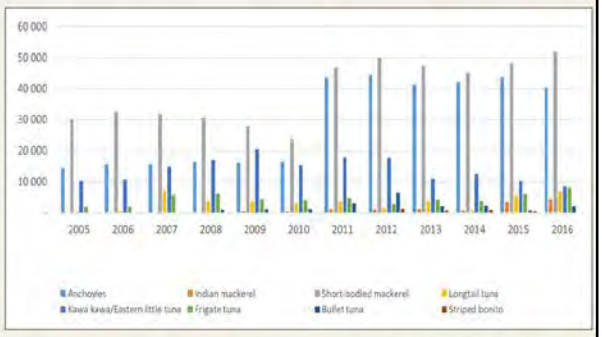
By *Mr. Suwarso*







TOTAL CATCH SERIES (2005-2016) BY SPECIES IN FMA 571 (Malacca Strait and Andaman Sea)

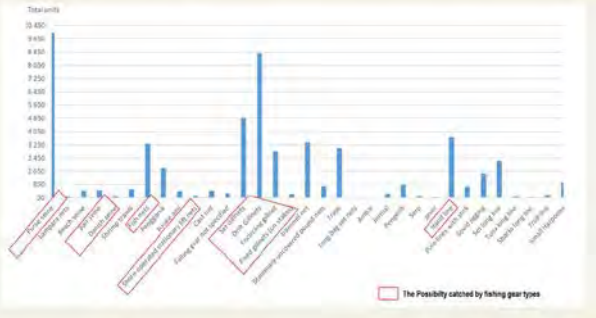


Source : Capture Fisheries Statistics - DGCFc

Anchovy, Mackerels, & Neritic Tuna

Source : Capture Fisheries Statistics - DGCF

The Types of Fishing Gears that Operated in FMA 571 (2016) → 53.508 unit



Source : Capture Fisheries Statistics - DGCF

The Types of Fishing Gears for Anchovy

Bagan Perahu (Liftnet Boat)

Bagan Tancap (Liftnet)

Purse Seine Teri

Payang Teri

The Types of Fishing Gears for Mackerel/Neritic Tuna

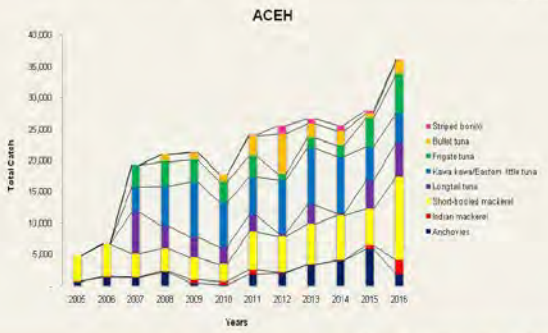
Purse Seine

Jaring Insang (Gillnet)

Pancing ulur (Handline)

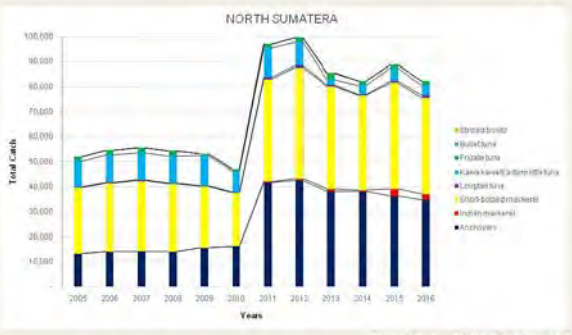
TOTAL CATCH IN FMA 571 BY PROVINCE BY SPECIES (in 2005-2016) : Aceh Province

Unit: Ton

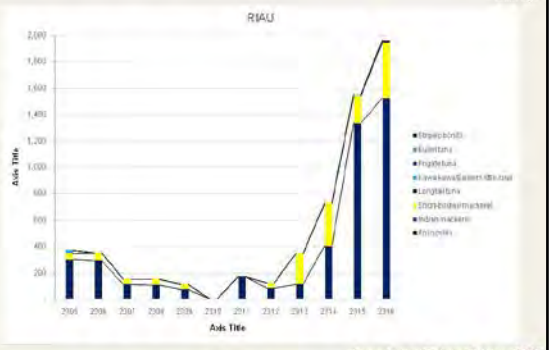


Source : Capture Fisheries Statistics - DGCF

TOTAL CATCH IN FMA 571 BY PROVINCE BY SPECIES (in 2005-2016) : North Sumatera Province



TOTAL CATCH IN FMA 571 BY PROVINCE BY SPECIES (in 2005-2016) : Riau Province



Fishing Port in Indonesia

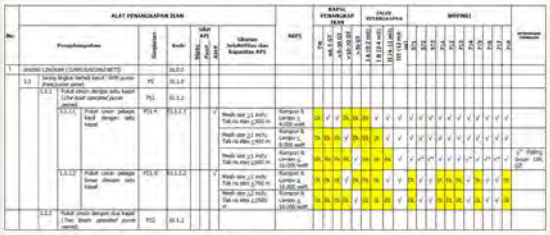
Source :http://pipp.djpt.kkp.go.id/

10 Type of Fishing Gear based on Ministerial Decree No. 6/2011

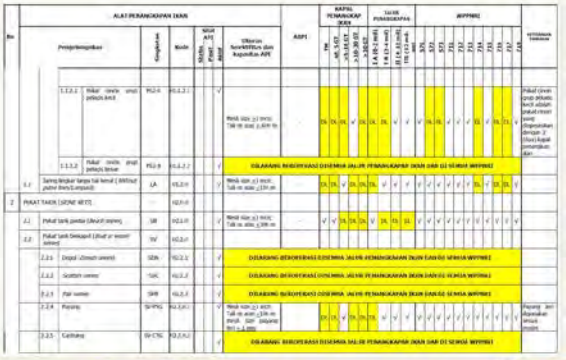
Ministerial Decree No. 71/2016 : Fishing Gear, FADs & Fishing Zone

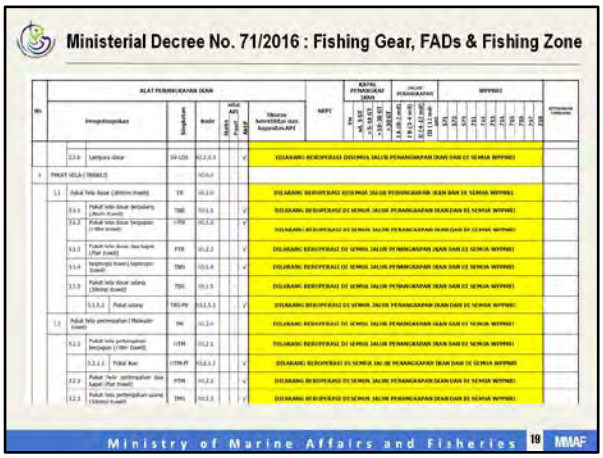
LAMPIRAN
PERATURAN MENTERI KELAUTAN DAN PERIKANAN
REPUBLIK INDONESIA
NOMOR 71/PERMEN-KP/2016
TENTANG
JALUR PENANGKAPAN IKAN DAN PENEMPATAN ALAT PENANGKAPAN IKAN DI WILAYAH PENGELOLAAN PERIKANAN NEGARA REPUBLIK INDONESIA

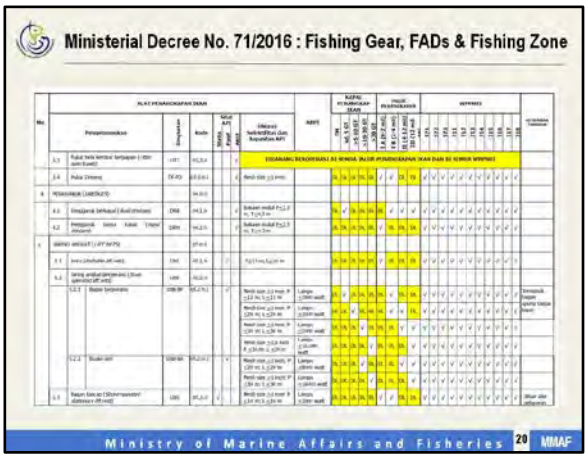
PENEMPATAN ALAT PENANGKAPAN IKAN PADA JALUR PENANGKAPAN IKAN



Ministerial Decree No. 71/2016 : Fishing Gear, FADs & Fishing Zone




Ministerial Decree No. 71/2016 : Fishing Gear, FADs & Fishing Zone
Ministry of Marine Affairs and Fisheries
19
MMAF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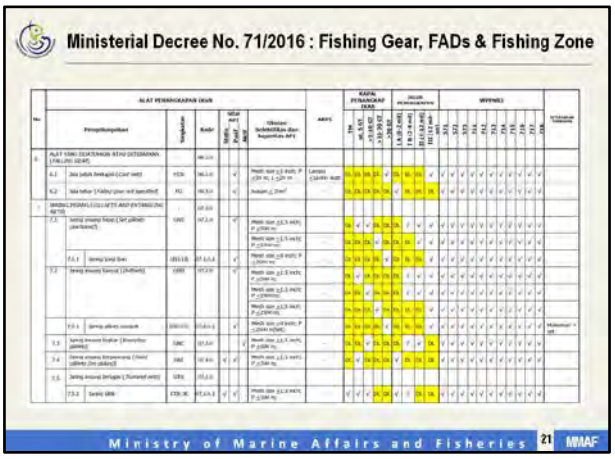
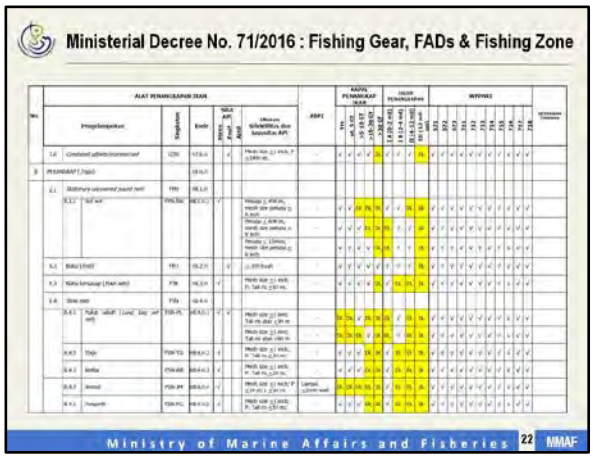
Ministry of Marine Affairs and Fisheries
20
MMAF


Ministerial Decree No. 71/2016 : Fishing Gear, FADs & Fishing Zone
Ministry of Marine Affairs and Fisheries
21
MMAF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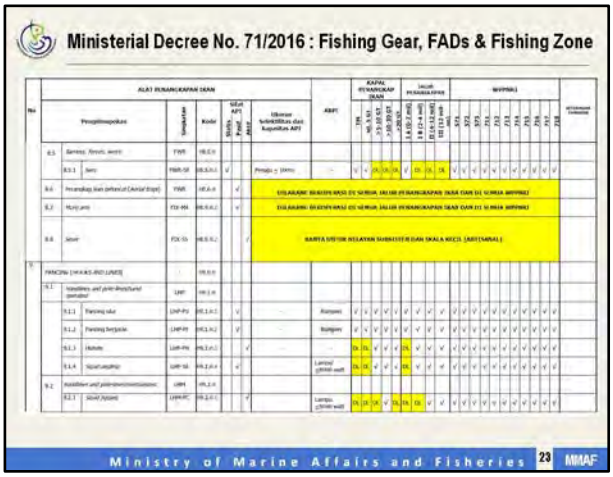
Ministry of Marine Affairs and Fisheries
22
MMAF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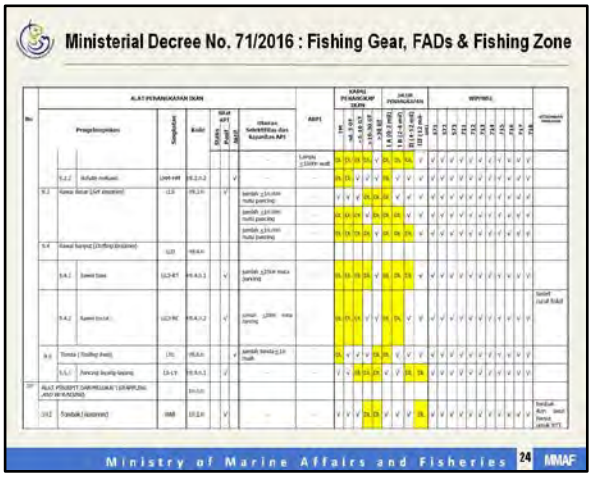
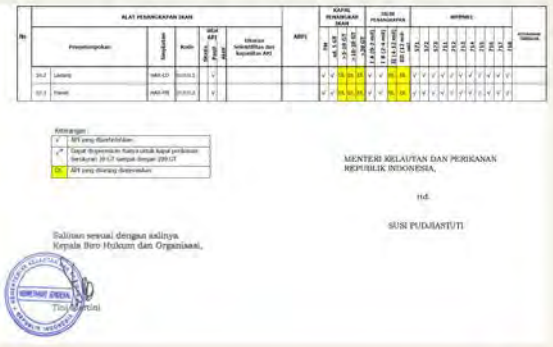
Ministry of Marine Affairs and Fisheries
23
MMAF


Ministerial Decree No. 71/2016 : Fishing Gear, FADs & Fishing Zone
Ministry of Marine Affairs and Fisheries
24
MMAF

Ministerial Decree No. 71/2016 : Fishing Gear, FADs & Fishing Zone



MENTERI KELAUTAN DAN PERIKANAN
REPUBLIK INDONESIA,

ttd.

SUSI PUDJIASTUTI

Salinan sesuai dengan aslinya
Kepala Biro Hukum dan Organisasi,

Ministry of Marine Affairs and Fisheries 25 MMAF

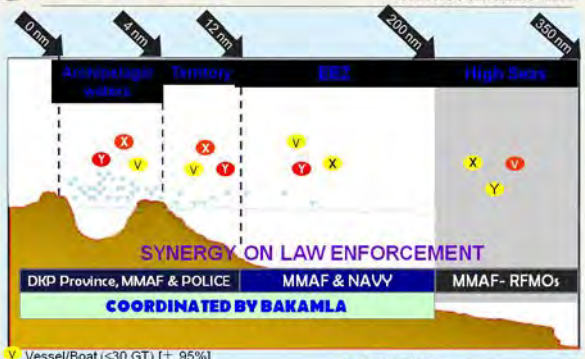
Fishery monitoring, controlling and surveillance system

Source : DG Surveillance - MMAF

Ministry of Marine Affairs and Fisheries 26 MMAF

Collaborating to MCS

Source : DG Surveillance - MMAF



V Vessel/Boat (<30 GT) [± 95%]
X Vessel/Boat (>30 GT) [± > 5 %]
Y Foreign fishing vessel

Ministry of Marine Affairs and Fisheries 27 MMAF

Annex 19

MALAYSIA: PRESENTATION OF EXISTING MANAGEMENT MEASURES RELATING TO MACKERELS, ANCHOVIES AND NERITIC TUNAS

By *Ms. Masazurah binti A. Rahim*

SEAFDEC SWEDEN

COUNTRY REPORT
MALAYSIA

Existing Management Measures

THE TECHNICAL EXPERTS MEETING ON MANAGEMENT OF TRANS-BOUNDARY SPECIES FOR THE SOUTHERN ANDAMAN SEA
4-5 APRIL 2018
BANGKOK, THAILAND

Legal Aspects

- Fisheries Act 1985 (Act 317)
- DG shall be responsible for the general supervisions of all matters relating to fisheries
- DG can refuse/cancel or suspend for such period any licenses (fishing vessel)
- Minister of Agriculture and Agro-Based Industry is empowered to make regulation pertaining to the management and development of fisheries resources in Malaysia
- Any person who contravenes of fails to comply – compounded or fines

Management Measures

- direct limitation of fishing effort through the licensing of fishing gear and fishing vessels
- identification of nursery areas
- facilitation of cooperative research effort between government and academicians to provide data essential for the formulation of area management plans;
- establishment of strict enforcement on regulations that address the problem of illegal fishing;
- rehabilitation of resources through the establishment of artificial reefs and coral replanting programmes; and

A. To control fishing effort

- ***Direct limitation of fishing effort***
  A moratorium has been placed on the issuance of new or additional fishing licences for vessels to fish in coastal waters.
- ***Controls on size and power of fishing vessels***
  Any attempt by fishermen to change the tonnage or engine power of fishing vessels requires permission from the Director-General of Fisheries
- ***Registration of fishermen*** This program controls entry of new individuals into the fishing industry
- **Resettlement of excess fishermen into the other sectors**
  A voluntary programme to resettle excess fishermen is in place to reduce fishing pressure, especially on inshore fisheries.

B. To conserve and rehabilitate the fisheries resources and marine ecosystem

- ***Closed fishing areas*** Commercial fishing vessels, like trawlers and fish purse seiners, are prohibited from fishing in waters less than 5 nautical miles from the shore. The waters within 5 nautical miles of the shore are the nursery grounds of juveniles of prawns and fish. This will reduce fishing pressure from trawlers and fish purse seiners

- ***Management zones***

1. Conservation Zone 0-1 nm - For aquaculture, cockle culture, community base fisheries activities

2. Zone A 1-8 nm from shore, reserved solely for small-scale fishers

3. Zone B 5 -15 nm , commercial fishing vessels of less than 40 GRT

4. Zone C beyond 15 nm to ZEE, commercial fishing vessels of more than 40-70 GRT

5. Zone C2 beyond 30 nautical miles, where deep-sea fishing vessels of 70 GRT and above are allowed to operate

Marine parks in Malaysia

Source: Department of Marine Park Malaysia

- ***Conservation of Resources***

Marine Parks and Marine Reserves as well as fisheries protected areas have been established under the Fisheries Act 1985. This is to protect, conserve and manage in perpetuity the marine environment in order that it remains undamaged for future generation. Fishing in fisheries protected areas is also prohibited unless specifically licensed to do so.

- ***Rehabilitation of Resources***

Artificial reefs have been established in Malaysian fisheries waters as a marine resource enhancement, as well as one step to alleviate the problem of depleting fish resources in the coastal waters. They are used as a possible tool for fisheries management in maximizing exploitation, resource conservation, habitat rehabilitation and mitigation of the effects of over fishing.

- ***Monitoring, Control and Surveillance Program for fisheries management***

This program provides for effective and efficient scientific data acquisition for resource evaluation and management of fisheries in Malaysia. It also provides for the design of effective monitoring and control of fisheries enforcement activities to ensure that only authorized fishing vessels conduct their fishing activities within designated areas in Malaysian fisheries waters.

- ***Prohibition of fishing gear***

Under the Fisheries Act 1985 and the related regulations, fishing gear that is destructive to the environment and the fisheries resources are banned.

Special regulations for Anchovy fishing

- Fishing activity is limited from 6am to 6pm on the same day
- FAD is not allowed
- The vessel is not allowed to fish >12 nm from shore
- >70% anchovies, <30% by catch

THANK YOU

Annex 20

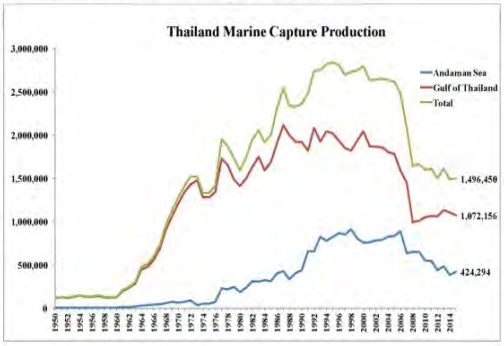
THAILAND: PRESENTATION OF EXISTING MANAGEMENT MEASURES RELATING TO MACKERELS, ANCHOVIES AND NERITIC TUNAS

By *Ms. Praulai Nootmorn*

THAILAND
Fisheries Management

Ms. Praulai Nootmorn Senior Expert in Marine Fisheries
Marine Fisheries Research and Development Division,
Department Of Fisheries, THAILAND

Thailand fisheries production



Main Fishing gears

Pair trawl

Otter board trawl

Beam trawl

Anchovy purse seine

Thai purse seine with sonar and souder

Thai Purse Seine with light luring

Squid cast net with light luring

Anchovy lift net

Indo-Pacific mackerel gill net

Cuttlefish Traps

Crab gill net

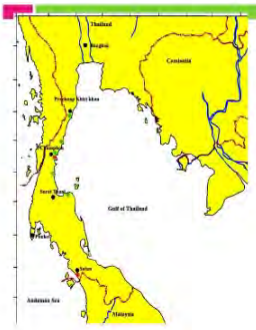
Crab Traps

Fleet structure

- Aartisanal fishing vessels
  - Small < 5 GT, with engine power <180 horsepower
  - Large 5 - <10 GT, between 180-220 horsepower
- Commercial fishing vessels
  - Small 10- <20 GT, power between 220-380 horsepower
  - Medium 20 – 60 GT, >380 horsepower
  - Large > 60 GT
- Transshipment vessels
  - Domestic operating in Thai waters >30 GT
    Ices are used to store and preserve
  - Operating outside Thai waters >60 GT
    freezing system is used to store and preserve

(FMP,2015)

Fishing areas



Total area of Thai waters is about 420,280 sq. km.

- Gulf of Thailand 304,000 sq. km. (86 m max. depth)
- Andaman Sea 116,280 sq. km. (1,200 m max.depth)

Fisheries Management

- Thailand government is willing and committed to manage the marine resources for sustainable utilization
- Reforming and modernizing fisheries sector in compliance with international rules
- Fisheries in Thailand has been transform
  Open access ⟹ limited access
- Key issues use for fisheries management in Thailand

1. Legal framework

- The Royal Ordinance on Fisheries B.E. 2558 (2015) was approved by the cabinet came into force on November 2015.
- Highlights of the Royal Ordinance include:
  - Sustainable resources management
  - Definition of illegal fishing
  - Introduce strictly penalty which proportional to sanction or resources exploitation
  - Concordance with international law and regulation

1. Legal framework

- After the Royal Ordinance (2015) entry into force, some amendments needs to close existing legal loopholes and to maximise the efficiency of its implementation and enforcement
- The Royal Ordinance (No.2) 2017 was approved by the Cabinet on June 2017.
- Royal Ordinance on Fisheries (2015 and 2017) are internationally and up to date

1. Legal framework

Related Law and Regulation

- NCPO Notification
- Ministerial Notification
- The Royal Ordinance on Thai Vessels
- The Royal Ordinance on the Navigation

2. Fisheries Management Plan (FMP)

- FMP (2015-2019) has been published in the Royal Gazette since December 2015
- FMP applies the EAFM that aims to balance ecological well-being with human well-being
- Implementing of FMP
  - to reduce fishing capacity,
  - to develop sustainable fisheries, and
  - to ensure full protection of the marine resources.

2. Fisheries Management Plan (FMP)

- FMP has integrated legal framework and fishery policy and closely linked to
  - The Royal Ordinance on Fisheries (2015 and 2017)
  - National Plan of Action to prevent, deter and eliminate Illegal, unreported and unregulated fishing (NPOA-IUU)
  - Monitoring control and Surveillance (MCS)
  - National Plan of Control and Inspection (NPCI)
  - Traceability

2. Fisheries Management Plan (FMP)

- To implement FMP and the fleet reduction measures properly, a clear and accurate picture of the fleet is necessary
- The latest fishing vessels survey (31 May 2017)
  - 10,616 Fishing License in Thai waters
  - 16 Oversea Fishing License
  - Up to date (real time) vessel data base called "Fishing info"
- Electronics fishing license system based on MSY has been developed
- Increasing 221 government officials for new tasks under the Royal Ordinance

2. Fisheries Management Plan (FMP)

- **Allowable catches and Allowable fishing days based on MSY has been introduced in Thailand**

Groups	Gulf of Thailand		Andaman Sea	
	Allowable Catches (tons) in 2016	Allowable fishing days (days) in 2016	Allowable catches (tons) in 2016	Allowable fishing days (days) in 2016
Demersal species	54,616	101,627	14,789	16,989
Pelagic fish	26,499	28,815	6,850	4,321
Anchovies	23038	21,932	3,104	4,277
Total	104,153	152,374	24,743	25,587

3. Traceability

- Thailand has developed "National traceability System" for catches from both Thai-flagged vessels and imported fish and fishery products to ensure their origin and movements
- Two electronic databases have been developed to strengthen the level of accuracy and in cross-checking information before issuing Catch Certificate and Processing Statement
  - Thai flagged traceability system
  - PSM linked and Processing Statement System (PPS)

4. Monitoring, Control and Surveillance (MCS) Systems

- MCS measures have been implemented to ensure fishing activities comply with the new fisheries laws and regulations
- Fisheries Monitoring Center (FMC)
  - VMS
  - Inspection at port
  - Inspection at sea
- Improved coordination mechanism among agencies involved in MCS activities

MCS Components to implement control measures

4. Monitoring, Control and Surveillance (MCS) Systems

- VMS
  - > 30 GT are installed VMS
  - all VMS devices must be sealed, to prevent a possibility of removal from the vessel
  - VMS switched on at all time, in case of signal lost FMC team take immediate action
- To control oversea fleet and carriers
  - new electronic surveillance system has been developed
    - Electronic Reporting System (ERS)
    - Electronic Monitoring (EM)
  - Observer on board

Inspection at port

- 32 PIPO Control Center
- 19 Forward Inspection Points (FIPs).

Catch landing inspection

For reliability and accuracy of information on landed fish before entering supply chain verified with fishing logbook, fishing gears and MCPD or MCTD

Inspection at sea

Zone 1 Rayong Center
(8 patrol units)
188 0fficers , 66 Patrol vessels

Zone 2 Songkhla
(4 patrol units)
76 0fficers , 28 Patrol vessels

Zone 3 Krabi Center
(3 patrol units)
76 0fficers , 23 Patrol vessels

5. National and international co-operation

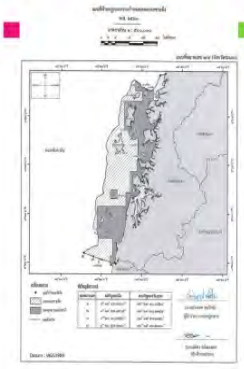
Strengthening cooperation with various third countries and RFMOs

- Thailand has successfully signed cooperation agreements on combating IUU fishing with Fiji, South Korea, the Philippines, Myanmar and Japan
- Many MoU or agreements which have been drafted
- RFMOs : Thailand is member of
  - Indian Ocean Tuna Commission (IOTC),
  - Southern Indian Ocean Fisheries Agreement (SIOFA) . effective on May 2017

Protected area/Coastal area

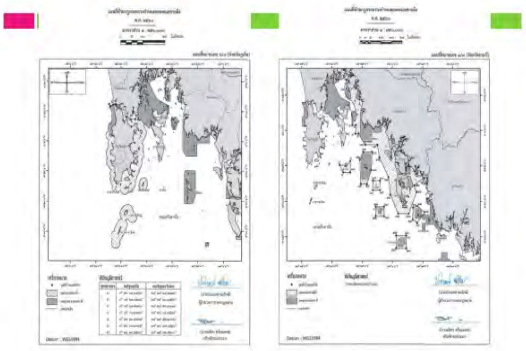
- Provincial coastal area
- Marine National Park

Ranong



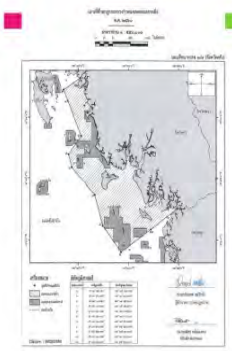
Phangnga

Phuket

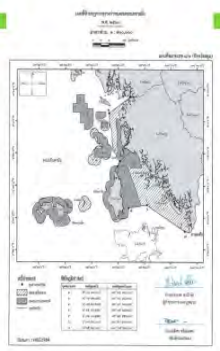


Kabi

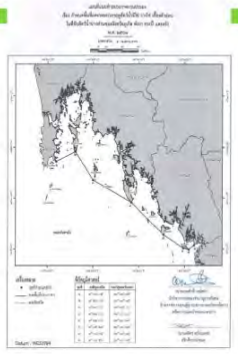
Trang



Satun



Closed area/Gear Restriction



Annex 21

DATA FORMATS AND NEEDS FOR THE PRODUCTION OF THEMATIC GIS BASED MAPS

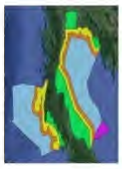
DATA FORMATS AND NEEDS

For the Production of Thematic (GIS based) Maps

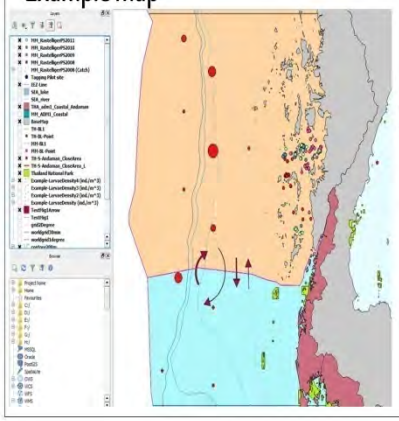
Data formats for making GIS map

- Position (Latitude, Longitude); Microsoft Excel / Word / Text file(s)
- Maps (digital or paper)
- Shapefile (GIS data)

Station no.	Date	Time	Longitude	Latitude	LonC	LatC	Bottom depth (m)	File name	Fish larvae (ind./m²)
1	14 March 2013	16:47	100 14.53 E	12 20.55 N	100.2421667	12.3425	31.00	s01s001	250.00
2	11 April 2013	10:56	100 44.48 E	12 14.59 N	100.7413333	12.2431667	32.00	s01s002	450.00
3	10 April 2013	11:30	101 08.49 E	12 15.36 N	101.1581667	12.256	32.00	s01s003	1020.00
4	9 April 2013	15:12	101 45.39 E	12 15.32 N	101.7565	12.25533333	32.00	s01s004	730.00
5	9 April 2013	10:45	102 14.38 E	11 44.45 N	102.2396667	11.74083333	48.00	s01s005	800.00
6	8 April 2013	19:21	101 45.51 E	11 44.49 N	101.7585	11.7415	59.00	s01s006	190.00
7	8 April 2013	10:43	101 14.15 E	11 43.54N	101.2358333	11.72566667	60.00	s01s007	15.00
8	7 April 2013	14:18	100 45.48 E	11 44.48 N	100.758	11.74133333	46.00	s01s008	36.00
9	15 March 2013	11:40	100 17.43 E	11 44.19 N	100.2905	11.7365	41.00	s01s009	50.00
10	16 March 2013	10:50	099 47.59 E	11 14.04 N	99.79316667	11.234	45.00	s01s010	180.00



Example map

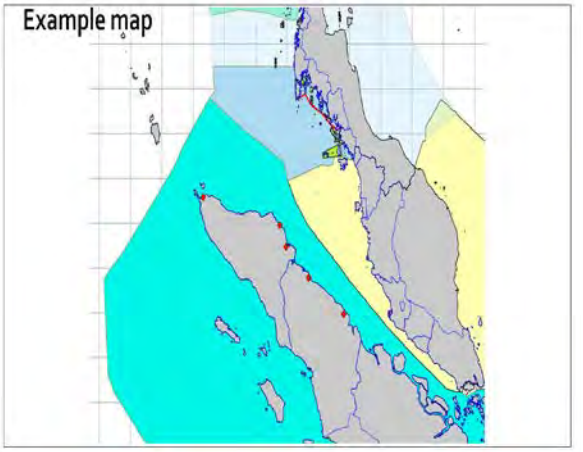


Maps

Each species:

- Spawning areas
- Fishing grounds
- Closed areas/Gear restrictions
- Protected Area
- Larvae distribution areas

Example map



Annex 22

DETAILED WORKPLAN FOR PRODUCING THEMATIC MAPS

INDONESIA

Please submit existing data as soon as possible but latest **April 15**

		Indonesia
Dead lines	**Map layer**	**Comment/available data**
June 15	Spawning ground anchovy (if possible by species)	Sjah Kuala University, Agricultural University of Bogor
June 15	Spawning ground mackerel (if possible by species)	Yes, estimated, preliminary map can be presented
June 15	Spawning ground Neritic tuna (if possible by species)	Check Indian Pacific Tuna Program
June 15	Spawning season anchovy (if possible by species)	yes, maybe from neighbour areas
June 15	Spawning season mackerel (if possible by species)	yes, estimated July, August
June 15	Spawning season Neritic tuna (if possible by species)	no
June 15	Migration route Short mackerel	maybe information from Boonrak and Chanasit, 1995 and other sources
June 15	Fishing ground anchovy (if possible by gear)	yes
June 15	Fishing ground mackerel (if possible by gear)	yes
June 15	Fishing ground Neritic tuna (if possible by gear)	yes
June 15	Fishing season anchovy (if possible by gear)	yes
June 15	Fishing season mackerel (if possible by gear)	yes
June 15	Fishing season Neritic tuna (if possible by gear)	yes
June 15	Larva distribution (if possible by species)	Yes, on mackerel from 2015 but limited area
June 15	Gear restrictions (by area, season and gear, mesh size, as appropriate)	yes
June 15	Closed areas (seasonal and permanently including MPAs, LMMAs and community/provincial)	
June 15	Stock structure Mackerel (if possible by species)	Yes, for Indian, include results from BOBLME
June 15	Stock structure Neritic tuna (if possible by spec	yes

Additional data

May 30	Catch data Anchovy	Yes. Monthly data for some vessels
May 30	Catch data Mackerel	Yes
May 30	Catch data Neritic tuna	yes
May 30	CPUE Anchovy by gear (average per boat and day)	Partly, per vessel
May 30	CPUE Mackerel by gear (average per boat and day)	Yes, per vessel and year
May 30	CPUE Neritic Tuna by gear (average per boat and day)	yes
May 30	Stock assessment/ MSY Anchovy	yes
May 30	Stock assessment/MSY Mackerel	yes
May 30	Stock assessment/MSY Neritic Tuna	yes
May 30	Length first maturity Anchovy (if possible by species)	no
May 30	Length first maturity Mackerel (if possible by species)	Yes
May 30	Length first maturity Neritic Tuna (if possible by species)	yes
May 30	Number of vessels	yes
May 30	Fishing effort limitation	
May 30	Catch composition (by gear)	

MALAYSIA

Please submit existing data as soon as possible but latest **April 15**

		Malaysia
Dead lines	**Map layer**	**Comment/available data**
June 15	Spawning ground anchovy (if possible by species)	some estimates, preliminary areas can be submitted
June 15	Spawning ground mackerel (if possible by species)	No, analyses ongoing, preliminary map can be presented
June 15	Spawning ground Neritic tuna (if possible by species)	Check Indian Pacific Tuna Program
June 15	Spawning season anchovy (if possible by species)	yes, for two areas
June 15	Spawning season mackerel (if possible by species)	yes
June 15	Spawning season Neritic tuna (if possible by species)	some indication peak in June and October
June 15	Migration route Short mackerel	yes, (Boonrak and Chanasit, 1995)
June 15	Fishing ground anchovy (if possible by gear)	yes
June 15	Fishing ground mackerel (if possible by gear)	yes
June 15	Fishing ground Neritic tuna (if possible by gear)	yes
June 15	Fishing season anchovy (if possible by gear)	yes
June 15	Fishing season mackerel (if possible by gear)	yes
June 15	Fishing season Neritic tuna (if possible by gear)	yes
June 15	Larva distribution (if possible by species)	Yes, on mackerel
June 15	Gear restrictions (by area, season and gear, mesh size, as appropriate)	mesh size limitation (10mm)
June 15	Closed areas (seasonal and permanently including MPAs, LMMAs and community/provincial)	
June 15	Stock structure Mackerel (if possible by species)	Yes, for Indian, include results from BOBLME
June 15	Stock structure Neritic tuna (if possible by species)	yes

Additional data

May 30	Catch data Anchovy	yes, per vessel and trip. 4 main species of anchovy
May 30	Catch data Mackerel	Yes, Two main species
May 30	Catch data Neritic tuna	yes, three species
May 30	CPUE Anchovy by gear (average per boat and day)	yes
May 30	CPUE Mackerel by gear (average per boat and day)	yes
May 30	CPUE Neritic Tuna by gear (average per boat and day)	yes
May 30	Stock assessment/ MSY Anchovy	no
May 30	Stock assessment/MSY Mackerel	yes
May 30	Stock assessment/MSY Neritic Tuna	yes
May 30	Length first maturity Anchovy (if possible by species)	yes
May 30	Length first maturity Mackerel (if possible by species)	yes
May 30	Length first maturity Neritic Tuna (if possible by species)	yes
May 30	Number of vessels	yes
May 30	Fishing effort limitation	Yes, no new licenses, support to quit fishing, no change of tonnage and power of vessel
May 30	Catch composition (by gear)	yes

THAILAND

Please submit existing data as soon as possible but latest **April 15**

Dead lines	Map layer	Comment/available data
June 15	Spawning ground anchovy (if possible by species)	yes, for three species
June 15	Spawning ground mackerel (if possible by species)	yes
June 15	Spawning ground Neritic tuna (if possible by species)	yes
June 15	Spawning season anchovy (if possible by species)	yes, for three species including nursing grounds
June 15	Spawning season mackerel (if possible by species)	yes, for two species
June 15	Spawning season Neritic tuna (if possible by species)	yes
June 15	Migration route Short mackerel	yes
June 15	Fishing ground anchovy (if possible by gear)	yes
June 15	Fishing ground mackerel (if possible by gear)	yes
June 15	Fishing ground Neritic tuna (if possible by gear)	yes
June 15	Fishing season anchovy (if possible by gear)	yes
June 15	Fishing season mackerel (if possible by gear)	yes
June 15	Fishing season Neritic tuna (if possible by gear)	yes
June 15	Larva distribution (if possible by species)	yes
June 15	Gear restrictions (by area, season and gear, mesh size, as appropriate)	yes, (6mm), temporal restrictions
June 15	Closed areas (seasonal and permanently including MPAs, LMMAs and community/provincial)	
June 15	Stock structure Mackerel (if possible by species)	Yes, for Indian, include results from BOBLME
June 15	Stock structure Neritic tuna (if possible by species)	yes

Additional data

May 30	Catch data Anchovy	yes
May 30	Catch data Mackerel	yes, two species
May 30	Catch data Neritic tuna	yes, three species
May 30	CPUE Anchovy by gear (average per boat and day)	yes
May 30	CPUE Mackerel by gear (average per boat and day)	yes
May 30	CPUE Neritic Tuna by gear (average per boat and day)	yes
May 30	Stock assessment/ MSY Anchovy	yes
May 30	Stock assessment/MSY Mackerel	yes
May 30	Stock assessment/MSY Neritic Tuna	yes
May 30	Length first maturity Anchovy (if possible by species)	yes, for three species
May 30	Length first maturity Mackerel (if possible by species)	yes, for two species
May 30	Length first maturity Neritic Tuna (if possible by species)	yes
May 30	Number of vessels	yes
May 30	Fishing effort limitation	yes
May 30	Catch composition (by gear)	yes