WEST PACIFIC EAST ASIA
OCEANIC FISHERIES MANAGEMENT
PROJECT

WPEA OFMP

WORKSHOP ON TUNA FISHERIES MANAGEMENT ON A NATIONAL LEVEL

SUMMARY REPORT

AGENDA I. INTRODUCTION

1. The workshop on tuna fisheries management on a national level, funded by KOICA-Yeosu Project, was held under the WPEA-OFM Project in Puerto Princesa City, Palawan, Philippines during 29-31 October 2012. The purpose of the workshop was to consider how tuna resources and tuna fisheries can be managed on a national and possibly sub-regional level, and to address issues and problems that may arise, specifically in determining management actions such as national catch and effort limits. There were about 27 participants from Indonesia, Philippines and Vietnam and 3 experts were invited to assist the workshop (Attachment 1).

2. Atty. Benjamin Tabios of the Bureau of Fisheries and Aquatic Resources welcomed the participants to the workshop. He acknowledged the need to adopt measures on a local and sub-regional level in ensuring the sustainability of tuna resources and the importance of collaboration between adjacent states. He thanked participants for attending the workshop and thanked the Commission for the assistance in the regional collaboration. Finally, he acknowledged Drs. Soh Lewis, Batongbacal and Armada for the assistance in preparing this important workshop for better tuna fisheries management in the region and looked forward to have a successful conduct of the workshop.

3. Dr. SungKwon Soh, briefly introduced the background of the workshop. He stated the need to come up with approaches to manage tuna resources in the national level, and to build the capacity of the countries on how to manage tuna resources by sharing their understanding in the dynamics of tuna stocks. He also facilitated the introduction of the participants and enumerated agenda items for the meeting.

4. Atty. Jay Batongbacal, the WPEA international law consultant, presented the regulatory interventions on tuna management at the international level and the member countries obligations at the national level (Attachment 2). In his presentation, he discussed the United Nations Convention on the Law of the Sea (UNCLOS), UN Fish Stocks Agreement, WCPFC Convention and WCPFC CMMs and CMM obligations.

5. On the regulatory interventions, he mentioned that most of the regulations are sea-based, but now slowly developing on the land-based operations. He then stated the need to inventory all current laws and regulations on tuna management and ensure that regulations are in place and enacted in accordance with the RFMO requirements. He also provided a summary table of general coastal/fishing State obligations for management of tuna and other migratory fish stocks (Attachment 3).

6. After his presentation, the workshop raised the following issues in relation to the presentation :

- How to ensure that the management measures in the EEZ are compatible with the RFMOs?
- Look into a possibility of having States in the South China Sea to fully cooperate with WCPFC, as they are not yet part of the WCPFC Convention Area,
- Penalties and fines are not specified in the WCPFC CMMs, but are imposed by the flag State as their obligation.

7. Atty. Batongbacal pointed out that obligations of States are clear, but the issue of making the national management measures compatible with the RFMOs management throughout the range of

the stock is a challenge. In order to make it compatible, there is a need for coastal States to make way for flexibility.

8. Incompatibility due to trade requirements was also noted in the case of Indonesia and Vietnam. A meeting/workshop with WCPFC was suggested to review their compliance with the Commission's requirements. The compliance monitoring report to TCC meetings may be utilized in this regard including participation in TCC meetings

AGENDA II. REGIONAL TUNA ASSESSMENT AND MANAGEMENT

9. Mr. Pham Viet Anh shared his learning from the stock assessment workshops hosted by the Secretariat of the Pacific Community (SPC). In his presentation, using the current bigeye stock assessment as an example, he gave background on the model, methodology and data used by WCPFC and how tuna resources are assessed at the regional level. A copy of the presentation appears as Attachment 4.

10. After his presentation, Dr. Soh commended Mr. Anh for providing a good overview on what SPC has been doing for regional stock assessment as science provider to the WCPFC. The group discussed the importance of the tuna tagging data, especially for estimating growth and natural mortality. The group was then referred to the WCPFC Scientific Committee website for more information on details of SPC's stock assessments..

AGENDA III. TUNA MANAGEMENT PLAN OF EACH COUNTRY

11. Representatives from Indonesia, Philippines and Vietnam introduced their national tuna management plans developed or revised under the WPEA OFM Project. Aside from the tuna management framework, each presenter also discussed issues and gaps in the implementation of their management plan in light of WCPFC requirements.

Indonesia

12. Mr. Saut Tampubolon presented Indonesia's National Tuna Management Plan (NTMP) as attached in Attachment 5 and as summarized below. He enumerated Indonesian Fisheries Management Areas (FMAs) and informed the group that catch estimates are done yearly, by species and gear, while catch limit determination has yet to be carried out.

13. He also discussed the processes in coming up with annual catch estimates by gear type and by species based on the best available data (2000-2011); catch composition will be obtained from the port sampling program, and he expected that stocks by species can be estimated through surplus production model. For the catch limit, 80% MSY level, if available will be adopted as a precautionary catch limit. Indonesia would appreciate if this workshop could make any contribution to identify plausible models to estimate MSY and procedures for catch limit determination.

14. Indonesia planned to assess catch limits based on the outputs of the catch estimation workshop. However, until the the catch limit is determined, various fishing effort controls can be introduced such as limitation of fishing area, limitation of fishing gear size, limitation of hooks, limitation of FADs, limitation of fishing vessels, moratorium, and establishment of marine protected areas (20 million ha). The presentation is attached as Annex 3.

Discussion

15. In addition to the need to refine elements in the plan, Indonesia raised the issue of monitoring and control of the significant number of fishing fleets, gears, fishermen and landing points in the country, and observed that it would require significant amount of time in convincing them to adopt the tuna management plan.

16. The Philippine fishing industry representative inquired whether the governments of other countries are providing any subsidy on oil price to their fishing industry. In response, Indonesia shared that they provide subsidies but for small scale fishers only, while Vietnam noted that it subsidized small scale fishers in 2008 when there was an economic crisis in the industry.

Philippines

17. The Philippine Tuna Management Plan was presented by Elaine Garvilles (Attachment 6). She detailed the main objective, specific objectives, principles and scope of application. The management measures and policy directions of the Philippines to ensure sustainable use of tuna resources are divided into i) management measures for tuna fisheries in 'Philippine waters', ii) effective control over Philippine flagged vessels fishing outside national jurisdiction and iii) trade of tuna products originating from the Philippines.

18. The presentation detailed the measures and policy directions for tuna fisheries in 'Philippine waters' which include i) Determination of catch limit based on best scientific evidence available; ii) Control of fishing effort and capacity through registration and licensing of fishing vessels, regulation on fishing gears, payao or fish aggregating device (FAD) management, regulation by fishing area and/or fishing season, protection of juvenile fish and management of associated species (bycatch); iii) Integrated monitoring, control and surveillance which include logbook system, regulation on transshipment at sea, national fisheries observer program, vessel monitoring system (VMS); iv) Port state measures and v) Regulate fishing in navigational areas and around data buoys.

19. Philippine challenges in implementing this plan include: i) increasing pressure to comply with obligations under international fisheries laws and measures adopted by regional fisheries management organizations, ii) pressure to apply compatible measures in areas under national jurisdiction, iii) keeping in step with recent and continuous developments, iv) increasing trade restrictions or regulations that impact on trade, v) raising the awareness of all sectors of the tuna industry, vi) increased cooperation with fishing industry and local governments, vii) ensuring that national laws and regulations are supported or enabled by adequate local regulations and viii) monitoring the level of implementation of the tuna management plan.

Discussion

20. In response to a questions on how the country is limiting its fishing effort, Philippines informed the meeting that since 2005, they did not increase the number of fishing vessels for tuna (moratorium) and that a Fisheries Administrative Order (FAO) has been enacted in 2009, which mandated certain changes in the fishing gear (mesh size, net depth for purse seiners). In addition, an FAO on the limitation of the numbers of FADs per catcher boat was also imposed.

21. On an inquiry about port state measures, it was noted that the catch documentation scheme in the Philippines requiring vessels to submit logsheets upon unloading in port, that will be verified by the fisheries inspectors, and requiring them to secure catch certificate, is in place. It was also noted that there is no law that applies a catch limit in the Philippines, though the country is adopting measures to reduce vessel numbers and effort compatible with WCPFC CMMs.

Vietnam

22. Mr. Vu Duyen Hai presented the national tuna management plan (NTMP) of Vietnam (Attachment 7). The main issues for managing tuna resources and tuna fisheries in Vietnamese EEZ have been illustrated. He also presented main principles for making the NTMP that should be compatible with the international agreements and domestic regulations, and provided the goal and main objective of the plan. The scope of the plan was also defined clearly.

23. Based on the current background, there are four main groups of conservation and management measures: 1) enhancing the legal regulations and institutional frameworks for managing tuna fisheries in Vietnam, 2) establishing and facilitating the mechanism of the data collection and analysis system for tuna fisheries in Vietnam, 3) a combined set of the technical measures, the catch limitation and the fishing effort control was provided in the plan and their implementation schedules were also determined to manage tuna fisheries and conserve the tuna resources, and 4) the trading and marketing measures were also determined to manage tuna and tuna products originating from Vietnam. The presentation also illustrated some major challenges to approve and implement the NTMP in the Vietnamese context.

Discussion

24. The meeting was also informed that Vietnam is just on its first steps to develop a tuna management plan.
Vietnam acknowledged the support of WCPFC through the WPEA project, particularly the assistance in developing the plan. They also expressed optimism on the future implementation of the plan, with an endorsement by the Minister of Agriculture and Rural Development.

25. The need to cross check provincial and national data for stock assessment was also raised, and it is necessary to enhance the quality of existing data to eventually support a scientific-based tuna management plan.

AGENDA IV. NATIONAL LEVEL TUNA MANAGEMNT PLAN?

26. The discussion on the in-country-issues on the tuna management plan was started off with a presentation from Dr. Tony Lewis, WPEA consultant, on national tuna management plans in Pacific islands (PI), and the lessons learned with the formulation and implementation of plans (Attachment 8). Preparation of these plans started in 1998 and there are now 15 of these in various states of sophistication and adoption.

27. He presented features of a generic Pacific Island national tuna management plan which include components of the tuna fishery, management issues, mechanisms to ensure adherence/compliance to the plan, external assistance and industry involvement. He also raised the common issues such as non-adoption of the plan, structural weakness and failure to implement the plan.

He emphasized that in order for the plan to be effective, there is a need to establish clear objectives and mechanisms to ensure adherence to the plan. He also recommended separating development and management aspects in the plan, resist prescription from external providers, and initially include just a simple ecosystem approach to fisheries management (EAFM) component. The need to secure adequate financial resources was also raised as an important factor in ensuring that the plan is moved forward and implemented.

28. Dr. Lewis also presented some guidance on setting catch limits/sustainable harvest targets in National Tuna Management Plans (Attachment 9). He introduced the Maximum Sustainable Yield (MSY), issues with application of MSY along with its widely accepted use as a management goal, but pointed out its acknowledged weaknesses, with examples, and outlined some modern management approaches that are more structured and provide precautionary alternatives to MSY that are nonetheless consistent with legal requirements of the Convention. And other international legal instruments.

29. He also discussed, as a separate issue, prospects for a sub-regional approach invoking the success of the PNA (Parties to the Nauru Agreement) as an example. He then provided some thoughts on the possibility and advantages of a sub-regional approach to tuna management involving Philippines, Indonesia and Vietnam in the future.

Discussion:

30. After the presentation, it was agreed that though a sub-regional approach is workable in employing management measures like that of PNA, a lot of work is needed in achieving it considering that there is limited or no background at all of the WPEA participating countries in the required information and scientific capacity to come up with MSY or alternative approaches .

A. Consideration on the potential technical approaches to mange highly migratory fish stocks on a national level

31. Dr. Nygiel Armada provided a presentation on the potential EAFM technical approaches to manage highly migratory fish stocks on a national level (Attachment 10). The presentation started with the fisheries management approach in the Philippines, the current approach and how it evolved, particularly the process of adopting to the current governance system under the local government code.

32. He also presented the challenges to resource management when local governments control the municipal waters while Bureau of Fisheries and Aquatic Resources (BFAR) controls the national waters. The necessity to have a convergence between the stock distribution and management scales was explained through examples.

33. The key message is the use of effort (input) control as the most practical fisheries control applicable in the Philippines, particularly for stocks shared by various local governments as well as BFAR. Effort control was also useful in allocating fishing efforts among players including commercial fisheries through the use of ecosystem modeling.

34. Finally, the presentation also showed how ecosystem models could provide a basis for effort control, particularly where size groups of important fish stocks like the migratory pelagic species are often spatially segregated. This is very relevant in the Philippines because there are practically different sectors targeting different size groups with the larger-sized groups caught primarily by commercial fishing boats while the small-sized groups largely caught by the municipal or small-scale fishermen.

Discussion

35. After the presentation, the following issues were raised:

- EAFM may not be easily employed in developing countries due to its high data input requirement;

- Practical application of EAFM may involve segregation of the size groups, to see who is catching the larger and smaller ones and to employ policy measures on the matter;
- There may be a difficulty in applying the EAFM approach in oceanic species/tuna management plan due to lack of background of the countries on the matter, as well as limited exposure and capacities, as well the open nature of their ecosystems;
- At the national level, it is better to look into input controls, but on the regional level, top down (output) control may be more acceptable;
- Consider how to incorporate fishing effort limits in the management plan; and
- It is not necessary to come up with specific activity in the soonest time, but at least improve the countries' capacity on how to develop and understand catch/effort limits.

B. Requirements for National-Level Tuna Management

In-Country Strategies towards setting effort limit

36. As a general issue, it was agreed that at the national level, management objectives based on effort limits was probably the best approach. As a next step, the group was therefore tasked to discuss among their country representatives the key steps on how to proceed and setting effort limits in their tuna management plan. Results of the discussions were then reported to the plenary.

Philippines

37. For the Philippines, Atty. Tabios presented Philippine initiatives towards limiting catch in their tuna management plan (Attachment 11). He informed the meeting that Philippines is straightforward in setting effort limit and that Philippines has recognized the MSY-based fishery indicators by the WCPFC and is also implementing precautionary approach to ensure that management measures are compatible with the CMMs. He shared that the objective in setting the limit is to ensure that fishing effort does not exceed the level that produces sustainable catch.

38. He added that in controlling the fishing effort and capacity of the country, Philippines has issued a moratorium on the issuance of commercial fishing vessel licenses since 2003, and that policies and technical measures have been adopted to prevent the increase in fishing mortality of tuna. He concluded that certain issues needs to be put in place, reviewed and updated.

39. The following discussions were raised after the presentation:
- The formulation of the Philippine tuna management plan has been a long process and has been revised and updated since its initial formulation in 2004;
- A no-take zone system is in place in the country to make way towards achieving MSY;
- To control catch limit, it was informed that input method is enforced as a precautionary approach, and that Philippines has not yet reached the point where catch exceeded the sustainable limits, and that sanctions and penalties were identified in view of violations;
- There is a need to set concrete timelines in the objectives of the management plan; and
- Evaluation and monitoring of tuna stocks is done regularly through the fisheries statistics data gathering, and that catches were observed to be declining in the recent years due to in-country initiatives in reducing fishing effort.

Indonesia

40. For Indonesia, Mr. Tampubolon discussed measures to control fishing effort of their country such as limitation of fishing area, fishing gear size, and hooks. Limitation of FADs per boat, deployment areas and distance are also employed. In addition, limitation of fishing vessels,

moratorium and establishment of marine protected area (MPA) within their archipelagic waters were also mentioned.

41. The following matters were discussed after the presentation:

- As a catch limit has not yet been identified, Indonesia shall proceed with the control mechanism and approaches that they have identified;
- There is a challenge in imposing conservation management measures while ensuring the livelihood of the small scale fisherman;
- There is a need to come up with a roadmap on how to achieve the plan;
- There is a need to revisit the timeframe for moratorium, limitation on hooks and imposing a close season in tuna fishing; and
- Many activities have been implemented in Indonesia in line with the WCPFC conservation measures, though these are still reported only in Bahasa and not generally available.

42. For Vietnam, Mr. Pham Viet Anh presented the approach to the setting of fishing effort using the Schaefer model. He detailed the data needed to come up with the MSY, as well as recognizing the shortcomings in using the model. After the presentation, the following comments were made:

- The model will serve as a good starting point for getting the catch limit and that available data in the past surveys done may be used; current available data are however inadequate to determine MSY with any certainty;
- Standardized effort data must be used as a measure of efficiency in the purse seine fishery and it is is different to that of longline fishery; and
- Relevant member countries in the sub-region may conduct a collaborative study to come-up with a sub-regional level MSY, as basis for management of the shared tuna stocks.

Key Lessons Learned

43. Drawing on the presentation on PI NTMPs made by Dr. Tony Lewis, Atty. Tabios facilitated the discussion, revisiting lessons from the Pacific Islands on things to consider in coming up with and implementing a national tuna management plan.

44. Aside from the lessons learned as enumerated, the group highlighted the following points:

- Look into the life cycle of the species in coming up with the plan in order to consider the spawning area of the fishes, although these are rarely limited in tropical tunas;
- Objectives and the action plan must be coherent and have to be linked with the general management plan of the nation and the fishery sector
- Industry participation and government structure must be clearly defined and the private sector must be consulted regularly on the plan formulation and implementation;
- Acceptance of the plan by the stakeholders will be faster if they know that they are already/partially involved in the plan and have some ownership of the plan
- Management plans need to be regularly reviewed and revised as the fishery and regulatory environment changes, so as to avoid decay
- Management is a way to achieve development, and that the development aspect can be part of the management plan.

Approaches to Calculate Catch Limits

45. Dr. Lewis reiterated the approaches that are aligned with MSY in coming up with, for example, a WCPFC provisional limit reference point (Attachment 14). He gave examples of how

PNA was able to estimate TAC and then TAE, based on biomass distribution and historical fishing effort . He also discussed the elements in the calculation which includes: 1) proportion of each model region covered by PNA EEZs; 2) MSY for each region of which the PNA EEZ is calculated; and 3) TAE that will produce the TAC is calculated given the PNA catch rate.

46. The group then discussed and further clarified how the PNA vessel day is derived, and that countries may take from the available data they have to come up with an MSY and then TAE.

47. The preliminary results of the recent study by Keith Bigelow entitled Relative Abundance of Tuna Stocks in the Sulawesi Sea (Region 12) and Estimating MSY was then presented by Atty. Benjamin Tabios, as an example of an approach at national or ecosystem level.

48. In his presentation he detailed the Philippine tuna catch history for the three sectors namely: handline, purse seine and ring net. He also discussed the statistical analysis of the three sectors to estimate the relative abundance (standardized CPUE) and to estimate the Maximum Sustainable Yield for the Sulawesi Sea (Region 12).

49. After the presentation, Vietnam suggested to come-up with a manual or guideline/s that states the criteria on what model is applicable for countries, and will raised the possibility of having the said initiative funded in the next phase of the WPEA project.

Basic EAFM

50. To give further consideration to the EAFM approach, Dr. Nygiel Armada presented the basic concepts, principles and relevant information needed for the Ecosystem Approach to Fisheries Management (Attachment 16). He outlined the advantages of EAFM particularly in addressing the ecosystem issues as well as those of human and ecological well-being.

51. He also emphasized the need to develop a governance system at the local level and to make partners realize that EAFM is not a new approach. He also compared EAFM to ICM, such that the latter deals with sectors to develop coastal areas, while EAFM focus on certain sector (fisheries), while others are considered peripheral.

52. After presentation, the following issues were raised:

- Approaches used varied on a case by case basis, but had to start at the local level;
- Adoption of EAFM by the Commission (and elsewhere) is on a voluntary basis, although conservation and measures for fisheries management generally increasingly call for an holistic EAFM approach; and
- With the migratory nature of tuna, Vietnam raised the difficulty in determining the boundary of the ecosystem, and this may be incorporated in the next phase of the project.

AGENDA V. REQUIREMENTS FOR NATIONAL LEVEL TUNA MANAGEMENT

53. As discussed, the following activities were identified to be funded under the Phase 2 of the WPEA OFM Project:

- Creation of regional database in the three countries;
- Development/ refinement of the National Tuna Management Plan; and

- Investigation of the EAFM approach to tuna management and collecting data as required

C. Closing Remarks

54. In closing the workshop, WPEA Project Manager, thanked the countries for their inputs and contribution, and for actively participating in the discussion during the workshop.

55. Nygiel Armada thanked the organizers for the opportunity to be part of this workshop, and sharing his views and knowledge on Ecosystem Approach to Fisheries Management (EAFM).

56. Tony Lewis noted that he was well pleased with the positive outcomes of the workshop, as he initially had some doubts that much could be achieved. He noted that Philippines was very well advanced in the process of formulating and implementing its NTMP, and provides a good example of what can be achieved, whilst Indonesia and Vietnam had made great strides in thinking about the content and practicalities of developing and applying an NTMP in quite complex situations and with less information than would ideally be needed to support a science-based plan. He also noted that the workshop has identified some key areas for further work at national and sub-regional level in tuna resource management, especially the agreement that input measures at national and sub-regional level may be the most appropriate measure to frame management objectives.

57. Indonesia thanked the WCPFC and the WPEA project for the conducting the workshop, and appreciated the learnings they had from the experts and the member countries. They also thanked the Philippine government for the arrangements and hospitality. Indonesia looked forward to develop the National Tuna Management Plan.

58. Vietnam thanked WCPFC and the organizers of the workshop for the kindness accorded to them and acknowledged the experts who provided them the guidance and better understanding on how to develop their management plan. Lastly, they look forward to continue working towards the development of their tuna management plan until the next phase of the project.

59. Philippines expressed their gratitude to WCPFC, especially Dr. Soh, for the assistance in the tuna fisheries of the country, through the implementation of the WPEA project. The useful participation and contribution of the other participants (Indonesia, Vietnam) were also acknowledged.

Attachment 1. List of participants

Name	Position	Agency/Office
1. Dr. Sungkwon Soh	WPEA Project Manager	WCPFC
2. Atty. Jay Batongbacal	WPEA Project Consultant	University Of the Philippines
3. Prof. Nygiel Armada	WPEA Project Consultant	USAID
4. Dr. Antony Lewis	WPEA Project Consultant	
Vietnam		
5. Mr. Pham Trong Yen	Deputy Director General	Science & Technology and International Cooperation Department
6. Mr. Le Tran Nguyen Hung	Head of Division	DECAFIREP
7. Mr. Vu Duyen Hai	Head of Division	MARD
8. Mr. Pham Viet Anh	National Tuna Coordinator	DECAFIREP
9. Mr. Nguyen Quoc Anh	Director of VMS Center	DECAFIREP
Indonesia		
10. Mrs. Erni Widjajanti	Deputy Director	DGCF
11. Mrs. Putuh Suadela	Staff	DGCF
12. Mr. Saut Tampubolon	Assistant Deputy Director	DGCF
13. Mr. Agustinus Anung Widodo	Research Scientist	RCFMC
Philippines		
14. Atty. Benjamin Tabios	Asst. Director for Admin. Services	BFAR
15. Mr. Melchor Tayamen	Interim Exec. Director	NFRDI
16. Mr. Samuel Resma	Manager, Dept. of Business Affairs	RD Fishing Corp.
17. Mr. Angel Buan	Executive Secretary	Alliance of Philippine Fishing Federations, Inc. (APFFI)
18. Ms. Rosanna Bernadette Contreras	Exec. Director	Socsksargen Federation of Fishing and Allied Industries, Inc. (SFFAII)
19. Dr. Alma Dickson	Chief, NMFDC	BFAR
20. Mr. Rafael Ramiscal	Chief, Scientist M/V DA-BFAR	BFAR
21. Mr. Peter Eric Cadapan	Regulatory Officer	BFAR
22. Ms. Sarah Bales		DA-NAFC
23. Ms. Virginia Viloria	Chief, Fisheries Statistics Division	BAS
24. Ms. Estella De Ocampo	Chief, Municipal Fisheries Statistics Section	BAS
25. Mrs. Cynthia Vallesteros	Chief, Commercial Fisheries Statistics Section	BAS
26. Engr. Miguel Lamberte	Operations Manager	PFDA
27. RD Ambutong Pautong	Regional Director	BFAR 12
28. Ms. Eunice Gasmin	Research & Admin. Assistant	NFRDI
29. Ms. Suzette Barcoma	Aquaculturist I	NFRDI
30. Mr. Desiderio Ayanan, Jr.	Research Assistant	NFRDI
31. Ms. Elaine Garvilles	Aquaculturist I/Asst. National Tuna Coordinator	NFRDI

List of Attachments

1. List of Participants
2. International Arrangements in Managing HMFS and Coastal State Obligations for National Tuna Management
3. Table of General Coastal/Fishing State Obligations for Management of Tuna and Other HMFS
4. Stock Assessment in WCPFC
5. National Tuna Management Plan – Indonesia
6. National Tuna Management Plan –Philippines
7. National Tuna Management Plan – Vietnam
8. National tuna management plans in Pacific Islands Lessons learned in plan formulation and implementation
9. Guidance on setting catch limits/sustainable harvest targets in National Tuna Management Plans
10. Potential approaches in managing highly migratory fish stocks on a national level
11. Country initiatives on Limiting Fishing Effort – Philippines
12. Country initiatives on Limiting Fishing Effort – Indonesia
13. Country initiatives on Limiting Fishing Effort – Vietnam
14. PNA longline VDS – Bigeye MSY and its utility for conservation limits
15. Relative abundance of tuna stocks in the Sulawesi Sea (Region 12) and estimating MSY
16. Basic EAFM

Attachment 1

List of participants

Name	Position	Agency/Office
1. SungKwon Soh	WPEA Project Manager	WCPFC
2. Jay Batongbacal	WPEA Project Consultant	University Of the Philippines
3. Nygiel Armada	WPEA Project Consultant	USAID
4. Antony Lewis	WPEA Project Consultant	WCPFC
Vietnam		
5. Mr. Pham Trong Yen	Deputy Director General	Science & Technology and International Cooperation Department, Ministry of Agricultural and Rural Development (MARD)
6. Mr. Le Trann Nguyen Hung	Head of Division	DECAFIREP, MARD
7. Mr. Vu Duyen Hai	Head of Division	MARD
8. Mr. Pham Viet Anh	National Tuna Coordinator	DECAFIREP, MARD
9. Mr. Nguyen Qouc Anh	Director of VMS Center	DECAFIREP, MARD
Indonesia		
10. Mrs. Erni Widjajanti	Deputy Director	DFRM, DGCF, Ministry of Marine Affairs and Fisheries (MMAF)
11. Mrs. Putuh Suadela	Staff	DGCF, MMAF
12. Mr. Saut Tampubdon	Assistant Deputy Director	DGCF, MMAF
13. Mr. Agustinus Anung Widodo	Research Scientist	Research Centre for Fisheries Management and Conservation, MMAF
Philippines		
14. Atty. Benjamin Tabios	Asst. Director for Admin. Services	Bureau of Fisheries Aquatic resources (BFAR), Department of Agriculture (DA)
15. Melchor Tayamen	Interim Exec. Director	NFRDI/BFAR, DA
16. Samuel Resma		RD Fishing Corp.
17. Angel Buan		Alliance of Philippine Fishing Federations, Inc. (APFFI)
18. Rosanna Bernadette Contreras	Exec. Director	Socsksargen Federation of Fishing and Allied Industries, Inc. (SFFAII)
19. Dr. Alma Dickson	Chief, NMFDC	BFAR
20. Rafael Ramiscal	Chief, Scientist M/V DA-BFAR	BFAR
21. Peter Eric Cadapan	Regulatory Officer	BFAR
22. Sarah Bales		National Agricultural and Fishery Council, DA
23. Virginia Viloria	Chief, Fisheries Statistics Division	Bureau of Agricultural Statistics (BAS), DA
24. Estella De Ocampo	Chief, Municipal Fisheries Statistics Section	BAS
25. Cynthia Vallesteros	Chief, Commercial Fisheries	BAS

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30. Desiderio Ayanan, Jr.	Research Assistant	NFRDI/BFAR
31. Elaine Garvilles	Aquaculturist I/Asst. National Tuna Coordinator	NFRDI/BFAR

West Pacific East Asia Oceanic Fisheries Management Project

International Arrangements in Managing HMFS and Coastal State Obligations for National Tuna Management

Prof. dr. Jay L. Batongbacal
Assistant Professor
University of the Philippines College of Law

Overview of Presentation

- **Regulatory Interventions: Tuna Management**
- **UN Convention on the Law of the Sea**
- **UN Fish Stocks Agreement**
- **WCPFC Convention**
- **WCPFC Conservation and Management Measures (CMMs)**
- **Conclusion**

Regulatory Interventions

- **Coastal State regulations available may be classified according to the object of regulation:**
  - Sea-based
    - *Catchers (fishing vessel activities)*
    - *Logistics*
    - *Transporters (cargo carriers activities)*
  - Land-based
    - *Ports*
    - *Processing*
    - *Distribution*
    - *Consumption*

Regulatory Interventions

- **Regulation of fishing activities for HMFS**
  - Primarily through Flag State responsibilities
    - *Control over flag fishing vessels (FFV)*
    - *Qualifications/standards for fishing operations by its FFV*
  - By regional fisheries management organizations (RFMOs)

UN Convention on the Law of the Sea

- **Comprehensive convention on the oceans**
- **Some provisions concern HMS fisheries management**
  - Exclusive economic zone (EEZ)
  - Straddling fish stocks & highly migratory fish stocks (SS/HMS)
  - High seas

Overview of Presentation

- **UNCLOS**
- **UNFSA**
- **WCPFC Convention/Regime**
- **CMM Regime**

UN Convention on the Law of the Sea

- **Comprehensive convention on the oceans**
- **Some provisions concern HMS fisheries management**
  - Exclusive economic zone (EEZ)
  - Straddling fish stocks & highly migratory fish stocks (SS/HMS)
  - High seas

UN Convention on the Law of the Sea

- **Coastal State duties/obligations in the EEZ (1)**
  - Determine TAC of living resources in EEZ (61.1)
  - Ensure proper conservation and management measures, prevent over-exploitation (61.2)
  - Cooperate with competent international organization (61.3)

UN Convention on the Law of the Sea

- **Coastal State duties/obligations in the EEZ (2)**
  - Consider effects on species associated with/dependent on harvested species (61.4)
  - Contribute and exchange scientific info, catch and fishing effort stats, other data through competent international organization (61.5)

UN Convention on the Law of the Sea

- **Coastal State duties/obligations in the EEZ (3)**
  - Determine capacity to harvest living resources, give other States access to surplus, if any (62.2)
  - Give due notice of conservation and management laws/regulations (62.5)

UN Convention on the Law of the Sea

- **User State duties/obligations in the EEZ**
  - Due regard for coastal State, compliance with laws/regulations of the coastal State adopted in accordance with Conv and other rules of IL (58.3)
  - Nationals shall comply with conservation measures and other terms and conditions est. by laws/regulations (64.4)

UN Convention on the Law of the Sea

- **Duty in case fish stock/s occur in EEZ of two or more coastal States**
  - Seek to agree upon measures to coordinate/enable conservation and development of such stocks (63.1)
- **Duty in case fish stock/s occur in EEZ and high seas**
  - Seek to agree upon measures necessary for conservation of stocks in the adjacent [high seas] area (63.2)

UN Convention on the Law of the Sea

- **In case coastal States fish for HMFS**
  - Cooperate directly or through appropriate international organizations (64)
    - *To ensure conservation and promote optimum utilization of such species throughout the region, both within and outside the EEZ*
    - *If no organization, cooperate to establish one*

UN Convention on the Law of the Sea

- **Conservation and management of living resources in the high seas**
  - Duty to take/cooperate with other States in taking, measures for their respective nationals as necessary for conservation of living resources of the HS (117)
  - Duty to cooperate with each other in conservation/management of living resources of areas of the high seas (118)
    - *Enter into negotiations for the taking of such measures*
    - *Cooperate to establish subregional or regional fisheries mngt organizations*

UN Convention on the Law of the Sea

- Take measures designed to maintain/restore population of harvested species at MSY (119)
- Regularly contribute/exchange information/data relevant to conservation (119.2)
- Ensure measures do not discriminate in form/fact against fishermen of any State (119.3)

UN Fish Stocks Agreement

- **Intended to implement UNCLOS provisions on SS/HMS, especially those on cooperation through "appropriate international organizations"**
- **Obligates States to pursue cooperation to ensure conservation/management of SS/HMS**
- **RFMOs pivotal and central to scheme**
- **Directly led to WCPFC**

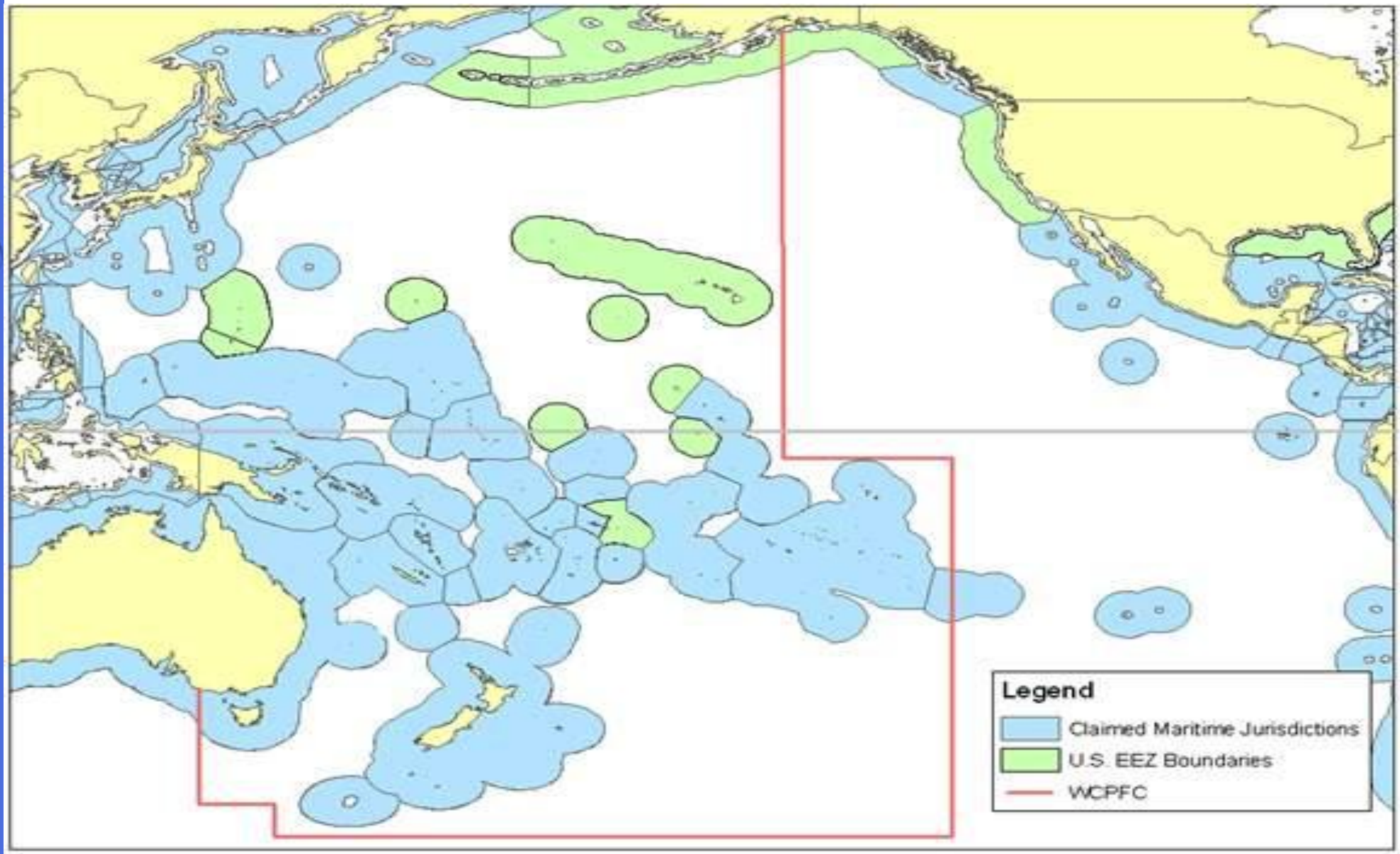
WCPFC Regime

- **Objective: long-term sustainable use of HMS**

- **Guiding Principles**
  - Science-based management (Conv approach)
  - Precautionary approach (C6)
  - Compatibility of measures across Convention Area (CA) -->natl waters to high seas (C8-9)
  - Consider disadvantaged groups (artisanal/small-scale fishers [5g], SIDS/PTs [C30.1])
  - Good faith and no abuse of rights (C33)

Convention Area

EEZs in the Convention Area



WCPFC Regime

- **General Obligations**
  - Promptly implement/enforce Convention and CMMs (C23.1)
  - Provide needed information for management (C23.2)
    - *Fish stocks, fishing activities, implementation of CMMs*
  - Feedback
    - *Measures to regulate HMFS in jurisdictional waters (C23.3)*
    - *Measures to regulate HS fishing activities (C23.4)*

WCPFC Regime

- **Compliance & Enforcement Obligations**
  - Boarding and Inspection – ensure acceptance by FFVs (C26.3, CMM 06-08)
  - Investigation
    - *Fully investigate reported violations by FFV (C25.2)*
    - *Fully investigate reported unauthorized fishing in jurisdictional waters (C25.6)*
  - Call attention of flag State/Comm to activity possibly undermining CMM (C25.10)

WCPFC Regime

- **Punishment**
  - Ensure FFV guilty of serious violations ceases fishing, and does not resume until all sanctions complied with (C25.4)
- **Reporting**
  - Annual statement of compliance measures, including sanctions meted out (C25.8)

WCPFC Regime

- **Flag State Obligations re. FFVs (1)**
  - Ensure FFV comply with Conv and CMMs (C24.1)
  - Ensure FFV do not conduct unauthorized fishing in other States' waters (C24.2)
  - Allow fishing only where it is capable of exercising responsibilities over the vessel (C24.3)

WCPFC Regime

- **Other Flag State Obligations re. FFVs (2)**
  - Require FFV to use satellite transponders (C24.8, C24.9)
  - Authorize fishing only under conditions of compliance with other States' regulations, or Convention Annex III (C24.3)

WCPFC Regime

- **Prevent undermining Conv/CMMs**
  - Ensure FFV do not undermine effectiveness of CMMs (C24.1)
  - Ensure compatible national and high seas VMS (C24.10)
- **Record and inform Comm**
  - Maintain complete/updated record of FFVs authorized to fish in CA (C24.4)
  - Annually provide info on each FFV authorized to fish in CA (C24.5)

WCPFC Regime

- **Port State Obligations**
  - Take measures to promote effectiveness of CMMs (C27.1)
- **Cooperating Non-Members – must also commit to same obligations as Members**

CMM Regime

- **Rapid evolution in years since entry into force in 2004**
- **Combination of measures/approaches; a "to do" list of over 200 Member State obligations**
- **WCP quickly becoming most highly regulated; multiple & complicated rules, mainly on:**
  - Fishing vessel registration
  - Operational regulations
  - Species-specific restrictions

CMM Regime

- **FFV Regulations (1)**
  - Marking & identification (CMM 04-03)
  - Records & authorization (CMM 09-01)
  - Comm VMS (CMM 07-01, 11-02)
  - “Blacklisting” (CMM 07-03)

CMM Regime

- **Vessel Regulations (2)**
  - Charter notification (CMM 09-08, 11-05)
  - Vessels without nationality (CMM 09-09)
  - Special rules for purse seine vessels (CMM 09-10)
  - IUU Vessel List (CMM 10-06)

CMM Regime

- **Fishing Operation Regulations (1)**
  - Transhipment restrictions (C29; CMM 09-06*)
  - Gear restrictions
    - *Large scale driftnet ban (CMM 07-04)*
    - *FAD closure (CMM 09-02)*
  - Time/area closures (scattered)
    - *e.g. no fishing around data buoys (CMM 09-05)*

CMM Regime

- **Fishing Operation Regulations (2)**
  - Mitigation measures
    - *Catch retention rules (CMM 09-02)*
    - *Seabirds (CMM 07-04)*
    - *Sea Turtles (CMM 08-03)*
  - Compliance Monitoring Scheme (CMM 10-03, 11-06)
    - *Annual evaluation of compliance with Conv and CMMs*
    - *Reporting requirements*

CMM Regime

- **Species-specific Regulations**
  - SP Albacore (CMM 05-02, 10-05)
  - NP Albacore (CMM 05-03)
  - SW Striped Marlin (CMM 06-04)
  - Yellowfin Tuna (CMM 08-01)
  - Swordfish (CMM 09-03)
  - Sharks (CMM 09-04, 10-07, 11-04)
  - Pacific Bluefin Tuna (CMM 09-07, 10-04)
  - N Pacific Striped Marlin (CMM 10-01)
  - Cetaceans (protection from purse seining) (CMM 11-03)

CMM Regime

- **Special Area Management**
  - Eastern High-seas Pocket (CMM 10-02)
  - VDS (CMM 08-01, 11-01)

CMM Regime

- **Cooperating Non-Members**
  - CNM status may be requested by non-members (CMM 09-11)
  - CNM must expressly commit to:
    - *cooperate fully with CMMs*
    - *accept boarding & inspections*
    - *provide full data/info*
    - *make financial contributions*

Conclusion

- **Need to inventory all current laws/regulations for FFVs operating in EEZ/HS areas**
  - Identify those relevant to State obligations above, classify
- **Enact measures for obligations not yet addressed**
  - FFV regulations
  - Fishing operations
  - Species-specific, area-based regulations

Conclusion

- **National tuna management**
  - Necessary in case of
    - *Occurrence of straddling fish stocks, highly migratory fish stocks*
    - *Fishing for such stocks, especially in WCPFC*
  - Goals
    - *Control own fishing effort to conform with requirements of conservation/management*
    - *Ensure compatibility between measures in own EEZ and adjacent EEZ/HS areas*
      - *In own EEZ: coastal State fishing laws/regulations*
      - *Beyond own EEZ: through RFMO*

Attachment 03

TABLE OF GENERAL COASTAL/FISHING STATE OBLIGATIONS FOR MANAGEMENT OF TUNA AND OTHER HMFS	
Convention/CMM	**Coastal Fishing State Law/Regulation**
UN Convention on the Law of the Sea	
General Obligations	
Determine TAC of living resources in EEZ (61.1)	
Ensure proper conservation and management measures (CMM) to prevent over-exploitation (61.2)	
Cooperate with competent international organization (61. 3)	
For the EEZ	
Consider effects on species associated with/dependent on harvested species (61,4)	
Contribute/exchange scientific information, catch and fishing effort statistics, other data through competent int'l org (61.5)	
Determine capacity of harvest living resources, and give other States access to the surplus, if any (62.2)	
Give due notice of conservation and management laws/regulations (62.5)	
For Straddling Fish Stocks	
Seek to agree upon measures to coordinate/enable conservation and development of SFS (63.1)	
For Highly Migratory Fish Stocks	
Seek to agree upon measures necessary for conservation of stocks in the adjacent [high seas] areas (63.2)	
Cooperate directly/through appropriate int'l organizations to ensure conservation/promote optimum utilization of HMFS throughout the region within and outside the EEZ (64)	
For the High Seas	
Take/cooperate to take measures for their respective nationals for conservation of the living resources of the high seas (117)	
Cooperate with each other in conservation/management of living resources of areas of the high seas (118)	
Take measures designed to maintain/restore population of harvested species at MSY (119.1)	
Regularly contribute/exchange information/data relevant to conservation/management (119.2)	

Ensure meaures do not discriminate in form/fact against fishermen of any State (119.3)	
WCPFC Convention	
General Obligations of All States	
Promptly implement/enforce Conv/CMM (23.1)	
Provide needed info for management (23.2)	
Feedback measures to regulate HMFS in own jurisdiction (23.3)	
Feedback measures to regulate high seas fishing activities (23.4)	
Fishing State: Compliance and Enforcement Obligations	
Ensure acceptance of boarding and inspection by FFVs (26.3, 06-08)	
Fully investigate reported violations by FFVs (25.2)	
Fully investigate reported unauthorized fishing in jurisdictional waters (25.6)	
Call attention of flag State or Commission to activity possibly undermining CMMs (25.10)	
Fishing State: Punishment of violations of CMM	
Ensure that FFV guilty of serious violations ceases fishing and does not resume until all sanctions complied with (25.4)	
Fishing State: Reporting	
Annual statement of compliance measures, including sanctions meted out to violators (25.8)	
Fishing State Specific Obligations re its flag fishing vessels (FFV)	
Ensure FFV comply with Convention/CMMs (24.1)	
Ensure FFV do not conduct unauthorized fishing in other States' waters (24.2)	
Allow fishing only in areas where it is capable of exercising responsibilities over the FFV (24.3)	
Require FFV to use satellite transponders (24.8, 24.9)	
Authorise fishing only under conditions of compliance with other States' regulations, or Convention Annex III (24.3)	
Ensure FFV do not undermine effectiveness of CMMs (24.1)	
Ensure compatible national and high seas VMS (24.10)	
Maintain complete/update record of FFVs authorized to fish in Convention Area (24.4)	
Annually provide info on each FFV authorized to fish in CA (24.5)	
Port State Obligations	

Take measures to promote effectivenss of CMMs (27.1)	
Commission CMMs	
FFV Regulations	
Marking and identification requirements (04-03)	
Records and authorization requirements (09-01)	
Commission VMS compliance (07-01, 11-02)	
“Blacklisting” (07-03)	
Charter notification (09-08, 11-05)	
Act on FFV without nationality (09-09)	
Special rules for purse seine vessels (09-10)	
IUU Vessel List (10-06)	
Fishing Operation Regulations	
Transshipment restriction (29, 09-06)	
Large-scale driftnet ban (07-04)	
FAD closure (09-02)	
Closure of specific areas/for specific times (e.g., 09-05)	
Catch retention rules (09-02)	
Mitigation measures for seabirds (07-04)	
Mitigation measures for sea turtles (08-03)	
Compliance monitoring scheme requirements (10-03, 11-06)	
Special Area Management	
Eastern high-seas pocket (10-02)	
VDS (08-11, 11-01)	
Regulations for specific species	
South Pacific albacore (05-02, 10-05)	
North Pacific albacore (05-03)	
Southwest striped marlin (06-04)	
Yellowfin tuna (08-01)	
Swordfish (09-03)	
Sharks (09-04, 10-07, 11-04)	
North Pacific striped marlin (10-01)	
Pacific bluefin tuna (09-07, 10-04)	
Cetaceans (for purse seiners) (11-03)	

WPEA-OFM PROJECT

WORKSHOP ON TUNA FISHERIES MANAGEMENT ON A NATIONAL LEVEL

Palawan, Philippines
29-31 October 2012

INTRODUCTION OF REGIONAL TUNA ASSESSMENT OF WCPFC

Presented by Pham Viet Anh

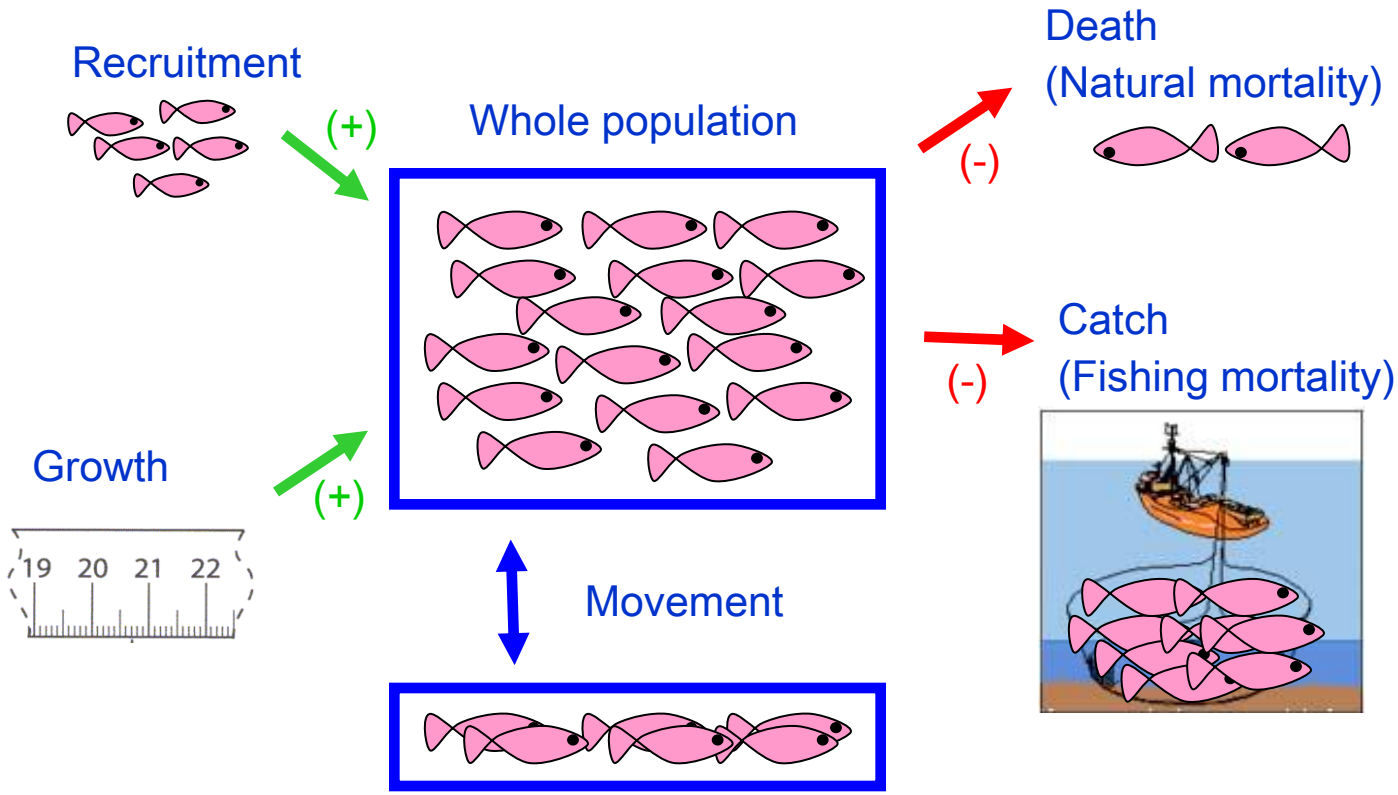
DECAFIREP, VIETNAM

Introduction

- Stock assessment is a multi-step process that starts with management questions, and includes processes involved in data collection, model selection, stock assessment modeling, and subsequent advice to decision makers
- A stock assessment model provides a mathematical simplification of a very complex system (fish and fishery), to help us estimate population changes over time in response to fishing
- Science of the stock assessments is to help we understand the impacts on catch, effort, catch rates, sizes of fish caught, now and in the long term…

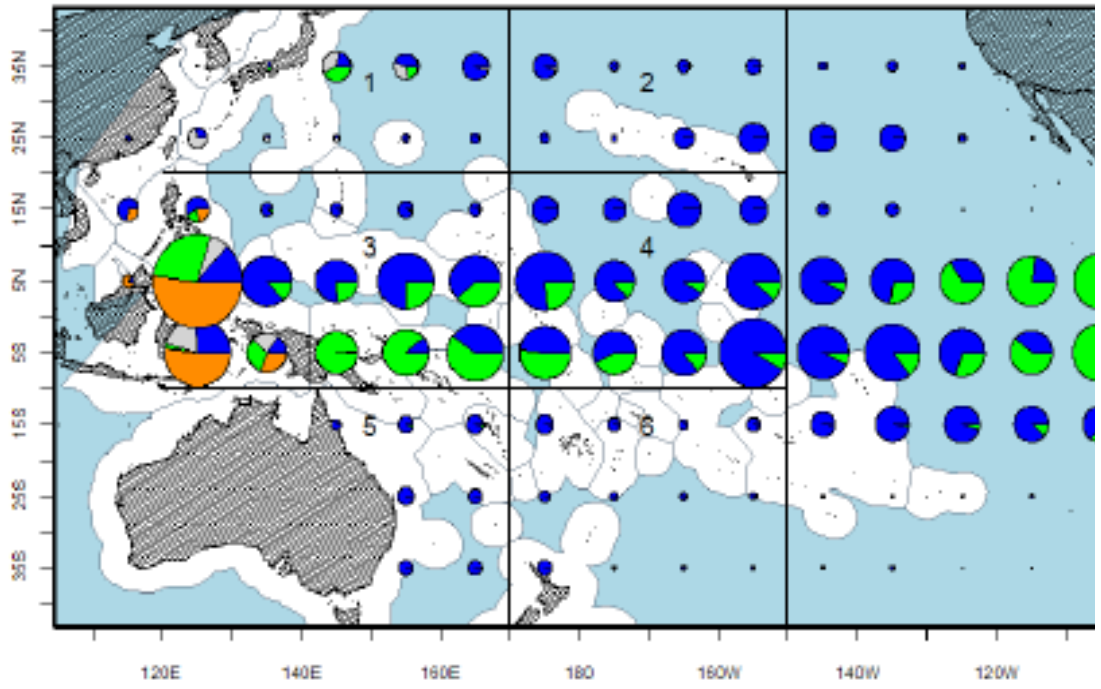
General conceptual model

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



WCPFC's stock assessment

1. Where is tuna fisheries located?
2. How much catch is taken in that region



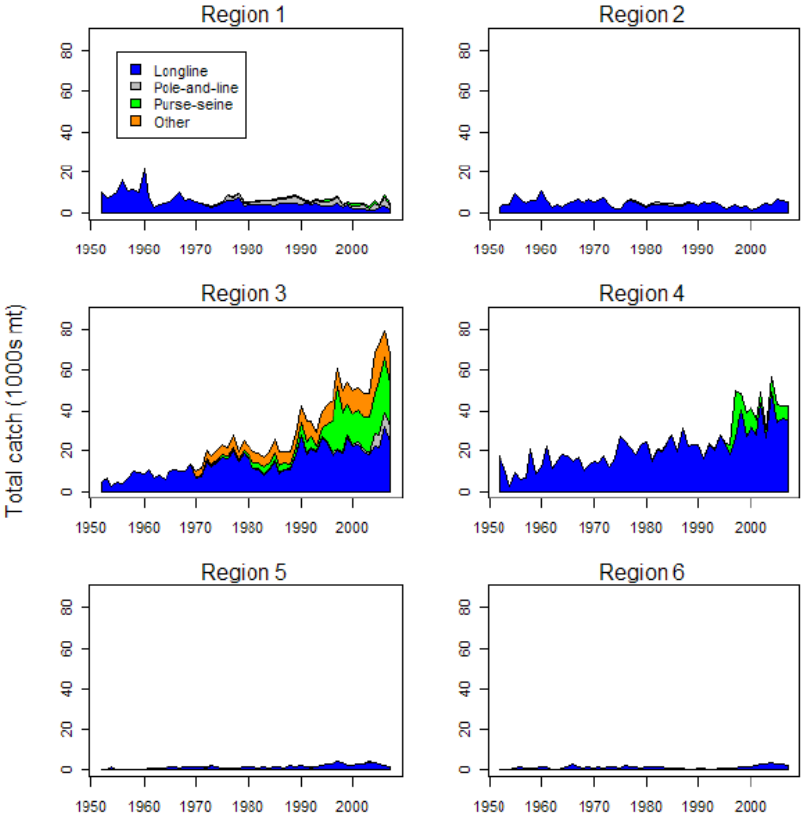


Figure 4. Total annual catch (1000s mt) of bigeye tuna by fishing method and MFCL region from 1952 to 20

Data needed for WCPFC's stock assessments

1. Recruitment: Length-frequency data, environmental predictors where these exist

2. Growth: Otoliths, length- and weight-frequency data, mark-recapture ("tagging") data

3. Fishing mortality: Logsheets and landings data → standardized catch-per-unit-effort (CPUE) abundance indices

4. Natural mortality: Mark-recapture data

5. Movement: Mark-recapture data

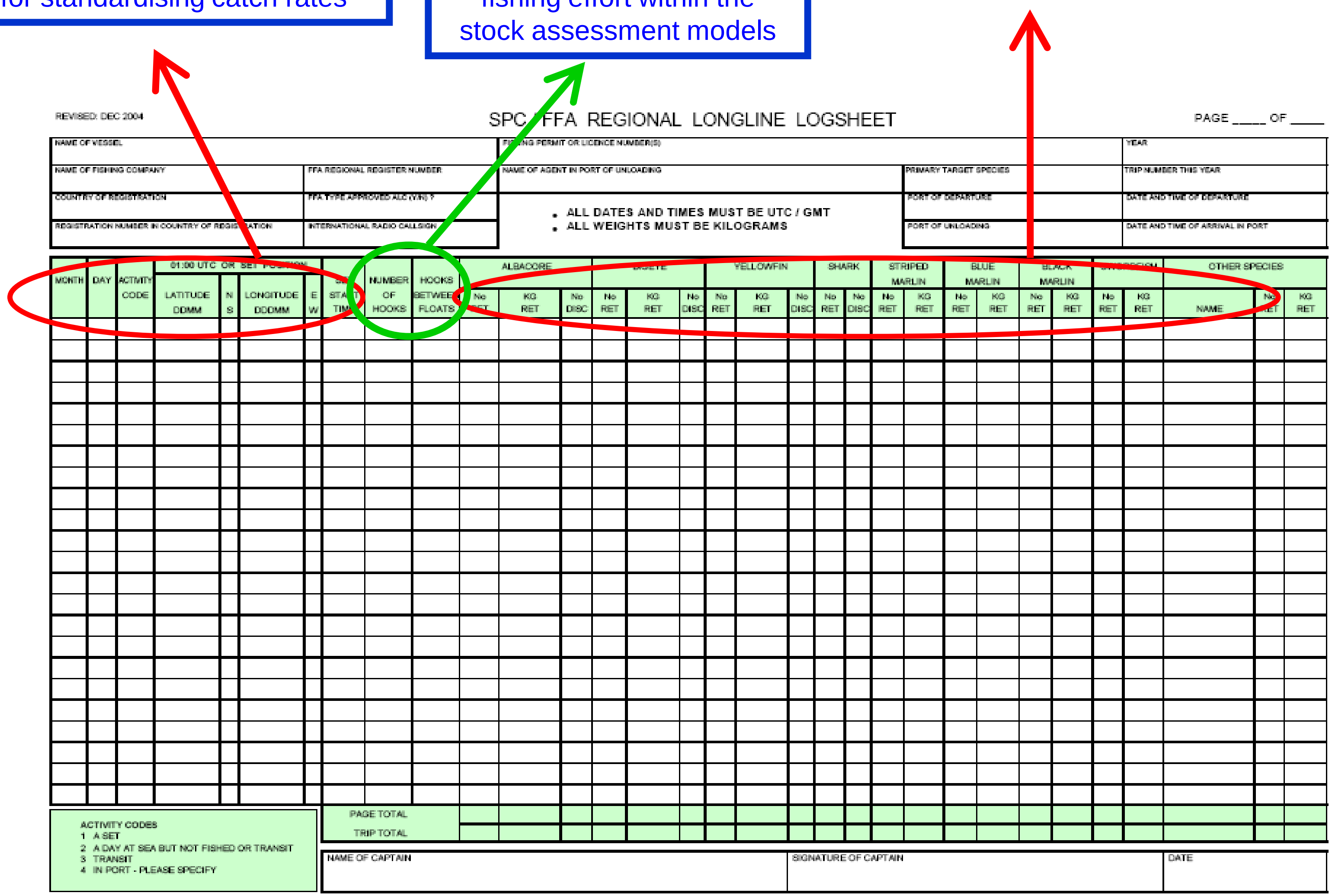
All these data are critical to successfully completing each assessment

Catch-effort log data

Used to allow spatial and temporal stratification of data within model and for standardising catch rates

Gear and method data are used to help standardise fishing effort within the stock assessment models

Catch data to estimate fishing mortality


REVISED: DEC 2004

SPC / FFA REGIONAL LONGLINE LOGSHEET

PAGE ____ OF ____

NAME OF VESSEL

FISHING PERMIT OR LICENCE NUMBER(S)

YEAR

NAME OF FISHING COMPANY

FFA REGIONAL REGISTER NUMBER

NAME OF AGENT IN PORT OF UNLOADING

PRIMARY TARGET SPECIES

TRIP NUMBER THIS YEAR

COUNTRY OF REGISTRATION

FFA TYPE APPROVED ALC (Y/N) ?

PORT OF DEPARTURE

DATE AND TIME OF DEPARTURE

REGISTRATION NUMBER IN COUNTRY OF REGISTRATION

INTERNATIONAL RADIO CALLSIGN

- ALL DATES AND TIMES MUST BE UTC / GMT
- ALL WEIGHTS MUST BE KILOGRAMS

PORT OF UNLOADING

DATE AND TIME OF ARRIVAL IN PORT

MONTH | DAY | ACTIVITY CODE | 01:00 UTC OR SET POSITION: LATITUDE DDMM, N S, LONGITUDE DDDMM, E W | SET START TIME | NUMBER OF HOOKS | HOOKS BETWEEN FLOATS | ALBACORE: No RET, KG RET, No DISC | BIGEYE: No RET, KG RET, No DISC | YELLOWFIN: No RET, KG RET, No DISC | SHARK: No RET, No DISC | STRIPED MARLIN: No RET, KG RET | BLUE MARLIN: No RET, KG RET | BLACK MARLIN: No RET, KG RET | SWORDFISH: No RET, KG RET | OTHER SPECIES: NAME, No RET, KG RET

PAGE TOTAL

TRIP TOTAL

ACTIVITY CODES
1 A SET
2 A DAY AT SEA BUT NOT FISHED OR TRANSIT
3 TRANSIT
4 IN PORT - PLEASE SPECIFY

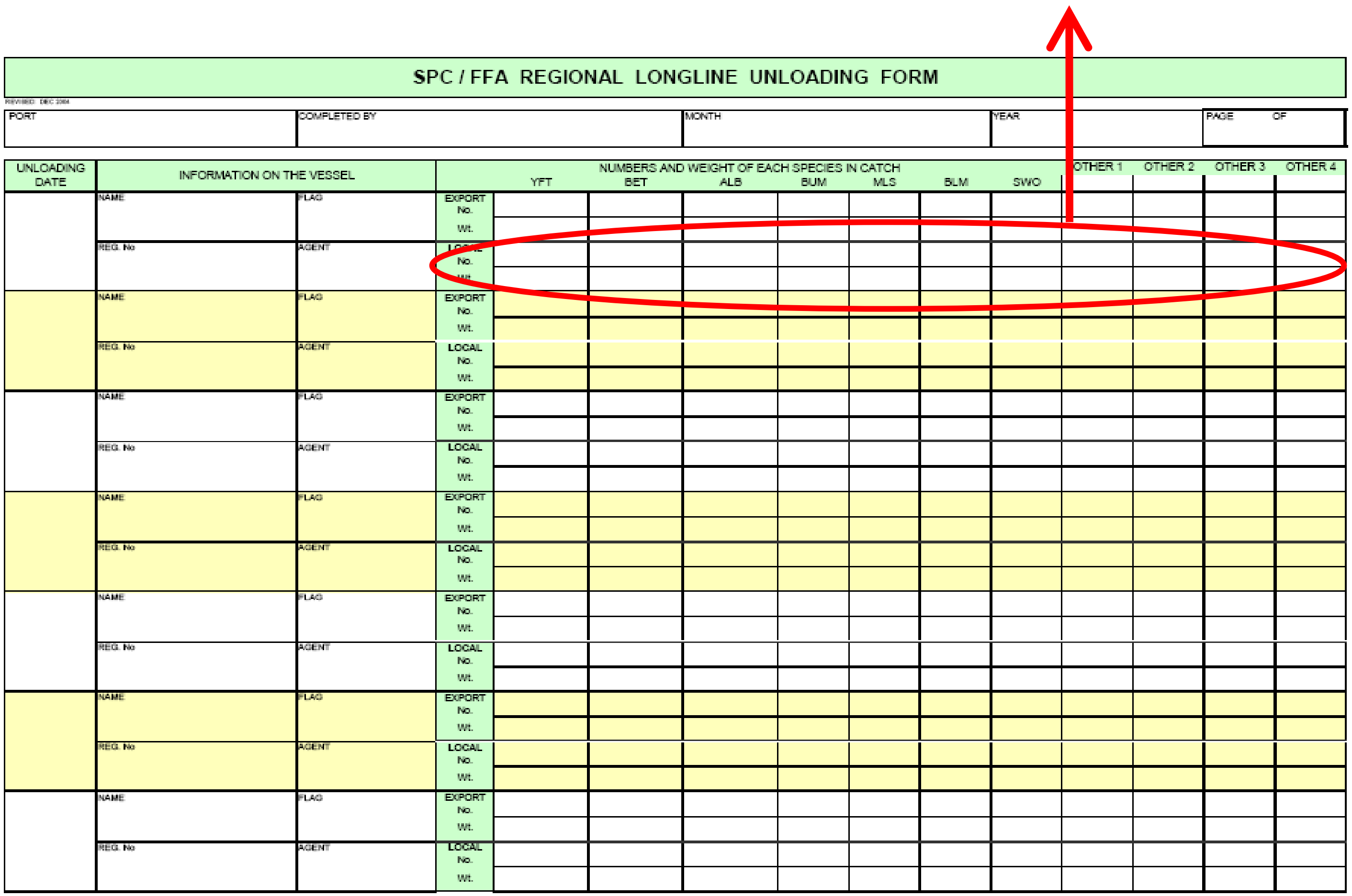
NAME OF CAPTAIN

SIGNATURE OF CAPTAIN

DATE

Landings or unloadings data

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



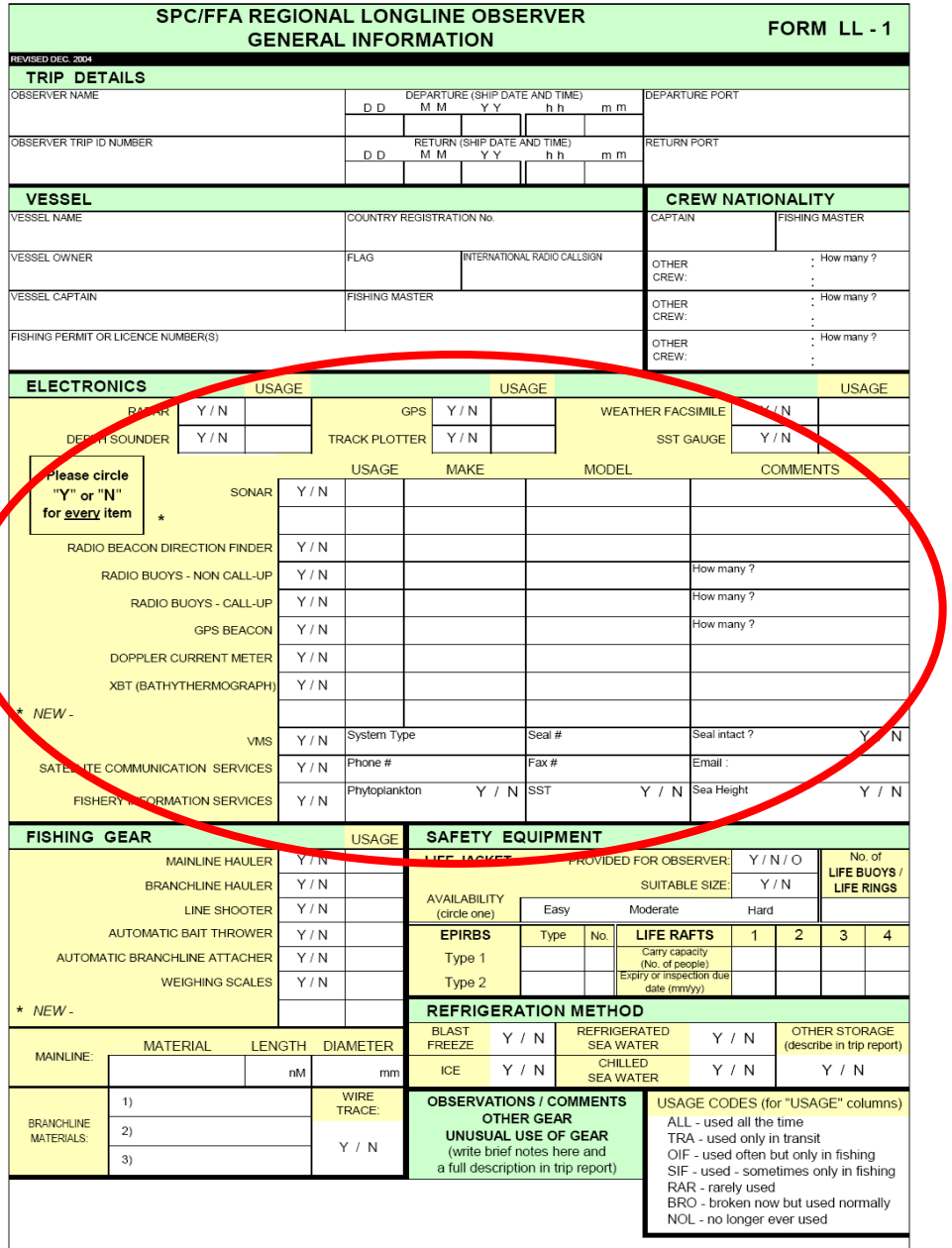
SPC / FFA REGIONAL LONGLINE UNLOADING FORM

PORT	COMPLETED BY	MONTH	YEAR	PAGE OF

UNLOADING DATE	INFORMATION ON THE VESSEL			NUMBERS AND WEIGHT OF EACH SPECIES IN CATCH YFT	BET	ALB	BUM	MLS	BLM	SWO	OTHER 1	OTHER 2	OTHER 3	OTHER 4
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											
	NAME	FLAG	EXPORT No. Wt.											
	REG. No	AGENT	LOCAL No. Wt.											

Observer data: catch-effort data

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



SPC/FFA REGIONAL LONGLINE OBSERVER
GENERAL INFORMATION

FORM LL - 1

REVISED DEC. 2004

TRIP DETAILS

OBSERVER NAME | DEPARTURE (SHIP DATE AND TIME) D D M M Y Y h h m m | DEPARTURE PORT

OBSERVER TRIP ID NUMBER | RETURN (SHIP DATE AND TIME) D D M M Y Y h h m m | RETURN PORT

VESSEL

VESSEL NAME | COUNTRY REGISTRATION No.

VESSEL OWNER | FLAG | INTERNATIONAL RADIO CALLSIGN

VESSEL CAPTAIN | FISHING MASTER

FISHING PERMIT OR LICENCE NUMBER(S)

CREW NATIONALITY

CAPTAIN | FISHING MASTER

OTHER CREW: : How many ? :

OTHER CREW: : How many ? :

OTHER CREW: : How many ? :

ELECTRONICS

	Y / N	USAGE		Y / N	USAGE		Y / N	USAGE
RADAR	Y / N		GPS	Y / N		WEATHER FACSIMILE	Y / N	
DEPTH SOUNDER	Y / N		TRACK PLOTTER	Y / N		SST GAUGE	Y / N	

Please circle "Y" or "N" for every item

	Y / N	USAGE	MAKE	MODEL	COMMENTS
SONAR *	Y / N				
RADIO BEACON DIRECTION FINDER	Y / N				
RADIO BUOYS - NON CALL-UP	Y / N				How many ?
RADIO BUOYS - CALL-UP	Y / N				How many ?
GPS BEACON	Y / N				How many ?
DOPPLER CURRENT METER	Y / N				
XBT (BATHYTHERMOGRAPH)	Y / N				
* NEW -					
VMS	Y / N	System Type		Seal #	Seal intact ? Y / N
SATELLITE COMMUNICATION SERVICES	Y / N	Phone #		Fax #	Email :
FISHERY INFORMATION SERVICES	Y / N	Phytoplankton Y / N		SST Y / N	Sea Height Y / N

FISHING GEAR

	Y / N	USAGE
MAINLINE HAULER	Y / N	
BRANCHLINE HAULER	Y / N	
LINE SHOOTER	Y / N	
AUTOMATIC BAIT THROWER	Y / N	
AUTOMATIC BRANCHLINE ATTACHER	Y / N	
WEIGHING SCALES	Y / N	
* NEW -		

SAFETY EQUIPMENT

LIFE JACKET PROVIDED FOR OBSERVER: Y / N / O | No. of LIFE BUOYS / LIFE RINGS

SUITABLE SIZE: Y / N

AVAILABILITY (circle one) Easy Moderate Hard

EPIRBS	Type	No.	LIFE RAFTS	1	2	3	4
Type 1			Carry capacity (No. of people)				
Type 2			Expiry or inspection due date (mm/yy)				

REFRIGERATION METHOD

BLAST FREEZE	Y / N	REFRIGERATED SEA WATER	Y / N	OTHER STORAGE (describe in trip report)
ICE	Y / N	CHILLED SEA WATER	Y / N	Y / N

MAINLINE: MATERIAL | LENGTH nM | DIAMETER mm

BRANCHLINE MATERIALS: 1) 2) 3)

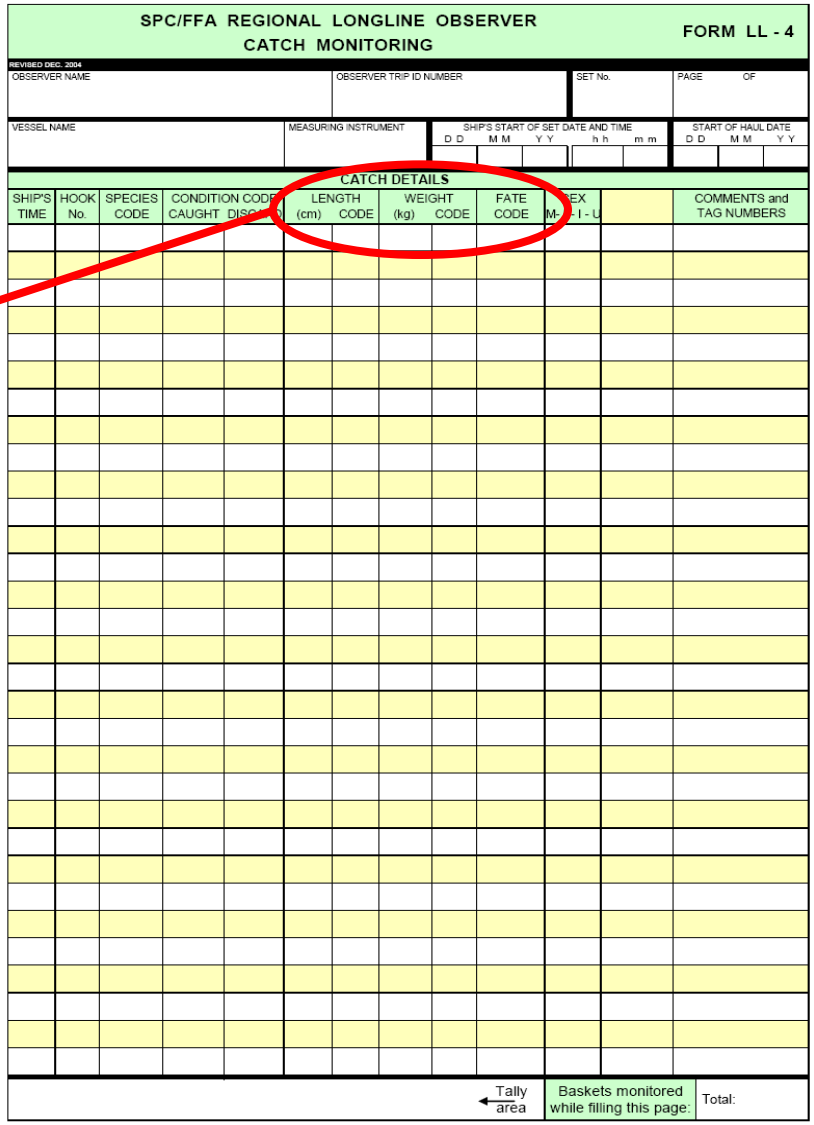
WIRE TRACE: Y / N

OBSERVATIONS / COMMENTS
OTHER GEAR
UNUSUAL USE OF GEAR
(write brief notes here and a full description in trip report)

USAGE CODES (for "USAGE" columns)
ALL - used all the time
TRA - used only in transit
OIF - used often but only in fishing
SIF - used - sometimes only in fishing
RAR - rarely used
BRO - broken now but used normally
NOL - no longer ever used

Observer data: catch composition

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



SPC/FFA REGIONAL LONGLINE OBSERVER
CATCH MONITORING

FORM LL - 4

REVISED DEC. 2004

OBSERVER NAME | OBSERVER TRIP ID NUMBER | SET No. | PAGE OF

VESSEL NAME | MEASURING INSTRUMENT | SHIP'S START OF SET DATE AND TIME D D M M Y Y h h m m | START OF HAUL DATE D D M M Y Y

CATCH DETAILS

SHIP'S TIME	HOOK No.	SPECIES CODE	CONDITION CODE CAUGHT	CONDITION CODE DISCARD	LENGTH (cm)	LENGTH CODE	WEIGHT (kg)	WEIGHT CODE	FATE CODE	SEX M - F - I - U		COMMENTS and TAG NUMBERS

Tally area

Baskets monitored while filling this page:

Total:

Observer data: biological sampling

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

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

Sampling Procedure

2 SPC 2002 PURSE SEINE

1. BEFORE YOU START SAMPLING

- Hydrate gelpacks ENVIROFREEZE™ with **FRESH WATER** as outlined on the 'Hydration of gelpacks ENVIROFREEZE™ (ice replacement)' leaflet. Put them in the freezer at least 24 hours before you start sampling.
- Place the cooler (esky) in the freezer, leave it open. Put a layer of hydrated frozen gelpacks ENVIROFREEZE™ in the bottom of the cooler (esky). You will store your samples here.
- If the freezer is very small, keep your samples in the strong plastic bag in the freezer. Pack the samples in the cooler (esky) just before disembarking (see section 7 of this protocol).
- **YOU ARE NOW READY FOR SAMPLING.**

2. SELECT YOUR FISH

- **Select 2 specimens of each tuna species from each set.**
  That is 2 SKJ, 2 YFT, and 2 BET when possible.
- **Select up to 5 specimens of each bycatch species landed from each set.**
  (5 RRU, 5 WAH, 5 TRI, etc. when possible)

Don't select the fish if the stomach is turned inside out.
You may sample gear-damaged fish if the internal organs are intact. Otherwise, ask to sample non-damaged tuna.
Stop sampling when the cooler (esky) is full or when you don't have any more labels.

3. SAMPLE THE STOMACH

Identify the different organs.
Determine the sex, if possible.
Open the fish's body carefully with the tip of the knife to avoid cutting internal organs.
liver
stomach
digestive system
intestine
Gonads (testes or ovaries) are located under the intestine, near the anus.
Remove the digestive system to see the stomach.
beginning of the intestine
stomach
intestine
CUT
digestive system on its side
oesophagus cut
stomach
intestine cut
Remove the stomach.
Cut the oesophagus as near as possible to the gills.
Cut the intestine away from the digestive system.

OBSERVER TRIP ID NUMBER:
MUSCLE LIVER N° 0001
OBSERVER TRIP ID NUMBER: JM 02-03
STOMACH N° 0001

- Carefully put the stomach in a plastic bag.
- Tear off the STOMACH part of the label and keep the MUSCLE/LIVER part of the label for muscle/liver sampling (section 5 on the following page).
- Record your **OBSERVER TRIP ID NUMBER** on the STOMACH part of the label (ex: third trip of John Masa in 2002: JM 02-03), put the label in the bag with the stomach, and close the bag tightly.
- Complete the forms (see section 4 below).
- Sample a piece of muscle and liver (see section 5 on the following page).

4. COMPLETE THE FORMS

Complete the form GEN-5 STOMACH CONTENTS for each set where stomach/muscle/liver samples are taken:

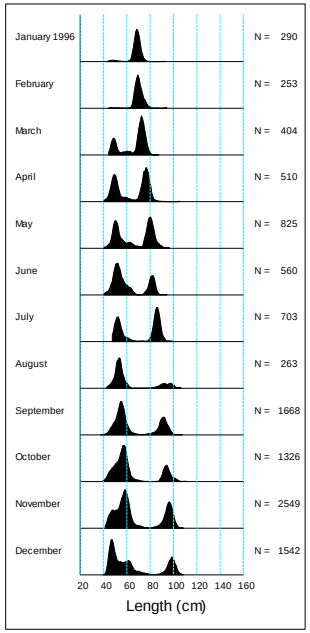
- Complete section A (i.e. observer name / trip number / vessel name / start of set date and time).
- Record the species code in section E.
- Measure the fish, report its length, and the sex if possible.
- Under the 'STOMACH' column, record the number of the stomach sample, which is on the waterproof label you put in the plastic bag with the stomach.

SPECIES CODE	LENGTH (cm)	SEX (M, F, I)	STOMACH (E or NUMBER)	MUSCLE (NUMBER)	COMMENT
SKJ	56	M	14		
RRU	77	F	15		

THE SAMPLING PROCEDURE IS CONTINUED ON THE FOLLOWING PAGE.
SAMPLE A PIECE OF MUSCLE AND A PIECE OF LIVER FOR EACH FISH EXAMINED (SEE SECTION 5 ON THE FOLLOWING PAGE)...

Port sampling data

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



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

Weight data for validating logbook catch estimates outside of assessment model

SPC / FFA REGIONAL LONGLINE PORT SAMPLING FORM

REVISED: DEC 2004

PORT: | SAMPLER: | STAFF ID Code | ASSISTANT: | STAFF ID Code | PAGE | OF

VESSEL NAME: | COUNTRY OF REGISTRATION: | REGISTRATION NUMBER:

DATE - START OF TRIP: (DEPARTED PORT) D D M M Y Y | DATE - END OF TRIP: (ARRIVED IN PORT) D D M M Y Y | DATE OF SAMPLE: D D M M Y Y

FISHING AREA FROM LATITUDE (or code/s) | N S (circle) | TO LATITUDE | N S (circle) | FROM LONGITUDE | E W (circle) | TO LONGITUDE | E W (circle)

	SPECIES	LENGTH CM	LENGTH CODE	WEIGHT KG	WEIGHT CODE	EXPORT CODE	OTHER		SPECIES	LENGTH CM	LENGTH CODE	WEIGHT KG	WEIGHT CODE	EXPORT CODE	OTHER
1								26							
2								27							
3								28							
4								29							
5								30							
6								31							
7								32							
8								33							
9								34							
10								35							
11								36							
12								37							
13								38							
14								39							
15								40							
16								41							
17								42							
18								43							
19								44							
20								45							
21								46							
22								47							
23								48							
24								49							
25								50							

CIRCLE "Y" OR "N" TO ANSWER
(Every submitted form must be circled twice.)

WERE ALL THE YFT, BET AND ALB UNLOADED AND ALL SAMPLED ?	Y N
WERE ALL SWO, MLS, BLZ, BLM AND SFA UNLOADED AND ALL SAMPLED ?	Y N

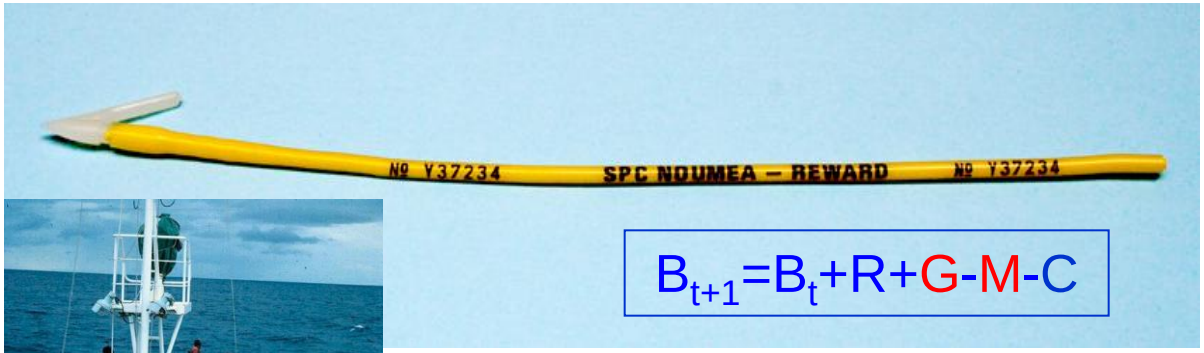
COMMENTS: IF UNABLE TO RECORD UNMEASURED FISH ABOVE then TALLY and TOTAL THOSE FISH HERE: and other COMMENTS

Eg: FSH 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 / = 41

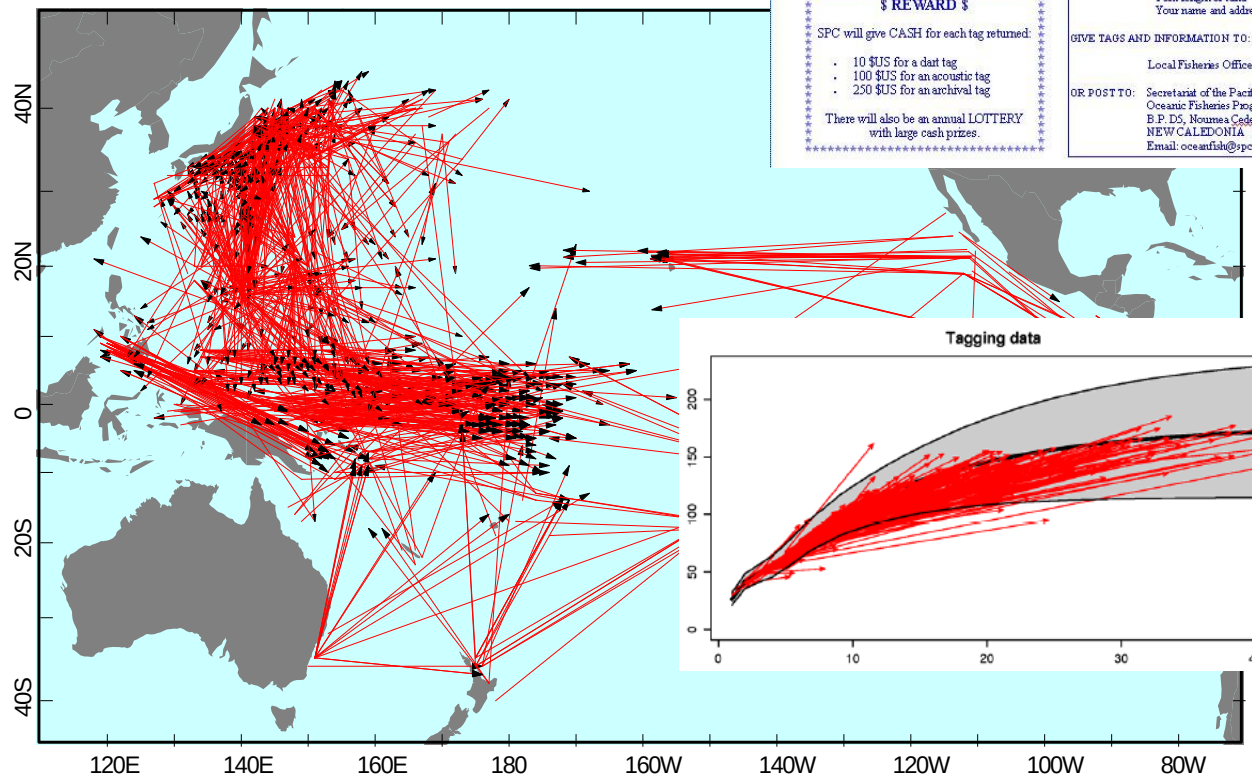
BILLFISH LENGTH CODES		OTHER SPECIES LENGTH CODES		WEIGHT CODES			
LF	LOWER JAW TO CAUDAL FORK	UF	UPPER JAW TO CAUDAL FORK	WW	WHOLE WEIGHT	GX	GUTTED, HEADED, TAILED
PF	PECTORAL TO CAUDAL FORK	US	UPPER JAW TO SECOND DORSAL	GH	GUTTED, HEADED	GO	GUTTED ONLY, NOT GILLED
PS	PECTORAL TO SECOND DORSAL	PS	PECTORAL TO SECOND DORSAL	GG	GILLED & GUTTED	SF	SHARK FINS
NM	NOT MEASURED	NM	NOT MEASURED	GT	GILLED, GUTTED, TAILED	NM	NOT MEASURED

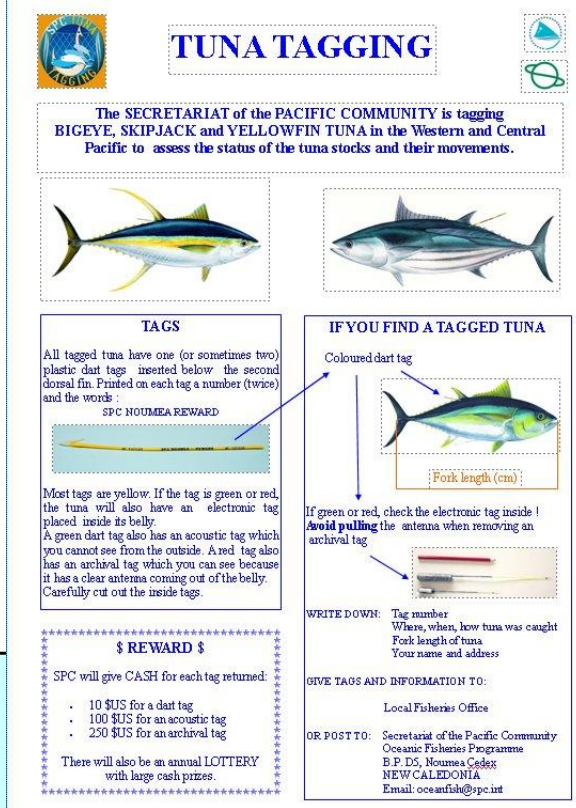
SPECIES	YFT	BET	ALB	SWO	MLS	BLZ	BLM	SFA	OTHER SPECIES
NUMBER									
SUM LENGTHS									
SUM WEIGHTS									

Conventional tags



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





Key Management Outputs

Now we can focus on our key management questions

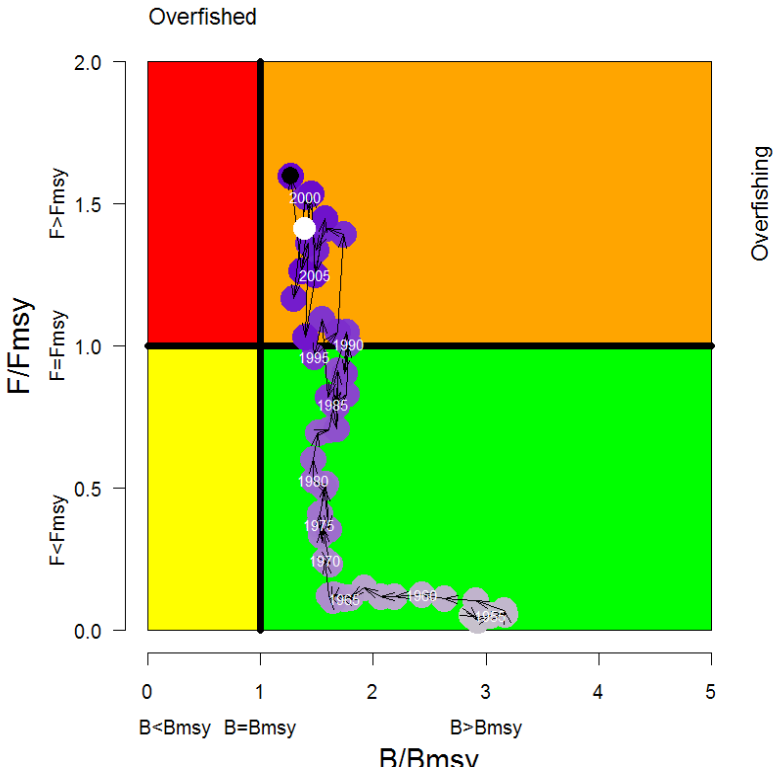
1. How is the fishery impacting the stock? (**CAUSE**)
2. What is the current condition of the stock? (**STATUS**)
3. What needs to be done, in response, in order to meet MSY based management objectives? (**MANAGEMENT OPTIONS**)

Resource Status

So….do management recommendations relate directly to region, fishery, the gears operating?

Is the sustainability of the resource being assessed of importance to your fishery/country ?

If the species is not important to your fishery or country, might the management actions effect your fishery anyway (as a by product)…e.g BET and SKJ



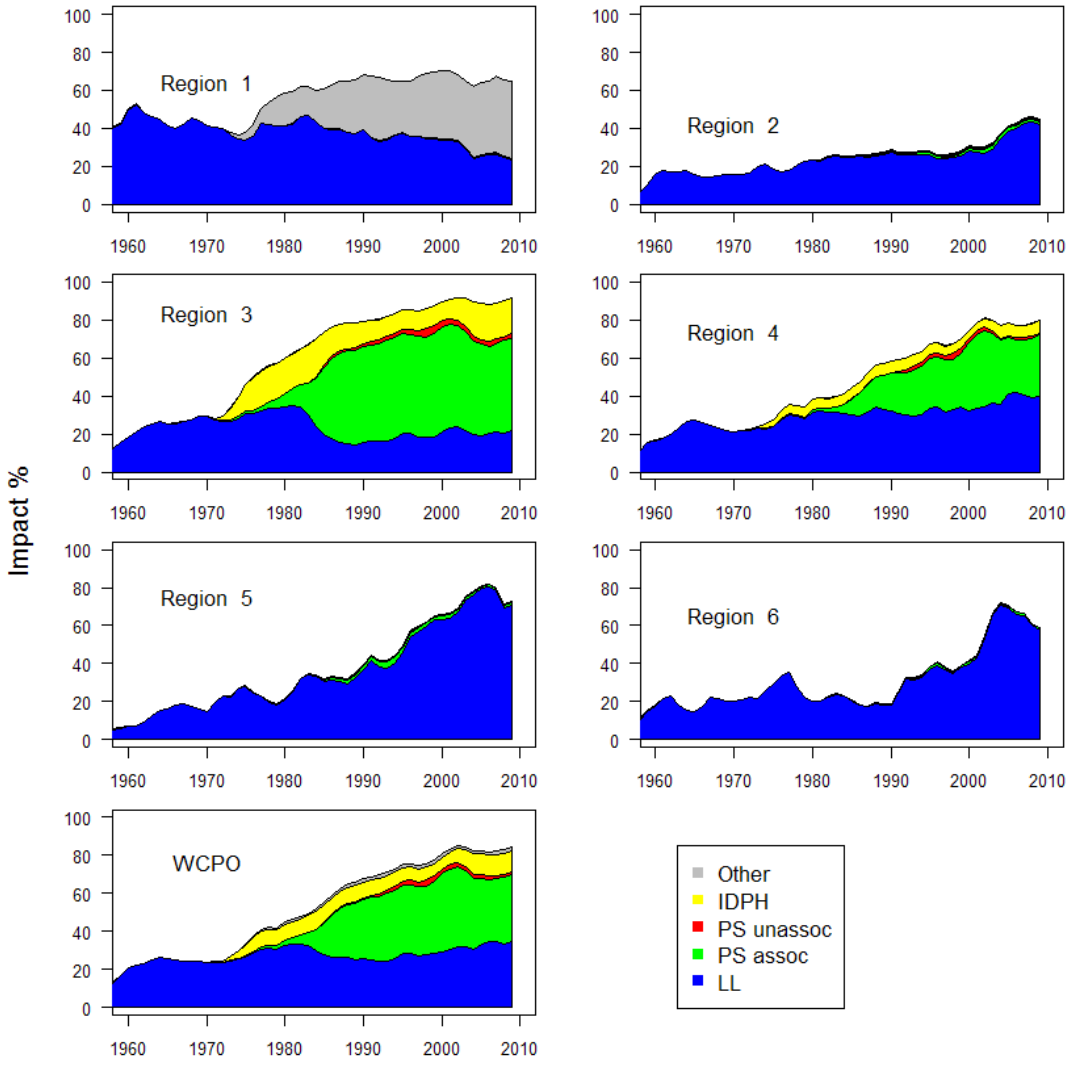
Where are the major impacts occurring and which gears are responsible?

A. Is a large portion of the stock located there?

B. Are there high impacts on the regional biomass?

C. What proportion of catch is taken by your fishery?

D. What proportion of the WCPO catch is taken by your fishery



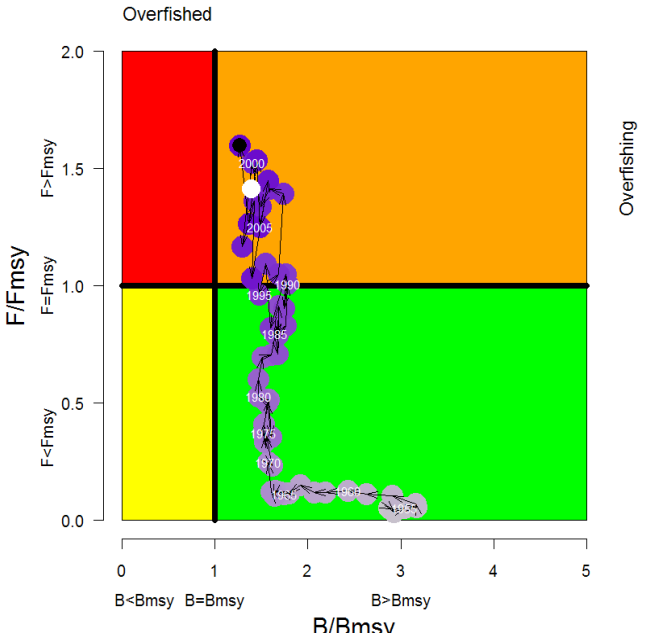
Are measures required to ensure sustainability objectives are met?

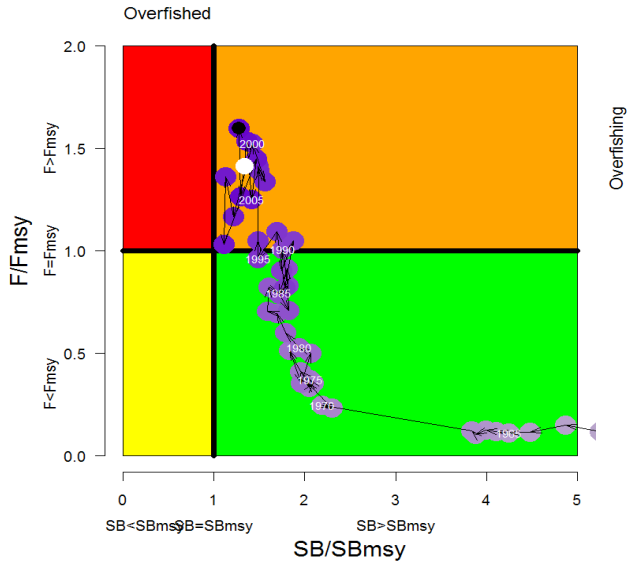
SC-6 Conclusions

The base model indicates that overfishing is occurring for the WCPO bigeye tuna stock but the stock is not in an overfished state.

SC-6 recommendation: A minimum 29% reduction in fishing mortality from average 2005-2008 levels is required to maintain the bigeye stock at levels capable of producing MSY.

SC6 reiterated that the intended 30% reduction in fishing mortality intended under the current Conservation and Management Measure is extremely unlikely to be achieved by that measure.





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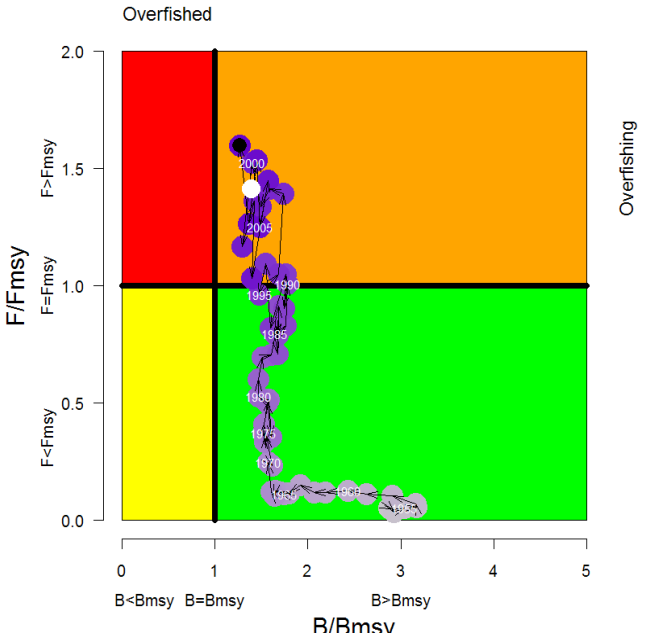
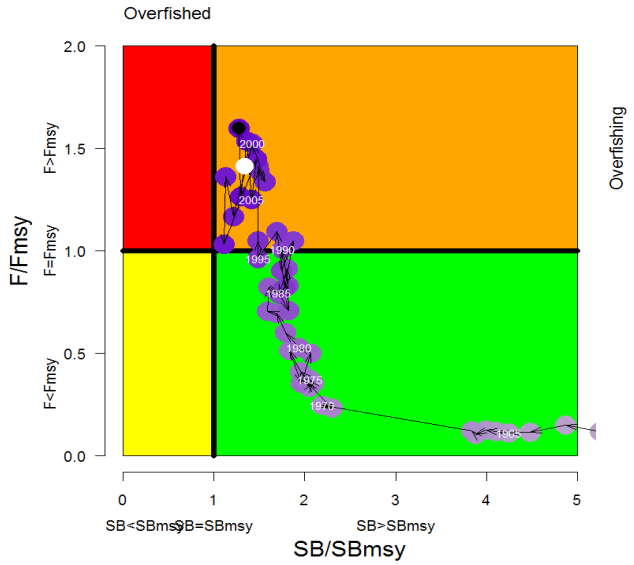




THANK YOU FOR YOUR LISTENING

Attachment 05

National Tuna Management Plan Indonesia

By Saut Tampubolon
Deputy Director for Vessels Registration
Directorate of Fisheries Vessels and Fishing Gear
Directorate General of Capture Fisheries
Ministry of Marine Affairs and Fisheries

Presented at
The Workshop on Tuna Fisheries Management on a Tuna National Level
Puerto Princesa City, Palawan, Phillipines, 29th-31st Oktober 2012

Indonesia FMA

Scope of Plan :

a. Gear Type
b. Species
c. FMA

Management Period:

3 years subject to annual evaluation

Profile of Indonesia Tuna Fisheries (Tuna Export)

No	Product Type	Export	
		Volume (Kg)	Value (US$)
1	Fresh	13.332.109	88.026
2	Frozen Tuna and Skipjack	58.452.825	131.413.987
3	Tuna Canning	69.989.252	279.150.989
Total		141.774.186	498.591.247

Tuna Issues in Indonesia

- Resource
- Management
- Socioeconomic

Fishing Fleet in FMA related to WCPFC Statistical Area

	2007	2008	2009	2010
< 5 GT	30.203	36.784	35.659	39.346
5 - 10 GT	10.884	7.920	9.359	10.024
10 - 20 GT	2.714	1.815	2.517	2864
20 - 30 GT	637	813	844	1.032
30 - 50 GT	579	95	337	384
50 - 100 GT	1.263	1.132	702	1.140
100 - 200 GT	576	510	373	324
200 - 300 GT	29	24	43	44
300 - 500 GT	17	30	24	12
500 - 1000 GT	17	17	12	13
> 1000 GT	2	3	2	2
Total	46.921	49.143	49.872	55.185

Fishing Fleet in Archipelagic Waters (FMA713-715)

	2007	2008	2009	2010
< 5 GT	27.313	29.911	30.847	34.720
5 - 10 GT	9.431	6.681	7.952	8.182
10 - 20 GT	2.094	1.162	1.882	2.474
20 - 30 GT	469	668	785	956
30 - 50 GT	422	16	286	331
50 - 100 GT	806	684	432	792
100 - 200 GT	397	319	259	224
200 - 300 GT	0	0	25	25
300 - 500 GT	0	0	0	0
500 - 1000 GT	0	0	0	0
> 1000 GT	0	0	0	0
Total	40.932	39.441	42.468	47.704

Fishing Fleet in IEEZ (FMA 716, 717)

	2007	2008	2009	2010
< 5 GT	2890	6873	4812	4626
5 - 10 GT	1453	1239	1407	1842
10 - 20 GT	620	653	635	390
20 - 30 GT	168	145	59	76
30 - 50 GT	157	79	51	53
50 - 100 GT	457	448	270	348
100 - 200 GT	179	191	114	100
200 - 300 GT	29	24	18	19
300 - 500 GT	17	30	24	12
500 - 1000 GT	17	17	12	13
> 1000 GT	2	3	2	2
Total	5989	9702	7404	7481

Annual Tuna Catch Estimates, 2011

FMA	Average Catch Estimates (2011)								Total
	Skipjact		Yellowfin		Bigeye		Swordfish		
	(ton)	(%)	(ton)	(%)	(ton)	(%)	(ton)	(%)	
713;714;715	179.429	56,7	97.017	30,7	39.800	12,6	0	0	316.246
716;717	69.713	65,4	33.009	31,0	3.889	3,6	0	0	106.611
High Seas	0	0	164	13,4	956	78,2	103	8,4	1.223
Total	249.142	58,7	130.982	30,8	43.853	10,3	103	0,2	424.080

Management Measures

1. In Indonesia FMA
2. On the High Seas

Management Measures in Indonesia FMA (Current / Future)

1. Catch estimates
2. Scientific data collection
3. Determination of catch limit
   - Territorial Waters and IEEZ
   - Archipelagic Waters

Catch Limit (cont..)

Determination of catch limit in territorial waters and IEEZ (FMA-716,FMA-717):

- will be determined by adoption of RFMO-CMM such as :

✓ bigeye tuna and yellowfin tuna (WCPFC)

✓ SBT (CCSBT)

Catch limit (cont….)

Determination of catch limit in archipelagic waters (FMA-713, FMA-714,FMA-715):

- Elaborate Annual catch estimates by gear type and species based on the best available data (2000-2011).
- Catch composition will be obtained from port sampling program and scientific observer-program.

Catch Composition Estimates by Gear Type and Species (port sampling basis)

No	Fishing Gear	Catch Composition (%)		
		Cakalang	Yellowfin	Bigeye
A	**BITUNG**			
1	Purse-seine	86	11	3
2	Pole and Line	94,2	3,5	2,3
3	Handline	0	96	4
4	Tuna Long Line		89	11
B	**KENDARI**			
1	Purse-seine	69	26	5
2	Pole and Line	67	25	8
2	Troll Line	70,9	27,1	2

Sources: Indonesia Annual Scientific Report to WCPFC, 2011

- Annual Catch Estimates by species will be elaborated based on annual catch estimates and catch composition.
- Number of fleets estimates by gear type.
- Standardized CPUE
- CPUE estimates

Catch Limit (Cont….)

- Stocks by species will be estimated through "surplus production model"
- MSY estimates by species
- TAC or Catch Limit Estimates (80% of MSY).

Management Measures in Indonesia FMA (Current and future)

4. Control mecahnism of catch limit
5. Control of fishing effort
6. Implementation of traceability scheme
   - Fishing logbook
   - Catch Certificate
   - CDS
   - Monitoring of at-sea transhipment

Management Measures in Indonesia FMA (Current / Future)

7. Implementation of Port State Measures
8. Fishing vessel monitoring system
9. Management of FADs
10. Ecosystem approach in tuna management
11. Development of Tuna MIS

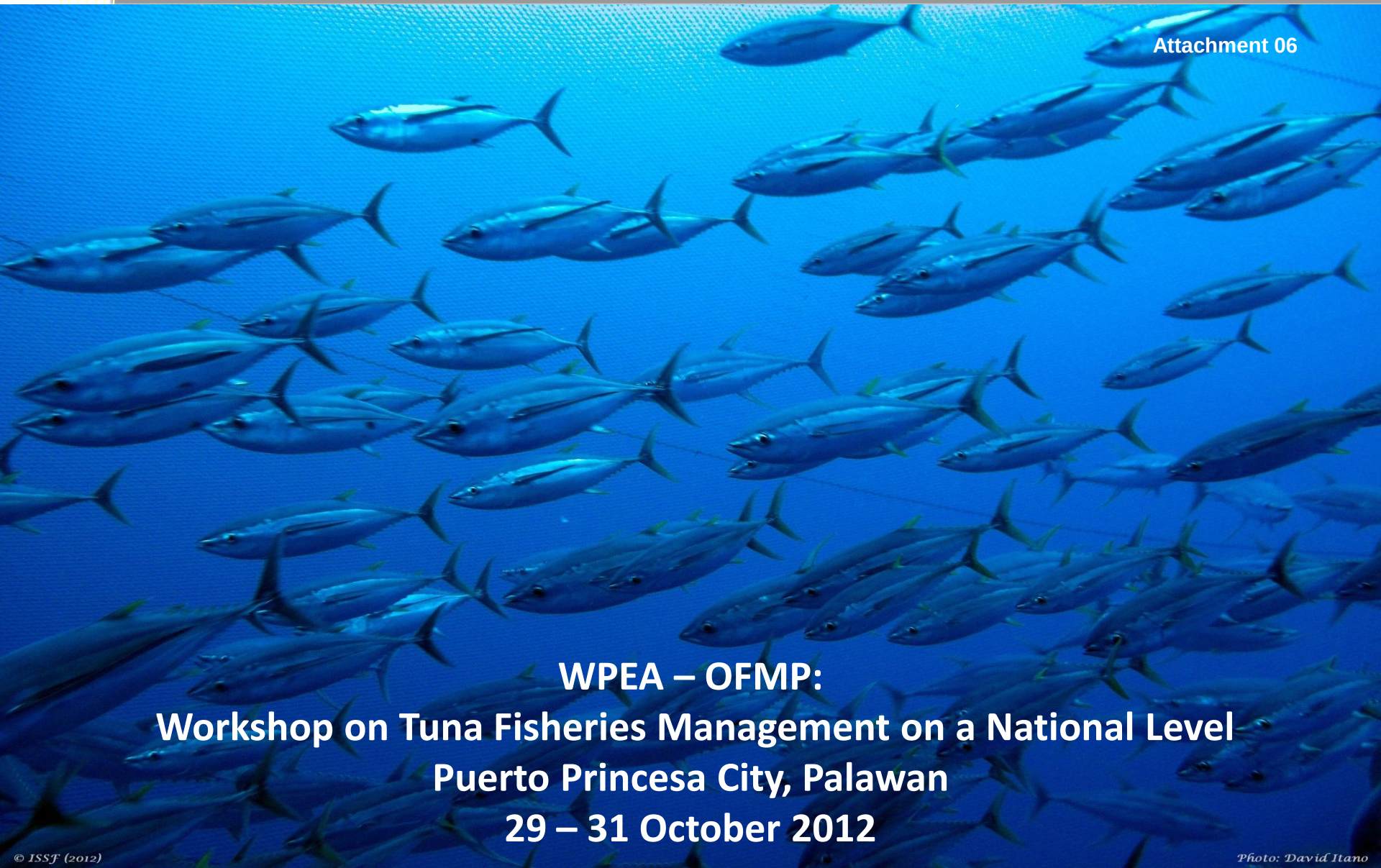
Management Measures in Indonesia FMA (Current / Future)

12. Elaboration of tuna trade and economic context.
13. Integration of regional and international provision into national legislation.
14. Capacity building of tuna fisheries association
15. Participation in international meeting

Thank you

Philippine Tuna Management Plan

Attachment 06



WPEA – OFMP:
Workshop on Tuna Fisheries Management on a National Level
Puerto Princesa City, Palawan
29 – 31 October 2012

Photo: David Itano

Main objective

The fundamental objective of the National Tuna Management Plan is to promote the effective conservation, management, and equitable use of tuna resources in the Philippines for the sustainable management of tuna fisheries and the sustainable development of the tuna industry in the Philippines.

Specific Objectives

- Ensure that tuna stocks are maintained at sustainable levels by taking into account best scientific evidence available and relevant environmental and socio-economic factors;
- Ensure effective data collection and analysis that would support management decisions for the rational use and conservation of tuna fisheries;
- Promote the socio-economic development of the tuna industry not only by encouraging responsible fishing practices but also by securing the trade of and market for tuna products and upholding just share of fishworkers in utilizing tuna resources;
- Exercise effective jurisdiction over Philippine-flagged vessels fishing for tuna resources in areas under the jurisdiction of other States, and on high seas areas managed by regional fisheries management organizations;
- Prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing for tuna stocks by adopting effective monitoring, control and surveillance measures; and
- Support the use of environmentally sound technology and relevant research on tuna fisheries.

Principles of the Tuna Management Plan

- Use of best scientific evidence available and relevant environmental and economic factors to ensure proper conservation and management of tuna resources
- Protection of the country's tuna resources in its archipelagic waters, territorial sea, and exclusive economic zone, reserving its use and enjoyment exclusively to Filipino citizens
- Protection of the rights of subsistence tuna fishermen, in both municipal and offshore fishing grounds
- Ecosystem and precautionary approaches to tuna fisheries management
- Responsible fish utilization and trade practices consistent with principles, rights and obligations under the World Trade Organization (WTO);
- Cooperation with other States, bilaterally or multilaterally, in promoting the conservation and management of shared tuna resources
- Compatibility of measures in the exclusive economic zone and on the high seas
- Effective monitoring, control, surveillance, enforcement, and compliance mechanism.

Scope of Application

- All forms of tuna fishing activities
  - municipal
  - Commercial
  - Fishing outside areas under national jurisdiction (WCPFC, ICCAT, IOTC, CCSBT and bilateral access agreements)
  - Trade of tuna originating from the Philippines
- All tuna resources, AND IN PARTICULAR
  - skipjack tuna (*Katsuwonus pelamis*)
  - yellowfin tuna (*Thunnus albacores*)
  - bigeye tuna (*Thunnus obesus*)
  - albacore tuna (*Thunnus alalunga*)
  - Other tunas (*Auxis spp*)
- "Philippine waters"
  - within the context of areas under national jurisdiction (archipelagic waters, territorial sea and the EEZ)

Structure of the 'Management Measures' Section of the Plan

- Management measures for tuna fisheries in 'Philippine waters'
- Effective control over Philippine flagged vessels fishing outside national jurisdiction
- Trade of Tuna Products Originating from the Philippines

Management of Tuna Resources within Philippine Waters

- **Determination of Catch Limit based on Best Scientific Evidence Available**
  - *Philippine Fisheries Code commits to the use of maximum sustainable yield (MSY) and total allowable catch (TAC) in the management of fisheries in Philippine waters ???*
- **Control of Fishing Effort and Capacity**
  - *Registration and Licensing of Fishing Vessels*
  - *Regulation on Fishing Gears*
  - *Payao or Fish Aggregating Device (FAD) Management*
  - *Regulation by Fishing Area and/or Fishing Season*
  - *Protection of Juvenile Fish*
  - *Management of Associated Species (Bycatch)*

Management of Tuna Resources within Philippine Waters

- **Integrated Monitoring, Control and Surveillance**
  - *Logbook System*
  - *Regulation on transshipment at sea*
  - *National Fisheries Observer Program*
  - *Vessel Monitoring System*
- **Port State Measures**
  - *Transshipment Operations of Foreign Fishing Vessels*
  - *Port State Measures for Domestic Fishing Vessels*
  - *Catch Retention and Landing*
- **Fishing in Navigation Areas and Around Data Bouys**

Effective Control of Activities of Philippine flagged Vessels in Areas Beyond National Jurisdiction

- Control of Fishing Effort and Capacity
- Regulation of Transshipment at Sea
- Catch Retention and Landing
- Regional Observer Program
- Vessel Monitoring System
- Entry and Exit Position Reporting
- Boarding and Inspection on the High Seas
- Port State Measures
- Charter Vessels
- Catch and Trade Documentation
- IUU Vessel Listing

Trade and Market of Tuna and Tuna Products Originating from the Philippines

- Sanitary and Phytosanitary Measures and Commodity Clearance
- Catch Certification and Traceability Schemes
- Other Measures: Eco-labelling Initiatives

Philippine Challenges in Managing Tuna Resources

- Increasing pressure to comply with obligations under international fisheries law and measures adopted by regional fisheries management organisations
- Pressure to apply compatible measures in areas under national jurisdiction
- Keeping in step with recent and continuous developments, e.g. EU IUU regulation, US regulation, and EU-US and EU-Japan Initiatives
- Increasing trade restrictions or regulations that impact on trade
- Raising the awareness of all sectors of the tuna industry
- Increased cooperation with fishing industry and local governments
- Ensuring that national laws and regulations are supported or enabled by adequate local regulations
- Monitoring the level of implementation of the tuna management plan


☺ Salamat ☺

Attachment 07

National Tuna Management Plan of Vietnam

Vu Duyen Hai

Vuduyenhai@yahoo.com

The outline

1. Background
2. Principles
3. Goals and Objectives
4. Measures and implementation schedules
5. Challanges to implement

Background

- Tuna fisheries take an important role for developing marine capture fisheries in Vietnam
- Lacking a systematical fisheries data collection machenism.
- Tuna fishery is not governed by specific management plan
- Lacking legal regulations and institutional frameworks for managing tuna tuna fisheries.
- There is a very weak enforcement and compliance of legal regulations.

Principles

- Compatible with international agreements and domestic regulations.
- Tuna resources maintained and tuna fisheries developed sustainably, equitably.
- Management measures developed based on the best scientific evidence.
- Application of precautionary and eco-system approaches to manage tuna fisheries
- A mechanism of effective monitoring, control, surveillance, enforcement, and compliance
- Scope: gears and species

Goals and Objectives

The general goal of the NTMP is to promote the effective conservation, management, and equitable use of tuna resources in Vietnamese EEZ to develop the tuna fisheries sustainably. The following specific objectives:

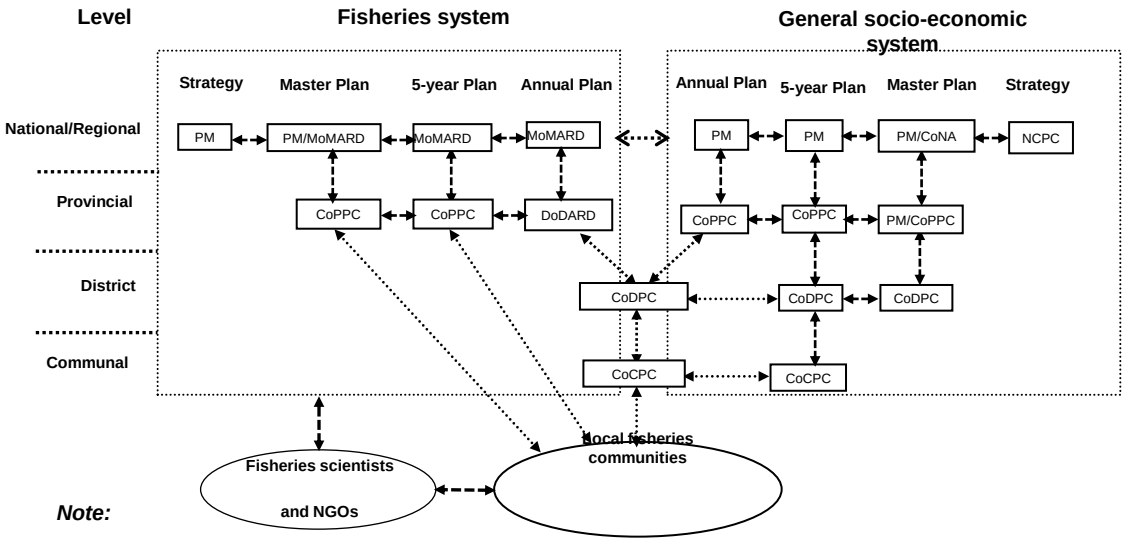
- The legal regulations and management institutions are revised and enforced sufficiently
- The data collection and analysis system is developed and maintained regularly.

Goals and Objectives (Cont.)

- The tuna stocks are maintained at sustainable levels.
- Exercise effective jurisdiction of tuna fishing over the Vietnamese EEZ and on the high seas.
- The VMS and Fisheries Inspector Force are established and operated effectively.

Challenges

- Approve of the NTMP



Note:

NCPC: The National Communist Party Congress

CoNA: Chairman of the National Assembly

MoMARD: Minister of Ministry of Agriculture and Rural Development

DoDARD: Director of Department of Agriculture and Rural Development

PM: Prime Minister

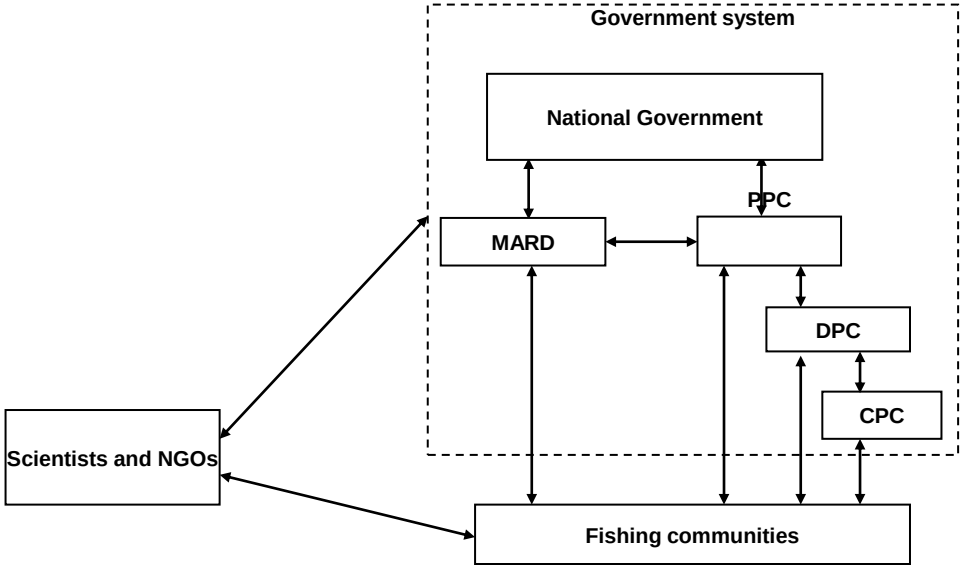
CoPPC: Chairman of Provincial People's Committee

CoDPC: Chairman of District People's Committee

CoCPC: Chairman of Communal People's Committee

Challenges (cont.)

- Institutions and organizations



Measures and Implementation Schedules

1. Legal regulations and management institutions
2. Collecting data for management of tuna fisheries (being compatible with the WCPFC protocols)
3. Implementing management measures
4. Trading and marketing of tuna and tuna products

Going to doc. file

Measures

1. Determining the average MSY 2013-2018 for making the state long term and medium term plans and annual TACs of BYT, YFT, SKJ for individual vessels and in given fishing areas
2. Limitation of fishing effort for BYT & YFT
3. Determining the total fishing effort congruent with the MSY of tuna resources
4. Introduction of the output control, rights-based for BYT & YFT long line fishery

Measures

5. Enforcement of technical measures e.g. fish size, fishing method, closed time and areas to protect tuna resources
6. Introduction of the VMS for tuna long line fishery
7. Implementing control and onboard inspection to tuna fishing vessels
8. Listing IUU fishing vessels

Measures

9. Control tuna transhipment at sea and ports
10. Trade and market of tuna and tuna products originated in Vietnam. Issue certificate and traceability
11. Getting MSC's eco-label certificate for tuna and tuna products originated from Vietnam

Thank you

National tuna management plans in Pacific Islands
Lessons learned in plan formulation and implementation

Study undertaken in 2009 by Robert Gillett for FFA – summary here.
Measures of effectiveness based on stakeholder perceptions, not rigorous review

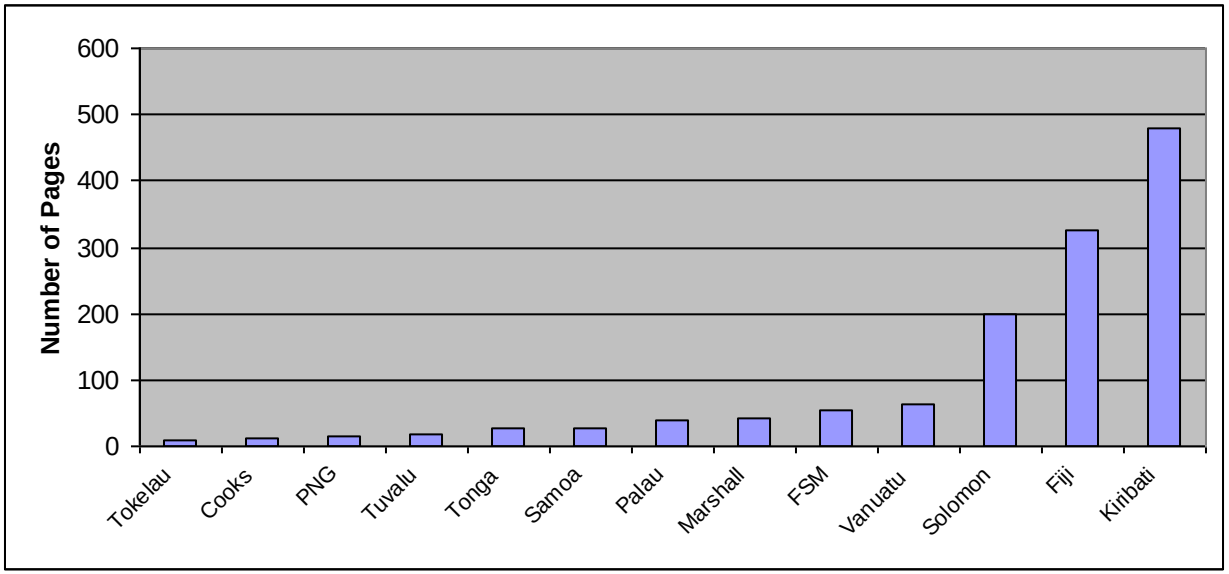
History – TMP development began in 1998 (Solomons – Canadian support), with PNG at around same time; extended gradually to other countries, usually with external support (Canada, NZ, Australia); now all FFA island members (15) have some form of TMP, whether adopted or not
Also some territories eg French Polynesia but these not assessed.

Legal status of TMPs (as of late 2009)
The TMPs of two countries are statutory plans under Fisheries Acts.
The newly adopted TMP of one country states an intent to give legal power to the elements of the plan.
TMPs in six countries have official recognition but no legal status (i.e. the plans provide policy guidance).
TMPs in four countries have no official recognition and therefore have no legal status,
Legal status of TMPs in two countries uncertain.

Features of PI NTMPs

No standard format or template for TMP but similar overall
Vary greatly in length and complexity (up to 400 pages plus)
Need to include all components of the tuna fishery ("designated" – difficult in some cases; may need to rationalize eg artisanal)
Management and development issues may be mixed in the plan
Presence of mechanisms to ensure adherence to plan variable
External assistance usually accessed to formulate plan
Industry involvement in preparation and implementation of the plan crucial but variable by country

Presence of Govt structures and processes to support the plan variable.



Overall view

Successes and disappointments – patchy but generally positive

Can provide opportunity for improving fisheries governance by providing framework to integrate all management initiatives for the tuna fishery and add coherence and credibility to these efforts

Some improvements in fisheries governance have been remarkable, other NTMPs have sunk without trace or not adopted – generally related to the importance of the tuna fishery to the country concerned

Table 1: Summary of the Status of Tuna Management Plans in the Region (early 2009) - 15 countries

	The Latest TMP Plan	Official Status	Legal Status
Cook Is.	The Longline Fishery Plan 2008 contains 12 pages of text plus three schedules.	Approved by cabinet in mid-2008 and signed by the Queen's Representative in August 2008.	The management measures described in part 5 of the plan have the full force and effect of regulations.
Fiji	The "Fiji Tuna Development and Management Plan" consists of 325 pages in 3 volumes: executive summary, main plan, and background information.	Uncertain official status: In January 2002 Cabinet "noted" an information memo on the plan submitted by the Minister of Fisheries.	Present stakeholders have different ideas of the legal status conferred by Cabinet to the plan: creation of a "Cabinet directive" to follow the plan, adoption of plan, or endorsement of selected features of the plan.
FSM	The Plan for the Management of Tuna in the FSM is a 53-page document with 13 sections, mostly based on management objectives.	The plan was officially adopted by the Micronesian Maritime Authority in December 2000.	Although the plan states that MMA will "give legal effect to the plan by adopting regulations based on and reflecting its contents', those regulations were never formulated .
Kiribati	Kiribati Tuna Development and Management Plan 2003-2006 consists of 480 pages in three components: Development and Management Plan, Implementing the Plan, and Supporting Documents.	11 meetings of Tuna Task Force in 2002/03 resulted in the plan being ready for Cabinet approval, but in mid-2003 the Government changed and the plan was not adopted by the new government.	No legal status
Marshall Is.	The Marshall Islands Tuna Management and Development Plan (2009-2011) is a 41 page document containing three main sections.	The plan was presented to the MIMRA board in February 2009 and it was subsequently adopted.	The current plan is considered by MIMIRA as a goal to achieve and is not legally binding.
Nauru	In the early 2000s the National Tuna Fishery Strategy was prepared. In 2005 the Nauru National Tuna Management and Development Plan was prepared. A copy of an unfinished draft is 8 pages.	The plan was not officially adopted	No legal status
Niue	In the early 2000s a draft tuna and billfish management plan was prepared.	The plan was not officially adopted but used as a working plan by the Department of Agriculture, Forestry and Fisheries	No legal status

Palau	The "Palau National Tuna Fisheries Management Plan 2001" is a 39-page document, of which the first 18 pages are descriptive.	The Bureau of Marine Resources has a scanned copy of the plan with the President's signature on cover, but significance of this is uncertain.	it is uncertain whether the President's signature was an order to implement, an adoption of a policy, or simply a noting of the plan.
PNG	The National Tuna Fishery Management Plan is a 16 page document divided into 3 parts: Preliminary Information, Management Framework, and Application Framework.	The cover of the plan states: "Certified on: 13th December 2000; Gazetted on: 25th January 2001".	The plan is a regulation under the Fisheries Management Act 1998
Samoa	The Samoa Tuna Management and Development Plan 2005-2009 is a 28-page document, divided into 5 sections: introduction, tuna management, tuna industry development, implementation and review procedures, and key projects.	The plan was approved by Cabinet in February 2002.	The Fisheries Division indicates the plan provides an endorsement and mandate for the plan-specified management measures and development initiatives.
Solomon Is.	The "Solomon Islands National Tuna Management and Development Plan" consists of three volumes and 200 pages.	The plan was endorsed by Cabinet, and approved by the Minister for Agriculture and Fisheries in June 1999.	The plan states "The Plan has no legal force in itself, however provisions may be given legal force by being incorporated into fishing licence conditions or regulations".
Tokelau	The National Tuna Development & Management Plan is 10 pages in length with 3 sections: introduction, domestic tuna development, tuna management	The plan was approved by the cabinet in about 2004, but was not sent to the General Fono because it needed some extra WCPFC provisions.	No legal status: "This Plan describes what Government of Tokelau intends to do over the next 4 years".
Tonga	The Tonga National Tuna Management and Development Plan is a 26-page document, divided into four sections: (1) Introduction, (2) Management framework, (3) Conservation and management of the tuna fishery, and (4) Development of the tuna industry.	The plan was signed in 2002 by the Minister responsible for fisheries.	The Fisheries Act provides the legal basis for having the plan, but the plan itself has no legal status.
Tuvalu	National Tuna Development & Management Plan (2002-2006) is an 18-page document with 4 sections: introduction, domestic tuna development, tuna management, NAFICOT, implementation and project profiles	The plan was submitted to the Development Coord. Committee in 2003, which endorsed the Plan but required minor editorial changes prior to sending to Cabinet. This did not occur.	Not adopted; no legal status
Vanyatu	The "Revised Tuna Management Plan" is a 62-page document which (1) Identifies the fishery and assesses the present state of its exploitation, (2) Specifies the objectives to be achieved; and (3) Specifies the management and development measures to be taken.	The revised plan was endorsed by the Government and launched by the Minister responsible for fisheries in December 2008.	The revised TMP states an intent to give legal power to the elements of the plan, with a particular focus on the table in the schedules and the conditions for different vessel categories.

Key lessons learned

Short simple plan likely to be more effective (simplicity, clarity)

Establish clear objectives and interventions, and clearly state “the rules of the game”

Mechanisms to ensure adherence to the plan (eg grievance procedures, responsibility for implementation identified (individual or agency), continuing assistance from FFA (in Pac Is case))

Separate development and management in the plan, don’t mix

Resist prescriptions from external provider

Presence and support of industry participants and especially associations critical in formulation and implementation

Appropriate govt structures and processes need to be in place

Key lessons learned (continued)

Adoption of the plan helped if simple and clear, especially for EAFM components

Industry needs rules that are binding on all parties, transparency of decision-making process, reduction in discretionary powers of fisheries officials, mandatory industry consultation

Periodic review s of the plan required (egs of decay)

Applying EAFM has been difficult (understanding, complexity, data) – limited success/uptake but need to find way that is appropriate to the situation and practical
(EAFM light in the first instance) … see later

The Way Ahead

Major problems have been :

- difficulties related to non-adoption of plan
- structural weaknesses of plans
- failure to implement/adhere to plans (main problem)

Make NTMPs easier to implement and include multiple mechanisms to encourage adherence

Final word - one stakeholder comment caught the eye
“80 percent of our problems with the Fisheries Department are about them violating their own tuna management plan”

Guidance on setting catch limits/sustainable harvest targets in National Tuna Management Plans

Most plans include some catch limit which may be biologically based

May be at species or fishery level, all components

As no standard format for management plans, may not need to be a sustainable measure, could be a harvest target to guide development eg TAC, fleet capacity

In this discussion, will assume a sustainable yield measure is required

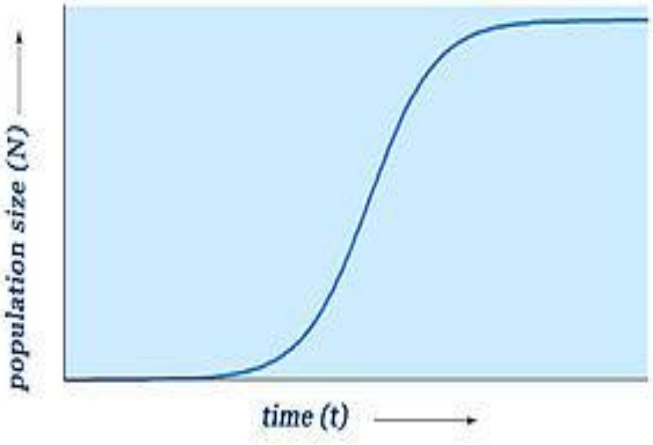
Two aspects - most appropriate measure at national level and approach

- spatial considerations

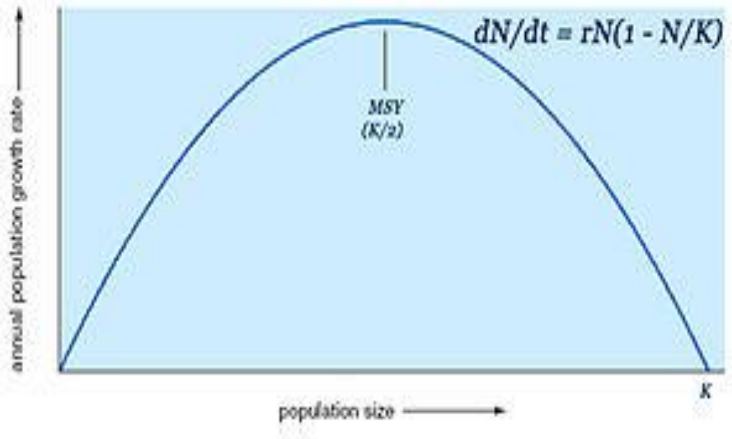
MSY (Maximum Sustainable Yield)

Extensively used in fisheries management and incorporated in most international conventions/instruments eg UNCLOS, UNFSA, WCPFC Convention – "an international juggernaut set in motion"

"The largest yield that can be taken from a species' stock over an indefinite period, or under existing environmental conditions"
- assumes logistic growth with equilibrium state (carrying capacity)
- add constant removal (right)



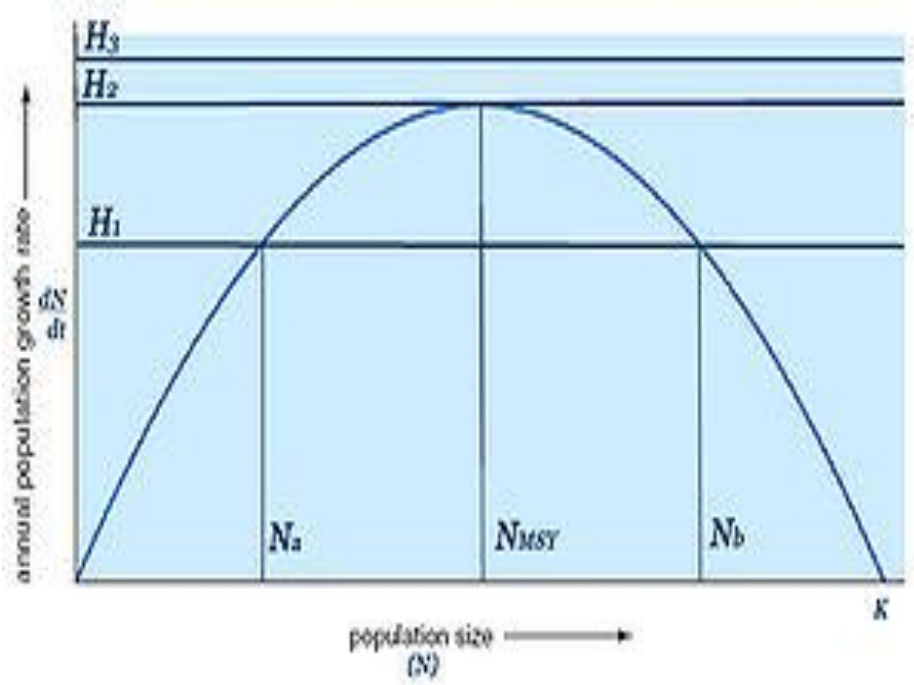
Logistic growth



Growth maximum at half carrying capacity (K/2)

MSY assumptions

Any harvesting will reduce population size
Assume population will then stabilize at a lower carrying capacity
Sustainable harvest depends on a density-dependent response (negative feedback)
MSY aims at balance between too much and too little harvest, to keep population at some intermediate abundance with a maximum replacement rate (the dream)



Now recognized that many issues with MSY and its use as a management goal

Larkin (1977) – An epitaph for the concept of maximum sustainable yield
His concerns included, *inter alia*, ….. does not take not account of recruitment variation, hard to maximize yield for all species simultaneously in a multi-species fishery etc

Assumes stasis but natural populations typically fluctuate with environmental variation eg ENSO for tropical tunas, some dramatic fluctuations for small pelagics, r-selected species

MSY treats all individuals are identical (size/age classes, with differential rates of growth, survival, reproduction etc

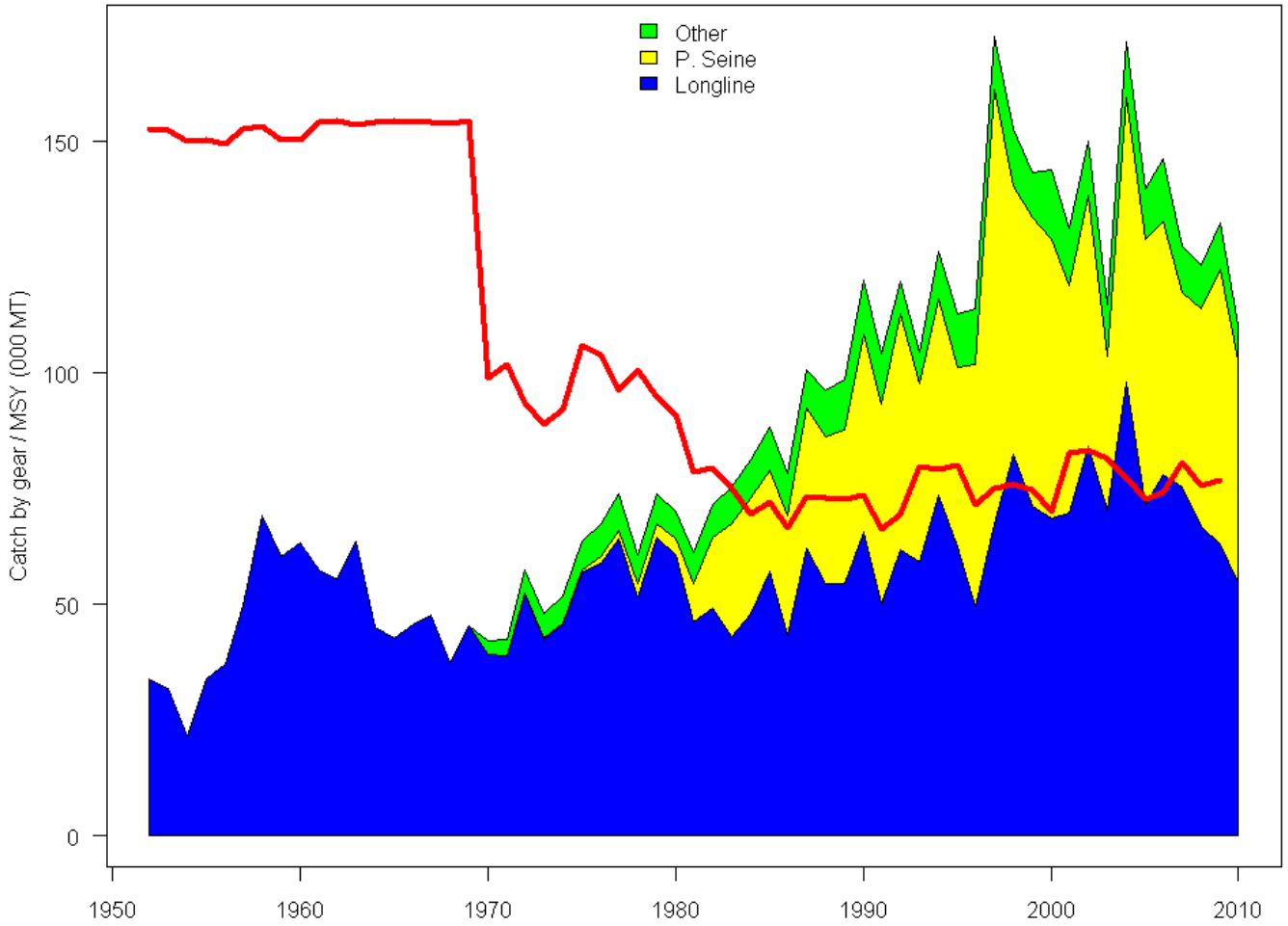
Often unreliable data (for determining population size and its growth rate)

More dynamic interpretation needed -> maximum average yield or A_{MSY}

Fishery changes (gear,size)

Changes in MSY as size structure of catch changes – WCPO bigeye
MSY drops as purse seine fishing commences -> lower yield

History of the annual estimates of MSY compared with annual catch split into four sectors



Recruitment variation – impact on MSY

BET stock status summary for 2009

Management Quantity	2009 Assessment	2008 Assessment
Most Recent Catch	134,315 mt (2008)	143,059 mt (2007)
MSY and MSY(recent R)	Range: 52,120 - 67,800 mt Range:110,000 - 146,114 mt	Base case: 64,600 mt Range: 56,800 - 65,520 mt
$F_{current}/F_{MSY}$	Range: 1.51 - 2.55	Base case: 1.44 Range: 1.33 - 2.09
$B_{current}/B_{MSY}$	Range: 1.11 - 1.55	Base case: 1.37 Range: 1.02 - 1.37
$SB_{current}/SB_{MSY}$	Range: 0.85 - 1.42	Base case: 1.19 Range: 0.76 - 1.20
$Y_{Fcurrent}/MSY$	Range: 0.12 - 0.92	Base case: 0.94 Range: 0.50 - 0.97
$B_{current}/B_{current, F=0}$	Range: 0.18 - 0.29	Base case: 0.26 Range: 0.20 - 0.28

Average MSY over the 6 models used:

- Long-term recruitment = 58,950 t
- Recent recruitment = 121,570 t

MSY (or F_{MSY}) now best regarded as a limit to be avoided rather than a target that can be routinely exceeded (Mace 2001)

There is no one MSY, but rather many depending on size structure of catch, environmental impacts (recruitment), fishery structure by gear etc;
may be variable in space and time

To avoid over-fishing, now looking more at biological reference points (limit and reference) and harvest control rules; rebuilding if biomass falls below B_{LIM}

WCPFC (and PNA) currently wrestling with this but not yet RPs in any WCPO CMMs or national TMPs

Modern management approaches

More structured and precautionary alternatives to MSY, yet broadly consistent with legal requirements of Conventions

One example: MSC FAM (Fishery Assessment Methodology) but others also eg Australia HSF

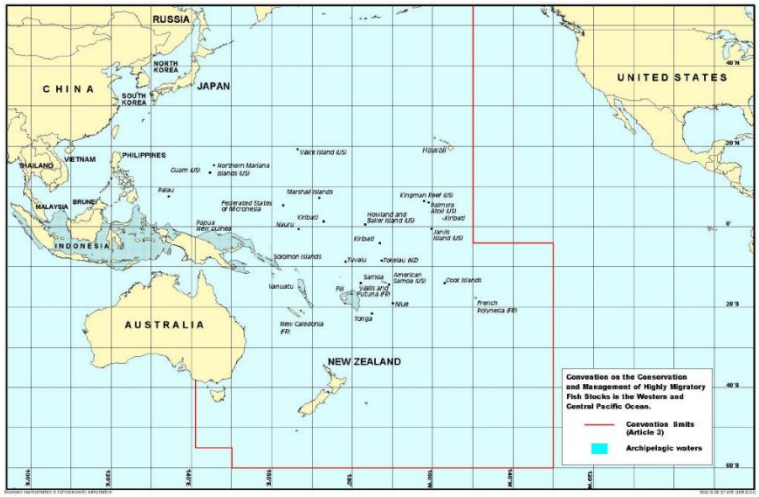
Reference points
LRP
TRP

Harvest control rules, rebuilding strategy

Incorporate uncertainty, risk

Operational models (data intensive)

Spatial considerations



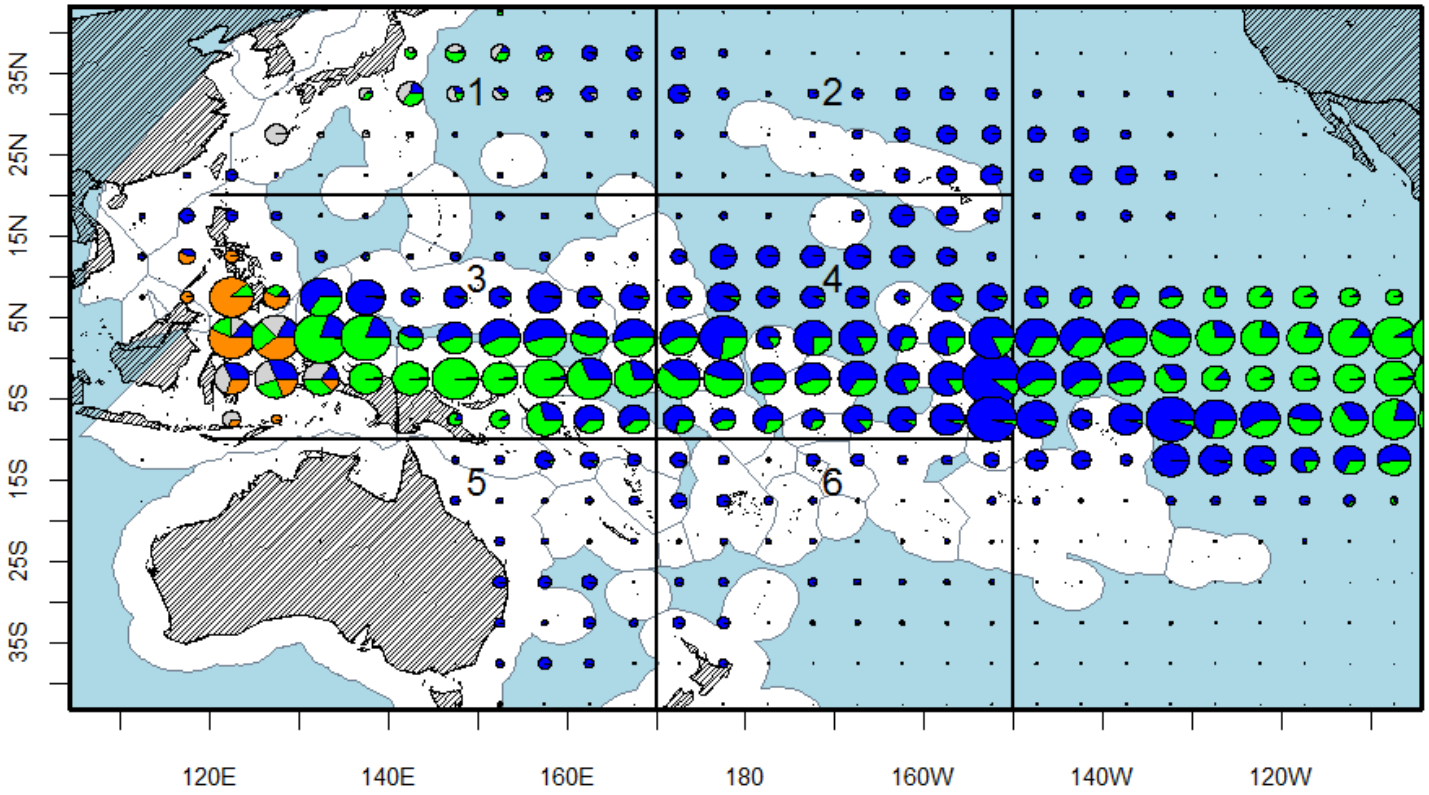
Management on a national scale – can MSY and other parameters be estimated ?

Great variation in spatial and temporal distribution of biomass eg tropical tunas with ENSO, inter-annual var

M-CL used in WCPO tuna assessments – assessments include spatial structure (5 areas) ; parameter estimates based on various data catch/effort, size (port sampling), tagging and biological data (age, growth) etc – large and complex data sources, good data for industrial fisheries, less so for others

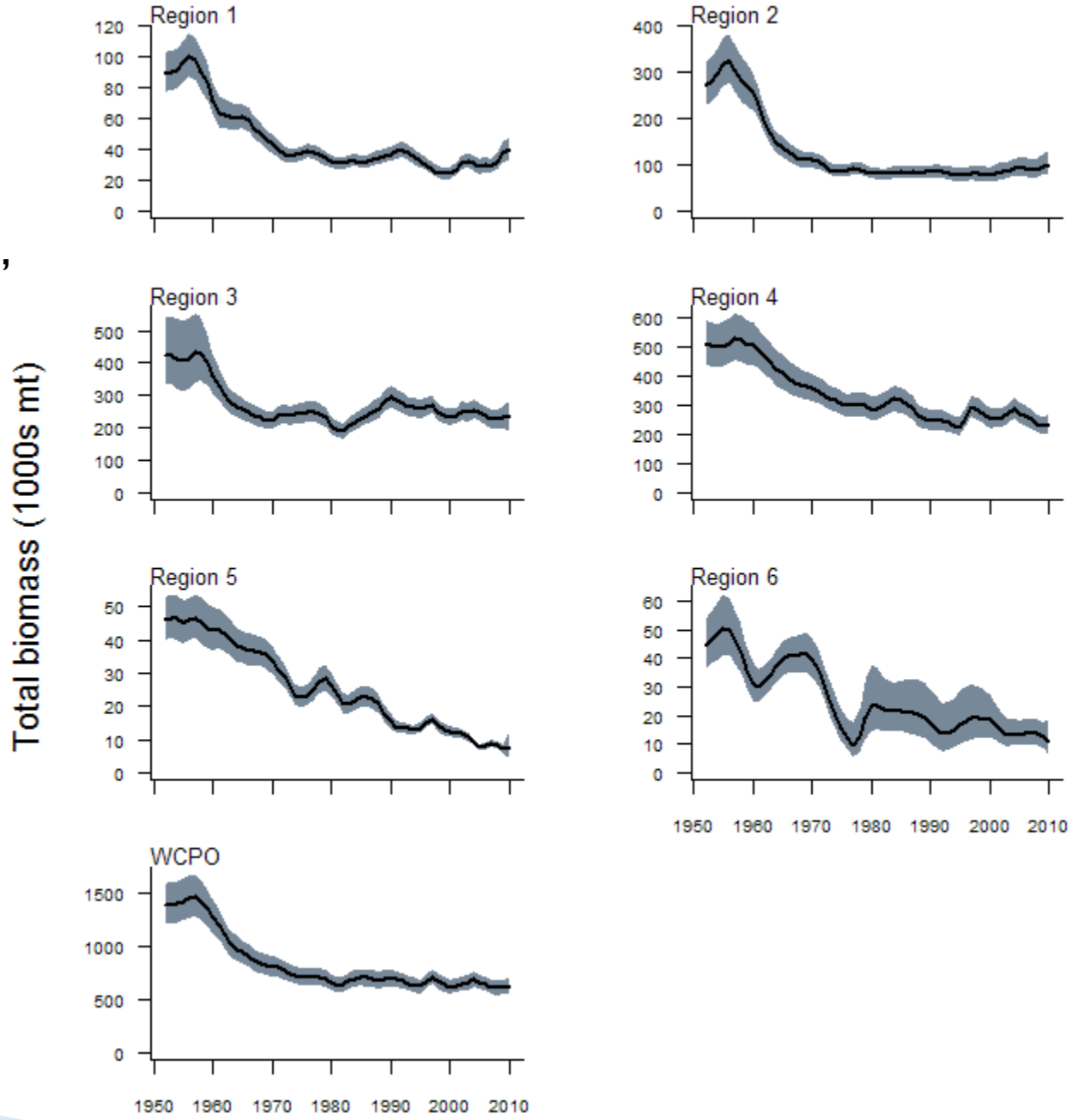
Spatial structure in assessments (bigeye and others)

A range of parameters estimated for the five areas in the model; biomass, gear selectivity, catchability, movement, age structure of catch by gear, biomass (total and spawning), reduction in spawning potential due to fishing, ratio of exploited to unexploited biomass etc



Total biomass over time, by the 6 regions, And WCPO overall

Most biomass in Regions 3 and 4 (see scale)



Compatibility/reconciliation issues
(Art .. of Convention)

NTMPs with catch limits etc, management measures
WCPFC with high seas management
How to reconcile various limits and ensure compatibilty, whilst managing throughout the range of the stocks ?
Top down or bottom up ?
Thus far has been handled **top-down** (more practical)
eg applying CMMs at regional level but flag state responsibility; VDS also incorporated in CMM 2008-01 (under revision, to also include skipjack and revise)
Key elements (directed at yellowfin and bigeye):
Purse seine effort limitation (2004 levels), FAD closures, HSP closure, restrict effort to 2004 levels, catch retention, 100% observer coverage
Longline – no increase in catch etc

Has not been successful in reducing F on bigeye, in particular; numerous exemptions (AWs), SIDS,
some non-compliance (see SPC paper)

Self-policing – no penalty even when non-compliance clear
eg PNG catch -> 750,000t

Vietnam currently not included and Indonesia has not fully implemented (data issues and AW sovereignty concerns

Other CMMs – few fully implemented; TCC review function

Conclusion: RFMO has yet to really address the issue of compatibility against some unwillingness of members to do so. Also high seas issues and management not yet dealt with at RFMO level

Bottom-up

Could in theory estimate MSY (or other parameters) for large EEZs eg PNG (~ 20% of global catch), but much inter-annual variation, and much uncertainty in estimates (how much uncertainty prepared to accept ?)

Also at odds with need with highly mobile (cf "highly migratory") species to manage throughout the range of the stock

Best used only as indicative – can also estimate extent of interaction with adjacent fisheries (immigration, emigration) and variability.

Better prospects with **sub-regional approach ?** grouping -> buffer
eg PNA VDS scheme for purse seine –
Using mix of M-CL biomass estimates (% of region by EEZ) and historical catch for a given time period, allocate effort by EEZ (PAE) from an agreed total effort (TAE); also allow trading to smooth out inter-annual variations in availability.

But need good data at various levels (operational, VMS) in near real time

Estimating longline MSY by sub-region eg PNA longline VDS

1st element in calculation is the proportion of each model region covered by a PNA EEZ.

Country	Region 3	Region 4	Region 5	Region 6
Federated States of Micronesia	0.152			
Kiribati	0.007	0.200		
Marshall Islands	0.070	0.042		
Nauru	0.016			
Palau	0.031			
Papua New Guinea	0.095			
Solomon Islands	0.038	0.003	0.051	0.013
Tuvalu		0.010		
Total	0.409	0.255	0.051	0.013

2nd element

MSY for each region, of which the proportion in PNA EEZs (cover) is calculated (much high seas)

The sum over all regions is the TAC_{PNA}

		Recent BET catch		BET longline MSY	
Region	**Cover**	**Region**	**PNA EEZs**	**Region**	**PNA EEZs**
3	0.409	21526		11382	4655
4	0.288	34872		18439	5310
5	0.094	3516		1859	175
6	0.039	3485		1843	72
Total		63399	11821	33523	10212

- Lastly, the total allowable effort (TAE) that will produce the TAC is calculated given the PNA catch rate.

Species grouping	Recent catch	Recent scaled effort	TAC	CPUE	TAE
BET	11821	44427	10212	0.268	38104

NOTE: this calculation was done using:

- the 2008 assessment
- The long-term average recruitment MSY estimate

PNA summary and status

In 1982, a subset of the FFA membership whose equatorial waters contained much of the tuna taken in the region – the Parties to the Nauru Agreement (PNA) – developed an agreement to initially coordinate and harmonize their fisheries management and access conditions. PNA was housed within FFA until 2010, when following a ministerial decision on its future activity (see Bikinibeu Declaration below), a separate PNA Office was established in Majuro, Marshall Islands.

PNA, in its 20 years, has applied a series of Implementing Agreements (IAs) and other Arrangements incorporating increasingly comprehensive management measures to fisheries within its area of influence, and has become the driving force in effecting changes in fisheries management in the region. These IAs, and other Agreements/Declarations of the PNA, are summarized as follows:

Initial members PNG, FSM, Kiribati, RMI, Nauru, Palau, Solomon Islands, with Tuvalu joining in 1991

1st Implementing Agreement (1983) – established harmonized minimum terms and conditions for foreign fishing vessels, which were extended to all FFA states; Regional Register (RR) of fishing vessels established by FFA.

2nd Implementing Agreement (1991) – incorporated observer requirements, prohibited transhipments at sea (designated ports listed), expanded MCS activity and introduced annual registration for the Regional Register of vessels.

FSM Arrangement (1995) – concessional fishery access to the waters of all PNA states for domestic and locally-based purse seine vessels, to promote domestic fishery development.

Palau Arrangement (1995) – to limit purse seine effort in the PNA EEZs, through a cap on vessel numbers (205 in various categories, plus additional special case vessels).

Vessel Days Scheme (2007) – an alternative to the Palau Arrangement, with a limit on total purse seine fishing days, and days allocated to individual PNA parties; commenced late 2007; intended to constrain catches to 2004 levels, and enhance economic returns.

3rd Implementing Agreement (2008) – closure of high seas pockets, FAD closures, catch retention, observer coverage; incorporated into CCCM 2008-01; amended in 2010 to prohibit sets on whale sharks, and closure of additional high seas areas.

Koror Declaration (February 2010) – confirmed support for the Vessel Days Scheme, close additional high seas between 10^0N and 20^0S, and 170^0E to 140^0W, and proceed with a full MSC assessment for the PNA skipjack fishery (approved Dec 2011)

Most of these PNA management initiatives, which applied to PNA EEZs and some cases adjacent high seas areas, have since been incorporated into WCPFC measures applying throughout the Convention Area, notably CMM 2008-01.

Other PNA initiatives

The PNA office has also indicated that it will be undertaking a series of new management-related initiatives, including:

Establishing a separate PNA VMS associated with the VDS.
PNA observer agency - important role in MSC Chain of Custody (CoC)
Additional FAD closures - possibly extend to 6 months
Mesh limits for purse seine nets (mesh not smaller than 90mm)
PNA fisheries information management system
PNA crewing agency
Implementation of the PNA Longline VDS.

Prospects for a sub-regional approach involving Philippines, Indonesia and Vietnam, similar to PNA ?

Shared stocks (demonstrated by tagging)

Legal/political framework for cooperation ? No

Jurisdictional issues eg South China Sea, baselines

Other players in the fishery need to be involved ? eg Chinese Taipei, PRC, maybe Thailand

Informal sharing of data and information;
establish sub-regional data base for oceanic species?
SEAFDEC for neritic species (straddling stocks), maybe oceanic ?

Workshop on Tuna Fisheries Management on a National Level – WPEA
Puerto Princesa City, Palawan, 29-31 October 2012

Potential approaches in managing highly migratory fish stocks on a national level

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Outline

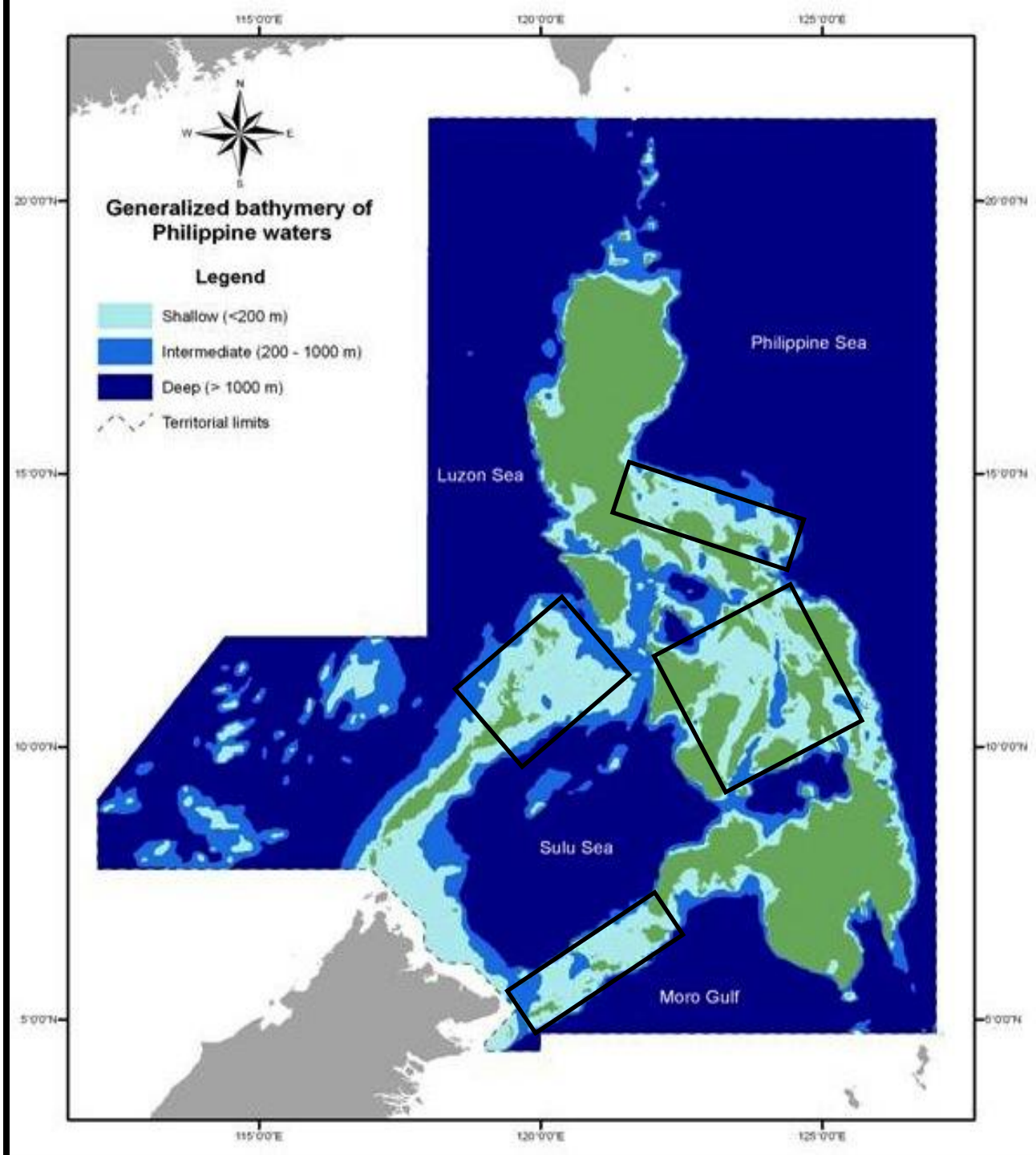
- Fisheries management approach in the Philippines
- Stock distribution and management scales
- Practical application of EAF
- Ecosystem scale
- Fishing effort control
- Data requirement







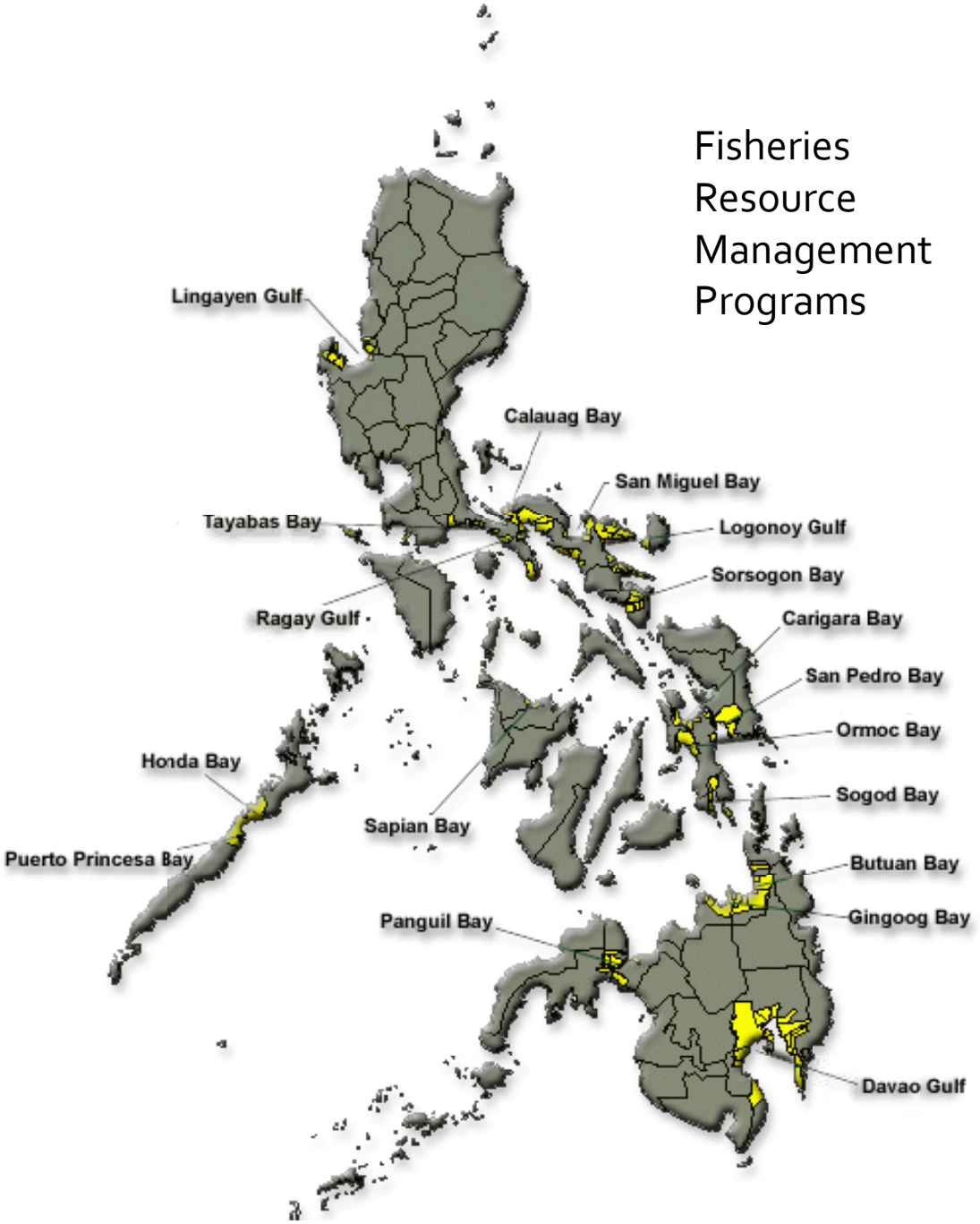

Fisheries management approach



Significant fishery productive shelf

Fisheries management approach

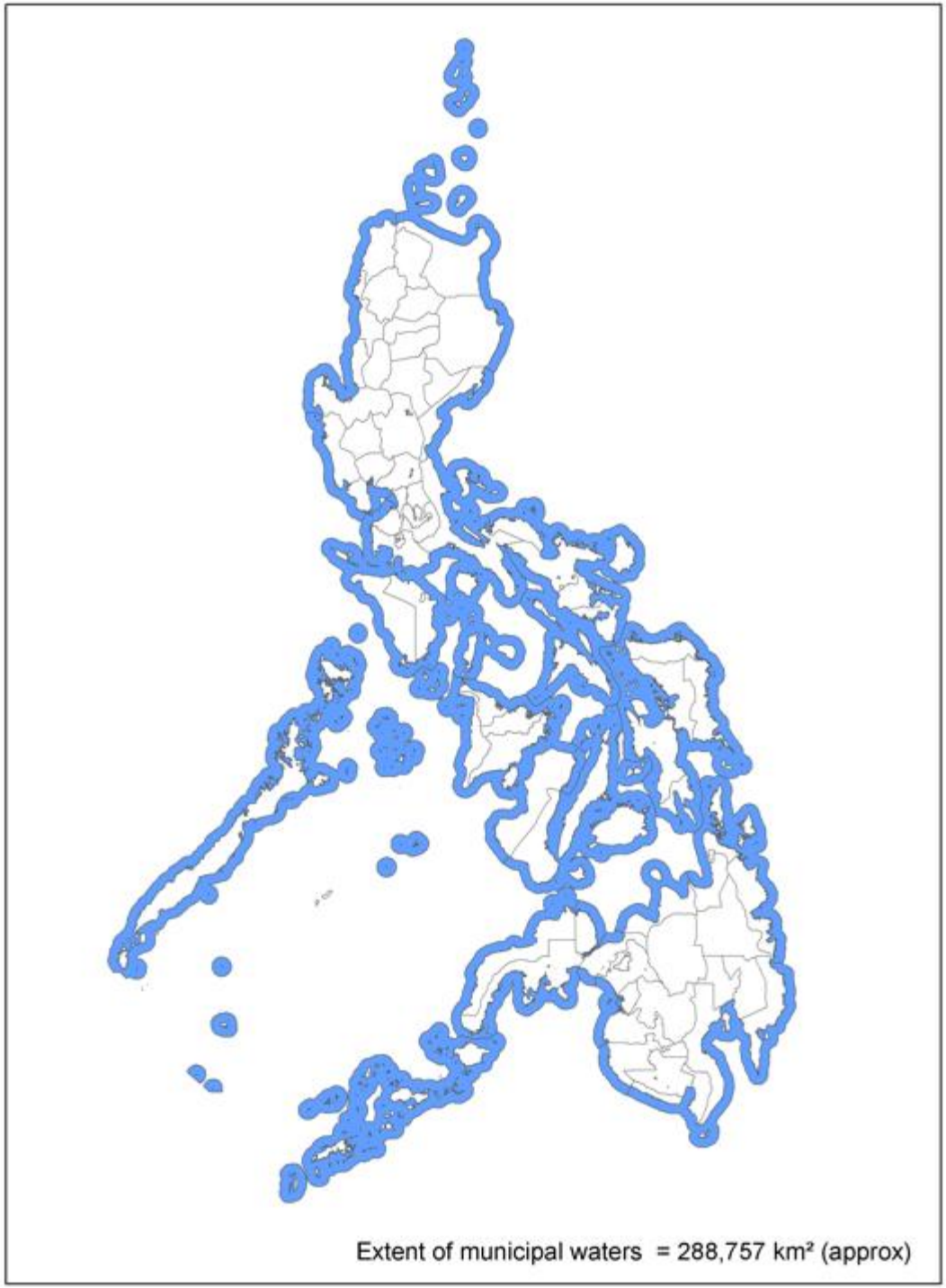
Management units
- Bays
- Gulfs
- Coastal waters



Fisheries management approach

1991 - Local Government Code
1998 – Fisheries Code

Municipal waters

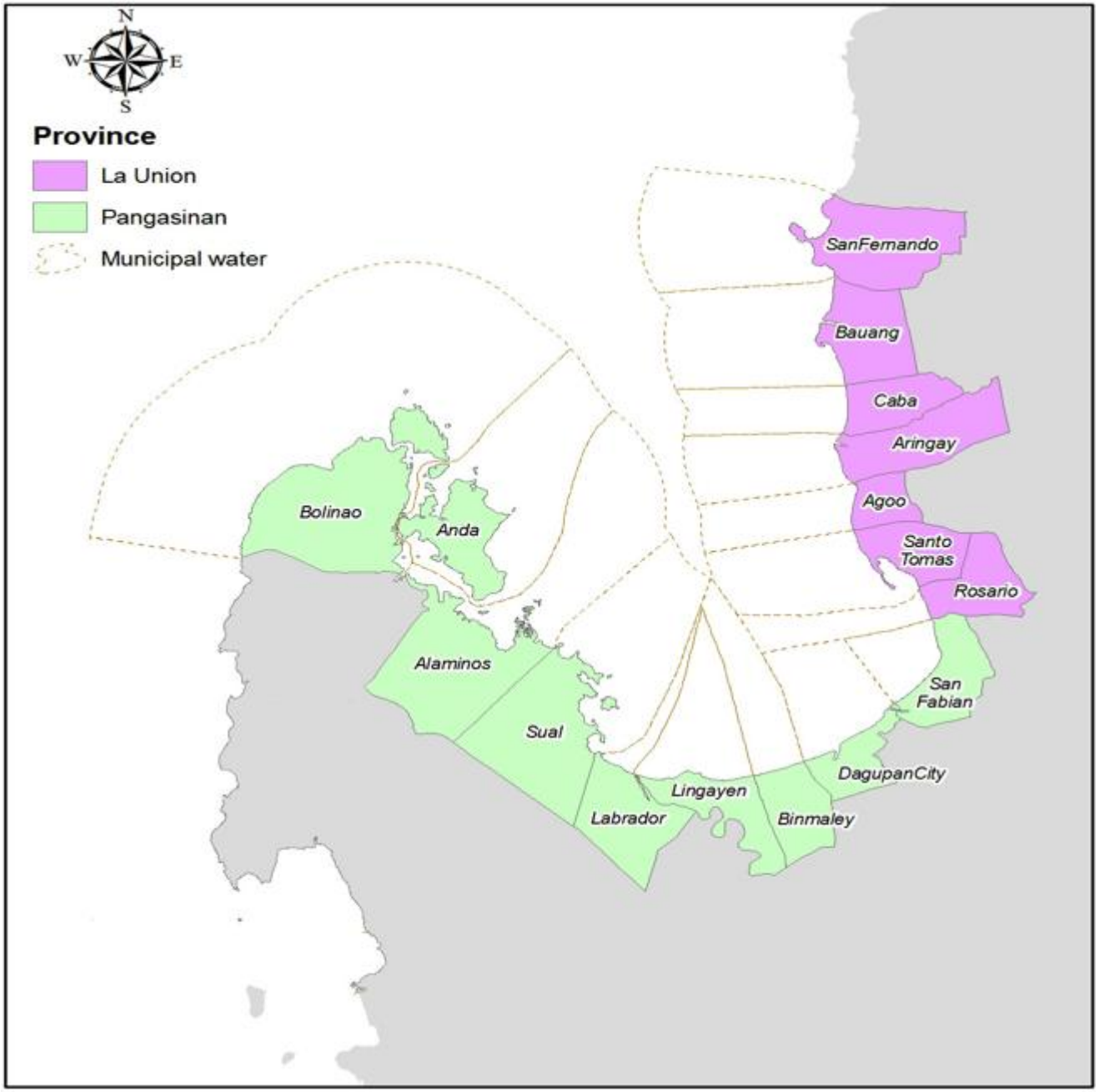


Fisheries management approach

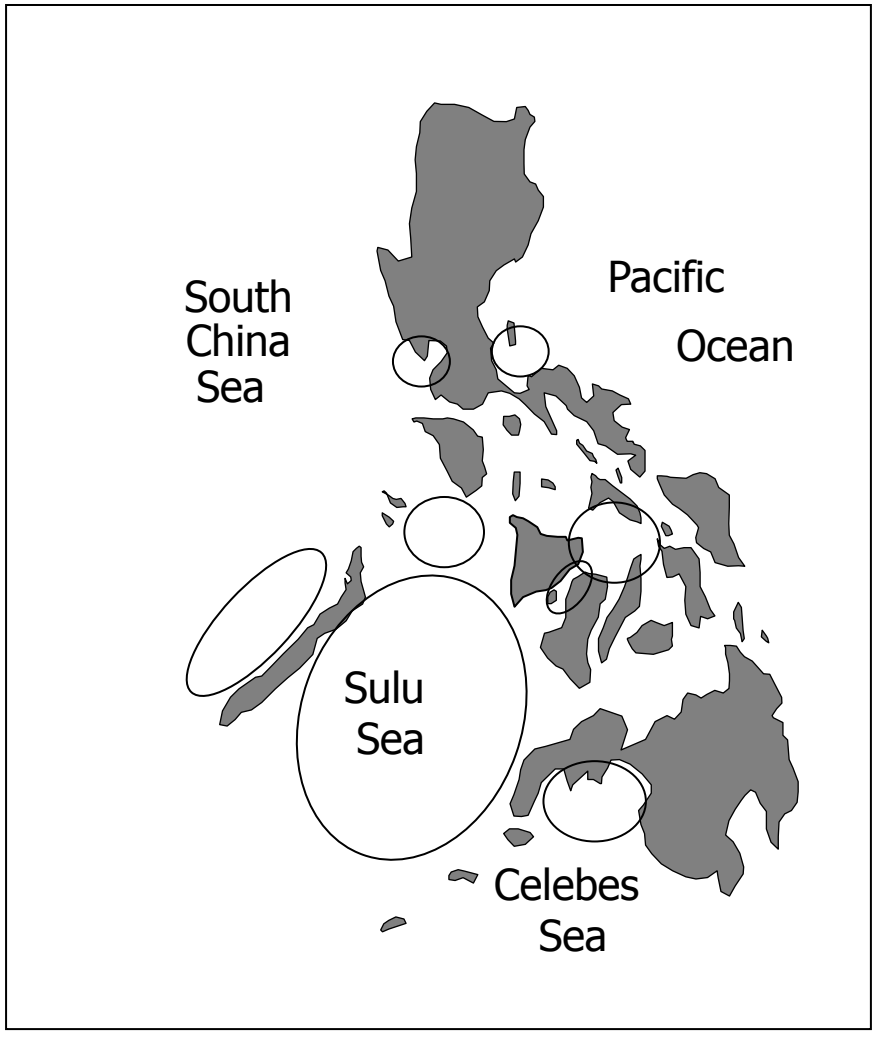
1991 - Local Government Code
1998 - Fisheries Code

Lingayen Gulf:

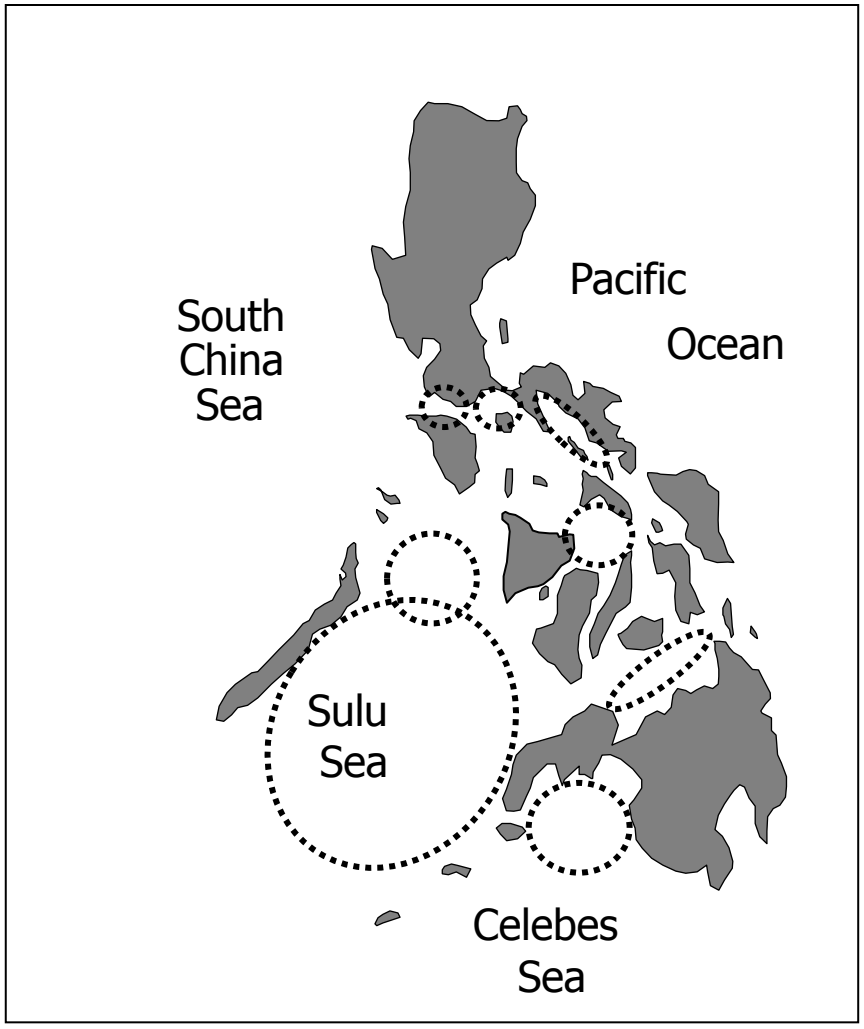
- Municipal waters
- National waters



Stock distribution and management scales

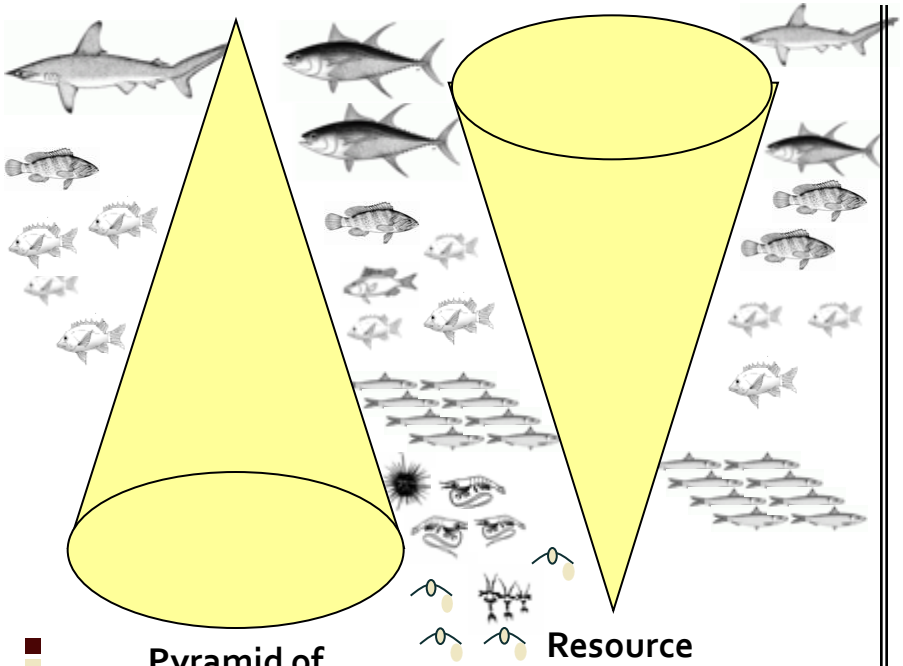


Major fishing grounds for small pelagic fish, based on annual landings >9000 MT during 1982-87 (PCAMRD 1993).



Top 10 tuna fishing grounds with mean annual landings >30,000 M during 1983-87 (PCAMRD 1993).

Stock distribution and management scales



Pyramid of Biomass

Resource Distribution (spatial)

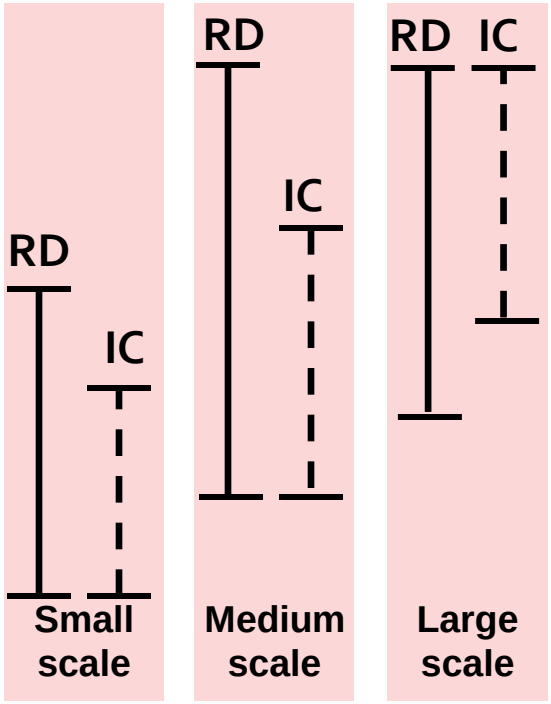
International

National

Regional

Inter-LGU

Local



Fishing Sub-sectors

NATURAL DIMENSION

HUMAN DIMENSION

RD - Resource distribution
IC - Institutional control

Practical application of EAF

EAF (FAO-CCRF, 2003)

"An approach to fisheries management and development that strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic, and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries."

In the tropical developing archipelagic country context

. . . this includes taking into account the fragility of the coastal ecosystems, the multi-sectoral uses, the multi-species and multi-gear nature of the fisheries, and the various needs of the coastal communities

Practical application of EAF

(Focus on the basic elements)

- **Delineation of ecosystem boundaries**
- **Incremental understanding of the dynamics of the marine ecosystem and subsystems within the boundary**
- **Development of indices of ecosystems' health as targets for management**
- **Immediate fisheries management interventions for species that constitute a large portion of the food web (economic importance?).**
- **Implementation of strategies such as MPAs, gear/species specific management, registration and licensing, zoning scheme, law enforcement**
- **Development of governance system that is responsive to ecosystems approach (and scale).**

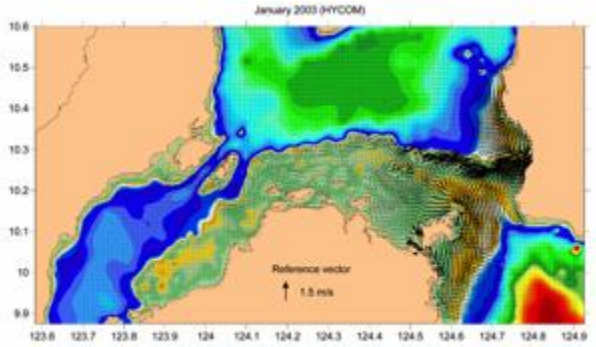
Practical application of EAF

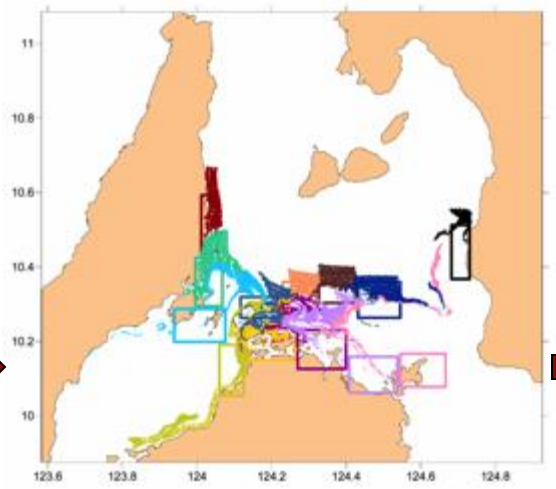
Fisheries management interventions

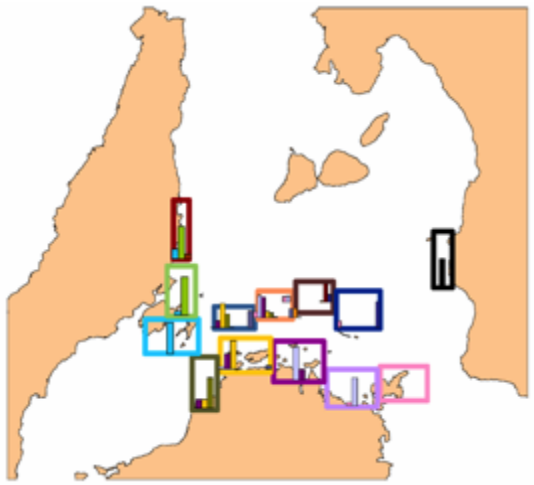
- Network of marine protected areas
- Species-specific and gear-specific management
- Zoning of fishing and water activities
- Registration and licensing
- Fishing effort rationalization
- Information Education and Communication
- Fishery Law Enforcement

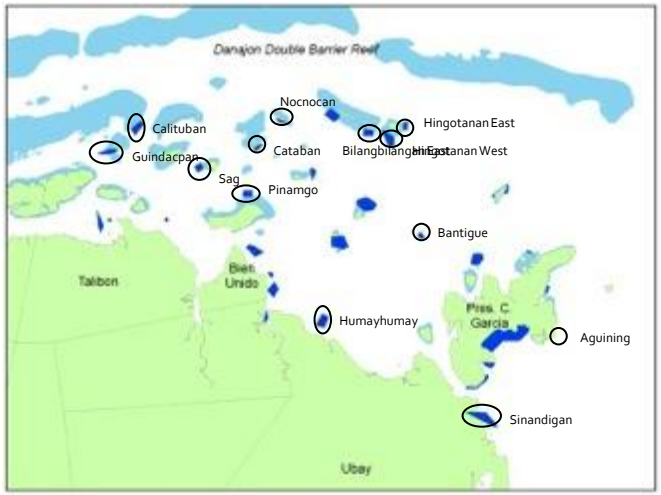
Practical application of EAF

Network of Marine Protected Areas

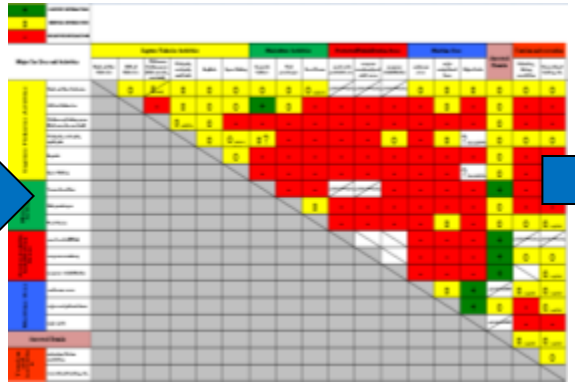


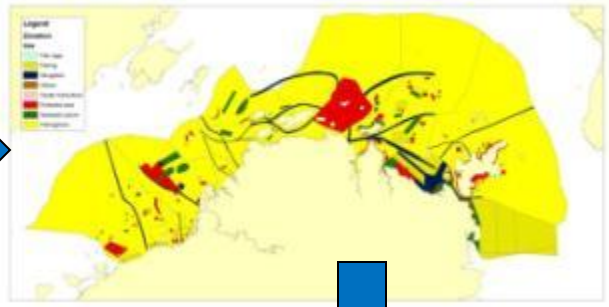


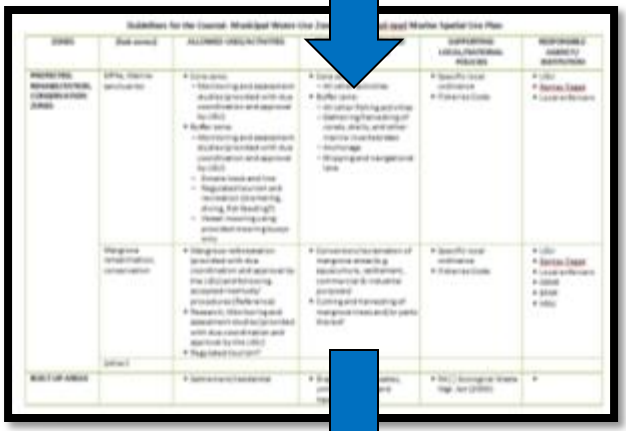




Practical application of EAF

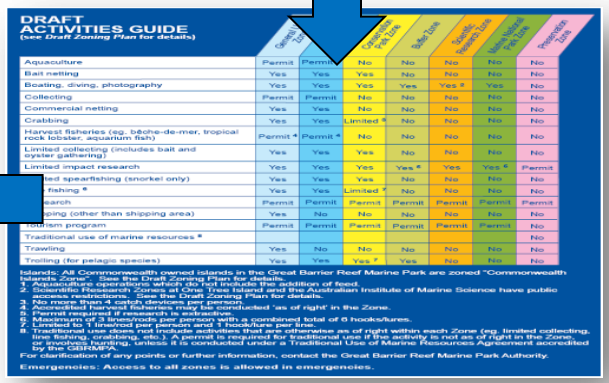






Zoning of fisheries uses

The Marine Spatial Use Plan of Danajon Bank, Philippines (Final)



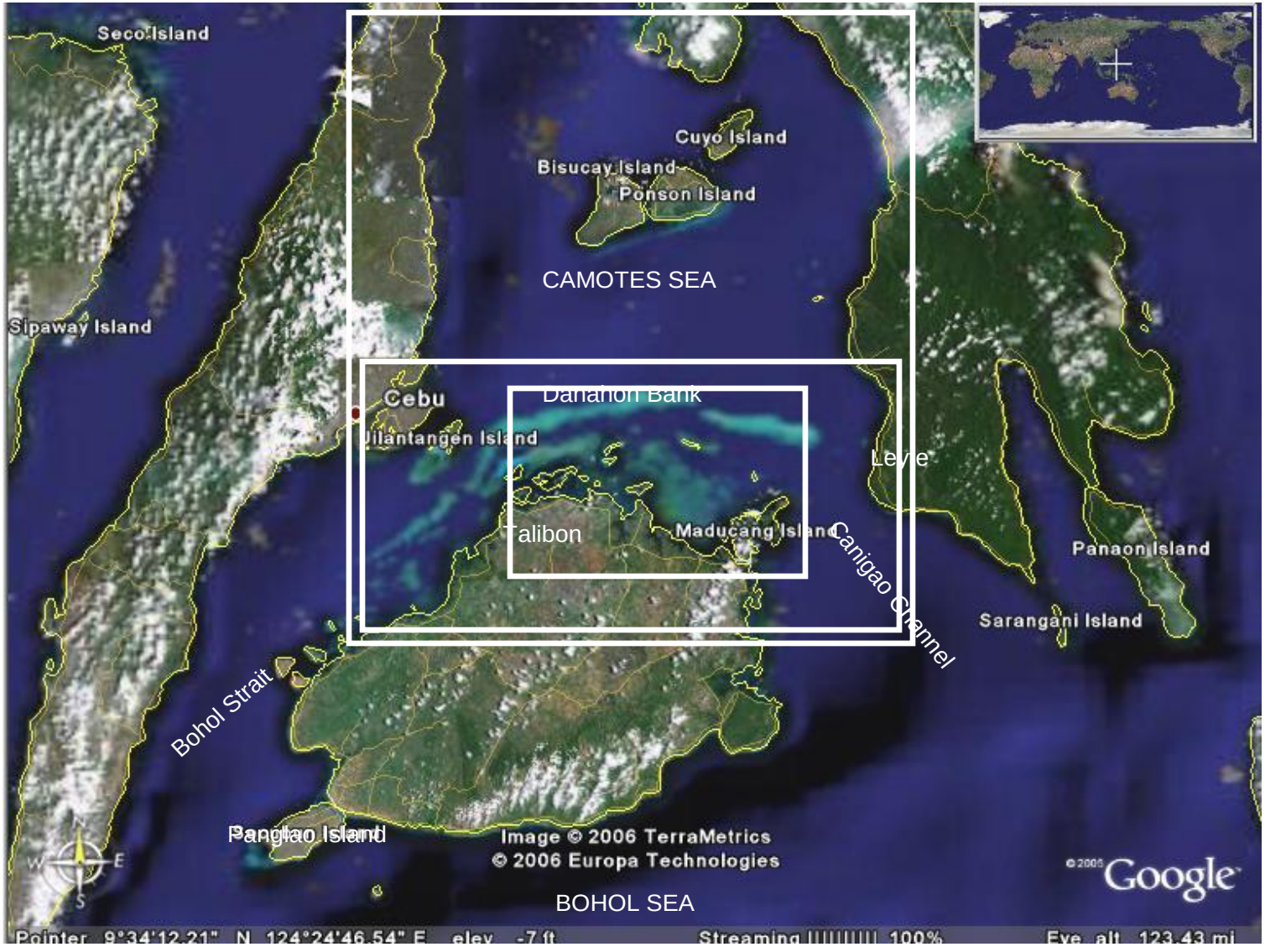
Practical application of EAF

Fisheries Law Enforcement

Ecosystem scale

Appropriate scale?

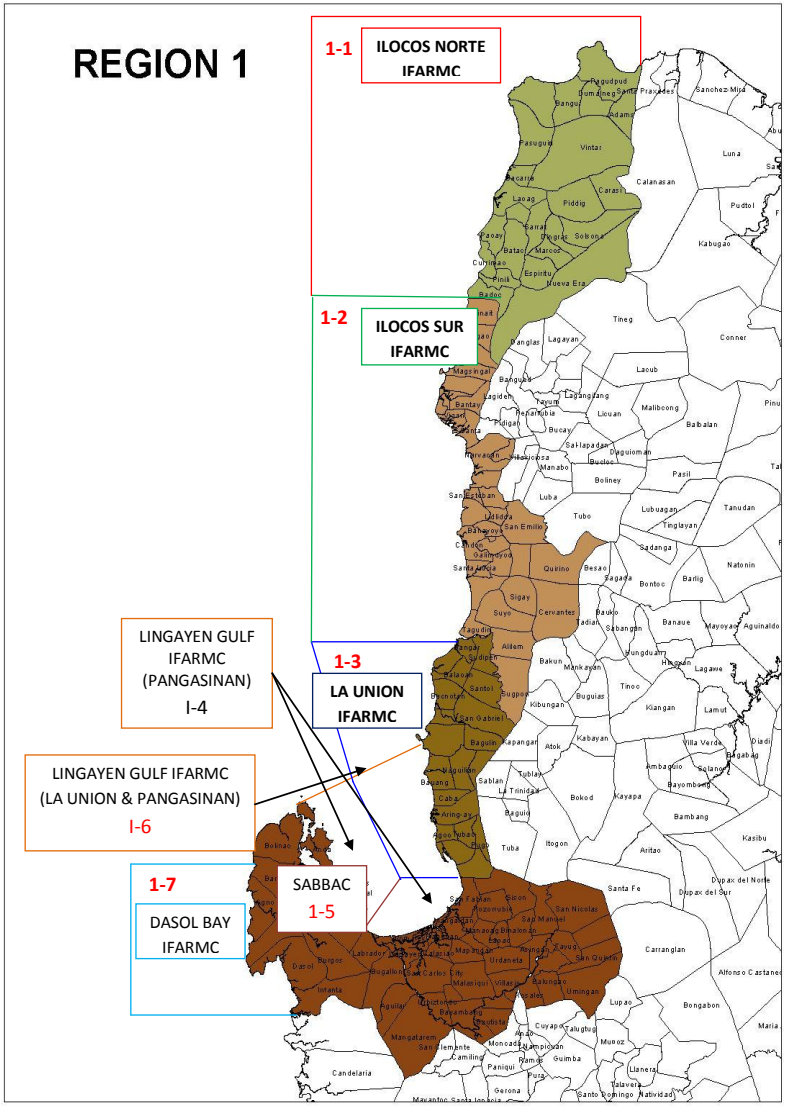
Fisheries Management Area



Ecosystem scale

I-3 NORTH LUZON SEA	**IFARMC-LA UNION**	**LA UNION** Western coastal towns bounded by Ilocos Sur in the north to the entrance of Lingayen Gulf in the south. (Luzon Sea)	BANGAR
			LUNA
			BALAOAN
			BACNOTAN
			SAN JUAN
			SAN FERNANDO CITY
			BAUANG
			CABA
			ARINGAY
			AGOO
			ROSARIO
			SANTO TOMAS
I-4 LINGAYEN GULF	**IFARMC-PANGASINAN**	**PANGASINAN** Coastal towns situated inside Lingayen Gulf from boundary of La Union in the east to the mouth of Lingayen Gulf in the west.	SAN FABIAN
			DAGUPAN CITY
			BINMALEY
			LINGAYEN
			LABRADOR
			SUAL
			ALAMINOS CITY
			BANI
			BOLINAO
			ANDA
			AGNO
			BURGOS
			DASOL
			INFANTA
I-5 LINGAYEN GULF	**SUAL, ALAMINOS CITY, BANI, BOLINAO, ANDA COUNCIL (SABBAC)**	**PANGASINAN** Western coastal towns along Lingayen Gulf noted for Milk-fish Cage Culture.	SUAL
			ALAMINOS CITY
			BANI
			BOLINAO
			ANDA

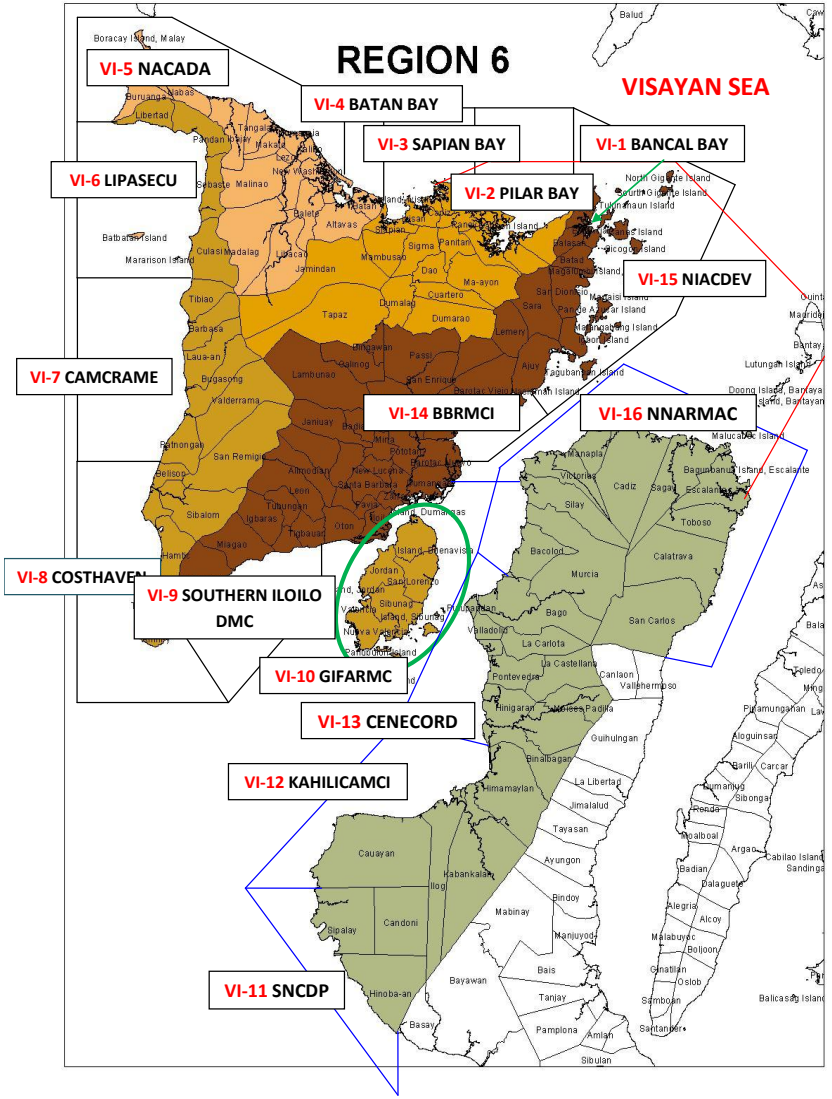
IFMA/IFMU



Ecosystem scale

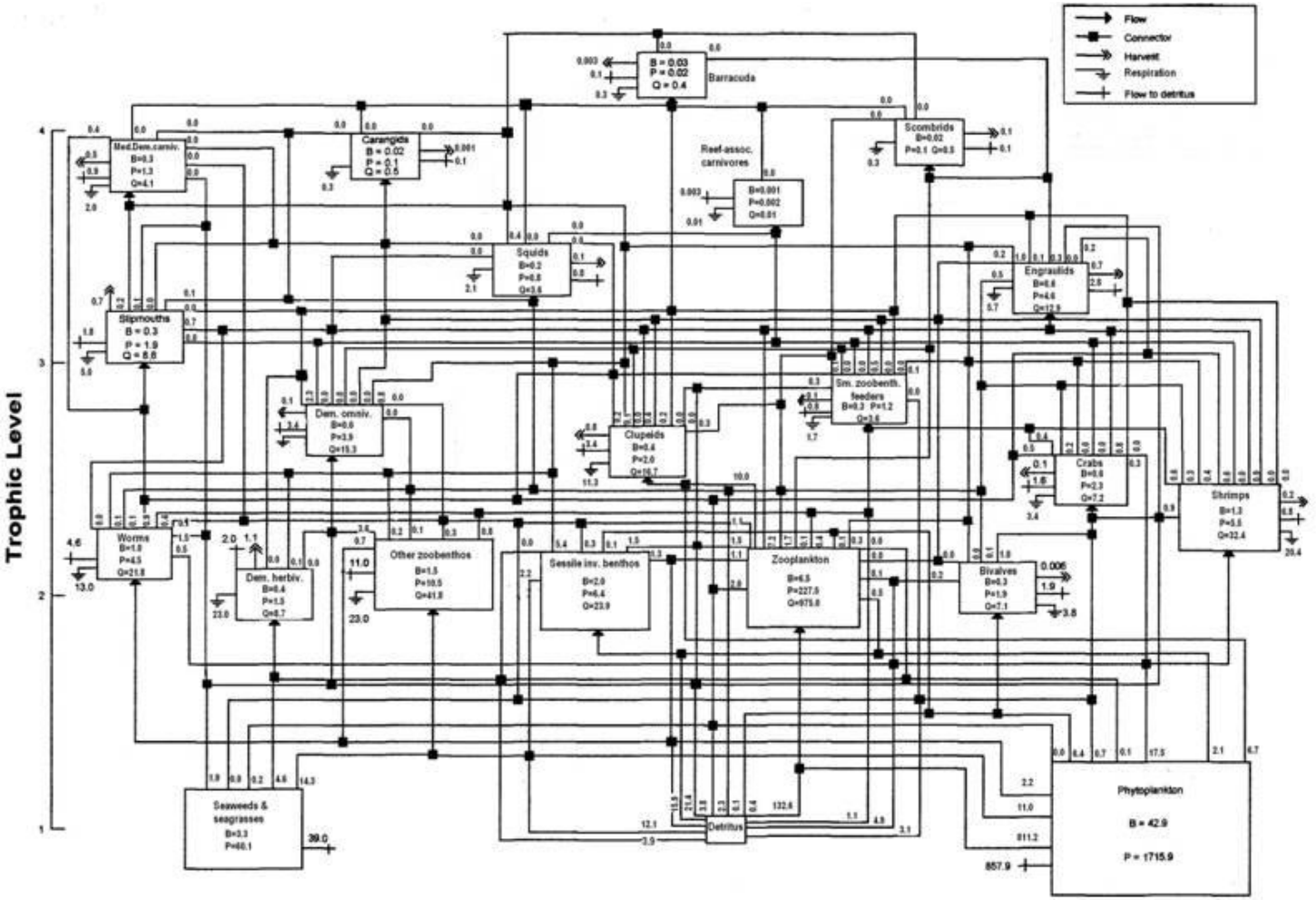
IFMA/IFMU

VI-6 EAST SULU SEA	LIBERTAD, PANDAN, SEBASTE, CULASI RESOURCE MANAGEMENT COUNCIL-LIPASECU	ANTIQUE Coastal towns from Aklan in the north to Culasi in the sout	LIBERTAD
			PANDAN
			SEBASTE
			CULASI
VI-7 EAST SULU SEA	CENTRAL ANTIQUE MUN. COASTAL RESOURCE for ACTIVE MANAGEMENT OF ECOSYSTEM-CAMCRAME	ANTIQUE Middle coastal towns.	TIBIAO
			BARBAZA
			LAUA-AN
			BUGASONG
			PATNONGON
			BELIZON
VI-8 EAST SULU SEA	COUNCIL of ANINI-Y, SAN JOSE, TOBIAS FORNIER, & HAMTIC for THE ADVANCEMENT OF VIABLE ENVIRONMENT-	ANTIQUE Western coastal towns bounded by Iloilo in the south.	SAN JOSE
			HAMTIC
			ASLUMAN (not mentioned)
			TOBIAS FORNIER (DAO)
			ANINI-Y
VI-9 CUYO PASS	SOUTHERN ILOILO DEV'T. & MANAGEMENT COUNCIL	ILOILO Southern coastal towns from Antique in the west to Tigbauan.	SAN JOAQUIN
			MIAGAO
			GUIMBAL
			TIGBAUAN
VI-10 GUIMARAS STRAIT	GUIMARAS ISLAND FISHERIES & AQUATIC RESOURCE MANAGEMENT COUNCIL-GIFARMC	GUIMARAS ISLAND PROVINCE	JORDAN
			BUENAVISTA
			SAN LORENZO
			SIBUNAG
			NUEVA VALENCIA
VI-14 GUIMARAS STRAIT	BANATE BAY RESOURCE MANAGEMENT COUNCIL BBRMCI	ILOILO Coastal along Guimaras Strait. Legally part of Visayan sea.	BAROTAC VIEJO
			BANATE
			ANILAO
			BAROTAC NUEVO
VI-15 VISAYAN SEA	NORTHERN ILOILO ALLIANCE FOR COASTAL DEVELOPMENT-NIACDEV	ILOILO Down south to Guimaras Strait. Legal territorial boundaries of Visayan Sea.	BALASAN
			ESTANCIA
			BATAD
			SAN DIONISIO
			CONCEPCION
			AJUY



Fishing effort control

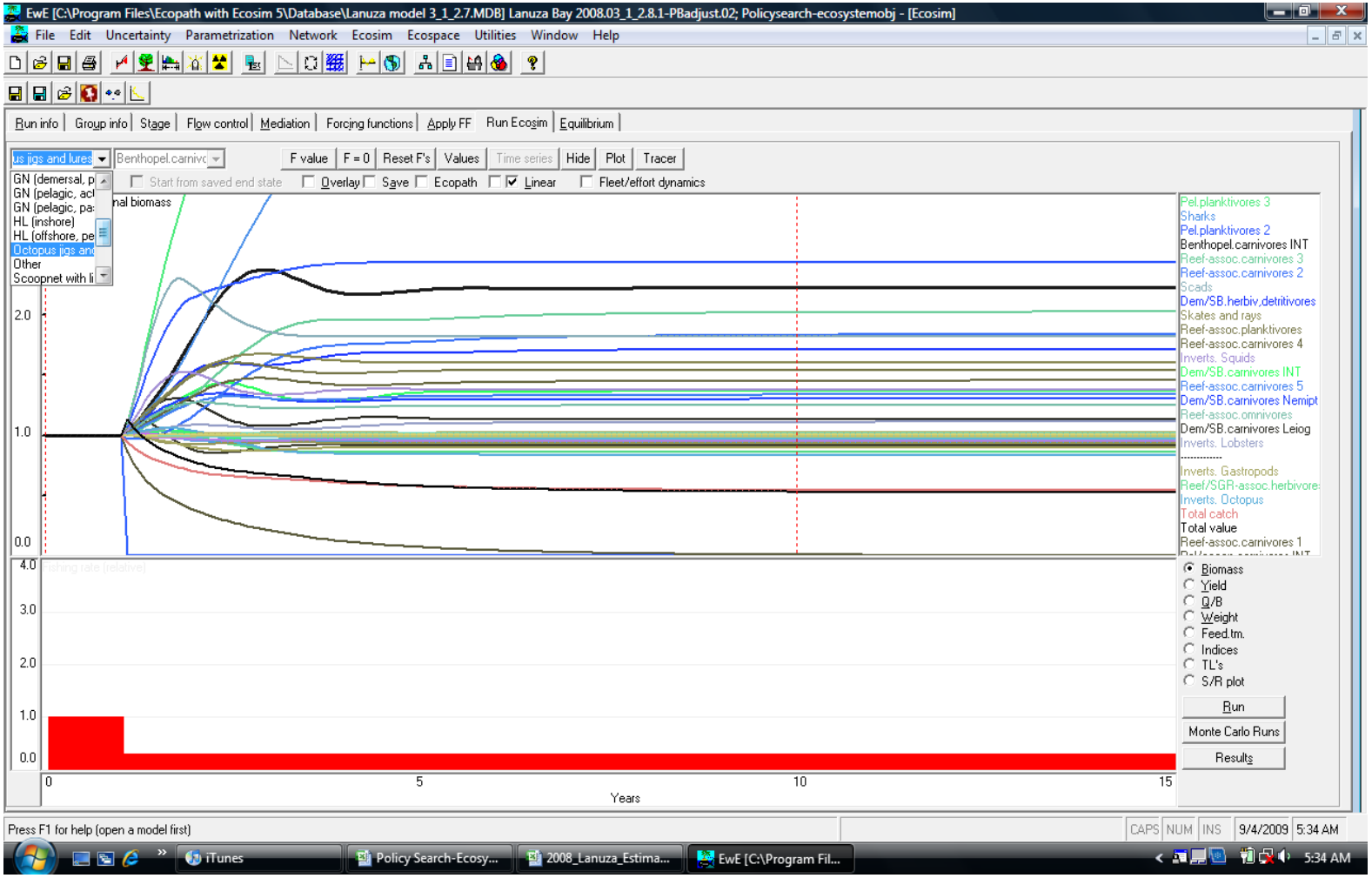
Ecopath with Ecosim



Trophic flow diagram

Fishing effort control

Ecopath with Ecosim



Simulation of relative changes of biomass

Fishing effort control

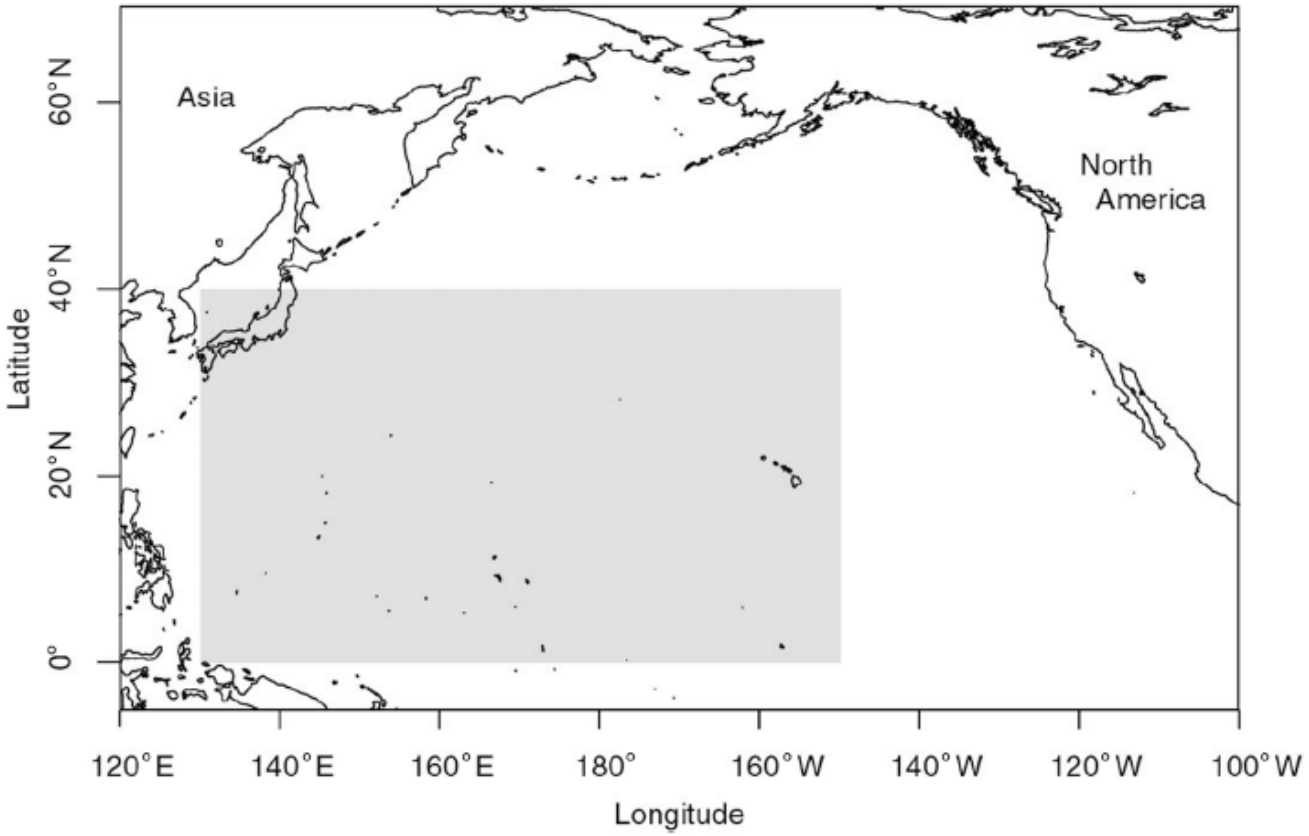
Inventory and ideal number

	Fishing gear	Local name	Talibon	Trinidad	B Unido	Ubay	CPG	TOTAL	Ideal	Remarks
1	Blast fishing	Tiro	14		33		8	55	0	ban
2	Bottom-set gillnet	Pukot palunod	133		42	282	208	665	600	reduce
3	Crab gillnet	Pukot panglambay	484	5	177	164	256	1,086	1,000	reduce
4	Drift gillnet	Pamo pamangsi, Yabyab	37		36	164	179	416	420	ok
5	Spear w/compressor	Buso	96		25	28		149	150	ok
6	Danish seine	Liba-liba	6		70	4		80	0	ban
7	Crab pot	Panggal	97		38	74	34	243	210	reduce
8	Set gillnet w/plunger	Pukot dumbol	41	10	77	68	12	208	210	ok
9	Beach seine	Baling	4		35	10		49	40	reduce
10	Simple hook and line	Pasol	295	44	298	292	518	1,447	1,500	ok, possible increase
11	Otter trawl	Palakaya	7		28			35	0	ban
12	Crab liftnet	Sapyaw panglambay	156	3	55	170	20	404	200	reduce
13	Fish corral	Bungsod, Tower	248	59	51	38	43	439	220	reduce
14	Bottom set longline	Palangre	18		113	114	232	477	400	reduce
15	Drive-in gillnet	Ariba-ariba, pangsasa	78		41	14	3	136	140	ok
16	Multiple handline	Chacha, Bira-bira	26		30		51	107	110	ok, possible increase
17	Fish trap	Bubo	67		31	17	69	184	100	reduce
18	Trammel net	Tripol net, Dobol net	164	5	27	8		204	60	reduce
19	Encircling gillnet	Likom, Paninsin			14	8	15	37	40	ok
20	Handspear	Pana	289		32	35	34	390	200	reduce
21	Round-haul seine	Lawag	4					4	0	ban
22	Stationary liftnet	Newlok, Bintol	4	1		52		57	20	reduce
23	Others									

Fishing effort control

Major species caught:

- Various tunas (*Thunnus* spp.), adult and juveniles
- Skipjack tuna (*Katsuwonus pelamis*)
- Billfishes (*Xiphias gladius*, *Makaira* spp., *Tetrapturus* spp., *Istiophorus platypterus*)
- Various sharks, large and small



Map of the Pacific Ocean with central north Pacific (CNP) represented by shaded area (Source: Cox et al. 2002)

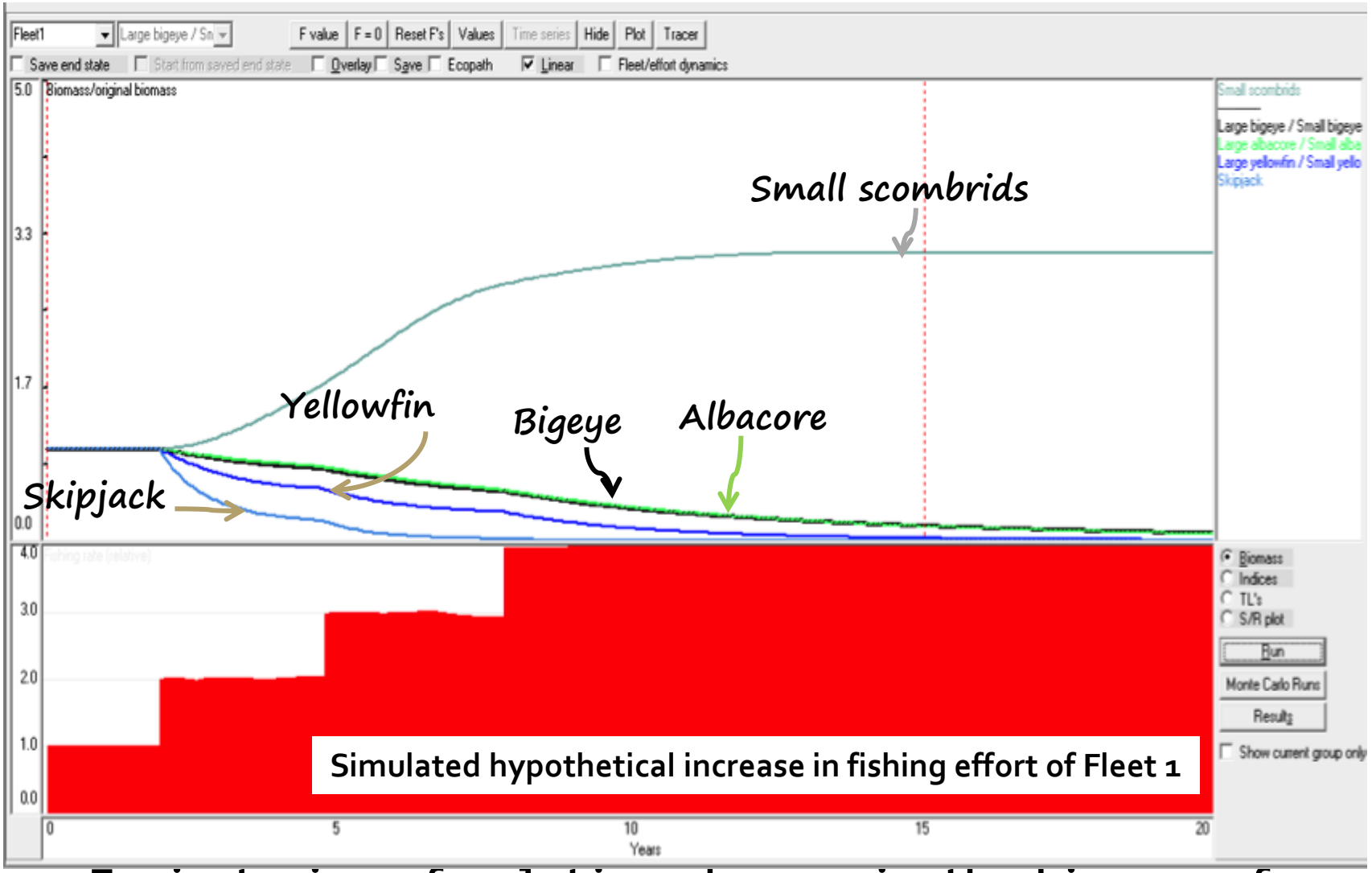
Fishing effort control

Group	Code	TL	*B*	*P/B*	*Q/B*	EE	*Y*	*F*
Large bigeye	LB	4.06	8.80	0.42	7.20	**0.332**	1.28	0.15
Small bigeye	SB	3.82	4.20	0.67	9.70	**0.233**	0.35	0.08
Large yellowfin	LY	4.12	12.66	0.98	14.00	**0.179**	2.16	0.17
Small yellowfin	SY	3.91	2.25	2.52	17.60	**0.736**	2.77	1.23
Large albacore	LA	4.10	8.80	0.36	7.30	**0.437**	0.49	0.06
Small albacore	SA	3.96	8.12	0.35	9.60	**0.580**	1.27	0.16
Large blue shark	LBS	4.05	4.96	0.32	2.75	**0.989**	0.99	0.20
Small blue shark	SBS	3.99	0.35	0.46	3.50	**0.504**	0.02	0.06
Blue marlin	BM	4.61	0.58	0.46	4.00	**0.700**	0.18	0.31
Large sharks	LS	4.68	**0.28**	0.39	2.50	0.500	0.05	0.19
Brown sharks	BS	4.32	**1.67**	0.18	2.80	0.600	1.02	0.08
Swordfish	SW	4.32	0.87	0.60	5.00	**0.653**	0.33	0.37
Other billfish	OB	4.41	**0.81**	0.44	5.00	0.600	0.18	0.23
Mahi mahi	MM	3.97	**11.23**	0.85	20.00	0.600	0.42	0.05
Small scombrids	SS	3.53	**263.90**	1.08	10.00	0.700	—	—
Flying squid	FS	3.32	**19.93**	7.13	50.00	0.350	0.70	0.04
Skipjack	SK	3.85	13.20	2.90	20.00	**0.771**	14.12	1.07
Lance	LA							
Squids	SQ							
Flying fishes	FF							
Mesopelagic fish	MF							
Epipelagic fish	EF							
Epipelagic micronekton	EM							
Mesopelagic micronekton	MM							
Phytoplankton	PP	1.00	**26 583.78**	194.36	—	0.400	—	—

Large and small members of the same species are treated as separate functional groups, each with own inputs and/or estimates of Biomass, Production/B, Consumption/B, EE, Fishery yield, Diets, Trophic level

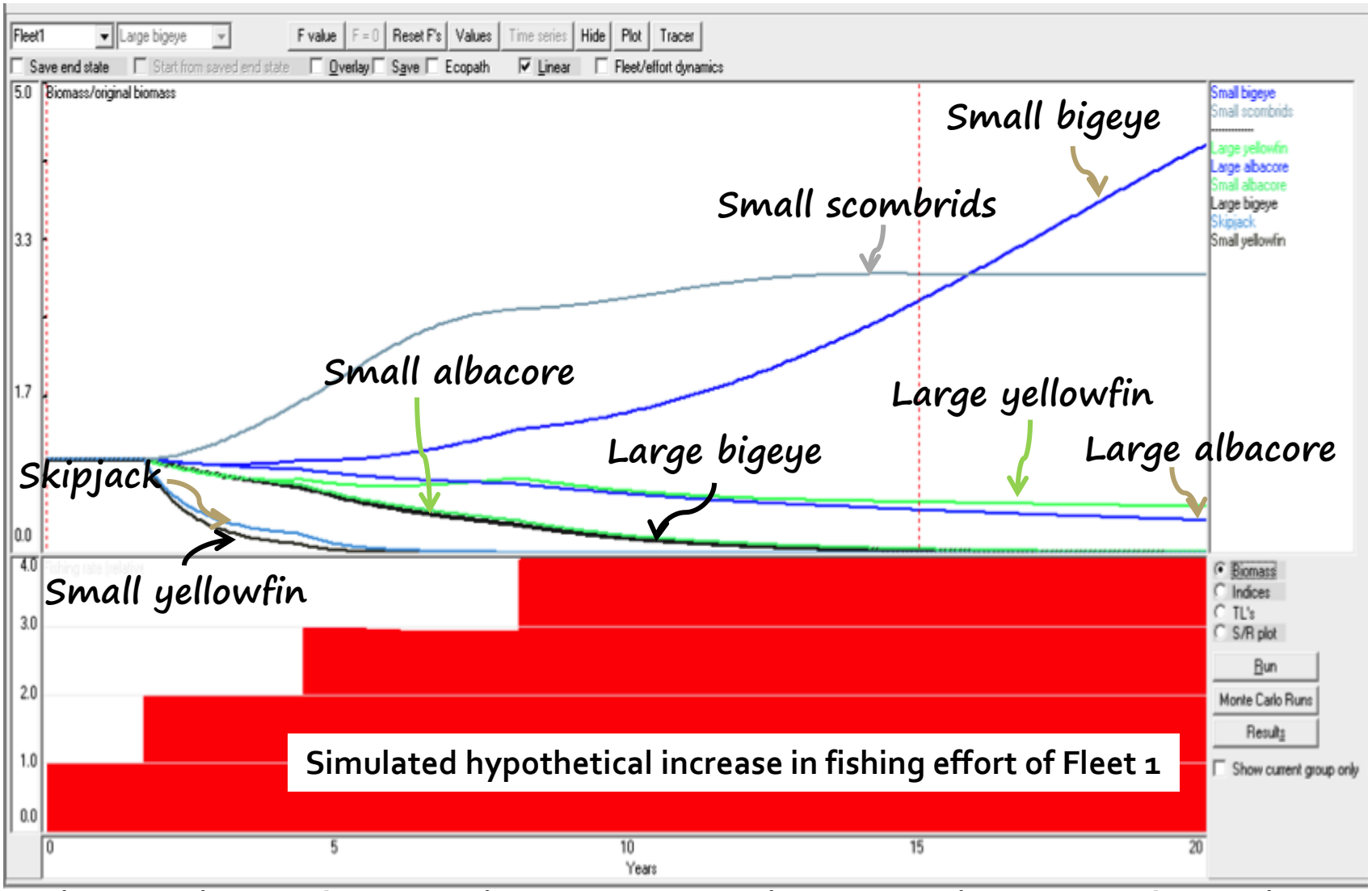
Balanced Ecopath estimates of trophic level (TL), biomass (B; kg·km–2), production per biomass (P/B; year–1), consumption per biomass (Q/B; year–1), ecotrophic efficiency (EE), total yield from all fisheries (Y; kg·km–2), and mean 1990s fishing mortality (F; year–1). (Source: Cox et al. 2002)

Fishing effort control



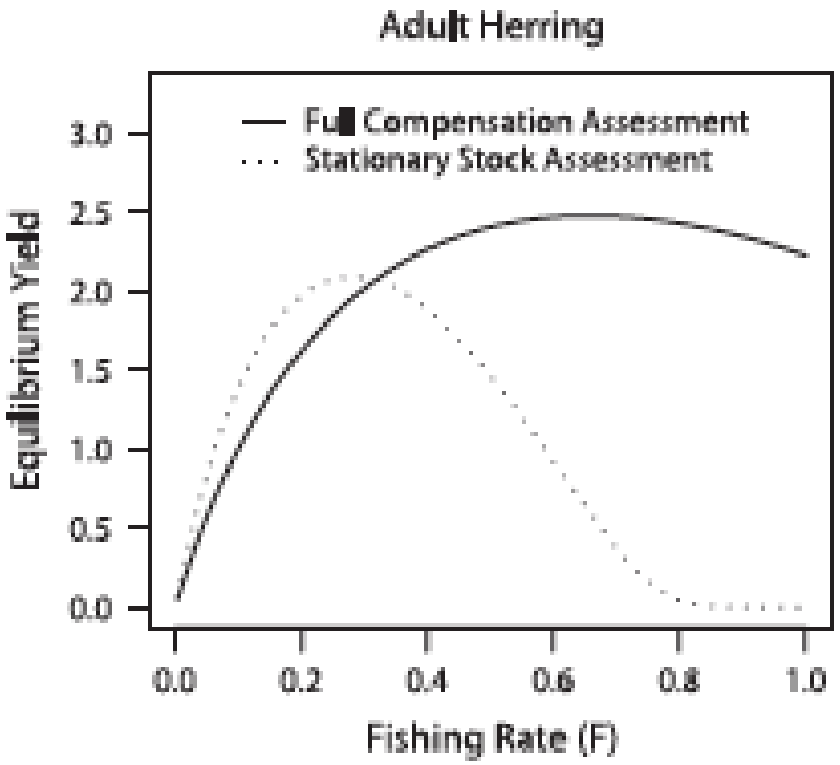
Trajectories of relative changes in the biomass of various tuna species (no size segregation)

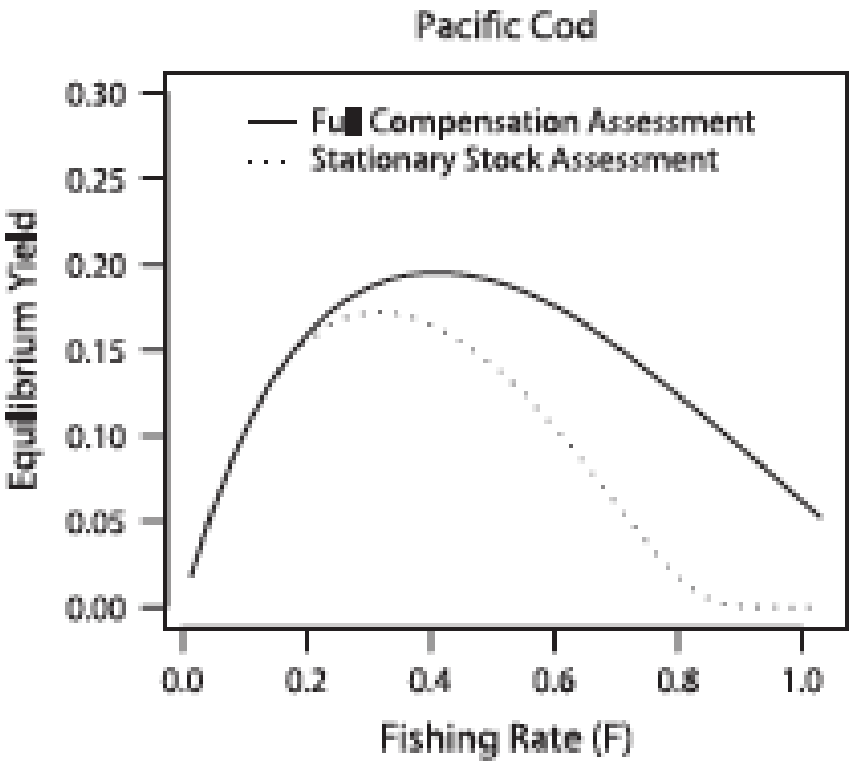
Fishing effort control



Trajectories of relative changes in the biomass of various tuna species and sizes

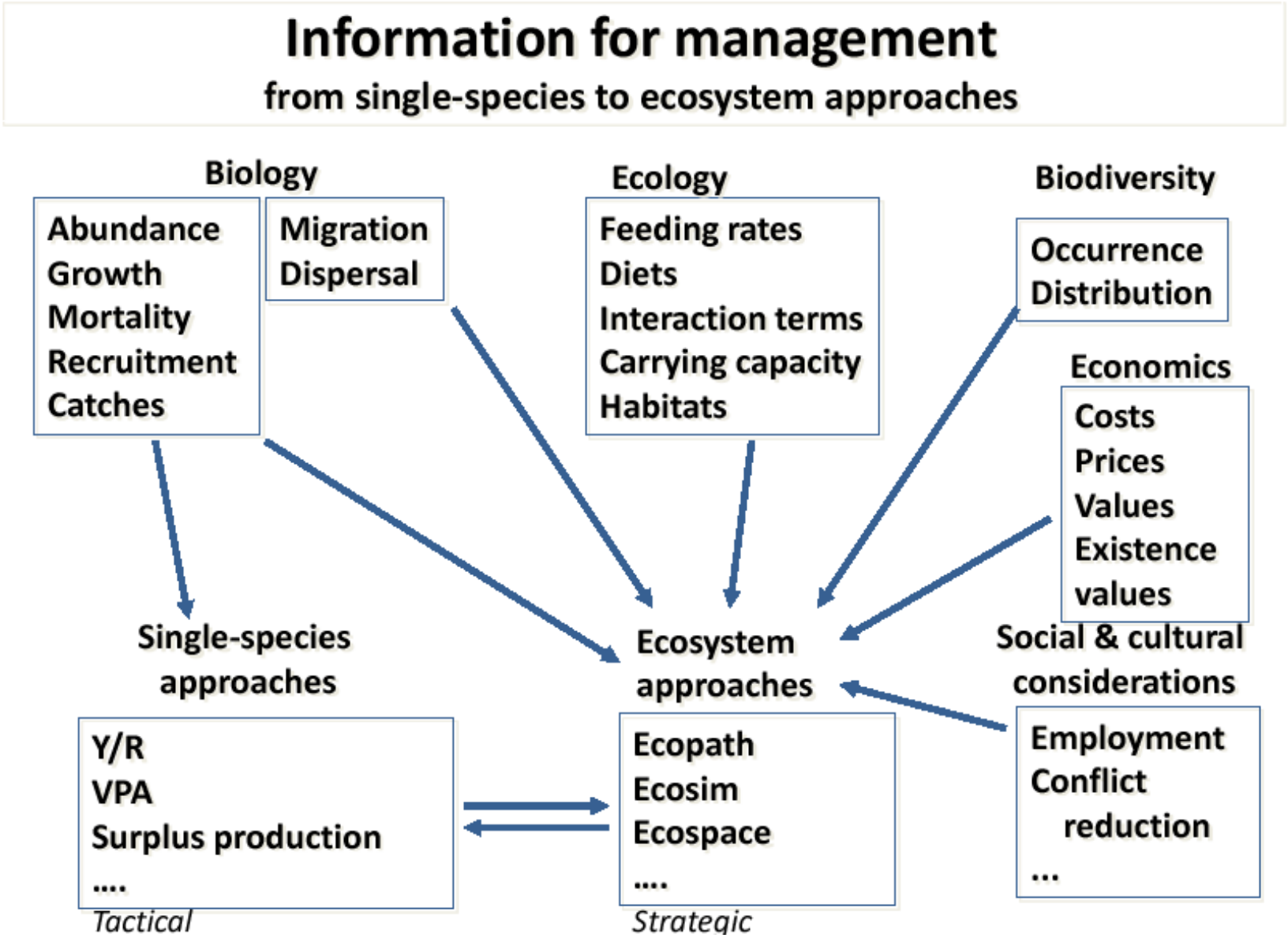
Fishing effort control





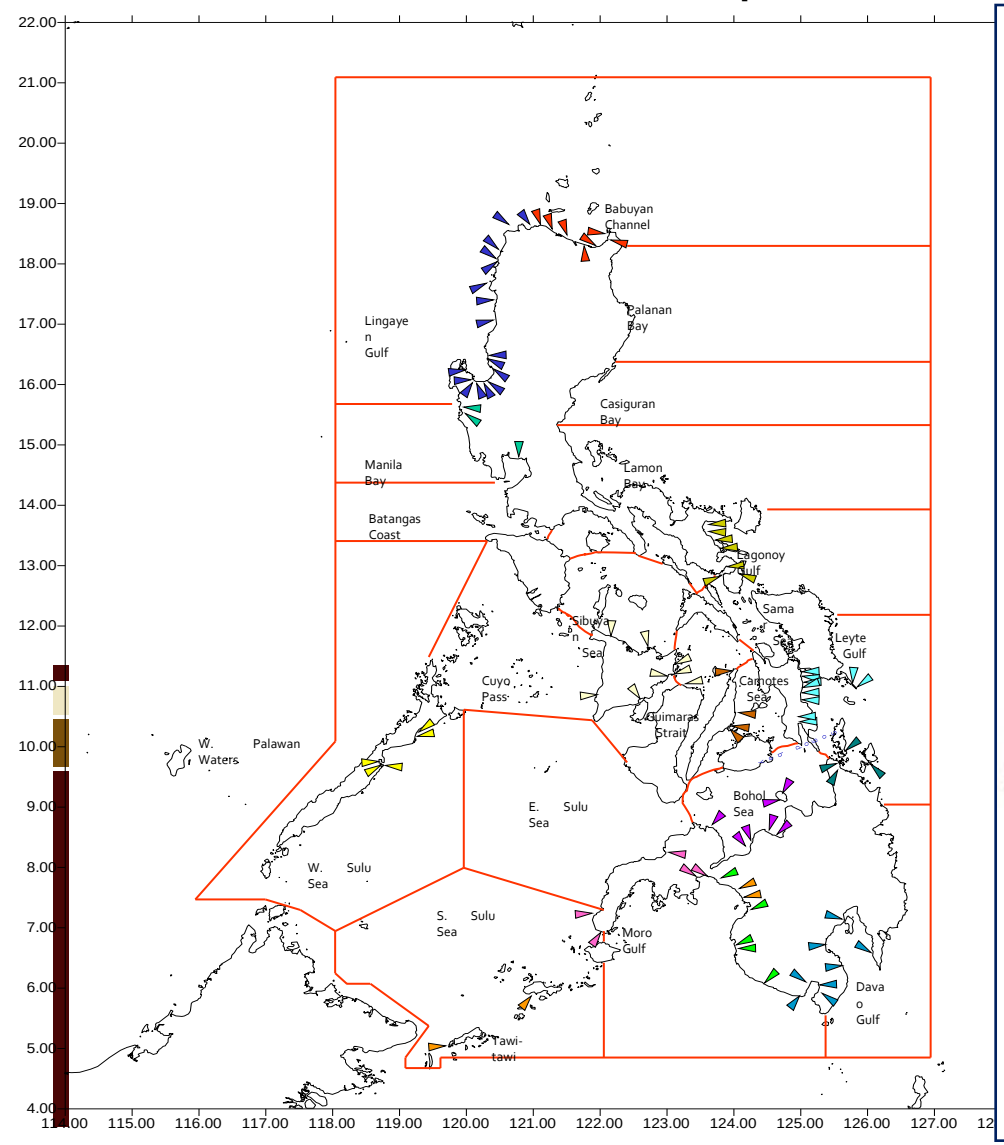
Stationary Stock Assessment = no ecosystem interaction
Full Compensation Assessment = with ecosystem interaction

Data support

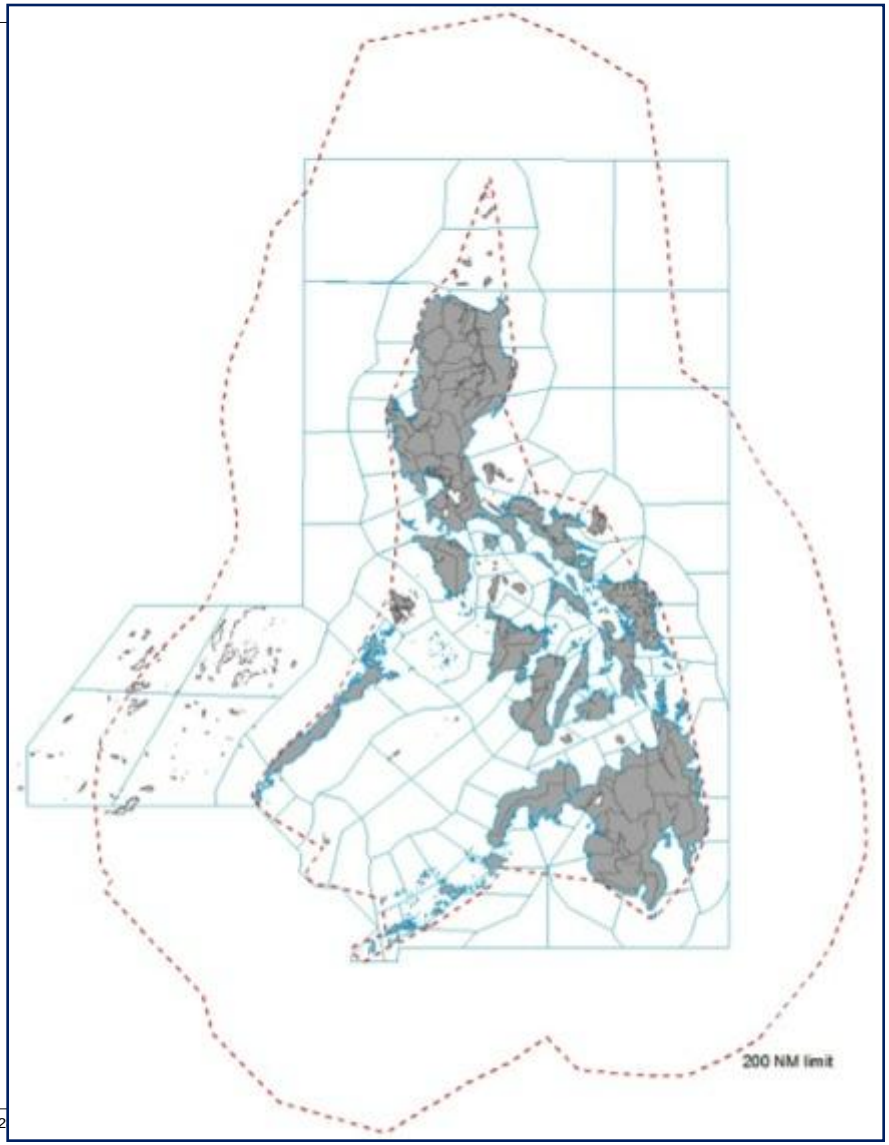


Data support

NSAP data collection points



IFMA/IFMU







West Pacific East Asia Oceanic Fisheries Management Project (WPEA-OFMP)

5.1.1 Determination of Maximum Sustainable Yield and Total Allowable Catch

The Philippine Fisheries Code commits to the use of maximum sustainable yield (MSY) and total allowable catch (TAC) in the management of fisheries in Philippine waters. Despite considerable data, there are no comprehensive stock assessments available for all Philippine tunas resources on which estimates of MSY and TAC for tuna species might be based. However the lack of adequate data to determine the MSY has not detracted the Philippines from making initial assessments on the status of tuna fisheries and from implementing measures that would limit fishing effort based on best scientific evidence available, as provided by the National Stock Assessment Program (NSAP). There are also routine regional assessments and tagging projects conducted by other organizations and participated in by the Philippines in the Western and Central Pacific Ocean which supplement data collection.

The Bureau of Fisheries and Aquatic Resources will prioritize work towards the determination of MSY and TAC for tuna resources in Philippine waters based on stock assessment and relevant environmental data. Such determination of MSY will assist in the setting of TAC for tuna resources. Setting of TAC will help ensure equitable use of tuna resources in Philippine waters, promote optimal economic and social benefits for the Filipinos, and protect the interests of municipal fisherfolks. If after the MSY has been determined there is enough evidence to suggest that tuna stocks are being fished beyond its capacity, the BFAR will adopt additional measures to ensure that fishing effort does not exceed sustainable catch levels.

Determination of MSY and TAC will help the Philippines move away from an open access regime towards a rights based management for the tuna fishery. This management system will include the development of a harvest strategy in accordance with target and limit reference points. The Philippine will work towards the determination of these reference points for key tuna fisheries, and in the interim will adopt measures to prevent negative fishing pressures based on existing data and best scientific evidence available.

5.1.2 Control of Fishing Effort and Capacity

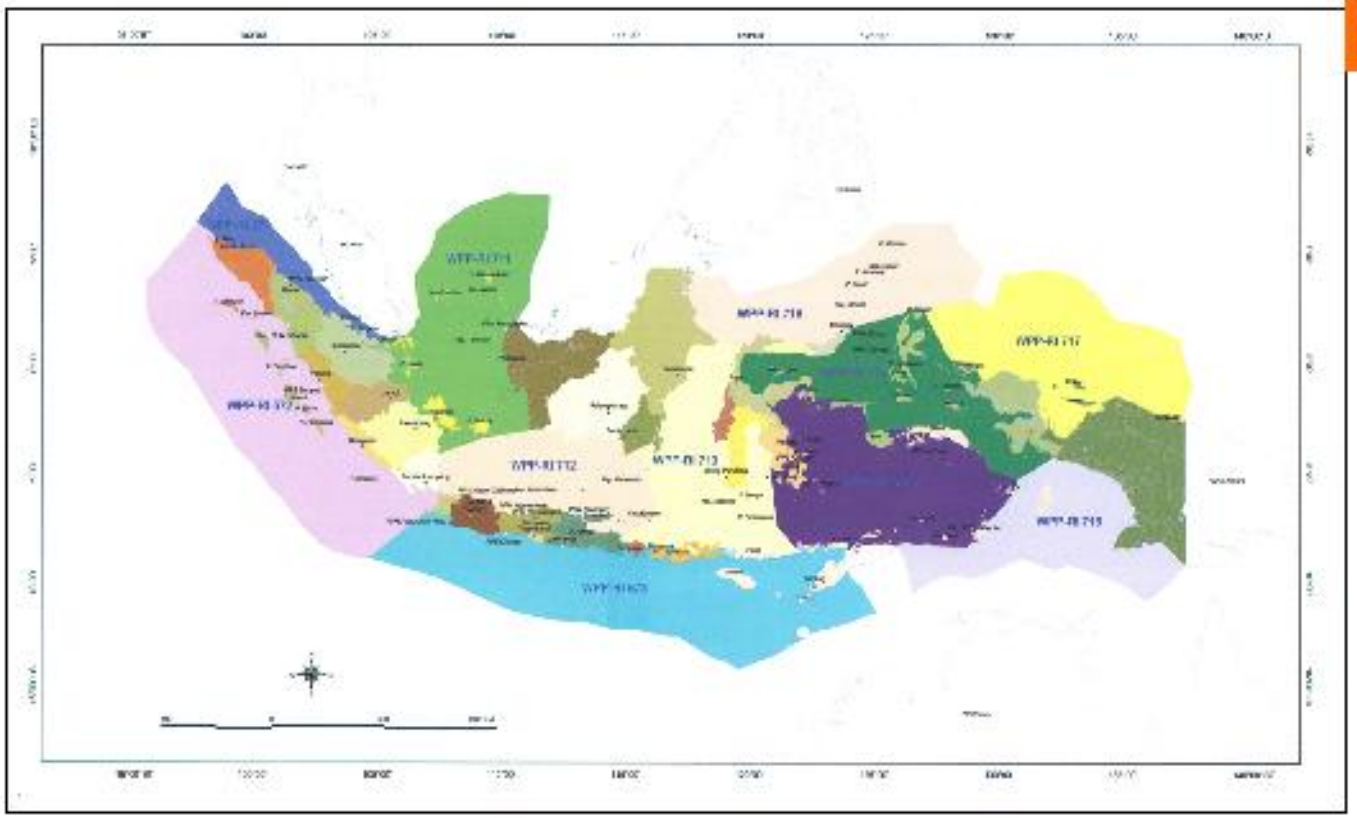
As highlighted in Part 2 of this Plan, tuna catch in the Philippines has been showing a declining trend in the past 10 years. This is largely due to measures adopted to limit fishing effort and capacity consistent with domestic law and applicable regional measures. In particular, the Philippines has issued a moratorium on commercial fishing vessel licenses since 2003. Policies and technical measures have also been adopted to prevent the increase in fishing mortality for yellowfin tuna beyond 2001-2004 average and to significantly reduce bigeye tuna fishing mortality consistent with conservation and management measures adopted for bigeye and yellowfin tuna by the WCPFC. These technical measures are further discussed below.

Thank you

Indonesia FMA

WPP-RI | Wilayah Pengelolaan Perikanan Republik Indonesia

WPP-RI



Scope of Plan :

a. Gear Type
b. Species
c. FMA

Management Period:

3 years subject to annual evaluation

Profile of Indonesia Tuna Fisheries (Tuna Export)

No	Product Type	Export	
		Volume (Kg)	Value (U.S. $)
1	Fresh	13.332.109	88.026
2	Frozen tuna and skipjack	58.452.825	131.413.987
3	Canned Tuna	69.989.252	279.150.989
	Total	**141.774.186**	**498.591.247**

Source: BPS-9 Digit HS, (analyzed) by Directorate of Foreign Market Development - DG of Fisheries Product

Tuna Issues in Indonesia

- Resource
- Management
- Socioeconomic

Fishing Fleet in FMA related to WCPFC Statistical Area

	2007	2008	2009	2010
< 5 GT	30.203	36.784	35.659	39.346
5 - 10 GT	10.884	7.920	9.359	10.024
10 - 20 GT	2.714	1.815	2.517	2864
20 - 30 GT	637	813	844	1.032
30 - 50 GT	579	95	337	384
50 - 100 GT	1.263	1.132	702	1.140
100 - 200 GT	576	510	373	324
200 - 300 GT	29	24	43	44
300 - 500 GT	17	30	24	12
500 - 1000 GT	17	17	12	13
> 1000 GT	2	3	2	2
Total	46.921	49.143	49.872	55.185

Fishing Fleet in Archipelagic Waters (FMA713-715)

	2007	2008	2009	2010
< 5 GT	27.313	29.911	30.847	34.720
5 - 10 GT	9.431	6.681	7.952	8.182
10 - 20 GT	2.094	1.162	1.882	2.474
20 - 30 GT	469	668	785	956
30 - 50 GT	422	16	286	331
50 - 100 GT	806	684	432	792
100 - 200 GT	397	319	259	224
200 - 300 GT	0	0	25	25
300 - 500 GT	0	0	0	0
500 - 1000 GT	0	0	0	0
> 1000 GT	0	0	0	0
Total	40.932	39.441	42.468	47.704

Fishing Fleet in IEEZ
(FMA 716, 717)

	2007	2008	2009	2010
< 5 GT	2890	6873	4812	4626
5 - 10 GT	1453	1239	1407	1842
10 - 20 GT	620	653	635	390
20 - 30 GT	168	145	59	76
30 - 50 GT	157	79	51	53
50 - 100 GT	457	448	270	348
100 - 200 GT	179	191	114	100
200 - 300 GT	29	24	18	19
300 - 500 GT	17	30	24	12
500 - 1000 GT	17	17	12	13
> 1000 GT	2	3	2	2
Total	5989	9702	7404	7481

Annual Tuna Catch Estimates, 2011

FMA	Average Catch Estimates (2011)								Total
	Skipjact		Yellowfin		Bigeye		Swordfish		
	(ton)	(%)	(ton)	(%)	(ton)	(%)	(ton)	(%)	
713;714;715	179.429	56,7	97.017	30,7	39.800	12,6	0	0	316.246
716;717	69.713	65,4	33.009	31,0	3.889	3,6	0	0	106.611
High Seas	0	0	164	13,4	956	78,2	103	8,4	1.223
Total	249.142	58,7	130.982	30,8	43.853	10,3	103	0,2	424.080

Management Measures

1. In Indonesia FMA
2. On the High Seas

Management Measures in Indonesia FMA (Current / Future)

1. Catch estimates
2. Scientific data collection
3. Determination of catch limit
   - Territorial Waters and IEEZ
   - Archipelagic Waters

Catch Limit (cont..)

Determination of catch limit in territorial waters and IEEZ (FMA-716,FMA-717):

- will be determined by adoption of RFMO-CMM such as :

✓ bigeye tuna and yellowfin tuna (WCPFC)

✓ SBT (CCSBT)

Catch limit (cont….)

Determination of catch limit in archipelagic waters (FMA-713, FMA-714,FMA-715):

- Elaborate Annual catch estimates by gear type and species based on the best available data (2000-2011).
- Catch composition will be obtained from port sampling program and scientific observer-program.

Catch Composition Estimates by Gear Type and Species (port sampling basis)

No	Fishing Gear	Catch Composition (%)		
		Cakalang	Yellowfin	Bigeye
A	**BITUNG**			
1	Purse-seine	86	11	3
2	Pole and Line	94,2	3,5	2,3
3	Handline	0	96	4
4	Tuna Long Line		89	11
B	**KENDARI**			
1	Purse-seine	69	26	5
2	Pole and Line	67	25	8
2	Troll Line	70,9	27,1	2

Sources: Indonesia Annual Scientific Report to WCPFC, 2011

- Annual Catch Estimates by species will be elaborated based on annual catch estimates and catch composition.
- Number of fleets estimates by gear type.
- Standardized CPUE
- CPUE estimates

Catch Limit (Cont….)

- Stocks by species will be estimated through “surplus production model”
- MSY estimates by species
- TAC or Catch Limit Estimates (80% of MSY).

Management Measures in Indonesia FMA (Current and future)

4. Control mecahnism of catch limit
5. Control of fishing effort
6. Implementation of traceability scheme
   - Fishing logbook
   - Catch Certificate
   - CDS
   - Monitoring of at-sea transhipment

Management Measures in Indonesia FMA (Current / Future)

7. Implementation of Port State Measures
8. Fishing vessel monitoring system
9. Management of FADs
10. Ecosystem approach in tuna management
11. Development of Tuna MIS

Management Measures in Indonesia FMA (Current / Future)

12. Elaboration of tuna trade and economic context.
13. Integration of regional and international provision into national legislation.
14. Capacity building of tuna fisheries association
15. Participation in international meeting

Fishing Effort Control

1. Limitation of fishing area
2. Limitation of fishing gear size (mesh size; number of pieces).
3. Limitation of hooks
4. Limitation of FADs by:
   - Number of FADs /boat
   - Deployment areas
   - Distance among FADs

Fishing Effort Control

4. Limitation of Fishing Vessels by :
   - size
   - number
5. MORATORIUM, at scientific recommendation basis.
   - Not to issue a new fishing permits
6. *Establishment of MPA (20 millions Ha). No fishing is allowed in this areas.*

Thank you

WPEA-OFM PROJECT

WORKSHOP ON TUNA FISHERIES MANAGEMENT ON A NATIONAL LEVEL

Palawan, Philippines
29-31 October 2012

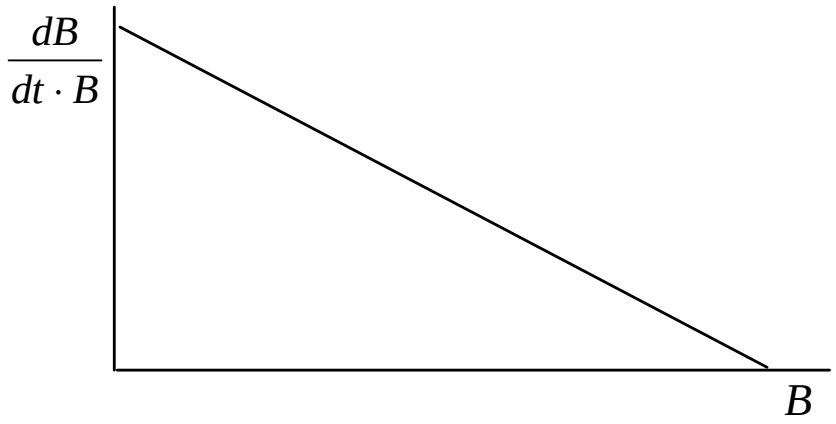
SET THE FISHING EFFORT BY SCHAEFER MODEL FOR BET IN VIETNAM

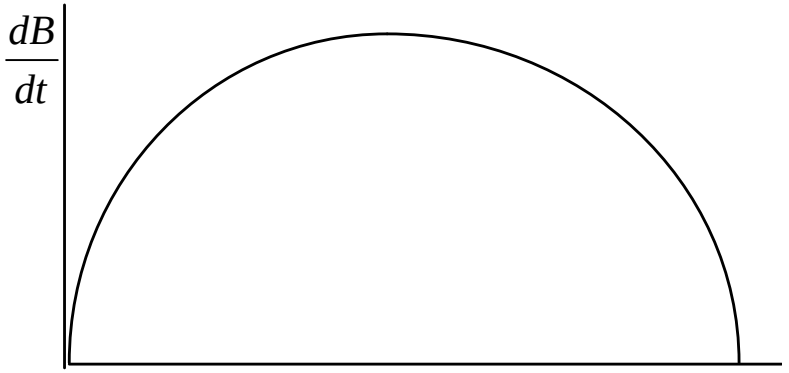
Presented by Pham Viet Anh

DECAFIREP, VIETNAM

Surplus Production models

Schaefer (1954): $\frac{dB}{dt} = rB(1 - \frac{B}{B_\infty})$





B

assuming that the specific rate of biomass growth is linearly related to the stock biomass (*r = intrinsic rate of population growth*)

$$\frac{1}{B}\frac{dB}{dt} = r(1 - \frac{B}{B_\infty}) = r - mB \quad where \quad m = \frac{r}{B_\infty}$$

Data analysis

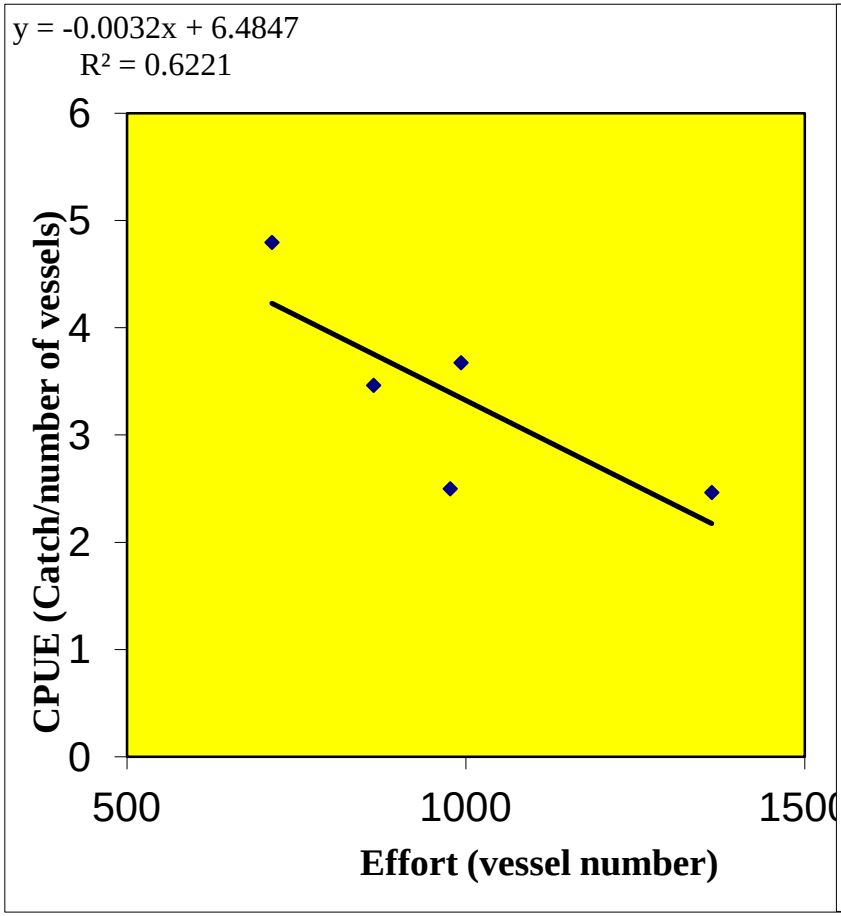
Schaefer model:

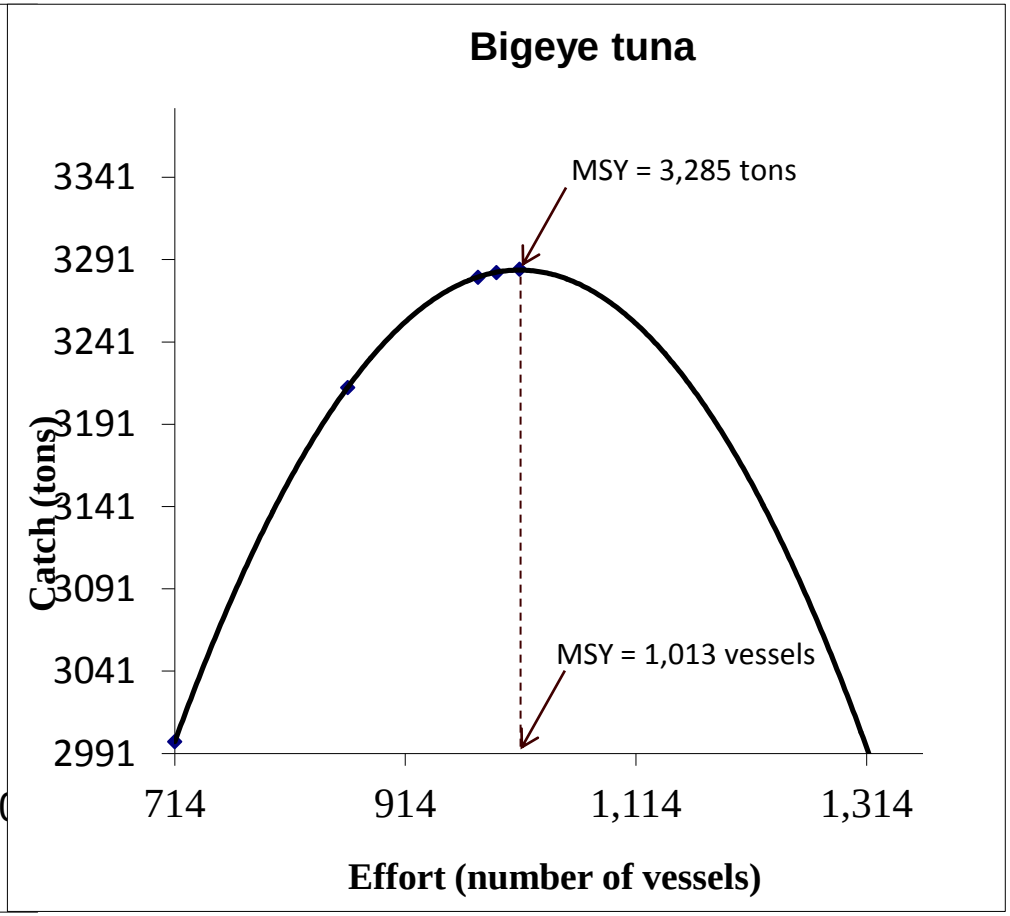
MSY = - 0.25*a/b, Fmsy = -0.5*a/b,

a = -0.0032, b= 6.4847

Year	Catch (ton)	Effort (vessels)	CPUE (Ton/vessel)	C = a*E - bE2
2007	3.648	993	3,67371601	3283,2
2008	3.358	1363	2,46368305	2892,7
2009	2.992	864	3,46296296	3213,3
2010	2.441	977	2,49846469	3280,3
2011	3.424	714	4,79551821	2998,2
		1013		3285,2

Linear regression and Schaefer model for BET in Vietnam





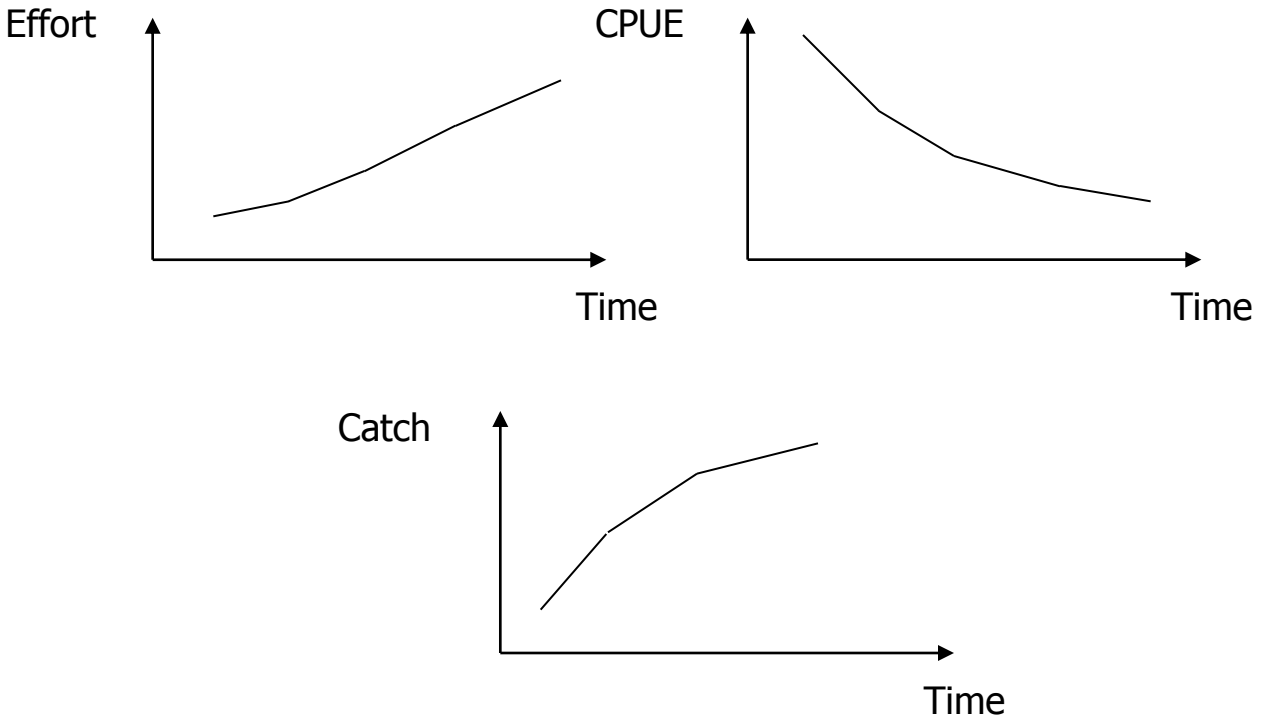
Setting up Fishing effort

- The MEY calculation should be done to define Fmey
- The precautionary approach:

The $F_{0.85} = 0.85^* F_{MSY/}/F_{MEY}$

Shortcomings

- "One way trip"
  - Increase in effort and decline in CPUE with time
    - A lot of catch and effort series fall under this category.



Shortcomings

- “Principle: You can not understand how a stock will respond to exploitation unless the stock has been exploited”. (Walters and Hilborn 1992).

- Ideally, to get a good fit we need three types of situations:

Stock size	Effort	get parameter
low	low	r
high (→K)	low	K (given we know q)
high/low	high	q (given we know r)

- Due to time series nature of stock and fishery development it is virtually impossible to get three such divergent & informative situations

Attachment 14

Parties to the Nauru Agreement
4th Meeting of the Longline Vessel Days Scheme
– Technical Working Group
Nadi, 29-31 May 2010

PNA longline VDS – Bigeye MSY and its utility for conservation limits

SPC Oceanic Fisheries Programme
Noumea, New Caledonia

Bigeye stock assessment –SC5 in 2009

Stock assessment of bigeye tuna in the western and central Pacific Ocean (SC5-SA-WP-4)

Shelton Harley[1], Simon Hoyle[1], Adam Langley[2], John Hampton[1], and Pierre Kleiber[3]

[1]Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.
[2]Consultant, Secretariat of the Pacific Community
[3]Pacific Islands Fisheries Science Center, National Marine Fisheries Service, Honolulu, Hawaii, USA.

Base case – run 10

Catches

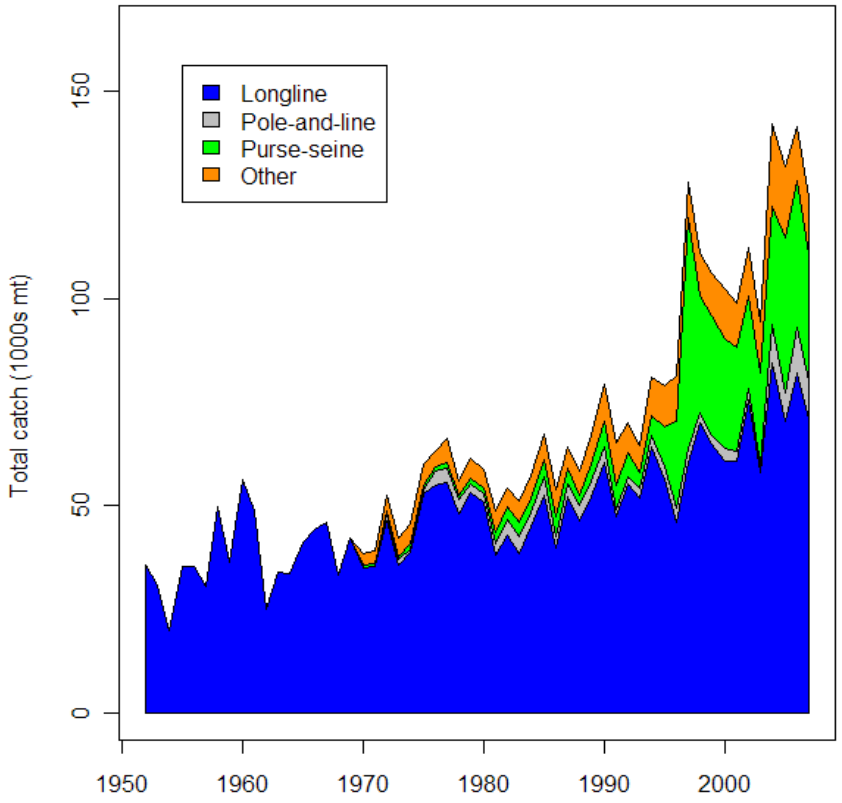


Fig. 2

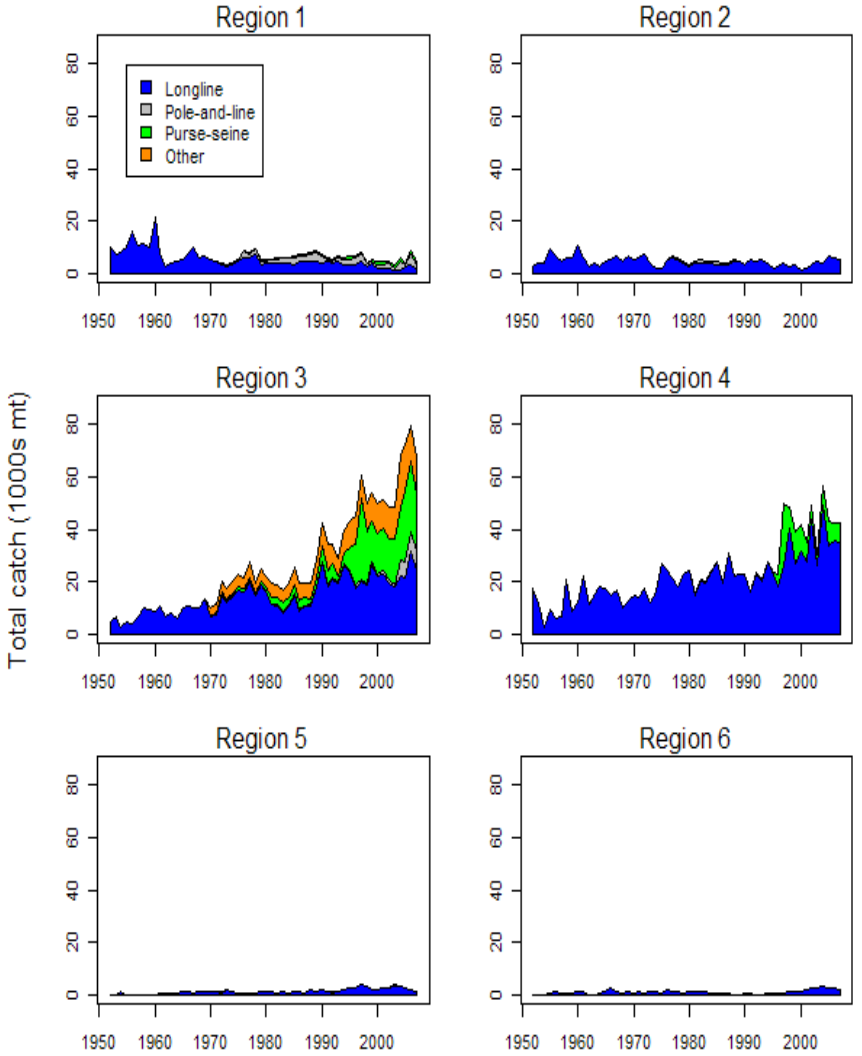


Fig. 4

Model pars/outputs

– ***recruitment***

Comparison of selected runs.

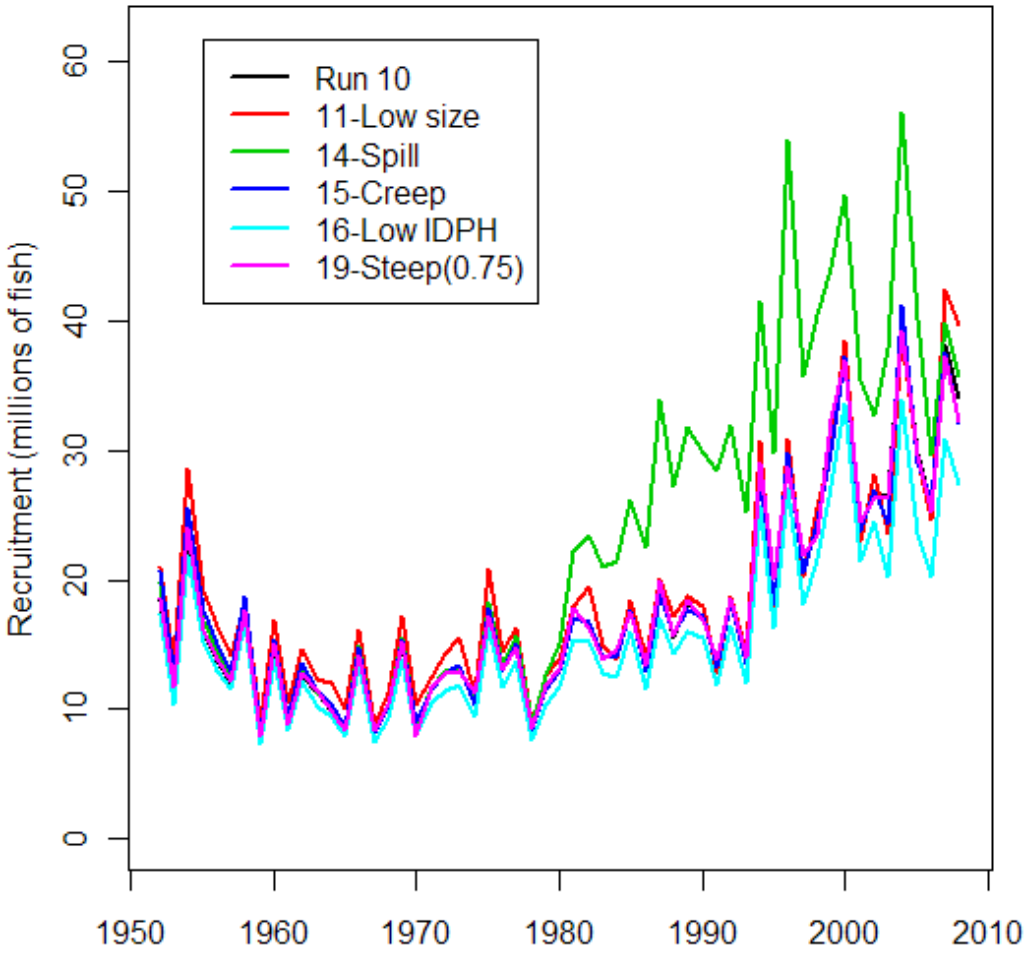


Fig. 24

Model pars/outputs

– **spawning *biomass***

Comparison of selected runs.

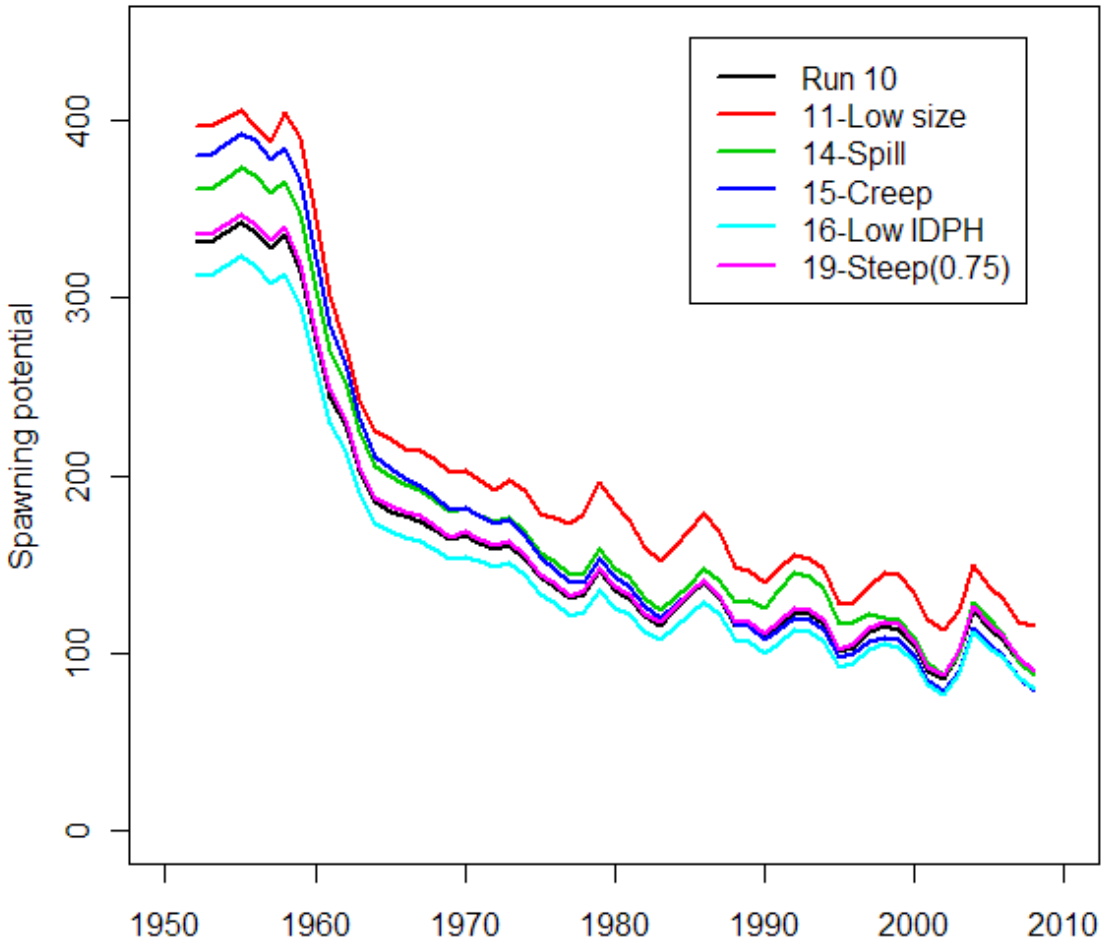


Fig. 29

Stock Status – ***equilibrium conditions***

$F_{current} = F_{2004\text{-}2007}$

$F_{mult} = 0.56$

$Y_{Fcurrent} = 86\%\ MSY$

$SB_{Fcurrent} = 35\%\ SB_{MSY}$

$SB_{Fcurrent} = 8\%\ SB_0$

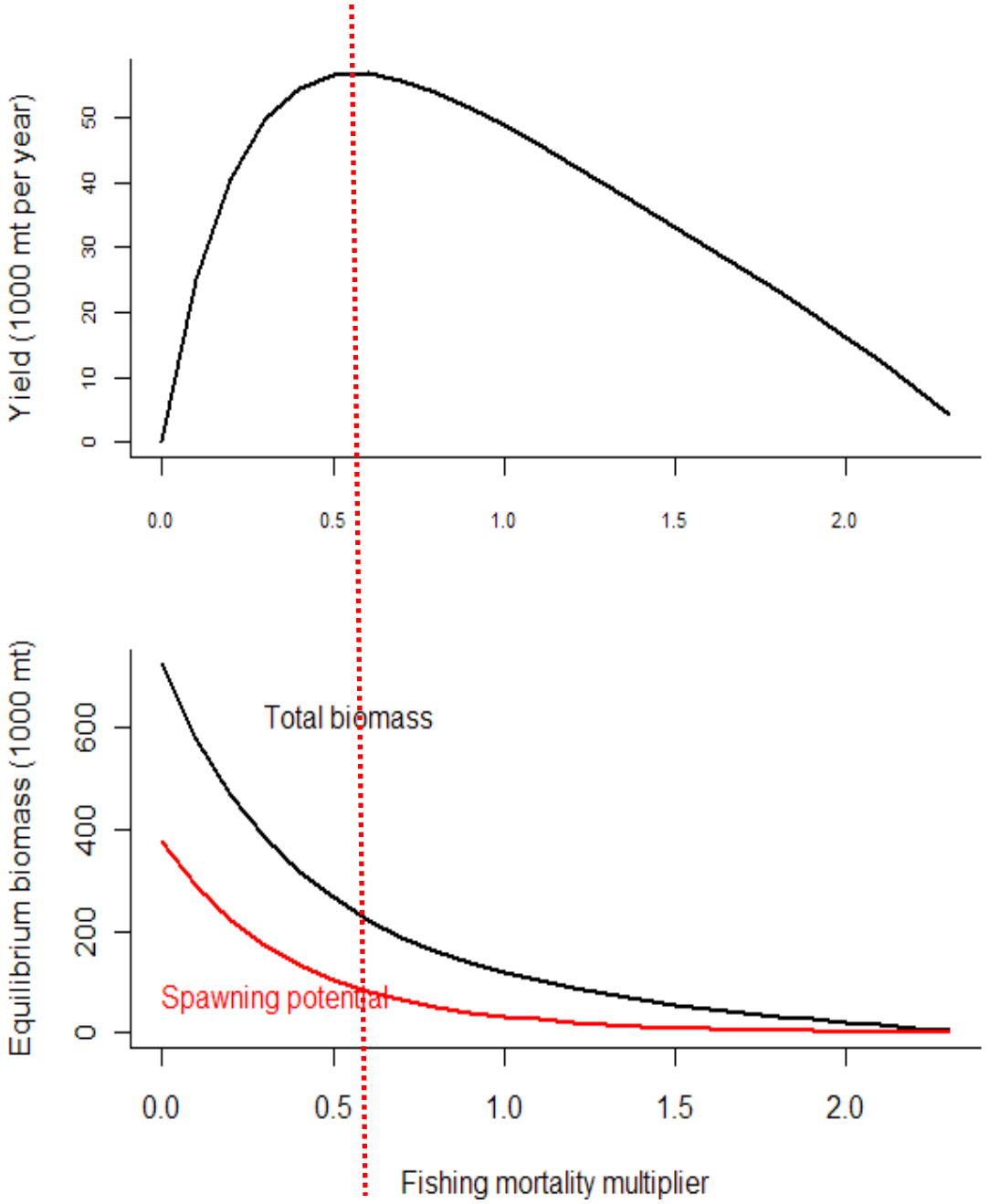
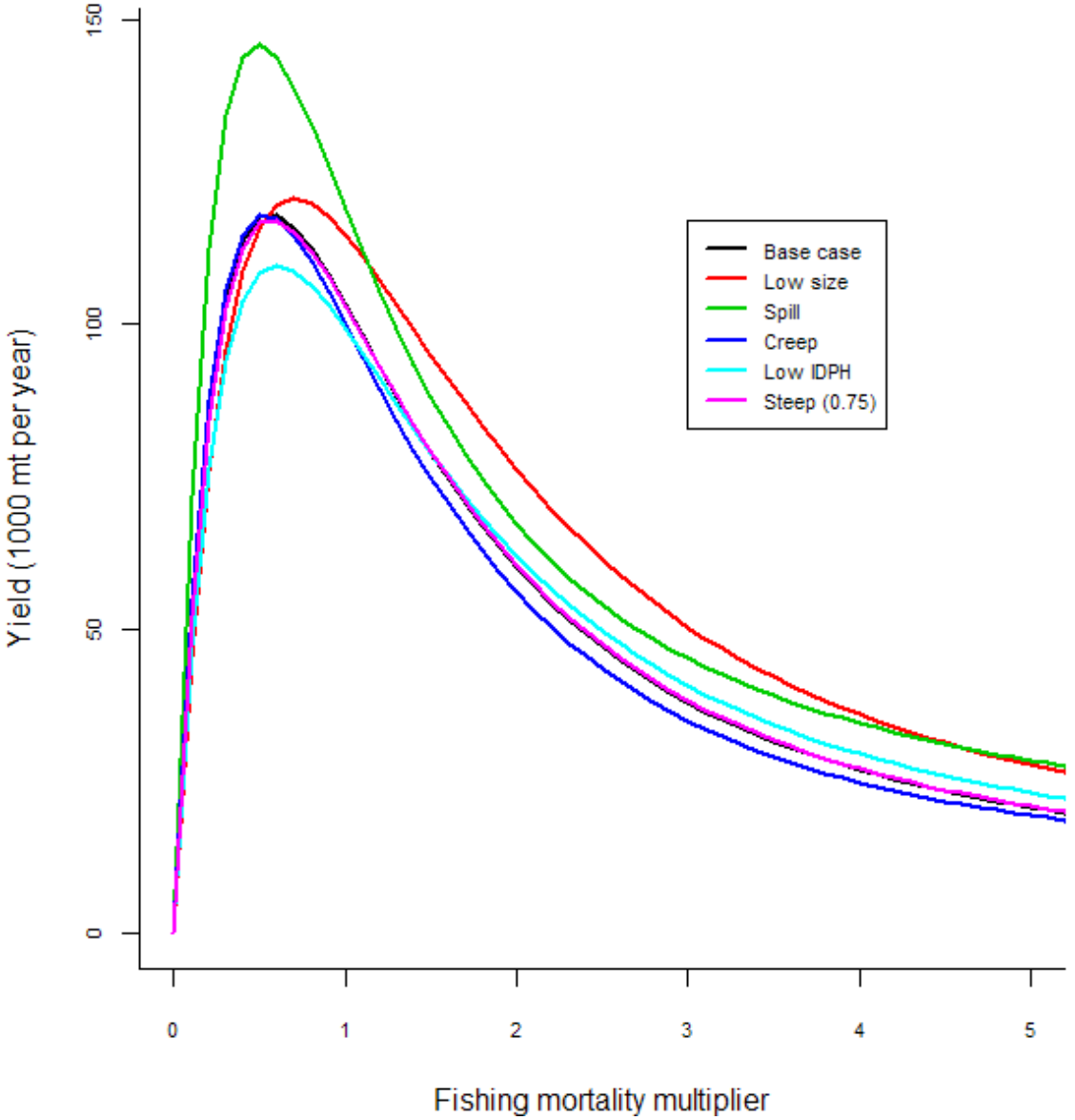


Fig. 40

Recent catches substantially higher than MSY due to sustained period of high recruitment and .... high levels of fishing mortality



1999-2008 average recruitment

Fig. 49

BET stock status summary for 2009

Management Quantity	2009 Assessment	2008 Assessment
Most Recent Catch	134,315 mt (2008)	143,059 mt (2007)
MSY and MSY(recent R)	Range: 52,120 - 67,800 mt Range:110,000 - 146,114 mt	Base case: 64,600 mt Range: 56,800 - 65,520 mt
$F_{current}/F_{MSY}$	Range: 1.51 - 2.55	Base case: 1.44 Range: 1.33 - 2.09
$B_{current}/B_{MSY}$	Range: 1.11 - 1.55	Base case: 1.37 Range: 1.02 - 1.37
$SB_{current}/SB_{MSY}$	Range: 0.85 - 1.42	Base case: 1.19 Range: 0.76 - 1.20
$Y_{Fcurrent}/MSY$	Range: 0.12 - 0.92	Base case: 0.94 Range: 0.50 - 0.97
$B_{current}/B_{current, F=0}$	Range: 0.18 - 0.29	Base case: 0.26 Range: 0.20 - 0.28

Average MSY over the 6 models used:

-long-term recruitment = 58,950 t

-Recent recruitment = 121,570 t

How can we use MSY in a PNA LL-VDS?

Remember Niue 2009:

Agenda item: 6.5.2 PNA28/ WP 5.2

PNA longline VDS – Scientific analysis

TAC/TAE estimation

- TAC_{PNA} derived:
  - MSY for BET/YFT from assessment model (that part of MSY vulnerable to longline)
  - Proportion of model regions made up by $EEZs_{PNA}$
  - MSY_{PNA} is the portion of MSY allocated to $EEZs_{PNA}$
- TAE_{PNA} is: $TAC_{PNA} \div CPUE$

PNA Total allowable effort (TAE) calculation

Proportion of model region made up by all PNA EEZs

$$A_{PNA,Rg} = \sum_{EEZ} A_{EEZ,Rg}$$

PNA average CPUE scalar

Indicative yield over all PNA EEZs

$$TAC_{PNA} = \sum_{Rg} MSY_{Rg} \times A_{PNA,Rg}$$

TAE over all PNA EEZs

$$TAE_{PNA} = \frac{TAC_{PNA}}{CPUE}$$

1st element in calculation is the proportion of each model region covered by a PNA EEZ.

Country	Region 3	Region 4	Region 5	Region 6
Federated States of Micronesia	0.152			
Kiribati	0.007	0.200		
Marshall Islands	0.070	0.042		
Nauru	0.016			
Palau	0.031			
Papua New Guinea	0.095			
Solomon Islands	0.038	0.003	0.051	0.013
Tuvalu		0.010		
Total	0.409	0.255	0.051	0.013

- 2nd element is the MSY for each region, of which the proportion in PNA EEZs is calculated.
- The sum over all regions is the TAC_{PNA}

		Recent BET catch		BET longline MSY	
Region	**Cover**	**Region**	**PNA EEZs**	**Region**	**PNA EEZs**
3	0.409	21526		11382	4655
4	0.288	34872		18439	5310
5	0.094	3516		1859	175
6	0.039	3485		1843	72
Total		63399	11821	33523	10212

- Lastly, the total allowable effort (TAE) that will produce the TAC is calculated given the PNA catch rate.

Species grouping	Recent catch	Recent scaled effort	TAC	CPUE	TAE
BET	11821	44427	10212	0.268	38104

NOTE: this calculation was done using:

- the 2008 assessment
- The long-term average recruitment MSY estimate

Attachment 15

Relative abundance of tuna stocks in the Sulawesi Sea (Region 12) and estimating MSY

Keith Bigelow – NOAA Fisheries, USA, Department of State Embassy Science Fellow, Philippines

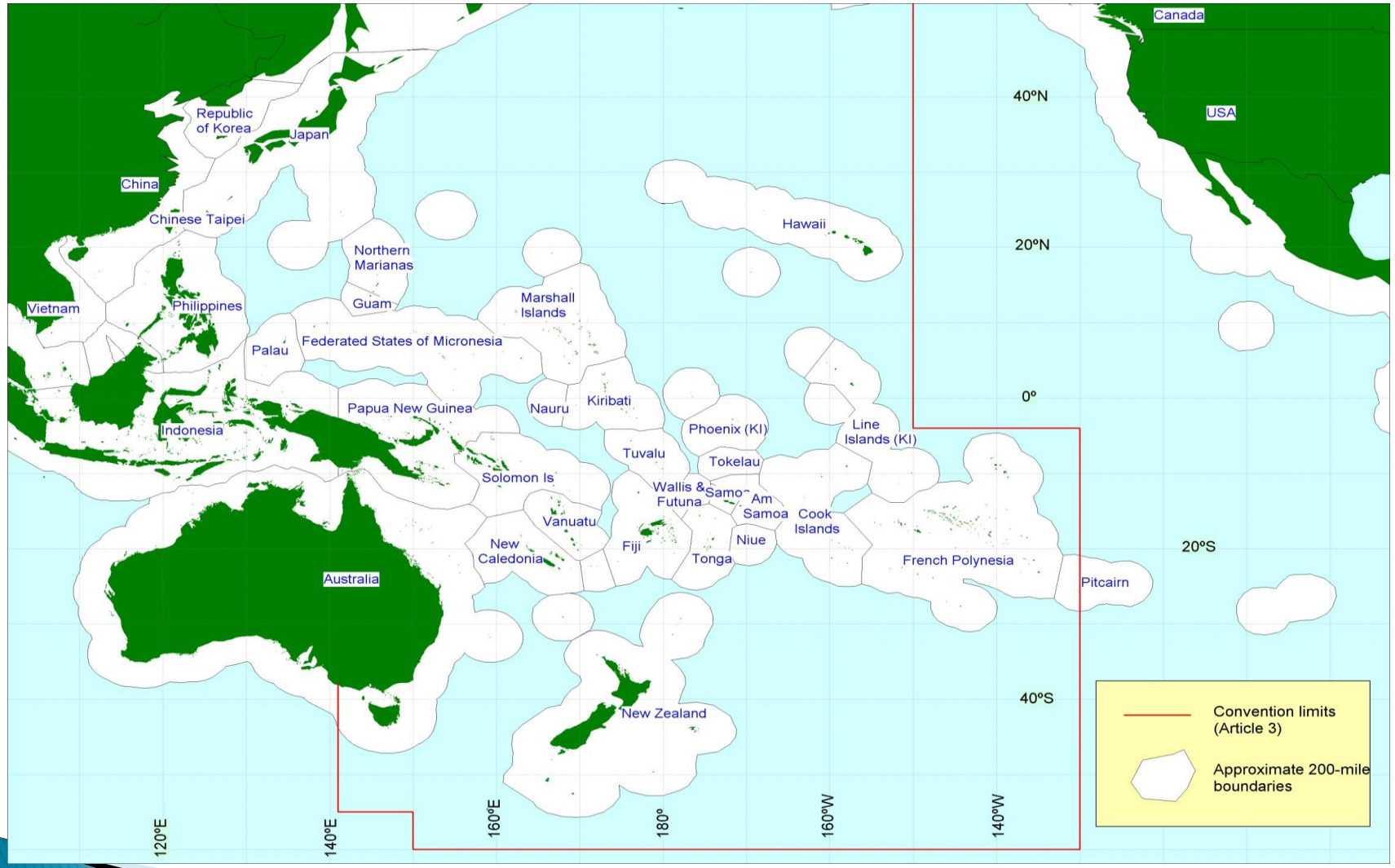
Elaine Garvilles & Noel Barut – NFRDI, Philippines

Patrick Lehodey – CLS, France

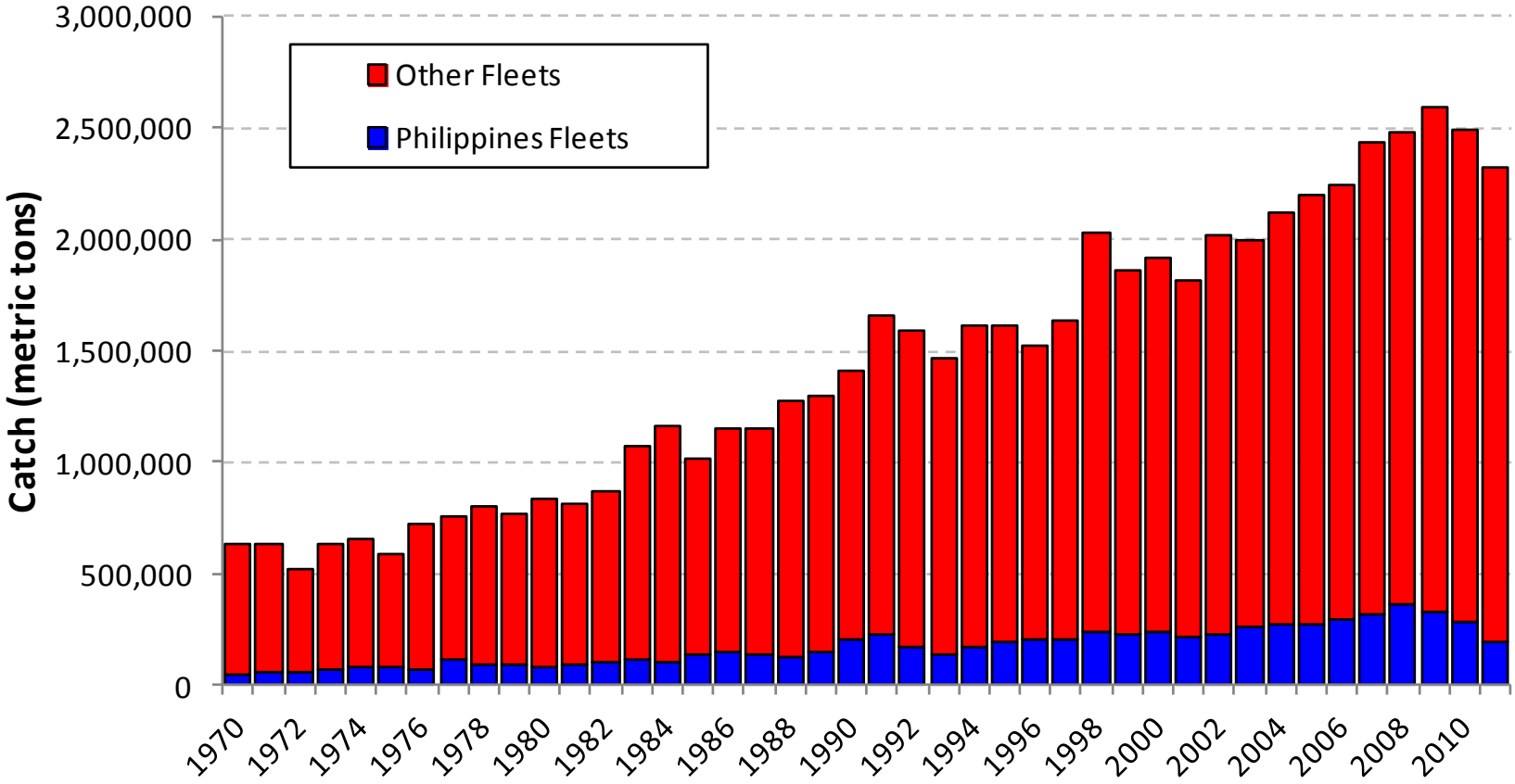
Outline

- Three themes for today:
  - **Philippine tuna catch history for three sectors – handline, purse seine and ringnet**
  - **Statistical analysis of the three sectors to estimate relative abundance (standardized CPUE)**
  - **Estimating Maximum Sustainable Yield (MSY) for the Philippines EEZ**

WCPFC Convention Area



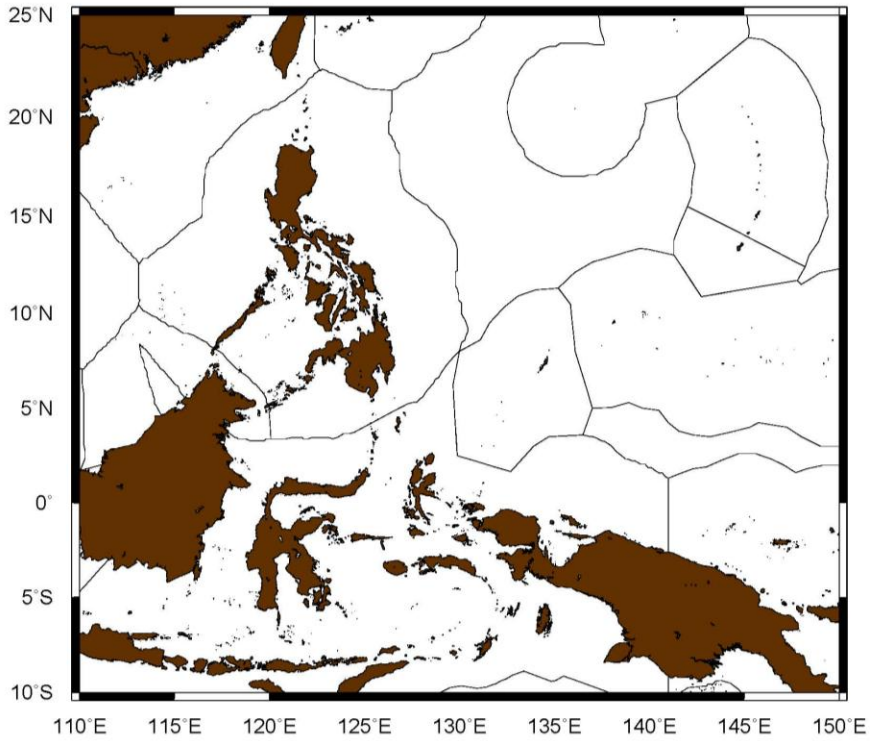
Philippines contribution to the total WCPFC Area Tuna catch



Tuna Fisheries

Major Tuna Fishing Grounds

Tunas are caught throughout the Philippine waters but the most productive fishing grounds are the Sulu Sea, Moro Gulf and waters extending to the north Sulawesi Sea.



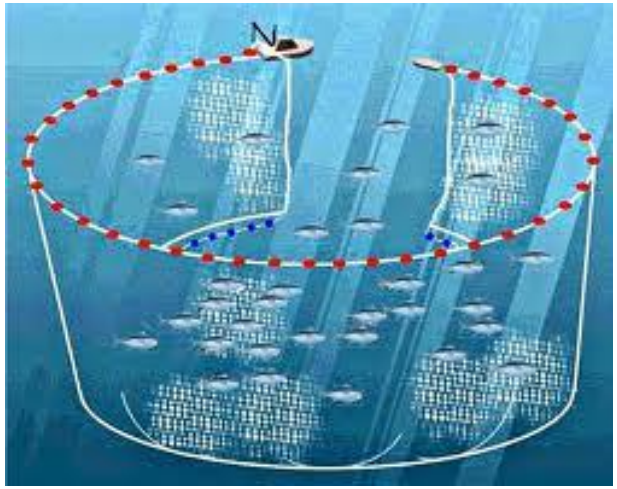
Economics

- Fishery is a key component of the Philippine economy
- Over 1.5M people of the country's labor force depend on fishery for livelihood
- Fisheries contribution to Philippine economy is ~2% GDP
- Philippine exports:
  - Net surplus of 616 million $US
  - Total export 803 million $US
- Tuna – top export commodity
  - Collective volume: ~450,000 Metric tonnes (fresh/chilled/frozen, smoked/dried and canned)
  - Valued at 337.719 million $US
  - major markets: USA, UK & Germany

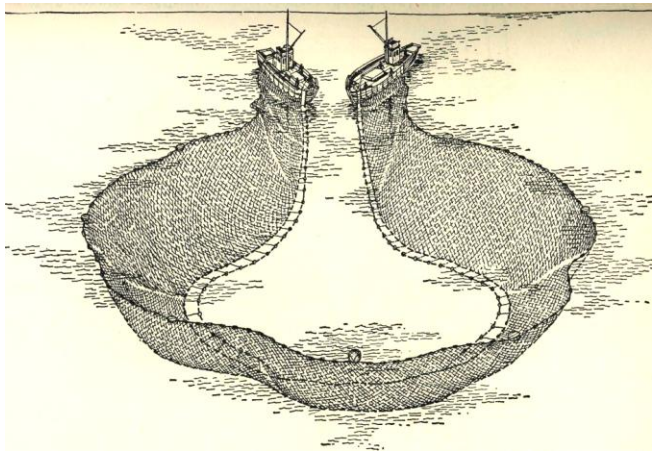
Source: *Philippine Fisheries Profile, 2010*

Major tuna fishing gears

- Purse Seine



- Ringnet

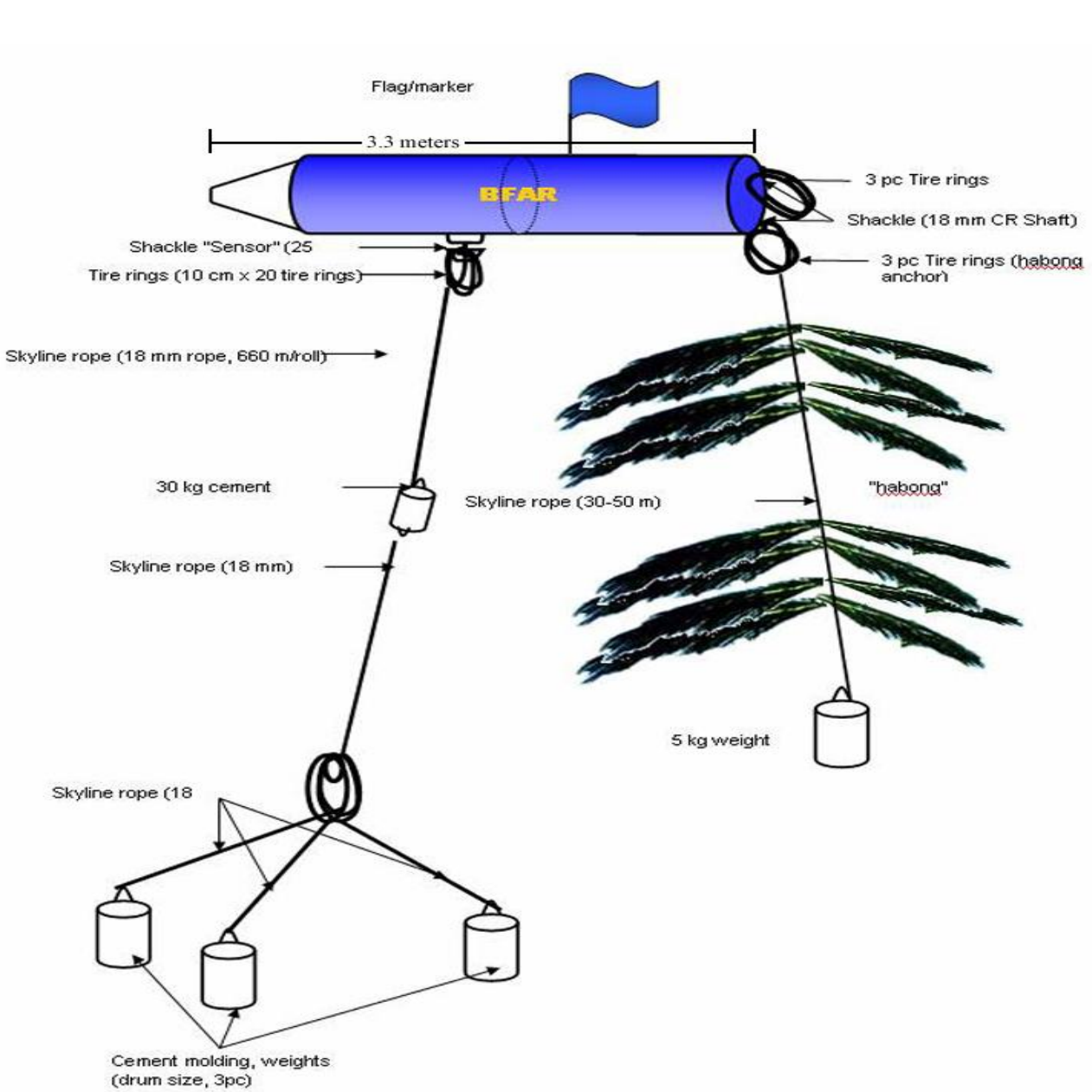


- Hook & Line

- Handline

Major Tuna Fishing Gears

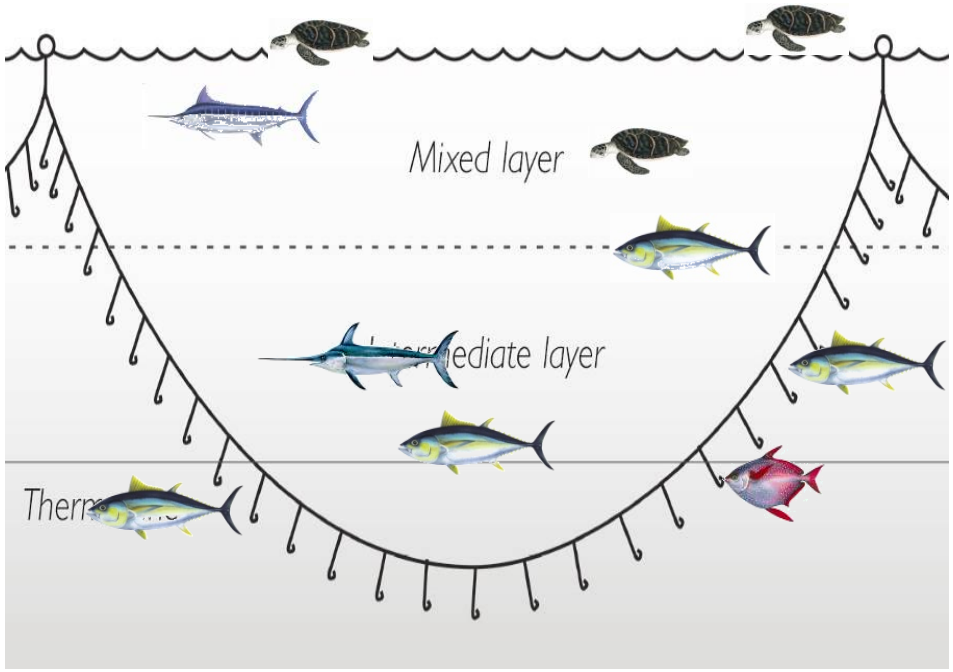
- FADs or *payao*



Source: BFAR, NMFDC

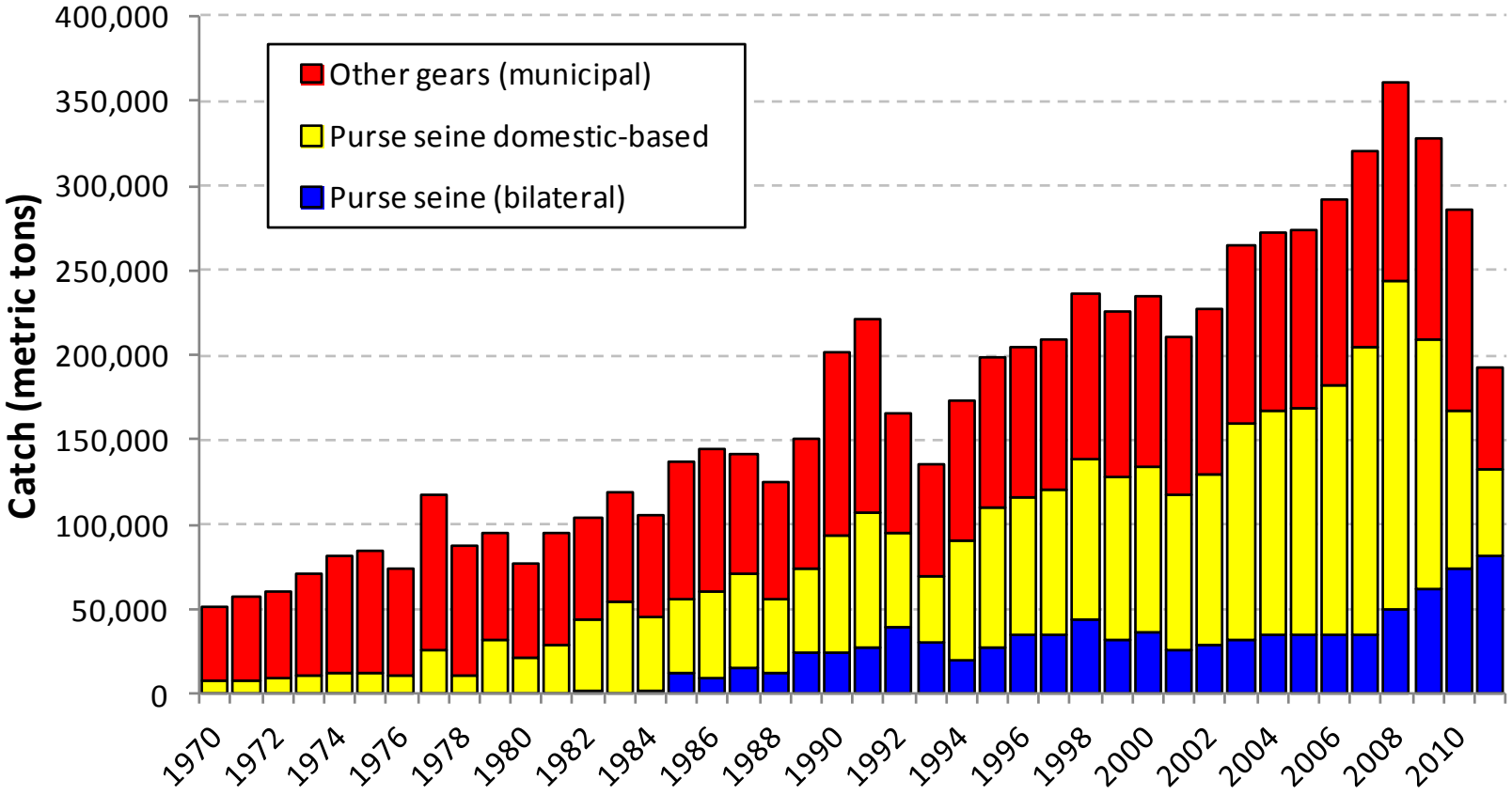
Tuna fishing gears – other areas

- Longline



- Pole and Line

Philippines Fleet catch in the WCPFC Area by GEAR category



Tuna Fisheries

Major Tuna Species

- Yellowfin tuna
  - *Thunnus albacares*
  - tambakol/bariles

- Skipjack tuna
  - *Katsuwonus pelamis*
  - gulyasan

Tuna Fisheries

Major Tuna Species

- Bigeye tuna
  - *Thunnus obesus*
  - tambakol/bariles

- Eastern Little tuna
  - *Euthynnus affinis*
  - katchorita/kawa-kawa

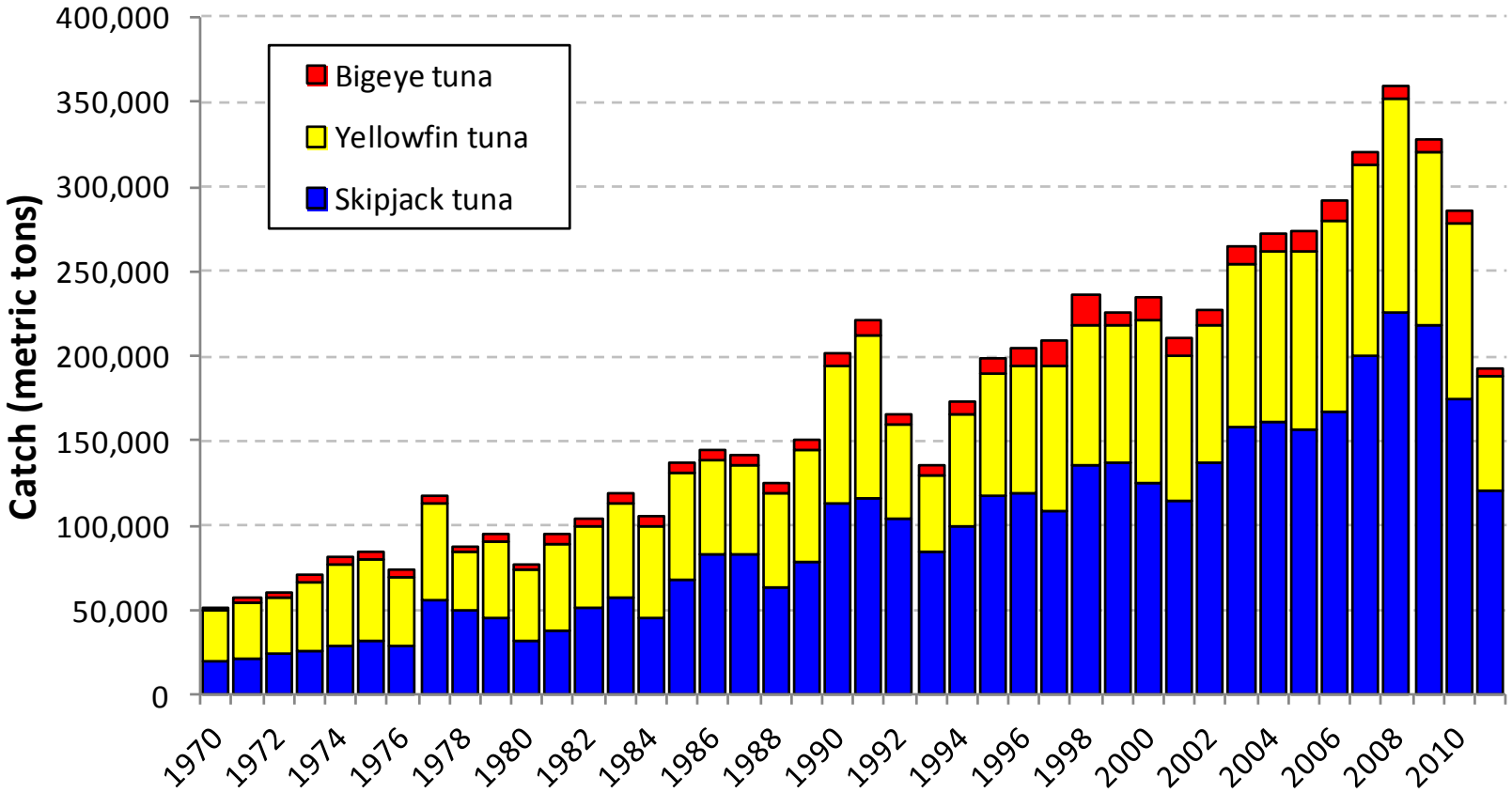
Tuna Fisheries

Major Tuna Species

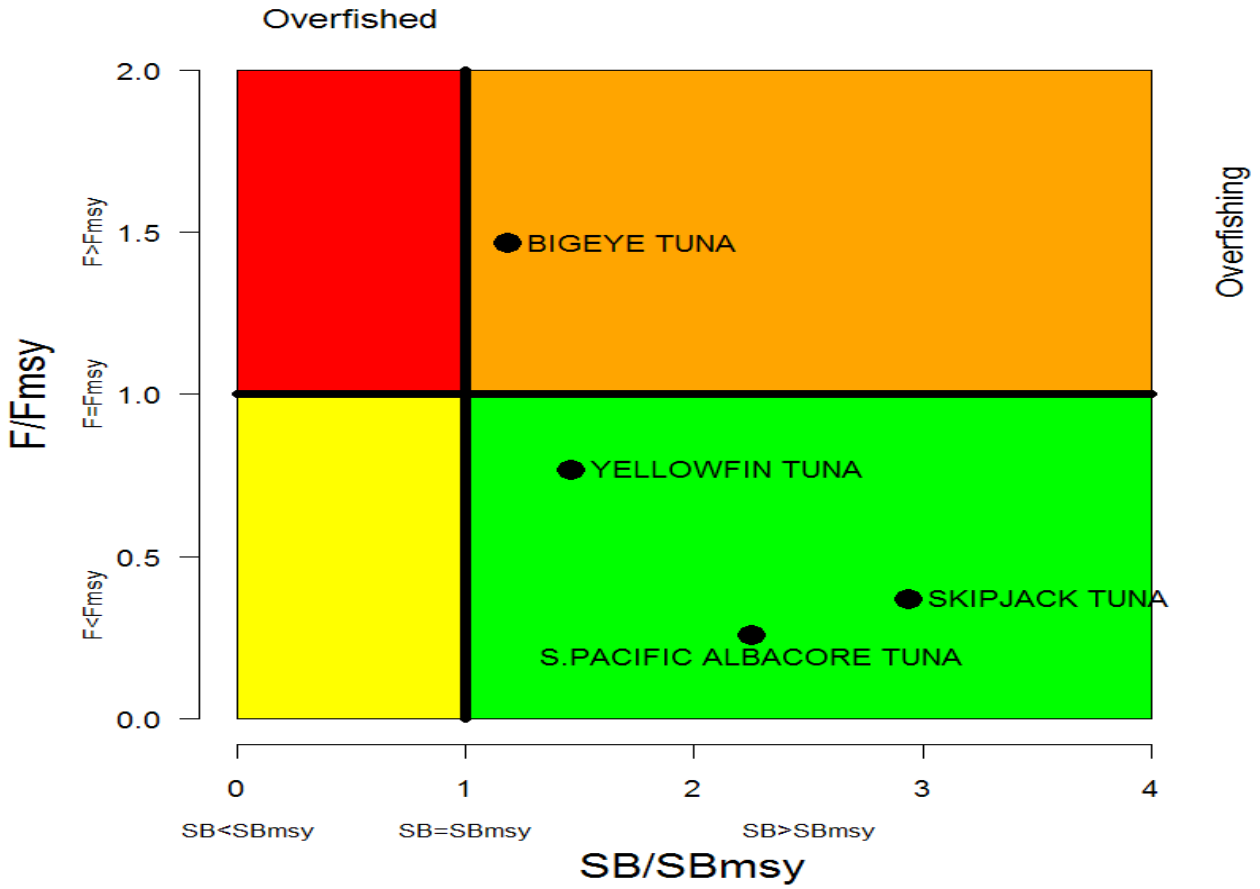
- Frigate tuna
  - *Auxis thazard*
  - tulingan

- Bullet tuna
  - *Auxis rochei*
  - tulingan

Philippines Fleet catch in the WCPFC Area by Oceanic Tuna SPECIES



Stock status – WCPFC region

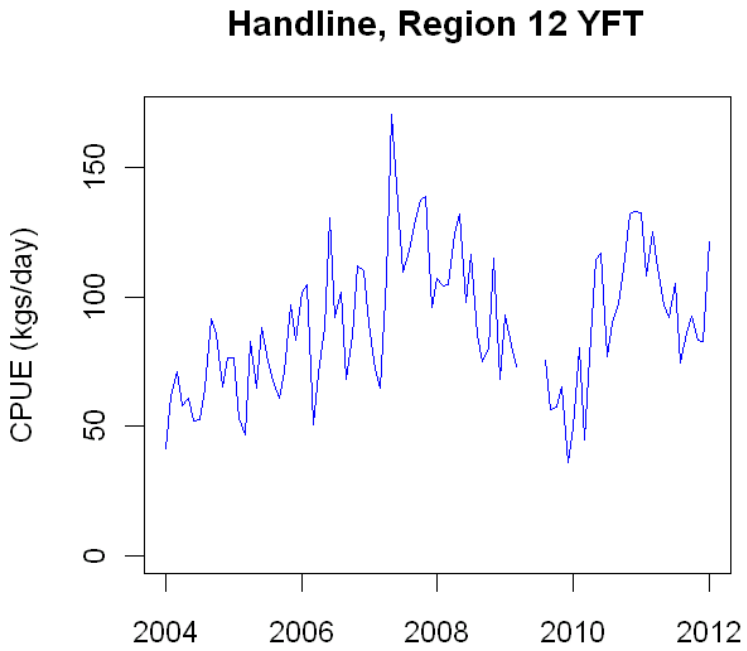


Species	Skipjack	Yellowfin	Bigeye	S Pacific albacore
Depletion	50%	55%	80%	40%

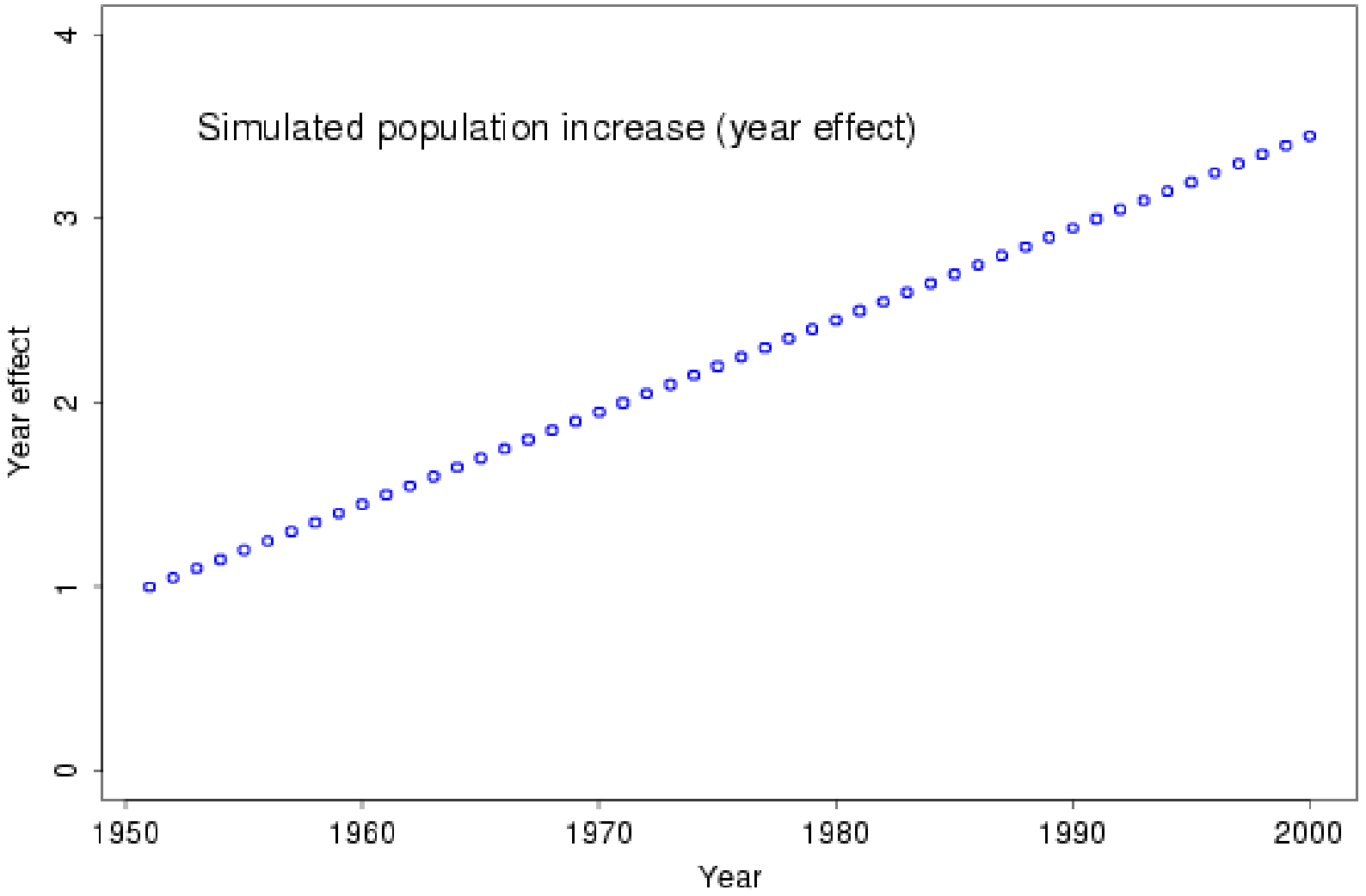
Statistical analysis of the three sectors to estimate relative abundance (standardized CPUE)

- Region 12 – handline, purse seine and ringnet
- NSAP – National Stock Assessment Program
- Port sampling in Region 12, primarily Gensan
- Nominal catch rates (CPUE) and standardized catch rates by Generalized Linear Modeling (GLMs)

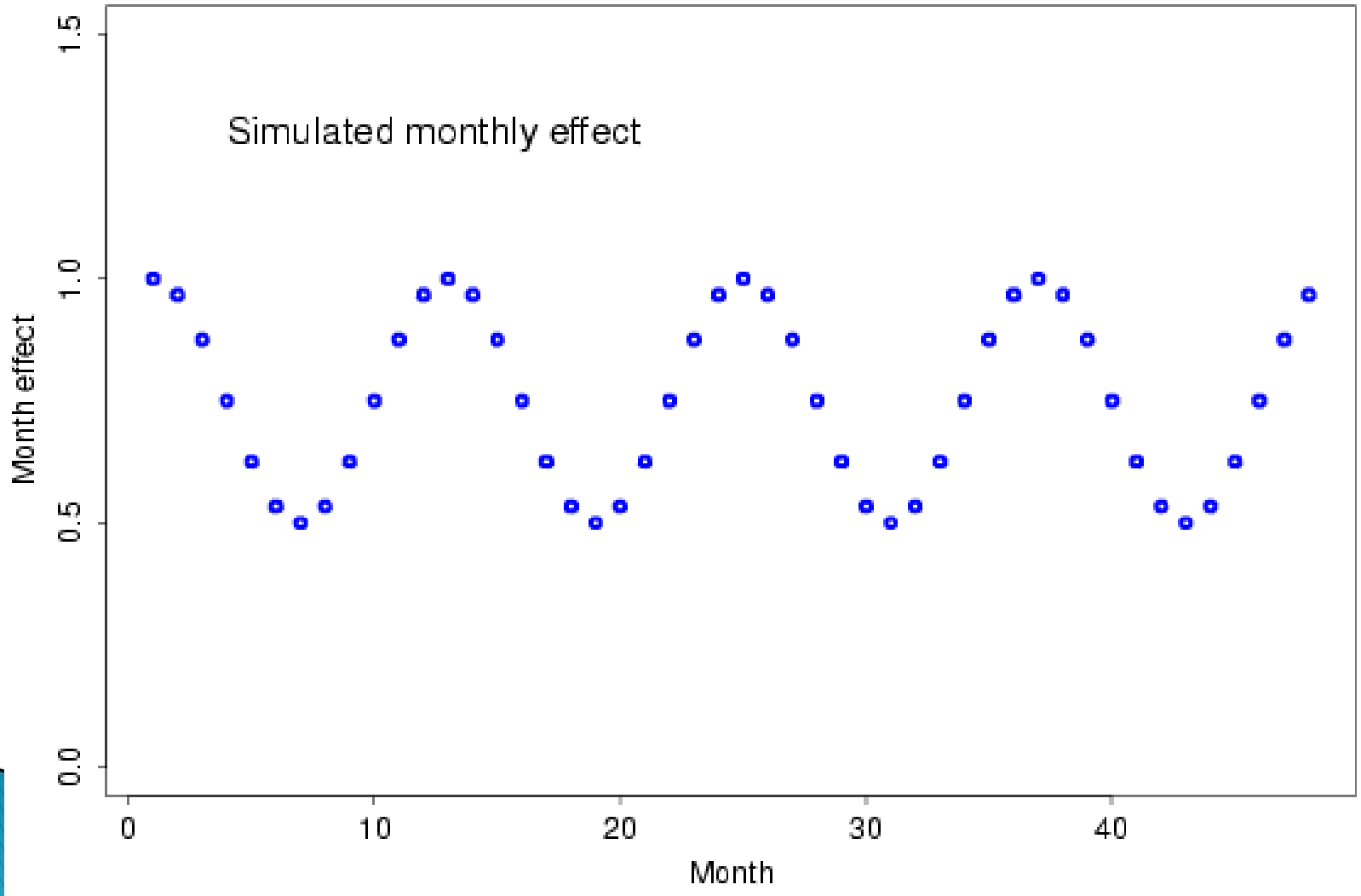
GLMs account for changes in catch rates due to various factors, e.g. annual and seasonal abundance, area of fishing, vessel efficiency



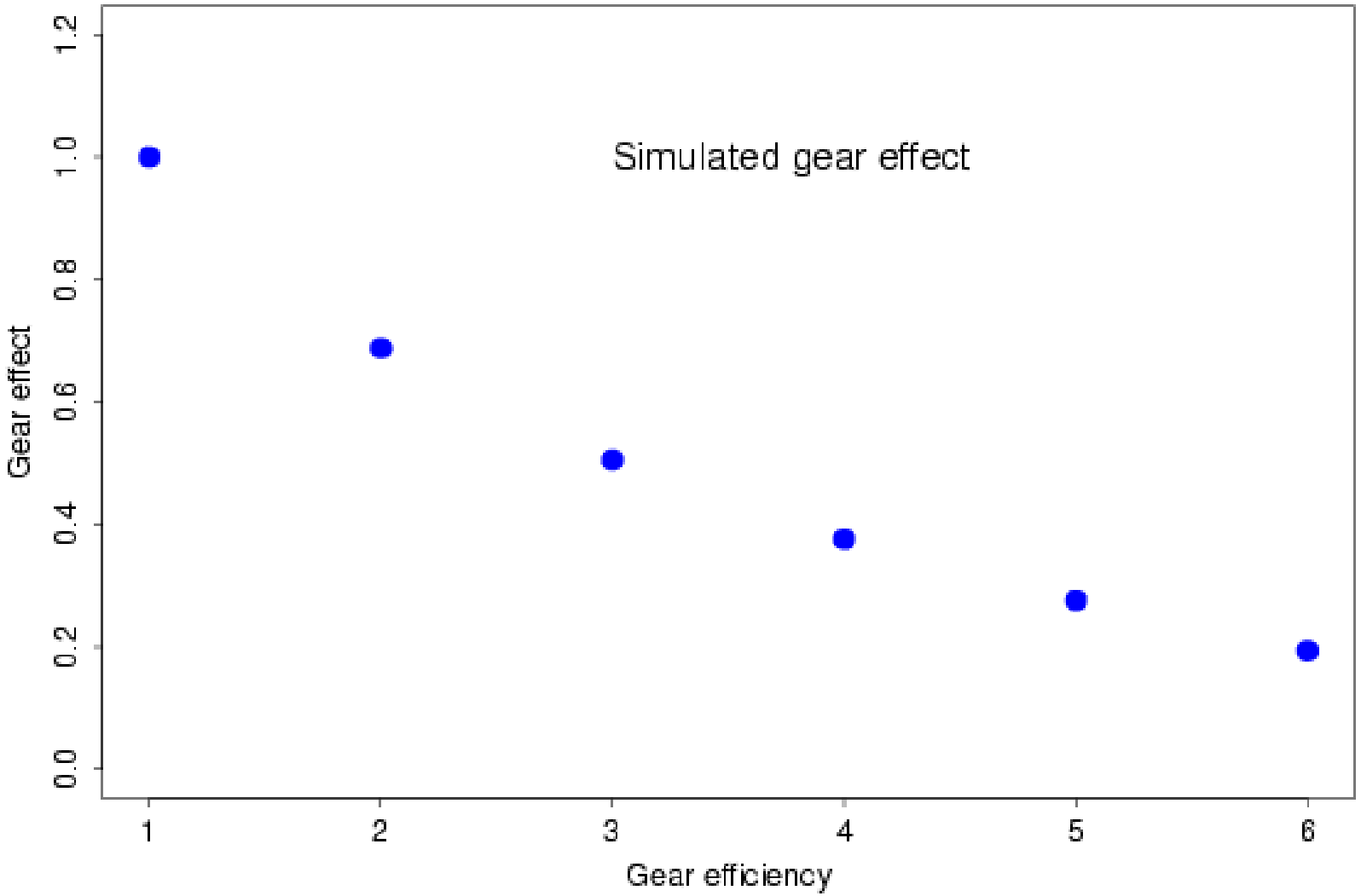
GLMs – a simulated example



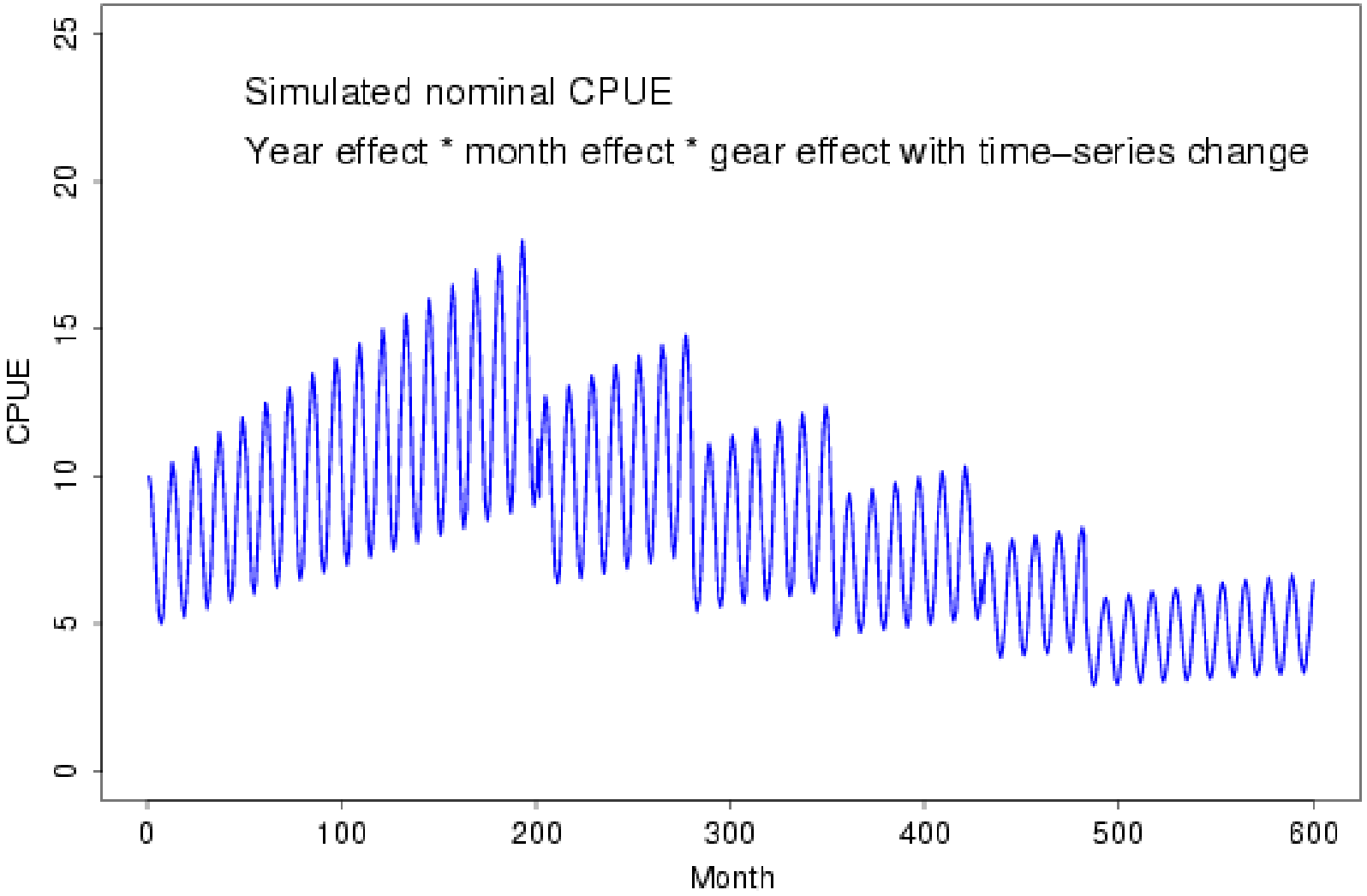
Simulated month effect



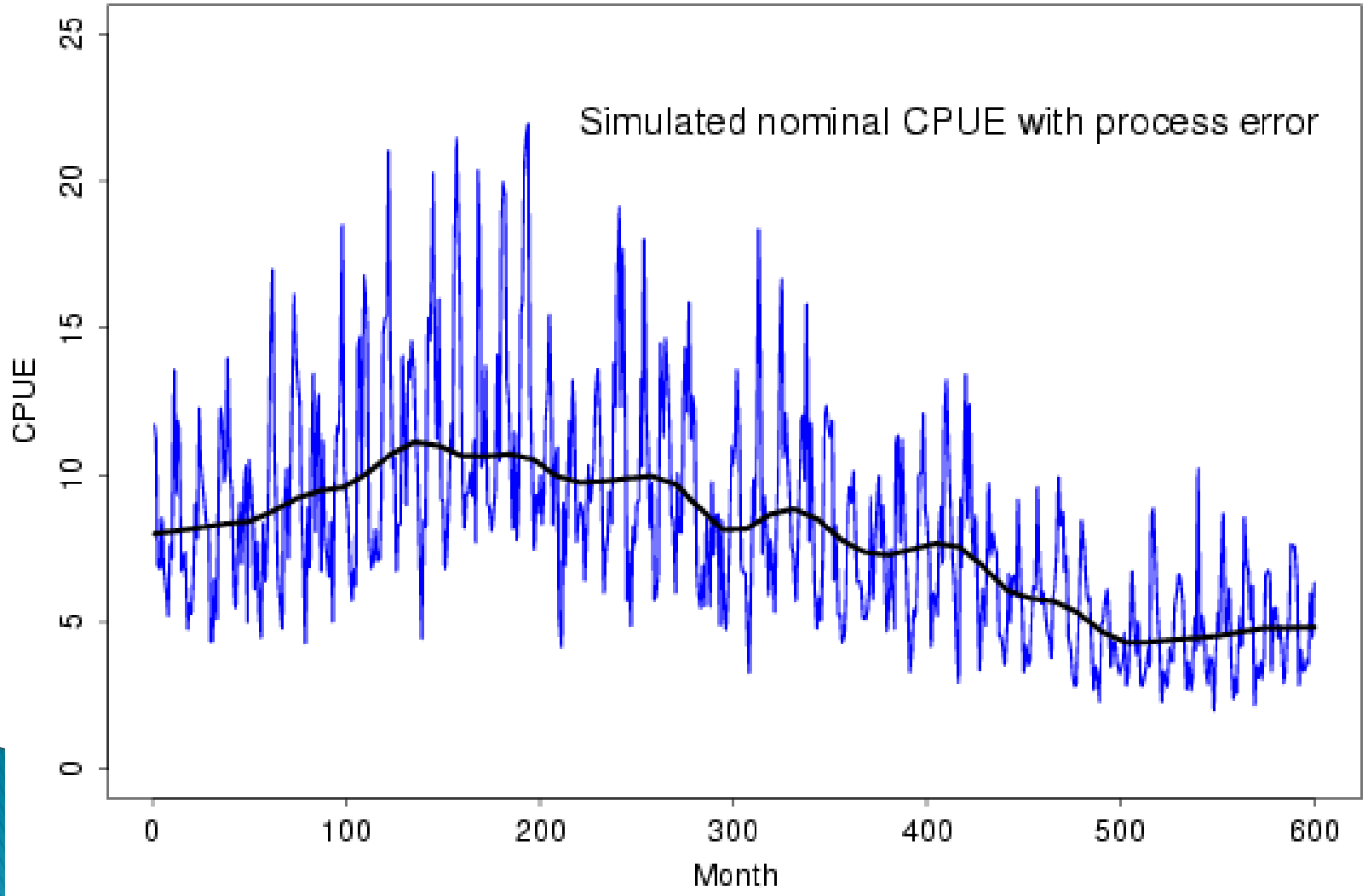
Simulated gear effect (longline hooks per floats effect for marlin)



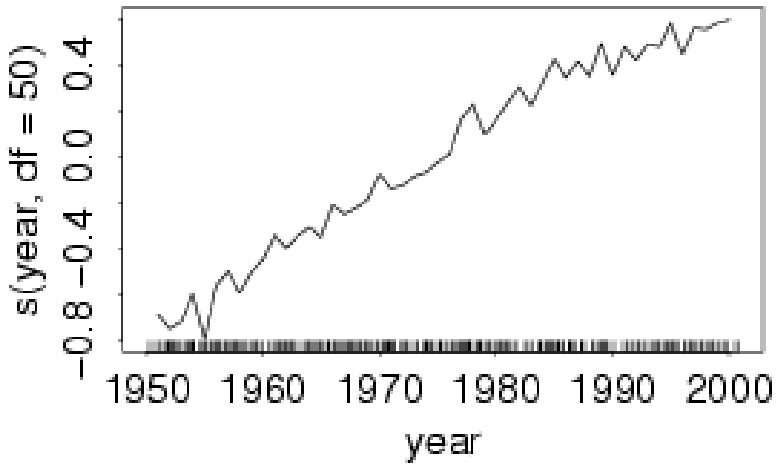
Simulated catch rates

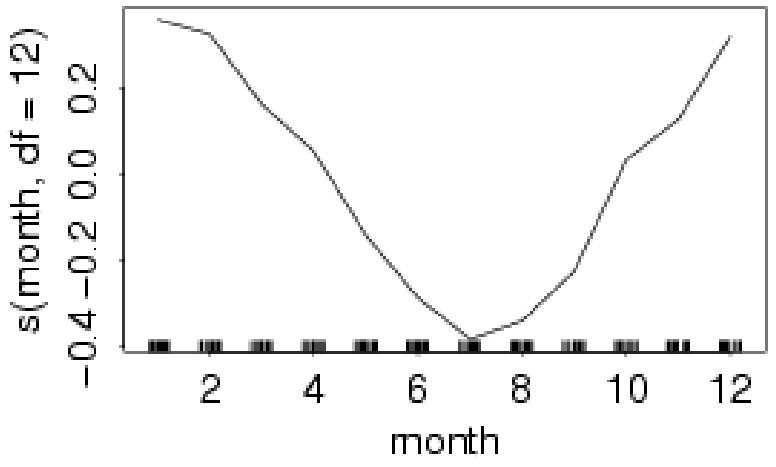


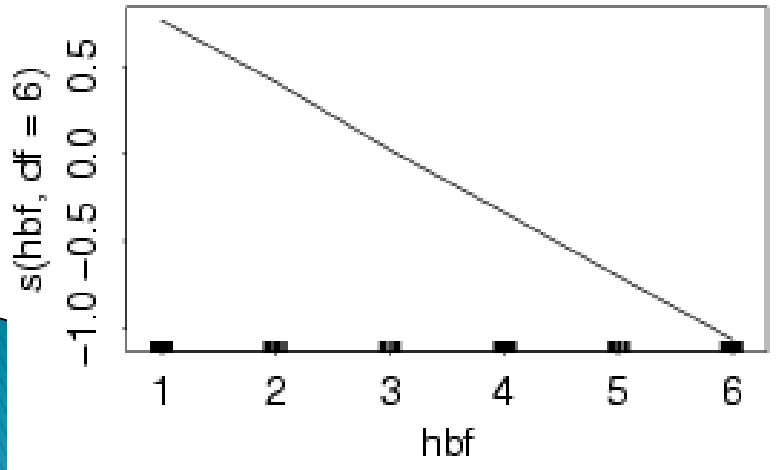
Simulated catch rates with process error



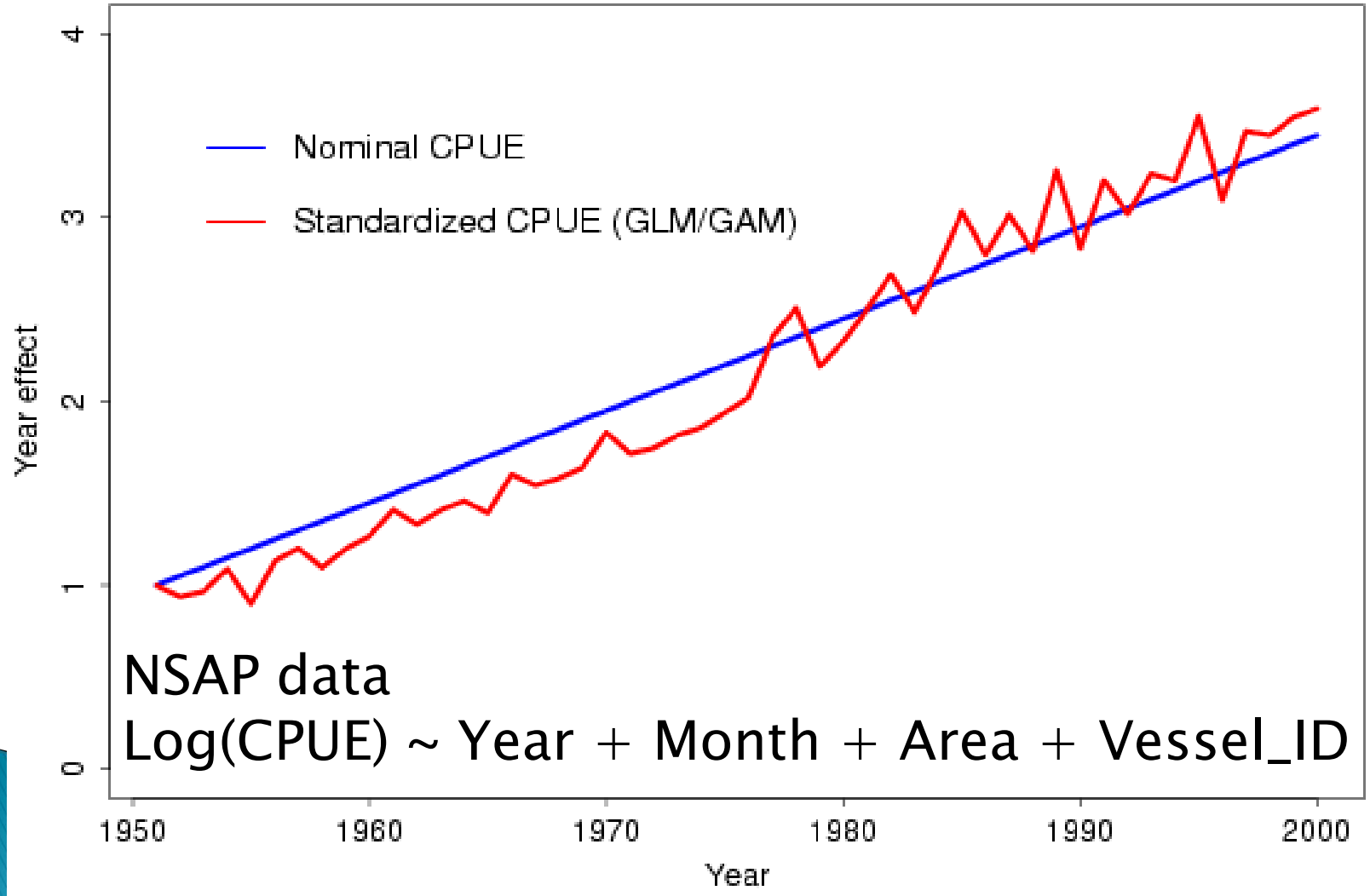
Model – log(cpue) ~year+month+gear



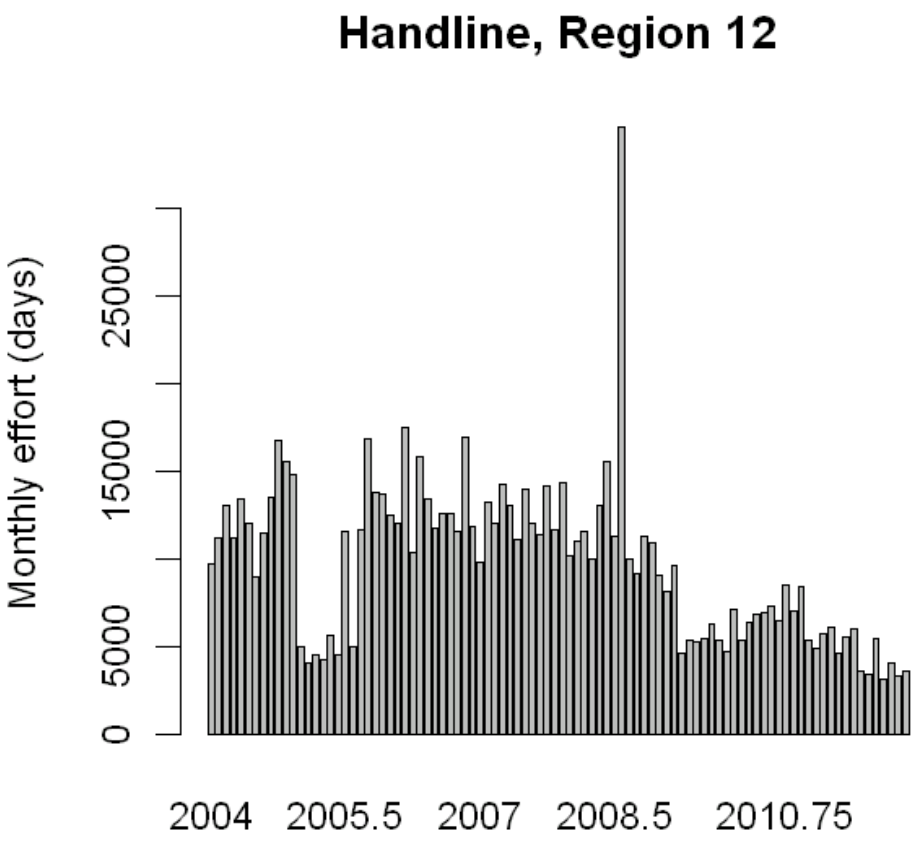


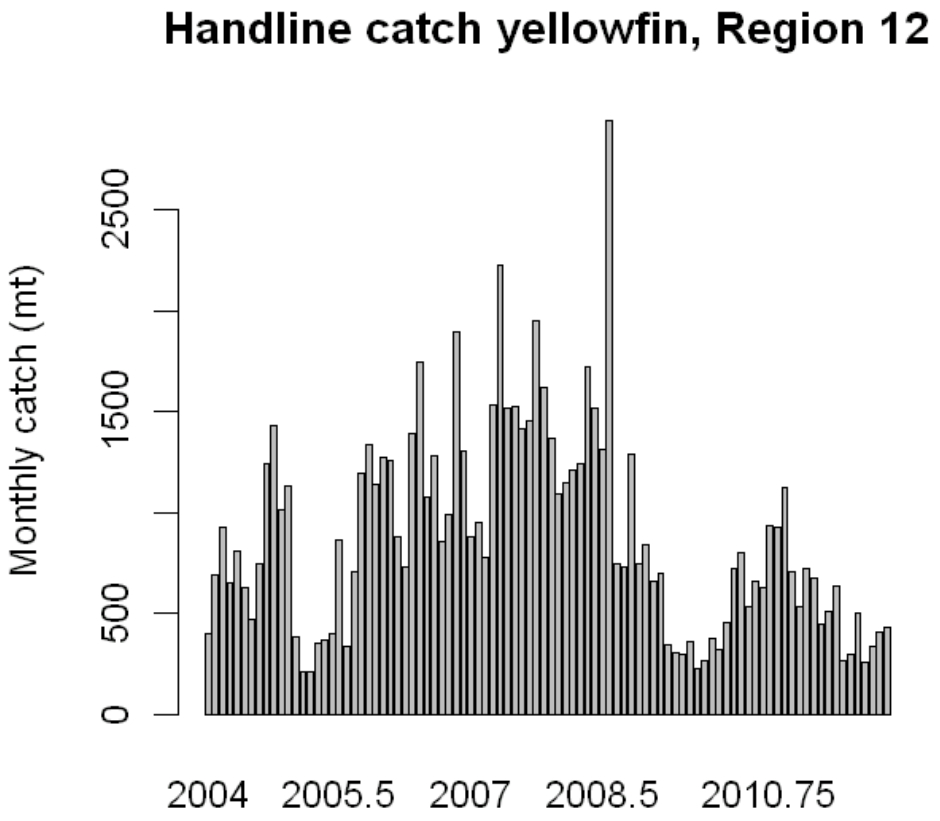


Simulated year effect and GLM estimated



Handline catch and effort





Difficulty in characterizing handline effort due to vessel efficiency

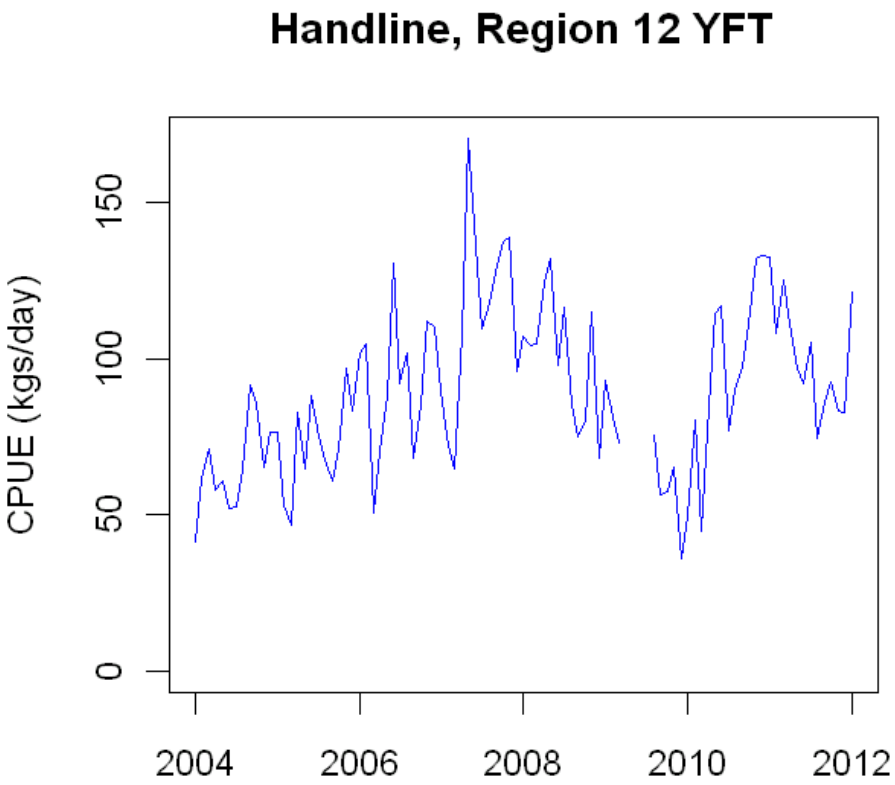
Single pumpboat

Pumpboat with pakura

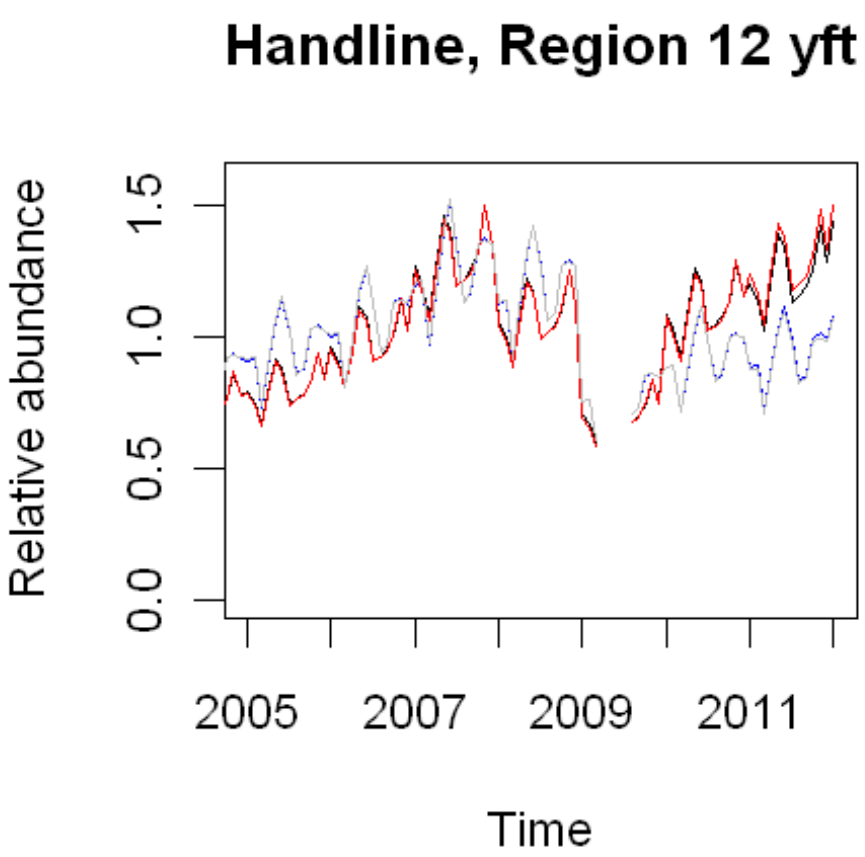
GLMs use vessel_id, consider using length or gross tonnage

Handline – Yellowfin 82% of catch

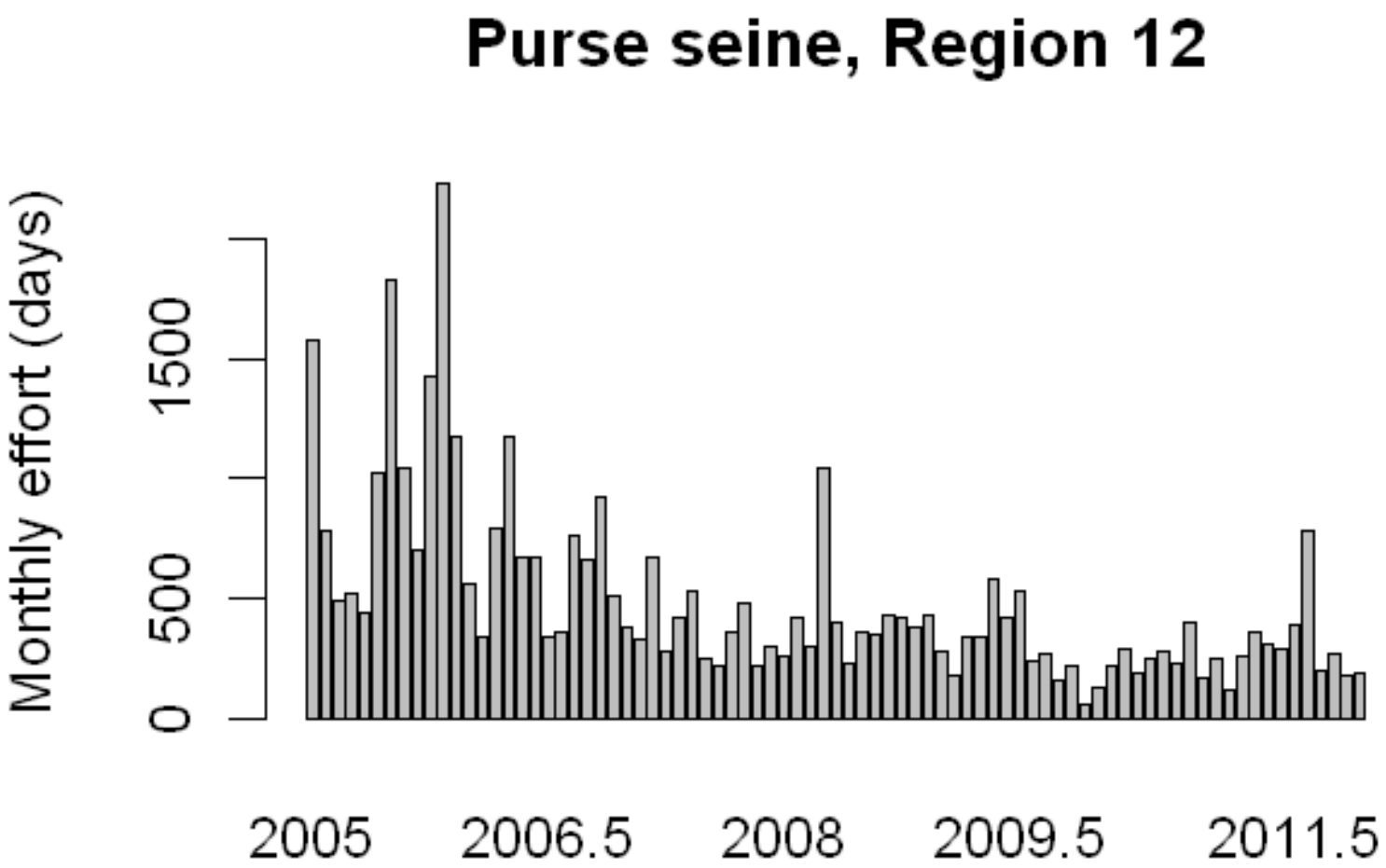
Nominal CPUE



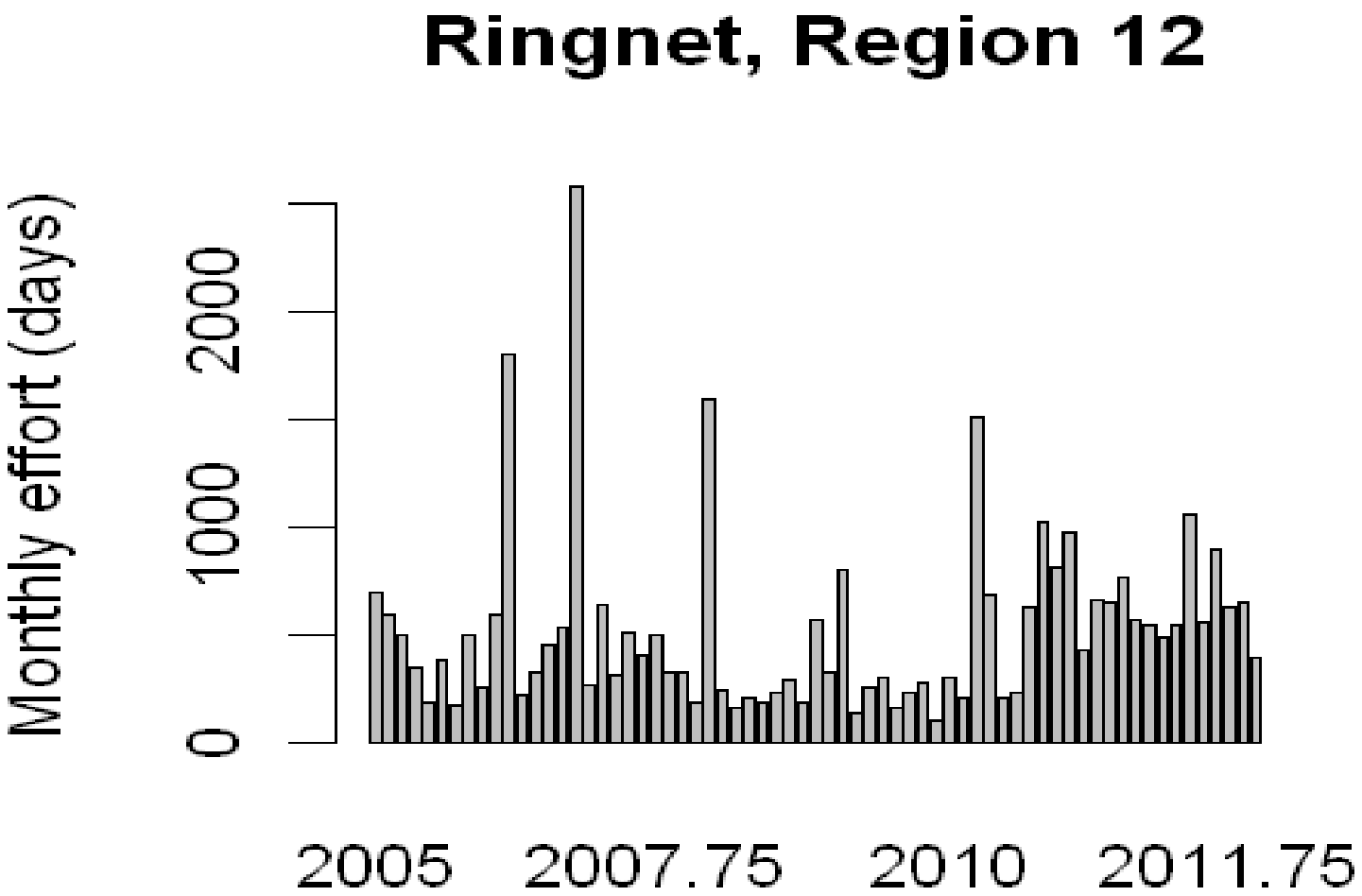
Standardized CPUE



Purse seine effort

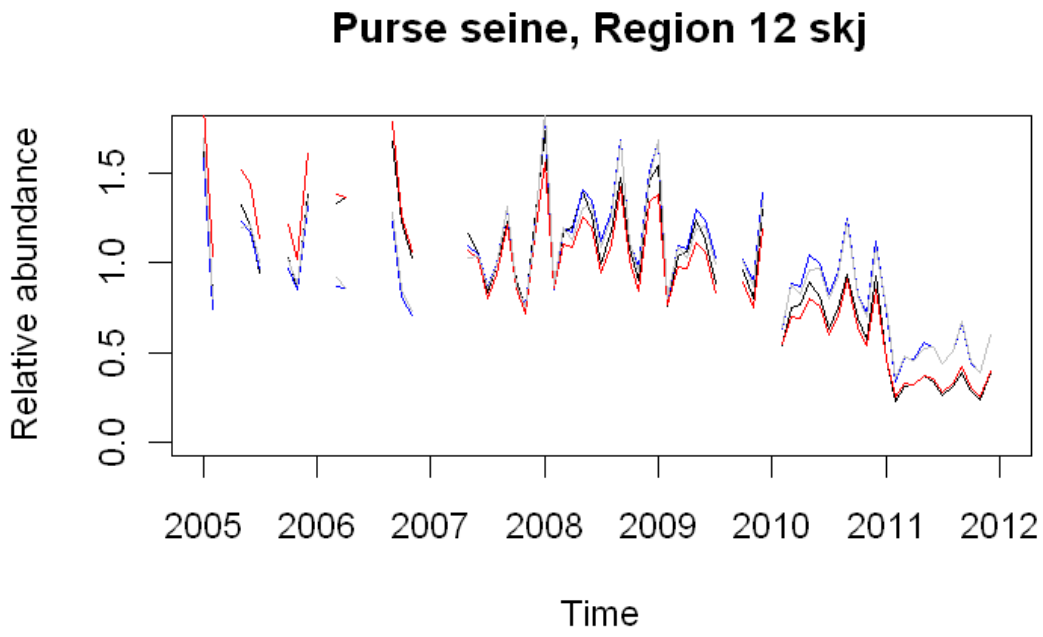


Ringnet effort

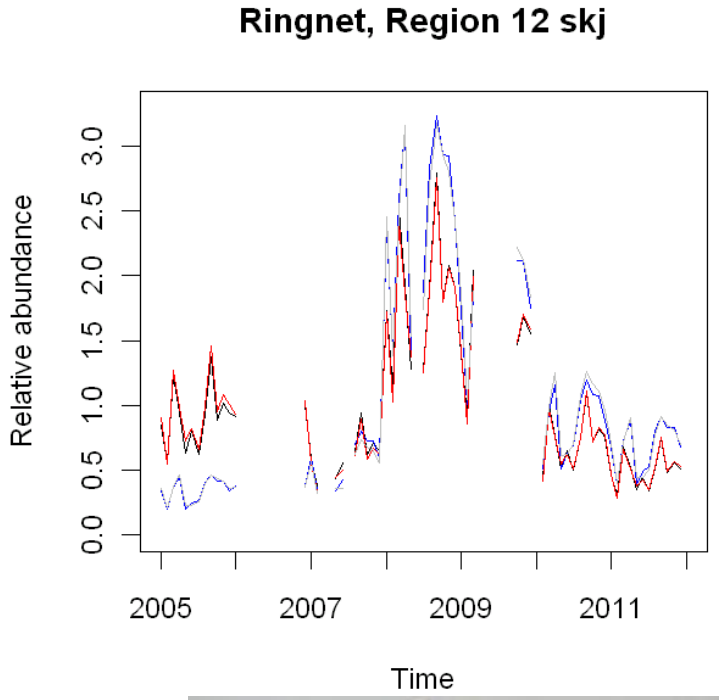


Purse seine and ringnet, skipjack relative abundance

Purse seine – 55% of catch



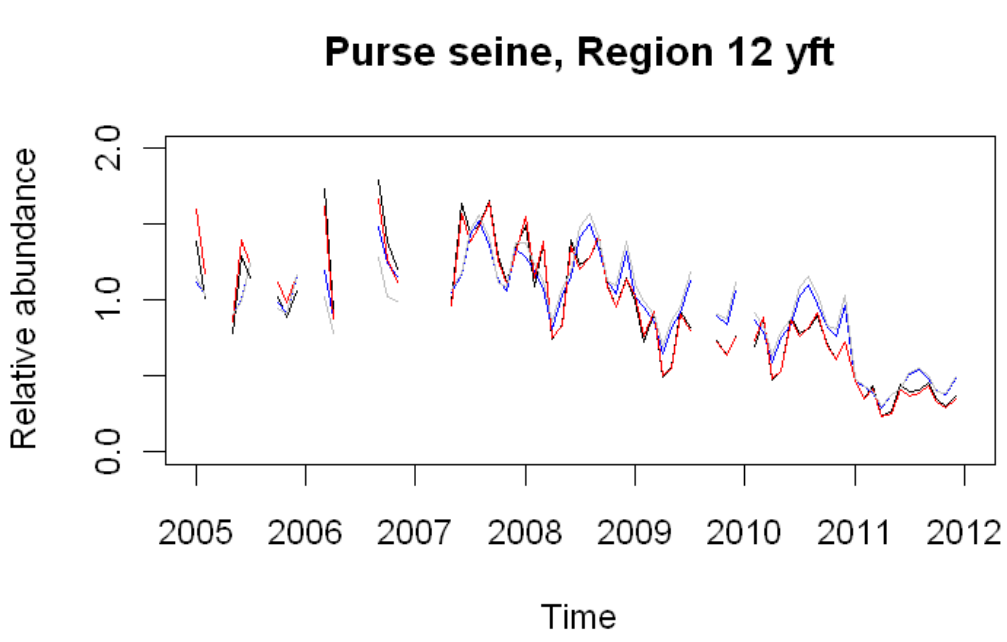
Ringnet – 43% of catch



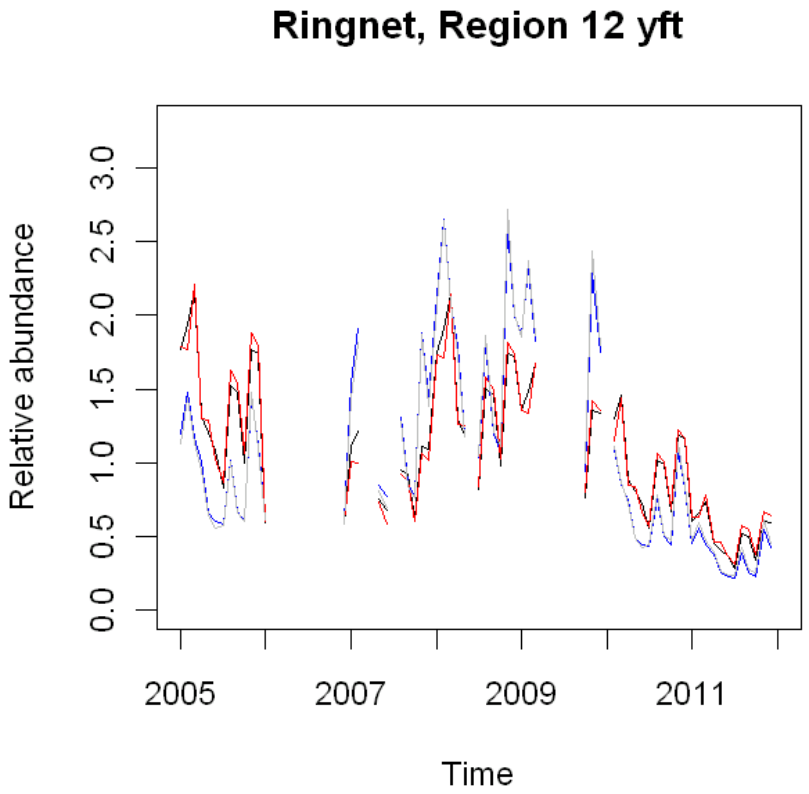
Gulyasan

Purse seine and ringnet, yellowfin relative abundance

Purse seine – 15% of catch

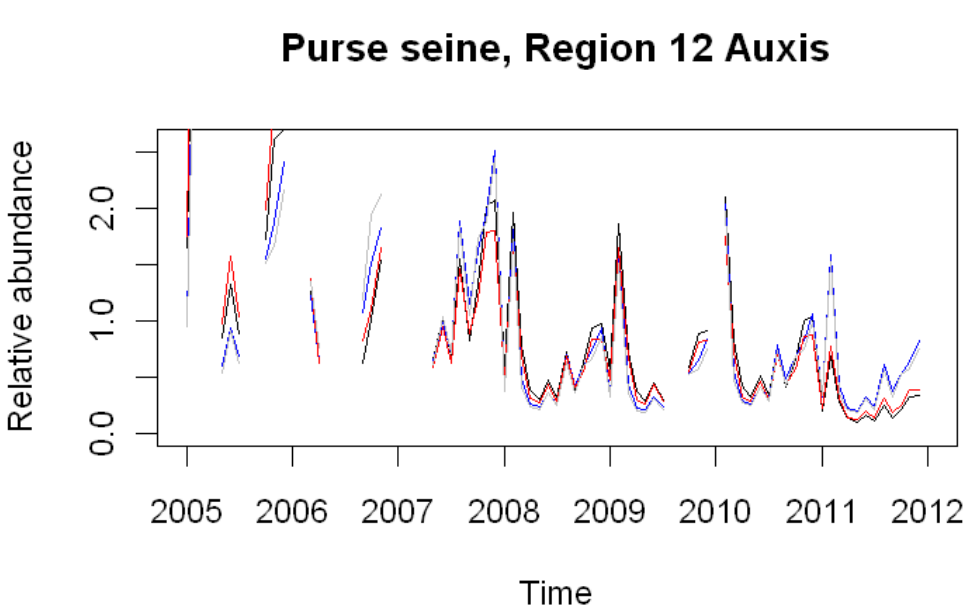


Ringnet – 13% of catch

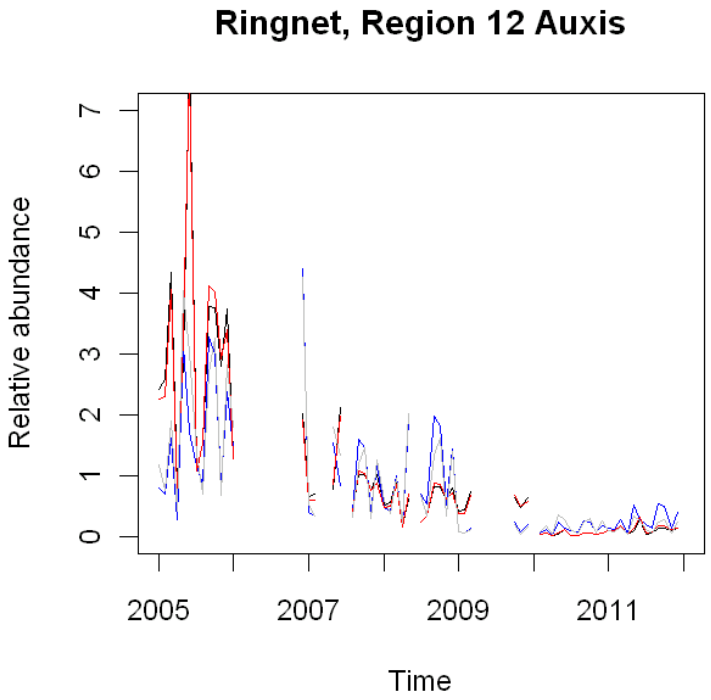


Purse seine and ringnet, Auxis relative abundance

Purse seine – 17% of catch

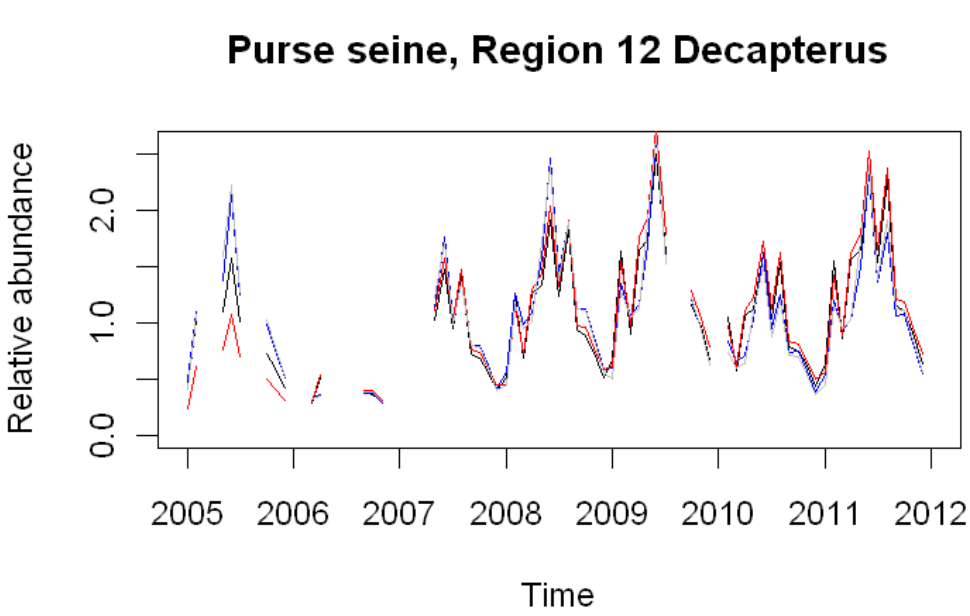


Ringnet – 23% of catch

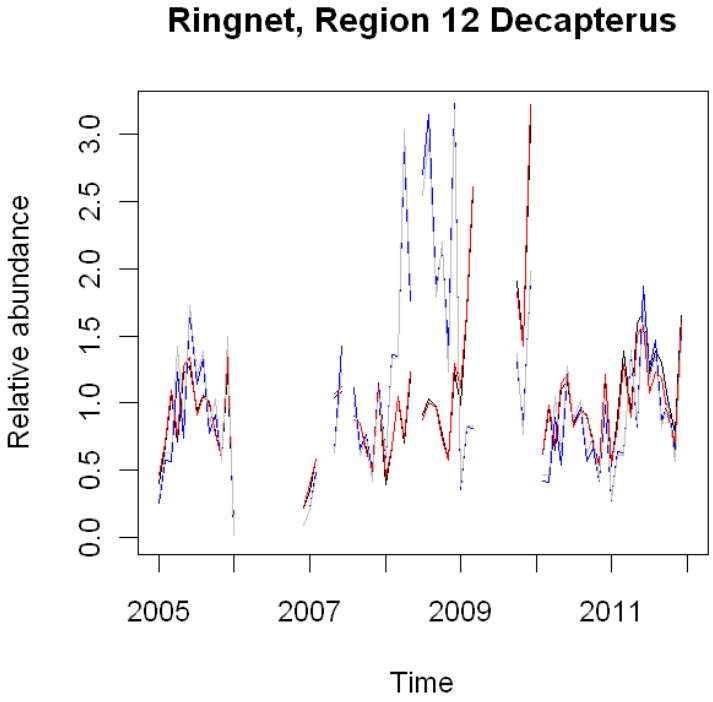


Purse seine and ringnet, Decapturus relative abundance

Purse seine – 9% of catch

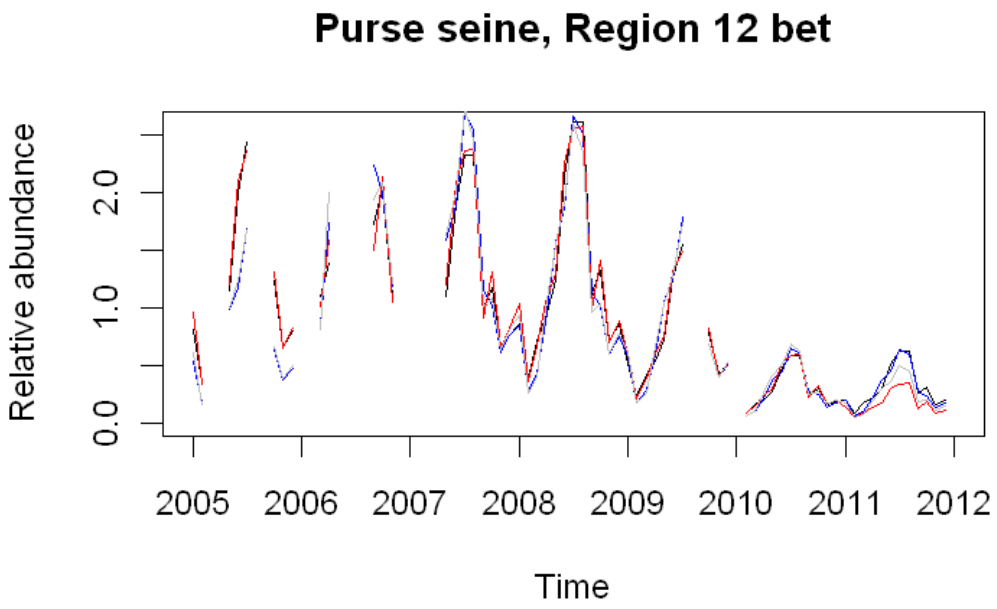


Ringnet – 17% of catch

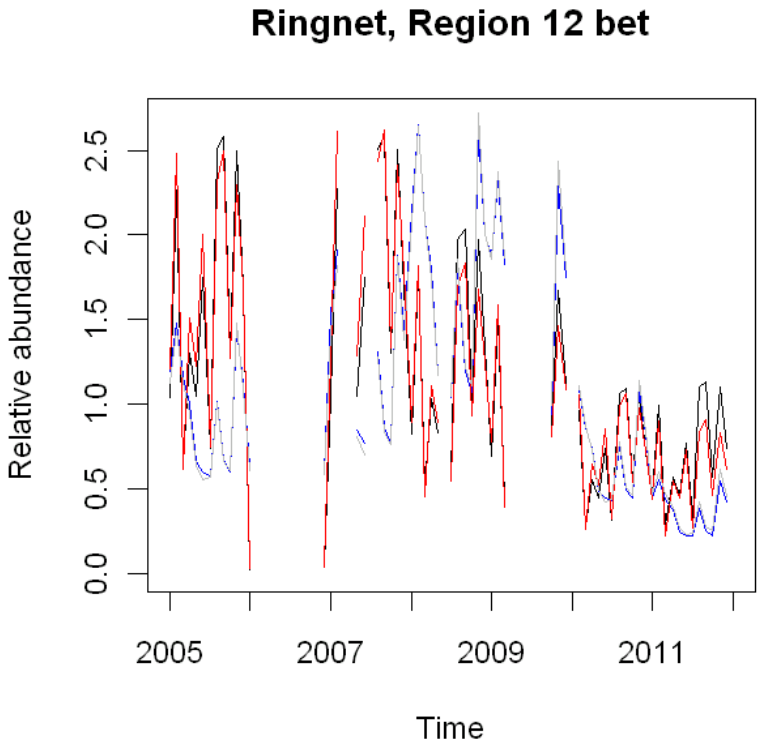


Purse seine and ringnet, bigeye relative abundance

Purse seine – 2% of catch



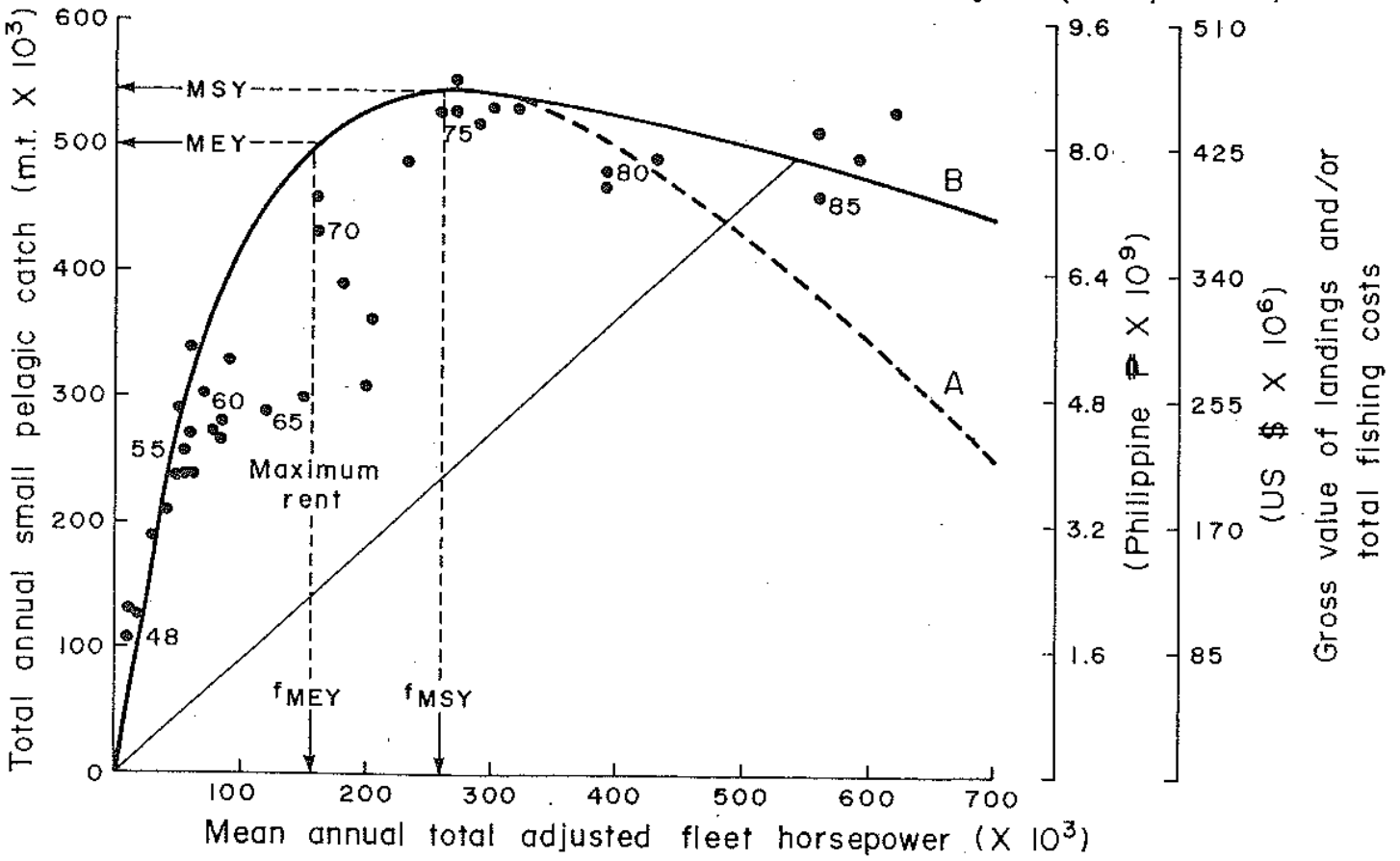
Ringnet – 1% of catch



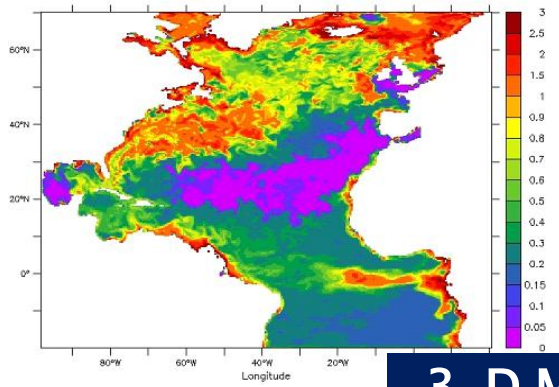
Dalzell et al 1987 – Demonstrated overfishing on small pelagics, a reduction of 45% was necessary to achieve MEY.

Yield curve for Philippine small pelagics

A plot of total small pelagic catch versus mean annual adjusted fleet horsepower is shown in Fig. 7. The estimated yield curve gave a maximum sustainable yield (MSY) of 544,000 tonnes



From physics to fish and fisheries, Patrick Lehodey and Inna Senina (CLS)



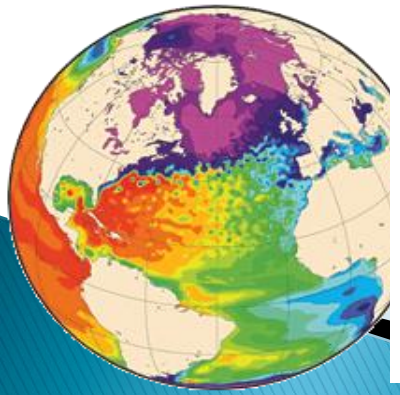
3-D Models

Ocean Biogeochem.

Primary Production

Ocean Physics

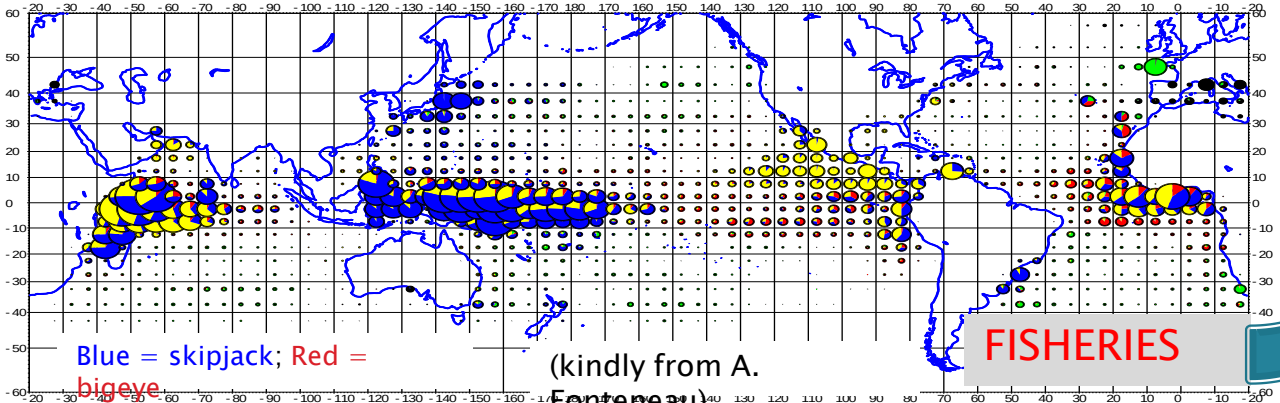
3-D models



SEAPODYM

Prey model

Predator's population dynamics model

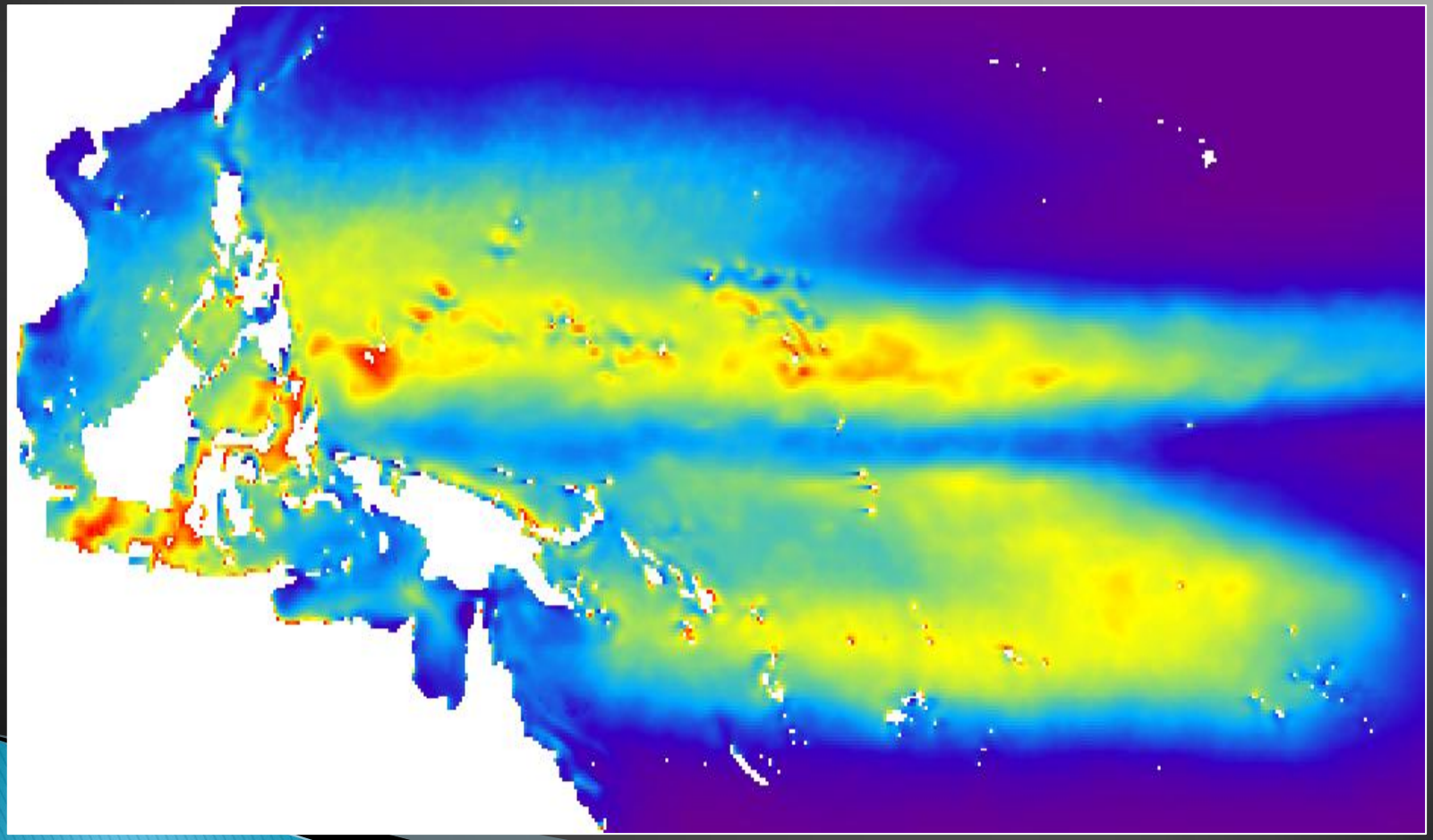


Blue = skipjack; Red = bigeye

(kindly from A. Fonteneau)

FISHERIES

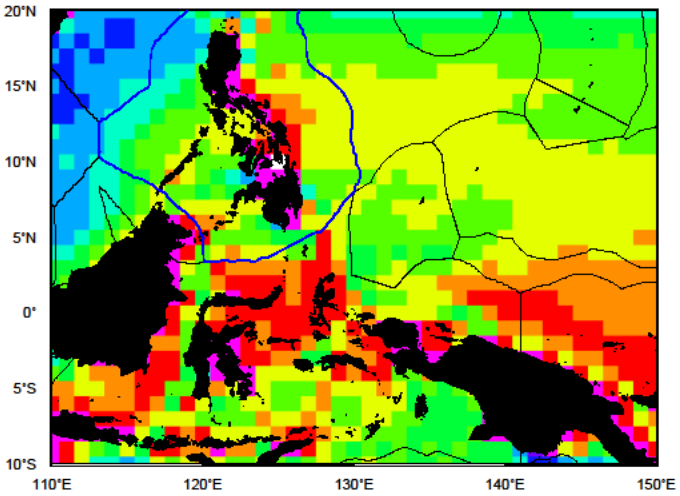
Skipjack Larval Distribution



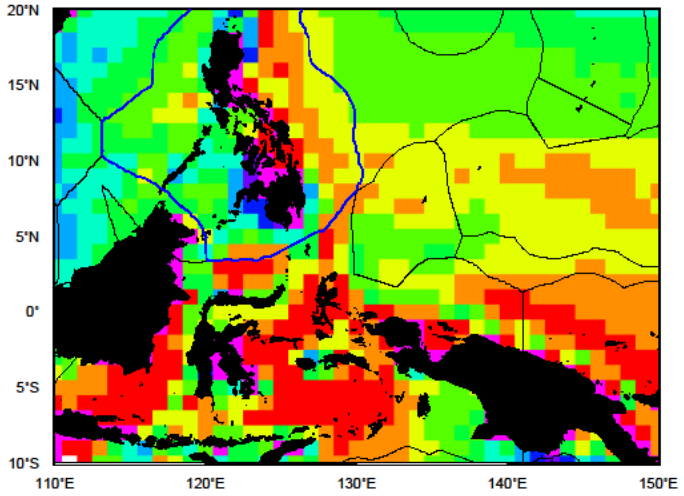
Skipjack in the EEZ

Sepodym model (1998-2008)

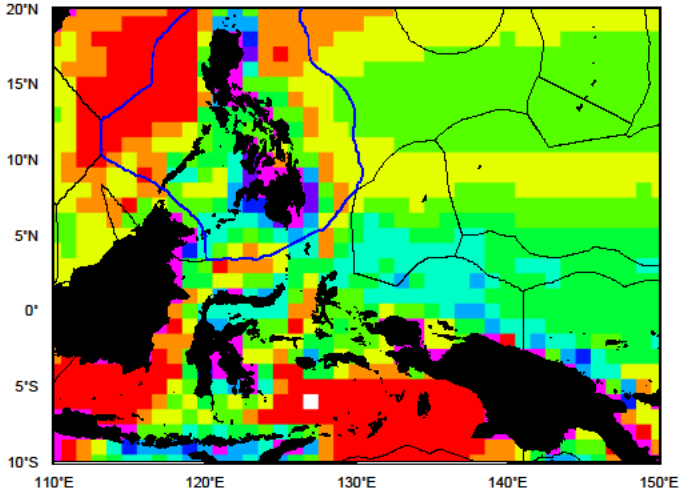
Recruits (1-3 months , 10 cm)



Young (3-10 months, 17-40 cm)



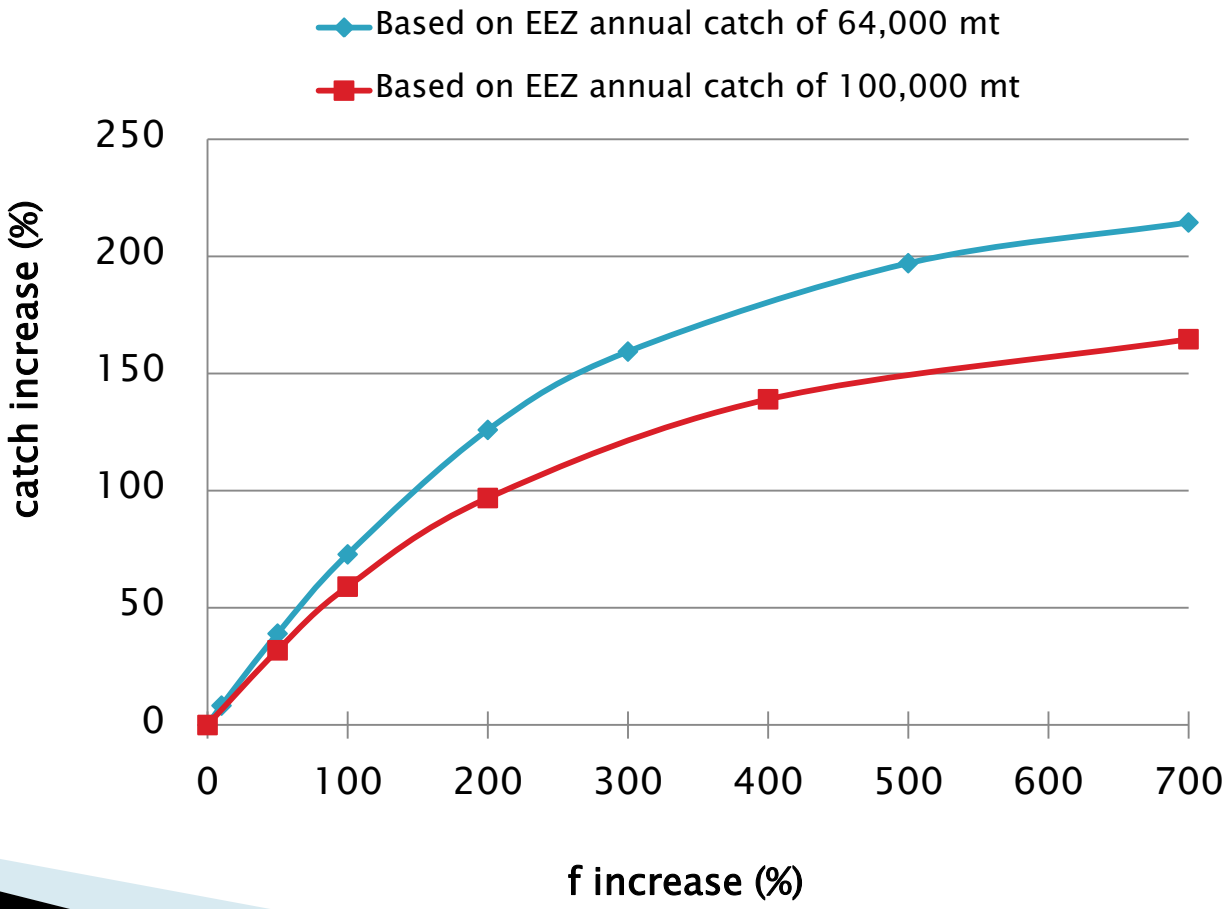
Adult (10-50 months , 47-88 cm)



Yield based on effort scaler with assumptions on domestic catch in the EEZ

Double effort (100% increase)

Increase in yield of 73% to 59%



Conclusions (1)

- Sustainability concerns, perhaps less concern for the handline fishery due to a recent reduction in effort.
- Substantial reduction in abundance for the purse seine and ringnet fisheries.
- Potential reduction in catch competition due to opening of High Seas pocket 1? Future access arrangements?

Species	2009–2011 reduction in abundance compared to 2005–2007
Yellowfin (handline)	–19%
Yellowfin (purse seine)	–33%
Skipjack	–20%
Bigeye	–66%
Auxis	–55%
Decapturus	+26%

Conclusions (2)

- Skipjack MSY preliminarily estimated.
- Valid for 1998–2008, estimates are probably too optimistic
- Reduction in Philippines CPUE since 2008
- Expansion of PNG catches to >700,000 mt in both 2010 and 2011 which effects availability of skipjack to the Philippines EEZ.

Acknowledgements

- US Department of State, Manila Embassy
- NFRDI staff assisting in data extraction – Aprille Pagtanac, May Matucad, Val Manlulu
- WPEA – OFM for funding for enhanced data collection and many other aspects

Questions?

Basic EAFM

EAFM

EAFM (FAO-CCRF, 2003)

“An approach to fisheries management and development that strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic, and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.”

In the tropical developing country context

. . . this includes taking into account the fragility of the coastal ecosystems (particularly the coral reef system), the multi-sectoral uses, the multi-species and multi-gear nature of the fisheries, and the various needs of the coastal communities

EAFM

- **addresses the sustainability of ecosystems instead of just the sustainability of target species**
- **addresses both human and ecological well-being**
- **merges two paradigms: protecting and conserving ecosystem structure and functioning, and providing food, income and livelihood**
- **can be used at different scales and uses tools that can be customized to allow a prioritization process of major issues and setting of objectives**
- **Instead of fisheries targets, it uses indices of ecosystem health as target for management**

Conventional Fisheries Management and EAFM

	Conventional Fisheries Management	Ecosystem Approach to Fisheries Management
Management objectives	Fisheries sector	Multiple fisheries, ecosystem and socioeconomic
Species considered	Target species	All species in the ecosystem, particularly those impacted by fishing
Scale	Stock/fishery	Broader ecosystem (spatial and temporal)
Assessment method	Stock assessment	Multispecies and ecosystem assessment and indicators
Data	Scientific	Scientific and traditional knowledge
Governance/management	Top-down; fishery specific	Participatory, co-management, adaptive management
Management intervention	Mainly control of fishing	Broad based incentives (including MPAs, livelihoods)

Source: FAO 2009

Principles of relevance to EAFM

- Avoiding overfishing
- Ensuring reversibility and rebuilding
- Minimizing fisheries impact
- Considering species interactions
- Ensuring compatibility
- Applying the precautionary approach
- Improving human well-being and equity
- Allocating user rights
- Promoting sectoral integration
- Broadening stakeholders participation
- Maintaining ecosystem integrity

Practical application of EAFM

(Focus on the basic elements)

- **Delineation of ecosystem boundaries**
- **Incremental understanding of the dynamics of the marine ecosystem and subsystems within the boundary**
- **Development of indices of ecosystems' health as targets for management**
- **Immediate fisheries management interventions for species that constitute a large portion of the food web (economic importance?).**
- **Implementation of strategies such as MPAs, gear/species specific management, registration and licensing, zoning scheme, law enforcement, IEC**
- **Development of governance system that is responsive to ecosystems approach (and the scale.**

Information