

An underwater scene featuring a clownfish swimming near yellow sea anemones, a large brown coral structure, and a large school of silver fish. The image is divided into three horizontal sections by curved white lines. The top section shows the clownfish and anemones. The middle section shows the coral. The bottom section shows the school of fish. Several white circles of varying sizes are scattered across the image, some overlapping the curved lines.

Present and Future Challenges for Coastal Communities

**Proceedings of the
Coastal Resources Management Forum**
Local Government Initiative Project
22 August 2008

CRTR • MSI • MERF

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Government Agencies: Department of Environment and Natural Resources (Pangasinan), Bureau of Fisheries and Aquatic Resources (Region 1), Office of the Provincial Agriculturist (Pangasinan);

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Activity Report

Introduction

The Lingayen Gulf is one of the major fishing grounds in north western Philippines. Presently, the fisher folks are experiencing dwindling fish catch due to the increasing fishing pressure in the gulf (e.g. overfishing, use of destructive methods, increase in the number of fishers, etc) and the degradation of its coastal habitats. The concentration of local fishers in the area is among the highest in the country as shown by studies conducted by several research institutions. As early as 1976, the Bureau of Fisheries and Aquatic Resources (BFAR) declared the Lingayen Gulf as overfished (Smith et al. 1980).

From the early 1990's up to the present, conservation and protection programs have been piloted and implemented to make the Lingayen Gulf recover. Different government entities (e.g. the local government units (LGUs) and the provincial governments of Pangasinan and La Union), academic institutions (e.g. U.P. MSI, the U.P. College of Social Work and Community Development (CSWCD)), and non-government organizations (NGOs, e.g. Haribon) have undertaken various projects geared towards this objective. The initiatives have contributed to the evolution of the coastal resources management in the area, and have paved the way for simultaneous efforts to reverse the present trend of the Gulf.

In line with its objectives to provide capacity-building training for the LGUs, the GEF-LGI Project in collaboration with the District Office of Congressman Arthur F. Celeste conducted a 1 day symposium workshop entitled “Coastal Resources Management (CRM) Forum”. The activity was held at the El Pescador Resort Hotel, Barangay Luciente, Bolinao, Pangasinan on August 22, 2008 as one of the noteworthy activities in the celebration of the International Year of the Reef. The activity focused on the challenges and opportunities related to scaling up the sustainable mariculture development, coastal tourism and marine protected area (MPA) network in western Pangasinan and the neighboring province of Zambales.

The main participants were local government officials and staff, local educators, MPA managers, representatives of NGOs, resort owners, representatives of peoples organizations (POs), and local professional law enforcers. They came from the 6 municipalities and city (Alaminos) of Pangasinan and 1 municipality from Zambales.

National government agencies such as the Bureau of Fisheries and Aquatic Resources (BFAR Region 1) and the Department of Environment and Natural Resources (DENR) also participated in the CRM Forum.

The activity was led by Drs. Edgardo D. Gomez, Malou McGlone and Marie Antonette Meñez (from U.P. MSI), who are respected authorities in the field of coral reef ecology, coastal biogeochemistry, ecology of invertebrates and resource management respectively. Local leaders with experiences in MPA network, mariculture and coastal tourism were also invited as resource persons for the activity.

The District Office of Congressman Arthur F. Celeste co-sponsored the activity by providing logistical support (venue and food) for the forum. Mayor Domingo Doctor, Jr. of Burgos, Pangasinan represented Congressman Celeste who was unable to attend the activity due to unavoidable commitments in Congress.

The activity was envisioned to enhance the inter-LGU collaboration in coastal resources management in the Alaminos, Bani, Bolinao and Anda (ABBA) area and the neighboring municipalities in western Pangasinan and Zambales. Additionally, the workshop was conducted to share and learn from the vast experiences of the LGUs and other stakeholders in common approaches to coastal resources management.



Objectives

The primary objectives of the activity were to:

- a. Gather the policy makers, local chief executives (LCEs), and selected stakeholders to a 1 day forum that will serve as venue to share the lessons learned from key CRM initiatives in the area
- b. Initiate the feedback and evaluation of the state of the coasts of the target municipalities/cities
- c. Identify opportunities for joint key activities in relation to MPA networking, mariculture and coastal tourism in the 1st District of Pangasinan and the neighboring municipalities.



Activity Design and Methods Employed

The activity was divided into two parts: (1) input presentations to synthesize the lessons learned in implementing CRM, and (2) workshop sessions on the 3 themes (sustainable mariculture, coastal tourism & MPA network) to develop the framework for inter-LGU collaboration. During the input session, 6 topics were discussed, namely, “The Coral Reefs: Present and Future Challenges for Coastal Communities”; “Coastal Law Enforcement: The Task Force ABBA (Alaminos, Bani, Bolinao, Anda)”; “Mariculture and Marine Emergency System (MERSys) in ABBA Waters”; “Coastal Tourism”; “MPA Network in Bolinao, Pangasinan”; and “MPA Networks and Sustaining Mechanisms for MPA Management”. (See Annex 1: Program of Activities).

Participatory and evocative processes were employed as the main strategy to ensure the lively discussion/exchange of information among the participants and the resource persons. The inputs were in power point presentations for the audience to understand the topics easily. The resource persons were able to sustain the attention and interests of the audience all throughout the input sessions.

The presentations were made by CRM practitioners and marine scientists to enhance the exchange of information between resource manager, local community and other scientists. After each topic, an open forum was facilitated to clarify and discuss the questions raised by the participants.

Prior to the workshop, the participants were divided into 3 groups based on the 3 themes of the forum. Each group was tasked to work on the following questions: What worked? What did not work? and What needs to be done? After an hour, the participants reported on the outputs of the workshop.

Kits containing information materials (e.g. lecture notes, Bolinao MPA Protocol Pamphlet, Elsevier publication titled “Management of Coral Reefs: Where We Have Gone Wrong and What We Can Do About It”) were distributed to each of the participants as supplementary hand-outs during the activity. A resource book entitled “Improving the Governance of Philippine Coastal and Marine Areas: A Guide for Local Government Units” was also given to selected participants of the forum (e.g. LCE,

Sangguniang Bayan (SB) members, representatives of the various Municipal Agricultural Offices (MAOs), educators, PO leaders). The book was solicited by Dr. Meñez from the Eco Governance Project.

The forum was covered by the print and broadcast media. Present during the activity were journalists from the Philippine Daily Inquirer- Northern Luzon, GMA 7 Northern Luzon and the local AM stations Dagupan Aksyon Radyo and DZWM of Alaminos City.



Outputs

Two (2) major outputs were achieved during the activity. First, the participants were able to identify and recommend general action plans that could improve the CRM initiatives in their respective localities and at the inter-municipality level. Second, the activity provided substantial inputs on the available CRM tools that enhanced the knowledge and skills of the participants.

The Mayor of Burgos, Pangasinan showed keen interest in collaborating with their neighboring municipalities pertaining to coastal resources management and forging partnerships in CRM for the BIDA (Burgos, Infanta, Dasol, Agno) cluster.

The activity also gathered some local executives, policy makers and key stakeholders of the five municipalities of Pangasinan who apprised each other of the latest developments concerning their respective coastal resources management initiatives.

Per Municipality Composition of the Participants

More than 80 individuals (including the representatives of national government agencies, people from the academe, members of the media and students from U.P. MSI) participated in the activity. The municipalities of Burgos and Dasol, Pangasinan also sent representatives as first time participants to a GEF-LGI activity. Unfortunately, some of the target LGU participants from the municipality of Anda and the city of Alaminos, Pangasinan failed to attend the activity.

Municipality	No. of Participants	Composition
Agno	6	Vice Mayor, SB Members, Municipal Planning and Development Office (MPDO) representatives, Municipal Agriculturist, Local PNP
Alaminos	2	Representatives from the Department of Interior and Local Government (DILG), NGO (Tanggol Kalikasan)
Bani	7	SB Member, MPDO, Municipal Agriculturist, Tourism Officer, Bantay Dagat Volunteer, MPA Manager, PO Representatives
Bolinao	24	Municipal Agriculturist, Municipal Local Government Officer, CRM Officer, Law Enforcement Officer, Municipal Fisheries & Aquatic Resources Management Council (MFARMC) Chair, Academe, NGOs & POs Representatives
Burgos	8	(MFARMC) Chair, Academe, NGOs & POs Representatives
Dasol	6	SB Members, Municipal Agriculturist, MFARMC Chair, MFARMC
Masinloc, Zambales	5	CRM Staff, MPDO Staff, Aquaculturist





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Summary of the Input Presentations

- Coastal Law Enforcement: The Task Force ABBA (Alaminos, Bani, Bolinao, Anda)
- Mariculture and the Marine Emergency Response System (MERSys) in ABBA Waters
- Coastal Tourism
- The Marine Protected Area (MPA) Network in Bolinao, Pangasinan
- MPA Networks and Sustaining Mechanisms for MPA Management

Coral Reefs: Present and Future Challenges for Coastal Communities

The topic served as the take-off point for the succeeding inputs during the CRM forum. Dr. Edgardo D. Gomez, U.P. Professor Emeritus, discussed the status of the coral reefs in Lingayen Gulf. He tackled the economic and environmental importance of the reefs to the communities living within the Gulf. The concepts of food chain and food web were also discussed for the participants to understand the ecological functions and the inter-connectivity of the different marine life and the environment.



Emerging threats to the coral reefs due to environmental changes (e.g. global warming) and destructive human activities were given emphasis in this introductory lecture. Restoration initiatives to save and manage the coral reefs better were also discussed thoroughly by the speaker (See Annex 4).

Coastal Law Enforcement: The Task Force ABBA (Alaminos, Bani, Bolinao, Anda)

Mr. Florante Garcia, the Deputy Team Leader of Task Force ABBA, presented the implementation of the coastal law enforcement activities in the ABBA waters (See Annex 5). He also discussed the history of the Task Force and the legal bases (e.g. Ordinances, Resolutions, Executive Orders) of its creation as an enforcement body in the area.

Apprehensions of illegal fishers and the cases filed in court were presented for the participants to appreciate the level of involvement of the Task Force in coastal law enforcement. The legal component has been integrated in the system to support the law enforcers in their campaign against illegal fishing activities in the ABBA waters. Aside from the regular seaborne patrol activities, the Task Force also conducted market denial operations and filed a total of 292 cases in court from 1999 to 2007.

Mr. Garcia emphasized the importance of enforcement as a critical factor to the success of CRM initiatives in a given locality.



Mariculture and the Marine Emergency Response System (MERSys) in ABBA Waters

Inputs were focused on the mariculture industry and the marine emergency response system protocol that were developed for the ABBA municipalities. Information on harmful algal blooms and fish kills were given emphasis because of their prevalent occurrences in the area. The extent of finfish mariculture in the area was discussed to illustrate the need for regulation and regular monitoring activities on the part of the concerned LGUs. Poor water quality in areas with many structures contributed to the massive fish kills specifically in the Bolinao-Anda municipal waters.

Guidelines on how to attain sustainable mariculture (response mechanisms, regulation, research, management) were also discussed during the lecture. The guidelines are necessary information for the LGUs because mariculture is emerging as the next frontier for fish production in the country.



The lecture on MERSys enhanced the knowledge of the participants on how to quickly respond to emergencies at the local level. It aimed to empower the LGUs to anticipate marine related emergencies such as fish kills, harmful algal blooms, human poisonings from fish and seaweeds, and oil/chemical spills. The MERSys protocol was developed by the U.P. MSI, Sagip Lingayen Gulf Project and the ABBA municipalities as a tool to mitigate the occurrences and impact of the fish kills in the area. Its main elements include training of LGU personnel and other stakeholders, advocacy and information, partnership agreements and institutionalization at the LGU level. It was patterned on the National Disaster Coordinating Committee (NDCC) Comprehensive Emergency Management Framework.

Dr. Ma. Lourdes McGlone, the Director of the U.P. MSI, discussed the topics with the participants during the forum. She is one of the authors of the MERSys protocol (See Annex 6).

Coastal Tourism

Mr. Ronaldi Torres, Executive Director of the Western Pangasinan Visitors Bureau, tackled coastal tourism as the emerging industry in western Pangasinan.

The talk provided a clear picture of the potentials and revenues coastal tourism could generate to help sustain the CRM initiatives in a certain municipality. Proper planning and packaging, aggressive promotion (e.g. national level) and adequate support from the LGUs, NGOs and other stakeholders are the crucial factors for attaining success in the development of coastal tourism areas throughout the region.

Updates on the profiles and existing structures for tourism activities were presented to the participants by the resource person (See Annex 7).



The Marine Protected Area (MPA) Network in Bolinao, Pangasinan

Ms. Carolina Ramirez, Bolinao Municipal Agriculturist, acted as resource person for this topic. She discussed the zoning plan and the CRM initiatives with emphasis on the different types of marine protected areas that were established in the municipality (See Annex 8).

She described the MPAs in the area: seagrass beds, a giant clam nursery, and mangrove management areas. She also elaborated on the process of MPA establishment as well as the importance and gains from the MPA network based on their actual experiences.

The salient feature of her topic was the collaboration of the LGU, POs, academe and NGOs in working for the establishment of the MPA (including mangrove & seagrass) network in Bolinao. She also discussed the perceived changes (environmental, economic, behavioral) that the MPAs have brought to the local communities and in the municipality in general. Lastly, she tackled the challenges and future actions of the LGU in sustaining the CRM programs in the municipality.



MPA Networks and Sustaining Mechanisms for MPA Management

MPA Networking is a strategy being promoted as a means to optimize the gains of MPA management and its maintenance for sustainability. By adopting this strategy, neighboring municipalities could benefit from decreased MPA maintenance cost, enhance their ecological and social functions and promote inter-LGU collaborations. MPA networking also facilitates exchange of important information, experiences and good practices as well as sharing of resources among the concerned municipalities. The topic was discussed by Dr. Marie Antonnette Meñez, U.P. MSI Professor and adviser to the LGI Project.



Aside from the significance of the MPA network, she cited provisions from the Philippine Fisheries Code of 1998 and the Local Government Code which provides for an integrated management of contiguous fishery areas and for inter-LGU cooperative undertakings as legal basis for the initiative.

The lessons learned from Illana Bay were also shared and discussed to the participants as a local example of a working marine sanctuary network in the country. Concrete examples of these were inter-LGU collaboration on the coastal and fishery law enforcement activities being implemented in the area.

The last part of the topic was the introduction of the Marine protected areas Support Network (MSN) to the participants. Dr. Meñez discussed the goals and objectives as well as the advocacies being promoted by the MSN (e.g. policy and legislative reforms) through various means to lobby support from the LGUs and from the different sectors of the society in general (See Annex 9).







Output of the Thematic Workshops

- Mariculture Development
- Coastal Tourism
- Marine Protected Areas

A. Mariculture Development

Mariculture is a major industry in the Province of Pangasinan. From the mid-90's up to the present, the coastal waters of Alaminos, Bani, Bolinao, and Anda have been the center of mariculture expansion which contributed to the deterioration of water quality and coastal ecosystems in the area. The unsustainable mariculture practices have led to massive harmful algal blooms and fish kills that translated into heavy losses to the industry and the marine environment. The workshop reviewed the options to develop an environment-friendly and sustainable framework to manage and sustain the mariculture industry in the gulf.

Sharing of Local Experiences

Mariculture Activities

Agno

- Seasonal milkfish culture in the river (done after rainy season)
- Emerging industry in the municipality

Bani

- No pens and cages at present
- Former mayor dismantled all illegal fyke nets
- Want to try abalone and *Trochus* culture

Bolinao

- No fish kills were observed during the dry season
- Regular water quality monitoring is being conducted by the LGU
- Operators are warned right away when monitoring results are found critical
- Verbal agreement between the LGU of Anda to dismantle fish cages but no action on the part of Anda was undertaken

Dasol

- Seasonal culture of Talakitok in rivers
- Salt production is being prioritized rather than milkfish culture



Issues

1. Deterioration of water quality
2. Stocking density
3. Feed quality control
4. Boundary dispute between the ABBA municipalities

Strategic Action Plan (1 Year)

Issue	What To Do	Who's Responsible	When
1. Feed quality & feeding regime	<ul style="list-style-type: none"> • Training of operators • Legislation • Pass position paper to lobby for provincial action 	LGU, BFAR, Academe Provincial level LGUs	Last Quarter of 2008 September 2008
2. Zonation	<ul style="list-style-type: none"> • Implement recommended assessed/zoned areas 	LGUs	Last Quarter of 2008
3. Dismantling of cages	<ul style="list-style-type: none"> • SABBAC (Sual, Anda, Bani, Bolinao, Alaminos City) Memorandum of Agreement (MOA) 	LGUs of SABBAC	Last Quarter of 2008
4. Balingcaging River (Agno) used for aquaculture	<ul style="list-style-type: none"> • Technical studies, Inputs to CRM Plan & Fishery Ordinance 	BFAR, DENR, Academe, Tanggol Kalikasan	Last Quarter of 2008

B. Coastal Tourism

Coastal tourism is a major development area for LGUs in the region. This is evident with the experience of Alaminos City in the development and management of the Hundred Islands National Park. Revenues from coastal tourism could generate additional funds that could help the LGUs sustain the CRM initiatives in their respective localities. The workshop facilitated discussions on which LGUs can build on to develop the potentials of coastal tourism and enhance the management of coastal and marine resources in western Pangasinan.

Sharing of Local Experiences

- Bolinao has been identified as an ecotourism site
- CRM sites could enhance coastal tourism
- Potential of western Pangasinan as tourist destination in Region 1 based on the influx of tourists (local & foreign alike) in the province

Issues

- Lack of infrastructure that could boost the tourism industry
- Lack of promotion at the national level
- Inadequate capability of some LGUs to develop and promote coastal tourism in their respective municipalities

Recommendation

- LGUs to package special tourism spots/destinations and/or events



Strategic Action Plan (1 Year)

What To Do	Who Are Responsible	When
Organize Tourism Council	LGU	End of October 2008
Designate Information Center	LGU & NGO	End of November 2008
Environmental Scanning/Site Validation	LGU, NGO, Provincial Tourism Office	1st Quarter of 2009
Documentation	Provincial Tourism Office	2nd Quarter of 2009
Strengthening of CRM Solid Waste Information & Social Consequences	U.P. MSI, DENR, NGO, PNP	3rd Quarter of 2009
Capability Building	Manila North Toll ways Corporation (MNTC), North Philippines Visitor's Bureau (NPVB)	3rd Quarter of 2009
Packaging	Department of Tourism (DOT), LGU, NGO	4th Quarter of 2009
Familiarization Tour	Provincial Tourism Office	December 2009

C. Marine Protected Areas

From 1998 up to the present, several marine protected areas (MPAs) have been established in some municipalities in Lingayen Gulf. It is a popular management tool being implemented mainly to protect the coral reefs, mangroves and seagrass beds. In Bolinao alone, there are 8 MPAs (excluding mangrove and seagrass) being co-managed by the various POs and the LGU. Presently, the GEF-LGI Project is providing technical assistance to the MPA establishment in Agno, Pangasinan.

The workshop focused on the strategies to strengthen and sustain the MPA network in western Pangasinan and in Masinloc, Zambales. Its main objective is to enhance the ecological and social functions of the MPAs as one of the major tools in coastal resources management. The MPA network could serve as a means to scaling up the collaboration and networking arrangements among LGUs in the gulf.

Sharing of Local Experiences

Bolinao

- Information dissemination is an effective tool in the MPA establishment
- Partnership of the LGU, POs, NGOs and other stakeholders
- Federation of POs
- Political will of the Local Chief Executive
- Technical assistance being provided by the U.P. MSI

Bani

- Study tours helped in convincing the community residents
- Full support of the LGU to the POs
- Budget allocation for the operations of the MPA



Issues

- Resistance from the fisherfolks and other community residents
- Lack of logistical support to MPA managers and Bantay Dagat

Volunteers

- Lack or no support from new set of barangays officials/LGU
- Lack of alternative livelihood programs
- Minimal funds for the maintenance of MPAs
- Minimal or lack of incentives to the MPA managers and coastal law enforcers

Strategic Action Plan (1 Year)

Issue	What To Do	Who's Responsible	When
1. Municipalities with no MPAs	Establish MPAs in respective localities	LGUs of Agno, Burgos & Dasol	2009
2. Municipalities with existing MPAs	Forum with LCEs to lobby for regular budget allocation	LGUs, BFAR, DENR, POs, NGOs	October 2008
	Federation of MPA within the municipality (to represent each municipality in the District)	MPDC, MAO, CRM Officers, Fisheries & Aquatic Resources Management Council (FARMC), POs	End of December 2008
	Forging of MOA for enforcement & management	Same	2nd Quarter 2009
	Capacity-building for MPA managers	LGUs, U.P. MSI, BFAR, DENR, Congressman, Office of the Provincial Agriculturist (OPAg), Tanggol Kalikasan	2nd Quarter 2009

The image features a minimalist design on a light gray background. A large, dark gray circle is centered, containing the word "Annexes" in a white, sans-serif font. Surrounding this central circle are several other circles of varying sizes and styles: some are solid dark gray, some are white with dark gray outlines, and some are thin dark gray outlines. These circles are scattered across the page, creating a sense of depth and movement. The word "Annexes" is the central focus, with its bounding box approximately at [360, 454, 625, 500].

Annexes

Program of Activities

Time	Activity	In-Charge
7:30 – 8:30	Arrival & Registration	Secretariat
8:30 – 8:40	Invocation & Singing of National Anthem	Participants
8:40 – 8:50	Welcome Address	Atty. Ayar Montemayor
8:50 – 9:10	Keynote Address	Hon. Domingo Doctor Mayor, Burgos, Pangasinan
9:10 – 9:20	Rationale of the Activity	Dr. Marie Antonette J. Meñez
9:20 – 9:35	Coral Reefs: Present and Future Challenges for Coastal Communities	Dr. Edgardo D. Gomez, Center of Excellence (CoE) Coordinator
9:35 – 9:50	Coastal Law Enforcement: The TF ABBA	Florante Garcia Deputy Team Leader, TF ABBA
9:50 – 10:00	Open Forum	Facilitator
10:00 – 10:30	Mariculture & MERSys In ABBA Waters	Dr. Ma. Lourdes McGlone Director, U.P. MSI
10:30 – 10:40	Open Forum	Facilitator
10:40 – 11:10	Coastal Tourism	Ronaldi Torres Executive Director, Western Philippines Visitor's Bureau (WPVB)
11:10 – 11:20	Open Forum	Facilitator
11:20– 12:00	The MPA Network in Bolinao, Pangasinan	Carolina C. Ramirez Municipal Agriculturist, Bolinao
12:00 – 12:45	Lunch Break	
12:45 – 1:15	MPA Networks & Sustaining Mechanisms for MPA Management	Dr. Marie Antonette J. Meñez
1:15 – 1:30	Open Forum	Facilitator
1:30 – 3:00	Thematic Workshop	Participants
3:00 – 3:30	Presentation of the Workshop Outputs	Participants
3:30 – 4:00	Plenary & Synthesis	Dr. Marie Antonette J. Meñez

Group Photo



List of Participants

	NAME	AFFILIATION/ADDRESS	CONTACT NUMBER
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4	Alberto A. Elec	Project Officer, Tanggol Kalikasan	075-551-25-74
5	Edwin P. Conte	Municipal Interior and Local Government Operations Officer (MILGOO), Bolinao	0919-208-23-00
6	Ronaldi P. Torres	Executive Director, WPVB	0910-910-21-32
7	Rhia Gonzales	Student, U.P. MSI	0906-285-93-61
8	Leilani Solera	Student, U.P. MSI	0917-957-05-21
9	Romell Seronay	Student, U.P. MSI	0906-361-50-01
10	Camille Jordan	Student, U.P. MSI	0906-715-43-60
11	Domingo A. Doctor, Jr.	Mayor, Burgos, Pangasinan	0920-932-70-65
12	Ruel Notario	MPDC, Burgos	
13	Eufemia Bongar	Municipal Agriculturist, Burgos	0928-000-06-84
14	Ronald Ngayawan	SB Member, Burgos	0918-912-91-45
15	Wilson de Guzman	SB Member, Burgos	0921-721-48-70
16	Fred Bustamante	MFARMC, Burgos	
17	Nicanor C. Braga	Agricultural Technician (AT), Burgos	075-555-51-00
18	Carmen R. Chiong	Secretary, BHRROA, Bolinao	0916-455-44-96
19	Eugene R. Santos	Forester, Community Environment and Natural Resources Office (CENRO), Alaminos	0917-402-12-70
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23	Omar Pulido	AT, Masinloc	
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27	Sheila Albasin	Student, U.P. MSI	0916-724-86-66
28	Rosario Segundina P. Gaerlan	Assistant Regional Director (ARD), BFAR R-1, Sn. Fdo., La Union	0920-910-53-41
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31	Aileen Smith	President, BHRROA, Bolinao	
32	Gloria C. Gloria	Municipal Agriculturist, Bani	0920-916-74-29

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34	Marianito S. Castelo	SB Member, Bani	0918-941-90-14
35	Felicisimo Oiga, Jr.	SANCEDACO President, Bani	0910-937-61-53
36	Solomon Ochave	PO, Bani	0918-279-78-04
37	Fideliz Lomahan	Student, U.P. MSI	0917-392-30-77
38	Wilson N. Rosete	Vice Mayor, Agno, Pangasinan	0919-628-09-58
39	Reynaldo Necisito	SB Member, Agno	0919-629-01-04
40	Heroe Nerpio	SB Member, Agno	
41	George Nagal	MPDC, Agno	0918-232-35-72
42	Villa Fontanilla	Municipal Agriculturist, Agno	0917-273-87-09
43	Leduina S. Co	Provincial Environment and Natural Resources Office (PENRO), Dagupan	0917-508-49-81
45	William Raboy	LGU, Bani	
46	Margaret F. Celeste	President, BOMEFFI, Bolinao	075-554-20-35
47	Florante P. Garcia	AT, Bolinao	0910-473-19-42
48	J. Ayar Montemayor	SB Secretary, Bolinao	0919-316-03-00
49	Carolina Ramirez	Municipal Agriculturist, Bolinao	075-554-42-63
50	Jimmy C. Osorio	Bantay Dagat, Bolinao	
51	Jun C. Copa	TF ABBA, Bolinao	
52	Atomante Cahiga	TF ABBA, Bolinao	
53	Elmo Caagusan	TF ABBA, Bolinao	
54	Rosalie S. Aruelo	CRM Officer, Bolinao	0920-900-44-70
55	Annabelle Echavez	KAISA KA, Balingasay, Bolinao	0910-202-31-94
56	Roger C. Corbillon	KAISA KA, Victory, Bolinao	0910-364-94-76
57	Myrna Embile	KAISA KA, Pilar, Bolinao	
58	Percinita Junsan	KAISA KA, Arnedo, Bolinao	0909-571-81-98
59	Diosdado Carolino	KAISA KA, Pilar, Bolinao	0921-412-97-67
60	Jesem S. Gabatin	MFARMC Chair, Bolinao	0920-637-94-19
61	Manuel Ruben Bunao	SB Member, Dasol, Pangasinan	0916-647-48-69
62	Arsenio Sagaysay	SB Member, Dasol	
63	Fe A. Ballen	MPDC, Dasol	0921-842-60-59
64	Vilma P. Nifas	Municipal Agriculturist, Dasol	0919-753-88-21
65	Ma. Frieda Briz	AT, Dasol	0920-257-20-86
66	Rolando Bustria	MFARMC, Dasol	0919-336-23-54

Annex 3. List of Participants

	NAME	AFFILIATION/ADDRESS	CONTACT NUMBER
67	Charisse Victorio	GMA 7 Northern Luzon	
68	Lydia Colobong	DZWM, Alaminos	0920-280-45-78
69	PO 1 Leopoldo Garibay	PNP, Agno	
70	Silvestre Reyes	Bolinao	
71	Zenaida Ugaban	Fishery Coordinator, OPAg, Pangasinan	0919-855-46-13
72	Rolando Cerezo	Dean, PSU Binmaley	0919-440-39-84
73	Yolly S. Fuertes	PDI Northern Luzon	0920-908-83-57
74	Susan Yadao	Dagupan Aksyon	0919-680-57-29
75	Rodel L. Quibuyen	MPDC, Bani	0920-916-74-33
76	Naomi Tupas	GEF-LGI Project	
77	Christine Angelito	Admin Staff, GEF-LGI Project	0920-330-67-36
78	Joan Tiquio	Admin Officer, GEF-LGI Project	
79	Marie Antonette Meñez	Professor, U.P. MSI	
80	Ma. Lourdes S.D. McGlone	Director, U.P. MSI	0916-437-47-08
81	Helen T. Yap	Professor, U.P. MSI	
82	Edgardo D. Gomez	Professor Emeritus, U.P. MSI	0921-914-07-55
83	Elmer L. Tamayo	GEF-LGI Project	0915-441-01-84

Coral Reefs: Present and Future Challenges for Coastal Communities

- *Global change and coral reefs*
- *Status of the coral reefs of Lingayen Gulf*
- *Restoration research for coral reefs*

Edgardo D. Gomez, Ph.D.

*Coordinator,
Philippines/Southeast Asia Center of Excellence
GEF/WB Coral Reef Targeted Research
and Capacity Building for Management Program*

Global Change and Coral Reefs

- Temperature elevation
- Coral bleaching
- Sea level rise
- Ocean “acidification” and its effect on calcification

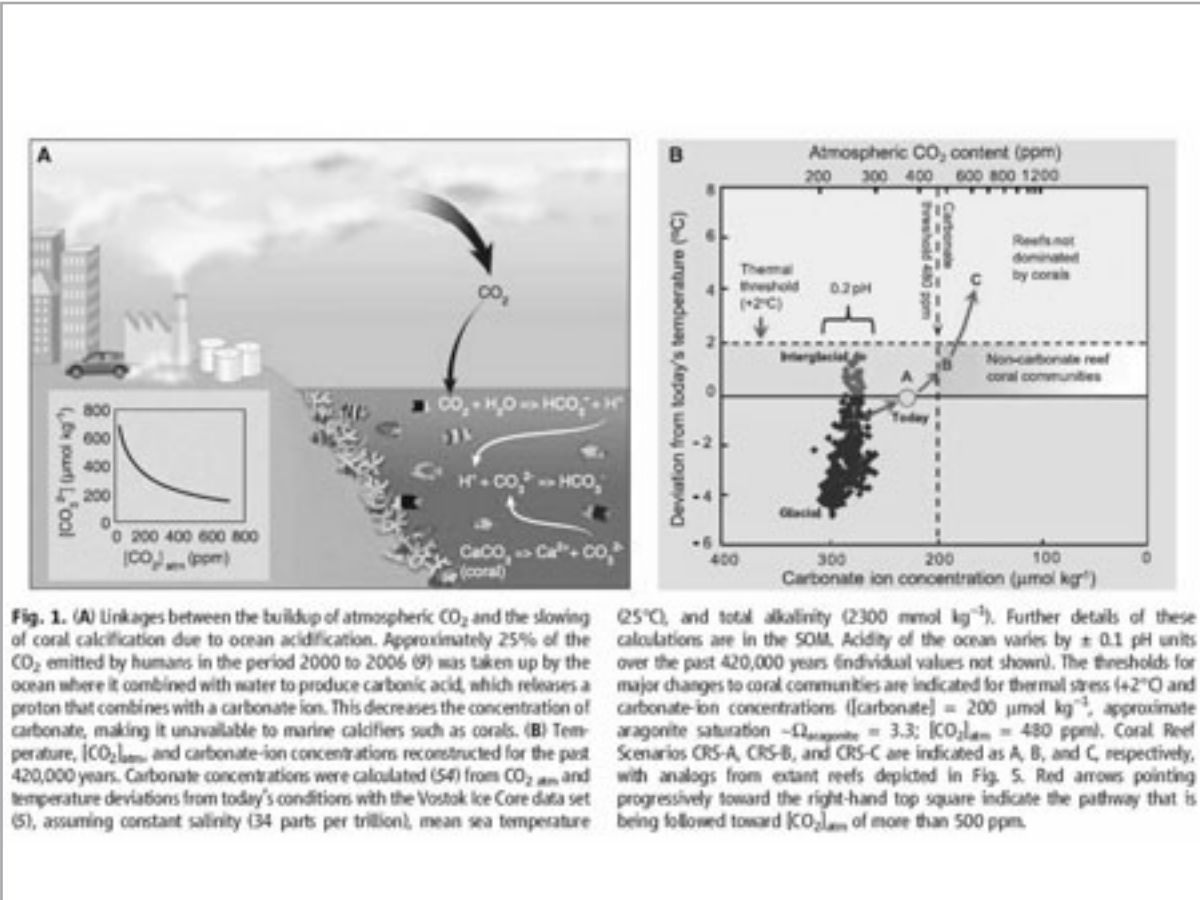


Table 1. Rates of change in atmospheric CO₂ concentration ([CO₂]_{atm} ppm/100 years) and global temperature (°C/100 years) calculated for the past 420,000 yr B.P. using the Vostok Ice Core data (5) and compared to changes over the last century and those projected by IPCC for low-emission (B1) and high-emission (A2) scenarios (8). Rates were calculated for each successive pair of points in the Vostok Ice Core record by dividing the difference between two sequential values (ppm or °C) by the time interval between them. Rates were then standardized to the change seen over 100 years. Ratios of each rate relative to the mean rate seen over the past 420,000 years are also calculated.

Period	[CO ₂] _{atm} (ppm century ⁻¹)	Ratio (relative to past 420,000 years)	Temperature (°C century ⁻¹)	Ratio (relative to past 420,000 years)
Past 420,000 years (99% confidence interval; n = 282)	0.07 ± 0.223	1	0.01 ± 0.017	1
Past 136 years (1870–2006)	73.53	1050	0.7	70
IPCC B1 scenario: 550 ppm at 2100	170	2429	1.8	180
IPCC A2 scenario: 800 ppm at 2100	420	6000	3.4	420

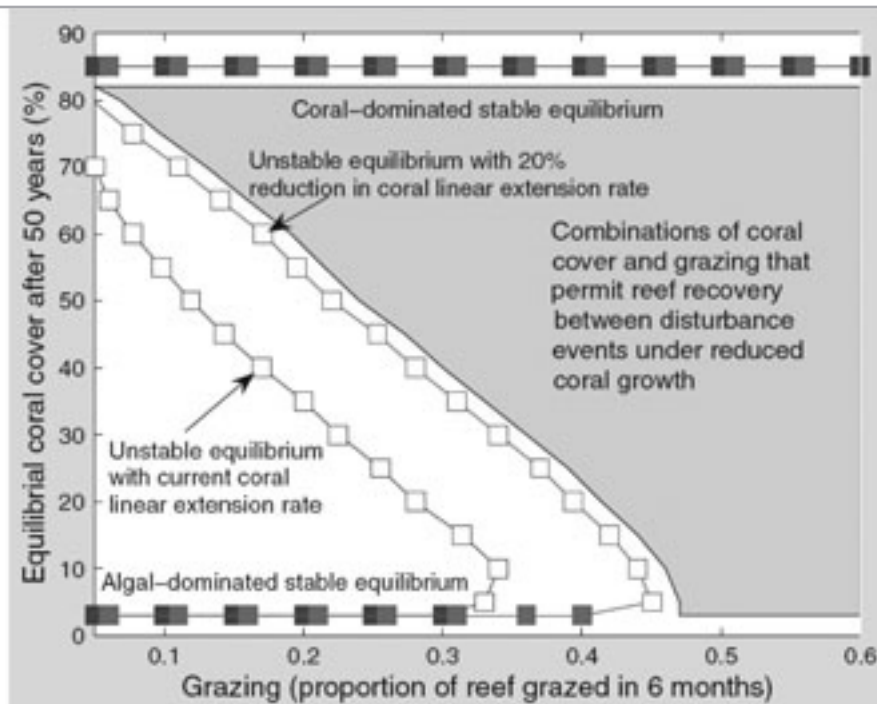


Fig. 2. Reduction in the resilience of Caribbean forereefs as coral growth rate declines by 20%. Reef recovery is only feasible above or to the right of the unstable equilibria (open squares). The "zone of reef recovery" (pink) is therefore more restricted under reduced coral growth rate and reefs require higher levels of grazing to exhibit recovery trajectories.

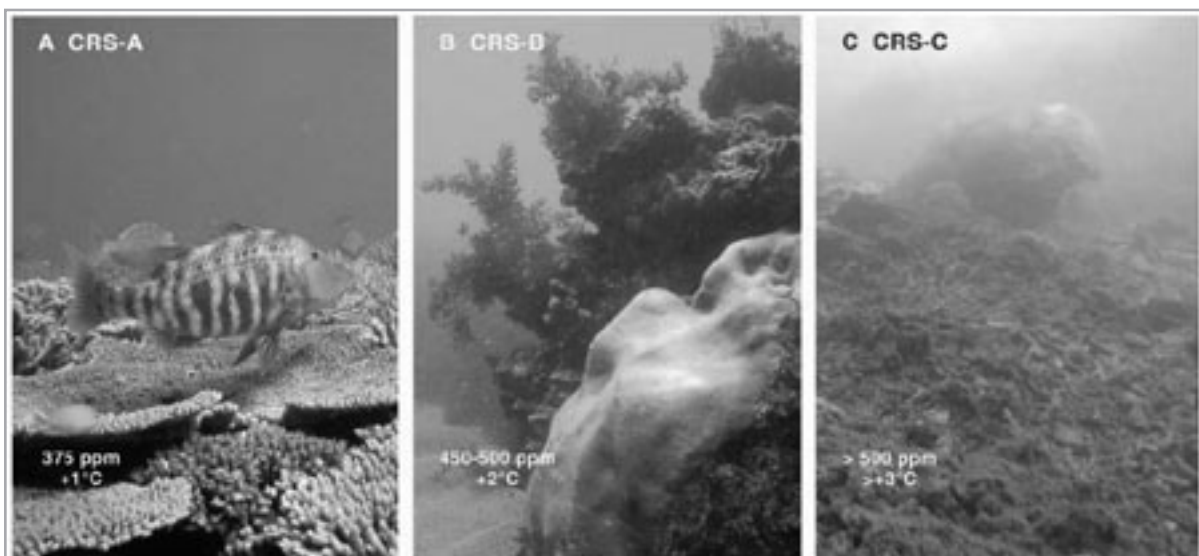
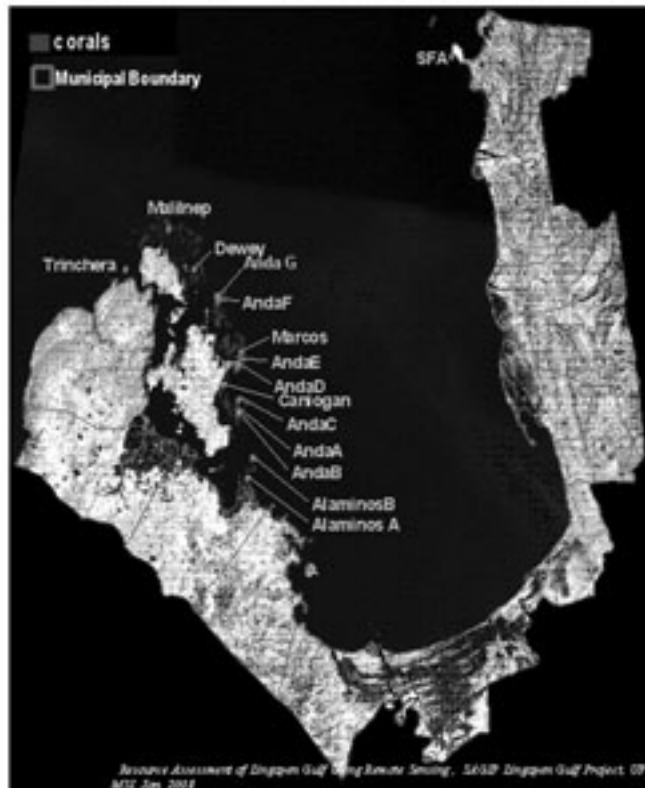


Fig. 5. Extant examples of reefs from the Great Barrier Reef that are used as analogs for the ecological structures we anticipate for Coral Reef Scenarios CRS-A, CRS-B, and CRS-C (see text). The $[\text{CO}_2]_{\text{atm}}$ and temperature increases shown are those for the scenarios and do not refer to

the locations photographed. (A) Reef slope communities at Heron Island. (B) Mixed algal and coral communities associated with inshore reefs around St. Bees Island near Mackay. (C) Inshore reef slope around the Low Isles near Port Douglas. [Photos by O. Hoegh-Guldberg]

Coral reefs in Lingayen Gulf



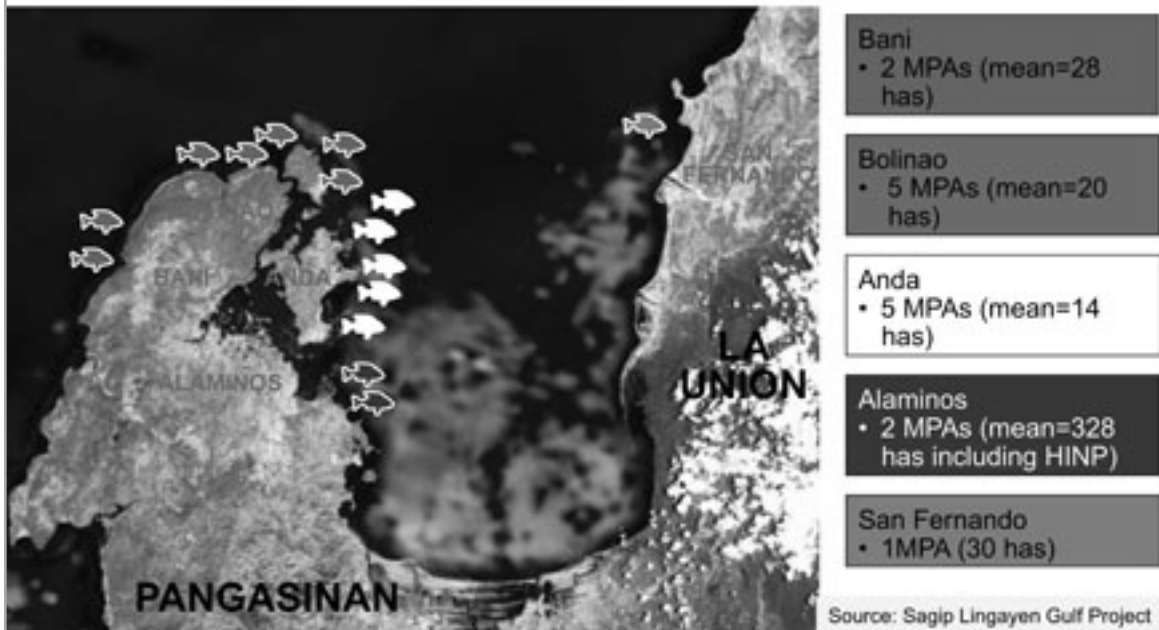
Coral reefs in Lingayen Gulf

- At municipal level, live coral cover declined from 1980s to 2000 (from 31-50% to 11-30%)
- Fish abundance decreased by almost 50% between 1998 to 2000
- From 2003 to 2006, general improvements in reef fish and hard coral cover throughout western Lingayen Gulf (Bolinao-Anda reef complex) → may be due to 'recruitment pulse'

Source: Reefs Through Time 2008

Save the coral reefs...

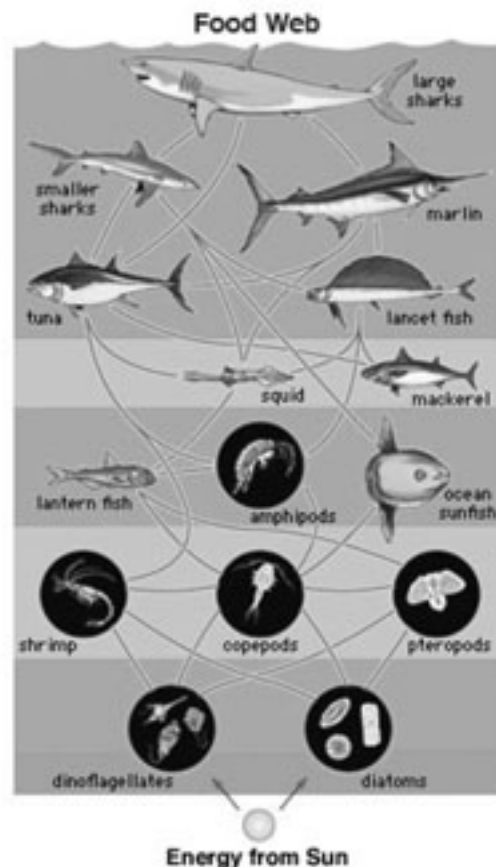
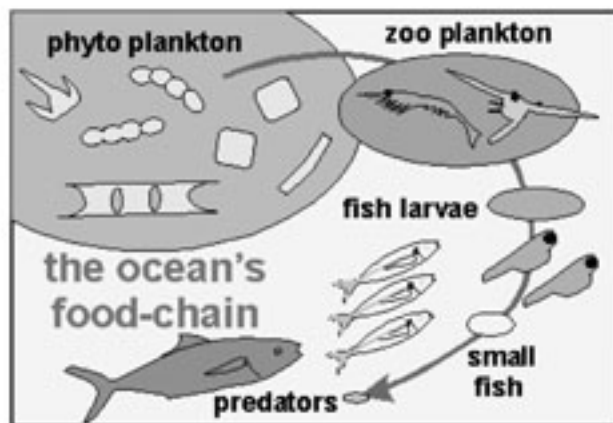
- Establishment of Marine Protected Areas (MPA)



Background: People pressure on coral reefs

- 3X more people now than when I was born
- Besides local demands for fish, there is a foreign demand for live fish
- Humanity has always overexploited fisheries, but then moved to new grounds, until there are none
- Our growing demands exceed what the reefs can supply
- Do we all suffer till the end or do we manage our fishing efforts (and population)
- E.g., Fish for food or for the aquarium? Fish for our people to eat or fish for foreigners to enjoy? Fish for many or fish for a few?

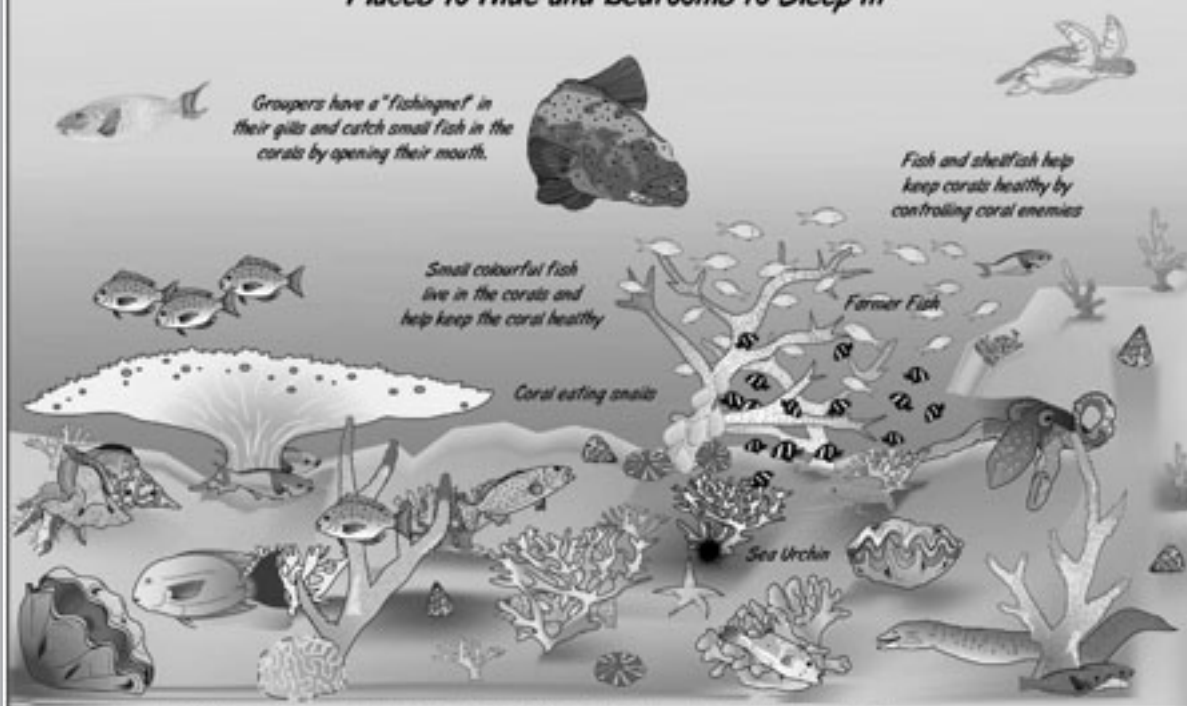
Food chain concepts



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CORALS ARE IMPORTANT FISH HOUSES

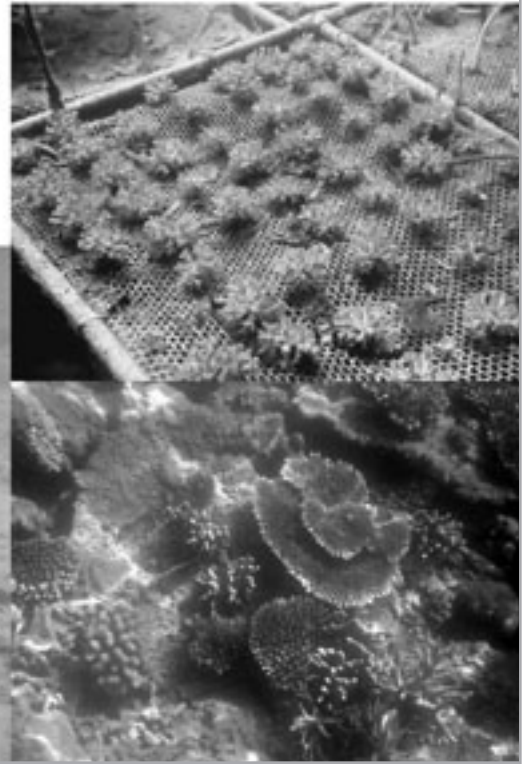
Places to Hide and Bedrooms To Sleep In



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Save the coral reefs...

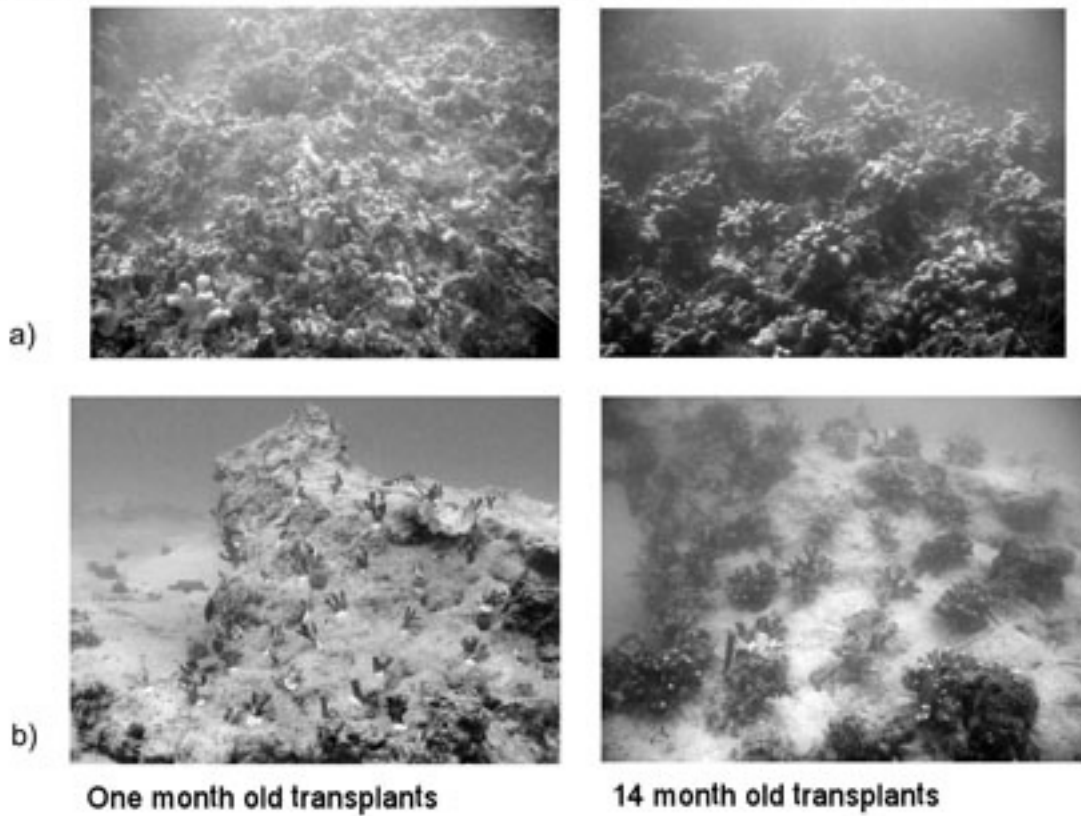
- Restoration/Rehabilitation



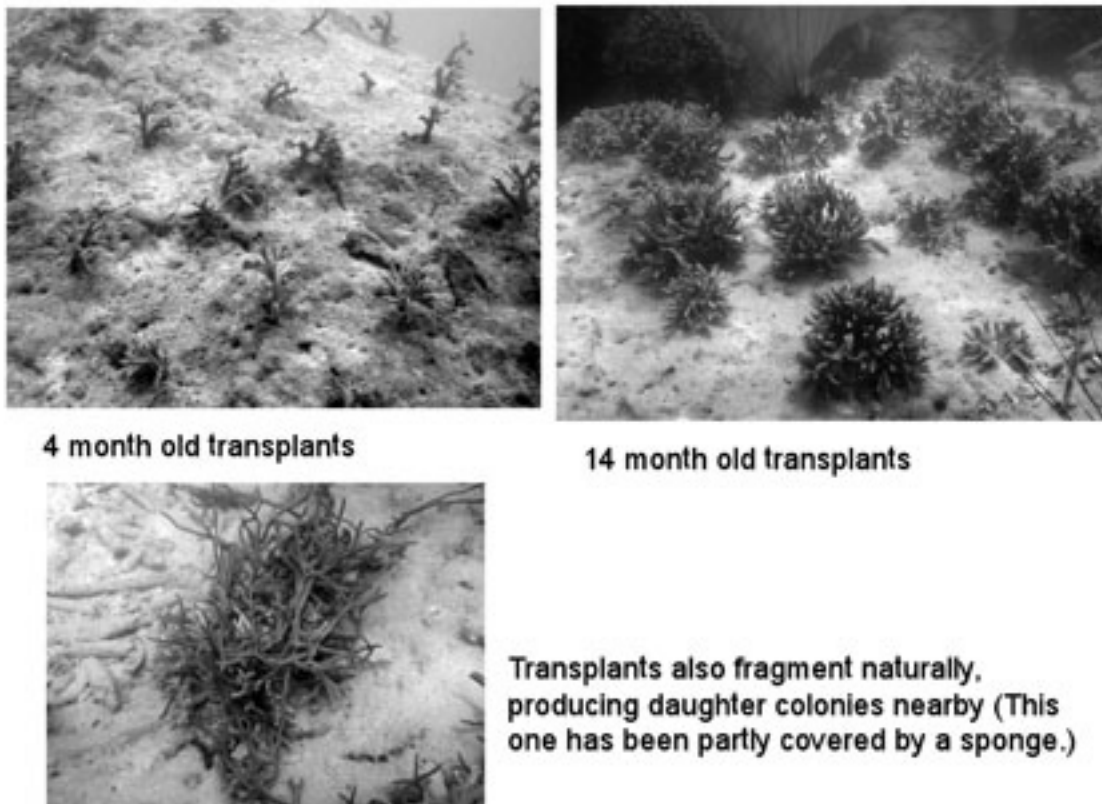
Restoration research and preliminary studies in the Philippines

- Pioneering studies in Dumaguete: Alcala, Gomez, and colleagues (e.g., 1982 Kalikasan papers)
- Interim studies: Yap, Gomez, and students (1982-1992+)
- Current research centered at the Bolinao Marine Laboratory: Gomez, Edwards, Rinkevich, and colleagues (2005 to present) under two projects: GEF/RRWG and EU INCO/DEV Reefres

***Porites cylindrica* at a) Binlab and b) Malilnep sites, Bolinao (High, horizontal)**



***Montipora digitata* at Malilnep Ac site, Bolinao, Pangasinan (High, horizontal)**



Asexual propagation by fragmentation

Coral bommie
(Direct transplantation)



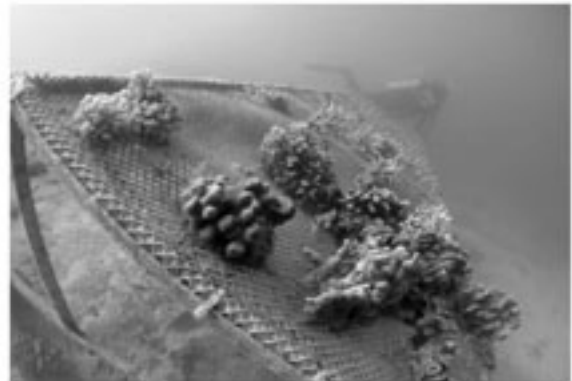
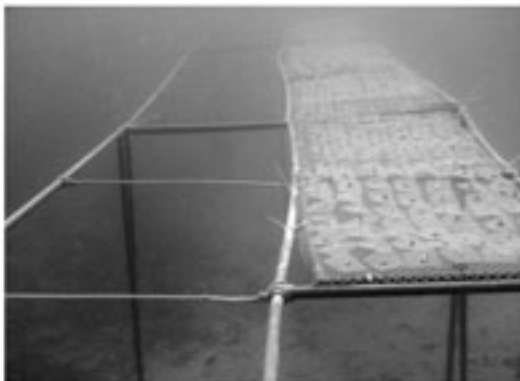
Porites cylindrica

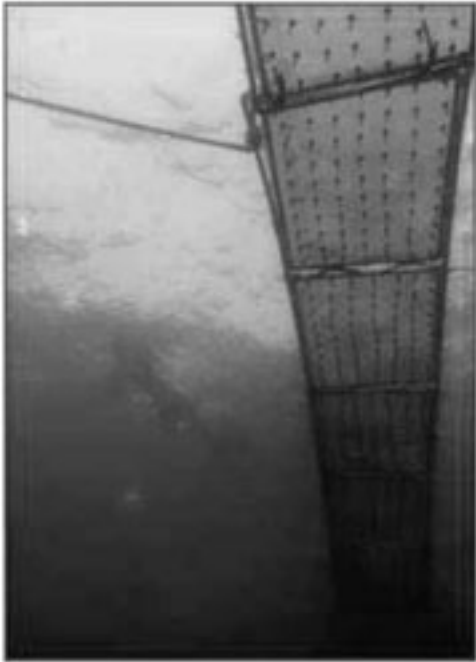
Coral nursery
(Coral gardening)



Montipora digitata

Standing Coral Nursery

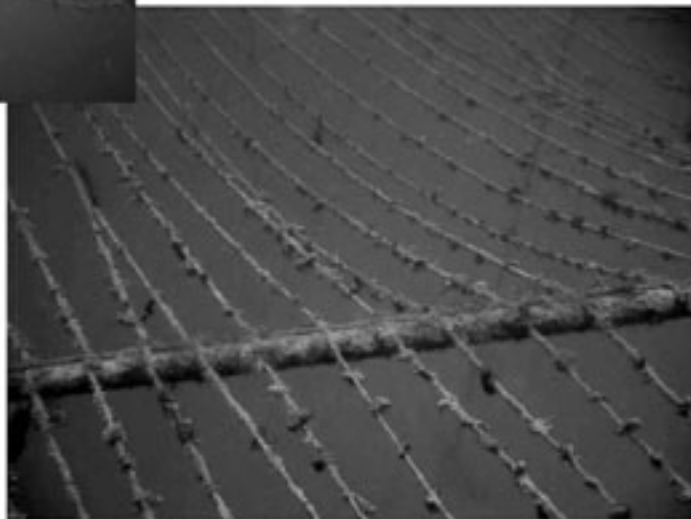




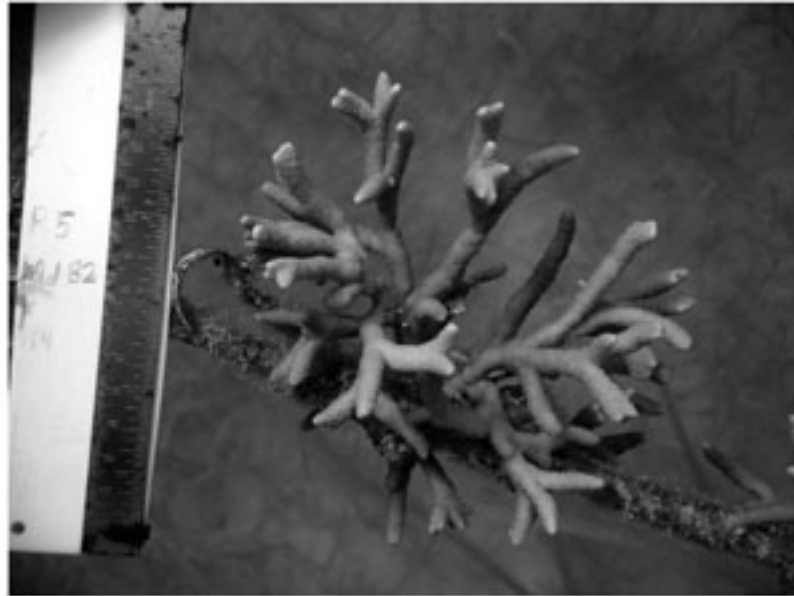
Floating or Mid-water
Coral Nursery



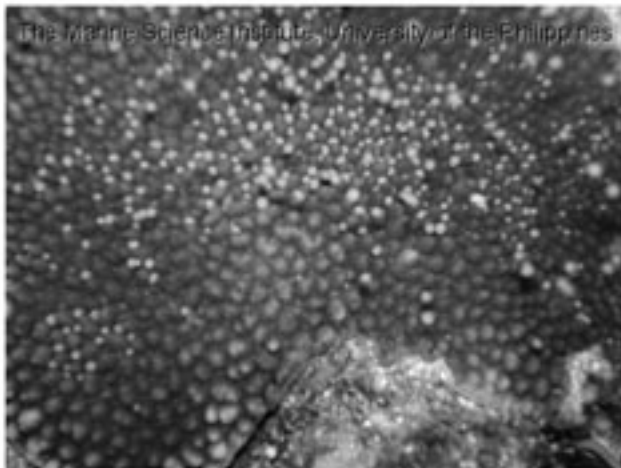
Rope Nursery



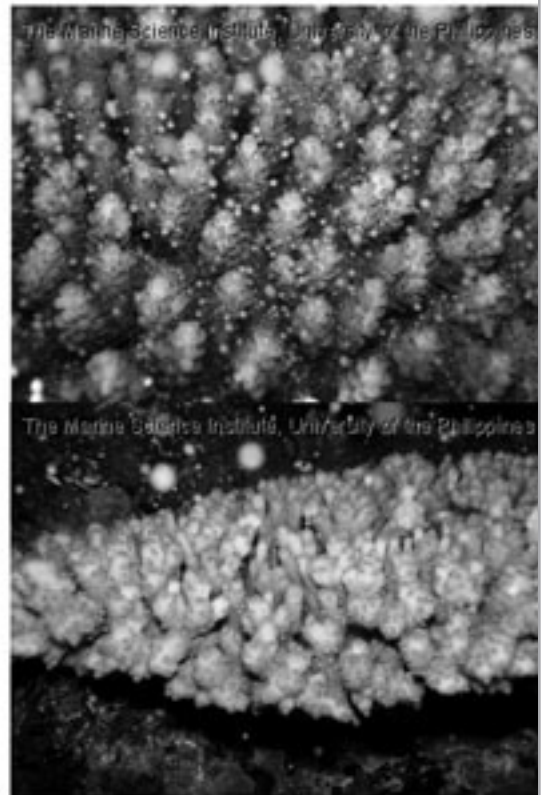
Porites cylindrica growing in mid-water on a strand of rope



Coral Spawning

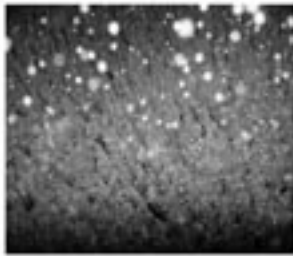


Hydnophora sp.



Acropora spp.

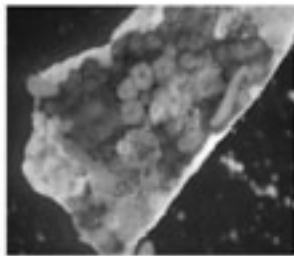
Sexual coral propagation: Larval rearing method



Coral spawning



Collection of larvae in tanks



Settlement in different substrates



Juvenile corals

Community-based restoration



Preliminary lectures on restoration

C. Angelito GEF



Participants wedging coral fragments to crevices

P. Caballero GEF



Newly transplanted corals on denuded reef areas

P. Caballero GEF



Self-attached fragment after 3 months

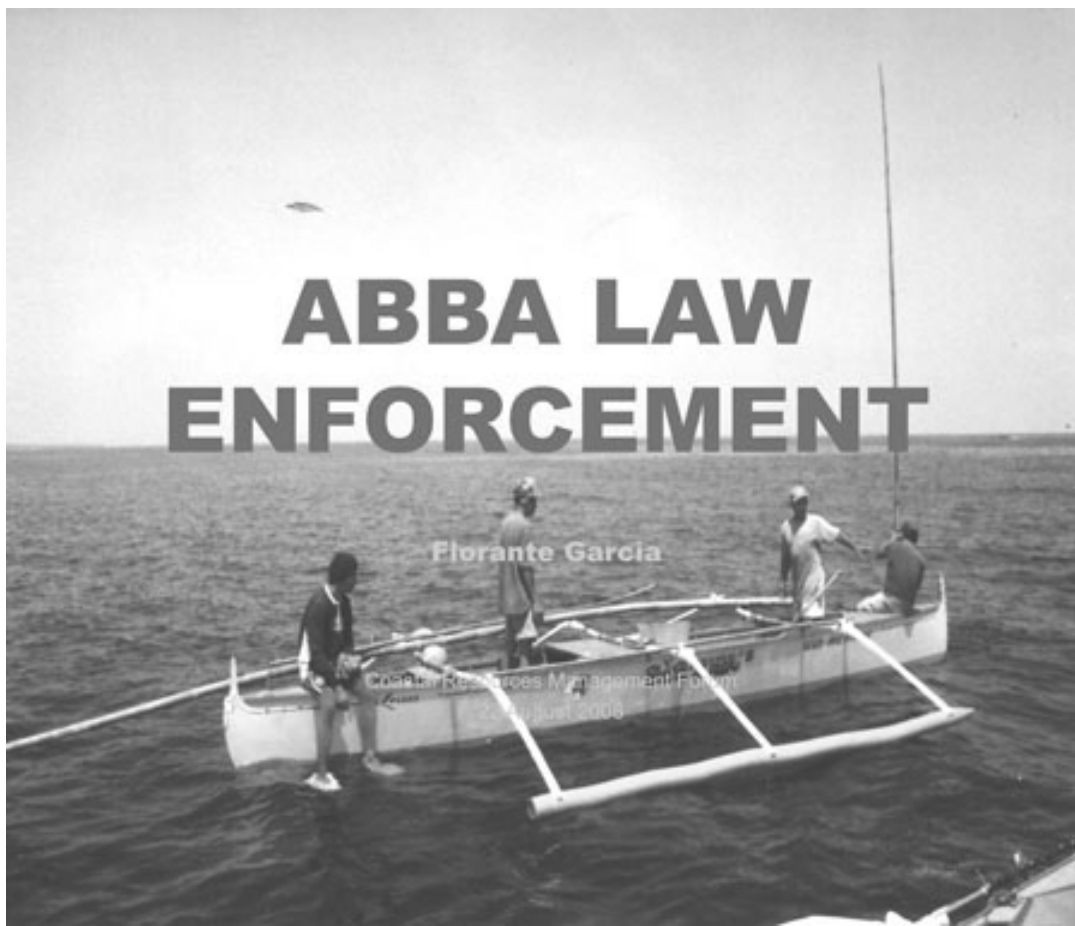
P. Caballero GEF

Future challenges

- Trained implementors and leaders
- Economic capability/affordable techniques
- Adequate numbers and scales of operation
- Sustainable monitoring and protection
- Reduced and eventually reversed global change trajectories

Acknowledgements

**GEF RRWG Projects and the EU
INCO/DEV Reefres Project: Students
and staff who provided pictures, esp.
P. Cabaitan**



HISTORY OF THE ABBA TASK FORCE

2003

- Sagip Lingayen Gulf Project Conservation Partnership Agreement
 - > initiation of enforcement system
 - > dialogue with the Point Persons on Fishery Law Enforcement
 - > formation of ABBA-TF
- Provincial Inter-Agency Task Force (PIATF) formation thru a Joint Resolution approved by the former Gov. Victor Agbayani

HISTORY OF THE ABBA TASK FORCE



2004

- ABBA-TF formally organized
 - > Bolinao - Task Force Marsman
 - > Anda - MEGA Task Force
 - > Bani – Bani Task Force
 - > Alaminos - POSO
 - 106th PNP-PMG
- Enforcement Training and Advance Coastal Law Enforcement
- Implementation of Multi/Inter-Sectoral Enforcement System (Soft & Hard Law Enforcement Approaches)

THREE LEVEL SYSTEM OF ENFORCEMENT



LEVEL 1

Composition:

- >Members of Enforcement Committee of POs managing MPAs and Mangroves

Qualification/s:

- >Civilian (not MEN IN UNIFORM) and have at least undergone BASIC COASTAL LAW ENFORCEMENT TRAINING

Function/s:

- >conduct regular guarding/patrolling at their respective sites

THREE LEVEL SYSTEM OF ENFORCEMENT



LEVEL 2

Composition:

>PNP, staff from C/MAO, Deputized Fish Wardens, Fish Examiners, designated staff from LGU that has undergone Advance Coastal Law Enforcement Training

Qualification/s:

>Undergone Basic and Advance Coastal Law Enforcement Training

Function/s:

>support team to Level 1 and patrolling in Municipal Waters (AOR)

THREE LEVEL SYSTEM OF ENFORCEMENT



LEVEL 3

Composition:

>ABBA Municipal Task Force Members, PNP

Qualification/s:

>Undergone Basic and Advance Coastal Law Enforcement Training

Function/s:

>support team to Level II and patrolling in ABBA Municipal Waters (AOR)

LEGAL BASES OF ABBA-TF CREATION

- **C/M Fisheries Ordinances**
- **C/M Resolutions**
- **Executive Orders**

ABBA-TF ACCOMPLISHMENTS / ACTIONS CONDUCTED

- Bi-monthly meetings rotating in 4 city/municipalities
 - > updating and reporting of accomplishments
 - > strategic planning
 - > Conduct Market Denial
 - > venue, snacks and transportation shouldered by the host city/municipality
 - > lunch as counterpart of SLGP
- Conduct Joint Seaborne Patrolling and Surveillance



ABBA-TF ACCOMPLISHMENTS / ACTIONS CONDUCTED

- Total of 292 cases (including pending in court) from 1999-2007
- Among the cases filed dynamite fishing is the highest (73 cases) followed by use of different Active Fishing Gears
- Out of 292, 95 cases are still pending in court, 89 convicted, 41 dismissed, 20 uncertain for status, 44 archived and 3 withdrawn.



Mariculture and MERSys in ABBA waters

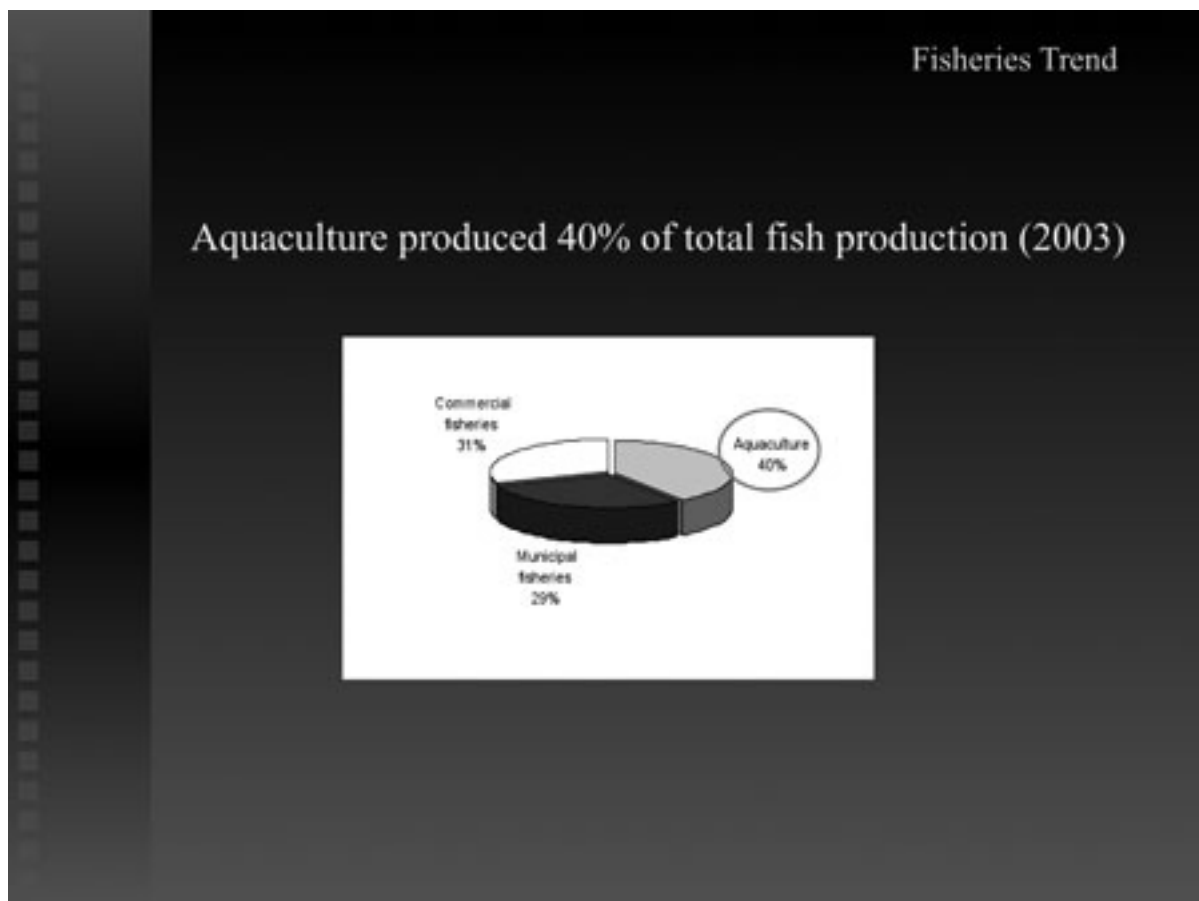
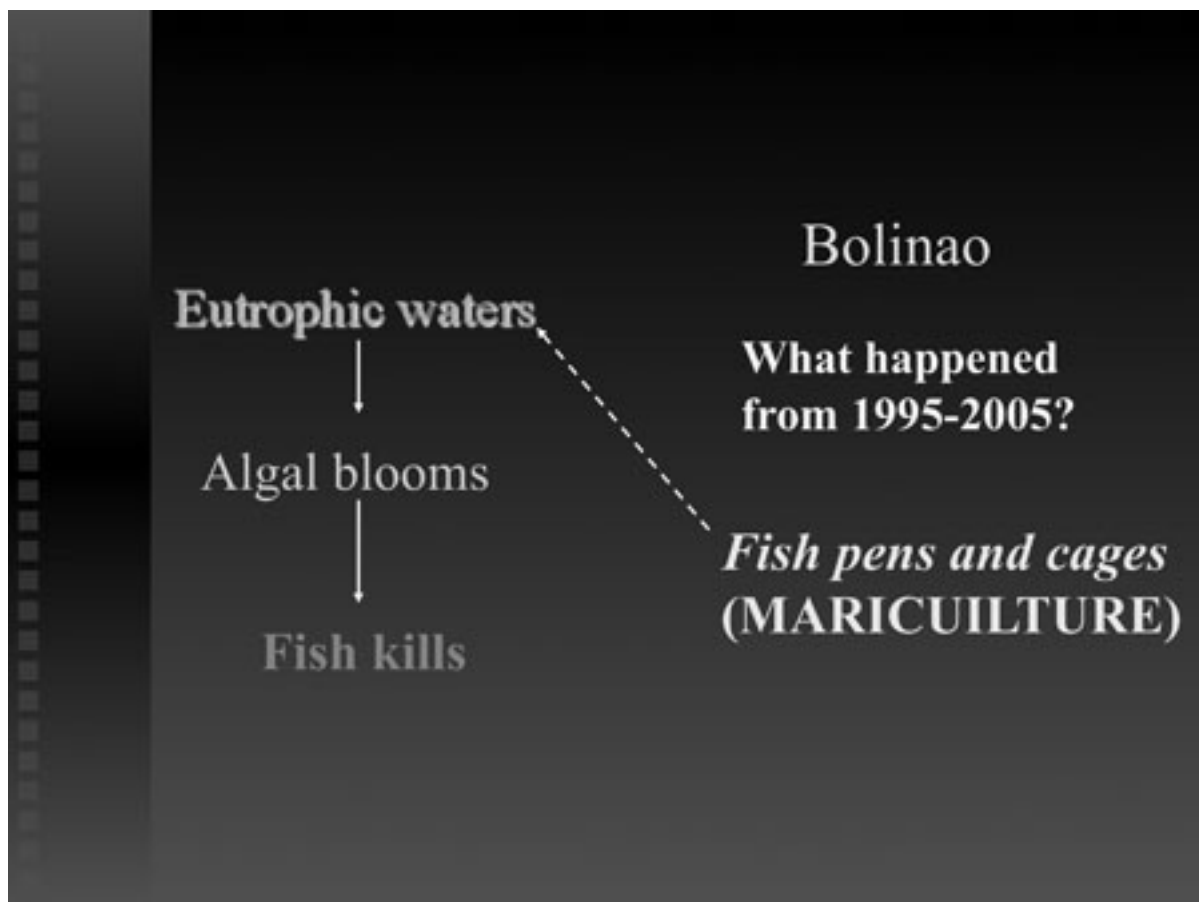
Malou San Diego-McGlone
UP MSI



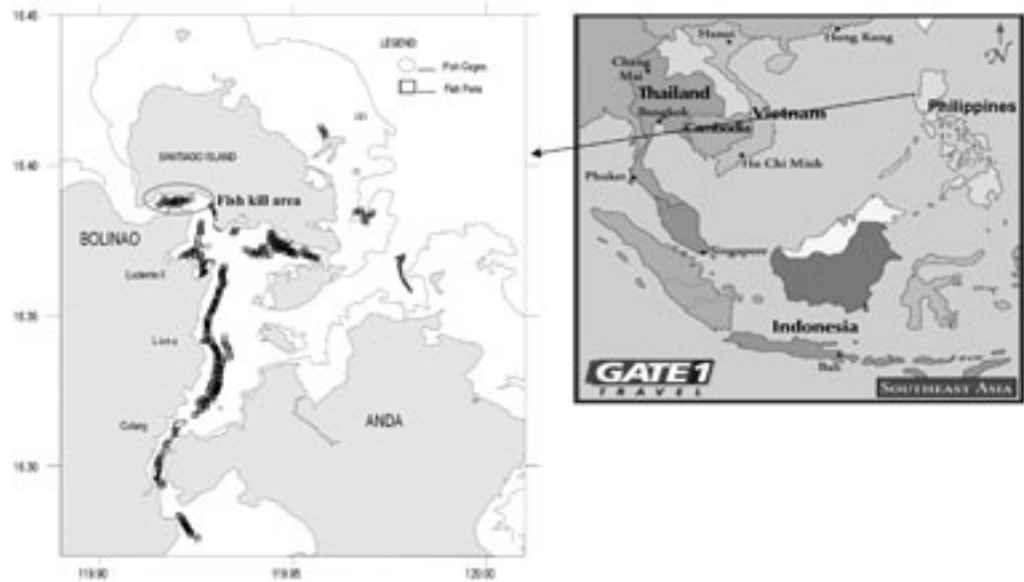
Fish kill in Bolinao, Pangasinan: A Case Study on Mariculture



Malou McGlone, Rhodora Azanza, Cesar Villanoy, Gil Jacinto



Bolinao



Background

- Mariculture in Bolinao not new
 - ◆ documented report in 1995
- Method
 - ◆ Fish cultured



Milkfish (*Chanos chanos*)

- ◆ Fish pens and cages

Fish pen



Fish cage

Fish pens:

Min size: 30mx40m

Max size: 100mx40m

Distance: 60 m apart

Fish cages:

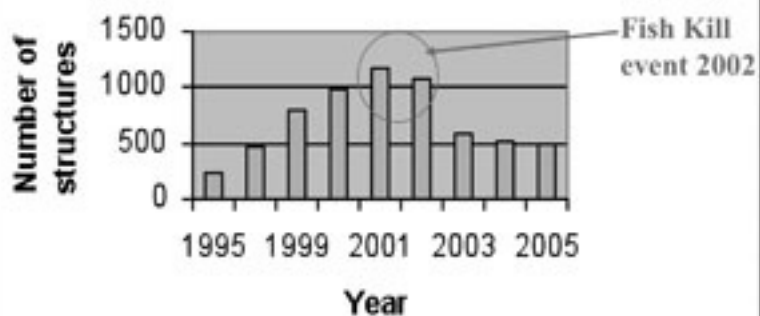
Min size: 12mx12m

Max size: 18mx18m

(10 units/cluster)

Distance: 100m between clusters

Fish Structures



Carrying capacity for number of structures = 544 units

Extent of Finfish Mariculture

Fish Cages

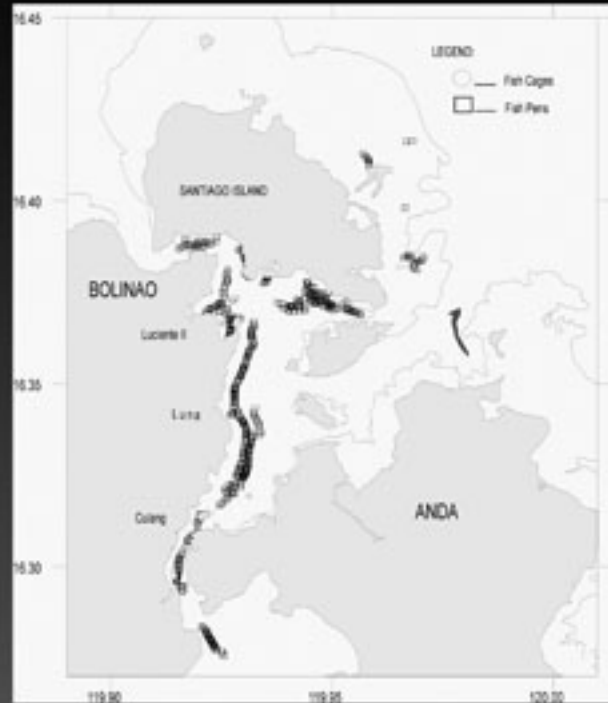
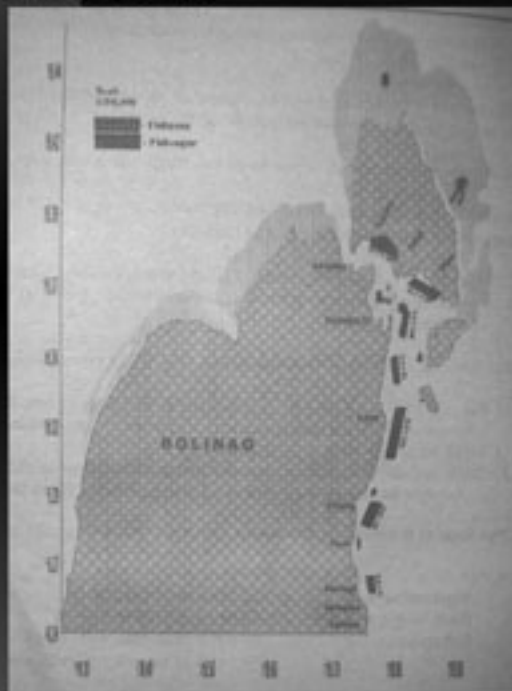


Fish Pens



(Aerial photos, 2001)

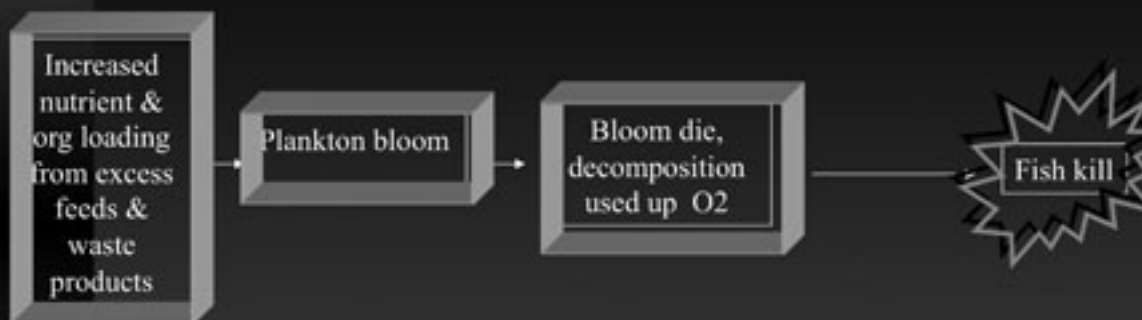
Recommended sites of fish structures based on the Coastal Development Plan of Bolinao

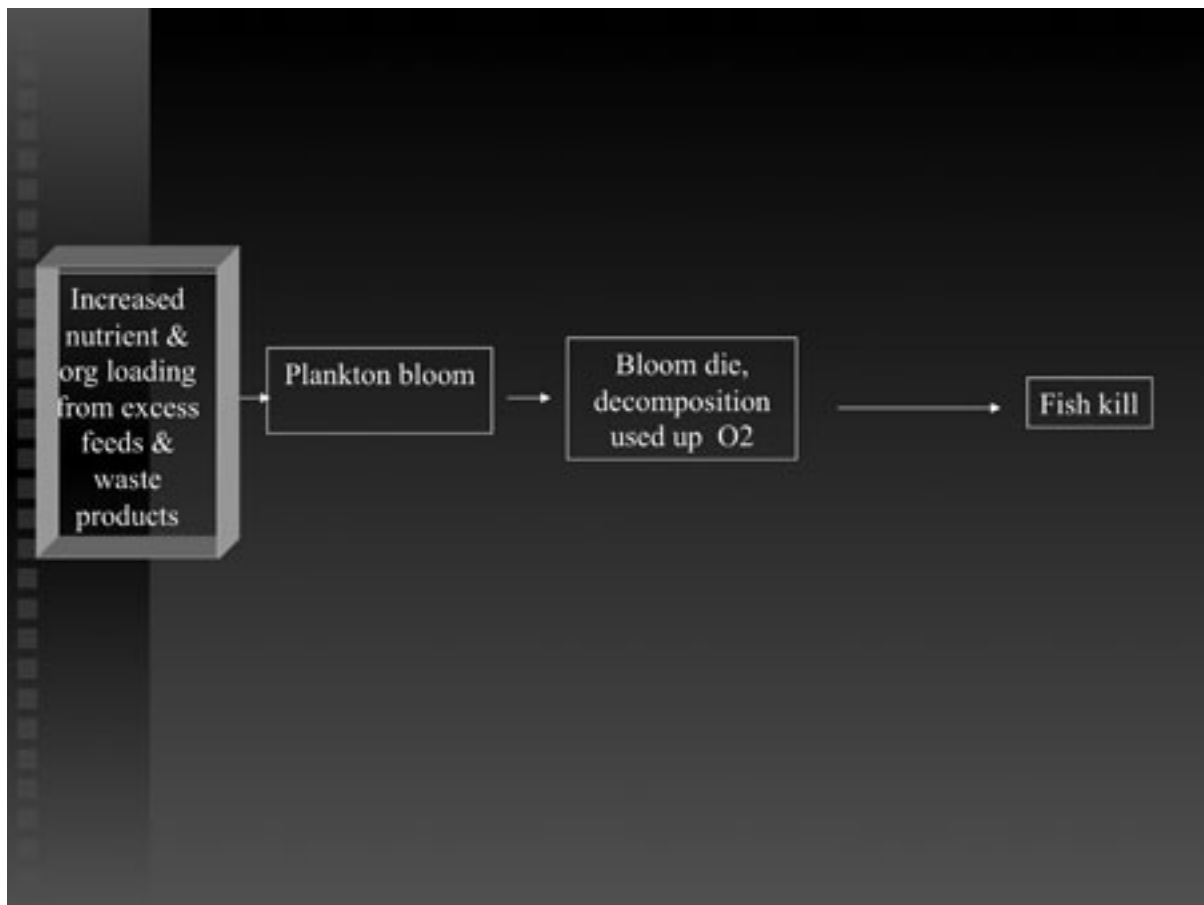


Map of Fish pens and cages (as of 2000)

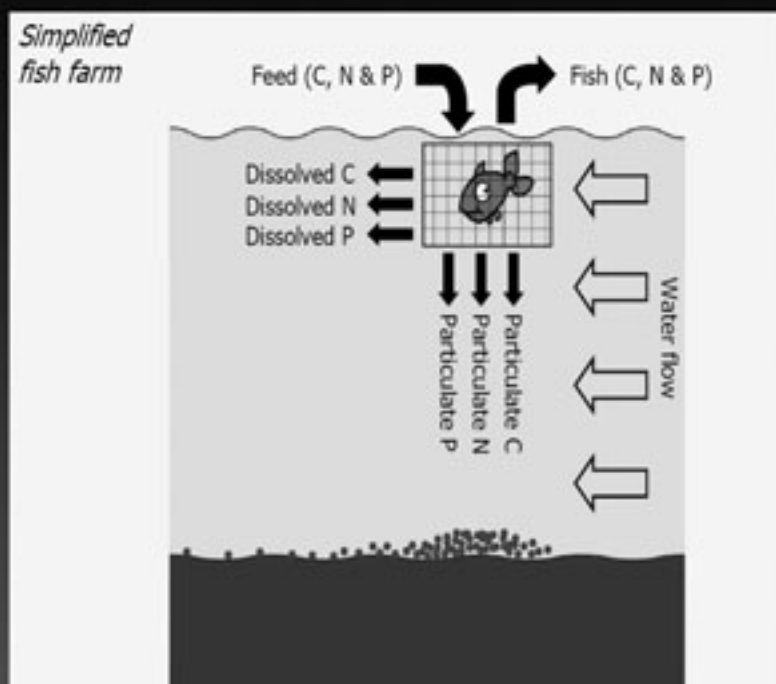
Consequences of Mariculture

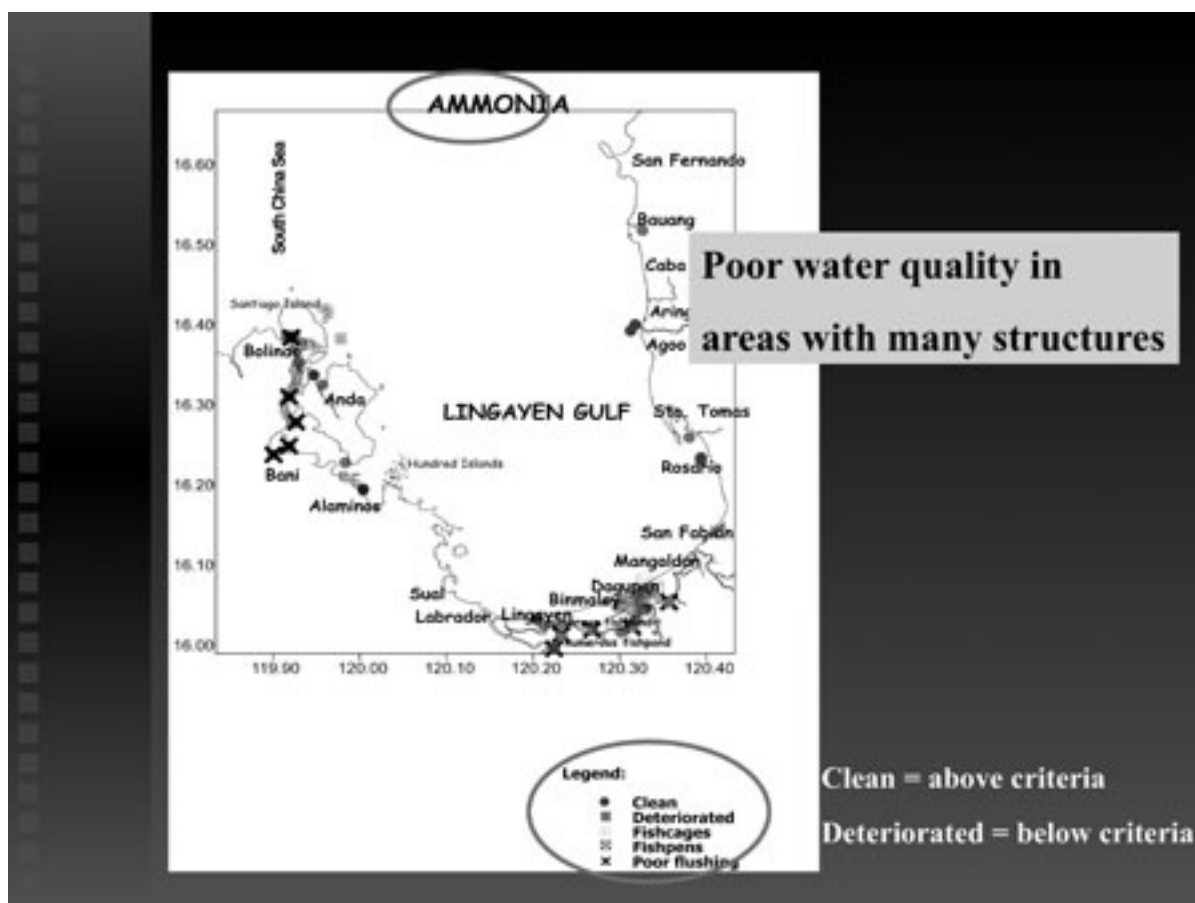
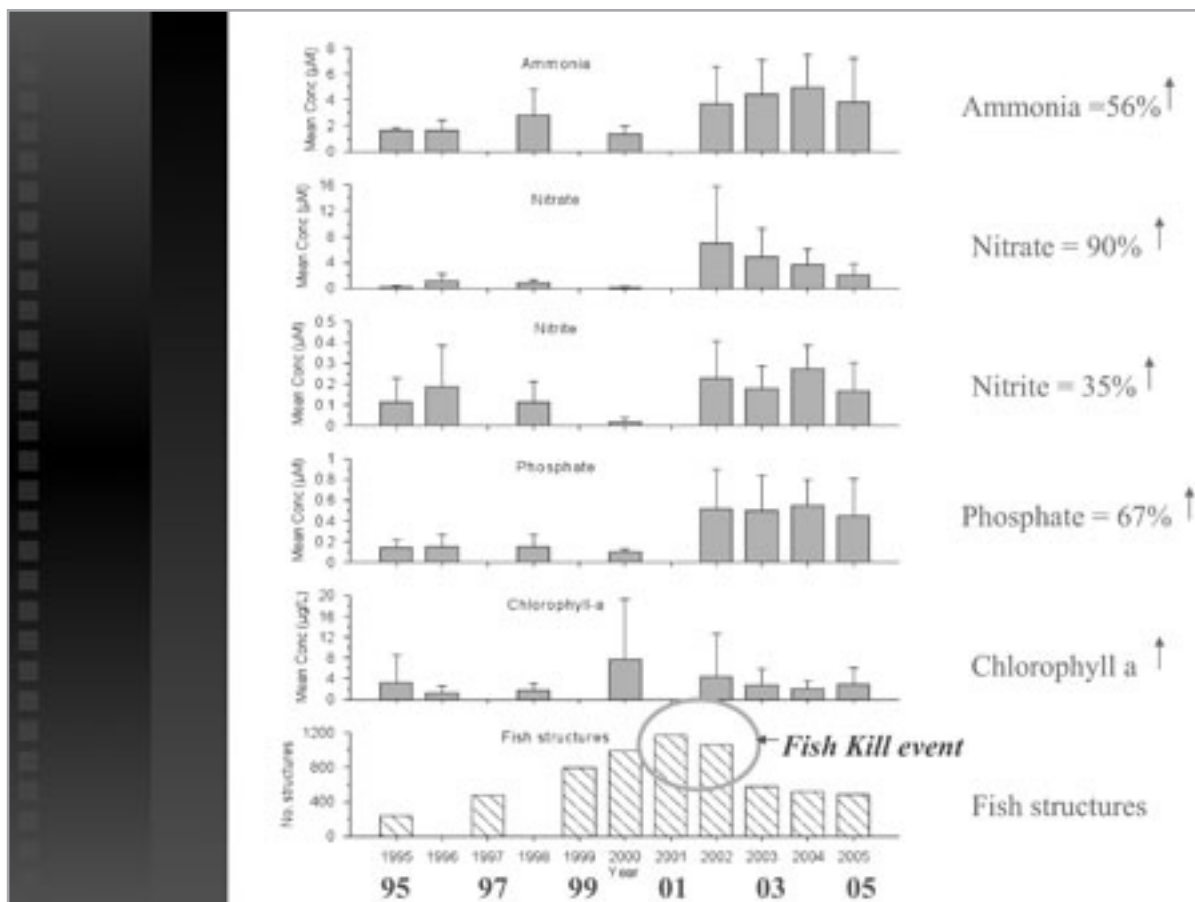
Why fish kill happened

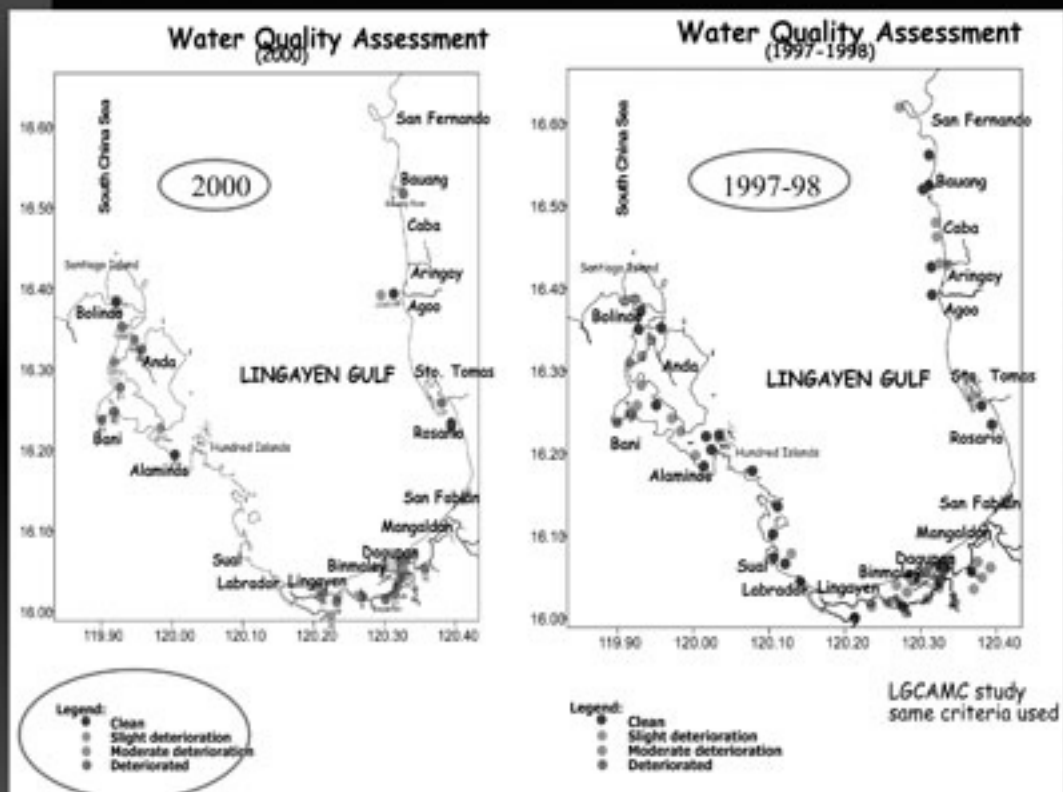




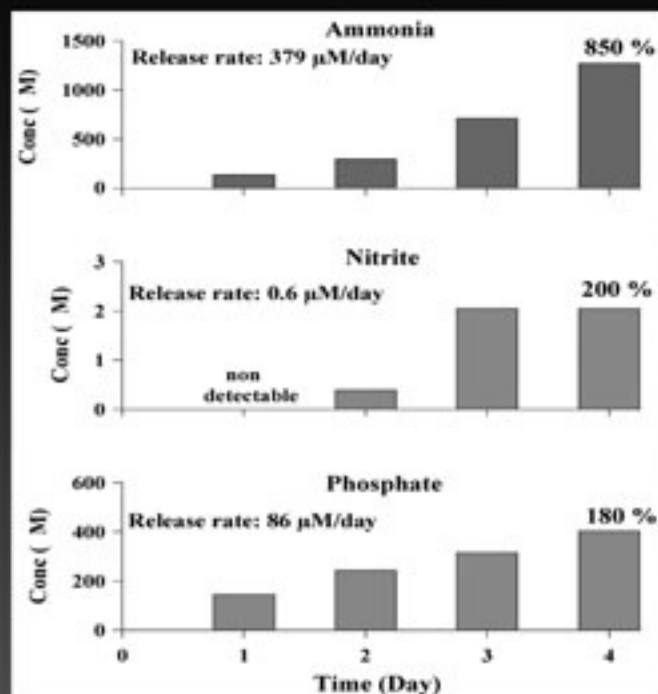
Nutrient balance

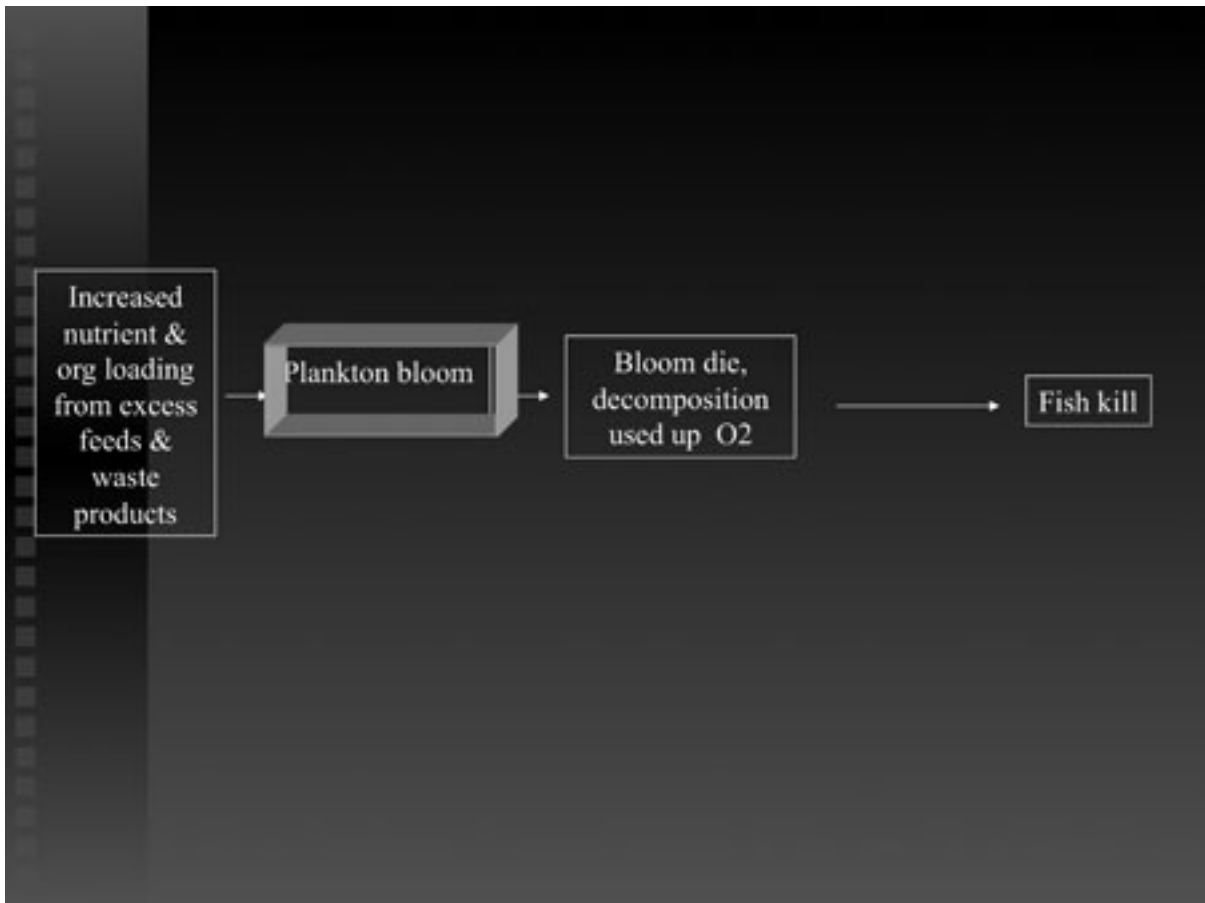
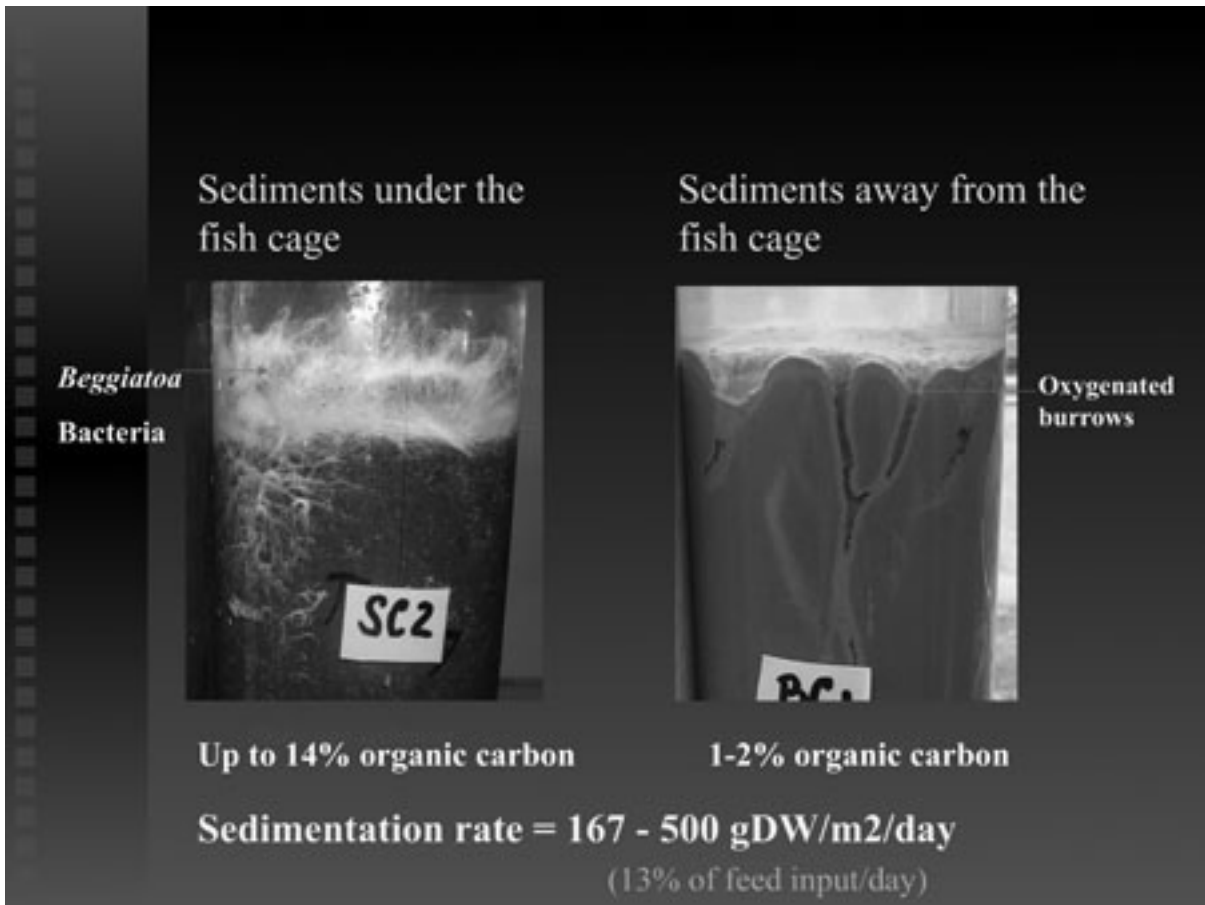


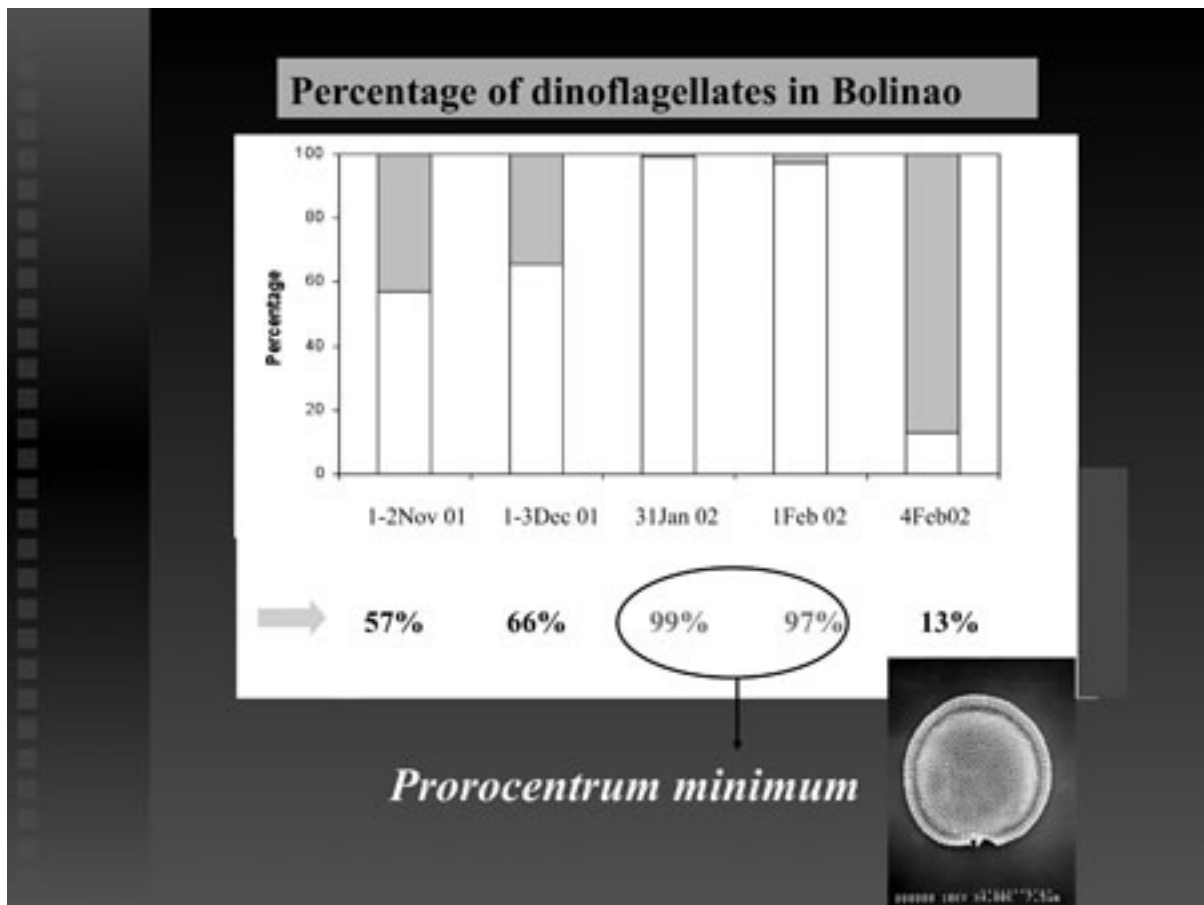


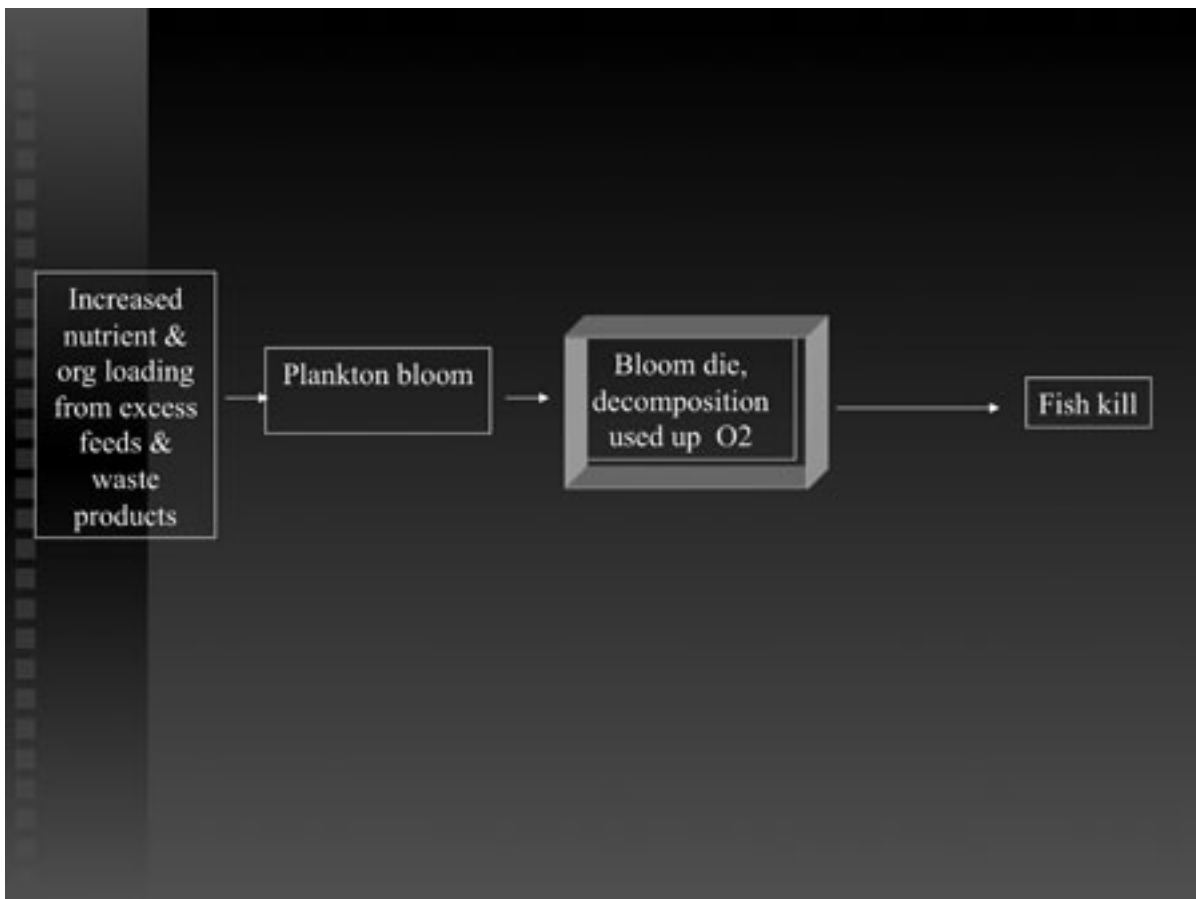
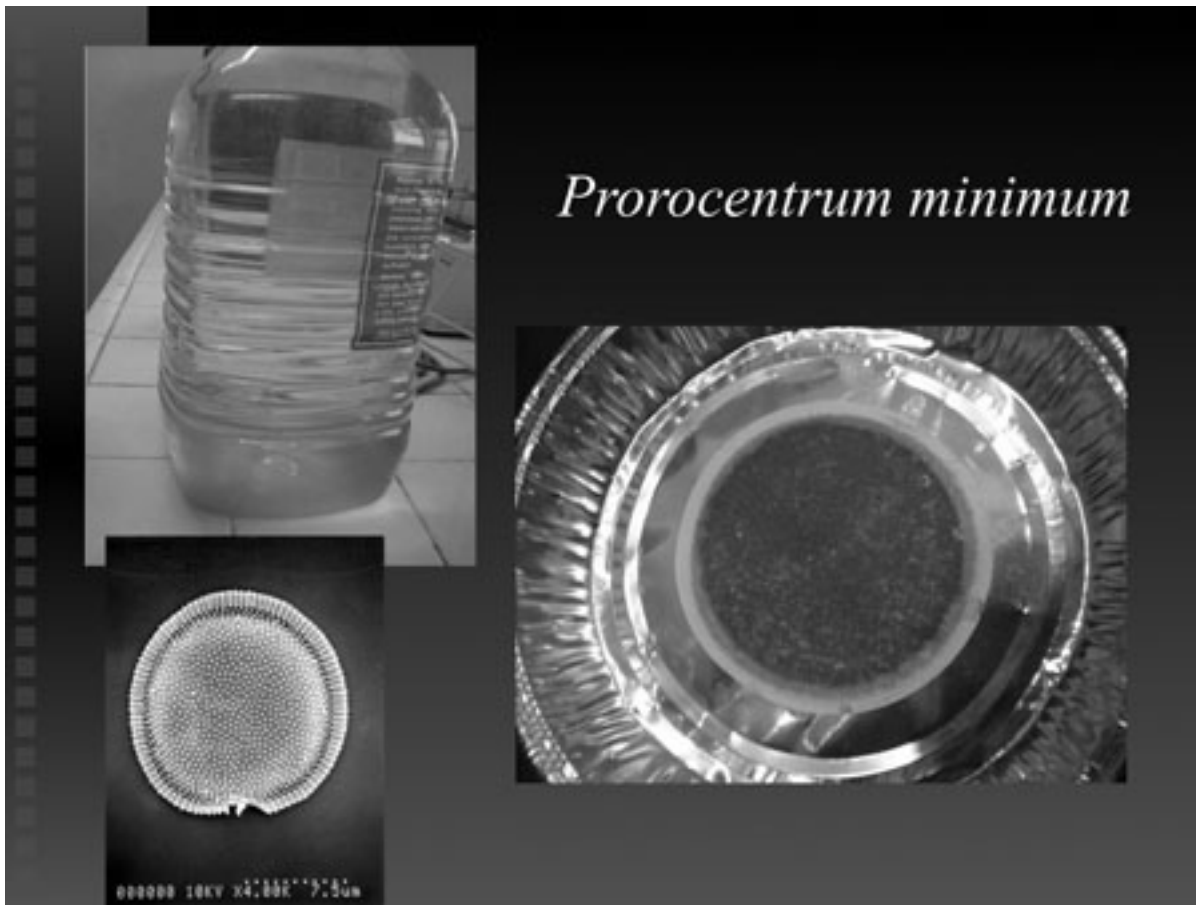


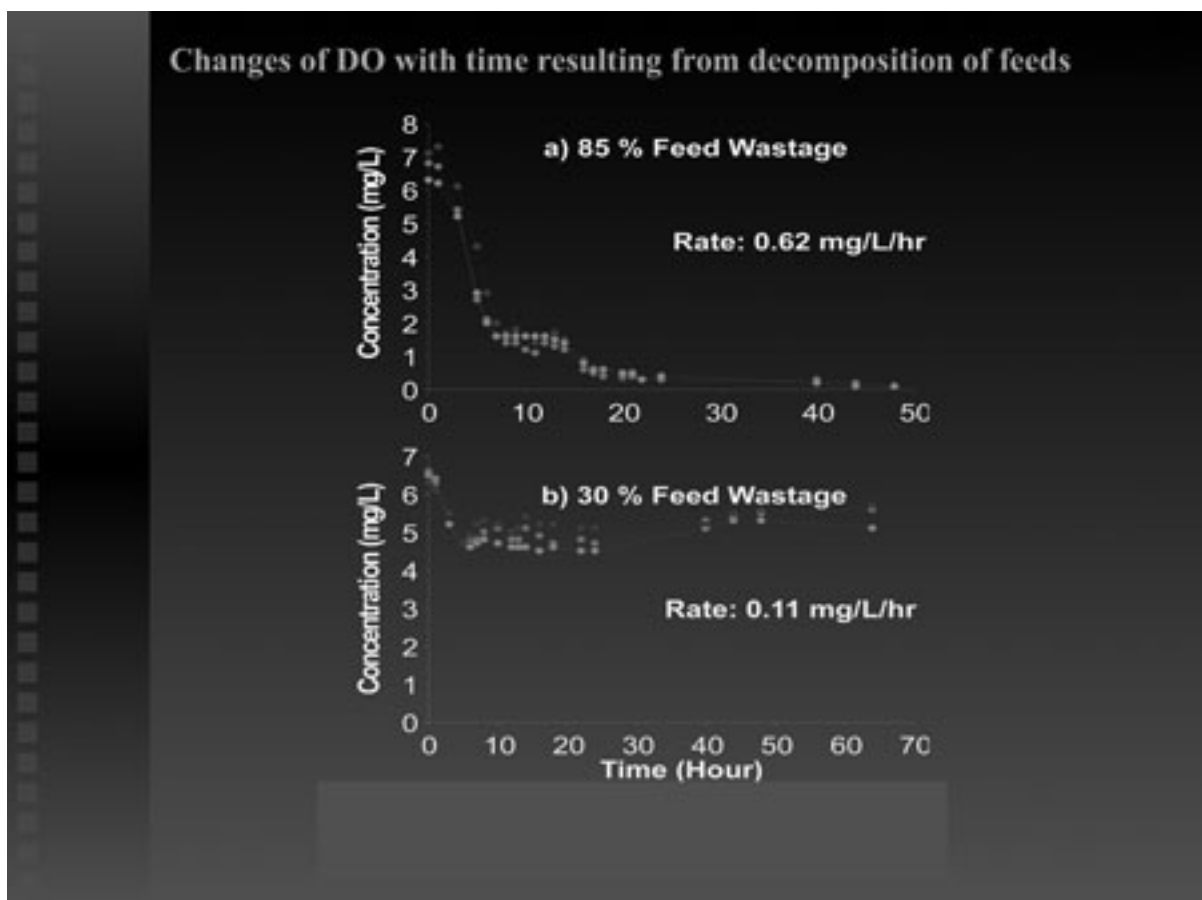
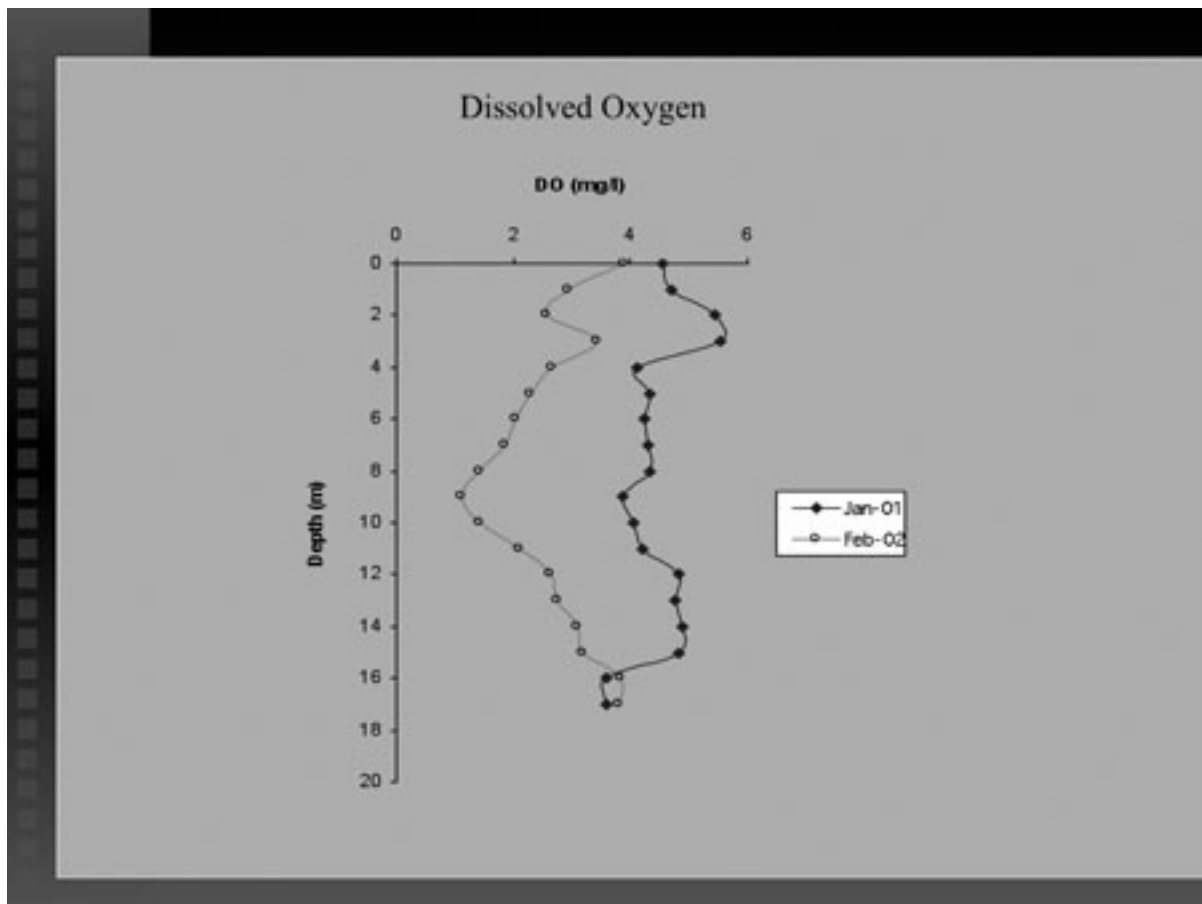
Release of nutrients from feed material

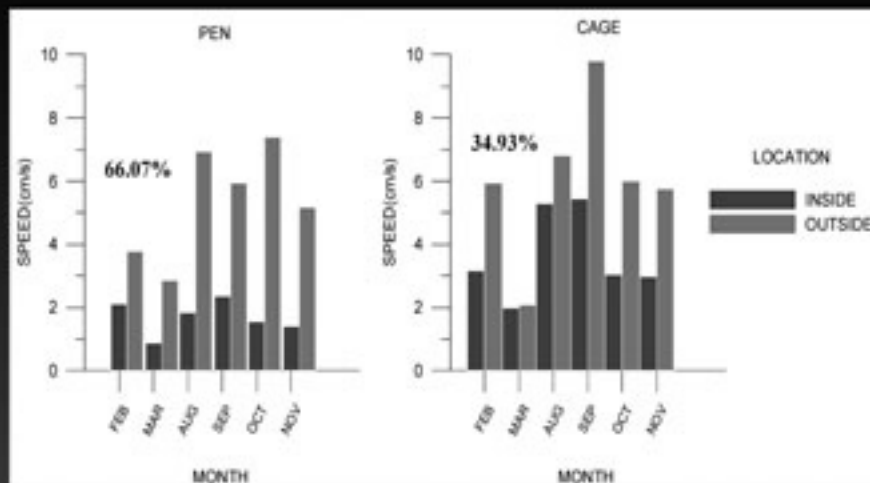




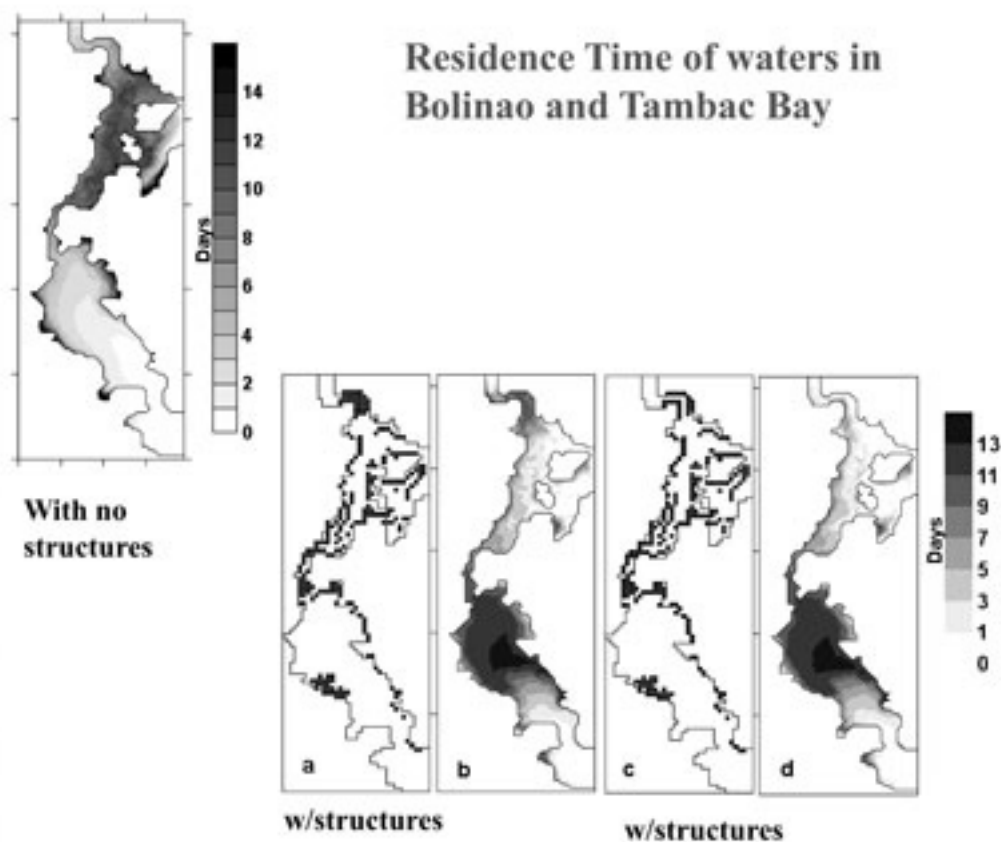


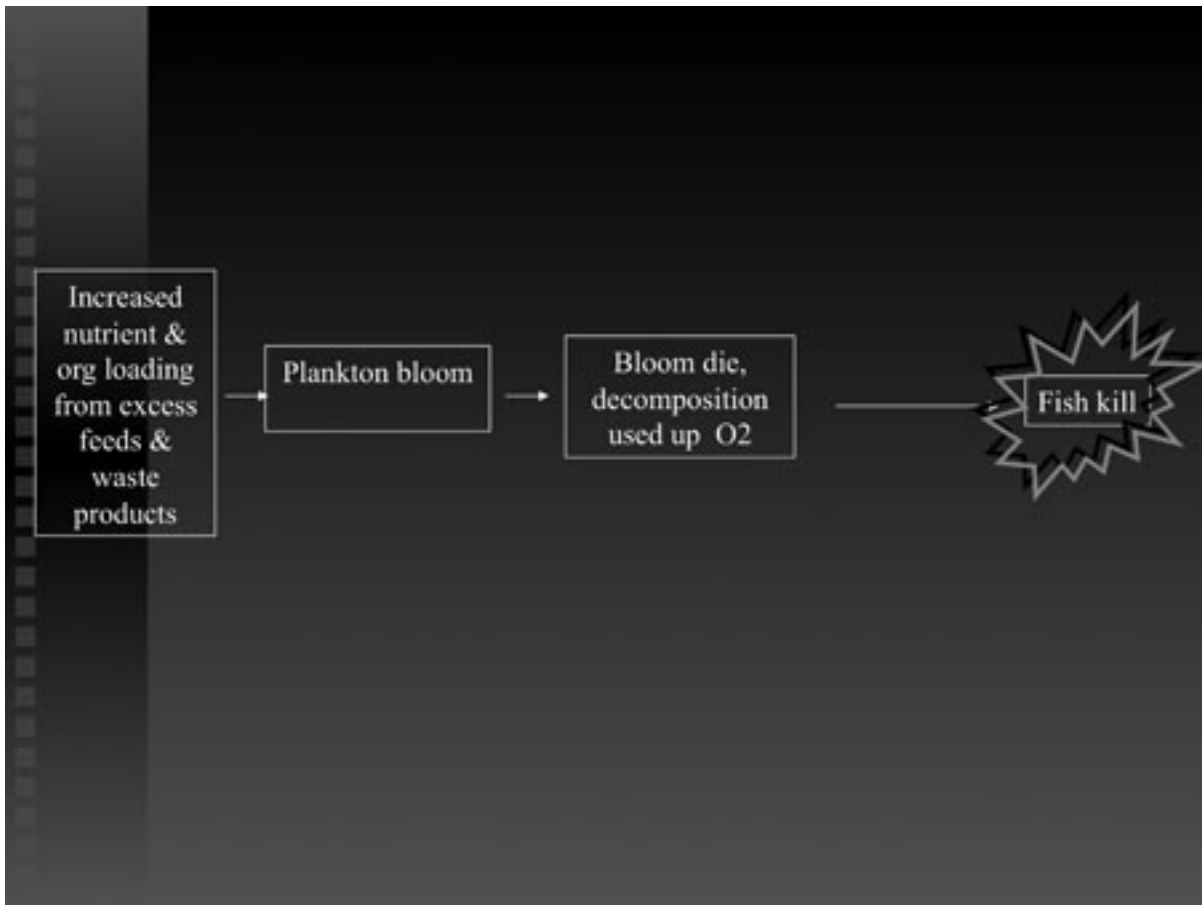


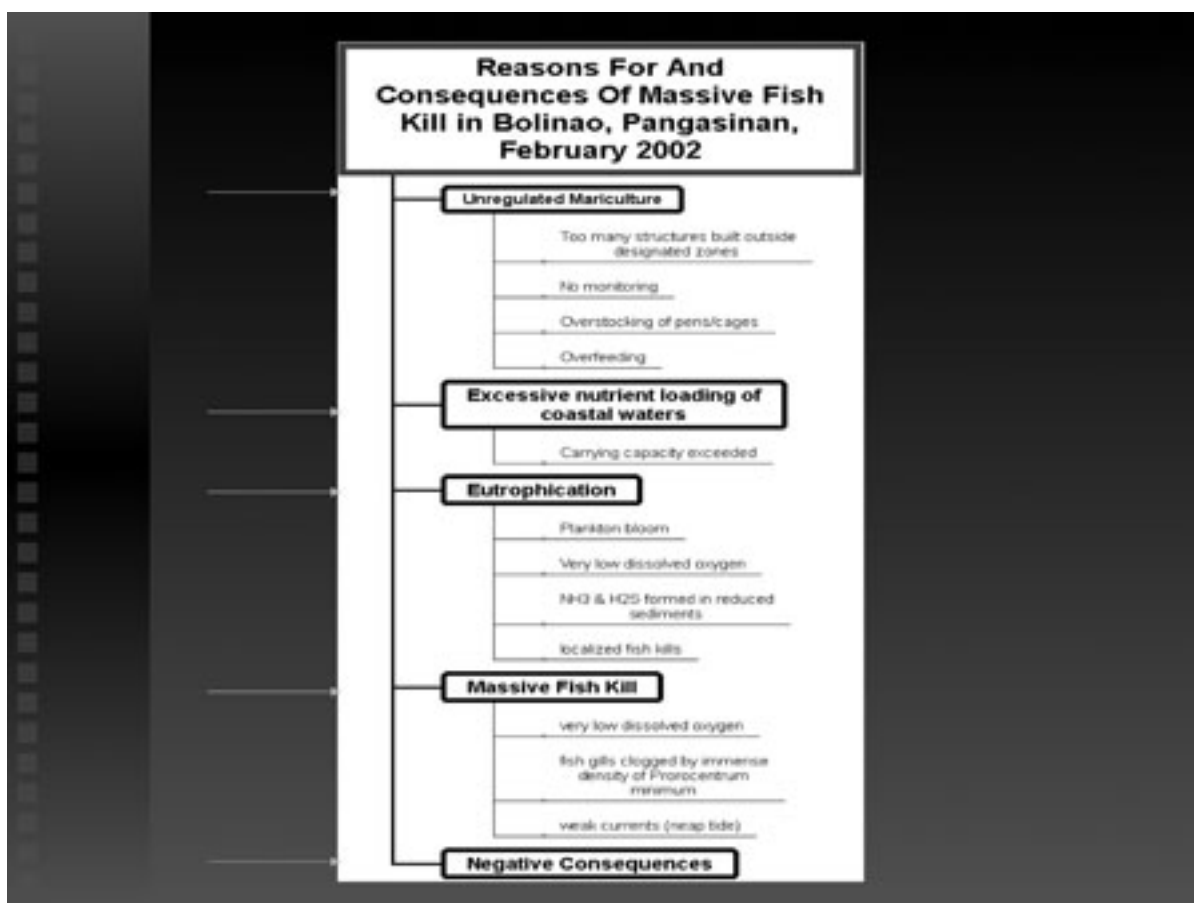


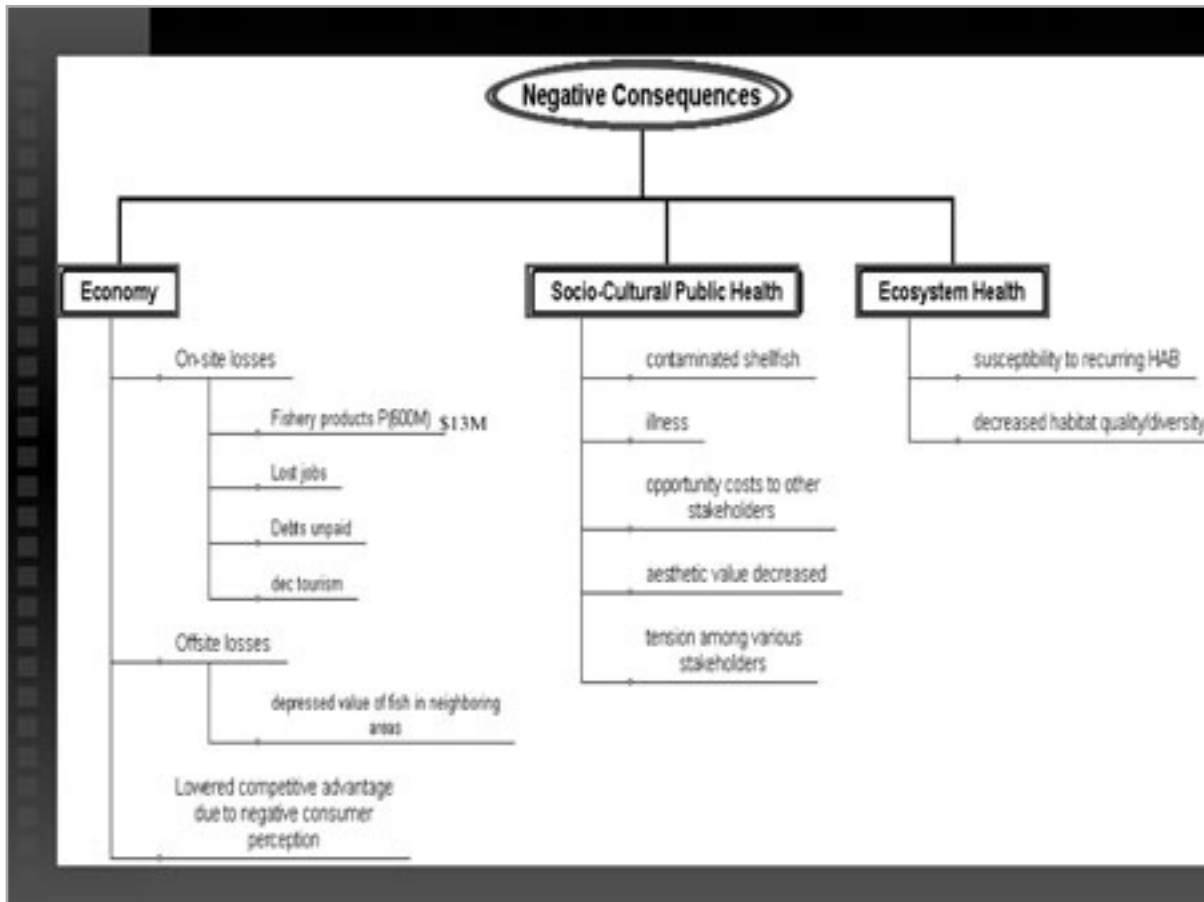


Reduction of flow measured inside and outside fish pen and cage during 24-hr sampling









Way Forward

Response mechanisms for fish kill events

- ◆ reduction in number of structures
- ◆ MERSys (Marine Emergency Response System)

Regulation

- ◆ Guidelines on establishment of fish pens and cages
- ◆ Code of Practice for Aquaculture

Research

- ◆ Environmental criteria and standards for mariculture sites
- ◆ Carrying capacity

Management

- ◆ Monitoring, accreditation

PHILMINAQ:



Mitigating impact from aquaculture in the Philippines

INCO-DEV-SSA-CT2006-031640

(Aug 2006 – February 2008)

APN SAMS BFAR-IFAD MERF-UP MSI

Project Output - Monitoring



Use of surveys

- Check level and extent of impact
- Check if
 - ◆ production over carrying capacity, too many licenses issued
- Check if impact
 - ◆ getting worse, staying the same, getting better

3 categories of surveys

Category 1 = Low cost, simple survey, can be done by LGU or farmer

Category 2 = Medium level survey, requires dedicated equipment, can be done by gov't agencies, management organizations

Category 3 = Comprehensive survey, baseline survey or impact studies, done by research institutions

Project Output - Monitoring



Category 1

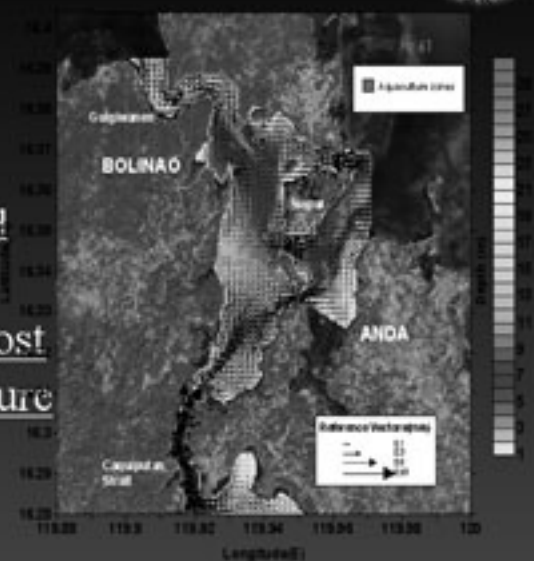
Classification	Good	Intermediate	Impacted
Sediment	Animals present Light colour No smell	Some animals present Thin black on top of normal sediment Some or no smell	Little or no animals Deep black or all black layer strong H ₂ S smell
Water column	Secchi depth	Secchi depth less than 3 - 5 m	Secchi depth less than 3 m
Nutrients NH ₄	< 0.02	0.02 – 0.05	> 0.05
Nutrients NO ₂	< 0.05	0.05 – 0.10	> 0.10
Oxygen	Above 6 mg/l	Between 4 and 6 mg/l	Less than 4 mg/l

Project Output - Modelling



■ Predictive modelling

Hydrodynamic Model-
assess current flushing and
residence time which was
used for identifying the most
suitable areas for aquaculture

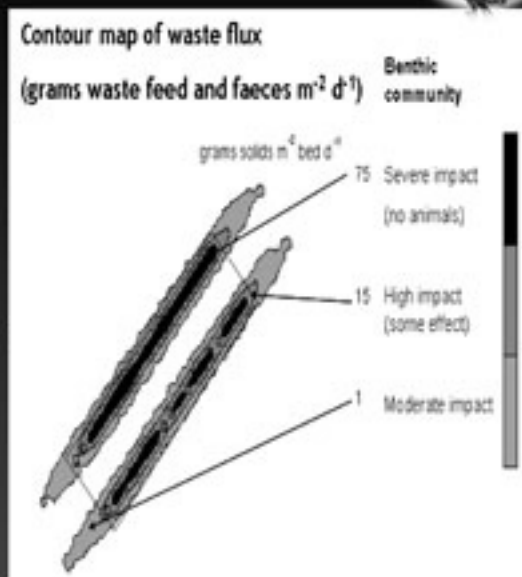


Project Output - Modelling



Depositional Model

“Tropomod” - predicts deposition of nutrients under the cages and estimating the sustainable carrying capacity



Project Output



Guidebook – help local governments address negative impacts associated with aquaculture



Project Output - LGU Guidebook



The 15 point LGU agenda

Existing policy framework for aquaculture management allows LGUs to implement the following

1. Enact ordinances in support of national standards on good aquaculture practice by adopting FAO 314 and implementing the EIS system.
2. Institute a licensing/permitting system consistent with measures of resource rent, resource value, opportunity cost, and cost recovery criteria.
3. Institute a farm identification system that will allow farm inspectors or farm workers themselves to report occurrences and circumstances needing immediate attention.
4. Protect and rehabilitate damaged ecosystems.
5. Work with national agencies to monitor performance of feed suppliers.
6. Coordinate with national agencies to constantly provide farmers simple advice on feed management.
7. Help the farmers manage their farms better.
8. Allow the environment to "rest" – FALLOW and continue monitoring until recovery is attained!
9. Work within the Environmental Carrying Capacity.
10. Monitor farm conditions, recognize signs of impending disasters and react immediately!
11. Recognize impending disasters and react immediately.
12. Organize fishfarmer communities.
13. Invest in collecting information for decision making. Establish a registry of aquaculture farms.
14. Incorporate aquaculture activities in local plans such as the coastal development plan or municipal development plan.
15. Promote cooperative management schemes.

Project Output



**Joint inter-agency
Administrative Order**
Defining/Identifying areas of
cooperation and collaboration among
gov't agencies in the planning,
management and control of
aquaculture development to mitigate
impacts on the environment

- Dept of Agriculture
- Dept of Environment and
Natural Resources
- Dept of Interior and Local
Government



Summary

- There is a link between eutrophic waters, algal blooms, fish kills
- Mariculture emerging as next frontier for fish production
- Environmental impacts of mariculture will have to be addressed because it will become common occurrence in coastal waters
- Mitigation measures will have to be implemented

MERSys

Establishing a Marine Emergency Response System (*MERSys*) for Mariculture Areas in Pangasinan, Philippines – Linking Science with Coastal Management

**Gil S. Jacinto^{*1}, Maria Lourdes San Diego-McGlone¹,
Rhodora Azanza¹, Lourdes J. Cruz¹,**

***Gabriel E. Navarro*², (Mayor of Bani, Pangasinan), Alfonso F. Celeste²
(Mayor of Bolinao, Pangasinan), Nestor B. Pulido² (Mayor of Anda,
Pangasinan) and Hernani A. Braganza² (Mayor of Alaminos City,
Pangasinan)**

¹Marine Science Institute, University of the Philippines, Diliman

Situationer

- Increasing use of coastal waters for mariculture activities with attendant environmental problems
- Increasing incidents of harmful algal blooms (HABs) with limited national government resources available to respond to problem



Two months after the Feb 2002 fish kill event in Bolinao, 3 persons died and at least 6 persons were taken seriously ill after eating the seaweed locally known as "kulot" (*Acanthophora spicifera*) harvested off Santiago Island.



"To date, BFAR in partnership with the respective local government units had already set up a total of 19 mariculture parks in storm-sheltered and environmental laws-compliant coastal areas nationwide."



Source: [http://www.bfar.da.gov.ph/news/BFAR_draftsbluprntformrculturehighways\(072606\).htm](http://www.bfar.da.gov.ph/news/BFAR_draftsbluprntformrculturehighways(072606).htm)

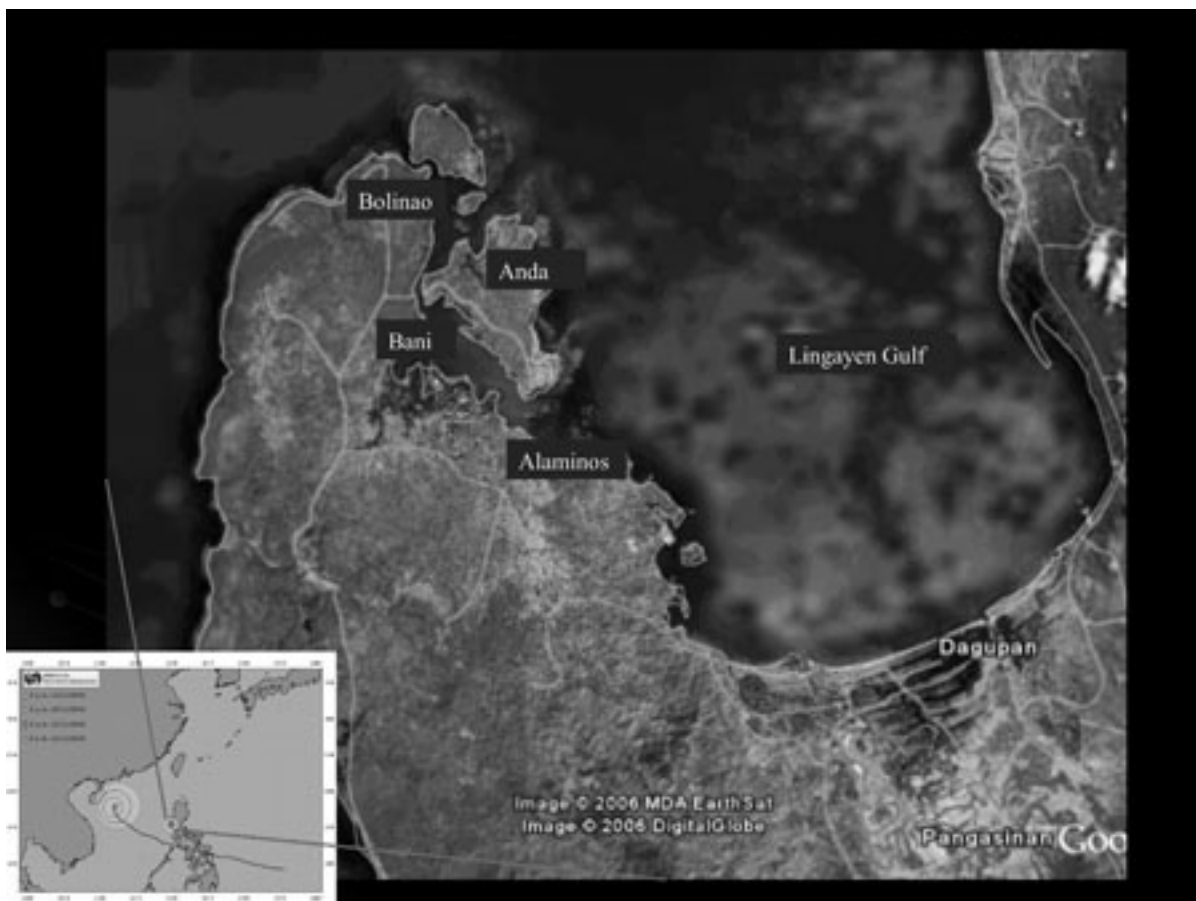


- 27 Bay areas already had *Pyrodinium* blooms & PSP incidents
- Other PSP-causing organisms *Alexandrium* & *Gymnodinium* species detected in Bolinao
- 6 PSP cases & 2 deaths in Bolinao (Bajarias, 2003)
- Goby responsible for May 2005 poisoning cases in Sual contained PSP & tetrodotoxin (TTX)

Slide courtesy of R Azanza

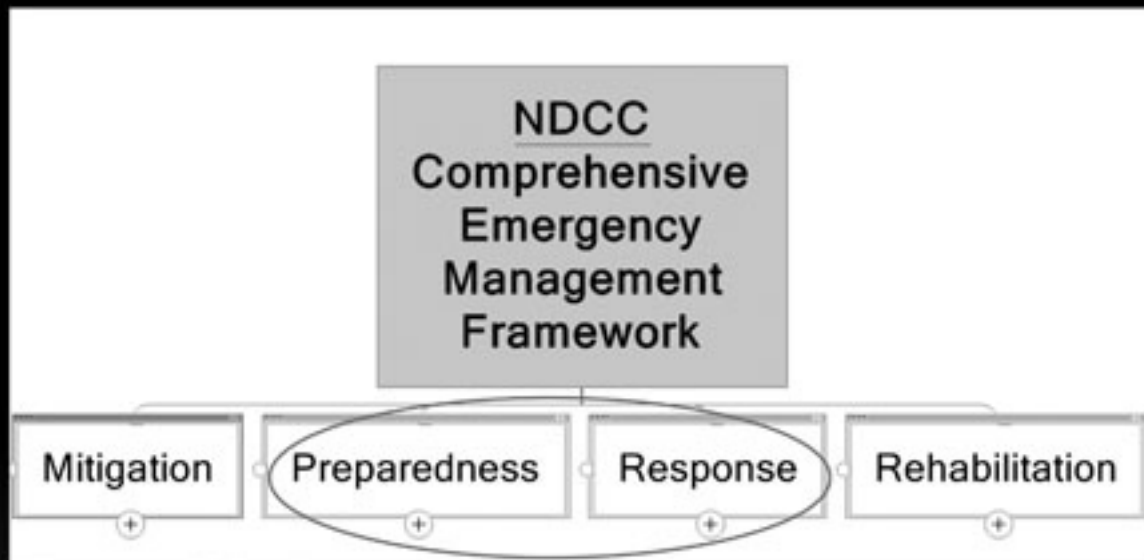
Rationale

- With the assistance of the Netherlands-funded project (SAGIP Lingayen Gulf), and in connection with a sub-project on "Sustainable Mariculture," a Marine Emergency Response System (MERSys) was designed for the purpose of quickly responding to environmental emergencies at the local level.
- Target: 3 adjoining coastal municipalities and 1 city



Rationale

- Specifically, MERSys to enable LGU's to anticipate and respond to marine related emergencies such as:
 - fish kills
 - harmful algal blooms
 - human poisonings from fish and seaweeds
 - oil/chemical spills



Elements of MERSys

- Training of LGU staff & other stakeholders
- Advocacy & Public Info
- Partnership Agreement(s)
 - Local Government Units
 - People's organizations
 - National Line Agencies (e.g., Bureau of Fisheries)
 - Academe/Research Institutions
 - Private Sector
- Institutionalization

Training



Water quality
monitoring

Training



Mouse Bioassay

Training



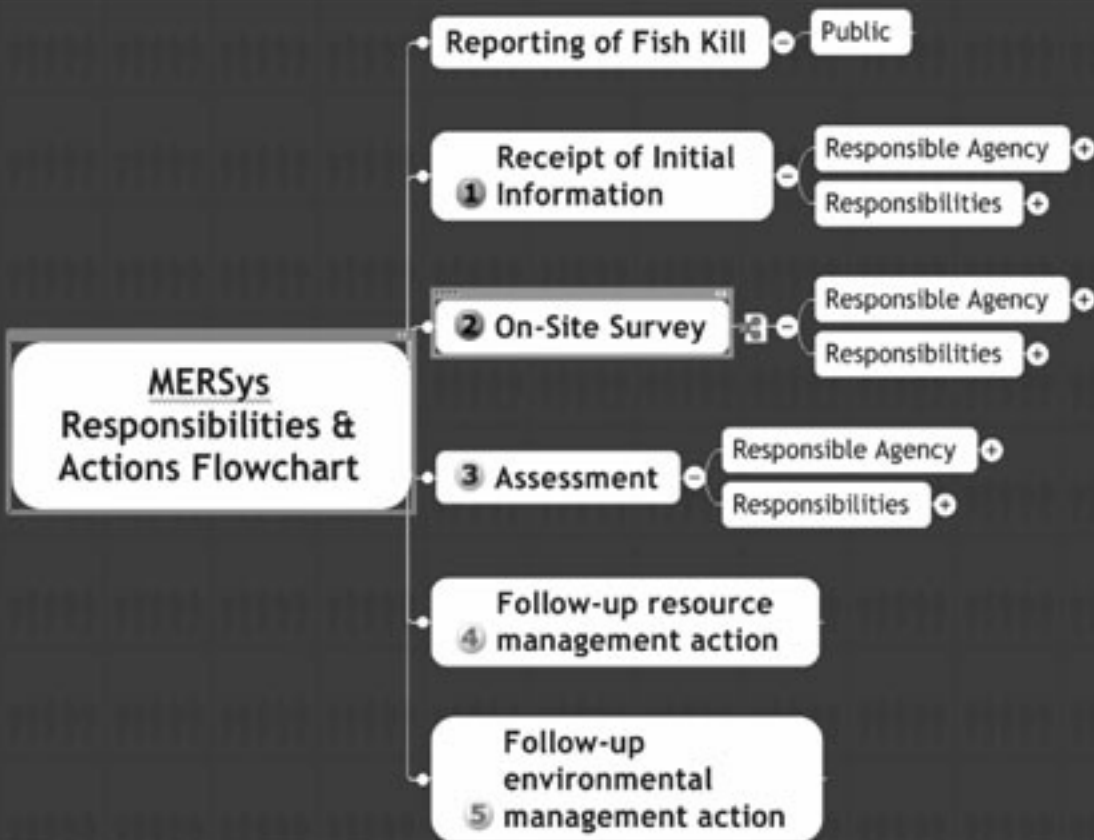
Plankton sampling and preliminary (harmful) plankton identification

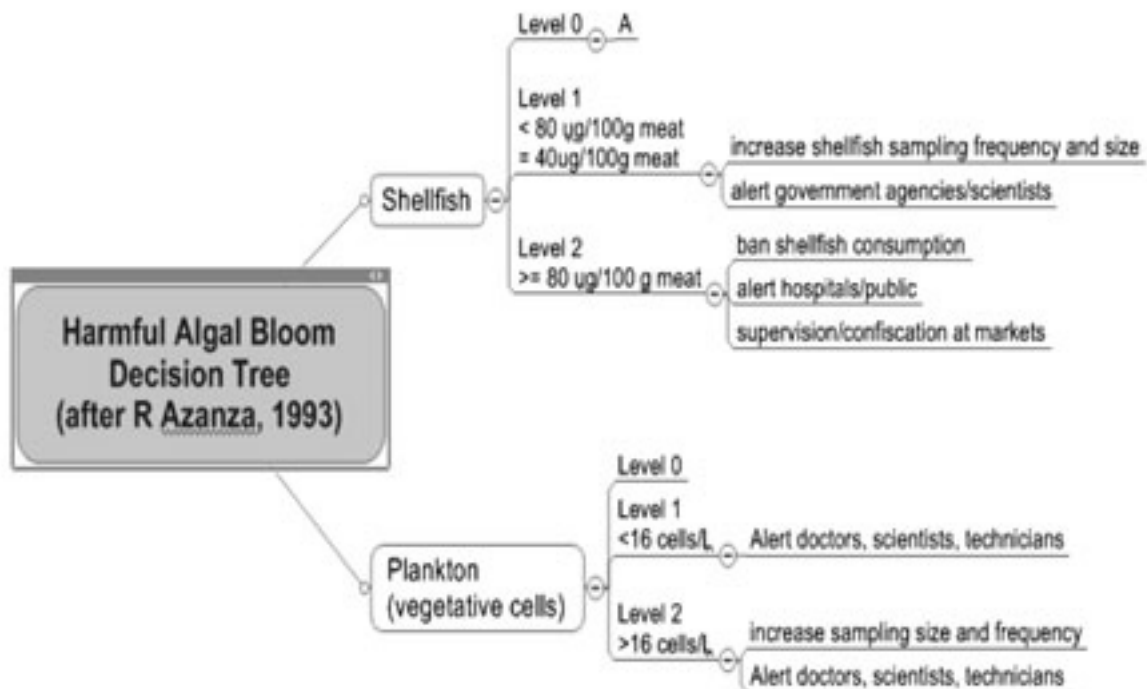


Information & Education Campaigns



Stage mock emergency





Project Output

- Stakeholders who are able to monitor water quality conditions in their mariculture sites
- Stakeholders who can make informed decisions on next steps to keep mariculture sustainable
- An implementable marine environmental emergency response system at LGU level

Stages of MERSys Development

- Stage 1 - Training, Public Info
 - LGU, line agencies, & public aware of MERSys
 - LGU staff capable of
 - routine water column and bio sampling & analysis
 - toxicity testing (mouse bioassay)
 - preliminary (harmful) phytoplankton ID
- Stage 2 - MERSYS Framework Developed, Accepted
 - MERSys Framework presented to stakeholders
 - Framework discussed, revised, and accepted

Stages of MERSys Development (2)

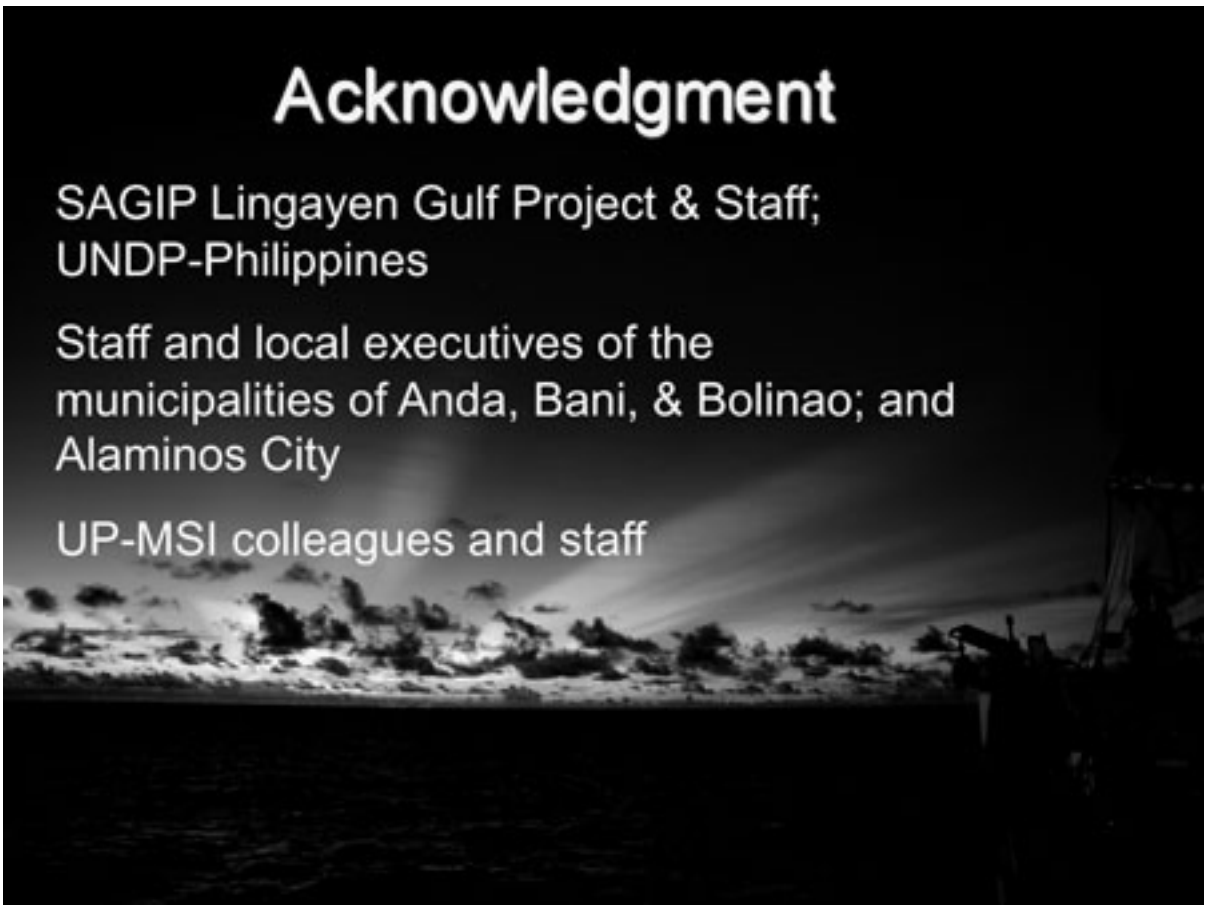
- Stage 3 - MERSYS Institutionalized
 - Executive Order or Ordinance passed on MERSys
 - Regular budget provided
 - Logistics & Infrastructure put in place
- Stage 4
 - Certification of the Laboratory and MERSys staff
- Stage 5
 - MERSYS adopted nationwide

Acknowledgment

SAGIP Lingayen Gulf Project & Staff;
UNDP-Philippines

Staff and local executives of the
municipalities of Anda, Bani, & Bolinao; and
Alaminos City

UP-MSI colleagues and staff







PRIME OBJECTIVES

1. To maintain an organizational machinery in the western part of Pangasinan to promote tourism and, if capable, to attract congresses and convention. This includes the creation of special events to draw tourist traffic to the area;

2. To oversee the requirements and welfare of visitors, in terms of convenience in travel, luxurious accommodation, nature, adventure and cultural journey;
3. To conduct a continuing program to promote the western part of Pangasinan as a tourist incentive and convention destination, taking into account the views and aspirations of all stakeholders, both private and government.



Pangasinan

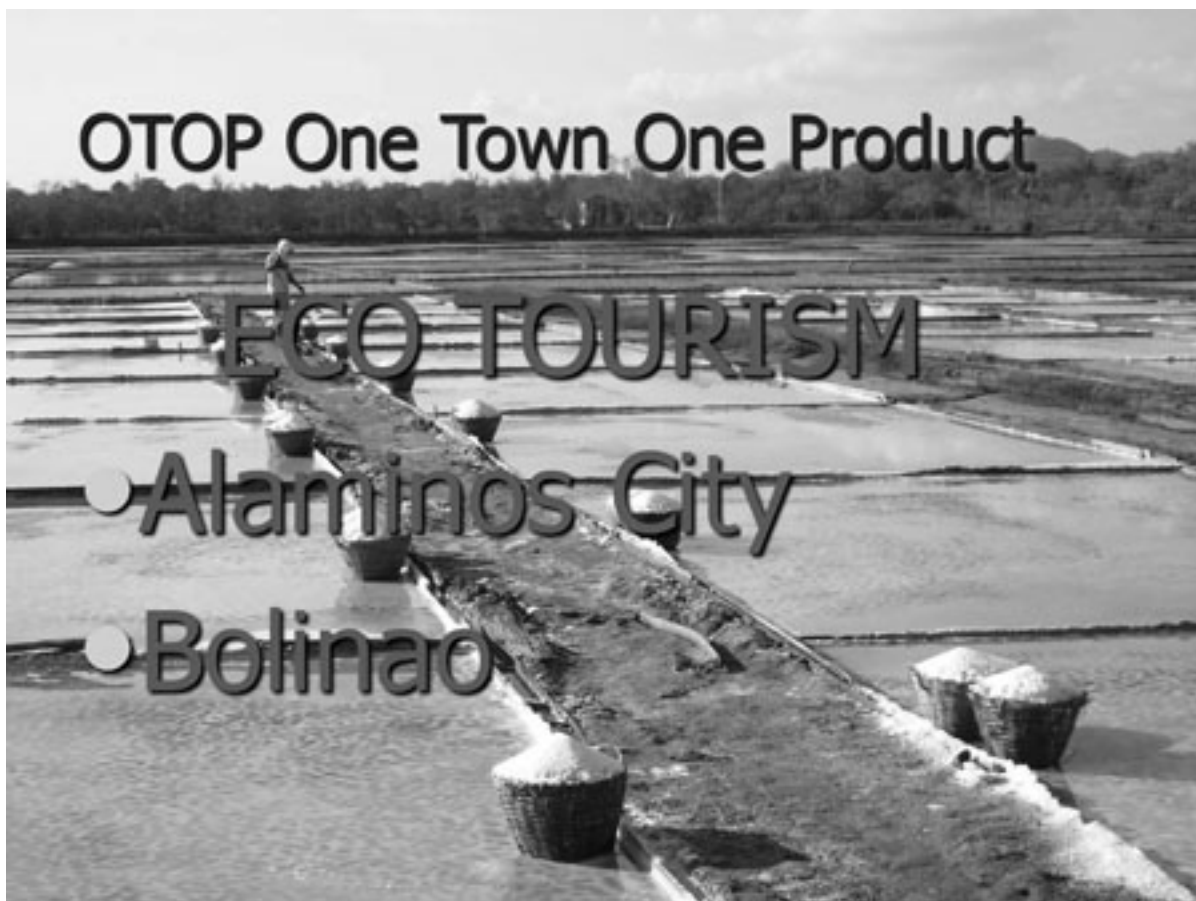
CORPORATE BACKERS

- MANILA NORTH TOLLWAYS CORP
- NORTH PHILIPPINES VISITOR'S BUREAU
- NORTH LUZON EXPRESSWAY
- VICTORY LINER



WHO ARE THE FOUNDING INCORPORATORS & BOARD OF TRUSTEES?

- MRS. AMOR BONA- Puerto Del Sol Resort & Hotel- Chairperson
- MS. MARGIE CELESTE- Celeste Seabreeze Restaurant- Vice Chairperson
- MR. RONNIE TORRES- Tummy Teasers Foodhouse- Treasurer
- BM DANILO DIZON- Family Tradehouse Inc. - Member
- MR. RAWEN BALMANA- Mabini Caver's Group- Member



TOURISM RESORT FACILITIES

- 16 Bolinao
- 8 Alaminos City
- 2 Anda
- 3 Bani
- 2 Sual
- 1 Dasol
- 1 Mabini
- 1 Agno

Inventory of Accommodation Facilities/ Rooms in Pangasinan

Estimated from TOD generated stats as of December 2007

Major Towns & Cities	Number of Accommodation Facilities			Number of Rooms			Total Room Capacity
	Accredited	Non-Accredited	Total	Accredited	Non-Accredited	Total	
ALAMINOS CITY	2	6	8	50	44	94	420 pax
San Fabian	1	28	29	16	158	174	687 pax
Lingayen	0	12	12	259	12	259	1088 pax
Dagupan City	2	20	22	127	426	468	1228 pax
BOLINAO	1	15	16	21	299	320	1583 pax
Manaoag	0	4	4	0	68	68	153 pax
Urdaneta City	-	10	10	-	236	236	572 pax
Labrador	2	3	5	86	28	114	266 pax
Binalonan	1	0	1	20	-	20	130
TOTAL	9	82	91	565	935	1,510	6,127 pax

Source: Validation of TREs by the Tourism Operations Division
Bolinao Hotel Resorts & Restaurants Association
Alaminos City Tourism Office

2006-2007 Visitor Arrivals Hundred Islands National Park

Year	Foreign	Domestic	Total
2006	7,917	110,219	118,136
2007	10,022	138,437	148,459

Source: Visitor Arrivals, Hundred Islands National Park, 2007
Alaminos City Tourism Office

POSITIVE OUTLOOK

- TOURISM RELATED BUSINESS PROGRESSES
- ATTRACTING INVESTMENT
- EMPLOYMENT GENERATION
- SUPPLEMENTAL LIVELIHOOD/INCREASE SALES FOR SMEs THAT WILL CREATE SOCIAL IMPACT
- INFRASTRUCTURE DEVELOPMENT
- GREATER AND WIDER AWARENESS OF AND CONCERN FOR RESPONSIBLE MANAGEMENT/ STEWARD OF THE ENVIRONMENT

NEGATIVE IMPACTS

- TOURISM RELATED CRIMES
- DEGRADATION OF CULTURAL AND ETHNIC HERITAGE
- ATMOSPHERIC, WATER AND LAND POLLUTION
- DEGRADATION/LOSS OF NATURAL LANDSCAPE THROUGH UNREGULATED TOURISM RELATED STRUCTURES

SUSTAINABLE TOURISM

By: Brundtland Commission

- Development that meets the needs of the present without compromising the ability of future generations to meet their own needs



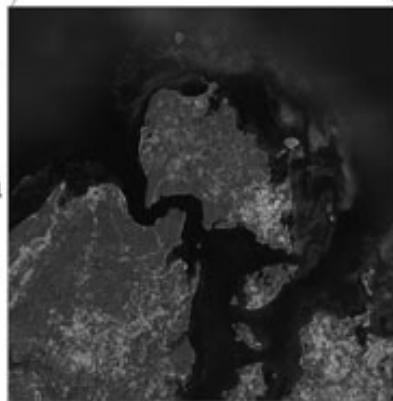
OVERVIEW

Zonation:

- Tourism Zone
- Fishery Management Zone
- Multiple Use Zone
- Trade and Navigation Zone



- 8 Marine Protected Areas (90.94 ha)
- 1 Giant Clam Nursery
- 1 Seagrass Protected Area (60 ha)
- 9 Mangrove Management Areas (78 ha)



CRM Programs and Projects

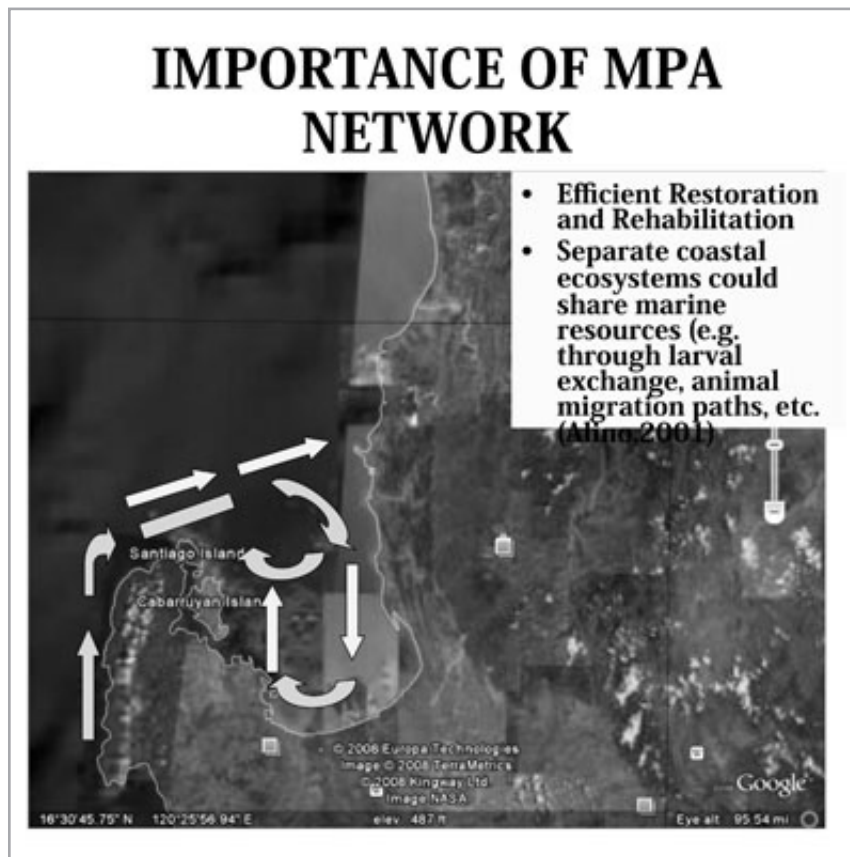
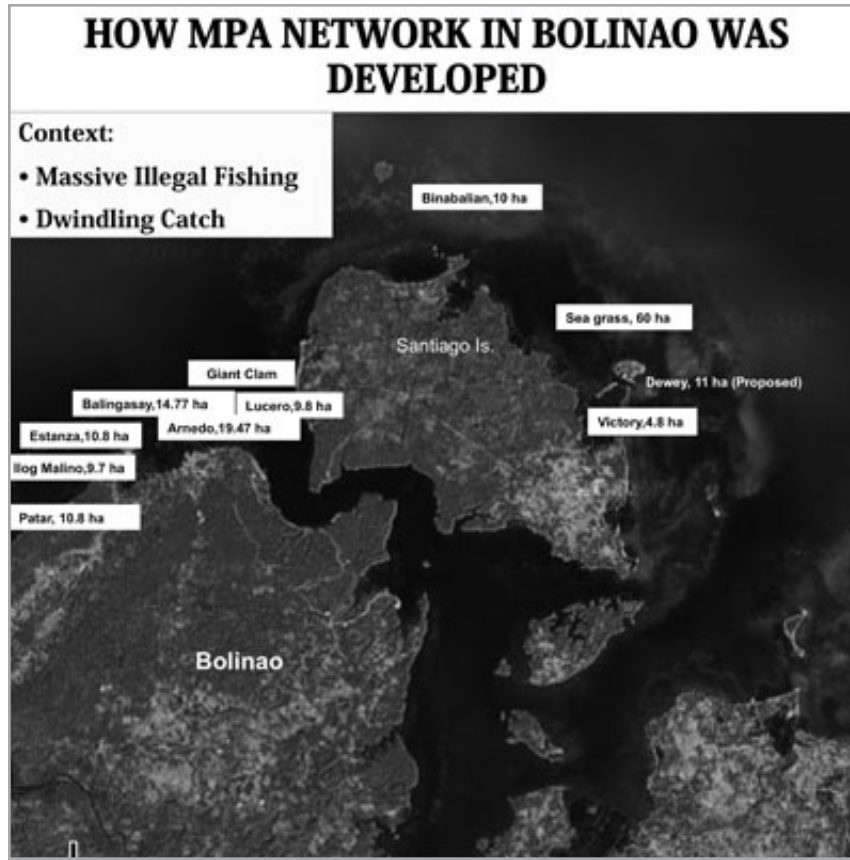
- Fisheries Registration and Licensing (FRL)
- Mangrove Planting and Management
- Law Enforcement
- Support to Rehabilitation and Protection of Other Habitats and High Value Species
- Support to Livelihood Projects
- Revitalization of M / BFARMs
- Mariculture and Water Quality Management
- Marine Protected Area (MPA) Establishment and Management

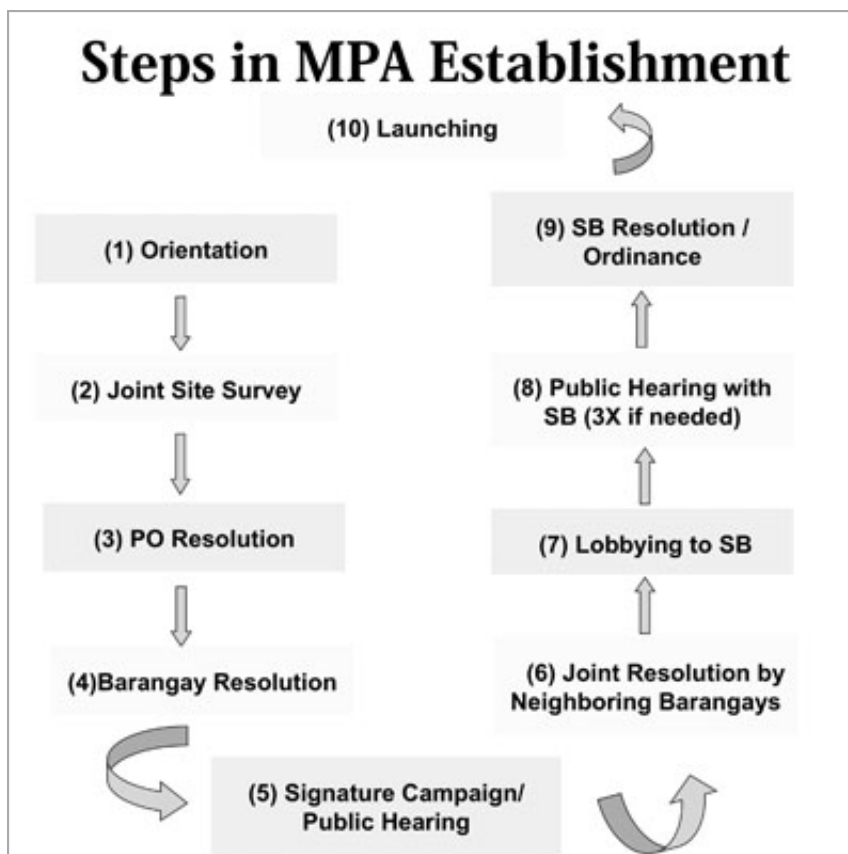
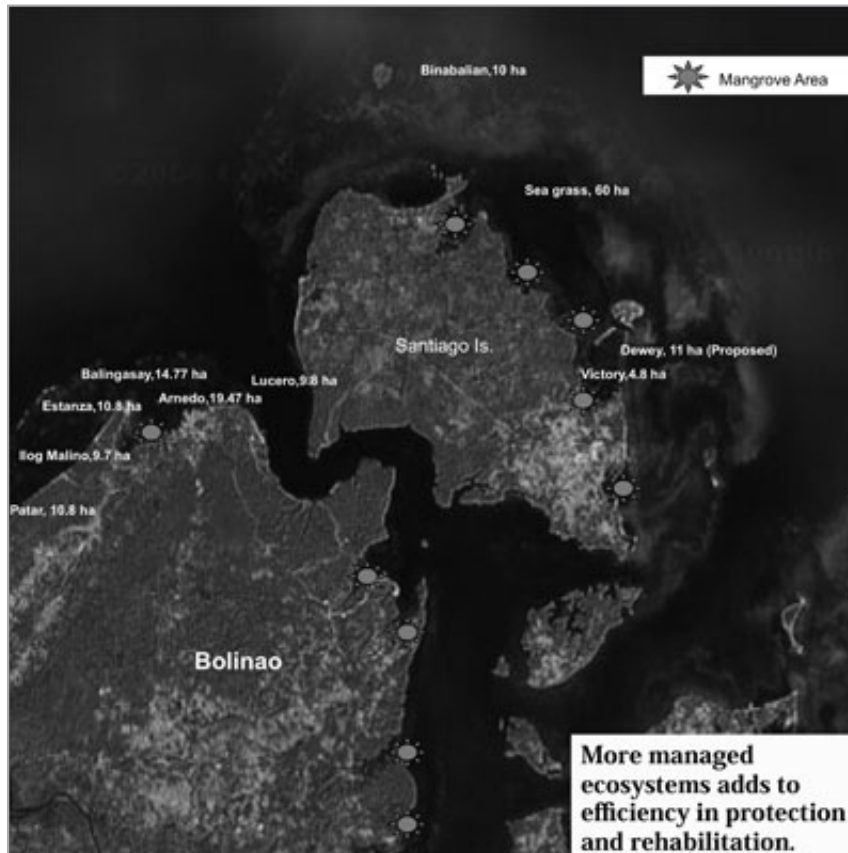


PARTNERS/SUPPORT AGENCIES

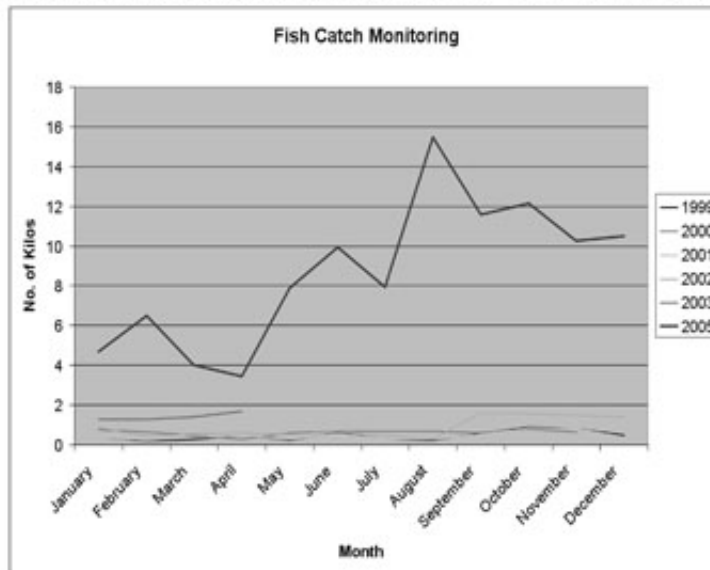
- Kaisahan ng mga Samahan Alay sa Kalikasan Inc. (KAISAKA, Inc)
- Bolinao Marine Ecological Fund Foundation Inc. (BOMEFFI)
- UP-Marine Science Institute & MERF (Projects)
- HARIBON Foundation
- UP College of Social Work & Community Development
- Foundation for Philippine Environment
- United Nations Development Program
- Royal Netherlands Embassy (MFRMP)
- United Nations Environment Programme-Global Environment Facility
- Philippine Tropical Forest Conservation Foundation Inc.
- Asian Social Institute
- Glaxo-Smith and Kline
- DA-BFAR
- DENR
- DILG
- DOST
- OPAg
- PNP, PCG & Other line agencies







GAINS FROM MPA ESTABLISHMENT & NETWORK



4X increase in Fish catch after 7 years of establishment

Incremental catch observed from subsistence fishers (e.g. spear gun)

Data Source: SAMMABAL (Balingasay MPA) Fish catch Monitoring from 1999 to 2005 (Spear gun Fishery)

GAINS FROM MPA ESTABLISHMENT & NETWORK

- Observed increase fish density inside MPAs than outside
- Increase in coral cover inside MPAs
- Siting of species that were previously affected by illegal fishing
- Indicated intents of other barangays to set up MPA
- Strong People's Organizations
- High people's awareness



CHALLENGES/PROBLEMS

- **Global Warming resulting to Bleaching**
- **Presence and Spread of Crown of Thorns (COTs)**
- **Recorded violations even with strict patrolling**
- **Modification of fishing gears (active fishing gears)**
- **Presence of Compressor / Aquarium Fishery**
- **MPAs become attractive to illegal fishers coming from other places**
- **Threatening: collection of topshells in and out of MPAs; reported trader recently**



MANAGEMENT EFFORTS AND SUSTAINABILITY ACTIONS

- **Regular Monitoring and Patrolling**
- **Provision of Logistical Needs of MPAs (e.g. gasoline)**
- **Continuous Information Dissemination**
- **Research and Studies Translation into Management Options**
- **Local Managers initiative in putting up Income Generating Projects to support MPAs (e.g. SAMMABAL Talipapa)**
- **Visitors Donations as source of fund for monitoring**

FUTURE ACTIONS

- **Promote Selected Sites into Eco-tourism Areas (e.g. Dive/ Snorkeling Sites)**
- **Maintenance of Monitoring Data of all established MPAs**
- **Packaging of all Management Efforts done in Bolinao**

Our Goal.

ensure sustainable and equitable utilization of its coastal areas and resources for the primary benefit of the local fishers and stakeholders and the future generations.



MPA Networks and Sustaining mechanisms for MPA management

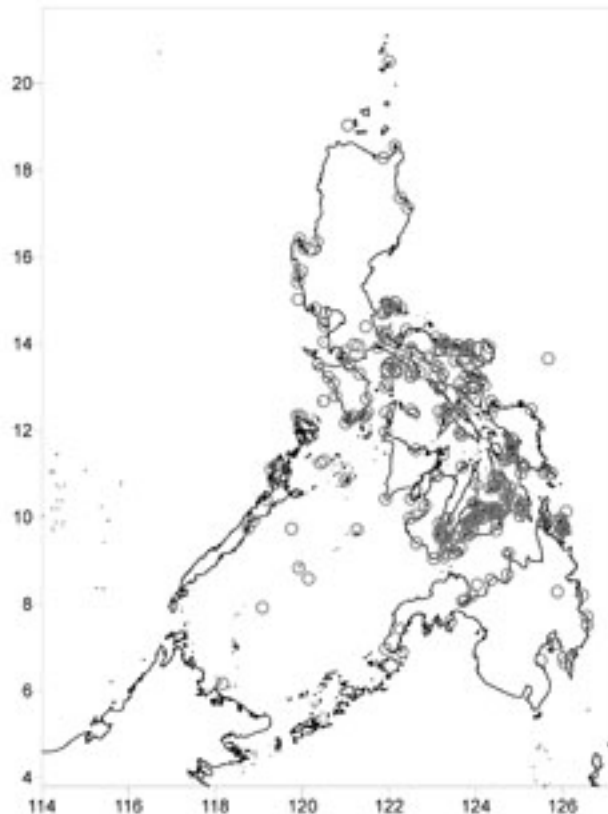
Porfirio M. Alino and
Marie Antonette Juinio-Meñez



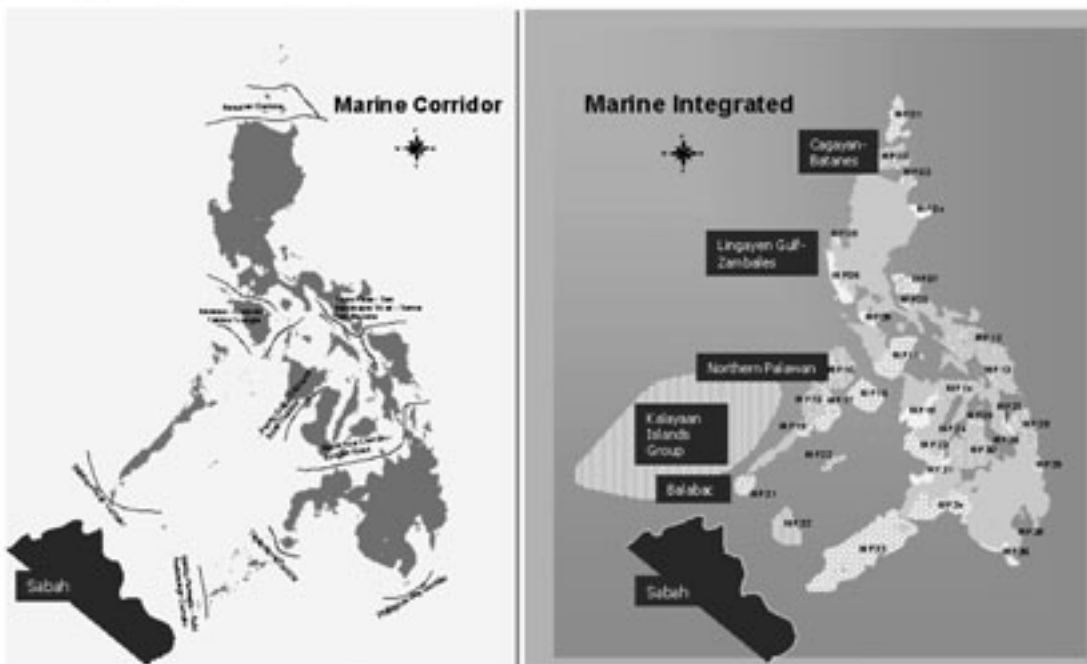
The Philippine Environmental Governance 2 Project

Philippine Setting:

- Philippines is the “hottest” of the marine biodiversity hotspots in the world (Roberts *et al.* 2002)
- Over 500 existing MPAs in the country (as of 2005)
- Only about 10-15% are effectively managed
- Primary purpose of establishment is for sustaining fisheries utilization in the adjacent fishing areas



National Biodiversity Priority Setting Workshop – determined the priority hotspots for conservation

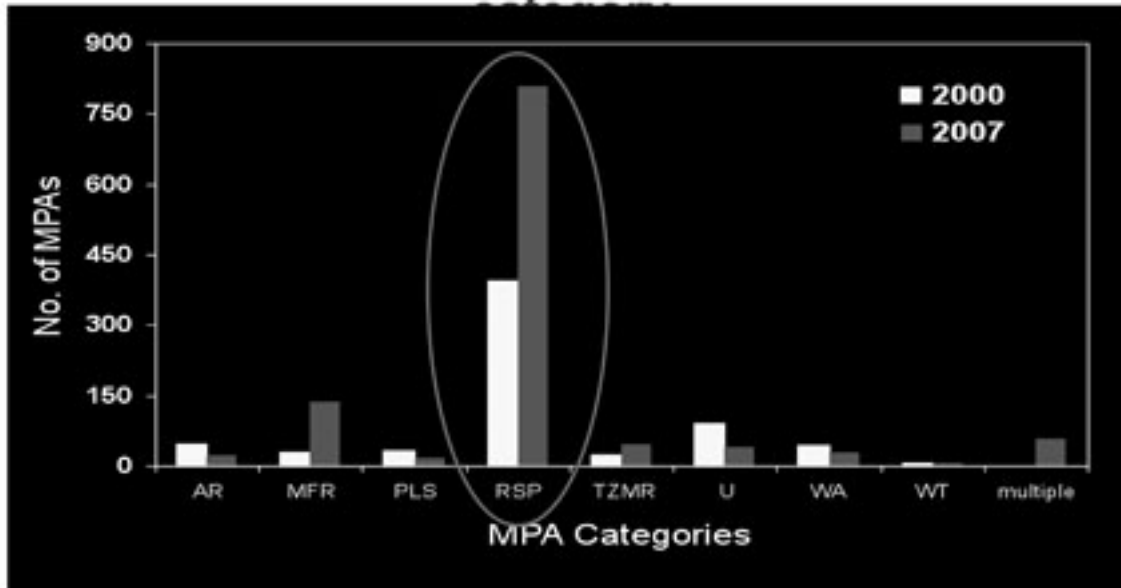


Source: Ong et al. 2003

A summary of the MPAs recorded through the years 1995, 1997, 2000 & 2007

Political Regions	Indicative No. of Existing MPAs (Baling 1995)	Indicative No. of MPAs (Haribon 1997)		Indicative No. of MPAs (Aliño et al. 2000)		Indicative No. of MPAs (UPMSI Database as of Oct 2007)	
		Existing	Proposed	Existing	Proposed	Existing	Proposed
I	3	6	4	7	0	20	0
II	4	4	0	8	0	11	4
III	2	6	9	10	1	22	3
IV	60	77	10	59	12	205	12
V	36	41	13	98	9	90	9
VI	3	18	11	28	12	48	10
VII	68	106	27	127	26	417	30
VIII	14	77	21	98	17	120	22
IX	7	23	15	40	14	56	19
X	4	16	6	20	5	46	10
XI	7	14	12	21	13	35	20
XII	1	3	5	7	8	15	14
CARAGA	38	44	3	36	3	66	3
NCR	0	2	0	2	0	2	0
ARMM	0	2	3	4	3	16	8
TOTAL	249	439	139	565	123	1169	164

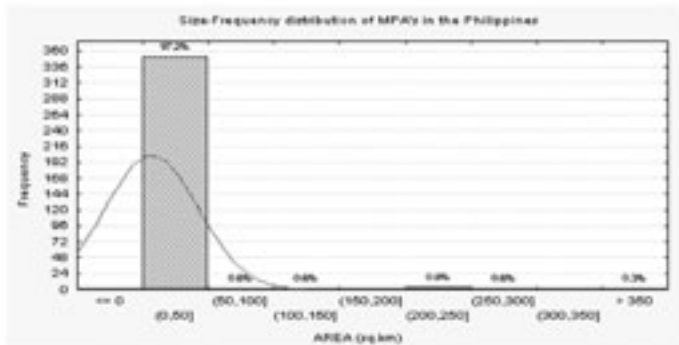
Frequency distribution of MPAs based on



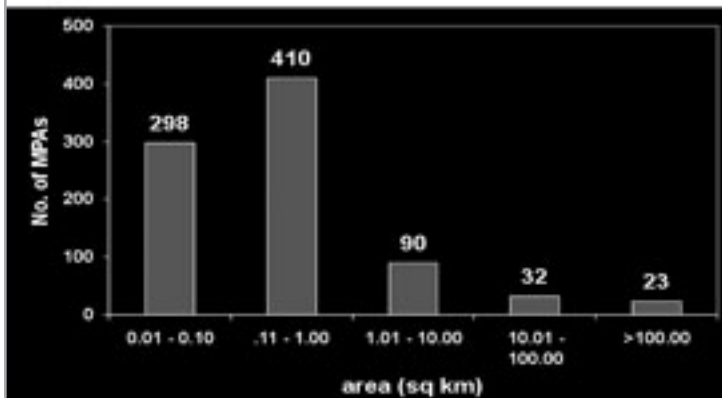
AR – Artificial Reef
 PLS – Protected Landscape/Seascape
 TZMR – Tourist Zone & Marine Reserve
 WT – Wetland
 Multiple – more than 1 MPA category

MFR – Mangrove Swamp Forest Reserves
 RSP – Reserve, Sanctuary or Park
 WA – Wilderness Area
 U – Undetermined

Frequency distribution of MPAs based on size

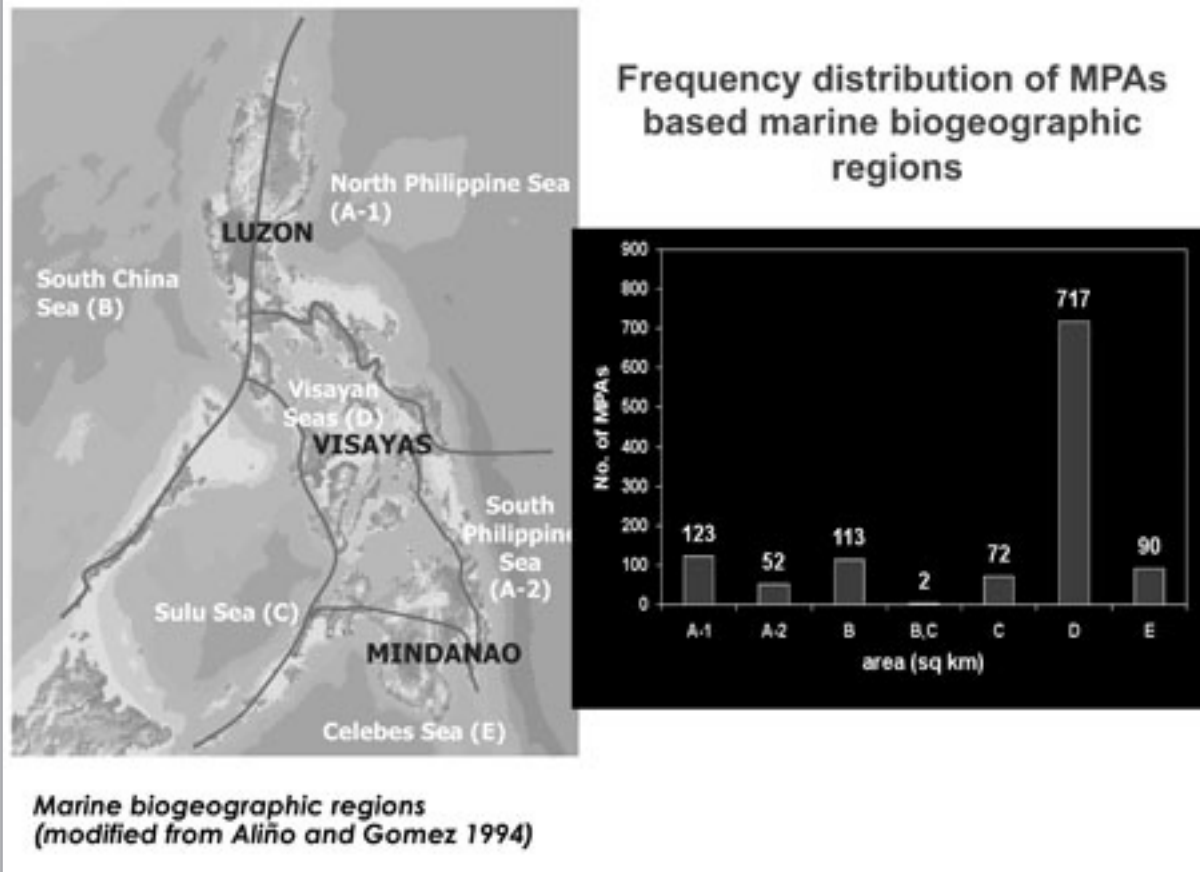


Of the 311 MPAs with known area, 93% are less than 10 hectares in size (Aliño *et al.* 2000)

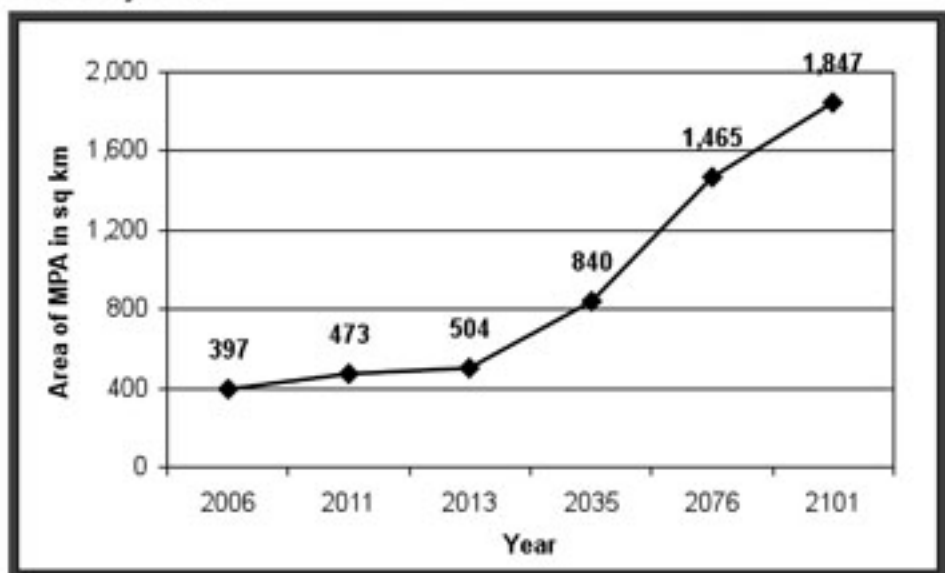


Of the 852 MPAs with known area:
 • 35% are less than 10 hectares in size
 • 48% are within 11-100 hectares

(UPMSI Database 2007)

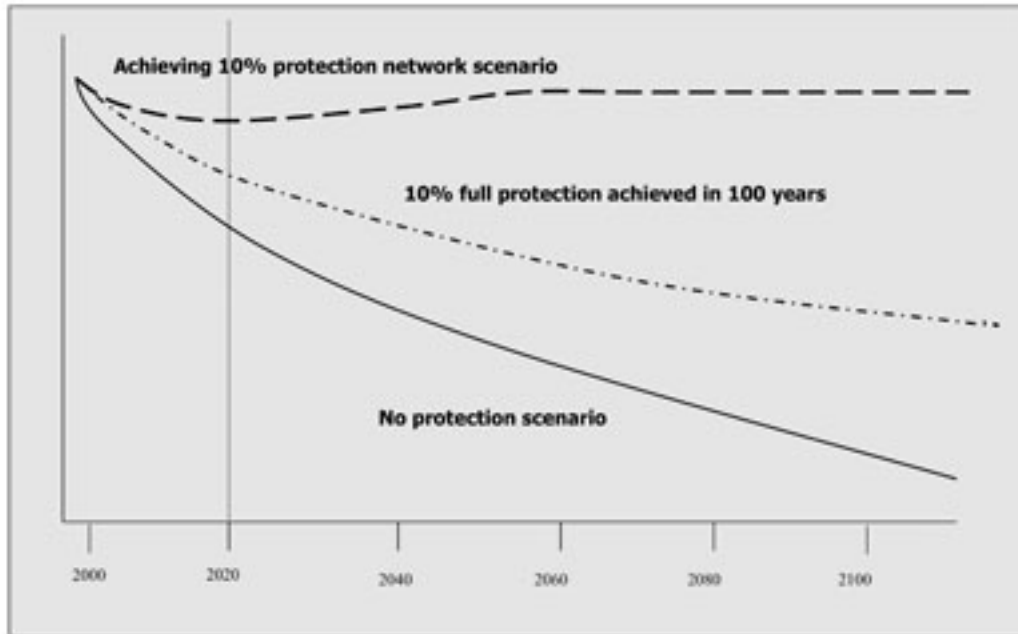


Given sizes of MPAs and rate of establishment, protecting 10% of the coral reefs in the Philippines would take 100 years



There is an URGENT need to accelerate improvement of ecosystem health

MPA Networks have greater potential to sustaining current fishery productivity and improve ECOSYSTEM RESILIENCY



MPA Networks:

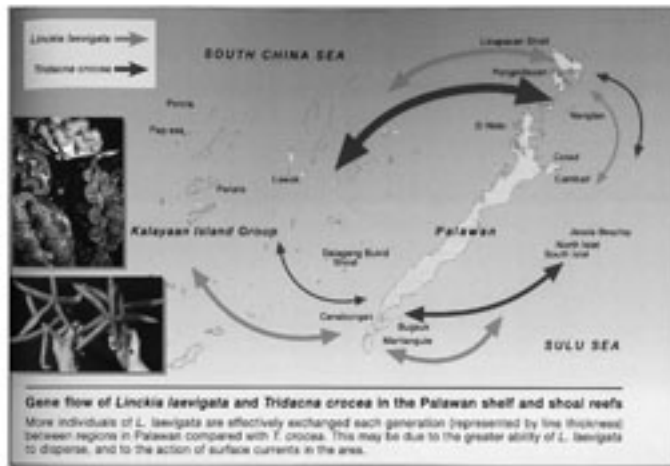
A strategy to optimize the synergy from CRM efforts

• What are MPA networks?

- A system of individual MPAs defined by connectivity and operating at various spatial scales (NOAA 2006)
- Can be:
 - Ecological - based on biophysical connectivity among sites that enhance ecological functions
 - Social - linking people and institutions through exchange of information, experiences and good practices, and sharing of resources

Why Form MPA Networks?

Existing connectivity among ecosystems at various scales:
benefits from natural networks need to be sustained



Source: Meñez et al. 2003 for giant clams; Ravago et al. 2001

Inferred migratory route of some tuna species passing through the Philippines



Source: Morgan and Valencia 1983

Single MPAs may not be enough for protection at larger scales.

From single MPAs to Networks

- **Fisheries Code recommends for an integrated management of contiguous fishery areas to facilitate management as a single resource system (R.A. 8550 Sec. 16)**
- **The Local Government Code provides the mechanisms for inter-LGU cooperative undertakings (R.A. 7160, IRR Art. 61):**
LGUs may, through appropriate ordinances, group themselves, consolidate or coordinate their efforts, sources and resources for purposes commonly beneficial to them.
- **Should be within the context of an integrated CRM (E.O. 533) at the LGU and inter-LGU level to realize optimum benefits**

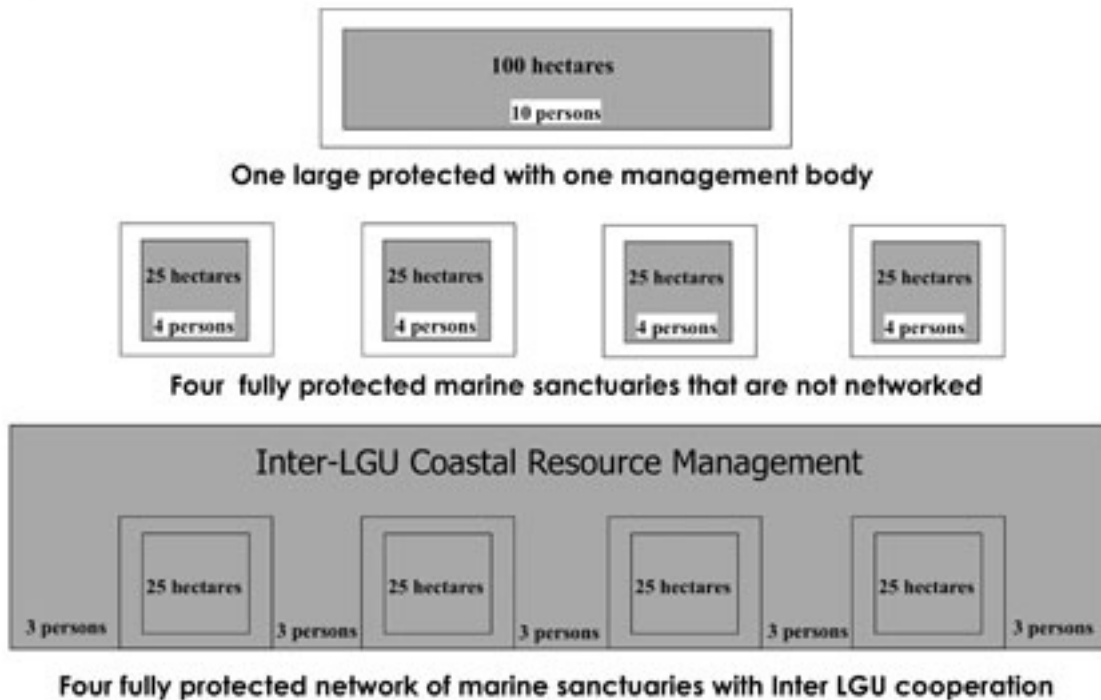
Why Form MPA Networks?

- **MPA Network as a strategy to decrease necessary costs incurred for MPA management**
- **MPA Network as an efficient way to avail of funding due to decreased transaction costs and expected higher economic benefits**

Why Form MPA Networks?

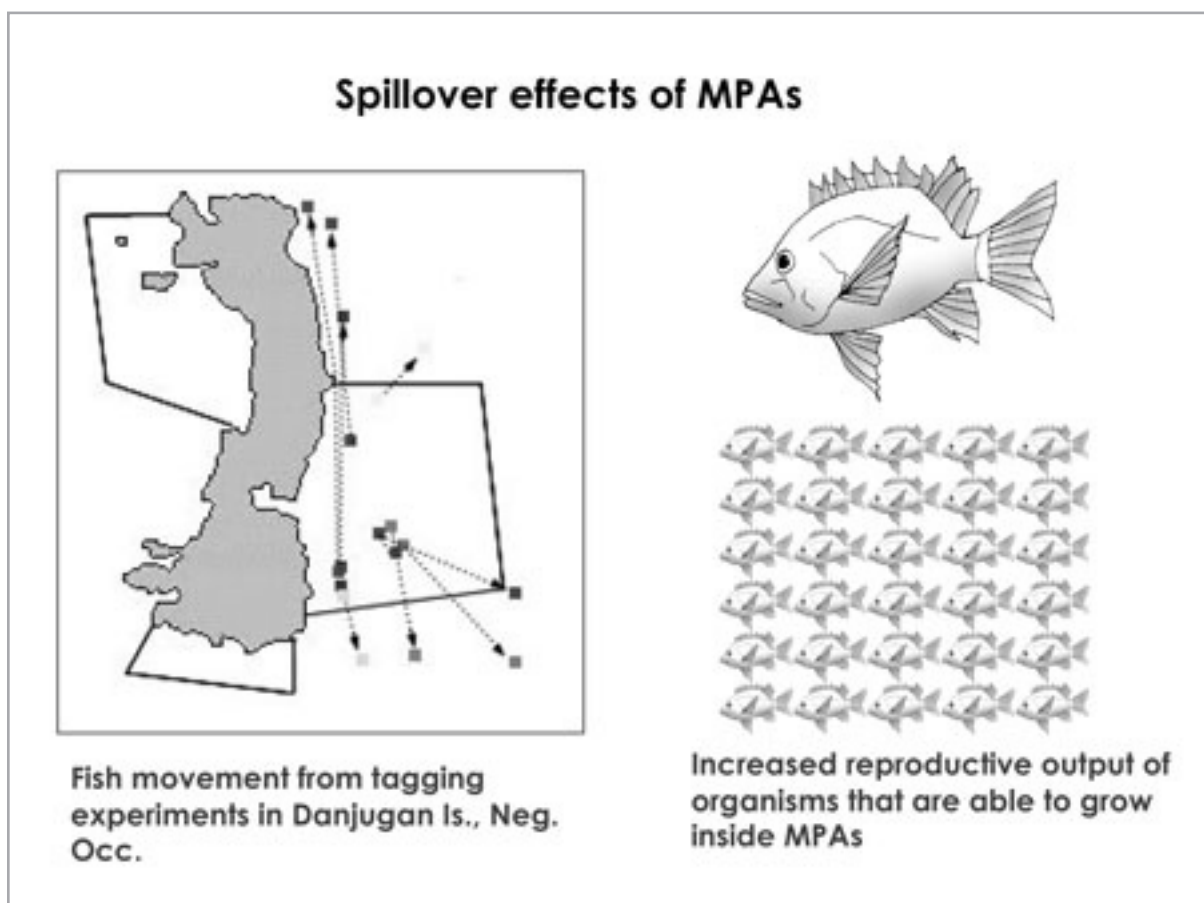
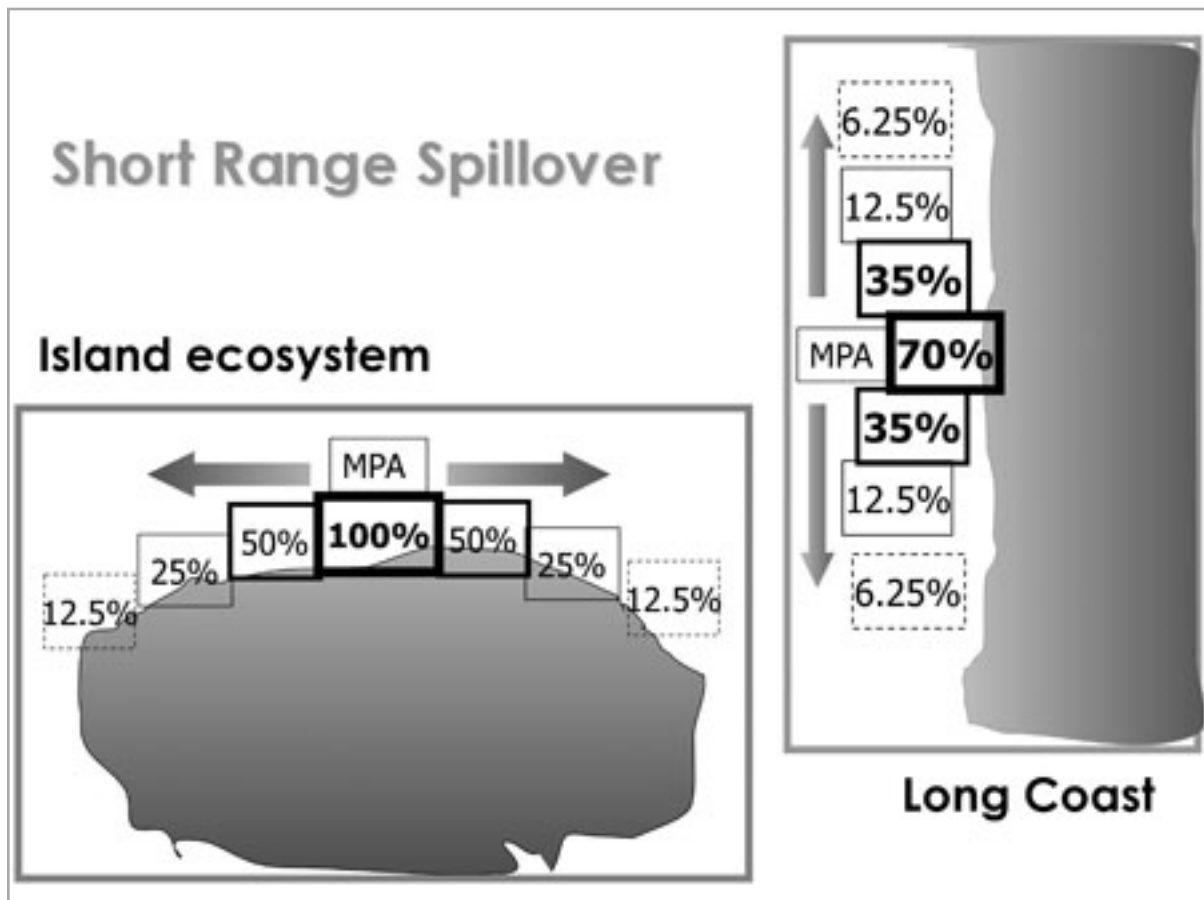
- **Inter-LGU MPA networks could enhance and scale up benefits of natural processes and LGU-level management interventions**
 - *biodiversity conservation*
 - *fishery productivity and livelihood of fisherfolk*
 - *recreational and aesthetic value of the environment*
 - *effectiveness of local environmental governance*

Sample Benefits Derived from MPA Networking and Adaptive Management



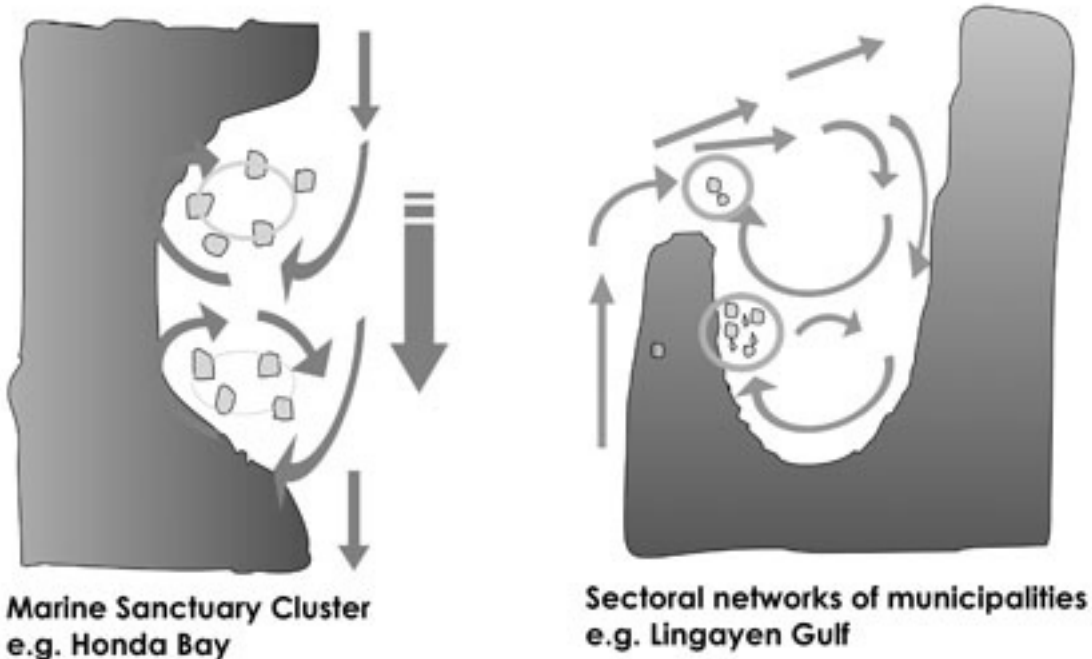
From single MPAs to Networks

- Individual MPAs must be already effective in their own right.
- Areas of connectivity among sites need to be identified.
 - Social connectivity – capacity of MPA managers to effectively work together
 - Biophysical connectivity – based on current circulation, bathymetric features, geomorphology



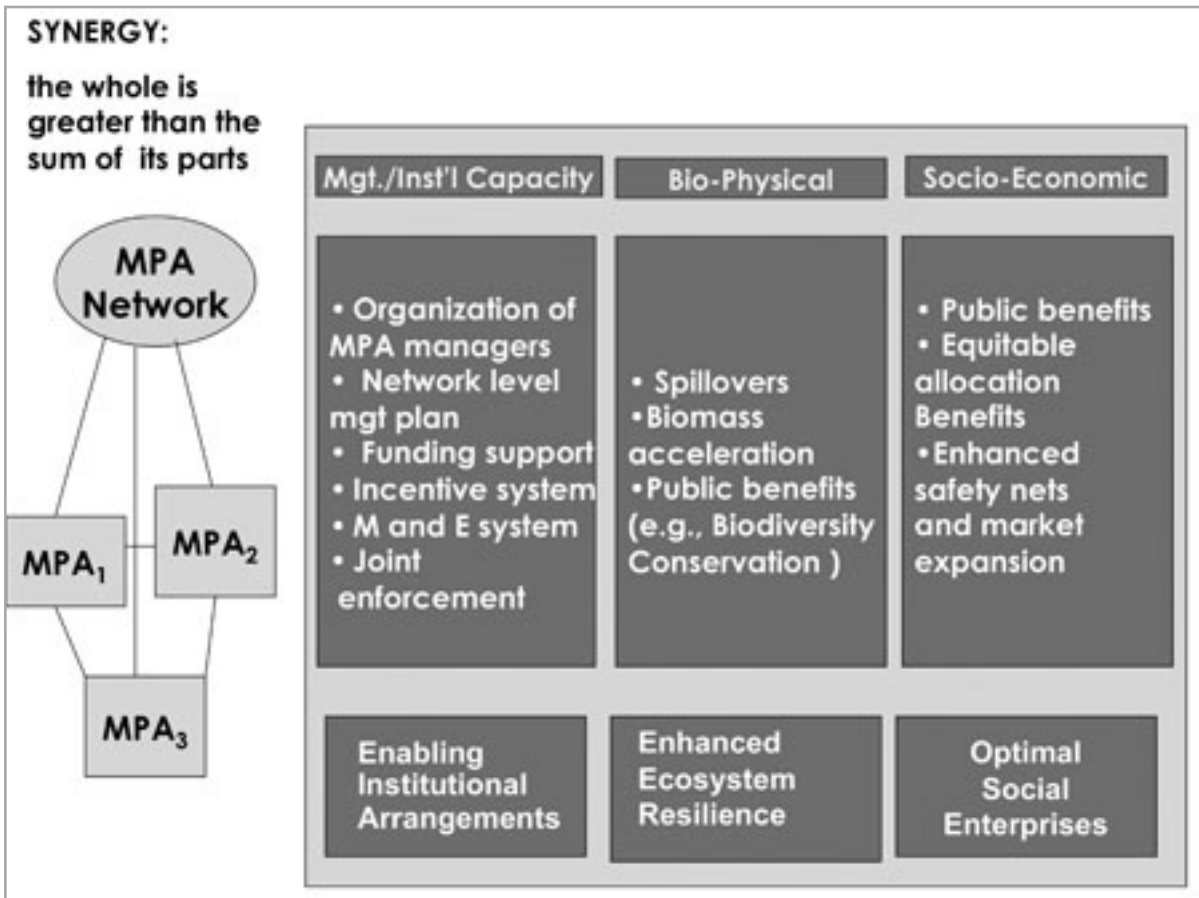
Medium range spillover

Larval dispersal potential , transport by current systems

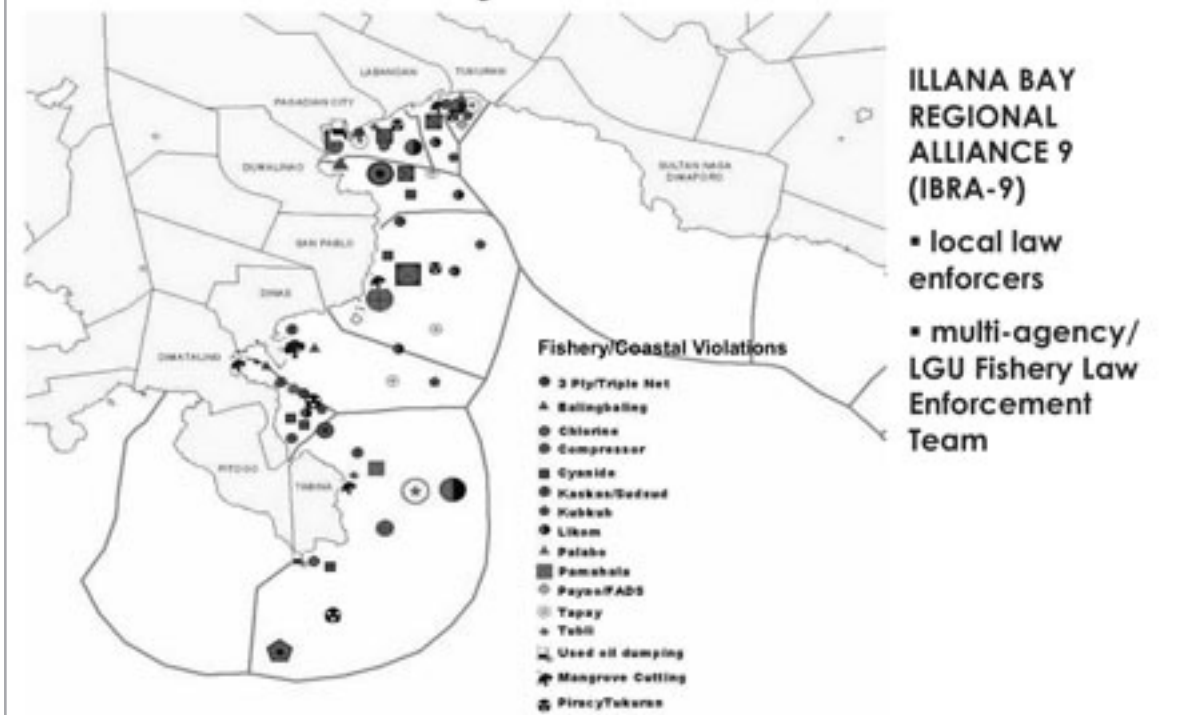


Key Mechanisms for Effectiveness

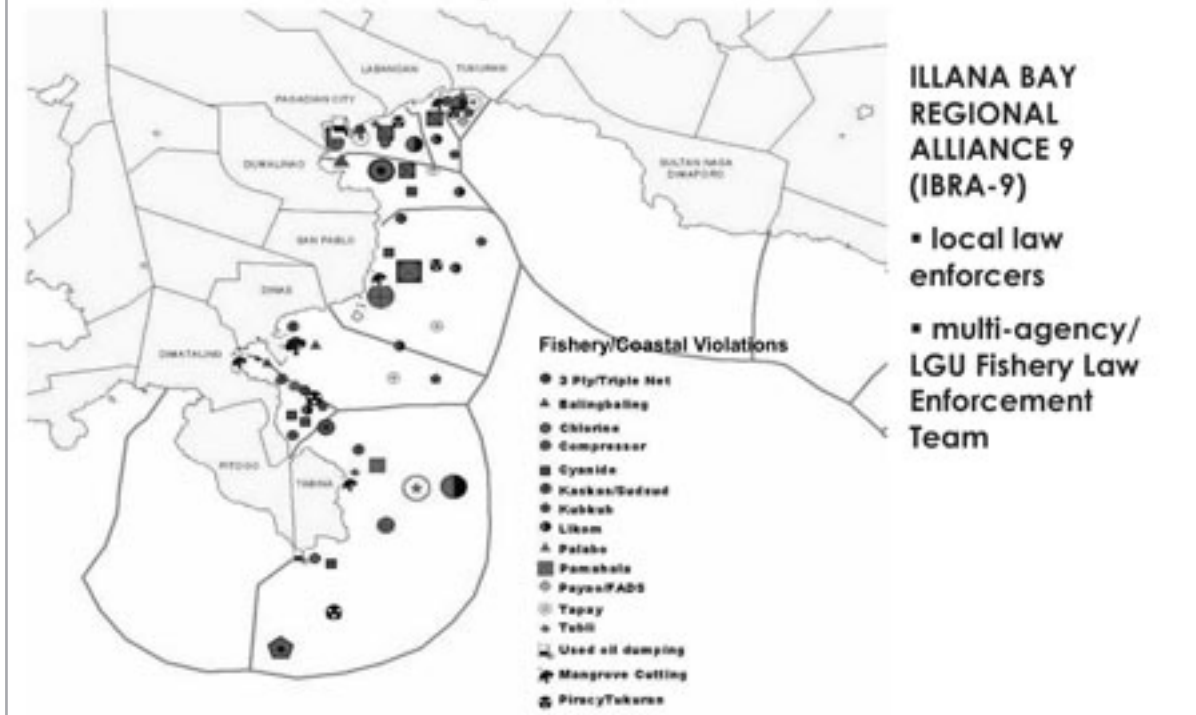
1. **Institutional Arrangements**
 - clarification of roles and responsibilities
 - formalizing agreements
2. **Enforcement**
 - multi-level support groups
 - sharing of resources
3. **IEC and Advocacy**
 - multi-level, different stakeholders
 - beyond awareness raising , action oriented
4. **Monitoring and Evaluation**
 - performance (governance)
 - impacts: biophysical , socio-economic, socio-cultural
5. **Sustainable financing** – diversifying sources and means
 - public/private investments
 - good financial management system



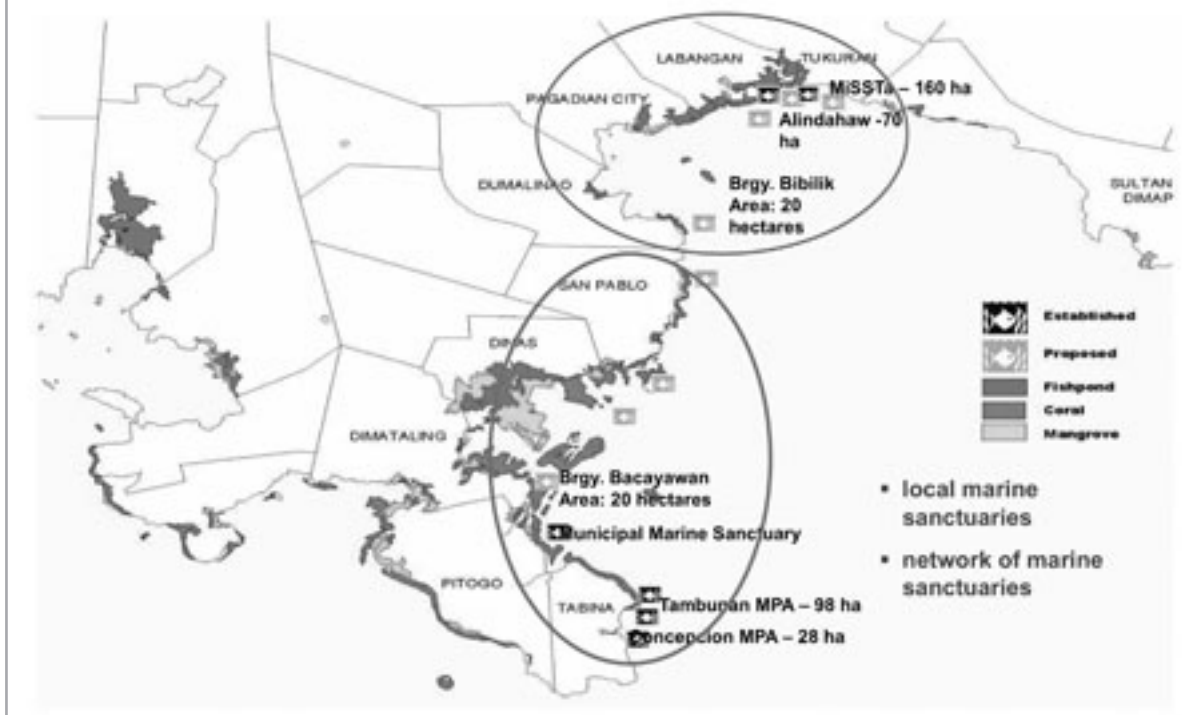
Inter-LGU Collaboration on Coastal & Fishery Law Enforcement



Inter-LGU Collaboration on Coastal & Fishery Law Enforcement



IBRA-9 MPA Networks (Cluster 1 & 2)



Lessons Learned and Challenges

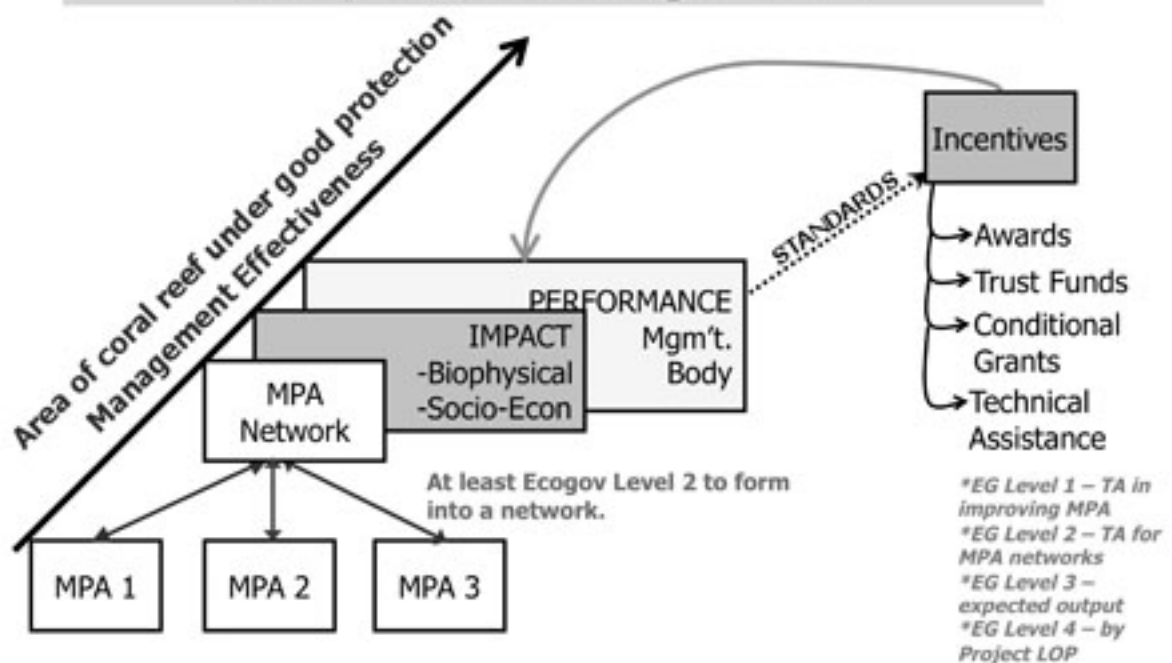
Areas of inter-LGU collaboration that are working

- **Coastal and fishery law enforcement**
 - sharing of information (Baler Bay)
 - IEC program (Camotes Sea, Baler Bay)
 - fund leveraging from public funds (e.g. Cebu provincial fund counterpart)
- **MPA management and networking**
 - joint monitoring and reporting (e.g. MPA Forum Illana Bay, Sibugay Bay, Camotes Sea)
 - joint marketing for private investments and other sources of financing (e.g. Camotes, Davao Gulf)
- **Solid waste management**
 - establishment of SLF (Bohol)
 - sharing of advocacy materials and experiences

Multiplier effects facilitated by sharing of experiences and scaling-up efforts by the PLGU (e.g. Zamboanga del Sur)

• STATE OF THE COASTS & SEAS

Sustaining development through adaptive management



The Marine protected area Support Network

- What is MSN?

A multi-sectoral aggrupation of government and non-government organizations, peoples' organization and academic institutions that aims to support MPA initiatives through complementary collaborative efforts at the local, regional and national level.

It aims to build on the **Philippine Marine Sanctuary Strategy (PhilMarSaSt)** and **Philippine Coral Reef Information Network (PhilReefs)** to contribute to the improvement of MPA management effectiveness and achieving at least 10% full protection of coastal areas by the year 2020.

The Marine protected area Support Network

- How did MSN come into being?

- Need for **a venue for collaborative efforts** among various MPA practitioners and supporters nationwide
- **Help improve MPA effectiveness**
- 20 organizations formed a TWG to brainstorm on institutional MPA networking at partners workshop in January 2005
- TWG concept of MPA support network presented in various fora and gained acceptance
- MOA drafted and signed in November 2005 to formalize MSN
- Support fund sourcing and in-kind contributions

The Marine protected area Support Network

• Why is the MSN needed?

- It is imperative to **reduce degradation** of coastal areas.
- It is crucial to **build on our gains** from establishing and managing MPAs.
- It is urgently needed to **strengthen the foundation** of our investments.
- We need to strengthen MPA management to improve **cost effectiveness and ensure sustainability**.
- We need to **sustain MPA ecological benefits** that redound to reducing poverty and enhance social inequity.

The Marine protected area Support Network

- How does MSN propose to achieve its MPA support role and commitments?

• **MSN proposes:**

- To come up with action agenda that supports local and regional adaptive management training through its monitoring, evaluation, response and feedback system.
- To facilitate the establishment of an incentive system for good MPA governance and performance through annual recognition awards.
- To assist in financial leveraging
- To advocate for better enabling environments through policy and legislative reforms.

The Marine protected area Support Network

- MSN Linking Coastal management Champions
- MSN Acting together in a concerted Way
- MSN Sharing knowledge and experiences
- MSN Transforming ourselves with the people

FOUR C's, the SEA that binds us

- MSN Committing resources now
- MSN Caring for our natural assets
- MSN Causing a sea change
- MSN Championing Champions

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Abbreviations and Acronyms

ABBA	Alaminos, Bani, Bolinao, Anda
BIDA	Burgos, Infanta, Dasol, Agno
ARD	Assistant Regional Director
AT	Agricultural Technician
BFAR	Bureau of Fisheries and Aquatic Resources
BHRROA	Bolinao Hotel, Resort & Restaurant Owners Association
BIDA	Burgos, Infanta, Dasol, Agno
BOMEFFI	Bolinao Marine Ecological Fund Foundation, Inc.
BSF	Bolinao School of Fisheries
CBHS	Cape Bolinao High School
CENRO	Community Environment and Natural Resources Office
CoE	Center of Excellence
CRM	Coastal Resources Management
CRMO	Coastal Resource Management Office
CSWCD	College of Social Work and Community Development
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
DOT	Department of Tourism
FARMC	Fisheries & Aquatic Resources Management Council
GEF	Global Environment Facility
KAISA KA	Kaisahan ng mga Samahan Alay sa Kalikasan
LCE	Local Chief Executive
LGI	Local Government Initiative
LGU	Local Government Unit
MAO	Municipal Agricultural Office
MERSys	Marine Emergency Response System
MILGOO	Municipal Interior and Local Government Operations Operation
MFARMC	Municipal Fisheries & Aquatic Resources Management Council
MNTC	Manila North Toll ways Corporation
MOA	Memorandum of Agreement
MPA	Marine Protected Area
MPDC	Municipal Planning Development Coordinator
MPDO	Municipal Planning Development Office
NGO	Non-Government Organization
NPVB	North Philippines Visitor's Bureau
OPAg	Office of the Provincial Agriculturist
PDI	Philippine Daily Inquirer
PENRO	Provincial Environment and Natural Resources Office
PNP	Philippine National Police
PO	Peoples Organization
PSU	Pangasinan State University
SABBAC	Sual, Anda, Bani, Bolinao, Alaminos City
SB	Sangguniang Bayan
SANCEDACO	San Simon-Centro Toma-Dacap Sur-Colayo
TF	Task Force
U.P. MSI	University of the Philippines Marine Science Institute
WPVB	Western Pangasinan Visitors' Bureau

The Coral Reef Targeted Research and Capacity Building for Management Program

The Coral Reef Targeted Research and Capacity Building for Management Program (CRTR) is a leading international coral reefs research initiative that provides a coordinated approach to credible, factual, and scientifically proven knowledge for improved coral reef management. The CRTR Program is a partnership between the Global Environment Facility (GEF), the World Bank, the University of Queensland (Australia), the United States National Oceanic and Atmospheric Administration (NOAA), and approximately 40 research institutes and other third parties around the world, including the Philippines.

The Marine Science Institute

Since its inception in 1974, the Marine Science Institute of the University of the Philippines has generated basic information necessary for optimal and sustained utilization, management and conservation of the marine environment and its resources. With research as its primary function, the Institute offers robust graduate and post graduate degree programs on Marine Biology, Marine Physical Sciences, and Marine Biotechnology. The Bolinao Marine Laboratory of the Institute, located on the northwestern shore of Lingayen Gulf, has facilities for mariculture, field sampling, and diving. In 1994, the Institute was designated the “National Center of Excellence in the Marine Sciences” by Presidential Proclamation No. 518.

The Marine Environment and Resources Foundation

The Marine Environment and Resources Foundation (MERF), Inc. is a duly recognized non-stock and non-profit organization. MERF has administered and implemented grants and projects ranging from research to extension and development work in the areas of oceanography, mariculture, biotechnology, integrated coastal management, marine fisheries management, and marine policy formulation. The creativity and innovation that MERF facilitated has supported and broadened the scientific research and extension work of the Marine Science Institute to socio-ecologically critical areas, such as Pangasinan, Bataan, Oriental Mindoro, Aurora, Cebu, Bohol, Surigao, Palawan, Zamboanga del Sur, Basilan, Tawi-Tawi, and Davao Oriental.

