



Title	Management options to mitigate environmental impact of aquaculture in the Philippines
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Citation	International Symposium on "Sustainability Science on Seafood and Ocean Ecosystem Conservation". 7 November 2009. Hakodate, Japan.
Issue Date	2009-11-07
Doc URL	http://hdl.handle.net/2115/39917
Type	conference presentation
Note	Panel Discussion
File Information	Edpalina.pdf



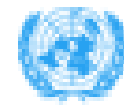
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Management options to mitigate environmental impact of aquaculture in the Philippines

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United Nations University

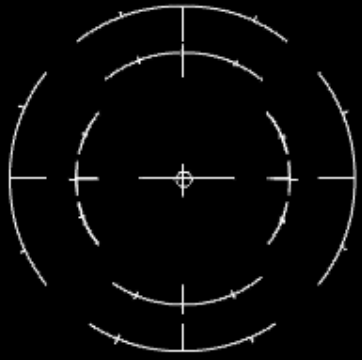
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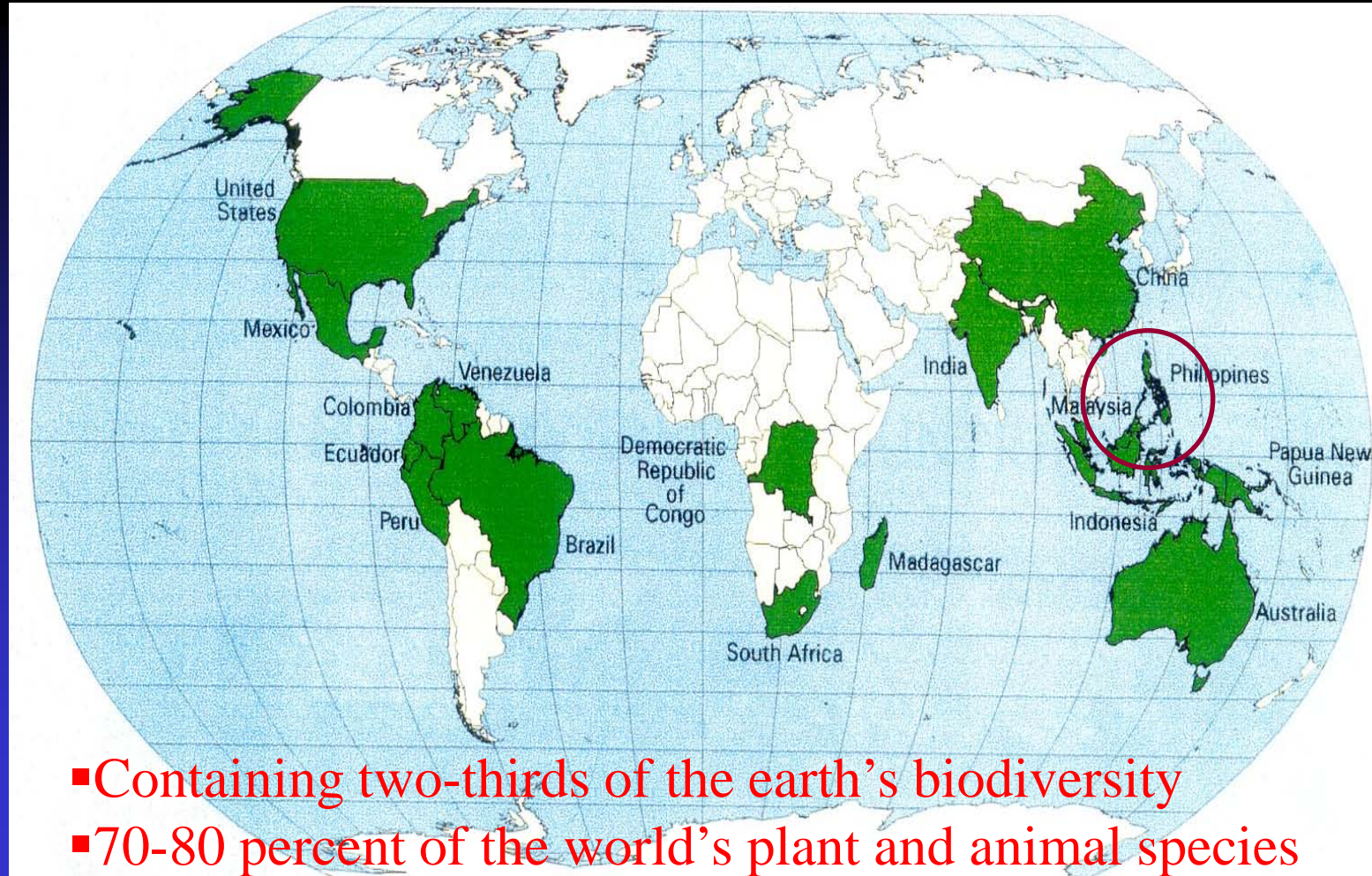
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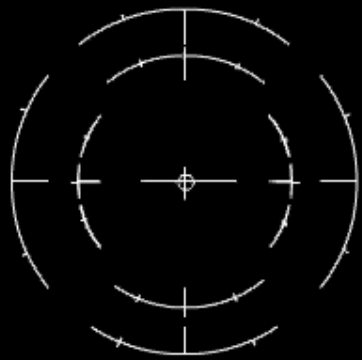
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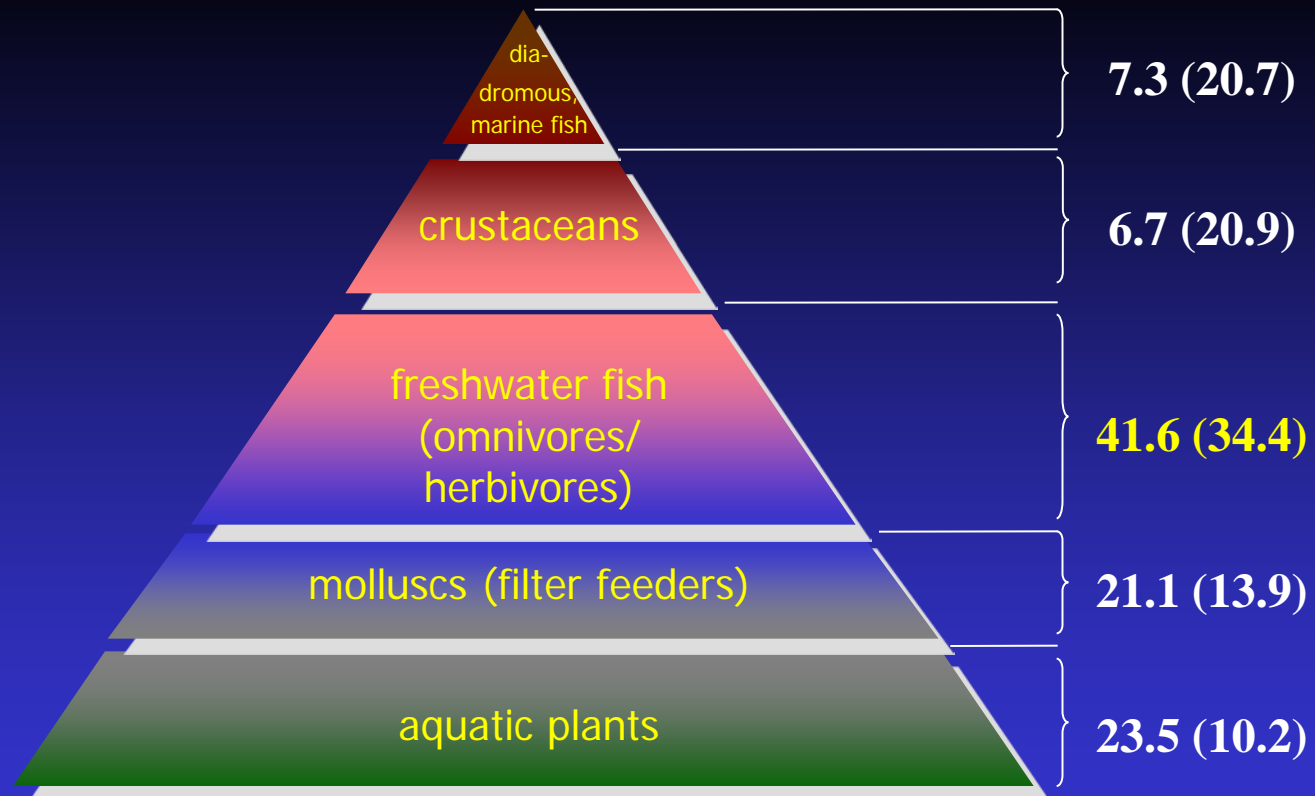


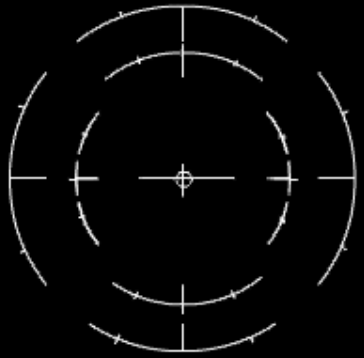
The Philippines: one of 18 megadiversity countries in the world (World Conservation Monitoring Center)



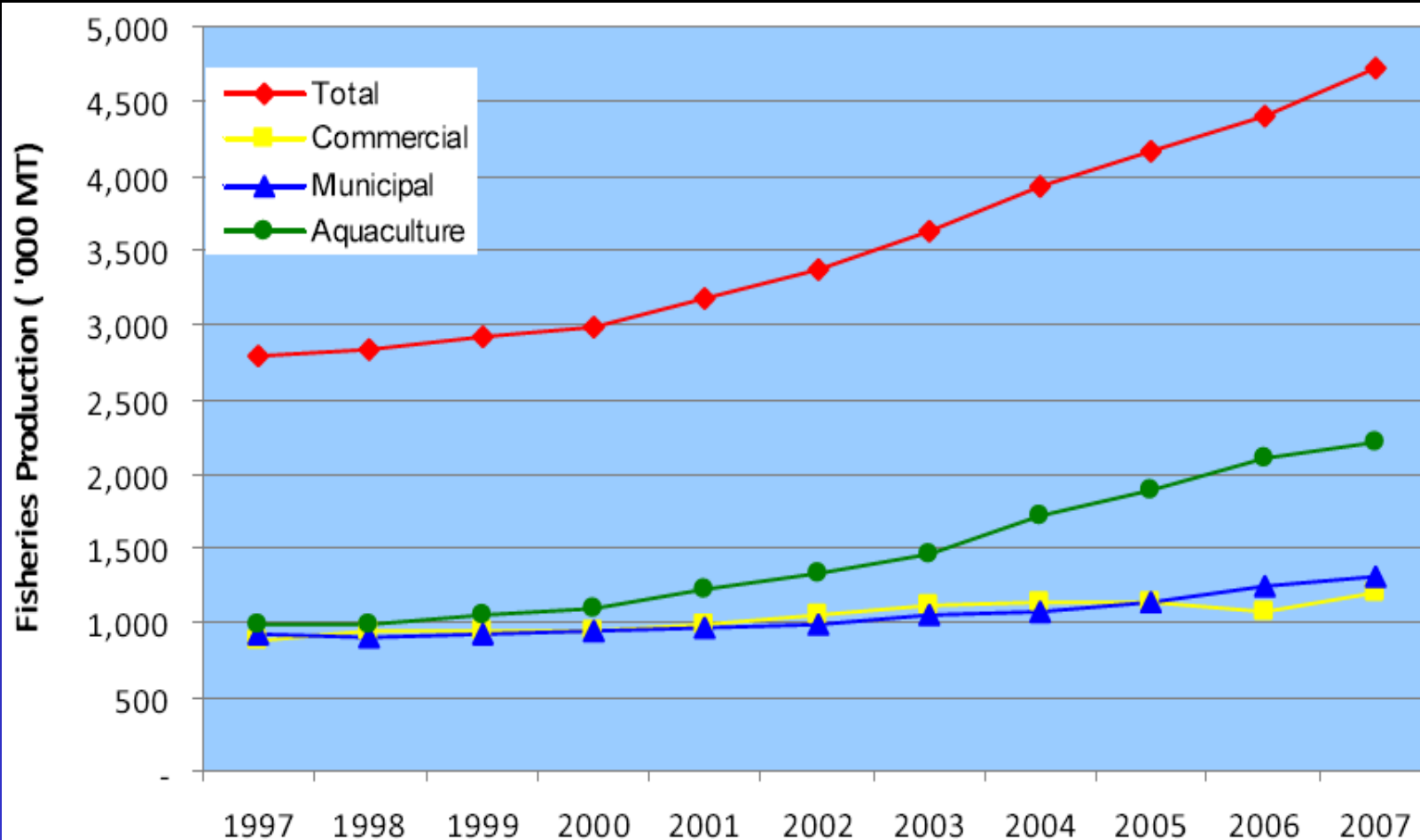


Aquaculture production in Southeast Asia (Source FAO Yearbook 2006)

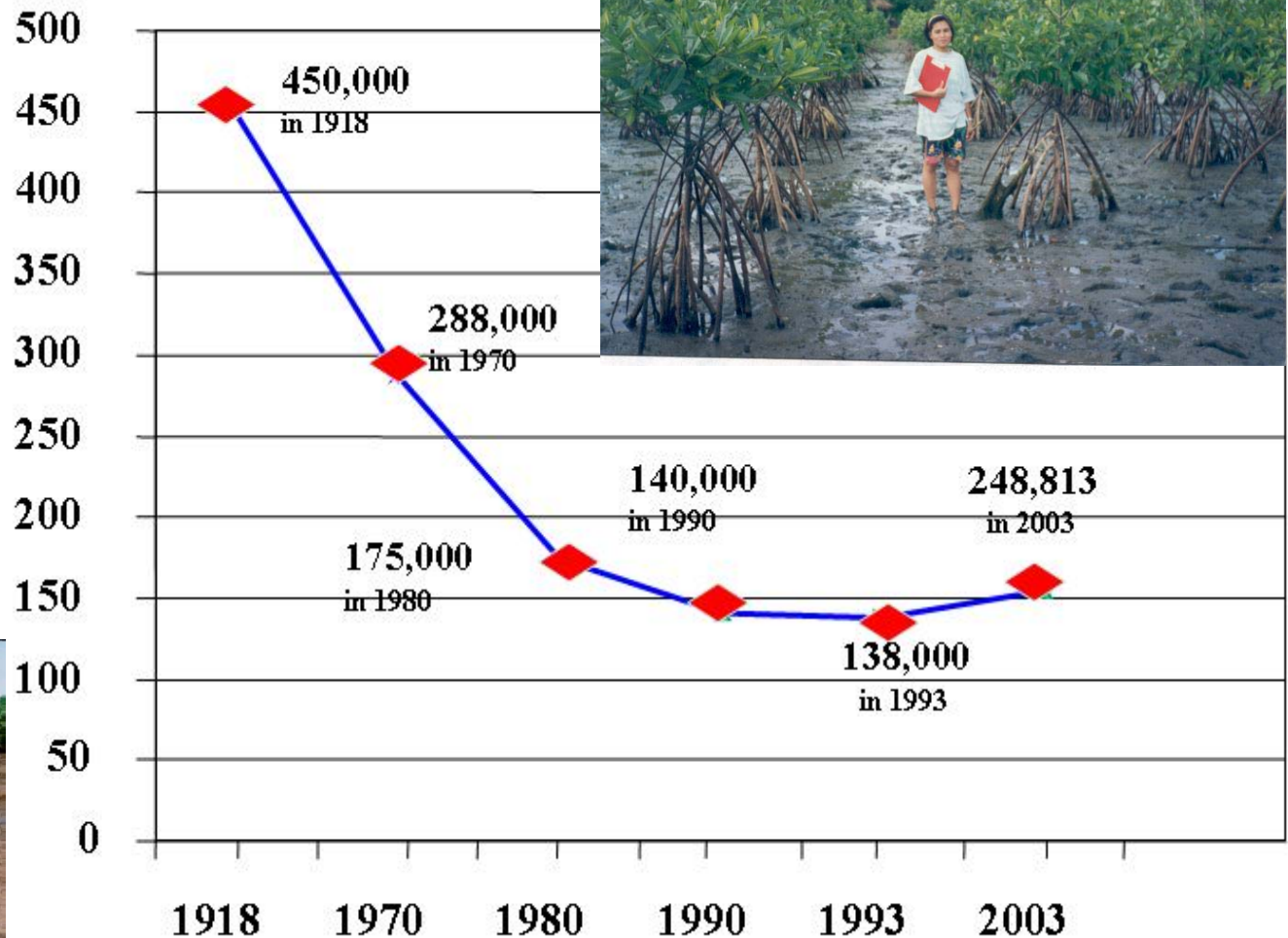
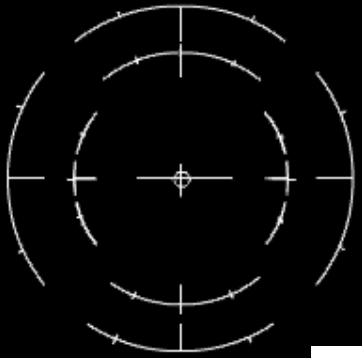


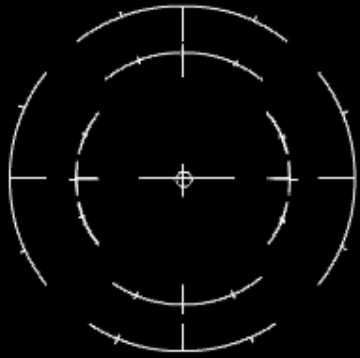


Annual fisheries production trends from 1997 to 2007 (BFAR, 2008)



Forested mangrove areas has decreased greatly in the Philippines (NAMRIA, 2003)





Policies and legislations

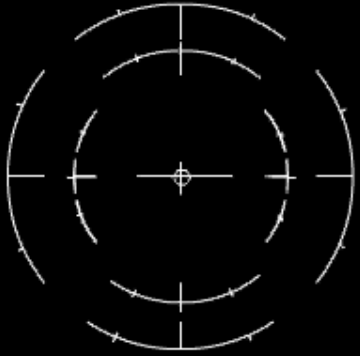


National Integrated Protected Areas System Act of 1992 (Republic Act No. 7586).
An Act providing for the establishment and management, of National Integrated Protected Areas System

Agriculture and Fisheries Modernization Act (No. 8435).
An Act prescribing urgent related measures to modernize the agriculture and fisheries sectors

Philippine Fisheries Code of 1998 (Republic Act No. 8550).
An Act providing for the development, management, and conservation of fisheries and aquatic resources, integrating all laws pertinent thereto, and for other purposes

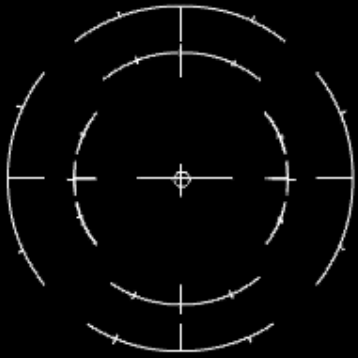




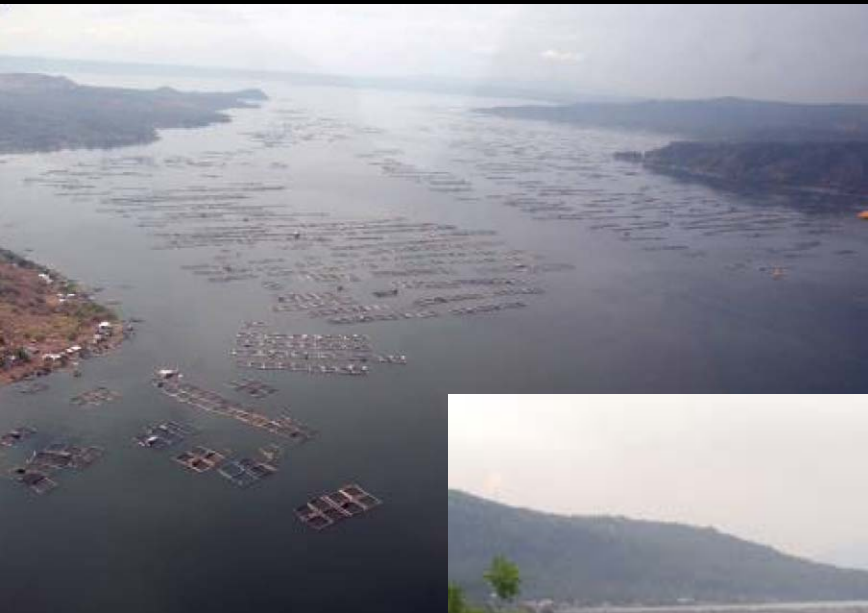
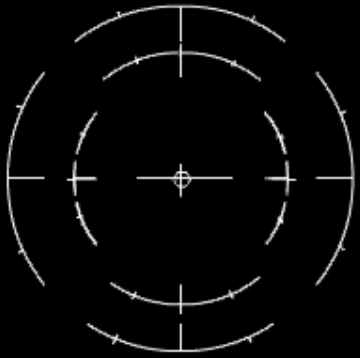
Environmental impacts of aquaculture (Primavera, 2009)



- 1) Habitat (mangroves) loss/modification (mangrove clearing; establishment of pens and cages above seagrass beds and coral reefs)
- 2) Introduction of exotic species and unintended entry of pathogens
- 3) Spread of pests and diseases
- 4) Salinization of soil and water
- 5) Dependence on fishmeal
- 6) Misuse of antibiotics and chemicals
- 7) Loss of bycatch of wild fry/broodstock
- 8) Pollution/eutrophication of receiving waters

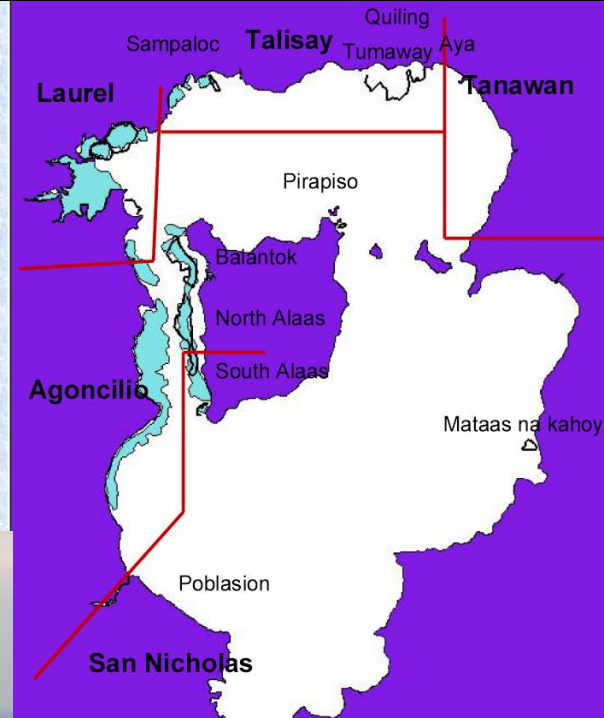


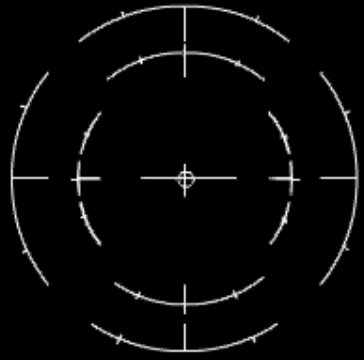
Indiscriminate installation and operation of fish cages in Taal Lake



Freshwater Taal Lake

Berlnayam
Leviste
Balakilong
Gulod
Buso buso
Banaga
Bili binwang
Manalao
Berlnayam
Subic Ilaya



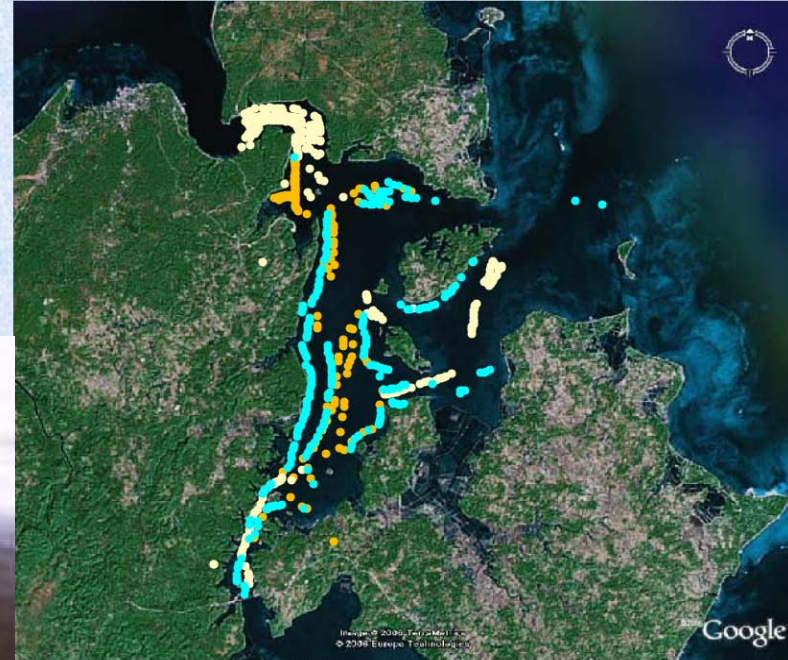


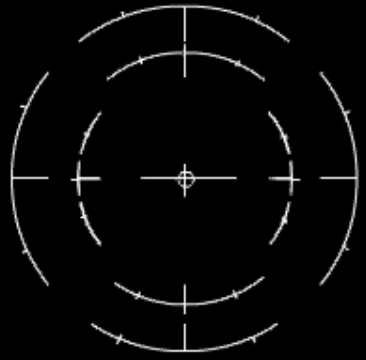
Inshore bays in Bolinao and Anda



Marine Bolinao

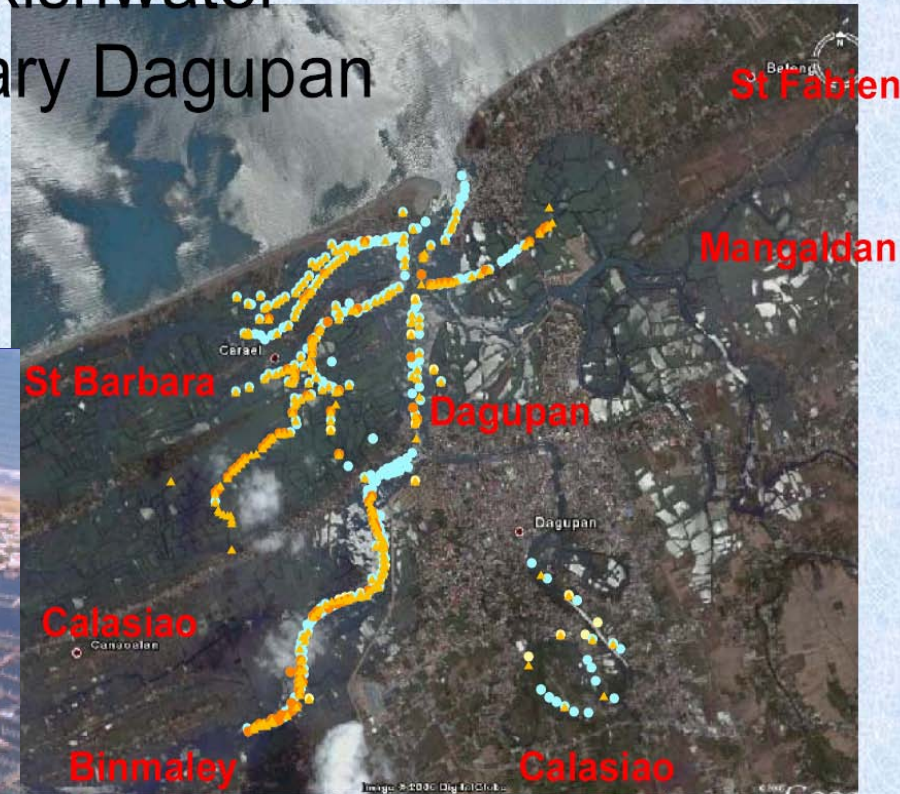
White – cages
Blue – pens
Orange - mussels

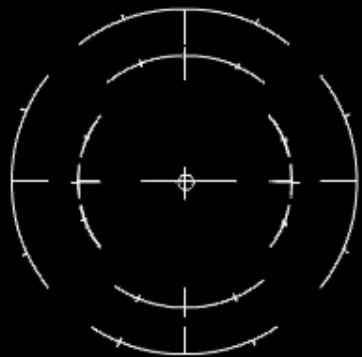




Estuary and river systems in Dagupan

Brackishwater
estuary Dagupan





Ecosystem based approach to aquaculture management



The ecosystem approach is a strategy for the integrated approach of management of land, water and living resources.

Objectives

conservation



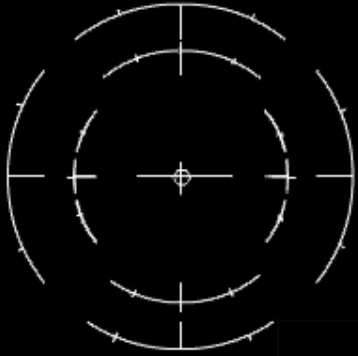
Fair and equitable
Sharing of benefits &
use of nat. res.

Sustainable use

Goals

- Maintain a healthy and sustainability ecosystem
- Provide profitable and sustainable livelihoods
- Production within safe carrying capacity

Management model for Taal Lake



Management Model: Taal Lake as NIPAS Area

Research Development and Extension
Problem-based, Site-specific and Balanced Fish Production for Food Security;
And Conservation for Resource Sustainability

Integrated
and Holistic

PAMB-led, DENR, LGU (FARMC),
Private Sector, and other stakeholders

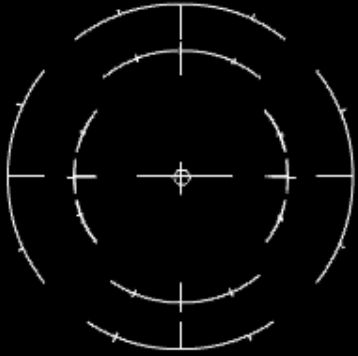
Multi-disciplinary and
multisectoral

Taal Volcano Protected Landscape (TVPL) Management Plan

Components: water quality and health of the lake; Aquatic living natural resources, Terrestrial watershed components, Recreational and cultural resources, Disaster preparedness and management, Population, Socio-economics, Research program and knowledge center

Sustainable Management of Taal Lake

Considerations for ecosystem based approach to aquaculture management

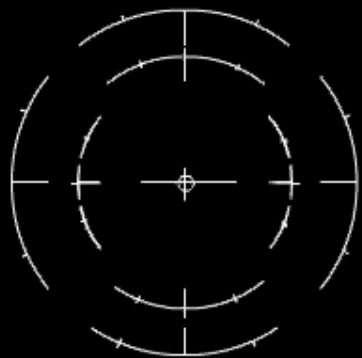


Scientific Support

- Estimate carrying capacity of the ecosystem for aquaculture based on science
- Regular monitoring of impacts; etc

Mgt. Plan formulation

- Develop an integrated plan development that takes aquaculture into consideration
- Develop a frame work of planning and management at all levels of the community
- zoning of areas for fisheries and aquaculture, including protected areas
- authorized fishing and aquaculture activities within carrying capacity



Thank You





Thank you