

5.4 Participant group presentations

Group Presentations - Conceptual diagrams to illustrate good and poor management practices

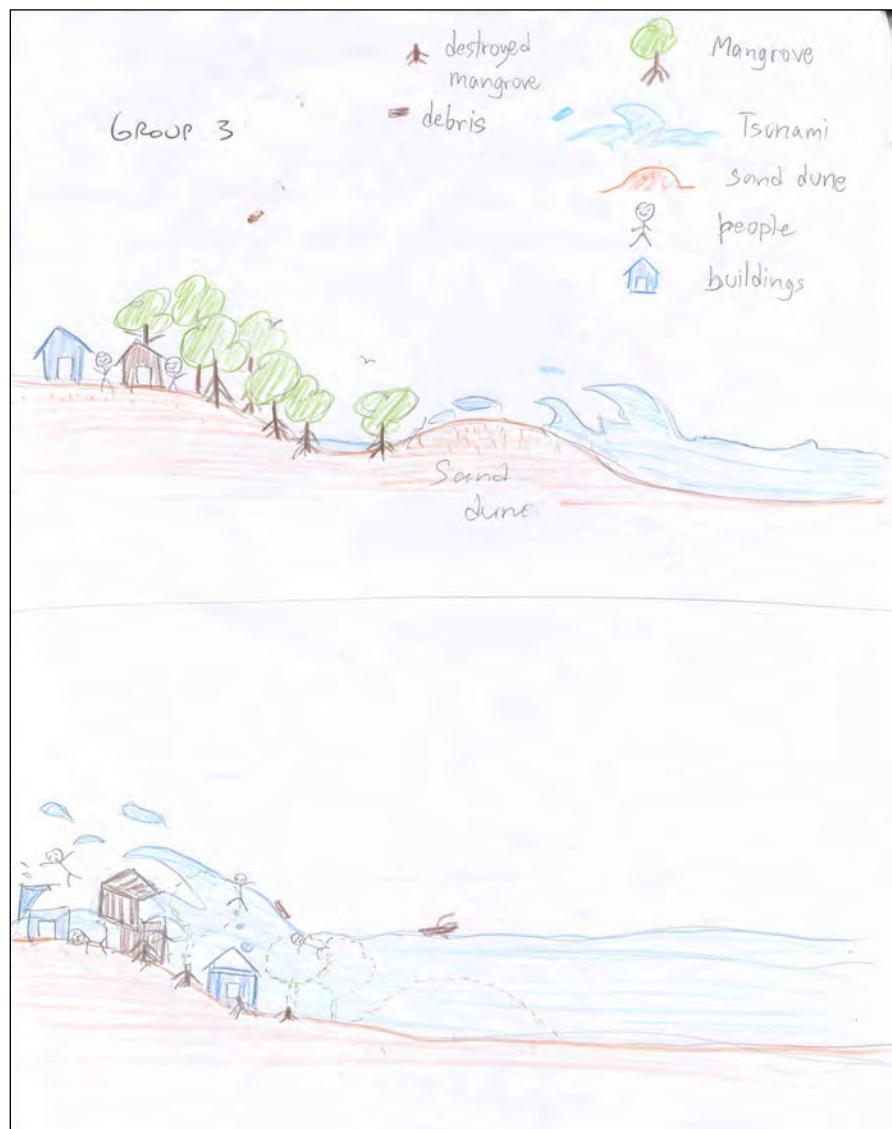
Group 1



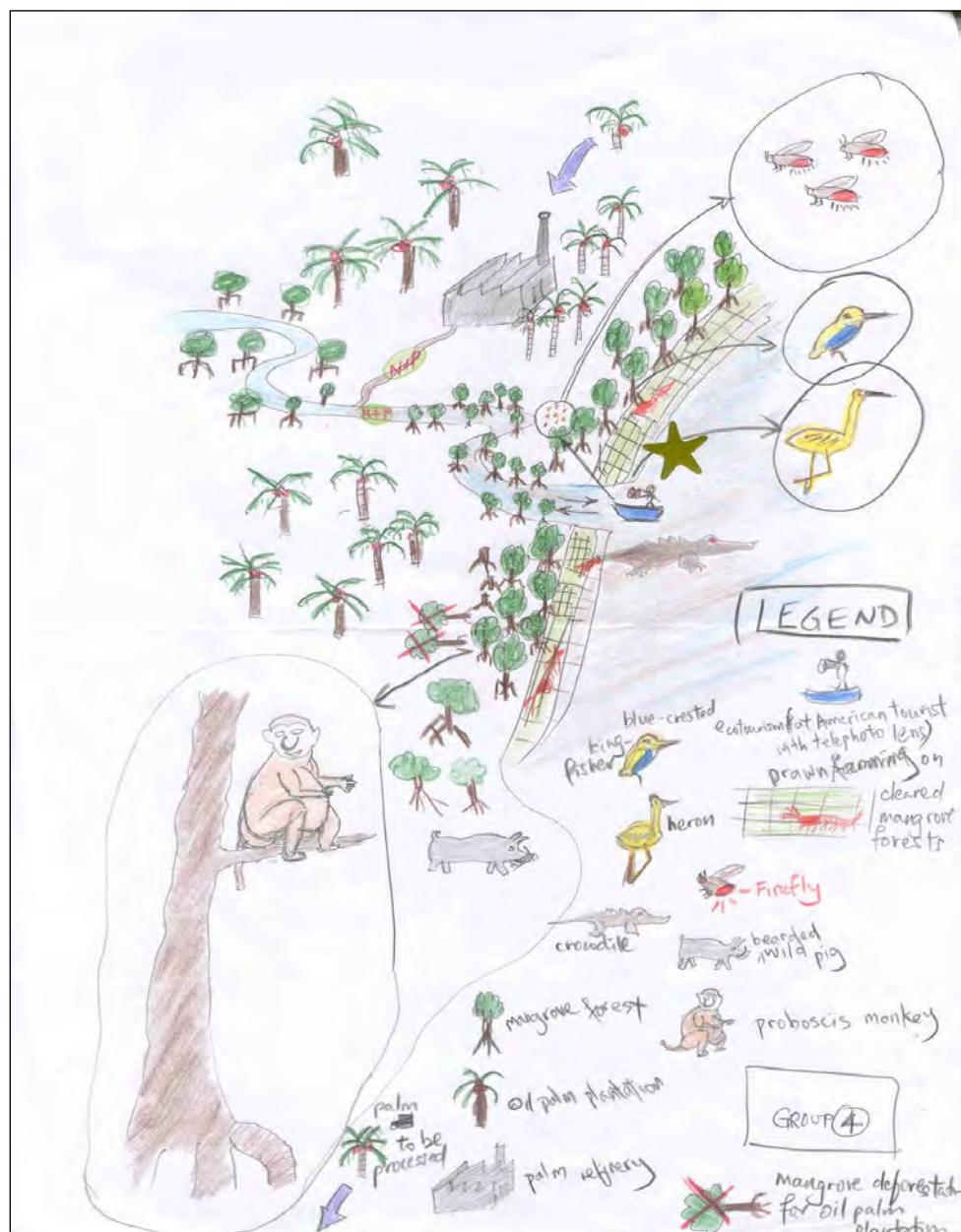
Group 2



Group 3



Group 4



Group 5

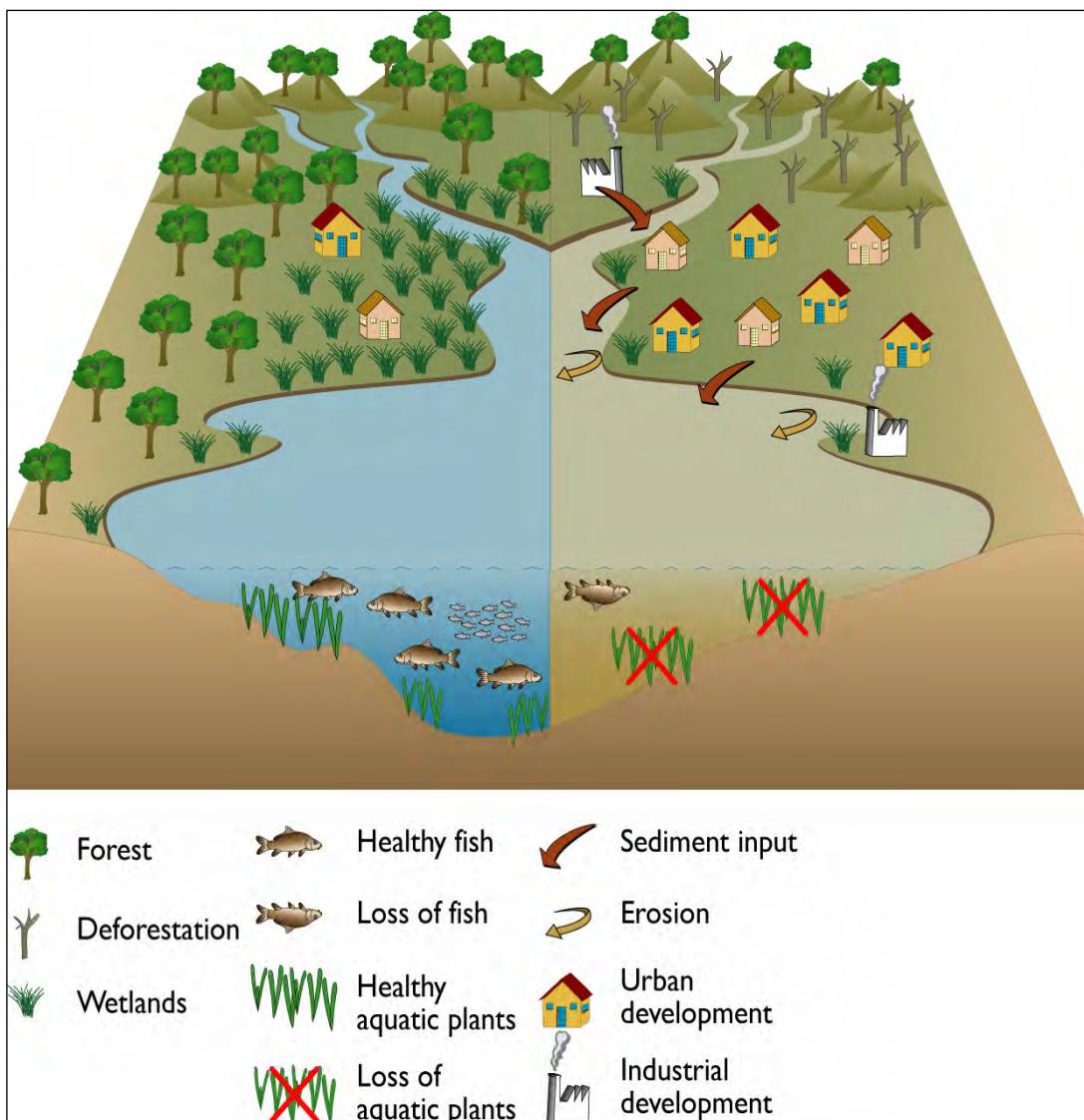


Group 6

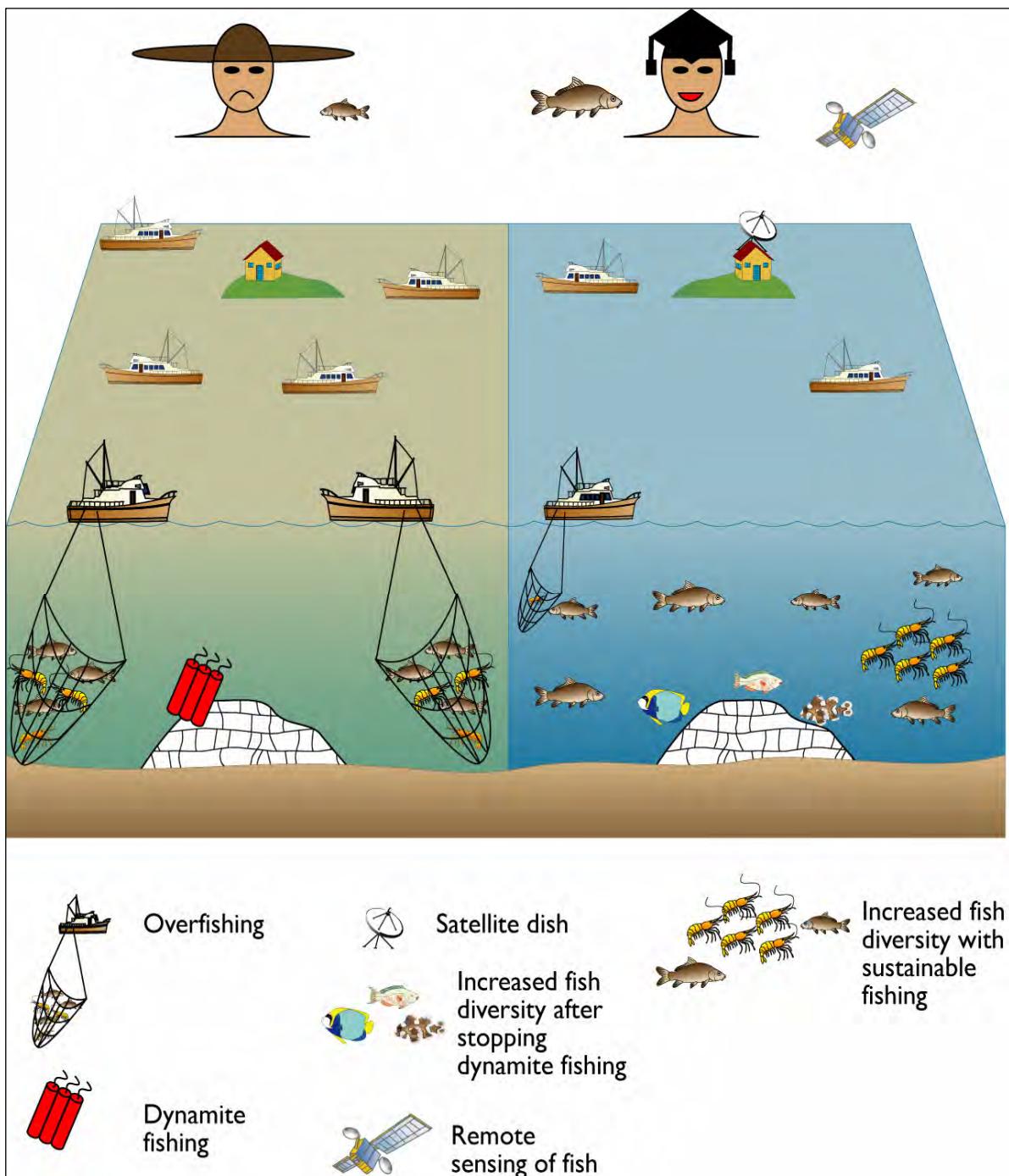


Conceptual diagrams transferred into Adobe Illustrator

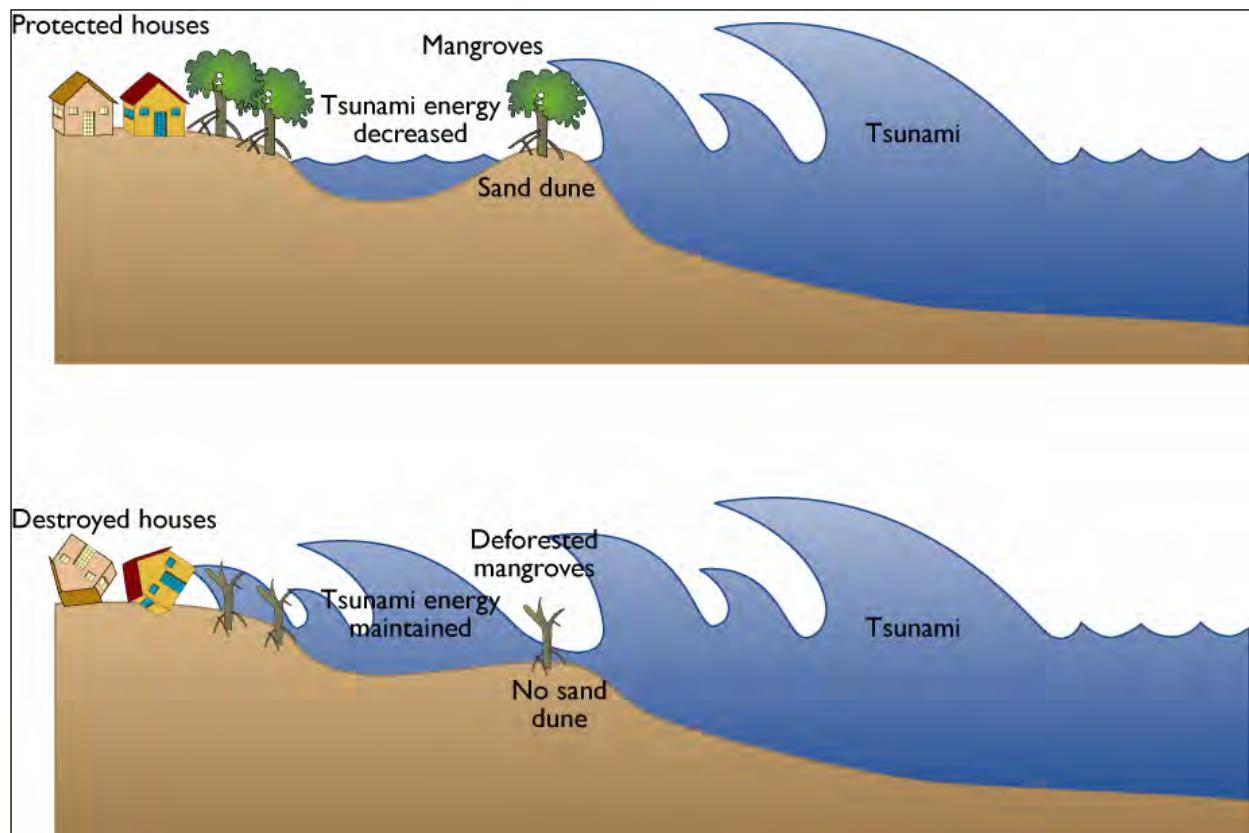
Group 1



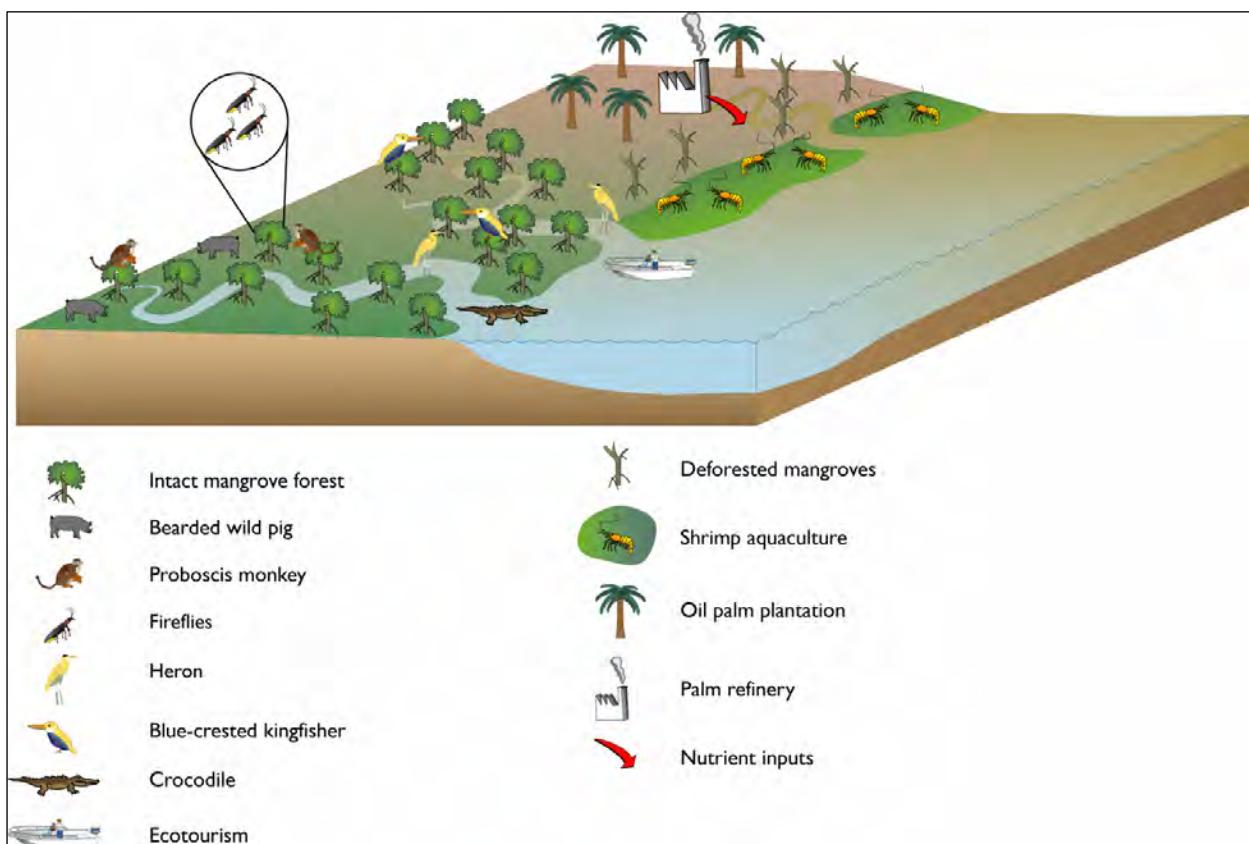
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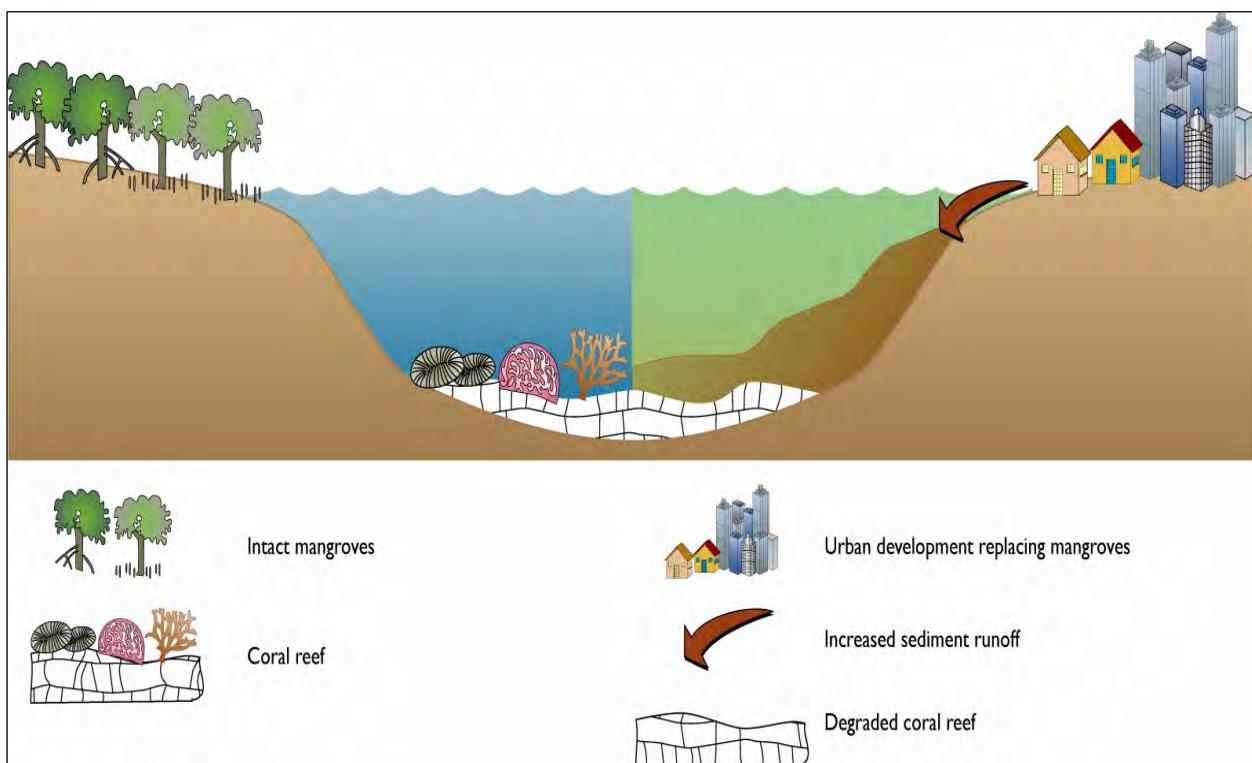
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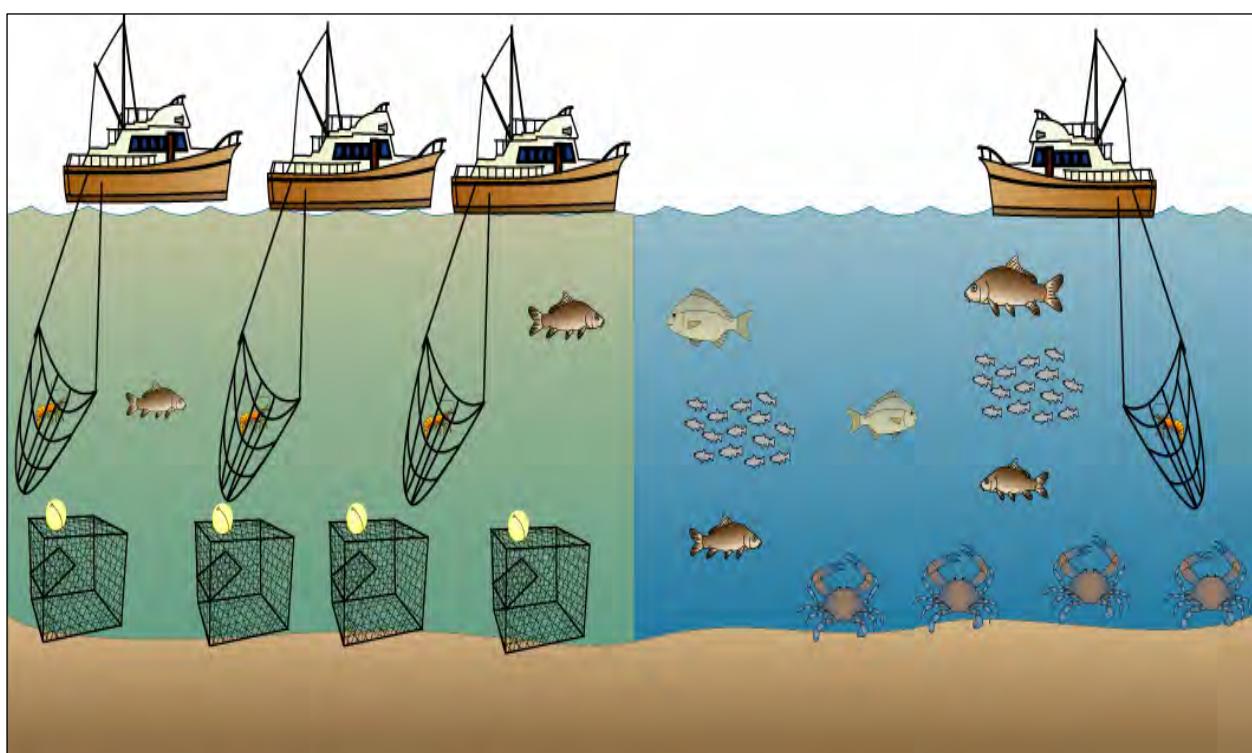
Group 4



Group 5



Group 6



Presentation by PowerPoint

Group 1



MARYLAND COASTAL BAYS AT RISK: THE NEED FOR MONITORING

Bamroongsak Chatananthawej
Beverly Goh
Martin Le Tissier
Richard Cooper
Roselle Borja
Zarinah Waheed



Outline

- History
- Threats - population growth
- Impacts
- Consequences
- Monitoring needs
- Benefits of monitoring

History

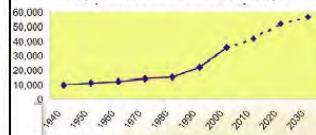


- Major activities over 5 decades
 - Dredging
 - Land reclamation
 - Settlement development
 - Tourist development

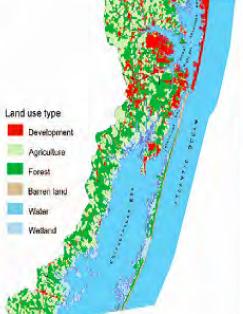
Threats

- Population growth
- Urban development

Population in the Coastal Bays



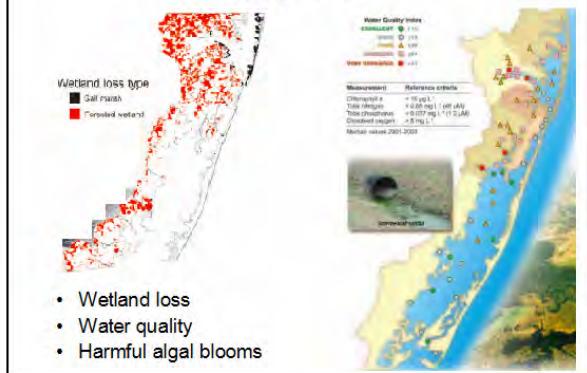
Population has steadily increased and is expected to double again by 2020



Land use type

- Development
- Agriculture
- Forest
- Barren land
- Water
- Wetland

Impacts



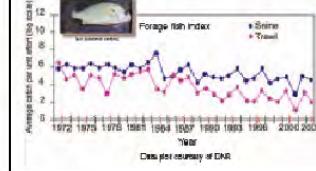
- Wetland loss
- Water quality
- Harmful algal blooms

Consequences



- Fish kills
- ↓ hard clam densities
- ↓ forage fish index

Forage fish index



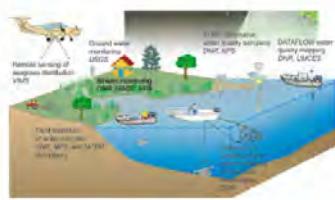
Days per category of CTD

Year

Monitoring Needs

Pollutant inputs, water quality, habitat and living resources

- Multi-agency
- Expensive



Benefits of Monitoring



It's a vote winner!



Community stewardship of the environment

Acknowledgements



Group 2

Water Quality Management for Newport Bay

Joint collaborative Project by
 Vangie, University of the Philippines
 Kim, University of Vietnam
 Krish, University of Madras, India
 Yukio, University of Tokyo
 Baban, National Institute of Oceanography, India

Marshall Creek in Newport Bay

Outline

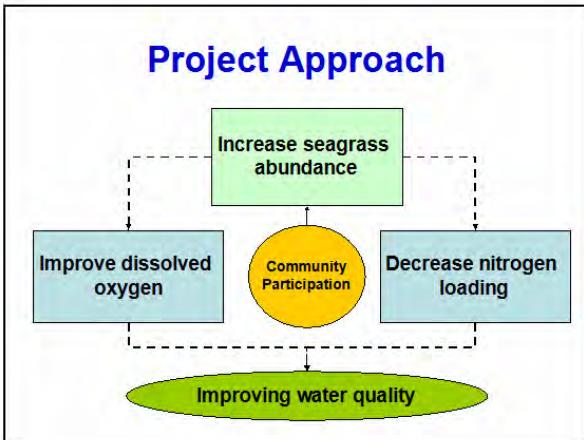
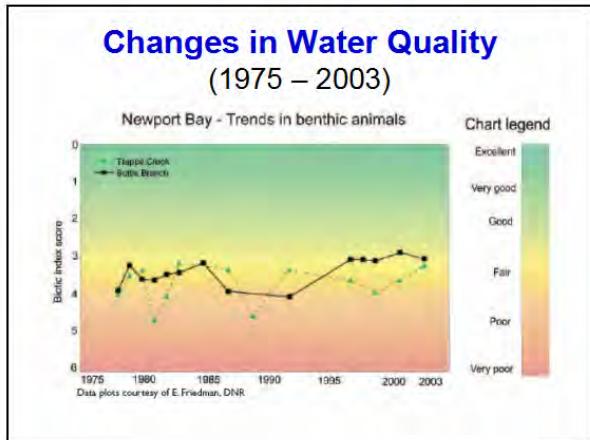
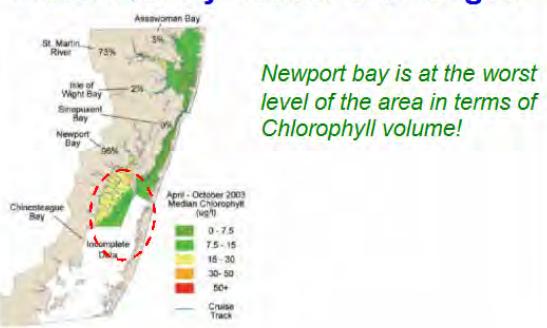
- Study area - introduction
- Research problem
- Water quality issues / problems
- Proposed approach
- Project work plan
- Important deliverables
- Budget estimate



Newport Bay

- Deterioration of water quality
- Poor flushing of discharges
- High concentration of sediments toxicity
- Reduced fish catches

Water Quality Seasonal Changes



Work Plan

ACTIVITIES	First Year		Second Year	
	I	II	I	II
Field observations	■			
Community participation		■		
Improving habitats			■	
Monitoring				■



Important Deliverables

- Scientific data generation
- Community empowerment
- Restoration of habitats
- Improving fishery potential
- Generation of employment

Budget

• Field observations	- 10,000 US\$
• Stakeholders involvement	- 10,000
• Habitats restoration	- 20,000
• Monitoring / management	- 15,000
»TOTAL	
55,000 US\$	

Thank you for
saving our
future!



Group 3

Help! Maryland bays in Danger

Group 3

Janaka	Srilanka
Longdy	Cambodia
Sayeed	Bangladesh
Samina	Pakistan
Pitiwong	Thailand

OUTLINE

- Update the status of the Maryland Bay
- Introduction to the area
- Identify problems
- Levels of degradation
- Parameters selected for study
- Conclusions
- Recommendations

Location Map Maryland Bay

Estuarine condition with wide range of aquatic life.

PROBLEMS

- Intensive development
- Nutrient level
- Sediment
- Anthropogenic activities

PARAMETERS used for study

Three health indicators

- Water quality
- Living resources
- Habitat

PARAMETERS used for study

Water quality

- Water quality index
- Brown tide organism
- Macro algae

PARAMETERS used for study

Living resources

- Benthic index
- Hard clam density
- Sediment toxicity

PARAMETERS used for study

Habitat

- Seagrass area
- Wetland area
- Natural shoreline

Management objectives:
Human suitable fisheries and seagrass habitat
Indicator 1: Water quality index > 0.6

Measurement
Chlorophyll-a
Total nitrogen
Phosphate
Dissolved oxygen
Water volume 2001-2003

Reference criteria
Chlorophyll-a
Total nitrogen
Phosphate
Dissolved oxygen

$\geq 10 \text{ mg L}^{-1}$

$> 0.6 \text{ mg L}^{-1}$ (48 µM)

$> 0.05 \text{ mg L}^{-1}$ (7.2 µM)

$> 1 \text{ mg L}^{-1}$

Other sites in marine parks

Water Quality

Water quality index

Decrease in water quality index

Indicator: Exceedance
of brown tide category
one (occurrence of category
two or three blooms)

Brown tide distribution
Average peak concentrations
1999-2003

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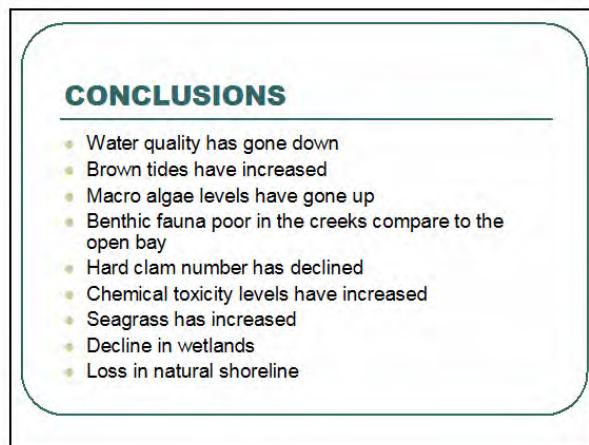
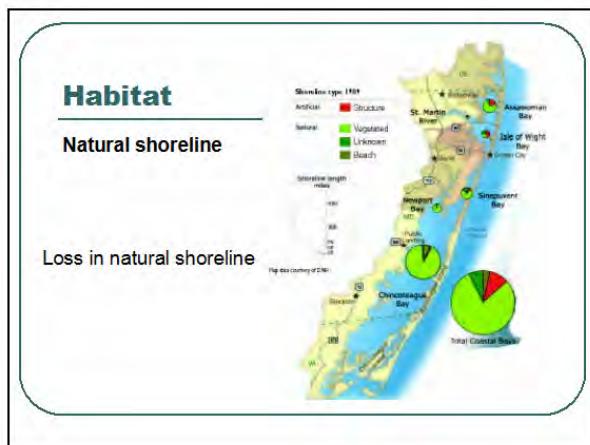
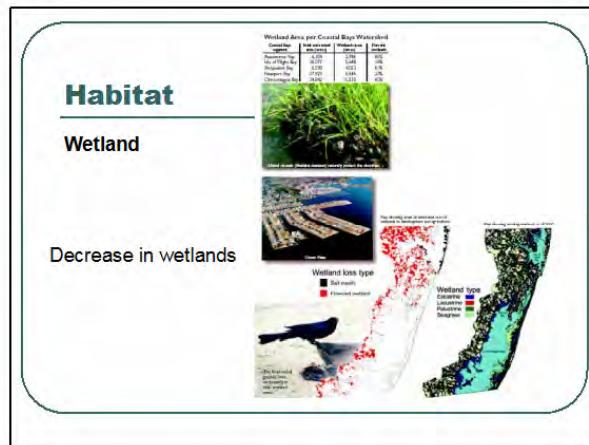
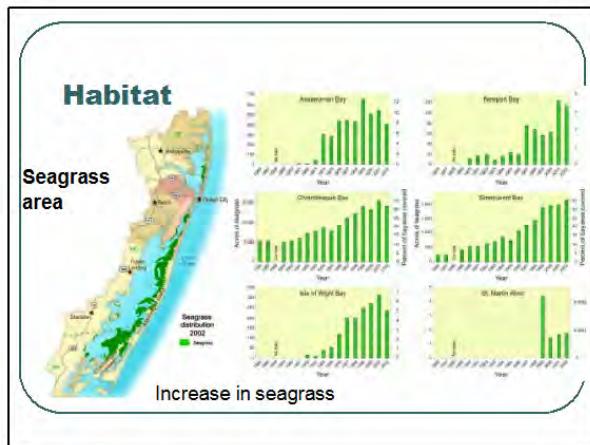
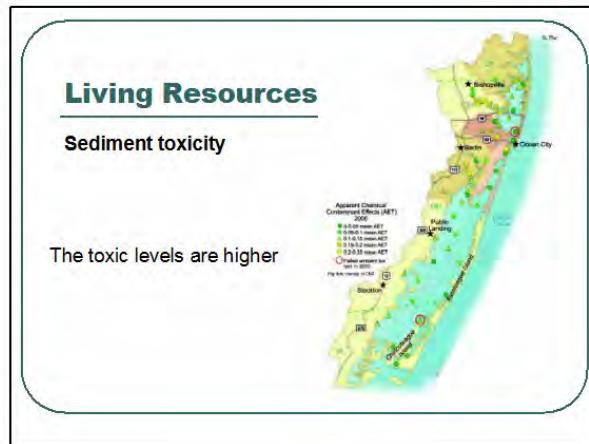
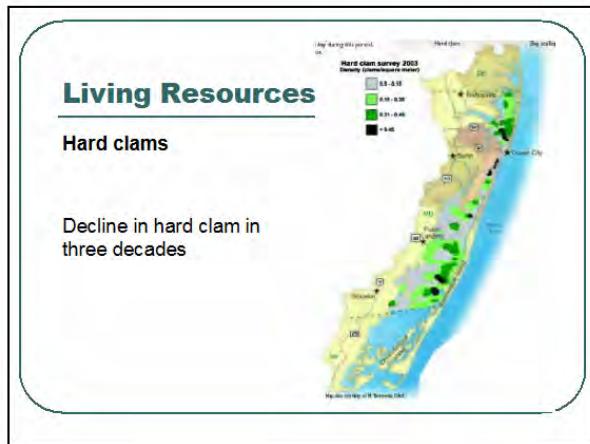
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RECOMMENDATIONS

- Continue present monitoring program
- Continue mitigating measures for the recovery of the health of the bay

Group 4

Good Management Approaches to Combat Harmful Algae Blooms

Aysha Akhtar Institute of Marine Sciences, Chittagong University, Bangladesh
Bhathiya Kekukandala IUCN Sri Lanka Office, Colombo, Sri Lanka
Pich Sereywath Department of Fishery, Cambodia
Suraj Patnaik National Institute of Oceanography, India
Susanna Nurdjaman Institute of Technology, Bandung, Indonesia
Tan Aik Ling Centre for Research in Pedagogy and Practice, National Institute of Education, Singapore

Group 4

Agenda

- Background
- Effects of Harmful Algae Blooms
- Recommendations
- Conclusions
- Acknowledgement

Group 4

BACKGROUND

Potentially Harmful Algae Species



Group 4

Current Status

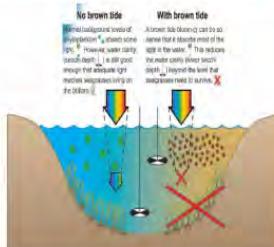
- 5% of phytoplankton species identified as potential HAB species in the Maryland coastal bays.
- Presence of these HAB species is most abundant in the St Martin river and Newport bay.
- Brown tide (*Aureococcus anophagefferens*) has been the most prolific HAB species.

Group 4

EFFECTS

On Aquatic Life

- Produce toxins that affect aquatic life.
- Leads to oxygen depletion.
- Potential negative impact on seagrass distribution and growth.



Group 4

EFFECTS (con't)

On Economic Loss

- Decreasing recreational fishing.
- Decreasing commercial fishing.
- Decreasing tourism.

Group 4

EFFECTS (con't)

Environmental Impacts

1. Change of ecosystem along the coastal bay.
2. Large blooms negatively affecting light and dissolved oxygen.



RECOMMENDATIONS

1. Public Education to increase awareness
 - To produce materials to inform public.
 - Improving communication networks and infrastructure.

Group 4

RECOMMENDATIONS (con't)

2. Regular Monitoring
 - Tracking of presence of HAB species along the costal bays.
 - Frequency and amount of nutrient input to the costal bay.

Group 4

RECOMMENDATIONS (con't)

3. Legislation
 - Amendment of existing regulation concerning human activities along the bay.
 - Proper management in drainage of domestic and industrial wastes.

Group 4

CONCLUSIONS

- It is crucial that there is continued government support in these research activities so that:
1. the quality of life of the residents along the coastal bay can be improved and sustained and
 2. the biodiversity and their habitats can be preserved.
 3. future decision making can be based on scientific evidence.

Group 4

ACKNOWLEDGEMENT

- The members of the research team;
- Sponsors
- Partners to the project
- Governor of Maryland
- Community

Group 4

Group 5

Maryland Coastal Bays Under Threat

Group 5

Nirmal - India

Agus - Indonesia

Pang - Thailand

Abu - Bangladesh

Tai - Thailand

Anouk - Sri Lanka

Outline

- Maryland coastal bays
- History
- Degrading ecosystems
- Fisheries
- Summary
- Conclusions
- Acknowledgements



Maryland's Coastal Bays

- The Coastal Bays are lagoonal estuaries: areas where freshwater mixes with saltwater.
- Landbased activities largely influence these ecosystems.
- Landuse pattern – agriculture, forest and wetlands



History

- Increasing population expected to double by 2020
- Seagrass begin to recover, 1982, attacked by wasting disease in 1930
- Non native green crabs invade coastal Bays (1991)
- 1999 Comprehensive conservation and management Plan
- DNR begins routine water quality monitoring



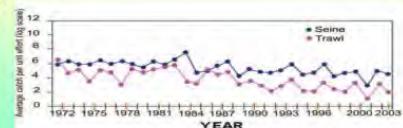
Degrading Ecosystems

- Water Quality trends
- Harmful algal blooms
- Shoreline changes



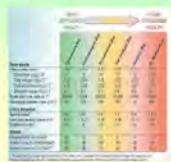
Fisheries

- Fin fish diversity
- The forage fish declining
- Low oxygen events increasing
- Benthic animals are faring poorly



Summary

- In term of overall water quality, living resources, and habitat conditions, the bays were giving the following ranking from best to worst:
Sinepuxent Bay,
Chincoteague Bay,
Assawoman Bay, Isle
of Wight Bay, Newport
Bay and St. Martin



Conclusions

- Protecting fish and wild life though implementation of fishery management Plan.
- Continue working to improve water quality
- Improve recreation and navigation in the Bay
- Enhance community and economic development

Acknowledgements

- Maryland Department. of Environment
- Maryland Department of Agriculture
- Maryland Coastal Bays Programme
- Maryland Dept. of Natural Resources
- Centre for Environmental science,
University of Maryland

Thank you



Group 6

**PLIGHT OF THE MARYLAND COASTAL BAYS:
NEED FOR CONSERVATION & MANAGEMENT**



An initiative of South-South Cooperation

1. Mr. R.A. Sreepada 2. Mr. Kennedy A. Aguol	N.I.O, Goa (India) (www.niog.org) Borneo Marine Research Institute Universiti Malaysia Sabah
3. Ms. L.M. Wickramadara 4. Ms. Suraththa S.	National Science Foundation Coastal Habitats and Resources Management Project (CHARM)
5. Ms. Sukanya S.	Coastal Habitats and Resources Management Project (CHARM)

UNIQUENESS OF THE MARYLAND COASTAL BAYS

- shallow water bodies (< 10 feet deep)
- uniform in depth, found in small coastal watersheds (175 sq. miles) and sandy barrier islands.
- Tidal exchange is limited and river input is low and groundwater is vital source of freshwater inflow.
- Wind blowing across these shallow waters results in very strong mixing and high oxygen levels.
- Human activities along Maryland's Coastal Bays had lead to diffuse sources of nutrients,
- from septic systems, agricultural inputs and wastewater treatment plants.
- Limited water exchange in the Coastal Bays makes them more sensitive to inputs.

Background of Maryland Coastal Bays

Threats: Maryland Coastal Bays

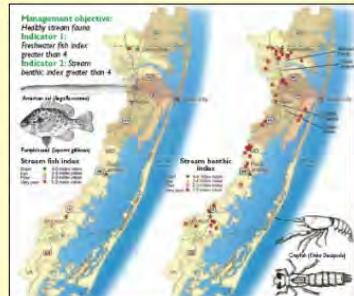
Then **Now**

What could be done?

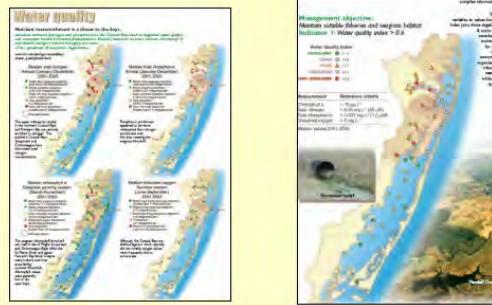
- Working to improve water quality
- Protection of unique flora and fauna
- Improvement of recreational and navigation facilities
- Enhancement of community participation and socio-economic development.

Monitoring Activities

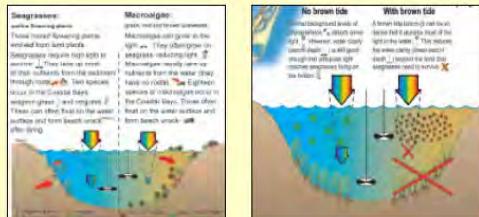
Stream Living Resources



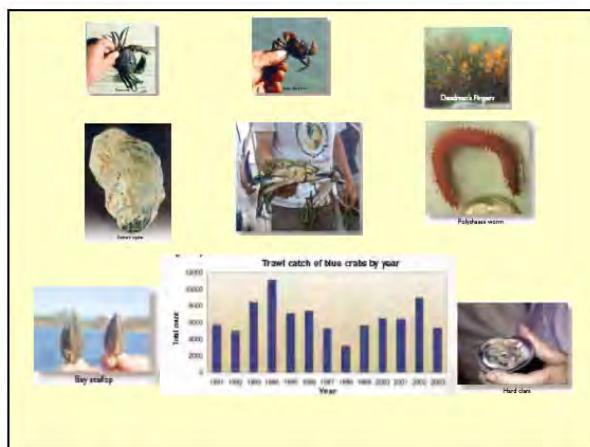
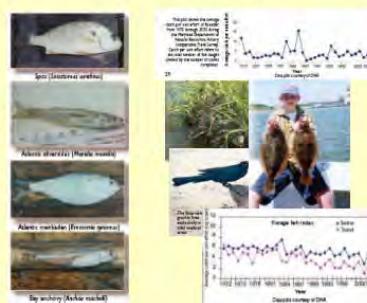
Water Nutrients and Index



Abundance of Micro- & Macro-algae (Brown Tide)



Flora and Fauna



Coastal Bays Summary

Suspension Beach had the highest ranking due to its small, relatively undeveloped watershed and geographic location. The Ocean City area with high values all water quality measures and health indicators.

Chicobog was the most highly ranked watershed and was ranked first in overall ranking. The relatively undeveloped watershed and flushing from both Chicobog and Ocean City indicate the presence of brown dikes and marginal bogs reduced its overall ranking.

Bay
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Ausswanan was
had poor water
quality and low
seagrass area.
development and
in the marshes
composed of
relatively poor
fishing. Grey
Roy's area had
little connectivity.
Little Auswanan
contributed the
to the relatively
poor water
quality.

Overall rating:
3

Wright had more than quality due to from Ocean City, but some development was hampered by the poorest hydrological indicators, resulting in overall mean Herring Creek, Toms Creek, Mandeville Creek, the worst condition. In addition, Little Wright Bay is a stream from St. Marcelline River.

Newport Beach had the most lowest ranking combination of poor water quality with high phytoplankton density known to have reduced clarity, high sediment values and very large areas. Potential development activities in the northern part of the watershed contributed to the low overall rating. Overall results

St. Martin River
had the lowest
ranking due to
of very
high
and
density
mosity
flushing
rate:
of the
the
ring
Floor

Overall ranking:
Very poor

Effective communication using posters Group 1

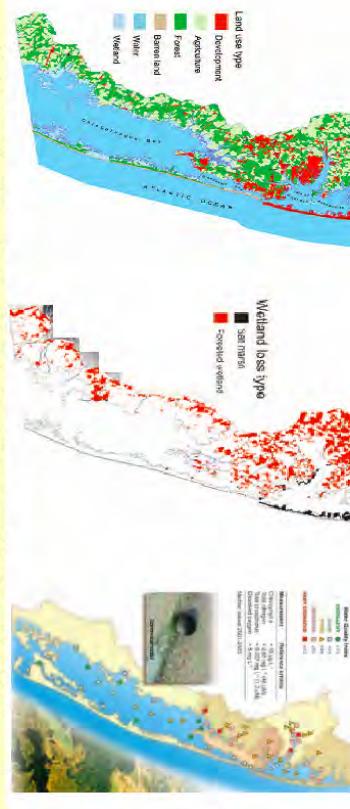
Maryland Coastal Bays at Risk: the Need for Monitoring

Bamroongsak Chatananthawee, Beverly Goh, Martin Le Tissier, Richard Cooper, Roselle Borja, Zainnah Waheed



Maryland Coastal Bays

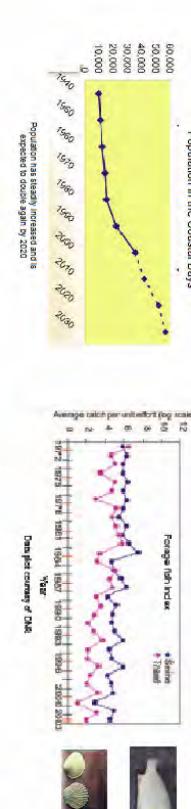
- Maryland's Coastal Bays are estuarine bays, at the interface between fresh and saltwater providing habitat for a wide range of aquatic life.
- They face threats from intense development, nutrients, sediments, and other stresses associated with human activities.
- The Coastal Bays exhibit high nitrate levels in the freshwater reaches of streams, exceeds algae, chronic brown tide blooms, macroalgae blooms, and incidents of low dissolved oxygen.
- The bays support diverse and abundant populations of fish and shellfish; human activities are affecting their numbers.
- Flock (sh), the major prey item for gamefish, have been in steady decline since the 1980s.
- Blue crab populations are fluctuating and are affected by a new parasite causing summer mortality in some areas.
- Oysters, which were historically abundant in the Coastal Bays, remain only as small, relict populations.
- Bay scallops have recently returned after being absent for many decades and are now found throughout the bays, although numbers are low.
- In terms of overall water quality, living resources, and habitat conditions, the bays were given the following ranking from best to worst: Sinepuxent Bay, Chincoteague Bay, Assawoman Bay, Isle of Wight Bay, Newport Bay, and St. Martin's River.
- In response to these changes, dozens of organizations, community groups, and agency partners have implemented a wide range of management activities.
- Fishery management plans, nutrient reduction goals, shoreline restoration, land conservation, and sewage upgrades along with several hundred other initiatives are serving and will serve to improve the condition of the Coastal Bays.
- Human population is expected to climb steadily in the Coastal Bays watershed and the associated impacts of this growth will present future challenges to the health of the bays.
- Maintaining an active and vigorous environmental management program will be essential to preserve this fragile estuary.



Population in the Coastal Bays

Population has steadily increased since 1980, reaching approximately 60,000 by 2020.

Year	Population
1980	~10,000
1985	~12,000
1990	~15,000
1995	~18,000
2000	~20,000
2005	~22,000
2010	~24,000
2015	~26,000
2020	~28,000



Average catch per commercial fisherman

The average catch per commercial fisherman has declined significantly from 1972 to 2003.

Year	Average catch per commercial fisherman
1972	~12
1975	~8
1978	~6
1981	~4
1984	~3
1987	~2
1990	~1.5
1993	~1
1996	~0.8
1999	~0.6
2002	~0.4
2003	~0.3

Population growth and urban development impacts wetland and water quality leading to reduced fish and bivalve abundance.

Community stewardship of the environment.

Acknowledgements

Coastal Bay Summary

Monitoring programs in the Coastal Bays are used to assess the conditions of natural resources and to track changes over time

Estuarine health indicator values

The past several years we have used a variety of monitoring programs to measure the health of the bays. These programs provide the basis for tracking the overall health of the bay regions.

Indicator	Chesapeake Bay	Assawoman Bay	Isle of Wight Bay	Newport Bay	St. Martin's River
Water clarity	3.5	3.3	3.3	3.25	3.2
Dissolved oxygen (mg/L)	7.5	7.5	7.5	7.5	7.5
Total phosphorus (mg/L)	0.020	0.020	0.020	0.020	0.020
Dissolved oxygen (mg/L)	7.5	7.5	7.5	7.5	7.5
Total nitrogen (mg/L)	0.020	0.020	0.020	0.020	0.020
Living resources	3.0	3.0	3.0	3.0	3.0
Bottom sediment	3.0	3.0	3.0	3.0	3.0
Wetland area (ha)	40,000	40,000	40,000	40,000	40,000
Habitat	3.0	3.0	3.0	3.0	3.0
Sediment health (% of target)	20	20	20	20	20
Water quality (% of target)	20	20	20	20	20
Living resources (% of target)	20	20	20	20	20
Wetland area (% of target)	20	20	20	20	20

Overall health

Overall health is determined by combining the results of all monitoring programs. The colors are compared to the maximum health ranges.

Dataflow

Dataflow shows the flow of information from monitoring programs to the USGS, DNR, and DEEP.

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Group 2



Conservation and Management of Maryland Coastal Bays

R.A. Sreepada, Kennedy A. A., L.M. Wickramadara,
Suratthar S. and Sukanya S.



Spot (*Leiostomus xanthurus*)



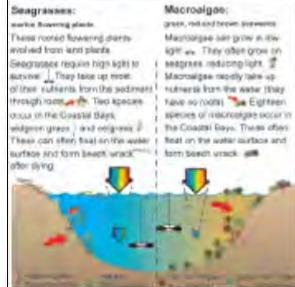
Atlantic silverside (*Menidia menidia*)



Atlantic menhaden (*Brama tyrannus*)



Bay anchovy (*Anchoa mitchilli*)



Abstract

Maryland's Coastal Bays coastal area has differences in water quality ranging from generally degraded conditions within or close to tributaries to better conditions in the more open, well flushed bay regions. The status of coastal bays living resources is mixed that support diverse and abundant populations of fish, shellfish, human activities are affecting their numbers. Although sea grass coverage has leveled off over the past three years, large increases in sea grass area have taken place since the 1980's. Habitat conditions face threats from intense development, nutrients, sediments, and other stresses associated with human activities. Estuarine health indicators (3 water quality, 3 living resources and 3 habitats) were used to compare individual Bay segments. Final rankings indicated the best to worst estuarine health in the following decreasing order: Sinepuxent Bay>Chincoteague Bay>Assawoman Bay>Isle of Wight Bay>Newport Bay>St.Martin Bay.



Weakfish (*Cynoscion regalis*)



Atlantic needlefish (*Strongylura macrura*)



Lookdown (*Selene vomer*)



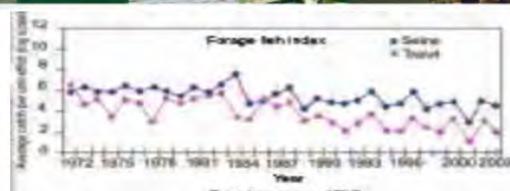
Tautog (*Tautoga onitis*)



Black drum (*Pogonias cromis*)

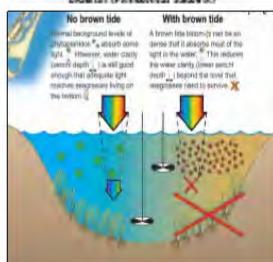


Bluefish (*Pomatomus saltatrix*)



This plot shows the average catch per unit effort of forage fish from 1972 through 2002 during the Maryland Department of Natural Resources' Rotating Index of Abundance (RIA) survey. Catch rates are often referred to as the total number of fish caught divided by the number of creel completed.

19



MARYLAND BAYS IN DANGER

Janaka Sri Lanka, Longdy Cambodia, Sayeed Bangladesh, Samina Pakistan, Pitiwong Thailand

STUDY AREA

ABSTRACT

METHODOLOGY

Three health indicators

- Water quality → Water quality index
Brown tide organism
Macroalgae
- Living resources → Benthic index
Hard clam density
Sediment toxicity
- Habitat → Seagrass area
Wetland area
Natural shoreline

CONCLUSIONS

- Water quality has gone down
- Brown tides have increased
- Macroalgae levels have gone up
- Benthic fauna poor in the creeks compare to the open bay
- Hard clam number has declined
- Chemical toxicity levels have increased
- Seagrass has increased
- Decline in wetlands
- Loss in natural shoreline

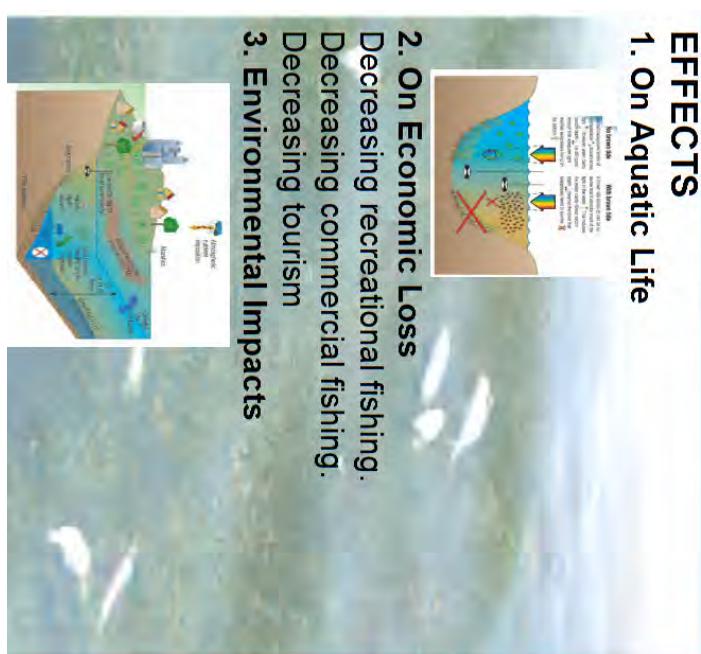


From BLOOM to DOOM!!



Good Management Approaches to Combat Harmful Algae Blooms

Aysha, A., Kekulandala, B., Suraj, P., Susanna, N., Sereywath, P. and Tan, A.L.

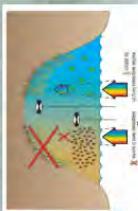


BACKGROUND

- 5% of phytoplankton species identified as potential HAB species in the Maryland coastal bays.
- Presence of these HAB species is most abundant in the St Martin river and Newport bay.
- Brown tide (*Aureococcus anophagefferens*) has been the most prolific HAB species.

EFFECTS

1. On Aquatic Life



2. On Economic Loss

Decreasing recreational fishing.

Decreasing commercial fishing.

Decreasing tourism

3. Environmental Impacts

CONCLUSIONS

It is crucial that there is continued government support in these research activities so that:

- the quality of life of the residents along the coastal bay can be improved and sustained and
- the biodiversity and their habitats can be preserved.
- future decision making can be based on scientific evidence.



RECOMMENDATIONS

Public Education

to increase awareness:

- To produce materials to inform public.
- Improving communication networks and infrastructure.
- Tracking of presence of HAB species along the coastal bays.

Regular Monitoring

- Tracking of presence of HAB species along the coastal bays.

Frequency and amount of nutrient input to the coastal bay.

- Legislation
- Amendment of existing regulation concerning human activities along the bay.

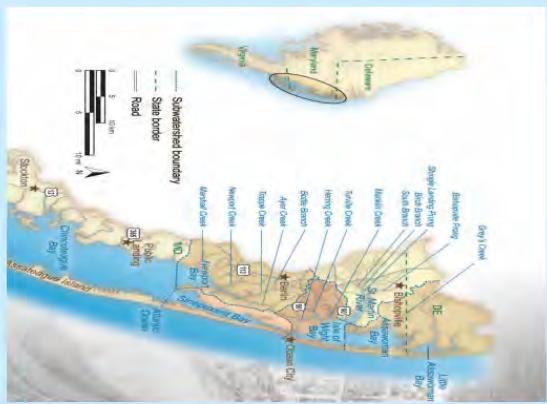
Proper management in drainage

- of domestic and industrial wastes

Group 5

Maryland Bays Ecosystem Under Threat

Anouk, Pang, Tai, Agus, Nirmal, Abu



Issues

- Degrading Ecosystems
- Water Quality Declining
- Harmful algal blooms increasing
- Shoreline habitat conversion
- The forage fish declining
- Low oxygen events increasing
- Benthic animals are faring poorly
- Increasing population expected to double by 2020



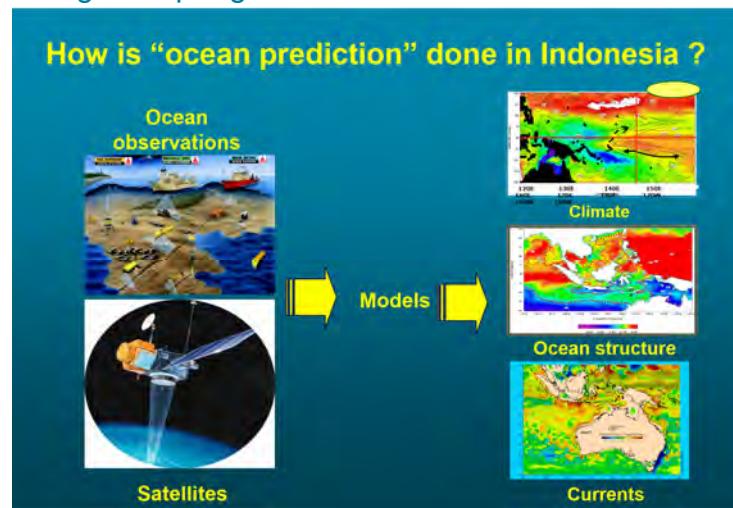
Recommendations

- Develop a management Plan for sustainable management of the ecosystems and the fauna and flora within them.
- Continue working to improve water quality
- Improve recreation and navigation in the Bay
- Enhance community involvement and economic development

In term of overall water quality, living resources, and habitat conditions, the bays were ranked from best to worst as Sinepuxent Bay, Chincoteague Bay, Assawoman Bay, Isle of Wight Bay, Newport Bay and St. Martin

5.5 Individual presentations

Dr.Agus Supangat



Ms. Anouckchika Darini Ilangakoon

MARINE MAMMAL RESEARCH & CONSERVATION IN SRI LANKA

Anouk Ilangakoon

Marine Mammals in Sri Lanka

- Sri Lanka is an island located in the northern Indian Ocean just south east of the Indian sub-continent
- The waters around Sri Lanka have high species diversity in terms of marine mammals, including:
 - 6 species of large whales
 - 21 species of small Cetaceans (dolphins & small whales)
 - 1 Sirenian the dugong

Threats to Marine Mammals

- Fisheries bycatch
- Over fishing and the use of destructive fishing methods
- Direct hunting of the dugong
- Increased shipping traffic leading to mortality of large whales due to accidental ship strikes
- Pollution from land based and aquatic sources:
 - Effect is particularly bad on the dugong and coastal dolphins due to specialized habitat needs
 - Pollution can be both chemical and sound

Research & Conservation

- Research**
 - Data on populations, habitat needs, habitat status
 - Converting data into useable information
- Management**
 - Marine protected areas
 - Fishery regulation
 - Monitoring
- Awareness**
 - Policy makers, Politicians
 - Management agencies and professionals
 - General public

Ms. Aysha Akhtar



Mr. Sayedur Rahman Chowdhury



Mr. Liyanage Don Chaminda Bhathiya Kekulandala

Biodiversity of the Maduganga Mangrove Wetland



IUCN - The World Conservation Union
Research Team -
C.N.B. Bambaradeniya, S.P.Ekanayake,
L.D.C.B.Kekulandala,V.A.P. Samarakrama, R.H.S.S.
Fernando, K.B. Ranawana

Introduction

- Madhuganga is an estuary with a rich mangrove vegetation
- It is located 90km South of Colombo in Galle District.
- Total area is 915 ha.
- About 15 islands accounts for 145 ha.



Vegetation type and Floristic Composition

- 10 major wetland vegetation types and 3 major terrestrial vegetation types.
- Based on the extent of occurrence (ha), mangroves and mangrove mixed swamps are the dominant wetland vegetation type, while perennial crops (cinnamon) is the dominant terrestrial vegetation type.
- These vegetation types harbored a total 303 species of plants including 19 endemics, 8 nationally threatened species and 9 invasive alien species.
- Mangroves harbored the highest number of species, closely followed by mangrove mixed swamps.



Species composition of fauna

Group	Madhuganga	New records ² (Madhuganga)
Fish	70 ¹ (2E, 2T)	41
Amphibians	12 (3E, 4T)	04
Reptiles	31 (7E, 11T)	05
Birds	111 (13 WM, 6E, 7T)	50
Mammals	24 (2E, 6T)	06
Butterflies	50 (5T)	50

It is interesting to note that about 42% of the vertebrate species documented during the present survey are new records to the Maduganga wetland.



Future Work & Recommendations

- Declare Madhuganga wetland as a protected area.
- Conduct a detailed socio- economic and Hydrological survey in Madhuganga.
- Regulate the nature based tourism in Madhuganga.
- Taking firm legal action against practices which degrade Madhuganga.
- Initiate restoration activities to enhance degraded habitats.
- Raise awareness on the importance of the Madhuganga.

Based on our work this was declared as a Ramsar Wetland Last Year



Thank You



CEM101 ENVIRONMENTAL STUDIES AND GLOBAL ISSUES (January 2005)

Instructors:

- Mr Chang Chew Hung (HSSE) Tel x3417
- Ast/P Beverly Goh (NSSE) – Coord x3819
- Ast/P Shawn Lum (NSSE) x3835
- Prof Paul Teng (NSSE) – guest lect x3808
- Mr Teh Tiong Sa (HSSE) x3422
- A/P Teo Khay Chuan (NSSE) x3849
- Ast/P Jean Yong (NSSE) x3816

CEM101 ENVIRONMENTAL STUDIES AND GLOBAL ISSUES

Objectives:

- Understanding of resources and their uses
- Information on current environmental issues from global, regional and local perspectives
- Understanding of scientific, social & policy-related approaches to the environment
- Knowledge to practice – activities for schools

CEM101 ENVIRONMENTAL STUDIES AND GLOBAL ISSUES

Outline:

- Natural resources and uses
- Environmental impacts, causes and consequences
- Environmental management: green and brown issues

Curriculum:

Earth's Natural Resources and Uses
Ecosystems (2h) BG
Cycles and Energy flows (1h) KC
Mineral, Oil and Gas resources (1h) MB
Food production, Biotechnology and Agrology (2h) SL

Natural and Anthropogenic Impacts on the Environment
Human impacts on air, water and land (2h) KC
Population growth and urbanisation (2h) SL
Desertification and land erosion (2h) ZY
Acid rain (1h) JT
Climate Change – Green deposition, global warming, sea level rise (2h) JP
Pollution – air, land and water (2h) KC
Biodiversity depletion (1h) SL
Aliens, ecrectics and introduced species (1h) BG

Environmental Management – green and brown issues
Ecosystem management (2h) SL
International initiatives on Climate Change, El Nino, Global Warming (1) MB
Conservation of Biological Diversity (1) SL
Waste management (2) KC
Water – policies and politics (1) KC
Sustainable Development – what it means (1) SL
International, UK, communities and treaties (1) TS



Conceptual diagram of CEM101 module scope (Work in progress)

Dr.Samina Kidwai

**DO BARNACLES ON BULEJI ROCKY BEACH,
PAKISTAN (ARABIAN SEA) SHOW PREFERENCES?**

Samina Kidwai , Muzammil Ahmed
National Institute of Oceanography, Pakistan
Centre of Excellence in Marine Biology, University of Karachi, Pakistan

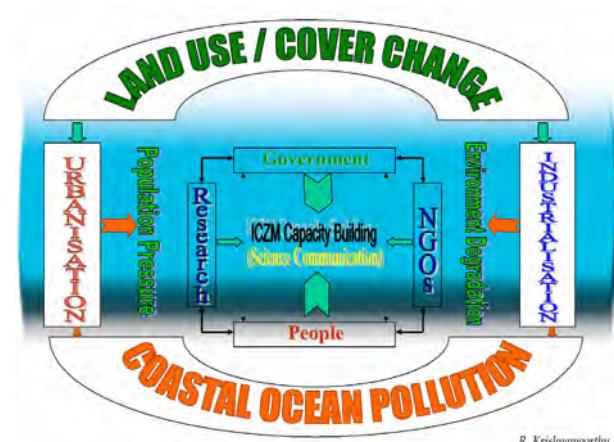
OBJECTIVES <ul style="list-style-type: none"> • Identify the barnacles species on Buleji rocky beach • Their seasonal and spatial distribution on different parts of the beach 	RESULTS 4 species <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;"><i>Balanus amphitrite</i>- all year varied density, preferred low wave action, mid tidal elevation</td> <td style="width: 33%;"><i>Chthamalus malayensis</i>-all year, moderate wave action, mid to high tidal elevation</td> <td style="width: 33%;"><i>Megabalanus tintinnabulum</i>- all year low tidal elevation, strong wave action,</td> </tr> <tr> <td colspan="3"><i>Tetraclita squamosa</i>- all year, mid to low tidal elevation, moderate wave action, some over lap</td> </tr> </table>	<i>Balanus amphitrite</i> - all year varied density, preferred low wave action, mid tidal elevation	<i>Chthamalus malayensis</i> -all year, moderate wave action, mid to high tidal elevation	<i>Megabalanus tintinnabulum</i> - all year low tidal elevation, strong wave action,	<i>Tetraclita squamosa</i> - all year, mid to low tidal elevation, moderate wave action, some over lap		
<i>Balanus amphitrite</i> - all year varied density, preferred low wave action, mid tidal elevation	<i>Chthamalus malayensis</i> -all year, moderate wave action, mid to high tidal elevation	<i>Megabalanus tintinnabulum</i> - all year low tidal elevation, strong wave action,					
<i>Tetraclita squamosa</i> - all year, mid to low tidal elevation, moderate wave action, some over lap							

STUDY AREA rocky beach

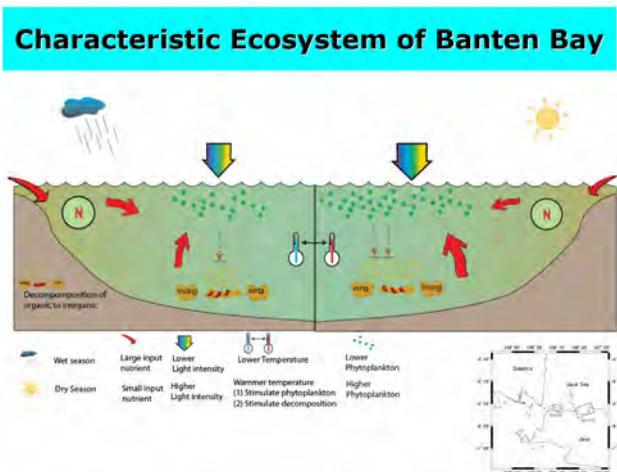
STUDY DUARTION Oct 1993-July1994

METHODOLOGY Line transect and quadrat method
transects – TLA, TLB, TLB

Dr. Ramasamy Krishnamoorthy



Dr. Susanna Nurdjaman



Mr. Va Longdy



INTRODUCTION

- DoF have published many awareness materials: Pamphlets, Poster and School book



Materials

- Pamphlet 1: Orient the people about how to identify the turtles and their biology such as food, habitat, mating and abundance.



Materials (Cont.)

Pamphlet 2:

- Historical beliefs
- Cambodia have been ratified many international conventions and MoU that related to sea turtle
- conservation and protection: CITES, Biodiversity Convention, and ASEAN's MoU.
- The activities to protect and conserve sea turtle



Materials (Cont.)

Poster:

- Human activities that impact the turtles and
- Strategies for management and conservation of the turtles



Materials (Cont.)

- School book:

- Describes the national law and
- Turtles release activities when they are caught



MATERIALS DISTRIBUTION

- All the materials were designed and published and handed over to
 - The local fishery authorities
 - To the primary student at the occasion of sea turtle releasing program
 - To the fishermen who caught the turtle by accident



MATERIALS DISTRIBUTION (cont.)

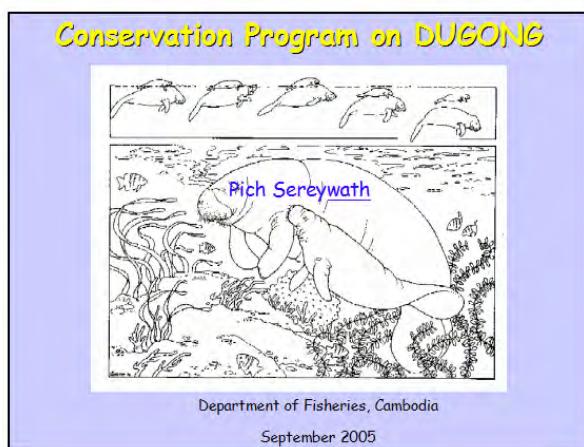
- All the materials were designed and published and handed over to
 - Some fishermen (Fish's day)
 - The school director

Beside these activities

- Monks were also invited to the releasing program to pray for the participants and to give faith to the people who have been ignoring their religion.
- In addition, marine inspectors who play a main role in the control of illegal actions in the marine waters are also joint.



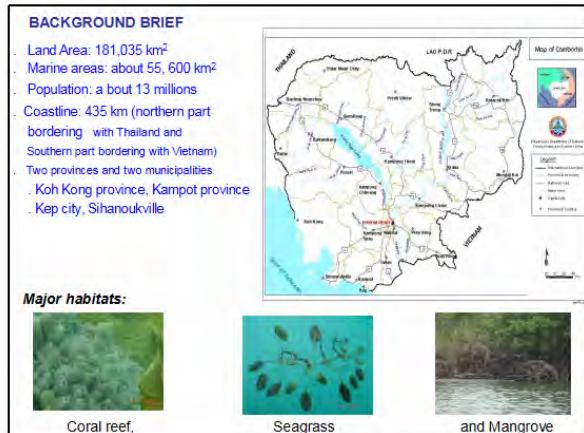
Mr. Pich Sereywath



Conservation Program on DUGONG

OUTLINES

- . Background
- . Why conservation program ?
- . Activities supporting program
- . Needs
- . New concept



Activities supporting program (con't)

- At international level (Membership)

- At national level

- To finalize draft of legislations
- To promote awareness building to all level
- To do more survey
- To open door for all

Needs:

- More research needs to be implemented with supporting from concerned NGOs
- More close cooperation within neighboring countries, other researchers, and research program .
- International level is also urgent needs to help financial support, in term of solving issues, threatening and destructing number of existing Dugong and habitats via

Remember: Dugong and other marine animals conservation is not only for Cambodia, but for all.

Activities supporting program (con't)

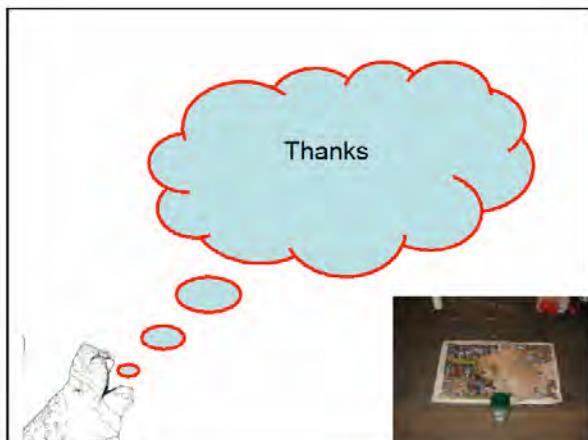
New concept:

Dugong conservation and management

-Decentralized, community-based conservation scheme

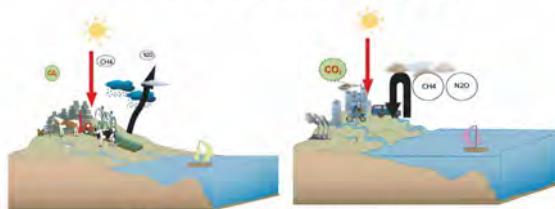


-Collaboration within govt. line agencies and local communities/authorities, na police, etc.

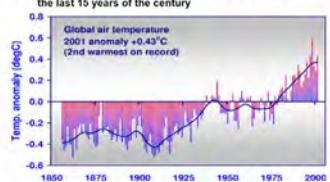


Mr. A.Nirmal Rajkumar

GreenHouse Effect



The 20th century's 10 warmest years have occurred in the last 15 years of the century



Mr. Suraj Kumar Patnaik

National Institute of Oceanography, Goa, India
Suraj Kumar Patnaik National Institute of Oceanography, India

Ocean Resources Exploration Along The Coastal Belt of India :Non Living Resources

Present land resources are decreasing very drastically and have to find an abundance resource base, Ocean proves to be the ultimate one.

Exploration of oil and gas
Gas charged sediments in Indian coastal area
Gas hydrate in EEZ.
Map and Estimation of Nickel,Cobalt-Copper resources in the Central India Ocean Basin.
Manganese Nodules
Sand mining

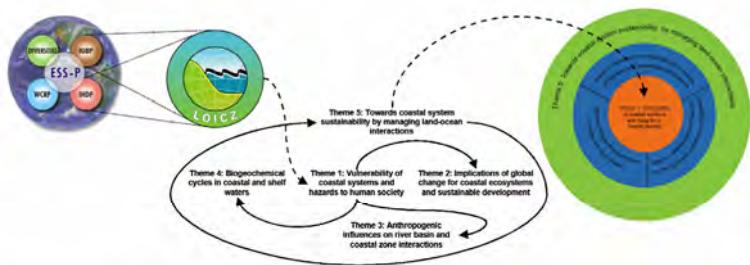
The present EEZ zone of India will increase further when claims are presented under the United Nation Convention of the Law of the sea. More research will find additional resources which can solve the Energy problem. The Science communication is very important for this.



Conclusion

The present EEZ zone of India will increase further when claims are presented under the United Nation Convention of the Law of the sea.
More research will find additional resources which can solve the Energy problem.
The Science communication is very important for this

Dr. Martin Le Tissier



The ESSP, IGBP, IHDP and LOICZ II illustrating the sequential and iterative process of LOICZ II that seeks to develop a programme of science that addresses the linked challenge of confronting and managing the consequences of global environmental change whilst securing a sustainable future.

Ms. Tan Aik Ling

Scientific Literacy: What is at stake?

Tan Aik Ling
Centre for Research in Pedagogy and Practice

What is Scientific Literacy?

```
graph TD; SL[Scientific Literacy] --- WS[Writing Science]; SL --- TS[Talking Science]; SL --- MS[Making science]; SL --- RS[Reading Science]; WS --- GT[Generating Text, Presenting Data]; TS --- SP[Speech patterns, Opportunities]; MS --- SI[Science inquiry methods, Discovery]; RS --- UC[Understanding Context, Understanding vocabulary]
```

Need for Scientific Literacy

```
graph TD; RSL[Reasons for being scientifically literate] --- IP[Intellectual Pursuit]; RSL --- E[Empowerment]; RSL --- KBE[Knowledge based Economy]; RSL --- TS[Tolerant Society]
```

Issues to address

- Ethics
- Awareness
- Global Citizens

Roles and Responsibilities

- Scientists
- Governments
- Curriculum writers
- Schools
- Public

The End

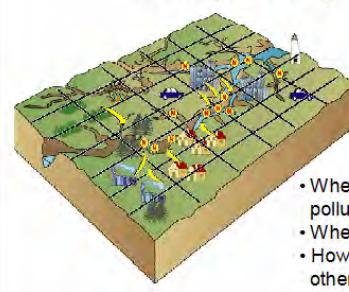
Mr. Yukio Tanaka

Determination of Pollution Loading from Land Based Sources by Using Modeling and GIS

Yukio Tanaka, University of Tokyo, JAPAN

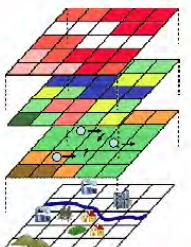
Study Background



- Where is the "Hot Spot" of pollutants discharge?
- Where do the pollutants go?
- How are they related with other factor?

Yukio Tanaka/ 田中 幸夫 (tanaka@start.or.th) 

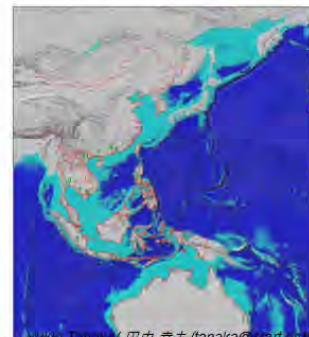
Conceptual Idea



- ↳ And more...
- ↳ Population
- ↳ Land Use
- ↳ Elevation

Yukio Tanaka/ 田中 幸夫 (tanaka@start.or.th) 

Study Area



Yukio Tanaka/ 田中 幸夫 (tanaka@start.or.th) 

Work Plan

We are just here!!

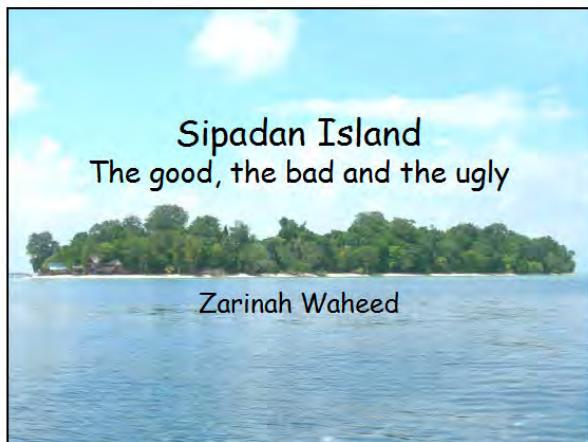
Tasks	Months						
	1	2	3	4	5	6	7
Review of historical study	■						
Develop spatial modeling and GIS		■	■	■	■		
Coordinate with local contacts			■				
Data complement at catchment level				■	■	■	
Data analysis				■	■	■	
Organize a wrap-up workshop							■

Yukio Tanaka/ 田中 幸夫 (tanaka@start.or.th) 

- This is my duty in Bangkok.
- If not completed, I can't go back to Japan!
- Your warm support is highly appreciated!!

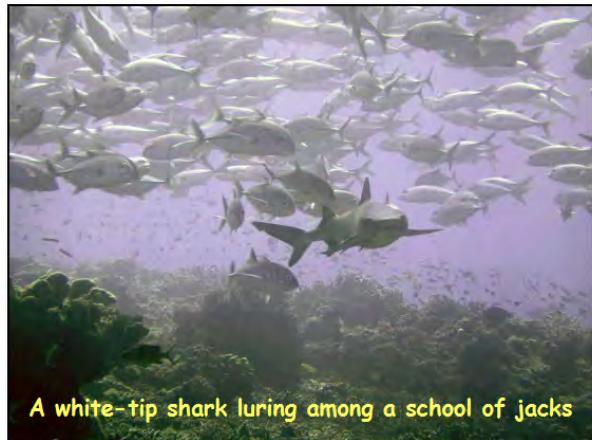
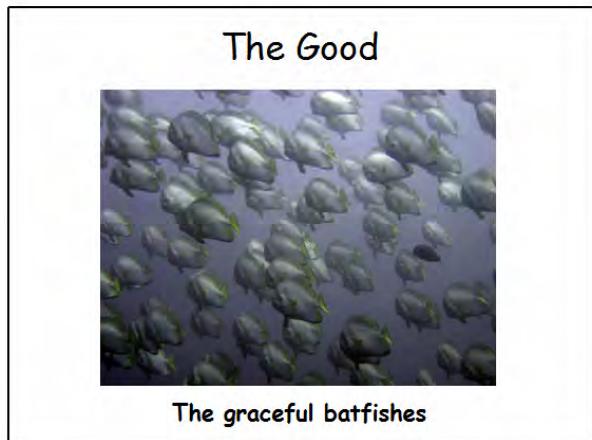
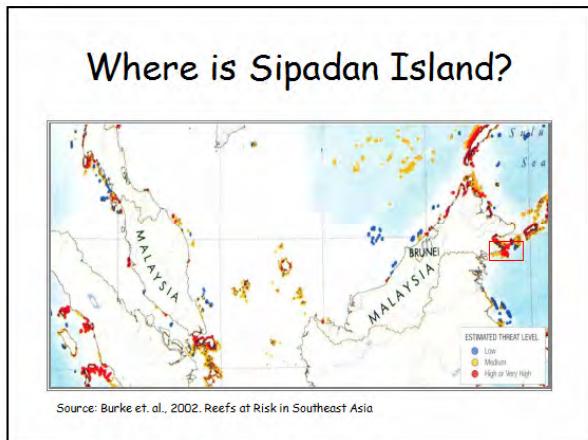
Special thanks to Bill, Jane, other Workshop staffs and all the participants.

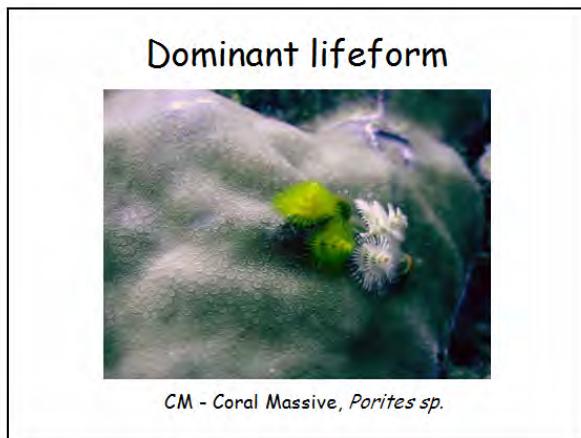
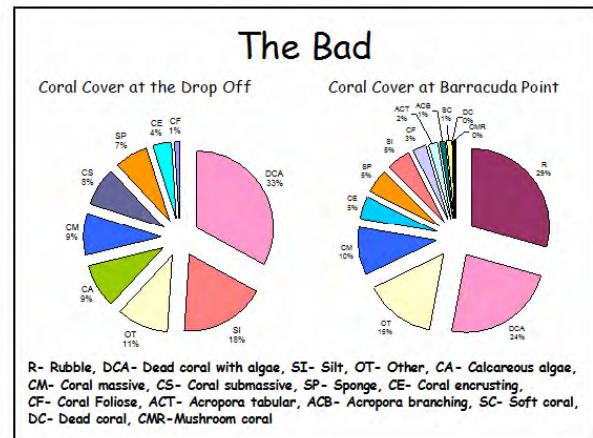
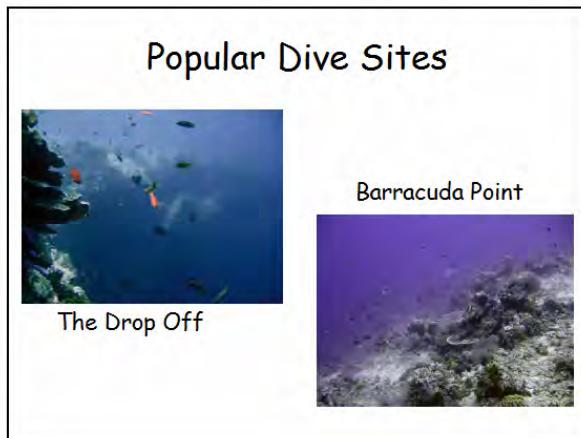
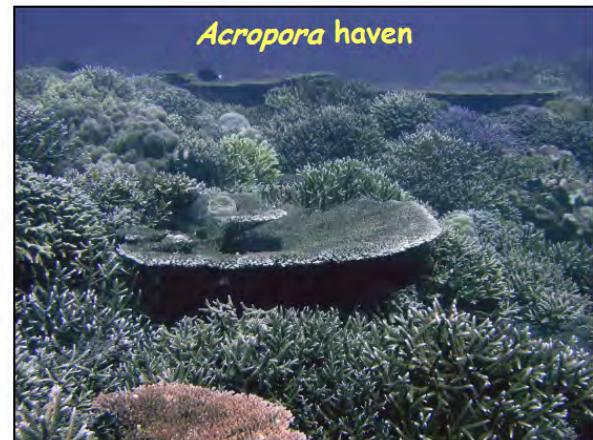
Yukio Tanaka/ 田中 幸夫 (tanaka@start.or.th) 



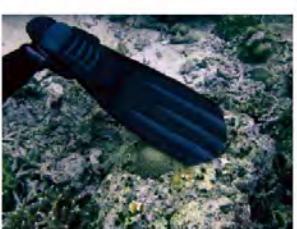
Sipadan Island

- The good
 - Icons of Sipadan
- The bad
 - Coral cover
- The ugly
 - Threats from tourism





The Ugly: threats at the Barracuda Point



Coral damage



Coral fragments

Rich Biodiversity

