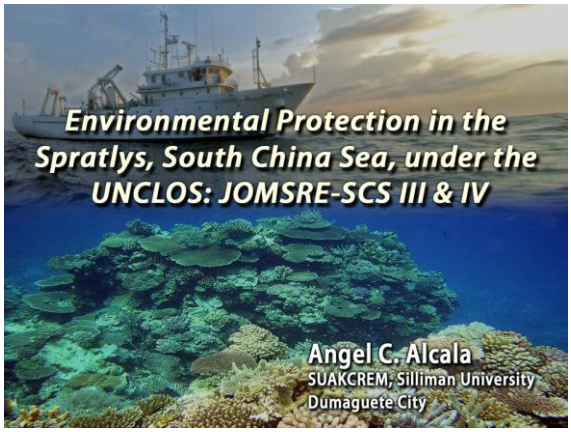


Introduction

- This presentation is based mainly on three marine scientific expeditions to the South China Sea in 2004, 2005 & 2007 in which I served as Chief Philippine Scientist of the expeditions with Dr. Bui Hong Long of Vietnam and as Editor of t two Proceedings on the scientific results published in 2005 and 2008 under the leadership of Amb. Alberto Encomienda, then Secretary General of the Maritime and Ocean Affairs of the Department of Foreign Affairs.

Introduction

- As in many instances worldwide, border issues and overlapping territorial claims in areas with natural resources, conflicts often arise. This is the case of the South China Sea, where fisheries and fossil fuels, minerals are expected to be present.

Introduction

- This has led to rapprochement and Declaration of Conduct in November 2002 by the ASEAN countries. It was hoped that the Declaration would create the climate for cooperation, peace, friendship and harmony (Encomienda 2008).

Introduction

- It was in this disturbed regional setting that the Joint Oceanographic and Marine Scientific Research Expedition in the South China Sea (JOMSRE-SCS I-IV) was conceptualized between the Philippines and the Socialist Republic of Vietnam.
- JOMSRE-SCS also served as a confidence-building initiative.

Introduction

- President Fidel V. Ramos of the Philippines and President Le Duc Anh and then Prime Minister Vo Van Kiet of the Socialist Republic of Vietnam initiated JOMSRE-SCS in March, 1994, two years after the UNCLOS entered into force.

Introduction

- The first JOMSRE-SCS was conducted in 1996. The results were published in the Conference Proceedings in 1997. The second JOMSRE was conducted in 2000, but the results were not published. The third and fourth JOMSRE were hosted by the Philippines and conducted in 2005 and 2007, respectively, and the results were published in the Conference Proceedings in 2008.

Introduction

- It was agreed by the Philippines and Vietnam in 2003 that JOMSRE III and IV were to be institutionalized, thus the direction towards UNCLOS Part IX cooperation in the South China was set (Encomienda 2008).

Introduction

- With the launching of JOMSRE-SCS, the course towards cooperative management of maritime security, including the safety and security of navigation, the prevention and control of oil pollution, and the Search and Rescue (Encomienda 2008).
- The way forward now is to expand the participation by all riparian states in the South China Sea and other interested States and International Organizations.

Introduction

- The hope is that a regional maritime organization as suggested under the UNCLOS Part IX can be established as a multilateral structure for cooperation in the South China Sea ocean governance that will contribute to peace, maritime security, prosperity, and growth (Encomienda 2008, Ramos 2008).

Introduction

- Based on the results, it is also hoped that Transborder Marine Peace Parks (TMPP), a variant of marine protected areas (MPA) will be established in the South China Sea, particularly the Spratly Islands, where a substantial amount of scientific information now exists on the nature of the marine environment, the oceanography, the conservation status of biological resources (biodiversity) and their vulnerability to climate change (sea level rise and extreme weather events) (Encomienda 2008).

Introduction

- In fact, the fourth meeting of the Philippines-Vietnam Joint Permanent Working Group on 29 September-04 October 2007 in Hanoi approved the establishment of TMPP as a practical application of the scientific findings of JOMSRE-SCS.
- The findings of JOMSRE are now useful in the forthcoming Impact Evaluation of the GEF in the South China Sea and the East Asian Seas.

Environmental Protection in the Spratlys, South China Sea, under the UNCLOS: JOMSRE-SCS III & IV

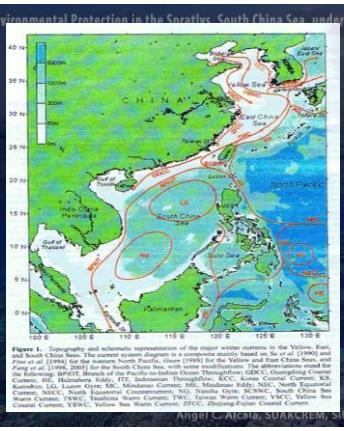
The JOMSRE Expeditions to the Spratlys 1996 – 2007: Oceanography, Marine Biology, Fisheries

Angel C. Alcala, SUAKCREM, Silliman University Dumaguete City

The Environment of the Spratlys

- The Spratlys consist of atolls, shoals, low islands and deep water in between reef systems.
- Vulnerable to sea level rise, temperature rise, acidity.
- Only 2 species of seagrass. No mangroves. Primary producers are phytoplankton.
- Reef systems ca 1,000 sq km in area are connected by ocean currents.

South China Reef Systems and deep waters explored by JOMSRE-SCS 1996-2007



Ocean currents could carry fish larvae from the SCS to Philippines and other States, providing connectivity among riparian States in the SCS.

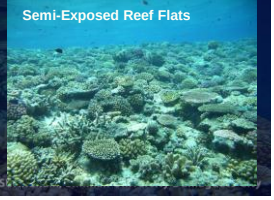
Quanan Zheng, Guohong Fang and Y. Tony Song, 2006, Journal of Geophysical Research, Vol. III, C11SO1, doi:10.1029/2005JCoo3261

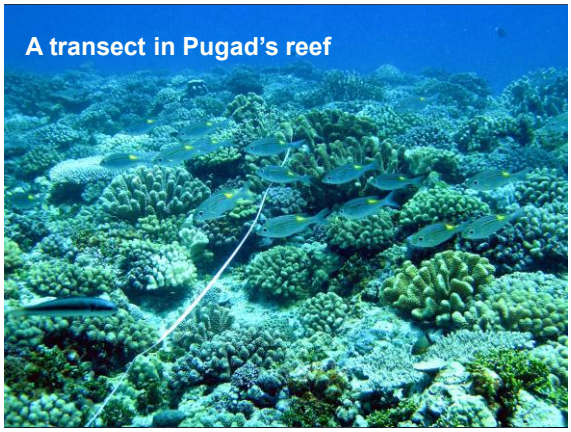
Reef Types Encountered


Exposed Surge Zones

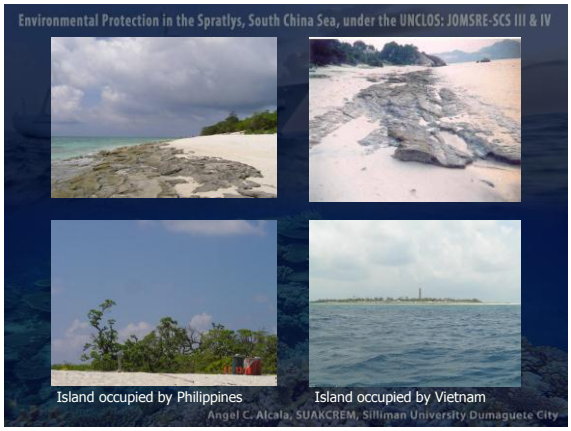

Steep Slopes / Drop-Offs

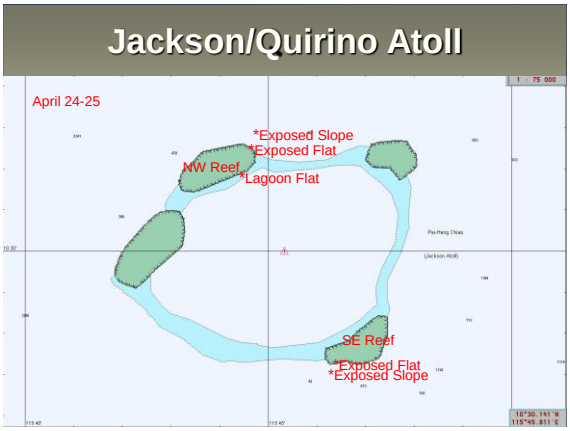

Sheltered Lagoons

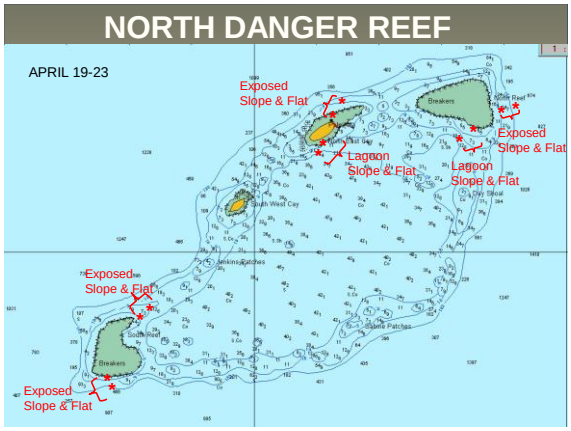

Semi-Exposed Reef Flats

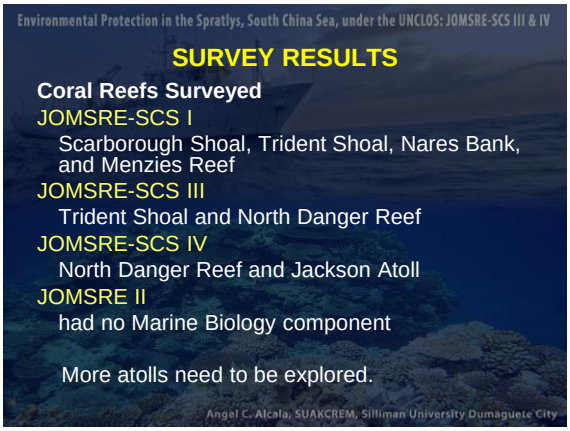

A transect in Pugad's reef

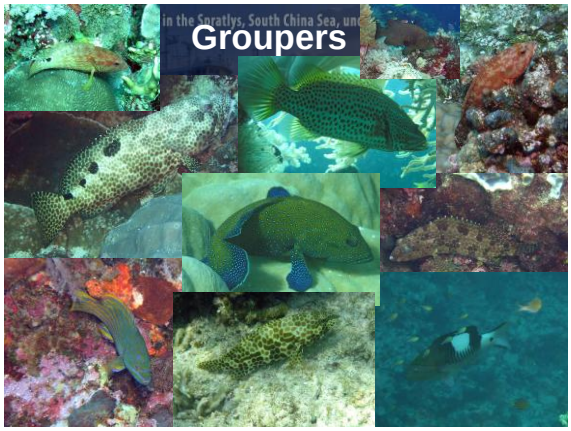

21 1354

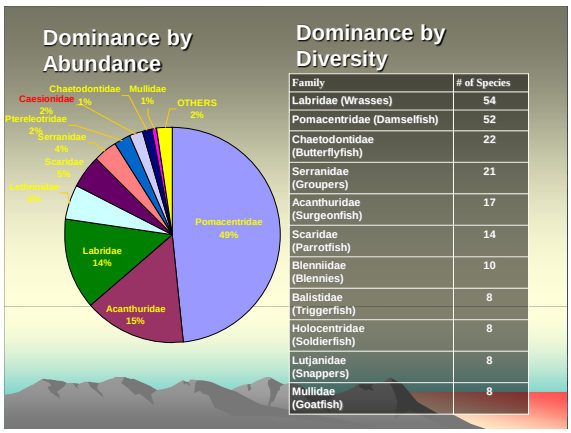

Environmental Protection in the Spratlys, South China Sea, under the UNCLOS: JOMSRE-SCS III & IV
Island occupied by Philippines
Island occupied by Vietnam
Angel C. Alcala, SUAKCREM, Silliman University Dumaguete City


Jackson/Quirino Atoll
April 24-25
*Exposed Slope
*Exposed Flat
NW Reef
*Lagoon Flat
SE Reef
*Exposed Flat
*Exposed Slope

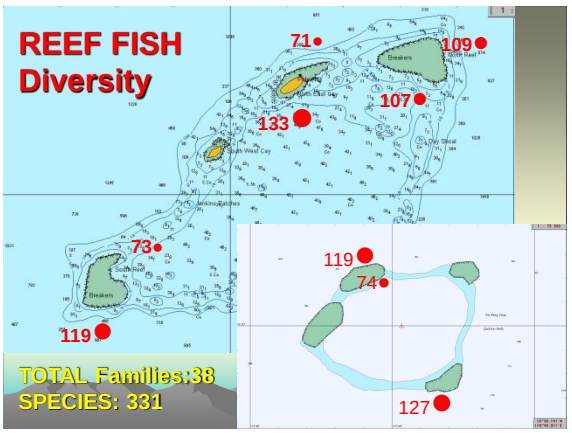

NORTH DANGER REEF
APRIL 19-23
Exposed Slope & Flat
Exposed Slope & Flat
Lagoon Slope & Flat
Lagoon Slope & Flat
Exposed Slope & Flat
Exposed Slope & Flat


Environmental Protection in the Spratlys, South China Sea, under the UNCLOS: JOMSRE-SCS III & IV
SURVEY RESULTS
Coral Reefs Surveyed
JOMSRE-SCS I
Scarborough Shoal, Trident Shoal, Nares Bank, and Menzies Reef
JOMSRE-SCS III
Trident Shoal and North Danger Reef
JOMSRE-SCS IV
North Danger Reef and Jackson Atoll
JOMSRE II
had no Marine Biology component
More atolls need to be explored.
Angel C. Alcala, SUAKCREM, Silliman University Dumaguete City

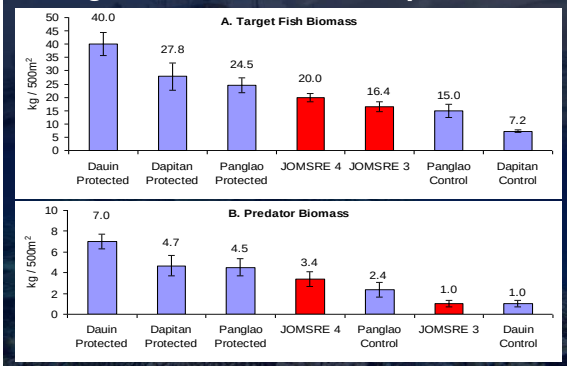




Family	# of Species
Labridae (Wrasses)	54
Pomacentridae (Damselfish)	52
Chaetodontidae (Butterflyfish)	22
Serranidae (Groupers)	21
Acanthuridae (Surgeonfish)	17
Scaridae (Parrotfish)	14
Blenniidae (Blennies)	10
Balistidae (Triggerfish)	8
Holocentridae (Soldierfish)	8
Lutjanidae (Snappers)	8
Mullidae (Goatfish)	8



Target Fish Biomass Comparisons



CORAL SPECIES in the Spratlys

In total, some approximately **250** reef-building coral species in 66 genera from **18** families were recorded in the 17 sites surveyed. Philippines,533 species.

Some of the hard coral species are new distributional records of this expedition such as: ***Leptoseris kalayaanesis, Anacropora forbesi, Acropora echinata, Acropora plumosa…***

Importance of Atolls

- Atolls abound in the Spratlys.
- Nutrients are retained in the NDR and Jackson Atolls.
- Juvenile and adult fish observed in these two atolls. More atolls need to be studied.
- It is inferred that atolls are areas of high productivity and may serve as centers of dispersal of marine organisms.

Seagrasses

Micro-Algae

- Total of 69 species of algae belonging to 11 Orders, 23 Families and 40 Genera and 4 Phyla; red algae - the most common, and the brown algae (Phaeophyta) – the least common; economically important algae included *Eucheuma, Kappaphycus, Gelidium, Gracilaria, Laurencia,* and *Caulerpa*

Findings:

Growth of seagrasses and algae in the study sites was sparse and their distributions on the reef systems limited

Macro-Invertebrates

- JOMSRE-SCS III and IV: four species of giant clams, five species of sea cucumbers and few species of other gastropod shells
- of the ca 130 macro-invertebrates observed on these three reefs in 2005 and 2007 were sponges, mollusks and sea stars. One notable sea star is the predatory crown of thorns starfish, which occurred in moderate numbers.
- The densities of these species were low, and the reason for this is heavy exploitation
- Only one of 5 spp of sea cucumber seen in 2007

Important Macro-Invertebrates

- COTS: outbreak at Southreef in NDR.
- *Tridacna* clams
- *Trochus* spp.

Ichthyoplankton

- JOMSRE-SCS III and JOMSRE-SCS IV :

  1,324 larvae out of the 1,884 have been identified as belonging to 43 Families

  95%of the larvae in the North Danger Reef and Jackson Atoll belong to Families Apogonidae, Gobiidae, Myctophidae, Labridae and Carangidae
- Overall distinct groupings of ichthyoplankton in the SCS, with the stations located northwest and northeast of Palawan being grouped together
- While the Jackson Atoll and North Danger Reef formed another group
- The deep offshore stations in the SCS - pelagic group of larvae, such as Scombridae
- In general, there were more larvae caught along the northwest and northeast coasts of Palawan, Philippines than in the deep offshore stations and atoll reefs of the South China Sea
- larval connectivity between the Spratlys and northwestern Luzon probably involves Scombridae and Myctophidae

Missing Marine Species

- Lobsters
- Pearl Oysters
- Turtles
- Sea Snakes
- Large Predators (groupers)
- Sea Cucumbers
- Manta Rays
- Sharks

Threats !!

- Blast Fishing
- Gill Nets
- Overfishing
- COTS
- Harvesting of turtle eggs
- Harvesting of giant clams

CONCLUSIONS

1. Corals/coral reefs are in good condition but fishery resources are depleted due to heavy exploitation. Fish biomass has declined from mean of ca 114 tons/sq km in 1997 to ca 39-42.1 tons/sq km in 2005-2007.

2. Spratlys are likely source of marine propagules for surrounding areas, but this ecosystem service may cease if current exploitation rate continues.

RECOMMENDATIONS

- Establish trans-border marine peace parks with 30% of area as no-take zones initially at NDR & JA to ensure high density & biomass of marine species for production of marine propagules.

  (Marine propagules are distributed for varying distances through ocean currents.)

- Establish multilateral regional structure for cooperation and governance.

- Make use of countries' experts on MPAs to study and monitor long-term progress of protection & management.

Environmental Protection in the Spratlys, South China Sea, under the UNCLOS: JOMSRE-SCS III & IV

No-take Marine Reserves *as* Marine-Conservation *and* Fisheries-Management Tools *in the Philippines*

Angel C. Alcala, Silliman University-Angelo King Center for Research and Environmental Management (SUAKCREM)

Figure 2. Aerial photographs of Sumilon (top) and Apo (bottom) islands in the central Philippines. The positions of the no-take marine reserves at each island are shown. The reserve at Sumilon Island extends 750m along the western side the island. The reserve at Apo is 450m long on the southeastern side of the island. *Photo: J Maypa & R Raymundo.*

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Figure 3. Biomass of fish targeted by fisheries in the no-take reserve, and fisheries catch of these fish outside the reserve, plotted against years of no-take reserve protection at both Sumilon and Apo islands. Reserve protection enhanced fish biomass at both islands. A parallel trend of increasing fisheries catch outside the reserve as duration of reserve protection increased is seen at Sumilon Island but not at Apo Island. Removal of 25% (Sumilon) and 10% (Apo) of the available fishing area did not reduce total fish catch at either island in the long term. Empty data points are biomass estimates when reserve was open to fishing or catch estimates at the island in absence of reserve. Filled data points are biomass estimates when reserve was closed to fishing or catch estimates at the island in presence of reserve. *Redrawn with permission from Alcala et al (2005).*

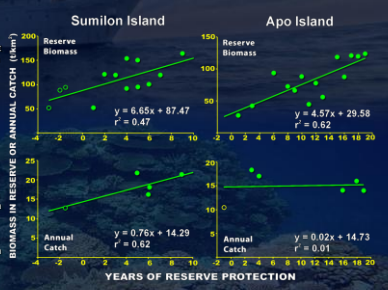

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Figure 5. Map shows the location of 60 no-take marine reserves in the southern Philippines as of 2004. The Sumilon (number 1 on map) and Apo (number 9 on map) reserves served as templates for a substantial expansion of the no-take reserve approach to marine conservation and fisheries management in the Philippines. *Base map from Reefbase GIS.*