Development of a large-scale, long-term coral cover database in the Philippines

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- Hottest of the hotspots (Roberts et al., 2002; Carpenter et al., 2008)
- 98% of the reefs are threatened due to local human impacts (Burke et al., 2011)
- >80% of population resides within 50 km of the coast (Burke et al., 2011)
- 20-40% dependent on fish as source of protein (Burke et al., 2002)
- Source of reefs larvae to Japan through Kuroshio Current (Fujiwara, 1997; Burke et al., 2002)

- Third largest coral reefs (Burke et al., 2011)
- Highly diverse reefs in the Coral Triangle (Carpenter and Springer, 2005)

Photo: Rich Clabaugh
Objectives

- Integrate existing living hard coral cover data to develop a large-scale and long-term coral cover database in the Philippines using previous studies.

- To assess recent trends in coral cover using quartile category.
Methods

Living hard coral cover (LHCC)
- Electronic search
  - Database/Search Engine (ReefBase, OneOcean, Google Scholar)
- Personal communications
  - Non-governmental organization (Reef Check, Coral Cay Conservation)
  - Reef scientists

Preliminary analysis
- Over-all annual means: data pooled per year then averaged
- Quartile Classification (Gomez and Alcala, 1979)
  - Sites with repeat measurement were averaged
  - % LHCC classified as:
    
    Poor (<25%), Fair (25-49%), Good(50-75%), Excellent (>75%)
Quartile Classification

- Spatial Group
  - Over-all
  - Biogeographic region (Aliño and Gomez, 1994)
  - City/Municipality

- Temporal Group (Bruno and Selig, 2007)
  - 1978-1983
  - 1984-1996
  - 1997-2004
  - 2005-2010
2,349 surveys collated from 571 sites, 156 cities/municipalities and 38 provinces

Results

Annual % mean living hard coral cover
Results

Annual mean LHCC ranges: 18% to 57%
Over-all mean: 34%
Over-all Quartile Category

- Increasing trend of Poor category while Excellent category is <1%
- Most surveyed reefs were protected areas but Poor category still increase
• VS region at high risk, Poor category dominated and gen. decrease of other categories in 2005-2010. SS region also showed similar trend, increase in % of Poor reefs and decrease in Good reefs.
Coral condition improved in WPS, SPS and CS in 2005-2010
Coral condition in cities/ municipalities similarly monitored compared between periods

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<tr>
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<td>Declined</td>
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1960-1992: Coral trade
1960-1990: Blast fishing
1962-1998: Cyanide fishing
1960-1986: murp-ami
1960s-present: Decreasing destructive fishing
1990s-present: Decreasing destructive fishing
1960s-present: Increasing sedimentation/pollution
1960s-present: Increasing fishing pressure

Disturbances:
- 1998: bleaching
- 2010: bleaching

Graph: % Living Hard Coral Cover vs. # of Survey 1978-2010
• Acanthaster planci is responsible for mass mortality of corals in Indo-Pacific (Miller, 2002)

• >0.3 per 100m² COTS is active outbreak (CRC Reef Research Center, 2003)

*Data obtained from Reef Check surveys
Crown-of-thorns-starfish (COTS) Predation

COTS outbreak*

High incidence COTS outbreak was in Visayas Region and Palawan Is.
Summary

- The Philippine reefs showed no major coral cover decline but increasing trend of Poor reefs and <1% Excellent reefs.
- In 2005-2010, coral cover decreased in Visayas Seas and Sulu Sea regions while increased in West Phils. Sea, South Phils. Sea and Celebes Sea regions.
- Results show that Visayas Seas is at high risk that warrants immediate concern and conservation efforts.
- High occurrence of Crown-of-thorns-starfish outbreak was also observed in Visayas Seas region.
- The low number of data obtained in 1980s may be attributed to limited literature accessible online (i.e. local journals).
- Monitoring sites should be considered in the future analysis since trend on national and regional levels may not the same for all sites.
Acknowledgements

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