# ReefBase Newsletter – July 2009

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## In this issue



## Announcements

### 1. Status of Coral Reefs of the World 2008 now in ReefBase Global Database

The text from the GCRMN (http://www.gcrmn.org) "Status of Coral Reefs of the World Report" (2008) has been integrated into ReefBase. It is now available online through the Global Database section where user can easily search the status report data as organized in various categories (Overview, Status, Threats and Management) and by countries. All data provide links between the ReefBase database, Photo Gallery and online GIS. To start the search, please follow this link: http://www.reefbase.org/global_database/default.aspx

## ReefBase Publication Database

### 1. A Decade of Reef Check Monitoring: Indonesian Coral Reefs, Condition and Trends

- Indonesia is situated in the centre of coral diversity (Veron, 2000), which is often referred to as the Coral Triangle. Indonesian coral reefs are estimated to cover around 51.000 km² or around 18% of the global coral reef area, and around 60% of coral species are found in this country. Sadly, environmentally damaging fishing practices (such as the use of cyanide and explosives), overfishing,

sedimentation, waste disposal (Burke et al.., 2002), and coral bleaching (Hughes et al., 2003) have been identified as the major threats to this ecosystem. Over 80% of the Indonesian population lives in the coastal zone, so that the degradation does not only impact the coral reefs themselves but also has a significant impact on the coastal communities who rely on this ecosystem for their livelihoods (Burke et al.., 2002). The Reefs at Risk in Southeast Asia report (Burke et al.., 2002) stated that during the past 50 years, the proportion of coral reefs in declining condition has increased from 10% to 50%. If this destruction is allowed to continue, it is estimated that the economic losses will be around 2.6 billion US $ over a period of 20 years. This is a very low value if compared to the estimated value of over 1.6 billion US $ per year if the coral reef ecosystem is maintained in a healthy condition (Cesar et al.. 1997).

Habibi, A., N. Setiasih and J. Sartin (eds). 2007. A Decade of Reef Check Monitoring: Indonesian Coral Reefs, Condition and Trends. The Indonesian Reef Check Network, 36pp.
http://www.reefbase.org/resource_center/publication/main.aspx?refid=27461&linksource=nl

## 2. Conservation hotspots of biodiversity and endemism for Indo-Pacific coral reef fishes

- There is growing scientific and public awareness of the widespread depletion of marine habitat-forming species, such as mangroves, seagrasses, oysters, and corals. This loss inevitably leads to the decline of the plants and animals that live in the biogenic structures created by such foundation species, and contribute to the overall degradation of marine ecosystems. For example, the reduction of coral cover on tropical coral reefs directly and rapidly causes a decline in the abundance and diversity of reef fish through the loss of structural heterogeneity.

  Scientists have recognized the ecological and economic value of coral reefs and the threats to reef-building corals for decades and there is broad scientific consensus that coral reef ecosystems are being rapidly. Yet there is little published empirical information on regional and global patterns of coral loss or the current state of reefs in the Indo-Pacific. This region encompasses approximately 75% of the world's coral reefs and includes the center of global marine diversity for several major taxa including corals, fish, and crustaceans. Many previous studies have documented mass coral mortality events and ecologically significant reductions in coral cover on particular reefs, throughout the Caribbean, and across the Great Barrier Reef. However, the inference that this decline is a general, global phenomenon is based largely on qualitative assessments. The absence of regional-scale quantitative analyses of reef health in general and coral cover in particular has led to substantial confusion and disagreement about the patterns and causes of coral decline. This shortcoming has also greatly limited our ability to measure the efficacy of different management practices designed to mitigate and reverse reef degradation.

Allen, G.R. 2007. Conservation hotspots of biodiversity and endemism for Indo-Pacific coral reef fishes. Aquatic conservation: Marine and Freshwater Ecosystems 17:1-6pp.
http://www.reefbase.org/resource_center/publication/main.aspx?refid=26594&linksource=nl

## 3. Aspects of the ecology of Indo-pacific seagrass systems

- There exists a lack of information about many of the ecological structuring processes within Indo-Pacific seagrass ecosystems, such knowledge is pertinent to the future sustainable exploitation and management of these systems. This project considered aspects of the functions of seagrass ecosystems in supporting the faunal productivity of Indo-Pacific coastal marine systems. The Wakatobi Marine National Park, Indonesia was used as an example of seagrass habitats throughout the Indo-Pacific bioregion. Research was split into three separate major aims. Research considered the major environmental influences on seagrass primary production, and investigated how the seagrass is utilised as habitat and as a direct food resource.

The second half of the thesis aimed to consider the role and extent of the impacts of habitat connectivity on seagrass fauna by considering how tidal and diel cycles, and the availability of mangrove and reef, influence seagrass fish assemblages. This thesis presents evidence for the first time that the mechanisms of photoacclimation in tropical Indo-Pacific seagrass species confer competitive advantages to individual species of seagrass to successfully inhabit particular environmental conditions. These floral assemblages were found to be important as a direct food source for scarids, whilst the variability within this seagrass flora was a key localised influence on abundant fauna. Seagrass habitats were found to contain large densities of juvenile fish, many of which frequent reef and mangrove habitats. Research describes how large numbers of predatory fish enter the seagrass beds, as a function of tidal and diel cycles, with fish abundance increasing by ˜45% from day to night and ˜30% from low to high tide to feed on abundant crustaceans and small fish. A key control on seagrass assemblages was found to be adjacent mangrove habitats that act as important feeding grounds for seagrass and reef fish, whilst providing an important source of organic matter to the seagrass food web, and stimulating a diverse and abundant fish fauna.

Unsworth, R.K.F. 2007. Aspects of the ecology of Indo-pacific seagrass systems. 2007. Aspects of the ecology of Indo-pacific seagrass systems. University of Essex, Colchester, U.K. PhD Thesis, 211 p.
http://www.reefbase.org/resource_center/publication/main.aspx?refid=26246&linksource=nl

## 4. Periodic Closures as Adaptive Coral Reef Management in the Indo- Pacific

- This study explores the social, economic, and ecological context within which communities in Papua New Guinea and Indonesia use adaptive coral reef management. We tested whether periodic closures had positive effects on reef resources, and found that both the biomass and the average size of fishes commonly caught in Indo-Pacific subsistence fisheries were greater inside areas subject to periodic closures compared to sites with year-round open access. Surprisingly, both long-lived and short-lived species benefited from periodic closures. Our study sites were remote communities that shared many socioeconomic characteristics; these may be crucial to the effectiveness of adaptive management of reef resources through periodic closures. Some of these factors include exclusive tenure over marine resources, a body of traditional ecological knowledge that allows for the rapid assessment of resource conditions, social customs that facilitate compliance with closures, relatively small human populations, negligible migration, and a relatively low dependence on fisheries. This dynamic adaptive management system, in which communities manage their resources among multiple social an ecological baselines, contrasts with western fisheries management practices, centered on maintaining exploited populations at stable levels in which net production is maximized.

Cinner, J., M. J. Marnane, T. R. McClanahan and G. R. Almany. 2005. Periodic Closures as Adaptive Coral Reef Management in the Indo- Pacific. Ecology and Society 11(1): 31p.
http://www.reefbase.org/resource_center/publication/main.aspx?refid=26018&linksource=nl

## 5. Future Effects of Climate Change on Coral Reefs and Mangroves in South Asia

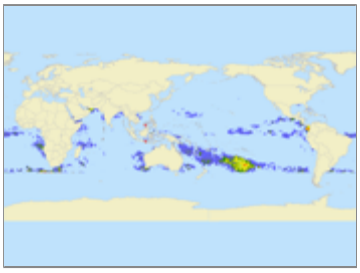
- Coral reefs are highly vulnerable to the effects of increased water temperatures, changes in precipitation, cloudiness, wave activity, ocean circulation and chemistry, and sea-level rise. Current climate models predict globally-averaged surface air temperature increases of between 1–5°C by 2100. Mean global sea-surface temperature is expected to rise by around 2°C, with possible greater regional and local increases. Sea-level projections predict a globally-averaged rise of up to 90 cm by 2100. There are also predictions of possible changes in storm intensity and frequency, and disruption of monsoon systems. In the South Asia Region, where so much of the coastline is subject to strongly seasonal (associated with two monsoons) and inter-annual (El Niño) weather patterns, storm events, and sea-surface temperature fluctuations, the task of understanding the effects of climate change

poses many challenges. South Asia covers a large geographical area, with numerous islands, and densely populated low-lying coastal areas. It has large areas of geographically scattered and diverse coral reef and mangrove systems. Many coastal communities, often reliant on subsistence-level practices, will be particularly hard hit by climate change.

Perks, H. 2002. Future Effects of Climate Change on Coral Reefs and Mangroves in South Asia. In: Linden, O., D. Souter, D. Wilhelmsson, and D. Obura (eds.). Coral degradation in the Indian Ocean: Status Report 2002. CORDIO, Department of Biology and Environmental Science, University of Kalmar, Kalmar, Sweden.pp 167-176pp.
http://www.reefbase.org/resource_center/publication/main.aspx?refid=19982&linksource=nl

## Online GIS

### 1. June 2009 NOAA Coral Reef Watch's Satellite Monitoring Products



This map shows the global observations of coral bleaching occurrences combined with NOAA Coral Reef Watch's satellite monitoring products including Sea Surface Temperature, Sea Surface Temperature Anomaly, Bleaching HotSpot and Degree Heating Weeks. These datasets are added into ReefBase Online GIS each month.
To view the latest June 2009 maps, click here.
http://reefgis.reefbase.org/redirect.aspx?urlid=46454&linksource=nl