Coral Reef Targeted Research & Capacity Building for Management

CRTR Research Compendium: Phase One (2004–2009)

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THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

The Coral Reef Targeted Research & Capacity Building for Management (CRTR) Program is a leading international coral reef research initiative that provides a coordinated approach to credible, factual and scientifically-proven knowledge for coral reef management.

The CRTR Program is a partnership between the Global Environment Facility, the World Bank, The University of Queensland (Australia), the United States National Oceanic and Atmospheric Administration (NOAA) and approximately 50 research institutes and other third-parties around the world.

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Contents

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Introduction

The Coral Reef Targeted Research & Capacity Building for Management (CRTR) Program was established in 2004 as a long-term research initiative into the impacts of human activity and environmental factors, such as climate change, on coral reef ecosystems. The research outputs are aimed at enhancing the sustainability of coral reef ecosystems, and their goods and services which support the livelihoods and security of millions of people worldwide living along tropical coastlines.

The CRTR Program was designed as part of a long-term effort, which will be implemented in phases. Phase One was designed to support the establishment of an applied research framework and to build capacity for science-based management of coral reef ecosystems in areas with significant coral reef resources which are under threat from climate change and human stressors.

The Program had two distinctive and key objectives in its first phase. These are:

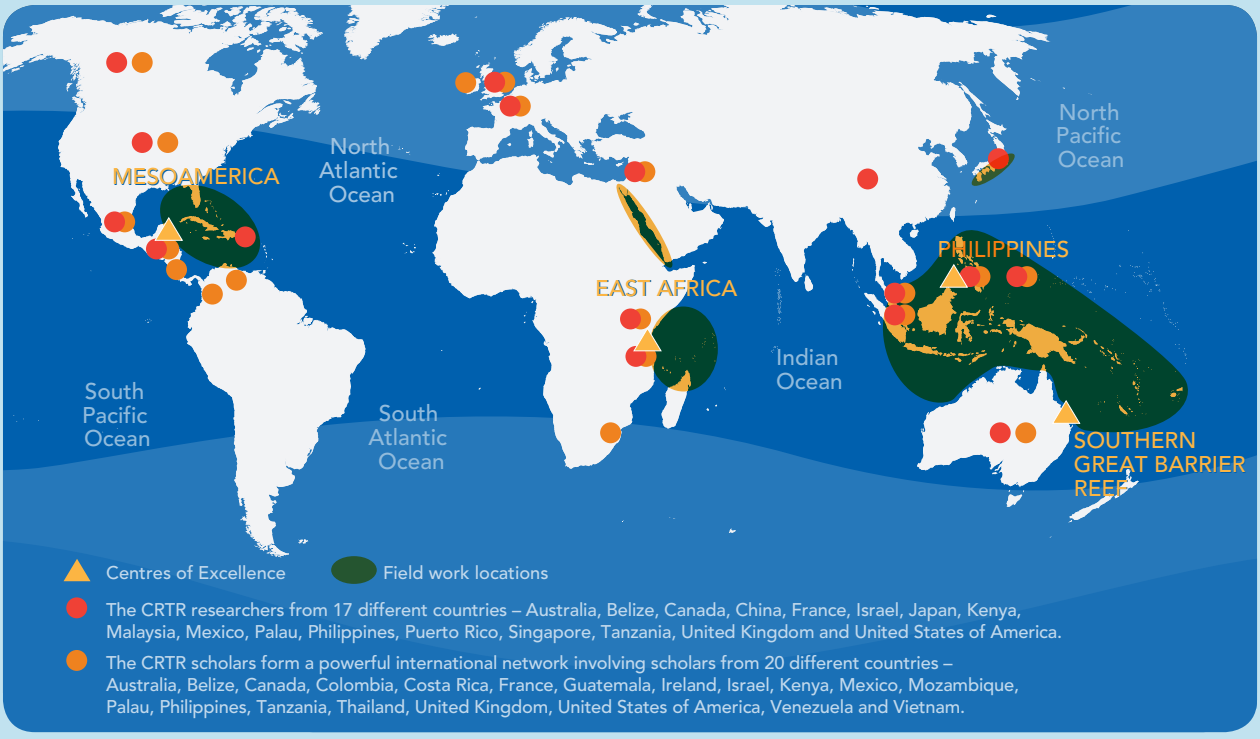
i. **The Global Environment Objective** was to fill critical gaps in our global understanding of coral reef ecosystem vulnerability and resilience to a range of key stressors – from localized human stress to climate change – and to inform policies and management interventions on behalf of coral reefs and the communities that depend on them.

ii. **The Project Development Objective** was to align, for the first time, the expertise and resources of the global coral reef community around key research questions related to the resilience and vulnerability of coral reef ecosystems, to integrate the results, and to disseminate them in formats readily accessible to managers and decision-makers. A related objective is to build much-needed capacity for science-based management of coral reefs in developing countries, where the majority of reefs are found. These objectives will be achieved through targeted investigations involving networks of scientists, in consultation with managers, and the dissemination of knowledge within and across regions to decision-makers.

In working towards achieving these objectives, the CRTR Program established six scientific working groups consisting of the world's leading experts in coral reef ecosystems. In addition to this, the Program established four regional Centres of Excellence in Mesoamerica (Puerto Morelos, Mexico), East Africa (Zanzibar), Southeast Asia (Philippines) and the South Pacific/Australasia (Queensland).

During Phase One, international teams of researchers worked on addressing knowledge and technology gaps in coral reef function and their resilience to change, including the basic functions of coral reefs. To undertake research to address these gaps, six Working Groups, comprised of developed and developing country scientists internationally recognised in their fields, were formed to focus and coordinate research around key themes. These were:

- **Coral bleaching and local ecological effects:** the physiological mechanisms and ecological consequences of large area coral reef bleaching.
- **Coral disease:** the nature, severity and spread of coral reef diseases, some of which may be responsible for major shifts in the structure, function, health and sustainability of coral reefs.
- **Connectivity and large-scale ecological processes:** the importance of physical and biological connections between coral reefs. This has importance for the environmental conditions and key design factors needed to establish and sustain effective Marine Protected Areas (MPAs).
- **Restoration and remediation:** the tools, technologies and efficacy of restoring coral reefs that have been severely degraded or destroyed, and the key organisms and environmental conditions to consider when rehabilitating a given coral reef environment, and the circumstances under which such restoration may be cost effective.
- **Remote sensing:** the application of remote sensing to refine information and enhance the rate and scale at which knowledge can be generated and applied.
- **Modeling and decision support tools:** the integration of biophysical data and other information about coral reef ecosystem boundaries and drivers with economic and social data from human communities.



About the publications

The CRTR Program's Phase One research effort has contributed to more than 630 research publications showcasing research results and outputs from December 2004 to November 2009. The research reported in **390** of these publications has been partially or fully funded by the CRTR Program. A further **240** publications are closely associated with the CRTR Program either through having been influenced by CRTR research results and outputs, or, in turn, having had some influence on CRTR research directions.

While attribution of research results and therefore publications is always difficult to gather, the CRTR Program has maintained a systematic approach to publication attribution through the maintenance of a publications directory by the researchers during the submission of their progress and annual reports. For the past five years, the publications have been attributed as:

- **CRTR Program publications** through either full or partial funding support, or
- **Associated publications** through influence on ideas, research outputs and results, and research directions.

This Research Compendium provides a comprehensive listing of these research outputs under these two categories, as reported by the Working Groups and Centres of Excellence over the five-year period from December 2004-November 2009.[1]

In addition to these categories, the publications have been listed by key research areas established during the planning phase of the Program.

Many of the CRTR Program's results continue to be prepared and published beyond the Phase One end date and are due for release in 2010.

CRTR publications influence

The Institute for Scientific Information (ISI) Web of Knowledge calculates a number of objective indices rating the relative influence or impact of a particular article or journal within a particular field.

The **Impact Factor** is a measure of the number of citations attributed to articles published in a particular journal. The higher the Impact Factor of the journal the greater its influence and the desirability as a place to publish.

Impact Factors are calculated yearly for those journals that are indexed in Thomson Reuter's *Journal Citation Reports* (more than 11,000 science and social science journals).

In a given year, the Impact Factor of a journal is the average number of citations to those papers that were published during the two preceding years. The Impact Factor for a journal is calculated based on a three-year period, and can be considered to be the average number of times published papers are cited up to two years after publication.

Other important metrics include the average number of citations per paper.

Clearly, papers that are cited a large number of times in high impact journals are those that are having a large impact on a particular research field.

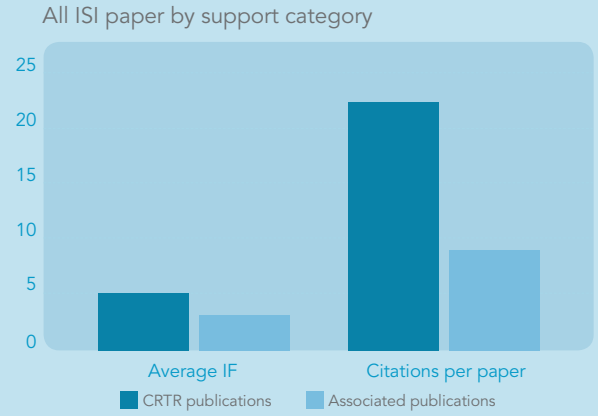
1. This Compendium does not include articles published during the Program's planning phases from 1998 – 2003 nor does it include journal articles published post-November 2009, or articles in preparation, in review or in press at the time of this Compendium's development.

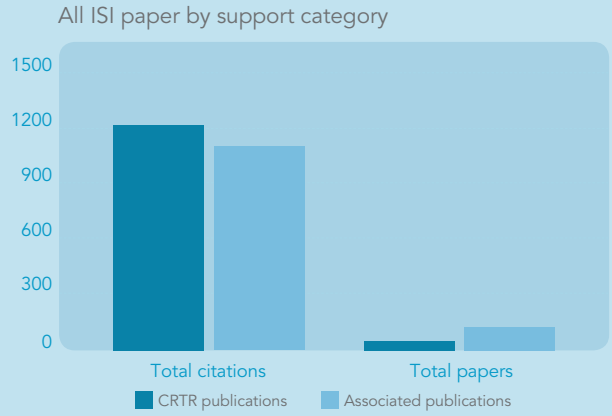
CRTR impact factor

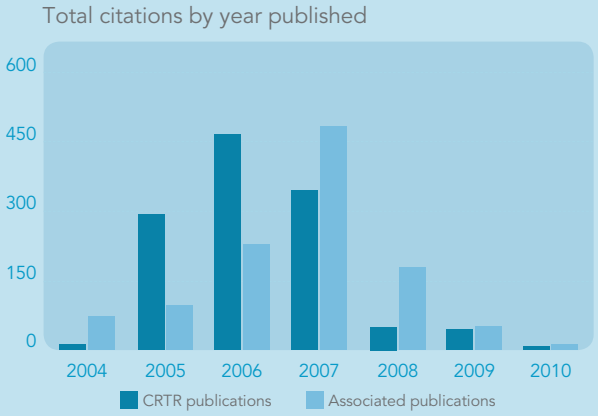
The ISI Web of Knowledge has been used to determine the Impact Factor for the CRTR peer-reviewed journal publications listed in this Research Compendium.[2]

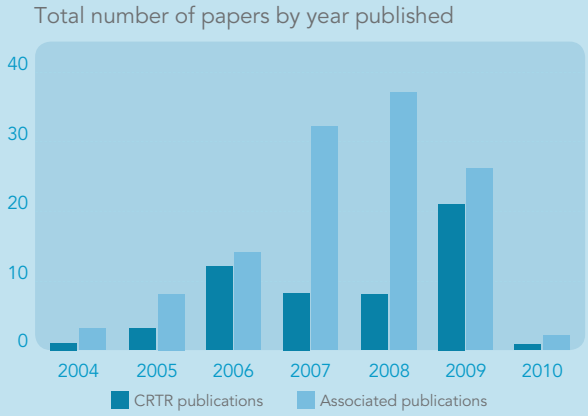
During the five-year period of Phase One, the CRTR Program has published a total of 176 articles (in ISI-recognised journals), with a total of 2326 citations.

These articles have had a major impact. Journal articles reporting on research fully-funded by the Program have an Impact Factor of 5.3. Articles on partially-funded research have an Impact Factor of 3.2. Within this research arena, an Impact Factor of 4.0 is considered extremely high.









2. Only published journal articles listed within the ISI Web of Knowledge, and recognised as CRTR fully- or partially-funded research were used in the analysis.

The CRTR Program published its first synthesis paper in Science Magazine in December 2007. The paper, "The Carbon Crisis: Coral Reefs under Rapid Climate Change and Ocean Acidification" by Hoegh-Guldberg et al., highlighted the urgent action required to protect coral reefs from rising concentrations of carbon dioxide in the Earth's atmosphere. It is now the second most cited paper of 2007 in the 'environment and ecology' category and the CRTR's most widely cited paper to date. It originally appeared as the Science cover story and its release generated widespread international media coverage, extending the reach to policy audiences and the public.

CRTR Publications

These are publications which have been fully or partially supported by the CRTR Program.

Journal Articles

Advancing knowledge of connectivity in coral and other reef invertebrates

Shearer, T.L. and Coffroth, M.A. (2005)
"Isolation of microsatellite loci from the scleractinian corals, Montastraea cavernosa and Porites astreoides"
Molecular Ecology Notes, 4(3): 435-437.
Summary: The ability to assess genetic variation is critical for determining genetic diversity and population structure. This study describes polymorphic microsatellite loci isolated from two scleractinian coral species. Most loci exhibit significant heterozygote deficiencies, likely due to nonrandom mating or Wahlund effects. These markers are being used to investigate gene flow among populations, providing insight into reef connectivity.

Shearer, T.L., Gutierrez-Rodriguez, C. and Coffroth, M.A. (2005)
"Generating molecular markers from zooxanthellate cnidarians"
Coral Reefs, 24(1): 57-66.
Summary: Genetic techniques are providing tools that are necessary to answer questions concerning the ecology and evolution of cnidarians that, until recently, could not be easily addressed. In developing molecular markers for cnidarians with algal symbionts (zooxanthellae), caution must be used to ensure the markers in question are derived from the cnidarian host and not zooxanthellae.

Butler IV, M.J., Dolan, T., Hunt, J.H., Rose, K. and Herrnkind, W.F. (2005)
"Recruitment in degraded marine habitats: a spatially-explicit, individual-based model for spiny lobster"
Ecological Applications, 15(3): 902-918.
Summary: Coastal habitats that serve as nursery grounds for numerous marine species are badly degraded, yet the traditional means of modeling populations of exploited marine species handle spatiotemporal changes in habitat characteristics and life history dynamics poorly, if at all. To explore how nursery habitat degradation impacts recruitment of a mobile, benthic species, we developed a spatially explicit, individual-based model that describes the recruitment of Caribbean spiny lobster (Panulirus argus) in the Florida Keys, where a cascade of environmental disturbances has reconfigured nursery habitat structure.

McClanahan, T.R., Steneck, R.S., Pietri, D., Cokos, B. and Jones, S. (2005)
"Interaction between inorganic nutrients and organic matter in controlling coral reef communities in Glovers Reef Belize"
Marine Pollution Bulletin, 50(5): 566-575.
Summary: We studied the responses of algae, corals, and small fish to elevated inorganic fertilizer, organic matter, and their combination over a 49-day summer period in cages that simulated the coral reef in the remote Glovers reef atoll, Belize.

Munday, P.L., Leis J.M., Lough, J.M., Paris, C.P., Kingsford, M.J. Berumen, M.L. and Lambrechts, J. (2008)
"Climate change and coral reef connectivity"
Coral Reefs, 28(2): 379-395.
Summary: This review assesses and predicts the impacts that rapid climate change will have on population connectivity in coral reef ecosystems, using fishes as a model group.

Shearer, T.L and Coffroth, M.A. (2008)
"Barcoding corals: limited by interspecific divergence, not intraspecific variation"
Molecular Ecology Resources, 8: 247-255.
Summary: The expanding use of DNA barcoding as a tool to identify species and assess biodiversity has recently attracted much attention. An attractive aspect of a barcoding method to identify scleractinian species is that it can be utilized on any life stage (larva, juvenile or adult) and is not influenced by phenotypic plasticity unlike morphological methods of species identification.

Ridgway, T., Riginos, C., Davis, J. and Hoegh-Guldberg, O. (2008)
"Genetic connectivity patterns of Pocillopora verrucosa in southern African Marine Protected Areas"
Marine Ecology Progress Series, 354:161-168.
Summary: A coherent management plan for coral reef communities should take into account the patterns of connections among distant reefs in order to prioritise conservation efforts to those areas that are important larval sources. At present, the inclusion of such connectivity assessments into Marine Protected Area (MPA) planning is hindered by the lack of knowledge of the exact patterns of connectivity among reefs.

Randall, C.J. and Szmant, A.M. (2008)
"Elevated temperature reduces survivorship and settlement of the larvae of the Caribbean scleractinian corals, Favia fragum"
Coral Reefs, 28(2): 537-545.
Summary: The effect of elevated seawater temperatures, such as those plaguing tropical seas during the summers of anomalously warm years, on early life stages of reef corals remains poorly studied. To redress this situation, survivorship of larvae of the brooding coral, Favia fragum, was studied in the laboratory, using both short term (48 h) and long term (156–191 h) exposures to 28, 29, and 31°C.

Shearer, T.L., Porto, I., Leon Zubillaga, A .and Coffroth, M.A. (2008)
"Restoration of coral populations in light of genetic diversity"
Marine Ecology Progress Series, 28(3): 727-733.
Summary: Due to the importance of preserving the genetic integrity of populations, strategies to restore damaged coral reefs should attempt to retain the allelic diversity of the disturbed population; however, genetic diversity estimates are not available for most coral populations. To provide a generalized estimate of genetic diversity (in terms of allelic richness) of scleractinian coral populations, the literature was surveyed for studies describing the genetic structure of coral populations using microsatellites.

Botsford, L.W., White, J.W., Coffroth, M.A., Paris, C., Planes, S., Shearer, T.L. Thorrold, S., Jone, G. P. (2009)
"Connectivity and resilience of coral reef metapopulations in MPAs: matching empirical efforts to predictive needs"
Coral Reefs, 28(2): 327-337.
Summary: Design and decision-making for marine protected areas (MPAs) on coral reefs require prediction of MPA effects with population models. Modeling of MPAs has shown how the persistence of metapopulations in systems of MPAs depends on the size and spacing of MPAs, and levels of fishing outside the MPAs. However, the pattern of demographic connectivity produced by larval dispersal is a key uncertainty in those modeling studies.

Jones, G.P., Russ, G.D., Sale, P.F. and Steneck, R.S. (2009)
"Theme section on Connectivity, resilience and the future of coral reefs"
Coral Reefs, 28(2): 303-305.
Summary: This article primarily focus on connectivity over spatial scales relevant to the typical spacing of local populations of reef organisms (kilometres to hundreds of kilometres). It is concerned with demographically significant levels of larval retention or dispersal on time scales that are relevant to the current dynamics of reef populations and their immediate future in the context of exploitation and environmental change (years to a few decades).

Biomarkers

Leggat, W., Hoegh-Guldberg, O., Dove, S. and Yellowlees, D. (2007)
"Analysis of an EST library from the dinoflagellate (Symbiodinium sp.) symbiont of reef-building corals"
Journal of Phycology, 43(5): 1010-1021.
Summary: Dinoflagellates (Symbiodinium sp. Freud.) are an obligatory endosymbiont of the reef-building corals. This study identified 1456 unique expression sequence tags (ESTs) generated for Symbiodinium (clade C3) from the staghorn coral Acropora aspera following exposure to a variety of stresses.

Rodriguez-Lanetty, M., Phillips, W.S., Dove, S., Hoegh-Guldberg, O. and Weis, V. (2008)
"Analytical approach for selecting normalizing genes from a cDNA microarray platform to be used in q-RT-PCR assays: A cnidarian case study"
Journal of Biochemical & Biophysical Methods, 70(6): 985-991.
Summary: Research in gene function using Quantitative Reverse Transcription PCR (q-RT-PCR) and microarray approaches are emerging and just about to explode in the field of coral and cnidarian biology. In this study, an effective analytical method is introduced to identify candidate housekeeping genes (HKG) from a sea anemone (Anthopleura elegantissima) cDNA microarray platform that can be used as internal control genes to normalize q-RT-PCR gene expression data.

Connectivity estimates for coral reefs

Steneck, R. S. Alban, M. Alcala, A. Arnold, S. Butler, M., McCook, L., Paris, C., Russ, G., Sale, P. F. (2009)
"Thinking and managing outside the box: Enlarging the footprint and coalescing connectivity networks for the resilience of coral reef ecosystems"
Coral Reefs, 28(2): 367-378.
Summary: As the science of connectivity evolves, so too must the management of coral reefs. It is now clear that the spatial scale of disturbances to coral reef ecosystems is larger and the scale of larval connectivity is smaller than previously thought. This poses a challenge to the current focus of coral reef management, which often centers on the establishment of no-take reserves (NTRs) that in practice are often too small, scattered, or have low stakeholder compliance.

Almany, G.R., Connolly, S.R., Heath, D.D., Hogan, J.D., Jones, G.P., McCook, L.J., Mills, M., Pressey, R.L. and Williamson, D.H. (2009)
"Connectivity, biodiversity conservation and the design of marine reserve networks for coral reefs"
Coral Reefs, 28(2): 339-351.
Summary: Networks of no-take reserves are important for protecting coral reef biodiversity from climate change and other human impacts. Ensuring that reserve populations are connected to each other and non-reserve populations by larval dispersal allows for recovery from disturbance and is a key aspect of resilience.

Connectivity estimates for selected reef fishes

Sale. P.F. (2004)
"Connectivity, recruitment variation and the structure of reef fish communities"
Integrative and Comparative Biology, 44(5): 390-399.
Summary: Coral reefs contain the most speciose communities of fishes on this planet, so it is appropriate to use these to explore how fish species are organized into communities. While descriptive data suggest that the diverse communities of fish on coral reefs are equilibrial assemblages of species, all finely adapted to specific and unique ecological roles, these are highly dynamic, non-equilibrial assemblages with structure driven more by patterns of recruitment and loss of individual fishes, than by patterns of resource allocation among differently adapted phenotypes.

Kritzer, J.P and Sale, P.F. (2004)
"Metapopulation ecology in the sea: from Levin's model to marine ecology and fisheries science"
Fish and Fisheries, 5(2):131-140.
Summary: Marine and fisheries scientists are increasingly using metapopulation concepts to better understand and model their focal systems. Consequently, they are considering what defines a metapopulation. One perspective on this question emphasizes the importance of extinction probability in local populations.

Paris, C.B. and Cowen, R.K. (2004)
"Direct evidence of a biophysical retention mechanism for coral reef fish larvae"
Limnology and Oceanography, 49(6): 1964-1979.
Summary: We examine the hypothesis that reef fish larvae have some direct influence on their own dispersal and ability to recruit to their natal reef by tracking cohorts of bicolor damselfish (Stegastes partitus) from hatching to settlement onto the reef, about 30 days later.

Jones, G., Planes, S. and Thorrold, S.R. (2005)
"Coral reef fish larvae settle close to home"
Current Biology, 15(14): 1314-18.
Summary: Population connectivity through larval dispersal is an essential parameter in models of marine population dynamics and the optimal size and spacing of marine reserves. However, there are remarkably few direct estimates of larval dispersal for marine organisms, and the actual birth sites of successful recruits have never been located. Here, we solve the mystery of the natal origin of clownfish (Amphiprion polymnus) juveniles by mass-marking via tetracycline immersion all larvae produced in a population.

Chittaro, P.M., Usseglio, P., Fryer, B. and Sale, P.F. (2005)
"Using otolith microchemistry of Haemulon flavolineatum (French grunt) to characterize mangroves and coral reefs throughout Turneffe Atoll, Belize: difficulties at small spatial scales"
Estuaries, 28(3): 373-381.
Summary: We investigated whether the otolith chemistry of Haemulon flavolineatum (French grunt), a nocturnally active fish, could be used as a means to differentiate individuals occupying mangrove and coral reef habitats.

Sale, P.F., Cowen, R.K., Danilowicz, B.S., Jones, G.P., Kritzer, J.P., Lindeman,K.C., Planes, S., Polunin, N.V.C., Russ, G.R., Sadovy, Y,J. and Steneck, R.S. (2005)
"Critical science gaps impede use of no-take fishery reserves"
Trends in Ecology and Evolution, 20(2): 74-80.
Summary: As well as serving valuable biodiversity conservation roles, functioning no-take fishery reserves protect a portion of the fishery stock as insurance against future overfishing. So long as there is adequate compliance by the fishing community, it is likely that they will also sustain and even enhance fishery yields in the surrounding area. However, there are significant gaps in scientific knowledge that must be filled if no-take reserves are to be used effectively as fishery management tools. Unfortunately, these gaps are being glossed over by some uncritical advocacy. Here, we review the science, identify the most crucial gaps, and suggest ways to fill them, so that a promising management tool can help meet the growing challenges faced by coastal marine fisheries.

Sale, P.F., Danilowicz, B.S. Doherty, P.J. and Williams, D.McB. (2005)
"The relation of microhabitat to variation in recruitment of young-of-year coral reef fishes"
Bulletin of Marine Science, 76(1): 123-142.
Summary: Despite their importance at smaller scales, microhabitat characteristics appear to have only a minor influence on recruitment of reef fishes at scales of >50 m. Abundance of young-of-year (YOY) recruits of 104 species was measured in late summer of 3 yrs at three sites on each of seven reefs of the Capricorn-Bunker Group, southern Great Barrier Reef.

Hepburn, R.I., Mottillo, E. Bentzen, P. and Heath, D.D. (2005)
"Polymorphic microsatellite loci for the masked goby, Coryphopterus personatus (Gobiidae)"
Conservation Genetics, 6(6): 1059-1062.
Summary: Understanding dispersal processes is critical for population management and/or creation of reserves, and polymorphic genetic markers are key to evaluating such processes.

Sadovy, Yvonne. (2005)
"Trouble on the reef: the imperative for managing vulnerable and valuable fisheries"
Fish and Fisheries, 6(3):167-185.
Summary: Reef fishes are significant socially, nutritionally and economically, yet biologically they are vulnerable to both over-exploitation and degradation of their habitat. Their importance in the tropics for living conditions, human health, food security and economic development is enormous, with millions of people and hundreds of thousands of communities directly dependent, and many more indirectly so. Reef fish fisheries are also critical safety valves in times of economic or social hardship or disturbance, and are more efficient, less wasteful and support far more livelihoods per tonne produced than industrial scale fisheries. Yet, relative to other fisheries globally, those associated with coral reefs are under-managed, under-funded, under-monitored, and as a consequence, poorly understood or little regarded by national governments.

Paris, C. B., Cowen, R. K., Claro, R. and Lindeman, K.C. (2005)
"Larval transport pathways from Cuban spawning aggregations (Snappers; Lutjanidae) based on biophysical modeling"
Marine Ecology Progress Series, 296: 93-106.
Summary: The potential linkages among Cuba and geographically associated northwestern Caribbean locations were examined through simulated transport of snapper larvae for 5 harvested snapper species. The analyses are based on a coupled biophysical model incorporating realistic, intra-annual varying currents from a single year (1984), a Lagrangian stochastic scheme, and larval behaviors to find settlement habitat.

Thorrold, S.R., Jones, G.P., Planes, S. and Hare, J.A. (2006)
"Transgenerational marking of embryonic otoliths in marine fishes using barium stable isotopes"
Canadian Journal of Fisheries and Aquatic Sciences, 63(6): 1193-1197.
Summary: We describe a new technique for transgenerational marking of embryonic otoliths that promises significant advancements in the study of larval dispersal and population connectivity in marine fishes.

Chittaro, P.M., Usseglio, P., Fryer, B.J. And Sale, P.F. (2006)
"Spatial variation in otolith chemistry of Lutjanus apodus at Turneffe Atoll, Belize Estuarine"
Coastal and Shelf Science, 67(4): 673-80.
Summary: Lutjanus apodus (Schoolmaster) were collected from several mangroves and coral reefs at Turneffe Atoll, Belize, in order to investigate whether elemental concentrations from the otolith edge could be used as a means to identify the habitat (mangrove or coral reef) and site (9 mangrove sites and 6 reef sites) from which they were collected.

Purcell, J.F.H., Cowen, R.K., Hughes, C.R. and Willams, D.A. (2006)
"Weak genetic structure indicates strong dispersal limits: a tale of two coral reef fish"
Proceedings of The Royal Society. Part B, 273: 1483-90.
Summary: The extent of dispersal by pelagic larvae in marine environments, including coral reefs, is central for understanding local population dynamics and designing sustainable marine reserves. We present here the first example of a clear stepping-stone genetic structure throughout the Caribbean basin for a common coral reef species, the French grunt (Haemulon flavolineatum).

Cowen, R.K., Paris, C.B. and Srinivasan, A. (2006)
"Scaling of connectivity in marine populations"
Science, 311: 522-527.
Summary: Defining the scale of connectivity, or exchange, among marine populations and determining the factors driving this exchange are pivotal to our understanding of the population dynamics, genetic structure, and biogeography of many coastal species. Using a high-resolution biophysical model for the Caribbean region, we report that typical larval dispersal distances of ecologically relevant magnitudes are on the scale of only 10 to 100 kilometers for a variety of reef fish species.

Thorrold, S.R. (2006)
"Ocean ecology: don't fence me in"
Current Biology, 16(16): 639-640.
Summary: New research that combines ocean circulation and genetic models to predict population structure of corals will help conservation efforts in tropical reef ecosystems.

Ablan, M.C.A. (2006)
"Genetics and the study of fisheries connectivity among marine species in Asian developing countries"
Fisheries Research, 78(2-3): 158-168.
Summary: Management interventions to halt the decline and restore productivity of coastal fisheries in developing countries are increasingly becoming spatially explicit and focused on local scales. As policies in these countries gravitate towards local management, knowledge of the extent to which the local management units are dependent or independent of others becomes essential to the success of any intervention.

Chittaro, P.M., Gagnon, J., Fryer, B.J. and Sale, P.F. (2006)
"The differentiation of Stegastes partitus populations using lapillar and sagittal otolith chemistry"
Journal of Fish Biology, 68(6): 1909-1917.
Summary: The comparison of elemental concentrations of sagittal and lapillar otoliths from the same individuals of Stegastes partitus indicated significant differences for several elements. Sagittal otoliths were superior at differentiating individuals, yet the differentiation of individuals was further improved when the elemental concentrations of both otolith types were used in the same analysis.

Chittaro, P.M., Hogan, J.D., Gagnon, J., Fryer, B.J. and Sale, P.F. (2006)
"In situ experiment of ontogenetic variability in the otolith microchemistry of Stegastes partitus"
Marine Biology, 149: 1227-1235.
Summary: Otolith chemistry can be used to assess pelagic larval fish connectivity by comparing spatially variable otolith edge chemistry (corresponding to the site of collection) to otolith core chemistry (corresponding to the site of hatching). Here we present data from a field experiment in which otoliths from embryos (3 days post-fertilization) and juveniles of Stegastes partitus were collected at the same site and time, and chemically analyzed to assess whether elemental concentrations of otoliths vary ontogenetically.

Chittaro, P.M., Mora, C., Fryer, B.J. and Sale, P.F. (2006)
"Discrimination of Stegastes partitus populations and an assessment of the movement of individuals at Turneffe Atoll, Belize"
Marine Ecology Progress Series.

Steneck, R.S. (2006)
"Staying connected in a turbulent world"
Science, 311: 480-481.
Summary: The swimming behavior of fish larvae limits their dispersal among coral reef populations more than previously thought. This stands to affect the design of protected marine ecosystems.

Thiessen, R.J. and Heath, D.D. (2007)
"Characterization of one trinucleotide and six dinucleotide microsatellite markers in bicolor damselfish, stegastes partitus, a common coral reef fish"
Conservation Genetics, 8(4): 983-985.
Summary: Fourteen primer pairs were designed from 47 sequences containing microsatellites isolated from a genomic library enriched for (GACA)4 in Stegastes partitus.

Almany, G.R. Berumen, M.L., Thorrold, S.R., Planes, S. and Jones, G.P. (2007)
"Local replenishment of coral reef fish populations in a marine reserve"
Science, 316: 742-44.
Summary: The scale of larval dispersal of marine organisms is important for the design of networks of marine protected areas. We examined the fate of coral reef fish larvae produced at a small island reserve, using a mass-marking method based on maternal transmission of stable isotopes to offspring.

Hogan, J.D., Thiessen, R.J.and Heath, D.D. (2008)
"Spatial and temporal instability in the genetic structure of adult and juvenile bicolor damselfish (Stegastes partitus) along the Mesoamerican barrier reef., *Heredity, In Review.*

Nolan, C.J. and Danilowicz, B.S. (2008)
"Advantages of using crest nets to sample pre-settlement larvae of reef fishes in the Caribbean Sea"
Fishery Bulletin, 106(2): 213-221.
Summary: This study was to simultaneously deploy crest and channel nets to compare the abundance and species richness of larval fishes sampled, and to explore correlations between certain abiotic factors and the number of species and individuals collected by each net type.

Saenz-Agudelo, P., Jones, G.P., Thorrold, S.R. and Planes, S. (2008)
"Estimating connectivity in marine populations: an empirical evaluation of assignment tests and parentage analysis at different spatial scales"
Molecular Ecology, 18(8): 1765-1776.
Summary: The application of spatially explicit models of population dynamics to fisheries management and the design marine reserves network systems has been limited due to a lack of empirical estimates of larval dispersal. Here we compared assignment tests and parentage analysis for examining larval retention and connectivity under two different gene flow scenarios using panda clownfish (Amphiprion polymnus) in Papua New Guinea.

Jones, G. P. lmany, G. R., Russ, G. D., Sale, P. F., Steneck, R. S., van Oppen, MJH, Willis, B. L., Williamson, D. H. (2009)
"Larval retention and connectivity among populations of corals and reef fishes: history, advances and challenges"
Coral Reefs, 28(2): 307-325.
Summary: The extent of larval dispersal on coral reefs has important implications for the persistence of coral reef metapopulations, their resilience and recovery from an increasing array of threats, and the success of protective measures. This article highlights a recent dramatic increase in research effort and a growing diversity of approaches to the study of larval retention within (self-recruitment) and dispersal among (connectivity) isolated coral reef populations.

McCook, L.J.,. Almany, G.R. Berumen, M.L., Day, J.C., Green, A.L., Jones, G.P., Leis, J.M., Planes, S., Russ, G.R., Sale, P.F. and Thorrold S.R. (2009)
"Management under uncertainty: guidelines for incorporating connectivity into the protection of coral reefs"
Coral Reefs, 28(2): 353-366.
Summary: The global decline in coral reefs demands urgent management strategies to protect resilience. Protecting ectological connectivity, within and among reefs, and between reefs and other ecosystems is critical to resilience. However, connectivity science is not yet able to clearly identify the specific measures for effective protection of connectivity. This article aims to provide a set of principles or practical guidelines that can be applied currently to protect connectivity.

Ravago-Gotanco, R., Lumibao, C.Y. and Pante, Ma. J.R. (2009)
"Isolation of microsatellite markers for estimating population genetic connectivity in the mottled spinefoot rabbitfish, siganus fuscescens"
UPV Journal of Natural Sciences, DOI 10.1007/s12686-009-9148-y.
Summary: The mottled spinefoot, siganus fuscescens, is an economically important rabbitfish species widely distributed in shallow waters throughout the Indo-Pacific. We describe methods for the identification of thirteen novel microsatellite markers for S. fuscescens using an enrichment protocol.

Hepburn, R.I., Sale, P., Dixon, B. and Heath, D.D. (2009)
"Genetic structure of juvenile cohorts of bicolor damselfish (Stegastes partitus) along the Mesoamerican barrier reef: chaos through time"
Coral Reefs, 28(1): 277-288.
Summary: Dispersal in marine systems is a critical component of the ecology, evolution, and conservation of such systems; however, estimating dispersal is logistically difficult, especially in coral reef fish. Juvenile bicolor damselfish (Stegastes partitus) were sampled at 13 sites along the Mesoamerican Barrier Reef System (MBRS), the barrier reefs on the east coast of Central America extending from the Yucatan, Mexico to Honduras, to evaluate genetic structure among recently settled cohorts.

Coral resistance to disease

Garren, M., Smriga, S. and Azam, F. (2008)
"Gradients of coastal fish farm effluents and their effect on coral reef microbes"
Environmental Microbiology, 1 (9): 2299-2312.
Summary: Coastal milkfish (Chanos chanos) farming may be a source of organic matter enrichment for coral reefs in Bolinao, Republic of the Philippines. Interactions among microbial communities associated with the water column, corals and milkfish feces can provide insight into the ecosystem's response to enrichment.

Mydlarz, L., E. McGinty, C.D. Harvell. (2009)
"What are the physiological and immunological responses of coral to climate change?"
Journal of Experimental Biology, 213(6): 934-945.
Summary: Coral mortality due to climate-associated stress is likely to increase as the oceans get warmer and more acidic. Coral bleaching and an increase in infectious disease are linked to above average sea surface temperatures. Despite the uncertain future for corals, recent studies have revealed physiological mechanisms that improve coral resilience to the effects of climate change.

Garren, M., L. Raymundo, J. Guest, C.D. Harvell and F. Azam. (2009)
"Resilience of coral-associated bacterial communities exposed to fish farm effluent"
PLoS One, 4(10): e7319. doi:10.1371/journal.pone.0007319.
Summary: The coral holobiont includes the coral animal, algal symbionts, and associated microbial community. These microbes help maintain the holobiont homeostasis; thus, sustaining robust mutualistic microbial communities is a fundamental part of long-term coral reef survival. Coastal pollution is one major threat to reefs, and intensive fish farming is a rapidly growing source of this pollution.

Dynamic decision support system

Cabral, R.B., Geronimo, R.C., Lim, M.T. And Alino, P.M. (2009)
"Effect of variable fishing strategy on fisheries under changing effort and pressure: An agent-based model application"
Ecological Modelling, 221(2): 362-369.
Summary: An agent-based model was used to evaluate the response of a two-species fish community to fishing boat exploration strategies, namely: boats following high-yield boats (Cartesian); boats fishing at random sites (stochast-random); and boats fishing at least exploited sites (stochast-pressure).

Arias-González J. E., Garza-Pérez R. Acosta-González G., Ruiz-Zárate M. A., González-Salas C. Bozec Y-M, Lindeman K. C. (2009)
"Rapid phase-shift on a Caribbean coral reef (Mahahual, Mexico): a mixture of anthropogenic and natural factors"
Coral Reefs.

Ecological mechanisms and outcomes

Lesser, M. P., Falcón, L. I., Rodríguez-Román, A., Enríquez, S., Hoegh-Guldberg, O. and Iglesias-Prieto, R. (2007)
"Nitrogen fixation by symbiotic Cyanobacteria provides a source of new nitrogen for the Scleractinian coral, Montastraea cavernosa"
Marine Ecology Progress Series, 346: 143-152.
Summary: Colonies of the Caribbean coral Montastraea cavernosa (Linnaeus) that harbor endosymbiotic cyanobacteria can fix nitrogen, whereas conspecifics without these symbionts cannot.

Naumann MS, Niggl W, Laforsch C, Glaser C, Wild C. (2009)
"Coral surface area quantification – evaluation of established methods by comparison with computer tomography"
Coral Reefs, 28(1): 109-117.
Summary: The surface area of scleractinian corals represents an important reference parameter required for various aspects of coral reef science. This study presents an evaluation of methodological accuracy for established techniques in comparison to a novel approach composed of computer tomography (CT) and 3-dimensional surface reconstruction.

Haas A, el-Zibdah M, Wild C. (2009)
"Effects of inorganic and organic nutrient addition on direct competition between hermatypic corals and benthic reef algae in the Northern Red Sea"
Journal of Experimental Marine Biology and Ecology, 380 (1-2): 99-105.
Summary: Previous studies in fringing reefs of the Northern Red Sea demonstrated that the in-situ competition of corals and algae in natural assemblages is highly variable between seasons displaying fast overgrowth of corals by benthic reef algae in fall that follows close to equilibrium between both groups of organisms in summer.

Naumann MS, Richter C, el-Zibdah M, Wild C. (2009)
"Coral mucus as an efficient trap for picoplanktonic cyanobacteria -implications for pelagic-benthic coupling in the reef ecosystem"
Marine Ecology Progress Series, 385: 65-76.
Summary: Although the planktonic community of coral reefs is dominated by picoplankton (e.g. the cyanobacterium Synechococcus), it was long believed to play only a marginal role in pelagic– benthic coupling, as its minute size (0.2 to 2.0 µm) and negligible sinking rate render it largely unavailable for the filter-feeding reef benthos. However, scleractinian corals have been shown to continuously release mucus that functions as an efficient trap and important carrier for particulate matter within the reef ecosystem. This study investigates the trapping potential of coral mucus for picoplankton in the laboratory and in the field.

van Woesik, R., Lacharmoise, F. and Koksal, S. (2006)
"Annual cycles of solar insolation predict spawning times of Caribbean corals"
Ecology Letters, 9: 390-398.
Summary: Seasonal increases in sea surface temperature (SST) have long been considered the trigger for mass spawning events in reef corals. We critically examined the relationship between SST and the spawning activity of broadcasting corals in the tropical western Atlantic (Caribbean).

Dove, S., Ortiz, J.C., Enriquez, S., Fine, M., Fisher, P., Iglesias-Prieto, R., Thornhill, D. and Hoegh-Guldberg, O. (2006)
"Response of holosymbiont pigments from the scleractinian coral Montipora monasteriata to short-term heat stress"
Limnology and Oceanography, 51(2): 1149-1158.
Summary: Heating the scleractinian coral, Montipora monasteriata (Forskal 1775) to 32°C under <650 mmol quanta m-2 s-1 led to bleaching in the form of a reduction in Peridinin, xanthophyll pool, chlorophyll c2 and chlorophyll a, but areal dinoflagellates densities did not decline. Associated with this bleaching, chlorophyll (Chl) allomerization and dinoflagellate xanthophyll cycling increased. Chl allomerization is believed to result from the interaction of Chl with singlet oxygen (1O2) or other reactive oxygen species.

Leggat, W. Ainsworth, T. Bythell, J., Dove, S., Gates, R., Hoegh-Guldberg, O., Iglesias-Prieto, R. and Yellowlees, D. (2007)
"The hologenome theory disregards the coral holobiont Reply to Rosenberg et al."
Nature Reviews: Microbiology, 5(10) doi:10.1038/nrmicro1635-c1.
Summary: The 'hologenome theory of evolution', proposed by Rosenberg and colleagues, suggests that reef corals, and by extrapolation other multicellular organisms, adapt to environmental stress by alterations in their resident microbial communities. Although this is an interesting idea, we strongly disagree with aspects of this theory, specifically those that arise from the omission and flawed interpretation of the coral literature.

Schuttenberg, H. and Hoegh-Guldberg, O. (2007)
"A world with corals: What will it take?"
Science, 318: 5847.
Summary: The measures required to limit climate change can seem an eternity away to coastal communities left to deal with the consequences. Yet, since the 1997–98 mass bleaching—an unforgiving global event that destroyed 16% of the world's coral reefs—practitioners and scientists have worked to identify meaningful actions that can promote reef survival in the face of climate change. We believe it is more useful to ask, "What would it take to have a world with corals?"

Hoegh-Guldberg, O., Mumby, P.J., Hooten, A. J., Steneck, R.S., Greenfield, P., Gomez, E., Harvell D. R, Sale, P.F., Edwards, A.J., Caldeira, K., Knowlton, N., Eakin, C. M., Iglesias-Prieto, R., Muthiga, N. radbury, R.H., Dubi, A. and Hatziolos, M. E. (2007)
"Coral reefs under rapid climate change and ocean acidification"
Science, 318: 1737-1742.
Summary: Atmospheric carbon dioxide concentration is expected to exceed 500 parts per million and global temperatures to rise by at least 2°C by 2050 to 2100, values that significantly exceed those of at least the past 420,000 years during which most extant marine organisms evolved. Under conditions expected in the 21st century, global warming and ocean acidification will compromise carbonate accretion, with corals becoming increasingly rare on reef systems. The result will be less diverse reef communities and carbonate reef structures that fail to be maintained.

Coronado, C., Candela, C., Iglesias-Prieto, R., Sheinbaum, J., Lopez, M. and Ocampo-Torres, F. (2007)
"On the circulation in the Puerto Morelos fringing reef lagoon"
Coral Reefs, 26(1): 149-163.
Summary: For a period of 22 months beginning in September 2003, an array of four current profilers were deployed on the Puerto Morelos fringing reef lagoon, a microtidal Caribbean environment characterised by the influence of the Yucatan Current (YC) and a Trade Wind regime.

Bejarano, S., Ticzon, V., Mumby, P.J. (2007)
"Modelling the grazing of Pacific Parrotfishes"
Marine Ecology Progress Series.
Summary: Since grazing by parrotfishes plays a crucial role in processes of reef recovery, this study aimed to understand the way it is affected by important biophysical variables.

Yarden, O. Ainsworth, T. D., Roff, G., Leggat, W., Fine, M. and Hoegh-Guldberg, O. (2007)
"Increased prevalence of ubiquitous Ascomycetes in an Acropoid coral (Acropora formosa) exhibiting symptoms of brown band syndrome and skeletal eroding band disease"
Applied and Environmental Microbiology, 73 (8): 526-538 .
Summary: The prevalence of coral-associated fungi was four times higher in diseased Acropora formosa colonies than in healthy colonies. Since taxonomically related fungal species were isolated from diseased and healthy colonies, we suggest that their association with coral may be constitutive but that their abundance is dependent on coral health.

Gomez Cabrera, M. del c; Ortiz, J. C., Loh, W. K.; Ward, S. and Hoegh-Guldberg, O. (2007)
"Acquisition of symbiotic dinoflagellates (Symbiodinium) by juveniles of the coral Acropora longicyathus"
Coral Reefs, 27(1): 219-226,1.
Summary: Scleractinian corals may acquire Symbiodinium from their parents (vertically) or from the environment (horizontally). In the present study, adult colonies of the coral Acropora longicyathus from One Tree Island (OTI) on the southern Great Barrier Reef (Australia) acquired two distinct varieties of symbiotic dinoflagellates (Symbiodinium) from the environment.

McClanahan, T. R. teweberhan, M., Ruiz Sebastian, C., Graham, N. A. J., Wilson, S. K. Bruggemann, J. H. and Guillaume, M. M. M. (2007)
"Predictability of coral bleaching from synoptic satellite and in situ temperature observations"
Coral Reefs, 26(3): 695-701.
Summary: Satellite and compiled in situ observations of sea surface temperatures have greatly increased the ability to detect anomalous and persistent warm water and are being widely used to predict climate change, coral bleaching and mortality. A field-based synoptic view of coral bleaching spanning eight countries and Ð35° of latitude in the western Indian Ocean tested the accuracy of synoptic temperature data derived from satellites and shipboard data to detect and predict bleaching during 2005.

LaJeunesse, T.C., Reyes-Bonilla, H. and Warner, M. E. (2007)
"Spring "bleaching" among Pocillopora in the Sea of Cortez, Eastern Pacific"
Coral Reefs, 26(2): 265-270.
Summary: A mild bleaching event was observed among Pocillopora spp. in the southern Gulf of California in the spring of 2006. No mortality was observed among tagged bleached colonies nor did symbiont species composition change during recovery. This unusual episode of bleaching did not appear to be a response to thermal stress, but may have been triggered by high levels of solar radiation during a period of unseasonally high water clarity in the early spring.

Ledlie, M.H., Graham, N.A.J. Bythell, J.C., Wilson, S.K., Jennings, S., Polunin, N.V.C. and Hardcastle, J. (2007)
"Phase shifts and the role of herbivory in the resilience of coral reefs"
Coral Reefs, 26(3): 641-653.
Summary: Cousin Island marine reserve (Seychelles) has been an effectively protected no-take marine protected area (MPA) since 1968 and was shown in 1994 to support a healthy herbivorous fish assemblage. In 1998 Cousin Island reefs suffered extensive coral mortality following a coral bleaching event, and a phase shift from coral to algal dominance ensued.

Efrony, R., Loya, Y. Bacharach, E. and Rosenberg, E. (2007)
"Phage therapy of coral disease"
Coral Reefs, 26(1): 7-13.
Summary: At present there are no known procedures for preventing or treating infectious diseases of corals. Toward this end, the use of phage therapy has been investigated.

Golbuu, Y., Victor, S., Penland, L., Idip, D., Emaurois, C., Okaji, K., Yukihira, H., Iwase, A. and van Woesik, R. (2007)
"Palau's coral reefs show differential habitat recovery following the 1998-bleaching event"
Coral Reefs, 26(2): 319-332.
Summary: Documenting successional dynamics of coral communities following large-scale bleaching events is necessary to predict coral population responses to global climate change.

McClanahan, T. R. Ateweberhan, M., Muhando, C., Maina, J. and Mohammed, S. M. (2007)
"Effects of climate and seawater temperature variation on coral bleaching and mortality"
Ecological Monographs, 77(4): 503-525.
Summary: Coral bleaching due to thermal and environmental stress threatens coral reefs and possibly people who rely on their resources. Here we explore patterns of coral bleaching and mortality in East Africa in 1998 and 2005 in a region where the equatorial current and the island effect of Madagascar interact to create different thermal and physicochemical environments.

Caldeira, K. Archer, D. Barry, J. P. Bellerby, R.G.J. Brewer, P.G., Cao, L., Dickson, A.G., Doney, S. C., Elderfield, H., Fabry, V. J., Feely, R. A., Gattuso, J.-P., Haugan, P.M., Hoegh-Guldberg, O., Jain, A. K., Kleypas, J. A., Langdon, C., Orr, J. C., Ridgwell, A., Sabine, C. L., Seibel, B. A., Shirayama, Y., Turley, C., Watson, A. and Zeebe, R. E. (2007)
"Comment on "Modern-age buildup of CO_2 and its effects on seawater acidity and salinity" by Hugo A. Loaiciga"
Geophysical Research Letters, 34: L18608.doi:10.1029/2006GL027288.
Summary: A doubling of present atmospheric CO_2 concentrations (to 760 ppm) may occur by the end of this century in the absence of efforts to diminish CO_2 emissions from fossil-fuel combustion Intergovernmental Panel on Climate Change (IPCC), 2001]. Based on inappropriate assumptions and erroneous thermodynamic calculations, Loa´ iciga [2006] mistakenly reports that atmospheric CO_2 concentrations of 760 ppm will lower the pH of the surface ocean by 0.28 relative to the natural "mid 18th century" conditions.

Lesser, M.P. Bythell, J.C., Gates, R.D., Johnstone, R.W. and Hoegh-Guldberg, O. (2007)
"Are infectious diseases really killing corals? Alternative interpretations of the experimental and ecological data"
Journal of Experimental Marine Biology & Ecology, 346(1-2): 36-44.
Summary: Emerging infectious diseases are a worldwide problem and are believed to play a major role in coral reef degradation. The study of coral diseases is difficult but the use of culture-independent molecular techniques has been, and will continue to be, useful in a system where a limited number of visible signs are commonly used to define a "coral disease". We propose that coral "diseases", with rare exception, are opportunistic infections secondary to exposure to physiological stress (e.g. elevated temperature) that result in reduced host resistance and unchecked growth of bacteria normally benign and non-pathogenic.

Torregiani, J. H. and Lesser, M. P. (2007)
"The effects of short-term exposures to ultraviolet radiation in the Hawaiian Coral, Montipora verrucosa"
Journal of Experimental Marine Biology and Ecology, 340(2): 194-203.
Summary: Exposure to ultraviolet radiation (UVR, 290–400 nm) is an important abiotic factor that tropical marine organisms have been exposed to over evolutionary time. Additionally, UVR is known to cause coral bleaching independently and is an important synergistic factor in bleaching caused by thermal stress.

Visram, S. and Douglas, A.E. (2007)
"Resilience and acclimation to bleaching stressors in the scleractinian coral Porites cylindrica"
Journal of Experimental Marine Biology and Ecology, 349(1): 35-44.
Summary: 'Resilience', the capacity of the coral symbiosis with dinoflagellate algal symbionts ('zooxanthellae') to recover after bleaching, is a little-studied but crucial aspect of coral responses to bleaching stressors. This study investigated the response of the zooxanthella population in the coral Porites cylindrica after bleaching either naturally on a shallow subtidal reef or experimentally in response to elevated temperature and darkness.

Houk, P. Bograd, S. and van Woesik, R. (2007)
"The transition zone chlorophyll front can trigger Acanthaster planci outbreaks in the Pacific Ocean: historical confirmation"
Journal of Oceanography, 63(1): 149-154.
Summary: We hypothesize that the North Pacific transition zone chlorophyll front (TZCF) can episodically deliver enhanced phytoplankton levels that are linked to the emergence of adult populations of the coral eating starfish Acanthaster planci.

McClanahan, T. R., M. Ateweberhan, C. R. Sebastian, N. A. J. Graham, S. K. Wilson, M. M. M. Guillaume, and J. H. Bruggemann. (2007)
"Western Indian Ocean coral communities: bleaching responses and susceptibility to extinction"
Marine Ecology Progress Series, 337: 1-13.
Summary: A field study of coral bleaching and coral communities was undertaken spanning 8 countries and ~35° of latitude in 2005. This was combined with studies in southern Kenya and northeast Madagascar in 1998 and Mauritius in 2004 to develop a synoptic analysis of coral community structure, bleaching response, susceptibility of the communities to bleaching, and the relative risk of extinctions in western Indian Ocean coral reefs.

Pettay, D.T. and LaJeunesse, T.C. (2007)
"Microsatellites from clade B Symbiodinium spp.
Specialized for Caribbean corals in the genus Madracis"
Molecular Ecology Notes, 7:1271-1274.
Summary: In order to determine boundaries of genetic recombination among putative 'species' of endosymbiotic dinoflagellates, nine polymorphic microsatellite loci were developed and optimized for clade B Symbiodinium designated as type 7 (B7) and two related types, B13 and B13a.

Poloczanska, E.S. Babcock, R. Butler, A., Hobday, A.J., Hoegh-Guldberg, O., Kunz, T.J. Matear, R., Milton, D.A., Okey, T.A. and Richardson, A.J. (2007)
"Climate change and Australian marine life"
Oceanography and Marine Biology: An Annual Review, 45: 407-478.
Summary: Australia's marine life is highly diverse and endemic. Here we describe projections of climate change in Australian waters and examine from the literature likely impacts of these changes on Australian marine biodiversity.

Muller, E.M., Rogers, C.S., Spitzack, A.S. and van Woesik, R. (2008)
"Bleaching increases likelihood of disease on Acropora palmata (Lamarck) at Hawksnest Bay, St. John, US Virgin Islands"
Coral Reefs, 27(1): 191-195.
Summary: Anomalously high water temperatures may enhance the likelihood of coral disease outbreaks by increasing the abundance or virulence of pathogens, or by increasing host susceptibility. This study tested the compromised-host hypothesis, and documented the relationship between disease and temperature, through monthly monitoring of Acropora palmata colonies from May 2004 to December (2006) in Hawksnest Bay, St John, US Virgin Islands (USVI).

Wild, C., Jantzen, C., Struck, U., Hoegh-Guldberg, O. and Huettel, M. (2008)
"Biogeochemical responses following coral mass spawning on the Great Barrier Reef: Pelagic-benthic coupling"
Coral Reefs, 27(1): 123-132.
Summary: This study quantified how the pulse of organic matter from the release of coral gametes triggered a chain of pelagic and benthic processes during an annual mass spawning event on the Australian Great Barrier Reef.

Iwase A., Sakai, K. Suzuki, A. van Woesik, R. (2008)
"Phototrophic adjustment of the foliaceous coral Echinopora lamellosa in Palau"
Estuarine, Coastal and Shelf Science, 77(4): 672-678.
Summary: We tested the hypothesis that foliose plates of Echinopora lamellosa (Esper, 1795) adjust their primary growth direction (or slope from the horizontal) when irradiance (light) is limiting.

Zvuloni, A. Artzy-Randrup, Y., Stone, L., van Woesik, R. and Loya, Y. (2008)
"Ecological size-frequency distributions: how to prevent and correct biases in spatial sampling"
Limnology & Oceanography: Methods, 6: 144-152.
Summary: Size-frequency distributions (SFDs) have been used to assess the ecological status of different populations in a variety of ecosystems and recently have become widely used to examine reef corals. SFDs may reflect the response of time-varying influences of the environment, including the intensity and frequency of disturbances and the degree of environmental degradation.

McClanahan, T. R. Ateweberhan, M. and Omukoto, J. (2008)
"Long-term changes in coral colony size distributions on Kenyan reefs under different management regimes and across the 1998 bleaching event"
Marine Biology, 153: 755-768.
Summary: Colony size is an important life-history characteristic of corals and changes in colony size will have significant effects on coral populations. This study summarizes *21,000 haphazard colony size measurements of 26 common coral taxa (mostly coral genera) collected annually between 1992 and 2006 in seven Kenyan reef lagoons.

Zvuloni, A. Armoza-Zvuloni, R. and Loya, Y. (2008)
"Structural deformation of branching corals associated with the vermetid gastropod Dendropoma maxima"
Marine Ecology Progress Series, 363: 103-108.
Summary: The vermetid gastropod Dendropoma maxima is found in association with diverse coral species. This association is often characterized by the coral head covered by a wide mucus net secreted by the gastropod to trap food particles from the water column. Here we report on the quantitative effect of the gastropod on the morphology of Stylophora pistillata, one of the most abundant branching corals on the reef flat in Eilat (Gulf of Aqaba/Eilat, Red Sea).

Fitt, W.K., Gates, R.D., Hoegh-Guldberg, O. ythell, J.C,.Jatkar, A,. Grottoli, A.G., Gomez,M., Fisher, P., Lajuenesse, T.C., Pantos, O., Iglesias-Prieto, R., Franklin, D.J., Rodrigues, L.J., Torregiani, J.M., van Woesik, R. and Lesser, M.P. (2009)
"Response of two species of Indo-Pacific corals, Porites cylindrica and Stylophora pistillata, to short-term thermal stress: the host does matter in determining the tolerance of corals to bleaching"
Journal of Experimental Marine Biology and Ecology, 373(2): 102-110.
Summary: The role of both host and dinoflagellate symbionts was investigated in the response of reef-building corals to thermal stress in the light.

Banaszak, A. T. and M. P. Lesser., (2009)
"Effects of Ultraviolet Radiation on Coral Reef Organisms"
Photochemical and Photobiological Sciences, 8: 1276-1294.
Summary: Organisms living in shallow-water tropical coral reef environments are exposed to high UVR irradiances due to the low solar zenith angles (the angle of the sun from the vertical), the natural thinness of the ozone layer over tropical latitudes, and the high transparency of the water column. Here, we review the experimental evidence demonstrating the direct and indirect effects of UVR, both UVB and ultraviolet A (UVA, 320–400 nm) on corals and other reef associated biota, with emphasis on those studies conducted since 1996.

Todd C. LaJeunesse, Tye Pettay, Eugenia Sampayo, Niphon Phongsuwan, Barbara Brown, David Obura, Ove Hoegh-Guldberg, and William Fitt K., (2009)
"Long-standing environmental conditions influence community diversity and dominance among ancient lineages of symbiotic dinoflagellate associated with coral reef cnidarians"
Biogeography, 37(5): 785-800.
Summary: This study examines the importance of geographic proximity, host life history and regional and local differences in environment (temperature and water clarity) in driving the ecological and evolutionary processes underpinning the global patterns of diversity and distribution of symbiotic dinoflagellates.

McClanahan, T. R., Weil, E. W. and Maina, J. (2009)
"Strong relationship between coral bleaching and growth anomalies in massive Porites"
Global Change Biology 15(7): 1804-1816.
Summary: Reports of coral diseases are increasing and may result from human land use and climate change conditions such as increased water temperature, coral bleaching, runoff from land, and changes in the ecology of heavily fished reefs. We examined a stable coral syndrome or a growth anomaly [Porite growth anomaly (PGA)] (skeletal tissue anomaly, hyperplasia, or 'tumor') that was present in 0–15% of massive Porites colonies in 12 Kenyan reef lagoons.

Zvuloni, A. rtzy-Randrup,Y., Stone, L., Kramarsky-Winter, E. Barkan, R. and Loya, Y. (2009)
"Spatio-temporal transmission patterns of black-band disease in a coral community"
PLoS ONE, 4(4): e4993
Summary: Transmission mechanisms of black-band disease (BBD) in coral reefs are poorly understood, although this disease is considered to be one of the most widespread and destructive coral infectious diseases. The major objective of this study was to assess transmission mechanisms of BBD in the field based on the spatio-temporal patterns of the disease.

Enhancing the use of habitat maps for managing coral reef biodiversity

Knudby A., Newman C., Shaghude Y.W. and Muhando, C.A. (2009)
"Changes in coral reefs and associated environments of Zanzibar from 1986 to 2005 assessed using Landsat and IKONOS imagery"
International Journal of Applied Earth Observation and Geo-information.

Roelfsema, C.M., Phinn, S.R., Udy, N. and Maxwell, P. (2009)
"An integrated field and remote sensing approach for mapping seagrass cover, Moreton Bay, Australia"
Journal of Spatial Science, 54(1): 45-62.
Summary: Creating accurate maps of seagrass cover is a challenging procedure in coastal waters with variable water clarity and depths. This paper presents an approach for mapping seagrass cover from data sources commonly collected by natural resource management agencies responsible for coastal environments. The aim of the study was to develop an approach for mapping classes of seagrass cover from field and/or image data for an area with variable water clarity and depths. The study was carried out in Moreton Bay in eastern Australia.

Epidemiology of coral diseases

Cróquer, A. Bastidas, C., Lipscomp, D., Rodríguez-Martínez, R.E., Jordan-Dahlgren, E. and Guzman, H.M. (2006)
"First report of Folliculinid ciliates affecting Caribbean scleractinian corals"
Coral Reefs, 25(2): 187-191.
Summary: This is the first report of a ciliate of the genus Halofolliculina infecting hard coral species of six families (Acroporidae, Agaricidae, Astrocoeniidae, Faviidae, Meandrinidae and Poritidae) and milleporids in the Caribbean. Surveys conducted during 2004–2005 in Venezuela, Panama and México confirmed that this ciliate affects up to 25 scleractinian species.

Croquer, A. Bastidas, C. and Lipscomb, D. (2006)
"Folliculinid ciliates: a new threat to Caribbean corals?"
Diseases of Aquatic Organisms, 69: 75-78.
Summary: This is the first report of a putative pathogenic ciliate protozoan that has been associated with Caribbean corals. In this study, a ciliate of the genus Halofolliculina was found on 10 hard coral species at the National Parks of Los Roques and Morrocoy, Venezuela.

Sussman, M. Bourne, D.G. and Willis, B.L. (2006)
"A single cyanobacterial ribotype is associated with both red and black bands on diseased corals from Palau"
Diseases of Aquatic Organisms, 69: 111-118.
Summary: Filamentous cyanobacteria forming red and black bands (black band disease, BBD) on 3 scleractinian corals from Palau were molecularly identified as belonging to a single ribotype. Red cyanobacterial mats sampled from infections on Pachyseris speciosa and a massive Porites sp. Yielded red strains RMS1 and RMS2 respectively; the black cyanobacterial mat sampled from an infection on Montipora sp. yielded black strain BMS1. Following trials of a range of specialized media and culture conditions, 2 media, Grund and ASN-III, were identified as the best for successful isolation and culturing. Cultured cyanobacteria were examined under a light microscope to establish purity, color and morphological appearance. DNA extraction and partial sequencing of the 16S rDNA gene of both red and black cyanobacterial isolates demonstrated 100% sequence identity. These isolated strains were also found to have 99% sequence identity with an uncultured cyanobacterial strain previously identified by molecular techniques as belonging to a cyanobacterial ribotype associated with BBDinfected corals in the Caribbean. This is the first report of the successful isolation and culture of cyanobacterial strains derived from both red bands and BBD. Based on these findings, it is suggested that the classification of these 2 syndromes as separate coral diseases be postponed until further evidence is collected.

Gil-Agudelo, D.L., Smith, G. and Weil, E. (2006)
"The white band disease type II pathogen in Puerto Rico"
International Journal of Tropical Biology, 54(Supp 3): 59-67.
Summary: The white band disease type I (WBD-I) epizootic event of the early 1980's resulted in significant changes in the structure and composition of coral communities throughout the wider Caribbean. The disease decimated populations of acroporid corals throughout their geographic distribution and it is still affecting the surviving and recovering populations of these corals in a number of localities in the wider Caribbean.

Reshef, L., Koren, O., Loya, Y., Zilber-Rosenberg, I.Z. and Rosenberg, E. (2006)
"The Coral Probiotic Hypothesis"
Environmental Microbiology, 8(12): 2068-2073.
Summary: Emerging diseases have been responsible for the death of about 30% of corals worldwide during the last 30 years. Coral biologists have predicted that by 2050 most of the world's coral reefs will be destroyed. This prediction is based on the assumption that corals can not adapt rapidly enough to environmental stress-related conditions and emerging diseases. Our recent studies of the Vibrio shiloi/Oculina patagonica model system of the coral bleaching disease indicate that corals can indeed adapt rapidly to changing environmental conditions by altering their population of symbiotic bacteria.

Thompson, F.L., Barash, Y.,Sawabe, T., Sharon, G., Swings J. and Rosenberg, E. (2006)
"Thalassomonas loyana sp. nov. causative agent of the white plague-like disease of corals on the Eilat coral reef"
International Journal of Systematic and Evolutionary Microbiology, 56(2): 365-368.
Summary: The taxonomic position of the coral pathogen strain CBMAI 722T was determined on the basis of molecular and phenotypic data. We clearly show that the novel isolate CBMAI 722T is a member of the family Colwelliaceae, with Thalassomonas ganghwensis as the nearest neighbour (95 % 16S rRNA gene sequence similarity).

Garrison, V.H., Foreman, W.T., Genualdi, S., Griffin, D.W., Kellogg, C.A., Majewski, M.S., Mohammed, A., Ramsubhag, A., Shinn, E.A., Simonich, S.L. and Smith, G.W. (2006)
"Saharan dust-carrier of persistent pollutants, metals and microbes to the Caribbean?"
International Journal of Tropical Biology, 54 Supp 3:9-21.
Summary: An international team of scientists from government agencies and universities in the United States, U.S. Virgin Islands (USVI), Trinidad & Tobago, the Republic of Cape Verde, and the Republic of Mali (West Africa) is working together to elucidate the role Saharan dust may play in the degradation of Caribbean ecosystems.

Smith, G.W. Mills, M. and Weil, E. (2006)
"Aspergillosis of Pseudopterogorgia americana: Increased host range of gorgonians from the wider Caribbean"
Marine Biology.

Gil-Agudelo, D.L., Myers, C., Smith, G.W. and Kim, K. (2006)
"Changes in the microbial communities associated with Gorgonia ventalina during Aspergillosis infection"
Diseases of Aquatic Organisms, 69: 89-94.
Summary: The surface mucopolysaccharide layer (SML) secreted by corals is a rich environment where bacteria live and proliferate, with population levels often being several orders of magnitude higher than in the surrounding waters (at least for culturable microbes). Some studies have suggested that these communities play an important role in energy and nutrient flux in marine environments. We hypothesize that the microbial community structure of the SML also plays a role in protection against disease.

Ainsworth, T.D., Kramasky–Winter, E., Loya, Y., Hoegh-Guldberg, O. and Fine, M. (2007)
"Coral disease diagnostics: what's between a plague and a band?"
Applied And Environmental Microbiology, 73(3): 981-992.
Summary: Despite increasing efforts to understand the changing incidence of coral disease, very few primary pathogens have been identified, and most studies remain dependent on the external appearance of corals for diagnosis. In the present study, we use structural and microbial studies to differentiate different forms of black band disease: atypical black band disease and typical black band disease.

Rosenberg, E., Kellogg, C.A. and Rohwer, F. (2007)
"Coral Microbiology"
Oceanography, 20(2): 146-154.
Summary: In the last 30 years, there has been approximately a 30% loss of corals worldwide, largely due to merging diseases. Coral microbiology is a new field, driven largely by a desire to understand the interactions between corals and their symbiotic microorganisms and to use this knowledge to eventually prevent the spread of coral diseases.

Koren, O. and Rosenberg, E. (2008)
"Bacteria associated with the bleached and cave coral Oculina patagonia"
Microbial Ecology, 55(3): 523-529.
Summary: The relative abundance of bacteria in the mucus and tissues of Oculina patagonica taken from bleached and cave (azooxanthellae) corals was determined by analyses of the 16S rRNA genes from cloned libraries of extracted DNA and from isolated colonies.

Bourne, D.G. Boyett, H.V., Henderson, M.E., Muirhead, A. and Willis, B.L. (2008)
"Identification of a ciliate (Oligohymenophora: Scuticociliata) associated with brown band disease on corals of the Great Barrier Reef"
Applied and Environmental Microbiology, 74(3): 883-888.
Summary: A ciliate associated with the coral disease brown band (BrB) was identified as a new species belonging to the class Oligohymenophorea, Subclass Scuticociliatia. The ciliates were characterized by the presence of large numbers of intracellular dinoflagellates and displayed an elongated, tube-shaped body structure. They had uniform ciliature, except for three distinct cilia in the caudal region, and were typically 200 to 400 µm in length and 20 to 50 µm in width.

Page, C.A. and Willis, B.L. (2008)
"Epidemiology of skeletal eroding band on the Great Barrier Reef and the role of injury in the initiation of this widespread coral disease"
Coral Reefs, 27(2): 257-272.
Summary: Skeletal eroding band (SEB), which manifests as dense aggregations of the ciliate Halofolliculina corallasia, was the first coral disease described from the Indo-Pacific. Little is known about its etiology or impact. This study describes the distribution, prevalence and host range of SEB on a 500 km extent of the Great Barrier Reef (GBR), together with in situ rates of progression and infection following experimental injury.

Sharon, G. and Rosenberg, E. (2008)
"Bacterial growth on coral mucus"
Current Microbiology, 56(5): 481-488.
Summary: Coral mucus-degrading bacteria were isolated by an enrichment culture procedure. The isolates were able to grow as pure cultures on 10% sterilized mucus in seawater, yielding 108 CFU/ml.

Work, T.M., Richardson, L.L., Reynolds, T.L. and Willis, B.L. (2008)
"Biochemical and veterinary medicine can increase our understanding of coral disease"
Journal of Experimental Marine Biology and Ecology, 362(2): 63-70.
Summary: A balanced approach to coral disease investigation is critical for understanding the global decline of corals. Such an approach should involve the proper use of biomedical concepts, tools, and terminology to address confusion and promote clarity in the coral disease literature.

Rypien, K. L., Andras, J. P. and Harvell, C. D. (2008)
"Globally panmictic population structure in the opportunistic fungal pathogen Aspergillus sydowii"
Molecular Ecology, 17(18): 4068-4078.
Summary: Recent outbreaks of new diseases in many ecosystems are caused by novel pathogens, impaired host immunity, or changing environmental conditions. Identifying the source of emergent pathogens is critical for mitigating the impacts of diseases, and understanding the cause of their recent appearances.

Dinsdale, E.A., Pantos, O., Smriga, S., Edwards, R.A. ngly, F., Wegley, L., Hatay, M., Hall, D. Brown, E., Haynes, M., Krause, L. Sala, E., Sandin, S.A., Vega Thurber, R., Willis, B.L. Azam, F., Knowlton, N. and Rohwer, F. (2008)
"Microbial ecology of four coral atolls in the Northern Line Islands"
PLoS ONE, 3(2) e1584: 1-17.
Summary: Microbes are key players in both healthy and degraded coral reefs. A combination of metagenomics, microscopy, culturing, and water chemistry were used to characterize microbial communities on four coral atolls in the Northern Line Islands, central Pacific.

Sussman, M., Willis, B.L., Victor, S. and Bourne, D.G. (2008)
"Coral pathogens identified for white syndrome (WS) epizootics in the Indo-Pacific"
PLoS ONE, 3(6) e2393: 1-14.
Summary: White Syndrome (WS), a general term for scleractinian coral diseases with acute signs of advancing tissue lesions often resulting in total colony mortality, has been reported from numerous locations throughout the Indo-Pacific, constituting a growing threat to coral reef ecosystems.

Palmer, C., Mydlarz, L. and Willis, B.L. (2008)
"Evidence of an inflammatory-like response in non-normally pigmented tissues of two scleractinian corals"
Proceedings of The Royal Society of London, 275(1652): 2687-2693.
Summary: Increasing evidence of links between climate change, anthropogenic stress and coral disease underscores the importance of understanding the mechanisms by which reef-building corals resist infection and recover from injury. This study demonstrates the presence of the phenoloxidase (PO) activating melanin pathway in two species of coral, Acropora millepora and a massive species of Porites, which both develop local pigmentation in response to interactions with a variety of organisms. L-DOPA (3-(3,4-dihydroxyphenyl)-Lalanine) substrate-based enzyme activation assays demonstrated PO activity in healthy tissues of both species and upregulation in pigmented tissues of A. millepora.

Weil, E., Croquer, A. and Urreiztieta, I. (2009)
"Caribbean Yellow Band Disease Compromises the Reproductive Output of the Reef-building Coral Montastraea faveolata (Anthozoa, Scleractinia)"
Diseases of Aquatic Organisms, 87(1-2): 45-55.
Summary: Sexual reproduction is critical to coral population dynamics and the long-term regeneration of coral reefs. Bleaching, disease, and/or anthropogenic-induced tissue/colony loss reduce reproductive output. This is the first attempt to explore the effect of a biotic disease on the reproduction of scleractinian corals. The study aimed to assess the effect of yellow band disease (YBD) on the reproduction of the important Caribbean reef-builder Montastraea faveolata.

Bourne D.G., Work T.M., Rosenberg E., Garren M, Smith G.W., Harvell. C.D. (2009)
"Infectious disease and the coral holobiont"
Trends in Microbiology, 17(12): 554-562.
Summary: Tropical coral reefs harbour a reservoir of enormous biodiversity that is increasingly threatened by direct human activities and indirect global climate shifts. Emerging coral diseases are one serious threat implicated in extensive reef deterioration through disruption of the integrity of the coral holobiont – a complex symbiosis between the coral animal, endobiotic alga and an array of microorganisms. In this article, we review our current understanding of the role of microorganisms in coral health and disease, and highlight the pressing interdisciplinary research priorities required to elucidate the mechanisms of disease.

Arboleda, M.D. and Reichardt, W. (2009)
"Vibrio sp. causing Porites ulcerative white spot disease"
Diseases of Aquatic Organisms, doi: 10.3354/dao02222.
Summary: The causative agent of the Indo-Pacific coral disease Porites ulcerative white spot syndrome (PUWS) that affects Porites and a few other coral genera has so far remained unidentified.

Littman, R.A., Willis, B.L., Pfeffer, C. and Bourne, D.G. (2009)
"Diversity of coral-associated bacteria differ with location, but not species, for three acroporid corals on the Great Barrier Reef"
FEMS Microbiology Ecology, 68(2): 152-163.
Summary: Patterns in the diversity of bacterial communities associated with three species of Acropora (Acropora millepora, Acropora tenuis and Acropora valida) were compared at two locations (Magnetic Island and Orpheus Island) on the Great Barrier Reef to better understand the nature and specificity of coral–microbial symbioses.

Sato Y, Willis BL, Bourne D.G. (2009)
"Successional changes in bacterial communities during the development of black band disease on the reef coral, Montipora hispida"
International Society of Microbial Ecology.

Raina JB, Tapiolas D, Willis BL, Bourne D.G. (2009)
"Coral-associated bacteria and their role in the biogeochemical cycling of sulfur"
Applied and Environmental Microbiology.
Summary: Marine bacteria play a central role in the degradation of dimethylsulfoniopropionate (DMSP) to dimethyl sulfide (DMS) and acrylic acid, DMS being critical to cloud formation and thereby cooling effects on the climate. High concentrations of DMSP and DMS have been reported in scleractinian coral tissues although, to date, there have been no investigations into the influence of these organic sulfur compounds on coral-associated bacteria. Two coral species, Montipora aequituberculata and Acropora millepora, were sampled and their bacterial communities were characterized by both culture-dependent and molecular techniques.

Ein-Gil, N, M lian, S Carmeli, GW Smith, JR Pawlik, O Yarden. (2009)
"Presence of Aspergillus sydowii, a pathogen of gorgonian sea-fans in the marine sponge Spongia abscura"
International Journal of Microbial Ecology.

Littman R, Willis BL, Bourne DG (2009)
"Bacterial communities of juvenile corals infected with different Symbiodinium (dinoflagellate) clades"
Marine Ecology Progress Series.

Sussman, M., Mieog, J.C., Doyle, J., Victor, S., Willis, B.L. and Bourne, D.G. (2009)
"Vibrio zinc-metalloprotease causes photoinactivation of coral endosymbionts and coral tissue lesions"
PLoS ONE, 4(2) e4511: 1-14.
Summary: Coral diseases are emerging as a serious threat to coral reefs worldwide. Of nine coral infectious diseases, whose pathogens have been characterized, six are caused by agents from the family Vibrionacae, raising questions as to their origin and role in coral disease aetiology.

Estimates in Connectivity of Spiny Lobster

Goldstein, J.S., M. J. Butler IV, and H. Matsuda. (2006)
"Investigations into some early life history strategies for Caribbean spiny lobster and implications for pan-Caribbean connectivity"
Journal of Shellfish Research, 25(2): 731.

Goldstein, J.S., Matsuda, H., Takenouchi, T. and Butler IV, M.J. (2008)
"The complete development of larval Caribbean spiny lobster Panulirus argus (Latreille, 1804) in culture"
Journal Crustacean Biology, 28(2): 306-327.
Summary: The Caribbean spiny lobster (Panulirus argus) is the most widespread, commercially important, and extensively studied spiny lobster in the western hemisphere, yet until now it has never been successfully reared through all its planktonic (phyllosomal) stages from egg to early benthic juvenile. Here we describe the development of phyllosomal P. argus in culture including the growth, duration, and morphology for 10 distinct stages.

Global assessment of coral diseases and anthropogenic facilitators

Page, C. and Willis, B. (2006)
"Distribution, host range and large-scale spatial variability in black band disease prevalence on the Great Barrier Reef, Australia"
Disease of Aquatic Organisms, 69: 41-51.
Summary: The prevalence and host range of black band disease (BBD) was determined from surveys of 19 reefs within the Great Barrier Reef Marine Park, Australia. We found that BBD was widespread throughout the Great Barrier Reef (GBR) and was present on 73.7% of the 19 reefs surveyed in 3 latitudinal sectors and 3 cross-shelf positions in the summer of 2004.

Selig, E.R., Harvell, C.D,. Bruno, J., Willis, B., Page, C., Casey, K. and Sweatman, H. (2006)
"Analyzing the relationship between ocean temperature anomalies and coral disease outbreaks at broad spatial scales"
In Phinney, J., Skirving, W., Kleypas, J. & Hoegh-Guldberg, O. (eds). Coral reefs and climate change: Science and management, 61 (Coastal & Estuarine Sciences). *AGU Press*.
Summary: Ocean warming due to climate change could increase the frequency and severity of infectious coral disease outbreaks by increasing pathogen virulence or host susceptibility. However, little is known about how temperature anomalies may affect disease severity over broad spatial scales. We hypothesized that the frequency of warm temperature anomalies increased the frequency of white syndrome, a common scleractinian disease in the Indo-Pacific.

Piskorska, M., Smith, G. and Weil, E. (2007)
"Bacteria associated with the coral Echinopora lamellosa (Esper 1795) in the Indian Ocean-Zanzibar Region"
African Journal of Environmental Science & Technology, 1(5): 93-98.
Summary: Infectious diseases are now known to have major effects on the structure and function of coral reef ecosystems throughout the world. The number of recognized coral diseases has increased dramatically. The problem was first recognized in the Caribbean in the early 1970's but has now been reported to affect coral communities worldwide. There is little information regarding bacteria associated with diseased corals in the Indian Ocean. However, one of the most common disease signs observed is a rapid loss of tissue leaving exposed white skeleton in contact with compromised tissue, followed by necrosis.

Bruno, J.F., Selig, E.R., Casey, K.S., Page, C.A., Willis, B.L., Harvell, C.D., Sweatman, H. and Melendy, A.M. (2007)
"Thermal stress and coral cover as drivers of coral disease outbreaks"
PLoS Biology., 5(6) e124: 1220-1227.
Summary: Very little is known about how environmental changes such as increasing temperature affect disease dynamics in the ocean, especially at large spatial scales. We asked whether the frequency of warm temperature anomalies is positively related to the frequency of coral disease across 1,500 km of Australia's Great Barrier Reef.

Maynard, J.A., Turner, P.J. Anthony, K.R.N. Baird, A.H. Berkelmans, R., Eakin, C.M., Johnson, J., Marshall, P.A., Packer, G.R., Rea, A. and Willis, B.L. (2008)
"ReefTemp: An interactive monitoring system for coral bleaching using high-resolution SST and improved stress predictors"
Geophysical Research Letters, 35: L05603.
Summary: We discuss the development and testing of ReefTemp, a new operational remote sensing application for the Great Barrier Reef that assesses bleaching risk daily using: highresolution (2 km) SST, regionally validated thermal stress indices, and color-graded legends directly related to past observations of bleaching severity. Given projections of sea temperature rise, ReefTemp is timely as it can accurately predict bleaching severity at a local scale and therefore help to give focus to future research and monitoring efforts.

Weil, E. and Croquer, A. (2009)
"Spatial variability in distribution and prevalence of coral and octocoral diseases I: Community level analysis"
Diseases of Aquatic Organisms, 83: 195–208.
Summary: Geographic assessments of coral diseases are needed to understand their local and geographic spatial-temporal variability. Coral and octocoral diseases and their prevalence were assessed along 4 permanent 10 °— 2 m band-transects in each of 3 depth habitats (<4, 5–12 and >15 m) in each of 2 reefs in each of 6 countries across the wider Caribbean during the summer and fall of 2005.

Haapkyla J, Unsworth RKF, Seymour AS, Melbourne-Thomas J, Flavell M, Willis BL, Smith DJ. (2009)
"Spatio-temporal coral disease dynamics in the Wakatobi Marine National Park, South-east Sulawesi, Indonesia"
Diseases of Aquatic Organisms, 87(1-2): 105-15.
Summary: In the present study we investigated inter-annual coral disease dynamics, in situ disease progression rates, and disease-associated coral tissue mortality in the Wakatobi Marine National Park (WMNP) situated in the coral triangle in South-East Sulawesi, Indonesia.

Impacts of coral disease on coral diversity, community diversity and population

Page, C., Willis, B., Golbung, Y., Baker, D., Harvell, C.D. and Raymundo, L. (2006)
"Assessing the role of MPA's in the prevalence of coral disease"
Conservation Biology.

Weil, E., Smith, G.W. and Gil-Agudelo, D. (2006)
"Status and progress in coral disease research"
Diseases of Aquatic Organisms, 69: 1-7.
Summary: Recent findings on the ecology, etiology and pathology of coral pathogens, host resistance mechanisms, previously unknown disease/syndromes and the global nature of coral reef diseases have increased our concern about the health and future of coral reef communities. Much of what has been discovered in the past 4 years is presented in this special issue.

Ward, J.R., Rypien, K. Bruno, J., Harvell, C., Jordan-Dahlgren, E., Mullen, K., Rodriguez-Martinez, R., Sanchez, J. and Smith, G. (2006)
"Coral diversity and disease in Mexico"
Diseases of Aquatic Organisms, 69: 23-31.
Summary: Field studies and empirical tests of the 'diversity-disease hypothesis' demonstrate the effects of species richness on disease transmission and severity in plant systems. Yet the converse, i.e. effects of disease on diversity, is rarely considered in either relatively well-studied plant systems or marine ecosystems. We investigated these effects along the Mexican Yucatan Peninsula to (1) quantify the relationship between disease prevalence and coral diversity, (2) test the hypothesis that octocoral and scleractinian disease prevalence are associated with one another, and (3) establish a longterm dataset.

Harvell, D., Merkel, S., Jordan-Dahlgren, E., Rosenberg, E., Raymundo, L., Smith, G., Weil, E. and Willis. B. (2007)
"Coral disease, environmental drivers and the balance between coral and microbial associates"
Oceanography, 20(1): 172-195.
Summary: Across the globe, we are witnessing the decline of coral reef ecosystems. One relatively new factor contributing to this decline is the outbreak of destructive infectious diseases, especially on Caribbean reefs. Global surveys have revealed significant levels of disease and disease outbreaks occurring not only in the Caribbean "hotspots," but also in sites throughout the Pacific and Indian Oceans. By monitoring coral disease, we will create a baseline and long-term data set that can be used to test specific hypotheses about how climate and anthropogenic drivers, such as decreasing water quality, threaten coral reef sustainability.

Rosenberg, E., Koren, O., Reshef, L., Efrony, R. and Zilber-Rosenberg, I. (2007)
"The role of microorganisms in coral health, disease and evolution"
Nature Reviews Microbiology, 5(5): 355-362.
Summary: Coral microbiology is an emerging field, driven largely by a desire to understand, and ultimately prevent, the worldwide destruction of coral reefs.

Page CA, Baker DM, Harvell CD, Golbuu Y, Raymundo L, Neale SJ, Rosell KB, Rypien KL, Andras JP, Willis B.L. (2009)
"Influence of marine reserves on coral disease prevalence"
Diseases of Aquatic Organisms, 87(1-2): 135–150.
Summary: Predicted increases in disease with climate warming highlight the need for effective management strategies to mitigate disease effects in coral communities. We examined the role of marine protected areas (MPAs) in reducing disease in corals and the hypothesis that the composition of fish communities can influence coral health, by comparing disease prevalence between MPA and non-protected (control) reefs in Palau.

Raymundo, L., Halford, A., Maypa, A., Kerr, A. (2009)
"Functionally diverse reef fish communities ameliorate the spread of coral diseases"
Proceedings of the National Academy of Science, 106(40): 17067-17070.
Summary: Coral reefs, the most diverse of marine ecosystems, currently experience unprecedented levels of degradation. Diseases are now recognized as a major cause of mortality in reef forming corals and are complicit in phase shifts of reef ecosystems to algal-dominated states worldwide. Even so, factors contributing to disease occurrence, spread, and impact remain poorly understood. We tested the hypothesis that reefs with trophically diverse reef fish communities have less coral disease than overfished reefs.

Arboleda, M.D. and Reichardt, W. (2009)
"Epizoic communities of prokaryotes on healthy and diseased scleractinian corals in Lingayen Gulf, Philippines"
Microbial Ecology, 57(1): 117-128.
Summary: In search for microbiological indicators of coral health and coral diseases, community profiles of coral associated epizoic prokaryotes were investigated because of their dual potential as a source of coral pathogens and their antagonists.

Smriga, S., S. Sandin and F. Azam. (2009)
"Abundance, diversity, and activity of microbial assemblages associated with coral reef fish guts and feces"
FEMS Microbiology Ecology, 10.1111/j.1574-6941.2010.00879.x.
Summary: Feces and distal gut contents were collected from three coral reef fish species.

Vu, I., Smelick, G., Harris, S., Lee, S.C., Weil, E., Whitehead, R.F. and Bruno, J.F. (2009)
"Macroalgae has no effect on the severity and dynamics of Caribbean yellow band disease"
Plos ONE, 4(2): e4514.
Summary: By removing herbivores and promoting increases in macroalgae, overfishing is thought to indirectly cause coral disease and mortality. We performed three field manipulations to test the general hypothesis that overfishing and the subsequent alteration of coral reef trophic dynamics are a cause of coral epizootics.

Sato, Y. Bourne, D.G. and Willis, B.L. (2009)
"Dynamics of seasonal outbreaks of black band disease in an assemblage of Montipora species at Pelorus Island (Great Barrier Reef, Australia)"
Proceedings of the Royal Society Biological Sciences, 276(1668): 2795-2803.
Summary: Recurring summer outbreaks of black band disease (BBD) on an inshore reef in the central Great Barrier Reef (GBR) constitute the first recorded BBD epizootic in the region. In a 2.7 year study of 485 colonies of Montipora species, BBD affected up to 10 per cent of colonies in the assemblage.

Larval recruitment

Vicentuan, K.C., Guest, J.R. Baria, M.V., Cabaitan, P.C., Dizon, R.M., Villanueva, R.D. Aliño, P.M., Edwards, A.J., Gomez, E.D. and Heyward, A.J. (2008)
"Multi-species spawning of corals in north-western Philippines"
Coral Reefs, 27(1): 83.
Summary: The Philippines has more than 30,000 km^2 of reef area and hosts some of the world's most diverse and endangered coral communities, however there is little information on patterns of coral reproduction and to date there are no published accounts of direct spawning observations, sampling to determine the reproductive state of Acropora species and in situ observations of coral spawning was conducted in 2006 and (2007) "at sites close to the Bolinao Marine Laboratory (BML) in north-western Luzon, (16°22ÐN 119°54ÐE).

Guest, J. Baird, A., Clifton, K. and Heyward, A. (2008)
"From molecules to moonbeams: Spawning synchrony in coral reef organisms"
Invertebrate Reproduction and Development, 51(3): 145-149.
Summary: A mini-symposium at the 11th International Coral Reef Symposium highlighted significant advances towards understanding the factors controlling reproductive timing and spawning synchrony in coral reef organisms.

Villanueva, R.D. and Edwards, A.J. (2009)
"Butterflyfishes feed on externally brooded larvae of the blue coral, Heliopora coerulea"
Coral Reefs, 29(1): 105-106.
Summary: During the annual brooding of the blue coral, Heliopora coerulea in April 2009 at a reef in the Malilnep channel near Bolinao, northwestern Philippines (16°26Ð23.5Ð N; 119°56Ð43.1Ð E), several butterflyfishes (Chaetodon melannotus, C. auriga, and C. vagabundus) were observed to aggregate around three gravid colonies (5–10 m apart) among seven such colonies on a 50-m transect. The butterflyfishes were biting on parts of the colonies with larvae being brooded at the surface. We infer that these fishes were feeding on the brooded larvae rather than coral tissues as they did not bite on the apical parts of the colonies without larvae and did not aggregate around 33 non-gravid H. coerulea colonies on the transect.

Heyward, A.J., Negri, A.P. (2010)
"Plasticity of larval pre-competency in response to temperature: observations on multiple broadcast spawning coral species"
Coral Reefs, DOI 10.1007/s00338-009-0578-5.
Summary: The pre-competency period of coral larvae influences dispersal, and this may be affected under projected climate change conditions. In this laboratory study, we examined the influence of sea water temperature on the duration of pre-competency of larvae of four broadcast spawning coral species.

Measuring reef health cost-effectively using remote sensing

Kutser, T., Vahtmäe, E. Roelfsema, C.M. and Metsamaa, L. (2007)
"Photo-library method for mapping seagrass biomass"
Estuarine, Coastal and Shelf Science, 75(4): 559-563.
Summary: The creation of seagrass biomass maps by diving/snorkelling is time-consuming and expensive. This paper presents a method for estimating seagrass dry weight using a photo-library of classes of differing seagrass biomass.

Hedley, J.D., C.M., Roelfsema, S.R. Phinn, and P.J. Mumby. (2007)
"Environmental versus sensor limitations to the remote sensing of coral reefs: implications for monitoring and sensor design"
Remote Sensing of Environment.

Lesser, M. P. and Mobley, C. (2007)
"Bathymetry, water optical properties, and benthic classification of coral reefs using hyperspectral remote sensing imagery"
Coral Reefs, 26(4): 819-829.
Summary: The complexity and heterogeneity of shallow coastal waters over small spatial scales provides a challenging environment for mapping and monitoring benthic habitats using remote sensing imagery. A variety of sensors and analyses have been employed for monitoring coral reefs: this study applied a spectrum-matching and look-up-table methodology to the analysis of hyperspectral imagery of a shallow coral reef in the Bahamas.

Brando, V.E. and Phinn, S.R. (2007)
"Coastal Aquatic Remote Sensing Applications for Environmental Monitoring and Management. Special Issue Editorial"
Journal of Applied Remote Sensing, 1(1): 011599.
Summary: In all regions of the world, coastal aquatic environments are under increasing levels of environmental stress, due to the large number of people living immediately adjacent to them and using them as a resource. Information on the composition and condition of these water bodies and their benthic environments is a critical piece of knowledge infrastructure for development and application of coastal management practices]. Due to the large and dynamic nature of coastal aquatic environments, remote sensing offers a potential source for this information. However, if remote sensing is so useful and suitable data sets for mapping and monitoring coastal environments have been around since the Landsat era (1972) – why isn't it widely used in coastal resource management applications around the world?

Mumby, P.J., Harborne, A.R., Williams, J., Kappel, C.V. Brumbaugh, D.R., Micheli, F., Holmes, K.E., Dahlgren, C.P., Paris, C.B. and Blackwell, P.G. (2007)
"Trophic cascade facilitates coral recruitment in a marine reserve"
Proceedings of the National Academy of Sciences (PNAS), 104(20): 8362-8367.
Summary: Reduced fishing pressure and weak predator–prey interactions within marine reserves can create trophic cascades that increase the number of grazing fishes and reduce the coverage of macroalgae on coral reefs. Here, we show that the impacts of reserves extend beyond trophic cascades and enhance the process of coral recruitment.

Knudby, A., LeDrew, E. and Newman, C. (2007)
"Progress in the use of remote sensing for coral reef biodiversity studies"
Progress in Physical Geography, 31(4): 421-434.
Summary: This paper reviews coral reef biodiversity, the influence of habitat variables on its local spatial distribution, and the potential for remote sensing to produce maps of these habitat variables, thus indirectly mapping coral reef biodiversity and fulfilling information needs of coral reef managers.

Peñaflor, E.L. Villanoy, C.L., Liu, C.-T. and David, L.T. (2007)
"Monsoonal bloom of phytoplankton in Luzon Strait with MODIS data"
Remote Sensing of Environment, 109(4): 443-450.
Summary: The Luzon Strait experiences a seasonal surge of phytoplankton based on ocean color data. To examine the timing and position of the bloom, daily MODIS chlorophyll data (2002–2005) were acquired and analyzed.

Marcos, Ma.S.A., David, L.T. Penaflor, E., Ticzon, V. and Soriano, M. (2008)
"Automated benthic counting of living and non-living components of Ngedarrack Reef, Palau via subsurface underwater video"
Environmental Monitoring and Assessment, 145(1-3): 177-184.
Summary: We introduce an automated benthic counting system in application for rapid reef assessment that utilizes computer vision on subsurface underwater reef video.

Mumby, P.J. and Steneck, R.S. (2008)
"Coral reef management and conservation in the light of rapidly-evolving ecological paradigms"
Trends in Ecology and Evolution, 23(10): 555-563
Summary: The decline of many coral reef ecosystems in recent decades surprised experienced managers and researchers. It shattered old paradigms that these diverse ecosystems are spatially uniform and temporally stable on the scale of millennia. We review the causes and consequences of reef decline and ask whether management practices are addressing the problem at appropriate scales. We conclude that both science and management are currently failing to address the co-management of extractive activities and ecological processes that drive ecosystems (e.g. productivity and herbivory).

Mumby, P.J. Broad, K., Brumbaugh, D.R., Dahlgren, C.P., Harborne, A.R., Hastings, A., Holmes, K.E., Kappel, C.V., Micheli, F. and Sanchirico, J.N. (2008)
"Coral reef habitats as surrogates of species, ecological functions, and ecosystem services"
Conservation Biology, 22(4): 941-951
Summary: Habitat maps are often the core spatially consistent data set on which marine reserve networks are designed, but their efficacy as surrogates for species richness and applicability to other conservation measures is poorly understood. Combining an analysis of field survey data, literature review, and expert assessment by a multidisciplinary working group, we examined the degree to which Caribbean coastal habitats provide useful planning information on 4 conservation measures: species richness, the ecological functions of fish species, ecosystem processes, and ecosystem services.

Mumby, P.J. and Hastings, A. (2008)
"The impact of ecosystem connectivity on coral reef resilience"
Journal of Applied Ecology, 45(3): 854-862.
Summary: Ontogenetic dispersal of animals has been observed among many ecosystems, but its full ecological significance is poorly understood. By modelling the consequences of ontogenetic reef fish dispersal between Caribbean mangroves and adjacent coral reefs, we quantify the broader implications of ecosystem connectivity for ecosystem function and resilience to climate-driven disturbance.

Holden, H. and LeDrew, E. (2008)
"An examination of variability in vertical radiometric profiles in a coral reef environment"
Journal of Coastal Research, 24(1): 224-231.
Summary: A significant challenge to remote sensing of submerged ecosystems in the littoral zone is correcting the signal received at the sensor for the complex and variable effects of the water column. Remote sensing scientists often assume that the optical properties of a scene do not vary horizontally and thus assume that a single attenuation coefficient can be applied for water column correction. The validity of this assumption is tested in this case study.

Johansen, K., Roelfsema, C. and Phinn, S.R. (2008)
"High spatial resolution remote sensing for environmental monitoring and management"
Journal of Spatial Science, 52(1): 43-47.

Hedley, J.D. (2008)
"A three-dimensional radiative transfer model for shallow water environments"
Optics Express, 16(26): 21887-21902.
Summary: A geometric optical model for three-dimensional radiative transfer capable of handling arbitrary arrangements of surfaces within anisotropic scattering media is described. The model operates by discretizing surfaces and volumes into patches and voxels and establishing the radiative transfer relationship between every pair of elements.

Lim, A., Hedley, J., LeDrew, E., Mumby, P.J. and Roelfsema, C. (2009)
"The effects of ecologically determined spatial complexity on the classification accuracy of simulated coral reef images"
Remote Sensing of Environment, 113(5): 965-978.
Summary: Numerous studies have been conducted to compare the classification accuracy of coral reef maps produced from satellite and aerial imagery with different sensor characteristics such as spatial or spectral resolution, or under different environmental conditions. In this paper, we will study how the accuracy of a commonly used maximum likelihood classification (MLC) algorithm is affected by spatial elements typical of a Caribbean atoll system present in high spectral and spatial resolution imagery.

Mechanisms of coral disease resistance

Koren, O. and Rosenberg, E. (2006)
"Bacteria associated with mucus and tissues of the coral Oculina patagonica in summer and winter"
Applied and Environmental Microbiology, 72(8): 5254-5259.
Summary: This study provides a comprehensive database for future examinations of changes in the bacterial community during bleaching events.

Mullen, K., Harvell, C.D. Alker, A., Dube, D., Jordan,E., Ward, J. and Petes, L. (2006)
"Host range and resistance to Aspergillosis in three sea fan species from the Yucatan"
Marine Biology, 149: 1355-1364.
Summary: Knowledge of host range and mechanisms of disease resistance is fundamental to predicting impacts and spread of marine diseases.

Gil-Agudelo, D.L,, Fonseca, D.P., Weil, E., Garzón-Ferreira, J. and Smith G.W. (2007)
"Bacterial communities associated with the mucopolysaccharide layers of three coral species affected and unaffected with dark spots disease"
Canadian Journal of Microbiology, 53(4): 465-471.
Summary: Dark spots disease (DSD) is a relatively new coral disease that has become one of the most prevalent afflictions in the Caribbean Sea. To partially characterize bacterial communities associated with DSD, carbon utilization patterns of bacterial strains isolated from the surface mucopolysaccharide layers of healthy and DSD-affected Montastraea annularis, Montastraea faveolata, and Siderastrea siderea were compared with each other and with bacterial strains isolated from the water column by using cluster analysis.

Mydlarz, L. and Harvell, C.D. (2007)
"Peroxidase activity and inducibility in the sea fan coral exposed to a fungal pathogen"
Comparative Biochemistry and Physiology, 146: 54-62.
Summary: The enzymatic defense mechanisms of Gorgonia ventalina to the fungal pathogen Aspergillus sydowii may play important roles in colony resistance to infection. In this study, we examined the role of the superfamily of peroxidase enzymes in the coral response to a naturally occurring pathogen. We examined the inducibility of peroxidases by experimentally exposing corals to A. sydowii and found that peroxidase activity was induced after an 8 day incubation period.

Douglas, N.L., Mullen, K.,Talmage, S. and Harvell, C.D. (2007)
"Exploring the role of chitinolytic enzymes in the sea fan coral, Gorgonia ventalina"
Marine Biology, 150: 1137-1144.
Summary: Chitinases are involved in defense against chitinaceous pathogens in both invertebrates and vertebrates. This study investigated whether sea fan corals, Gorgonia ventalina (Linnaeus) collected from the Florida Keys between the summer of 2002 and the summer of 2005 contain chitinases, and whether these enzymes could serve an analogous protective role against the fungal pathogen, Aspergillus sydowii (Thom et Church).

Ward, J.R., Kim, K. and Harvell, C.D. (2007)
"Temperature affects coral disease resistance and pathogen growth"
Marine Ecology Progress Series, 329: 115-121.
Summary: Temperature anomalies on coral reefs now routinely exceed coral stress thresholds, making temperature a critical variable to consider in coral host–pathogen systems. While temperature is widely hypothesized to drive coral disease outbreaks by decreasing coral resistance and increasing pathogen growth rates, tests of the temperature hypothesis are rare. Here we report evidence from the sea fan coral Gorgonia ventalina –Aspergillus host–pathogen system that temperature stress increases one component of sea fan resistance.

Couch, C.S., Mydlarz, L.D., Harvell, C.D. and Douglas, N.L. (2008)
"Variation in measures of immunocompetence of sea fan coral, Gorgonia ventalina, in the Florida Keys"
Marine Biology, 155: 281-292.
Summary: Aspergillosis is a widespread disease that has impacted the demography of the Caribbean sea fan coral, Gorgonia ventalina.

Geffen,Y., Ron, E.Z. and E. Rosenberg. (2009)
"Regulation of release of antibacterials from stressed scleractinian corals"
FEMS Microbiology Letters, 295(1): 103-9.
Summary: Recently, we showed that mechanical stress on scleractinian (stony) corals caused a rapid release of antibacterial material (referred to as coral antibacterial activity, or CAA), which killed various bacterial species, including the coral pathogen Vibrio coralliilyticus. We now report on studies on the regulation of CAA release from stressed scleractinian corals.

Nissimov, J., Rosenberg, E. and Munn, C.B. (2009)
"Antimicrobial properties of resident coral - mucus bacteria of Oculina patagonica"
FEMS Microbiology Letters, 292(2): 210-215.
Summary: The inhibitory properties of the microbial community of the coral mucus from the Mediterranean coral Oculina patagonica were examined. Out of 156 different colony morphotypes that were isolated from the coral mucus, nine inhibited the growth of Vibrio shiloi, a species previously shown to be a pathogen of this coral.

Mydlarz, L.D., Couch, C.S., Weil, E., Smith, G.W. and Harvell, C.D. (2009)
"Immune defenses of healthy, bleached and diseased Montastraea faveolata during a natural bleaching event"
Diseases of Aquatic Organisms, 87(1-2): 67-78.
Summary: One prominent hypothesis regarding climate change and scleractinian corals is that thermal stress compromises immune competence. To test this hypothesis we tracked how the immune defenses of bleached, apparently healthy and yellow band disease (YBD) diseased Montastraea faveolata colonies varied with natural thermal stress in southwestern Puerto Rico.

Mechanisms of thermal stress

Davey, M., Holmes, G. and Johnstone, R. (2008)
"High rates of nitrogen fixation (acetylene reduction) on coral skeletons following bleaching mortality"
Coral Reefs, 27(1): 227-236.
Summary: Nubbins of the coral Acropora aspera were artificially bleached and nitrogen fixation (acetylene reduction) rates were measured on the developing epilithic communities, seasonal comparisons were made between corals that died in summer of heat stress and corals that died in winter from natural cold stress.

Roff, G., Ulstrup, K. A., Fine, M., Ralph, P. J. Hoegh-Guldberg, O. (2008)
"Spatial heterogeneity of photosynthetic activity of dinoflagellate symbionts within diseased corals from the Great Barrier Reef"
Journal of Phycology, 44 (2): 526-538.
Summary: Morphological diagnosis and descriptions of seven disease-like syndromes affecting scleractinian corals were characterized from the southern Great Barrier Reef (GBR).

Holmes, G., Ortiz, J., Kaniewska, P. and Johnstone, R. (2008)
"Using three-dimensional surface area to compare the growth of two Pocilloporid coral species"
Marine Biology, 155: 421-427.
Summary: Many facets of coral research require coral colony surface area estimates. This study developed a relationship between the two-dimensional (2D) projected area and the three-dimensional (3D) whole colony surface area for two commonly studied Indo-Pacific coral species: Pocillopora damicornis and Stylophora pistillata.

Edmunds, P.J., Gates, R.D., Leggat, W., Hoegh-Guldberg, O.and Allen-Requa, L. (2005)
"The effect of temperature on the size and population density of dinoflagellates in larvae from the reef coral Porites astreoides"
Invertebrate Biology, 124 (3): 185-193.
Summary: Pre-settlement events play an important role in determining larval success in marine invertebrates with bentho-pelagic life histories, yet the consequences of these events typically are not well understood. The purpose of this study was to examine the pre-settlement impacts of different seawater temperatures on the size and population density of dinoflagellate symbionts in brooded larvae of the Caribbean coral Porites astreoides.

Thornhill, D.J., La Jeunesse, T.C., Kemp, D.W., Fitt, W.K. and Schmidt, G.W. (2006)
"Multi-year, seasonal genotypic surveys of coral-algal symbioses reveal prevalent stability or post-bleaching reversion"
Marine Biology, 148 (6): 711-722.
Summary: This report documents the extent to which coral colonies show fluctuations in their associations with different endosymbiotic dinoflagellates.

Werner, U. Bird, P., Wild, C., Ferdelman, T., Polerecky, L., Eickert, G., Johnstone, R., Hoegh-Guldberg, O. and de Beer, D. (2006)
"Spatial patterns of aerobic and anaerobic mineralization rates and oxygen penetration dynamics in coral reef sediments"
Marine Ecology Progress Series, 309: 93-105.
Summary: Oxygen consumption rates (OCR), aerobic mineralization and sulfate reduction rates (SRR) were studied in the permeable carbonate reef sediments of Heron Reef, Australia.

Miscellaneous

Flot, J.-F., Licuanan, W.Y., Nakano, Y., Payri, C., Cruaud, C. and Tillier, S. (2008)
"Mitochondrial sequences of Seriatopora corals show little agreement with morphology and reveal the duplication of a tRNA gene near the control region"
Coral Reefs, 27(4): 789-794.
Summary: The taxonomy of corals of the genus Seriatopora has not previously been studied using molecular sequence markers. As a first step toward a re-evaluation of species boundaries in this genus, mitochondrial sequence variability was analyzed in 51 samples collected from Okinawa, New Caledonia, and the Philippines.

R.H. Bradbury and R.M. Seymour. (2009)
"Coral reef science and the new commons"
Coral Reefs, 28(4): 831-837.
Summary: We humans have inadvertently triggered the emergence of a new Earth system: a new geological epoch called the Anthropocene. It is replacing the Holocene, the epoch in which civilisation evolved. Coral reefs, together with all other ecosystems on the planet, are being swept up in this change. The changes are so complex that they are overwhelming the ability of traditional science to comprehend them, and their consequences are so profound that they demand a new compact between science and society. This compact, we shall argue, is really an old one, but one, nevertheless, that is new to coral reef science. Coral reef science is doomed to irrelevance unless it embraces it.

Garren M, Arney C. (2009)
"Rebalancing Human-Influenced Ecosystems"
The Journal of Undergraduate Mathematics and Its Applications.

Garren M, Myers J. (2009)
"Authors' Commentary: The Outstanding Coral Reef Papers for the Interdisciplinary Contest in Modeling"
The Journal of Undergraduate Mathematics and Its Applications.

Miller S, Garren M, Sturdivant R. (2009)
"Judges' Commentary: The Outstanding Coral Reef Papers for the Interdisciplinary Contest in Modeling"
The Journal of Undergraduate Mathematics and Its Applications.

Licuanan, W.Y. and Aliño, P.M. (2009)
"Leptoseris kalayaanensis (Scleractinia: Agariciidae), a new coral species from the Philippines"
The Raffles Bulletin of Zoology, 57(1): 1-4.
Summary: A new species of Leptoseris L. kalayaanensis is described from three coralla found under overhangs in about 15m depth at its type locality, the Northeast Investigator Shoal of the Kalayaan Island Group, the Philippines.

Model parameterization

Rodriguez-Zaragoza, F.A. and Arias-González, J. E. (2008)
"Additive diversity partitioning of reef fishes across multiple spatial scales"
Caribbean Journal of Science, 44 (1): 90-101.

Yeager, L. A. and Arias-González, J. E. (2008)
"Preliminary survey of fish community composition in seagrass habitat in two back-reef lagoons of the southern Mexican Caribbean"
Gulf and Caribbean Research, 20(1): 41-47.

Arias-González, J. E., Legendre, P and Rodriguez-Zaragoza, F.A. (2008)
"Scaling up beta diversity on Caribbean coral reefs"
Journal of Experimental Marine Biology and Ecology, 366 (1-2): 28-36.
Summary: The objective of this paper is to find good proxies that are important to explain the spatial variation of beta/delta diversity in coral reefs.

Castro-Pérez J. M. Acosta González G. Arias-González J. E. (2009)
"Relationship between biodiversity and ecosystem functioning in Mexican aquatic systems"
Ecopath 25 years. Fisheries Centre Research Reports.

Cleland, D, Geronimo, R, Dray, A, Perez, P. (2009)
"Characterizing spatial and temporal reef fisheries in Chinchorro Bank Biosphere Reserve, northern Mesoamerican Reef System (MAR)"
Fisheries Management and Ecology.

Cruz-Trinidad, A.T., R.C. Geronimo, and P.M. Aliño. (2009)
"Development trajectories and impacts on coral reef use in Lingayen Gulf, Philippines"
Ocean & Coastal Management, 52(3-4): 173-180.
Summary: Management interventions to reduce pressures on coral reefs often include attracting fishers to nonextractive non-fishery supplemental livelihoods. We look at the case of coral reefs in Lingayen Gulf, Philippines to understand the impacts of local (i.e. Aquaculture and tourism), regional, and national development on the artisanal fisheries sector.

Model prototype development

T Fung, C R Johnson and R M Seymour. (2009)
"Conditions for global dynamic stability of a class of resource bounded model ecosystems"
Bulletin of Mathematical Biology, Epub Mar (2010)
Summary: This paper studies a class of dynamical systems that model multi-species ecosystems.

Cruz-Trinidad, A.T., R.C. Geronimo, and P.M. Aliño. (2009)
"Alternative Stable States and Phase Shifts in Coral Reefs under Anthropogenic Stress"
Ecology.

Arias-González J. E. Abarca L. G. Icocer-Durán J., Cabrera J. L., Calderón-Aguilera L., Chiappa Carrara X., Christensen V., Cupul Magaña A., Franco-López J., Pérez-España H., Morales-Zárate V., Rodriguez-Zaragoza F. A., Sansores C., Schmitter-Soto J. J. (2009)
"Predicting reef geomorphology and bathymetry at high-resolution using GRASP"
IJRS.

Melbourne-Thomas, J., Johnson, C.R., Aliño, P.M., Geronimo,R.C., Villanoy, C.L., Gurney, G.G. (2010)
"A multi-scale biophysical model to inform regional management of coral reefs in the western Philippines and South China Sea"
Environmental Modelling & Software On-line May 2010: 1-17.
Summary: The health and functioning of coral reef ecosystems worldwide is in decline, and in the face of increasing anthropogenic stress, the rate of decline of these important ecosystems is set to accelerate. Mitigation strategies at regional scales are costly, but nevertheless critical, as reef systems are highly connected across regions by ocean transport of both larval propagules and pollutants. It is essential that these strategies are informed by sound science, but the inherent complexity of coral reef systems confers significant challenges for scientists and managers. Models are useful tools for dealing with complexity and can inform decision making for coral reef management.

Predicting thermal stress related to coral bleaching

Peñaflor, E.L., Skirving, W.J., Strong, A.E., Heron, S.F. and David, L.T. (2009)
"Sea-surface temperature and thermal stress in the Coral Triangle over the past two decades"
Coral Reefs, 28(4): 841-850.
Summary: Increasing ocean temperature has become one of the major concerns in recent times with reports of various related ecological impacts becoming commonplace. One of the more notable is the increased frequency of mass coral bleaching worldwide. This study focuses on the Coral Triangle region and utilizes the National Oceanic and Atmospheric Administration-Coral Reef Watch (NOAA-CRW) satellite-derived sea surface temperature (SST) and Degree Heating Weeks (DHW) products to investigate changes in the thermal regime of the Coral Triangle waters between 1985 and 2006.

Botin, Z. T., David, L. T., del Rosario, R. C. H. And Parrott, L. (2009)
"Spatio-temporal complexity analysis of the sea surface temperature in the Philippines"
Ocean Science Discussion, 6: 2831-2859, doi:10.5194/osd-6-2831-(2009)
Summary: A spatio-temporal complexity (STC) measure which has been previously used to analyze data from terrestrial ecosystems is employed to analyse 21 years of remotely sensed sea-surface temperature (SST) data from the Philippines.

Projecting future change

McClanahan, T. R., Cinner, J. E., Maina, J., Graham, N. A. J., Daw T. M., Stead, S. M., Wamukota, A. Brown, K. Ateweberhan, M., Venus, V. and Polunin, N. V. C. (2008)
"Conservation action in a changing climate"
Conservation Letters, 1: 53-59.
Summary: Climate change will pose new challenges to conserving Earth's natural ecosystems, due to incremental changes in temperature and weather patterns, and to increased frequency and intensity of extreme climate events. Addressing these challenges will require pragmatic conservation actions informed by site specific understanding of susceptibility to climate change and capacity of societies to cope with and adapt to change.

Maina, J., Venus, V., McClanahan, T. R. and Ateweberhan, M. (2008)
"Modelling susceptibility of coral reefs to environmental stress using remote sensing data and GIS models"
Ecological Modelling, 212(3-4): 180-199.
Summary: There is a need to develop methods and a decision support system to establish marine protected areas that harbour coral reefs that are resilient to climate change. This study combined surface currents, wind velocity, sea surface temperature (SST), UV radiation, photosynthetically active radiation (PAR), and chlorophyll-a concentration for the western Indian Ocean and known relationships with coral bleaching and mortality to derive predictor variables that correlate with thermal stress. SST variability, UV, maximum temperature and wind speed had the highest influence on susceptibility estimates.

Haas A, el-Zibdah M, Wild C. (2009)
"Seasonal in-situ monitoring of coral-algae interaction stability in fringing reefs of the Northern Red Sea"
Coral Reefs, 29(1): 93-103.
Summary: This paper presents seasonal in situ monitoring data on benthic coverage and coral–algae interactions in high-latitude fringing reefs of the Northern Red Sea over a period of 19 months.

Reef restoration

Shafir, S., van Rijn, J. and Rinkevich, B. (2006)
"Coral nubbins as source material for coral biological research: A prospectus"
Aquaculture, 259(1-4): 444-448.
Summary: The global decline of coral reefs has raised interest in diverse aspects of coral biology, resulting in steady increase in the number of studies on physiological, ecotoxicological and molecular aspects of coral reef biology. An emerging problem in these disciplines is the shortage in source material for research. Genetically identical coral nubbins that are producedwithminimal detrimental impacts on donor colonies fulfill the need for the growing demand for research. Here we detail the protocol for the preparation of coral nubbins amenable for the ornamental trade, reef restoration and research purposes.

Shaish, L. Abelson, A. and Rinkevich, B. (2006)
"Branch to colony trajectory in a modular organism: pattern formation in the Indo-Pacific coral Stylophora pistillata"
Developmental Dynamics, 235: 2111-2121.
Summary: The architecture of the colony in a branching coral is an iterative process in which new layers of calcium carbonate compile atop existing structures that remain unchanged. This study seeks to explore the genetic blueprint of branch-to-colony developmental trajectory in the branching coral Stylophora pistillata, within an astogeny period of 1 year.

Shafir, S., van Rijn, J. and Rinkevich, B. (2006)
"Steps in the construction of underwater coral nursery, an essential component in reef restoration acts"
Marine Biology, 149(3): 679-687.
Summary: Many coral reefs worldwide are rapidly declining, but efficient restoration techniques are not yet available. Here, we evaluate methodologies for reef restoration based on the "gardening" concept.

Amar, K.O. and Rinkevich, B. (2007)
"A floating mid-water coral nursery as larval dispersion hub: testing an idea"
Marine Biology, 151(2): 713-718.
Summary: The global decline in reef health has prompted the need for effective management methodologies, including the development of active restoration measures. One such approach is the 'gardening concept' that involves use of underwater nurseries where coral fragments are farmed before their transplantation into denuded reefs. Here we document enhanced sexual reproduction in colonies of the coral *Stylophora pistillata* cultured in mid-water floating nursery situated in nutrient enriched water, near the fish farms in Eilat, Red Sea.

Shaish, L. Abelson, A. and Rinkevich, B. (2007)
"How plastic can phenotypic plasticity be? The branching coral *Stylophora pistillata* as a model system"
PLoS ONE, 2(7): e644. doi:10.1371.
Summary: Phenotypic plasticity enables multicellular organisms to adjust morphologies and various life history traits to variable environmental challenges. Here, we elucidate fixed and plastic architectural rules for colony astogeny in multiple types of colonial ramets, propagated by cutting from genets of the branching coral *Stylophora pistillata* from Eilat, the Red Sea.

Dizon, R.M., Edwards, A.J. and Gomez, E.D. (2008)
"Comparison of three types of adhesives in attaching coral transplants to clam shell substrates"
Aquatic Conservation: Marine and Freshwater Ecosystems, 18(7): 1140-1148.
Summary: Nubbins from 12 coral species were transplanted onto dead giant clam shells at three sites in a lagoon near Bolinao, north-western Philippines. Transplants were attached using three types of adhesives: cyanoacrylate glue (SG), epoxy putty (EP) and marine epoxy (ME) and were monitored over five months for detachment, in situ mortality and natural self-attachment by tissue growth.

Cabaitan, P.C., Gomez, E.D. and Aliño, P.M. (2008)
"Effects of coral transplantation and giant clam restocking on the structure of fish communities on degraded patch reef"
Journal of Experimental Marine Biology and Ecology, 357(1): 85-98.
Summary: Active restoration is being practiced to supplement conservation activities for the purpose of reversing the trend of reef degradation. In the last decade, the feasibility of different restoration approaches such as coral transplantation and restocking of other marine biota has been the focus of research and relatively few have examined experimentally its effects on the resultant communities. In this study, coral transplantation and giant clam restocking were applied on 25 degraded patch reefs (~ 25 m2) inside a marine sanctuary in Pangasinan, northwestern Philippines to examine their effects on the community structure of reef fishes.

Shaish, L., Levy, G., Gomez, E. and Rinkevich, B. (2008)
"Fixed and suspended coral nurseries in the Philippines: Establishing the first step in the "gardening" concept of reef restoration"
Journal of Experimental Marine Biology and Ecology, 358(1): 86-97.
Summary: The worldwide degradation of reef ecosystems has promoted the advocators of restoration acts to the foreground. Here, we describe the results of the first step of large-scale restoration based on the "gardening with corals" concept. During June–September (2005) "two coral nurseries were established in Bolinao, the Philippines, in front of Silaqui Island, in a shallow (2 m depth) sandy lagoon.

Amar, K.O., Douek, J., Rabinowitz, C. and Rinkevich, B. (2008)
"Employing of the amplified fragment length polymorphism (AFLP) methodology as an efficient population genetic tool for symbiotic cnidarians"
Marine Biotechnology, 10(4): 350-357.
Summary: Although the use of molecular markers in population genetics of marine organisms is increasingly employed, methodologic limitations still hampered the research for some taxa, such as symbiotic cnidarians, including scleractinian corals. The development of molecular tools in scleractinian corals' studies is faced with a list of obstacles, such as high cost, labor, time consuming, contamination with foreign DNA, and markers with low resolution.

Rinkevich, B. (2008)
"Management of coral reefs: We have gone wrong when neglecting active reef restoration"
Marine Pollution Bulletin, 56(11): 1821-1824.
Summary: The current best management tools employed in coral reefs worldwide do not achieve conservation objectives as coral reefs continue to degrade. Even improved reef management helps, at best, to reduce the degradation pace, whereas the worsening global changes foretell a dismal fate for coral reefs. The assertion made here is that the prospect for reefs' future is centered on omnipresent acceptance of restoration, an 'active' management instrument.

Omori, M. and Iwao, K. (2009)
"A novel substrate (the "coral peg") for deploying sexually propagated corals for reef restoration, Galaxea"
Journal of Coral Reef Studies, 11(1): 39-39.
Summary: At a workshop of the RRWG (CRTR Program) at Bolinao, Philippines, in August (2006) "there was a suggestion that juvenile corals reared with sexual propagation on tiles for transplantation could be reared either on a plastic pin or wall-plug so that they can be easily transported and stuck directly into the reef after drilling. Accordingly we developed the "coral peg" (hereafter referred to as the peg) and tested its result at Akajima Marine Science Laboratory in Okinawa.

Shafir, S. Abady, S., Rinkevich, B. (2009)
"Improved sustainable maintenance for mid-water coral nursery by the application of an anti-fouling agent"
Journal of Experimental Marine Biology and Ecology, 368(2): 124-128.
Summary: The 'gardening concept' for reef restoration focuses on coral colonies farming in mid-water nurseries before their transplantation onto denuded reef areas. Nurseries situated in a nutrient-enriched environment significantly curtail nursery time, but extend labor, as nursery construction and farmed corals must be frequently cleaned from competing fouling organisms. Mass farming of corals calls, therefore, for efficient and cheap maintenance methodologies, which we here tested by employing Aqua-guard M250, an anti-fouling agent used in the fish farming industry.

Shaish, L. And Rinkevich, B. (2009)
"Critical evaluation of branch polarity and apical dominance as dictators of colony astogeny in a branching coral"
PLoS One, 4(1): e4095. doi:10.1371.
Summary: The high morphological resemblance between branching corals and trees, can lead to comparative studies on pattern formation traits, best exemplified in plants and in some cnidarians. Here, 81 branches of similar size of the hermatypic coral Stylophora pistillata were lopped of three different genets, their skeletons marked with alizarin red-S, and divided haphazardly into three morphometric treatment groups: (I) upright position; (II) horizontal position, intact tip; and (III) horizontal position, cut tip.

Guest, J.R., Dizon, R.M., Edwards, A.J., Franco, C. and Gomez, E.D. (2010)
"How quickly do fragments of coral 'self-attach' after transplantation?"
Restoration Ecology, 10.1111/j.1526-100X.2009.00562.x.
Summary: Transplantation of coral fragments is seen as a potential method to rapidly restore coral cover to areas of degraded reef; however, considerable research is still needed to assess the effectiveness of coral transplantation as a viable reef restoration tool.

Books

Steneck, R.S and Sala, E.A. (2005)
"Large marine carnivores: trophic cascades and top-down controls in coastal ecosystems past and present"
Ray, J., Redford, K., Steneck, R. and Berger, J. (eds). *Large Carnivores and the conservation of biodiversity*, Island Press.

van Woesik, R. and Koksal, S. (2006)
"A coral population response (CPR) model for thermal stress"
Phinney, J.T. et al (eds). Coral reefs and climate change: science and management, *Coastal and Estuarine Studies*. v.61.Washington DC:AGU.

Rinkevich, B. (2006)
"The coral gardening concept and the use of underwater nurseries: lessons learned from silvics and silviculture"
Precht, William F (ed). *Coral Reef Restoration Handbook*, CRC Press.

Hoegh-Guldberg, O., Anthony, K.R., Berkelmans, R., Dove, S., Fabricius, K., Lough, J., Marshall, P., van Oppen, M.J.H., Negri, A. and Willis, B.L. (2007)
"The vulnerability of reef-building corals on the Great Barrier Reef to climate change"
Marshall, P. and Johnson, J. (eds). Climate Change and the Great Barrier Reef: *A vulnerability assessment, Townsville:GBRMPA & Australian Greenhouse Office.*

Omori, M. (2007)
"Observed spawning records of 82 coral species in Palau"
Kayanne H. et al. (eds). *Coral Reefs of Palau*, PICRC, Palau and JICA, Tokyo.

Smith, G.W. and Smith, M.A. (2008)
"Coral Disease and Global Climate Change"
Uzochukwu, G. (ed). *Proceedings of the 3rd National Conference on Environment, Science and Technology* , Greensboro, NC. Springer Press.

McClanahan, T. R., Weil, E., Cortes, J., Baird, A. and Ateweberhan, M. (2008)
"Consequences of coral bleaching for sessile reef organisms"
van Oppen, M. and Lough, J. M. (eds) *Coral Bleaching: Patterns, Processes, Causes and Consequences.*, Ecological Studies. v.205. Berlin: Springer.

Pratchett, M. S., Munday, C. N., Wilson, S. K., Graham, N. A., Cinner, J. E., Bellwood, D. R., Jones, G. P., Polunin, N. V. C. and McClanahan, T. R. (2008)
"Effects of climate-induced coral bleaching on coral-reef fishes: ecological and economic consequences"
Gibson, R.N., Atkinson, R.J.A. and Gordon, J.D.M. (eds). *Oceanography and Marine Biology: an Annual Review.*

Muhando, C.A. and Mwaipopo, R. (2008)
"Status of Coral Reefs of Tanzania (2008)"
Status of Coral Reefs of the World, GCRMN (Global Coral Reef Monitoring Network).

Muhando, C.A. (2008)
"Approaches to Coral Reef Monitoring in Tanzania"
Obura, D.O., Tamelander, J., & Linden, O. (Eds). *Coastal Oceans Research and Development in the Indian Ocean*. Status Report (2008), CORDIO.

Geronimo, R.C., Salmo III, S., Deocadez, M.R., Castrence Jr., F., Pacifico, K., Junsan, C. and Sagip Lingayen Gulf Project and Partners. (2008)
"Status of Coral Reefs in Lingayen Gulf"
Alino, P.M., Geronimo, R.C., Mamauag, S.S. and Gonzales, R.M. (eds). *Reefs through time (2008): Initiating the state of the coasts reports.*, PHILREEFS, MPA Support Network, Marine Environment & Resources Foundation, Inc. (MERF, Inc) and UP-MSI, Diliman, Quezon City.

Phinn, S.R., Stumpf, R., and Roelfsema, C.M. (2008)
"Remote sensing: The promise and the reality"
Dennison, W. (ed.) *Coastal Assessment Handbook*, University of Maryland Press.

Shafir, S.and Rinkevich, B. (2008)
"The underwater silviculture approach for reef restoration: an emergent aquaculture theme"
Schwartz, Stephen H. (ed). *Aquaculture Research Trends*, Nova Science Publishers Inc, New York.

Ruddick, B, and C Taggart. (2009)
"Tracing Particulates from Produced Water"
Produced Water: Environmental Risks and Advances in Mitigation Technologies, Springer.

Warner, M. E., Lesser, M. P., and P. Ralph. (2009)
"Chlorophyll Fluorescence in Reef Building Corals"
Suggett, D. (ed). *Fluorescence in the Aquatic Environment*, Springer-Verlag.

Lesser, M. P. (2009)
"Coral Bleaching: Causes and Mechanisms"
Dubinsky, Z. (ed). *Corals and Coral Reefs*, Springer-Verlag.

Bourne DG, Ainsworth TD, Willis BL. (2010)
"White syndromes of Indo-Pacific corals"
C Downs, C Woodley, A Bruckner, JW Porter (eds). *Diseases of Corals*, Wiley-Blackwell, Iowa.

Page CA, Croquer A, Bastidas C, Rodriguez S, Neale SJ, Willis BL. (2010)
"Halofolliculina ciliate infections on corals. In Diseases of Corals"
C Downs, C Woodley, A Bruckner, JW Porter (eds.).
Diseases of Corals, Wiley-Blackwell, Iowa.

Conference Papers

Szmant, A.M. and Meadows, M. (2005)
"Developmental changes in coral larval buoyancy and swimming behavior: Implications for dispersal and connectivity"
Proceedings of the 10th International Coral Reef Symposium.

Szmant, A.M and Miller, M.W. (2005)
"Settlement preferences and post-settlement mortality of laboratory cultured and settled larvae of the Caribbean hermatypic corals Montastraea faveolata and Acropora palmata in the Florida Keys, USA"
Proceedings from the 10th International Coral Reef Symposium.

Gil-Agudelo, D.L., Ali-Hassan, L., Kim, K. and Smith, G.W. (2006)
"Characterization of coral surface microbiota using metabolic profiling"
Proceedings of the 10th International Coral Reef Symposium.

Kutser, T., Vahtmäe, E. and Roelfsema, C.M. (2006)
"Mapping Seagrass Biomass With Photo-Library Method"
Proceedings of the 13th Australasian Remote Sensing and Photogrammetry Conference, Canberra.

Brady, K., Phinn, S.R., and Mumby, P.J. (2006)
"Towards an understanding of patterns in high spatial resolution satellite images of coral reefs"
Eos Trans. American Geophysical Union., 87(36): Ocean Sciences *Meeting Supplement*, Abstract OS22N-02.

Ruddick, B.R., Taggart, C.T., Feichter, J., Szmant, A.M. and Whitehead, R.F. (2006)
"Particles are better than dye: Direct measurement of Lagrangian connectivity of coral larvae"
Ocean Sciences Meeting.

Smith, G.W. and Weil, E. (2006)
"Diseases of coral reef organisms: Evolutionary aspects, current status and prognosis"
Proceedings at the 10th International Coral Reef Symposium.

Phinn, S. (2006)
"Coastal Zone Remote Sensing: Understanding and Managing Dynamic and Complex Environments (A Synthesis and Toolkit?)"
Proceedings of the 13th Australasian Remote Sensing and Photogrammetry Conference, Canberra, 20-24 November, CD-Rom, Causal Publications.

Phinn, S., Hough, S., Roelfsema, C., Anstee, J., Dekker, A., Wettle, M. and Daniels. (2006)
"Mud, Algae or Seagrass: An Assessment of Remote Sensing Techniques for Mapping Inter-Tidal Seagrass Cover and Composition in Turbid Tropical Environments"
Proceedings of the 13th Australasian Remote Sensing and Photogrammetry Conference, Canberra, 20-24 November, CD-Rom, Causal Publications.

Phinn, S.R., Roelfsema, C.M. Dekker, A.G., Brando, V., Anstee, J. and Wettle, M. (2006)
"Mapping seagrass (species composition, cover and above-ground biomass): a multi-sensor evaluation in Moreton Bay, Australia"
Eos Trans. American Geophysical Union. *13th Ocean Sciences Meeting*, February 20-24, Honolulu Convention Centre, Hawai'i., 87(36). Ocean Sciences Meeting Supplement, Abstract OS14G-02.

Roelfsema, C.M., Dekker, A.G., Brando, V., Anstee, J. and Wettle, M. (2006)
"Assessing the Effects of Multi Spectral Image Processing and Field Validation Survey Approaches on the Accuracy of Seagrass Maps in Moreton Bay Australia., Australia"
"Eos Trans. American Geophysical Union.13th Ocean Sciences Meeting, February 20-24, Honolulu Convention Centre, Hawai'i, v.87(36) Ocean Sciences Meeting Supplement, Abstract OS14G-03.

Roelfsema, C.M., Joyce, K. E. and Phinn, S.R. (2006)
"2006 Evaluation of benthic survey techniques for validating maps of coral reefs derived from remotely sensed images"
Proceedings of 10th International Coral Reef Symposium, Okinawa, Japan, June 28-July 2, 2004.

Shafir, S., van Rijn, J. and Rinkevich, B. (2006)
"A mid-water coral nursery"
Proceedings of 10th International Coral Reef Symposium.

Phinn, S.R., Yang, S.Y., Roelfsema, C.M., Brady, K. and Mumby, P.J. (2007)
"Integrating Satellite Image Data and Photo-Transects: Mapping Benthic Cover Types to Coral Reef Habitat Zones"
Proceedings of GEOHAB (2007): Marine Benthic Habitats of the Pacific and Other Oceans: Status, Use, and Management., Noumea, New Caledonia, May 2-6.

Knudby A. and LeDrew, E. (2007)
"Measuring Structural Complexity on Coral Reefs"
Diving for Science (2007) *Proceedings of the American Academy of Underwater Sciences. 26th Scientific Symposium*, Dauphin Island, http://www.telespazio.it/calendar09/doc/AAUS_(2007)_19.pdf.

Knudby A. and LeDrew, E. (2007)
"Measuring structural complexity on coral reefs"
N.W.Pollock & J.M. Godfrey (eds). Diving for Science (2007). *Proceedings of American Academy of Underwater Sciences 26th Symposium.*

Vergara, M.W. and Licuanan, W. (2007)
"Survey of coral communities using digital photo transects".

Luzon, K., Ablan-Lagman, M.A., and Licuanan, W. (2007)
"Optimizing DNA extraction and PCR amplification conditions for establishing phylogenetic relationships of bubble corals (Family Euphyllidae)".

Vergara, M.W., Licuanan, W., and Campos, R. (2007)
"Updates on coenoMAP: an online map library of Philippine corals".

Arboleda, M.D., Reichardt, W., and Pueblos, M.J. (2007)
"Status and microbiotic environment of corals in close vicinity to finfish cage mariculture"
8th International Conference on Marine Biotechnology., Eilat, Israel. 11-16 March (2007).

Arboleda, M.D. (2007)
"Profiles of epizoic prokaryotic communities on healthy and diseased scleractinian corals from Lingayan Gulf, Philippines".

Reichardt, W. (2007)
"How healthy are marine waters? Marine ecology and microbial pathogens in tropical environments".

Arboleda, M.D., and Reichardt, W. (2007)
"Disease-linked profiles of coral-associated prokaryotic communities in Bolinao coral reefs".

Ravago-Gotanco, R., Lumibao, C. and Pante, Ma J. R. (2007)
"Isolation of microsatellite markers for estimating population genetic connectivity in the mottled spinefoot rabbitfish, siganus fuscescens"
Proceedings of the 9th National Symposium in Marine Science.

Lumibao, C., Ravago-Gotanco, R. and Pante, Ma J. R. (2007)
"Fingerprinting padas"
Proceedings of the 9th National Symposium in Marine Science.

Lesser, M. P. (2007)
"Coral reefs bleaching and global climate change: Can corals survive the next century?"
Proceedings of the National Academy of Sciences.

Christopher A. Muhando. (2007)
"Coral reef monitoring in Tanzania: Has it been useful?"
Tanzania Coastal and Marine Forum - Proceedings.

Melbourne-Thomas, J., Johnson, C. R., Fung, T. and Seymour, R. M. (2007)
"Decision support tools for managing coral reef systems at local to regional scales"
Proceedings, Environmental Research Event (2007) Townsville, Australia.

Roelfsema, C.M., Phinn, S.R., and Zann, L. (2007)
"Mapping Benthic Habitats on Fijian Coral Reefs: Integrating Field and Remote Sensing Approaches, Proceedings of GEOHAB (2007)"
Marine Benthic Habitats of the Pacific and Other Oceans: Status, Use, and Management, Noumea, New Caledonia, May 2-6.

Roelfsema, C.M., S.R. Phinn, and L. Zann. (2007)
"Mapping Of Tropical Benthic Habitats in Fiji: A Study Into Integrated Field And/Or Remote Sensing Approaches"
GIS and Remote Sensing South Pacific User Conference,
Suva, 26-29 November (2006).

Roelfsema, C.M., S.R. Phinn, A.E. Dekker, V. Brando and A. Bell. (2007)
"Marine Remote Sensing Toolkit for Mapping and Monitoring Coastal Environments"
GIS and Remote Sensing South Pacific User Conference, Suva, 26-29 November (2006).

Roelfsema, C.M. and Phinn, S.R. (2007)
"Mapping Benthic Habitats on Fijian Coral Reefs: Evaluating Combined Field and Remote Sensing"
Proceedings of the Asian Remote Sensing Conference, Kuala Lumpur, Malaysia, November (2007).

Phinn, S.R., Yang, S-Y., Roelfsema, C.M., Brady, K., and Mumby, P.J. (2007)
"Mapping Benthic Habitats on Fijian Coral Reefs: Integrating Field and Remote Sensing Approaches"
P*roceedings of GEOHAB (2007): Marine Benthic Habitats of the Pacific and Other Oceans: Status, Use, and Management*, Noumea, New Caledonia, May 2-6.

Morse, A.N.C. (2007)
"Molecular cues in marine invertebrates: tools for remediation of endangered species"
Bio-Nano Electronics Symposium, Toyo University, Kawagoe, Japan.

Ortiz, J.C. and Holmes, G. (2008)
"Dynamic of the population size frequency distribution in 4 scleractinian coral species on Heron reef as a response to mild thermal stress"
Proceedings of the 11th International Coral Reef Symposium, http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf.

Muhando, C.A and Lanshammar F. (2008)
"Ecological Effects of the Crown-of-Thorns Starfish Removal Programme on Chumbe Island Coral Park, Zanzibar, Tanzania"
Proceedings of the 11th International Coral Reef Symposium.

Rodriguez-Zaragoza, F. and Arias-Gonzalez, J. (2008)
"Biodiversity and ecosystem functioning in three coral reefs at the Mexican Caribbean"
Proceedings of the 11th International Coral Reef Symposium.

Garcia, J. and Alino, P. (2008)
"Factors influencing coral recruitment patterns in the Sulu Sea marine corridors"
Proceedings of the 11th International Coral Reef Symposium.

Bozec, Y-M., Acosta-Gonzalez, G., Nunez-Lara, E.and Arias-Gonzalez, J.E. (2008)
"Impacts of coastal development on ecosystem structure and function of Yucatan coral reefs, Mexico"
Proceedings of the 11th International Coral Reef Symposium.

Cleland, D., Geronimo, R., Dray, A., Perez, P. and Trinidad, A. (2008)
"One fish, two fish, red fish, blue fish: the use of simple agent-based models and role-play games to communicate key messages to community groups"
Proceedings of the 11th International Coral Reef Symposium.

Fung, T., Seymour, R. and Johnson, C. (2008)
"Models of coral reefs with and without macroalgae indicate differential resilience to fishing and anthropogenic nutrients"
Proceedings of the 11th International Coral Reef Symposium.

Melbourne-Thomas, J., Johnson, C., Fung, T. and Seymour, R. (2008)
"Predicting reef futures using a multi-scale coral reef ecosystem model"
Proceedings of the 11th International Coral Reef Symposium.

Seymour, R. and Bradbury, R. (2008)
"The new commons: Why coral reef scientists should get out more"
Proceedings of the 11th International Coral Reef Symposium.

Aliño, P., Campos, W., Francisco, K., Mamauag, S., Geronimo, R., Licuanan, W., Villanoy, C., Deocadiz, M. and Beldia, P. (2008)
"The rites of passage in the marine corridors of the Sulu Sea"
Proceedings of the 11th International Coral Reef Symposium.

Arias-Gonzalez, J., Rivera, R., BBozec, Y-M., Rodriguez-Zaragoza, F., Castro-Perez, J., Villegas-Sanchez, C., Acosta-Gonzalez, G. and Lara-Arenas, H. (2008)
"Implications of coastal development on resilience in linked socio-ecological Mexican Caribbean system"
Proceedings of the 11th International Coral Reef Symposium.

Geronimo, R., Alino, P., Castrence Jr, F. and Uychiaoco, A.J. (2008)
"Trajectories of ecosystem change in an extremely degraded reef in the Philippines"
Proceedings of the 11th International Coral Reef Symposium.

Quibilan, M. C., Alino, P., Vergara, S. and Trono, R. (2008)
"Scaling-up efforts for fisheries management and marine biodiversity conservation through networks of marine protected areas in marine corridors within the Sulu-Sulawesi Seascape"
Proceedings of the 11th International Coral Reef Symposium.

Arceo, H., Alino, P., Lumbab, V., Nanola, C. and Portigo, Ma, F. (2008)
"Gaining ground in improving Marine Protected Areas (MPAs): The Philippine experience"
Proceedings of the 11th International Coral Reef Symposium.

Bradbury, R. and Seymour, R. (2008)
"Plan B for the Anthropocene, *Proceedings of the 11th International Coral Reef Symposium.*

Ticzon, V., Samaniego, B.R., Foster, G., Bejerano-Chavarro, S., Penaflor, E., Marcos, S., Palermo, J.D., Mumby, P.J. and David, L.T. (2008)
"Utilizing acoustic data in establishing reef fish recruit abundance"
Proceedings of the 11th International Coral Reef Symposium, http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf [16-33].

Gomez, E., Cabaitan, P. and Yap, H. (2008)
"Coral transplantation in a degraded lagoon environment: differential results of three species"
Proceedings of the 11th International Coral Reef Symposium.

Vicentuan, K., Guest, J., Aliño, P. and Heyward, A. (2008)
"Survival, growth, and fecundity of Acropora muricata and Hydnophora rigida after fragmentation and transplantation"
Proceedings of the 11th International Coral Reef Symposium.

Boch, C. and Morse, A. (2008)
"Implementing Acropora spp. larval settlement techniques and a coral hatchery system to gain insights into the survivorship of juvenile Acropora spp. polyps"
Proceedings of the 11th International Coral Reef Symposium.

Dela Cruz, D., Rinkevich, B., Gomez, E. and Yap, H. (2008)
"Comparisons between directly transplanted and nursery-reared coral fragments in Bolinao, northwestern Philippines"
Proceedings of the 11th International Coral Reef Symposium.

Bollozos, I.S., Villanueva, R., Edwards, A., Guest, J., Baria,V. and Heyward, A. (2008)
"Poster: Recruitment of corals on standardized artificial substrata at two Indo-West Pacific locations"
Proceedings of the 11th International Coral Reef Symposium.

Vicentuan, K., Guest, J., Baria, M.V., Cabaitan, P., Dizon, R., Villanueva, R., Aliño, P., Edwards, A., Gomez, E. and Heyward, A. (2008)
"Poster: Spawning patterns of corals in north-western Philippines"
Proceedings of the 11th International Coral Reef Symposium.

Baria, M.V., Aliño, P., Guest, J. and Heyward, A. (2008)
"Poster: Spatio-temporal patterns of coral recruitment in the Bolinao-Anda reef complex, northwestern Philippines"
Proceedings of the 11th International Coral Reef Symposium.

Levy, G. (2008)
"Poster: Coral reef restoration through the two stepped "coral gardening" concept"
Proceedings of the 11th International Coral Reef Symposium.

Omori, M., Watanabe, K., Tamura, M., Taniguchi, H. and Kimura, T. (2008)
"Poster: Mass culture of Acropora corals from eggs and larvae in the Republic of Palau"
P*roceedings of the 11th International Coral Reef Symposium.*

Kilfoyle, K., Rangel, M.A., Dodge, R.E. and Spieler, R.E. (2008)
"Poster: Coral reef restoration: standardized module intervention and monitoring program in Mexico, preliminary results"
Proceedings of the 11th International Coral Reef Symposium.

Ravago-Gotanco, R., Lumibao, C. and Pante, Ma J. R. (2008)
"Genetic connectivity of Siganus fuscescens populations along the northwest Luzon coast based on microsatellite data"
Proceedings of the 11th International Coral Reef Symposium.

Bythell, J.C. (2008)
"Coral reef bleaching events, microbial communities and climate change"
Society for General Microbiology 162nd meeting, Edinburgh, 2 April (2008). Abstracts pp6-7.

Hind, E.J. and Lindop, A.M. (2008)
"The unknowns in coral disease identification: An experiment to assess consensus of opinion amongst experts"
Proceedings of the 11th International Coral Reef Symposium, http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf.

Sale, PF and JP Kritzer. (2008)
"Connectivity: What it is, how it is measured, and why it is important for management of reef fishes"
Grober-Dunsmore, R., and B.D. Keller (eds). *Caribbean connectivity: Implications for marine protected area management. Proceedings of a Special Symposium.*

Muhando, C.A and Larshammar, F. (2008)
"Ecological Effects of the Crown-of-Thorns Starfish Removal Programme on Chumbe Island Coral Park, Zanzibar, Tanzania"
11th International Coral Reef Symposium.

Done, T., Devantier, L., Turak, E., Wakeford, M., McDonald, A. and Johnson, C. (2008)
"Great Barrier Reef coral communities: Resilient in the 1980s but struggling in the 2000s"
11th International Coral Reef Symposium.

Garza-Perez, J.R., Rankey, E.C., Ginsburg, R.N., Reeder, S.L., Guidry, S.A. and Guarin, H. (2008)
"Spatial prediction of reef bathymetry and geomorphology using high-resolution satellite imagery"
11th International Coral Reef Symposium.

Zarco-Perello, S., Garza-Perez, J.R., Simoes, N., Mascaro-Miquelajauregui, M. and Chiappa-Carrara, X. (2008)
"Life after death: Pleistocene reefs of Sisal, Yucatan Shelf"
11th International Coral Reef Symposium.

Acosta-Gonzalez, G.,Rodriguez-Zaragoza, F,, Gonzalez-Salas, C, and Arias-Gonzalez, J. (2008)
"Coral reef biodiversity loss at Mexican Caribbean due to the increasing tourist development effects"
11th International Coral Reef Symposium.

Vergara, M.W., Licuanan, W. and Alino, P. (2008)
"Coral community structure of the Bolinao Reef System, northwest Philippines"
11th International Coral Reef Symposium.

Gonzales, R.O., Deocadiz, M., Alino, P., Nanola, C., Arceo, H., Geronimo, R.,Campos, W., Salmo III, S., Uychiaoco, A.J. and Reboton, C. (2008)
"Status of the Philippine coral reefs: 2004-(2007)"
11th International Coral Reef Symposium.

Hernandez, A., Rodriguez-Zaragoza, F., Acosta-Gonzalez, G., Ruiz-Zarate, M., Castro-Perez, J., Medina-Hernandez, A. and Garcia-Rivas, M. (2008)
"Hurricane Dean impacts on Chinchorro Bank coral reefs, Mexico: Bases to implement ecosystem-based fisheries management"
11th International Coral Reef Symposium.

Beldia III, P., Campos, W., Villanoy, C., Canto, M. and Alino, P. (2008)
"Using ichthyoplankton distribution in selecting sites for an MPA network in the Sulu Sea, Philippines"
11th International Coral Reef Symposium.

Licuanan, W.R., Luzon, K. and Alino, P. (2008)
"Spatial diversity of coral reef communities in Sulu Sea marine corridors"
11th International Coral Reef Symposium.

Liu, G., Matrosova, L.E., Penland, M.C., Gledhill, D.K., Eakin, C.M., Webb, R.S. Christensen, T.R., Heron, S., Morgan, J.A., Skirving, W. and Strong, A.E. (2008)
"NOAA Coral Reef Watch Experimental Coral Bleaching Forecast Tool"
11th International Coral Reef Symposium.

Morgan, J.A, Eakin, C.M., Brainard, R.E., Hendee, J.C., Miller, J.E., Monaco, M.E., Christensen, T.R.L., Gledhill, D.K., Heron, S.F., Liu, G., Skirving, W.J. and Strong, A.E. (2008)
"CREIOS: NOAA's Coral Reef Ecosystem Integrated Observing System"
11th International Coral Reef Symposium.

Strong, A.E., Liu, G., Eakin,C.M., Christensen, T.R., Gledhill, D.K., Heron, S., Morgan, J. and Skirving, W. (2008)
"Implications for our Coral Reefs in a Changing Climate over the next few decades – Hints from the past 22 years"
11th International Coral Reef Symposium.

Heron, S., Skirving, W., Liu, G., Christensen, T.R., Eakin, C.M., Morgan, J. A, Gledhill, D.K. and Strong, A.E. (2008)
"Producing a satellite SST climatology – how long is a piece of string?"
11th International Coral Reef Symposium.

Eakin, M., Morgan, J., Heron, S., Lough, J.M., Skirving, W., Liu, G., Christensen, T.R., Gledhill, D.K. and Strong, A.E. (2008)
"Going, Going, Gone? Are 1998 and 2005 Signs of the Future for Coral Reefs"
11th International Coral Reef Symposium.

Christensen, T.R., Heron, S., Skirving, W., Eakin, M., Willis, B., Harvell, C.D., Page, C.A., Mumby, P.J., Raymundo, L., Weil, E., Jordan Dahlgren, E., Bruno, J.F., Gledhill, D.K., Strong, A.E., Morgan, J. A. and Liu, G. (2008)
"Linking environmental factors with coral disease events in the Caribbean"
11th International Coral Reef Symposium.

Skirving, W., Iglesias-Prieto, R., Enriquez, S.,Christensen, T.R., Hedley, J., Eakin, M., Hoegh-Guldberg, O., Dove, S., Heron, S., Mumby, P.J., Strong, A.E., Liu, G., Morgan, J. and Gledhill, D. (2008)
"A methodology for using satellite-based temperature and light measurements for predicting coral bleaching severity and mortality"
11th International Coral Reef Symposium.

Gledhill, D.K., Wanninkhof, R., Millero, F.J., Eakin, C.M., Langdon, C., Hendee, J., Christensen, T.R., Strong, A.E., Skirving, W., Moran, Liu, G. and Heron, S.F. (2008)
"Monitoring oceanic and coastal variability in carbonate chemistry: tracking ocean acidification in the greater Caribbean region"
11th International Coral Reef Symposium.

Christensen, T.R., Strong, A.E., Skirving, W.J., Eakin, C.M., Morgan, J.A., Liu, G., Heron, S. and Gledhill, D.K. (2008)
"Poster: NOAA Coral Reef Watch: Satellite Data Products for Coral Reef Managers"
11th International Coral Reef Symposium.

Gledhill, D.K., Christensen, T.R.L., Gramer, L.J., Hoeke, R.K., Iglesias-Prieto, R., Manzello, D., Eakin, C.M., Skirving, W.J., Liu, G., Heron, S.F., Morgan, J.A. and Strong, A.E. (2008)
"Poster: Satellite detection of low wind events conducive to mass coral bleaching: the NOAA Coral Reef Watch Experimental Doldrums Product"
11th International Coral Reef Symposium.

Eakin, C.M., Christensen, T.R., Gledhill, D.K., Heron, S.F., Liu, G., Morgan, J.A., Skirving, W.J. and Strong, A.E. (2008)
"NOAA Coral Reef Watch: Global satellite monitoring for coral reefs"
11th International Coral Reef Symposium.

Cabaitan, P., Gomez, E. and Alino, P. (2008)
"Effects of coral transplantation and giant clam restocking on the functional groups of fish on degraded patch reefs"
11th International Coral Reef Symposium.

Guest, J., Dizon, R., Franco, C., Edwards, A. and Gomez, E. (2008)
"How quickly do coral-fragments of different species 'self-attach' after transplantation?"
11th International Coral Reef Symposium.

Dizon, R., Guest, J., Gomez, E. and Edwards, A. (2008)
"Species specific sensitivities of transplanted coral fragments from eleven species to predation and bleaching"
11th International Coral Reef Symposium.

Baird, A. and Guest, J. (2008)
"Predicting patterns of coral spawning at multiple scales"
11th International Coral Reef Symposium.

Ravago-Gotanco, R. and Juinio-Meñe, M.A. (2008)
"Genetic connectivity in Philippine waters: Insights on patterns, scales, and processes based on various marine taxa"
11th International Coral Reef Symposium.

Cunning, R., Thurmond, J., Smith, G., Weil, E. and Ritchie, K. (2008)
"A survey of Vibrios associated with healthy and Yellow Band Diseased Montastraea faveolata"
Proceedings of the 11th International Coral Reef Symposium.

Ananthasubramaniam, B., Muller E., Boch C., Nisbet R. M., Morse D. E., and Doyle III, F.J. (2008)
"Understanding synchronized spawning and symbiotic metabolism in corals"
Proceedings of the 11th International Coral Reef Symposium.

Weil, E., Ritchie, K.B. and Smith, G.W. (2008)
"Inoculation of Vibrio spp. onto Montastraea faveolata fragments to determine potential pathogenicity"
Proceedings of the 11th International Coral Reef Symposium.

Cunning, JR, Thurmond JE, Smith GW, Weil E, Ritchie KB. (2008)
"A survey of Vibrios associated with healthy and Yellow band diseased Montastraea faveolata"
Proceedings of the 11th International Coral Reef Symposium.

Weil E, Kitchie KB, Croquer A, Smith GW. (2008)
"Inoculation of Vibrio spp. onto Montastraea faveolata fragments to determine potential pathogenicity"
Proceedings of the 11th International Coral Reef Symposium.

Geronimo, R.C., P.M. Aliño. (2009)
"Capturing significant coral reef ecosystem and fishery changes in Bolinao, Philippines (1997-2008) using Ecopath with Ecosim"
In: Palomares, M.L.D., L. Morissette, A. Cisneros-Montemayor, D. Varkey, M. Coll, C. Piroddi. (eds.), *Ecopath 25 Years Conference Proceedings: Fisheries Centre Research Reports,* Fisheries Centre, University of British Columbia.

Cleland, D, Geronimo, R, Dray, A, Perez, P and Trinidad. (2009)
"SimReef and ReefGame: two tools to support integrated ocean research and management"
World Ocean Conference, Manado, Indonesia, May 2009.

Smith, G.W. and M.A. Smith. (2009)
"Coral Disease and Global Climate Change"
Proceedings of the 3rd National Conference. on Environment, Science and Technology, Springer Press, (2009).

Cleland, D and Wyborn, C. (2009)
"Ecosystem functioning and biodiversity across reefscapes in Alacranes Reef, Campeche Bank, Mexico"
Diversitas OC2., Cape Town, South Africa 13-16 October.

Arias-González J. E., Cabrera J. L., González Gándara C. (2009)
"Protección and isolation: inseparable elements to reef persistence"
Coral Reef Mexican Congress, Tuxpan, Veracruz, México. June (2009).

Acosta-González, G., Hernández-Landa R. C., Franklin G.L., Lara-Arenas H., Arias-González J. E. (2009)
"Phase change the landscape of Mahahual reef, Quintana Roo, México"
Coral Reef Mexican Congress, Tuxpan, Veracruz, México. June (2009).

Martínez Rendis A., Acosta-González, G., Hernández-Stefanoni J. L., Arias-González J. E. (2009)
"Predicting Mexican coral reef bathymetry"
Coral Reef Mexican Congress, Tuxpan, Veracruz, México. June (2009).

Garza-Pérez J. R., Acosta-González G., Arias-González J. E. (2009)
"Herbivorous fish on the Alacranes reef: synonymous with stability by geographical isolation"
Coral Reef Mexican Congress, Tuxpan, Veracruz, México. June (2009).

Hernández-Landa R. C., Franklin G.L., Acosta-González, G., León-Pech G., Arias-González J. E., González-Gándara C. (2009)
"Recovery of reef communities after nine years of the stranding of a ship on the Alacranes reef"
Coral Reef Mexican Congress, Tuxpan, Veracruz, México. June (2009)

Strong, A.E., G. Liu, C.M. Eakin, T.R.L. Christensen, W.J. Skirving, D.K. Gledhill, S.F. Heron and J. A. Morgan. (2009)
"Implications for Our Coral Reefs in a Changing Climate over the Next Few Decades – Hints from the past 22 years"
Proceedings of the 11th International Coral Reef Symposium.

Electronic Resources (Web)

"Restoration Project at Half Moon Bay" (2006)
CEA Electronic Communications, Edition 46.

"Oceanographic student and professor deploy artificial reef modules in Mexico" (2006)
Sharkbytes.

Rosell, K., Jordán, G., Croquer,A. and Jordán, E. (2007)
"Photograph-based field guide to the scleractinian genera found the Philippines"
Online database.

Arias-González J.E., G. Acosta-González, E. Hernández-Juárez, F. D. Sagols-Troncoso. (2007)
"Banco Chinchorro Information System"
http://acme.math.cinvestav.mx:80/~merida/mapa.html.

Phinn, S.R. and Roelfsema, C.M. (2007)
"The Coastal Remote Sensing Toolkit – Coral Reef Mapping sections"
www.gpa.uq.edu.au/CRSSIS/tools/rstoolkit/default.html, www.gpa.uq.edu.au/CRSSIS/tools/rstoolkit/shallow-coral-bcm.html.

Other

Licuanan, W.R.Y., Geronimo, R.C. and Aliño, P.M. (2007)
"Going Beyond FISH-BE: Towards understanding ecosystem scale and simple rules for local fisheries management"
Aliño, P.M. (ed). *FISH-BE Library of Models.,* Philippine Environmental Governance (EcoGov 2) Project. (2007). Pasig City, Philippines.

Roelfsema C.M. and Phinn S.R. (2007)
"Queensland researchers develop photo-mapping technique for benthic habitats"
Position Magazine.

Hoegh-Guldberg, O. et al. (2009)
"The Coral Triangle and Climate Change: Ecosystems, People and Societies at Risk".
WWF-Australia Report. www.wwf.org.ph/downloads/TheCoralTriangleandClimateChange.pdf

Associated Publications

These are publications that have involved CRTR researchers, and whilst not supported financially by the CRTR, the research has either been influenced by complementary CRTR-research, or the CRTR-research has been influenced by the research outlined in these publications.

Journal Articles

Advancing knowledge of connectivity in coral and other reef invertebrates

Santos, S.R, Shearer, T.L., Hannes, A.R. and Coffroth, M.A. (2004)
"Fine-scale diversity and specificity in the most prevalent lineage of symbiotic dinoflagellates (Symbiodinium, Dinophyceae) of the Caribbean"
Molecular Ecology, 13: 459-469.

Severance, E.G., Szmant, A.M. and Karl, D. (2004)
"Microsatellite loci isolated from the Caribbean coral, Montastraea annularis"
Molecular Ecology Notes 4, 4: 74-76.

Severance, E.G., Szmant, A.M. and Karl, D. (2004)
"Single copy gene markers isolated from the Caribbean coral, Montastraea annularis"
Molecular Ecology Notes 4, 4: 167-169.

Ruiz-Zárate, M.A. and Arias-González, J.E. (2005)
"Recruitment of Acropora, Millepora and Stylaster roseus on an experimental substratum"
Coral Reefs, 24(1): 56.

Nugues, M. and Szmant, A.M. (2006)
"Coral settlement onto Halimeda opuntia: a fatal attraction to an ephemeral substrate?"
Coral Reefs, 25(4): 585-591.

Pandolfi, J. M., Tudhope, A.W., Burr, G., Chappell, J., Edinger, E., Frey, M. Steneck, R., Sharma, C., Yeats, A., Jennions, M., Lescinsky, H. and Newton, A. (2006)
"Mass mortality following disturbance in Holocene coral reefs from Papua New Guinea"
Geology, 34(11): 949-952.

Sale, P.F. (2008)
"Management of coral reefs: Where we have gone wrong and what we can do about it"
Marine Pollution Bulletin, 56(5): 805-809.

Ritson-Williams, Arnold, S. N, Fogarty, N. Steneck, R. S. Vermeij, M. Paul, V. (2008)
"2009 New Perspectives on Ecological Mechanisms Affecting Coral Recruitment on Reefs"
Smithsonian Contributions to Marine Science., Submitted.

Ulstrup KE, Nielsen HB, Jarmer H, Goffard N, Willis BL, David J, Miller DJ, van Oppen MJH. (2009)
"Microarray analysis reveals transcriptional plasticity in the reef building coral Acropora millepora"
Molecular Ecology, Bay LK.

Biomarkers

Mostafavi, P.G., Fatemi, S.M.R.,Shahhosseiny, M.H., Hoegh-Guldberg, O.and Loh, W. K. W (2006)
"Predominance of clade D Symbiodinium in shallow-water reef-building corals off Kish and Larak Islands (Persian Gulf, Iran)"
Marine Biology, 153(1): 25-34.

Siebeck, U.E., Marshall, N. J., Klüter, A. and Hoegh-Guldberg, O. (2006)
"Monitoring coral bleaching using a colour reference card"
Coral Reefs, 25(3): 453-460.

Mayfield, A. B., Hirst, M. B. and Gates, R. D. (2009)
"Real-time PCR-based gene expression analysis in the anthozoan-dinoflagellate endosymbiosis"
Molecular Ecology Resources, 9(2): 462- 470.

Connectivity estimates for coral reefs

Nardi, K., Jones, G.P, Moran, M.J and Cheng, Y.W. (2004)
"Contrasting effects of marine protected areas on the abundance of two exploited reef fishes at the sub-tropical Houtman Albatross Islands, Western Australia"
Environmental Conservation, 31: 160-169.

Ablan, M.C.A., McManus, J.W. and Viswanathan, K. (2004)
"Indicators for management of coral reefs and their applications to marine protected areas"
NAGA Worldfish Quarterly, 27: 31-39.

Hughes. T., Bellwood. D.R., Folke. C., Steneck. R.S. and Wilson. J.E. (2005)
"New paradigms for supporting the resilience of marine ecosystems"
Trends in Ecology and Evolution, 20(7): 380-386.

Paris, C.B., Chérubin, L.M. and Cowen, R.K. (2007)
"Surfing, spinning, or diving from reef to reef: How does it change population connectivity?"
Marine Ecology Progress Series (MEPS), 347: 285-300.

Connectivity estimates for selected reef fishes

Chittaro, P.M. (2004)
"Fish-habitat associations across multiple spatial scales"
Coral Reefs, 23(2): 235-244.

Doherty, P.J., Dufour, V., Galzin, R. Hixon, M.A., Meekan, M. and Planes S. (2004)
"High mortality during settlement is a population bottleneck for a tropical surgeonfish"
Ecology, 85(9): 2422-2428.

Kim, E.A. B., Lasker, H.R., Coffroth, M.A. and Kim, K. (2004)
"Morphological and genetic variation across reef habitats in a broadcast-spawning gorgonian coral"
Hydrobiologia, 530/531: 423-432.

Beukers-Stewart, B.D. and G.P. Jones. (2004)
"The influence of prey abundance on the feeding ecology of two piscivorous species of coral reef fish"
Journal of Experimental Marine Biology and Ecology, 299(2): 155-184.

Irisson, J.-O., Le Van, A., De Lara, M. and Planes, S. (2004)
"Strategies and trajectories of coral reef fish larvae optimizing self-recruitment"
Journal of Theoretical Biology, 225: 205-218.

Brophy, D., Jeffries, T.M and Danilowicz, B.S. (2004)
"Elevated manganese concentrations at the core of clupeid otoliths: possible environmental, physiological or structural origins"
Marine Biology, 144: 779-786.

Heffernan, O.A.,Danilowicz, B.S. and Milligan, S.P. (2004)
"Determination of species-specific spawning distributions of commercial finfish in the Irish Sea using a biochemical protein-based method"
Marine Ecology Progress Series, 284: 279-291.

Syms, C. and G.P. Jones. (2004)
"Habitat structure, disturbance and the composition of sand-dwelling goby assemblages in a coral reef lagoon"
Marine Ecology Progress Series, 268: 221-230.

Jones, G.P., M.I. McCormick, M. Srinivasan and J.V. Eagle. (2004)
"Coral decline threatens fish biodiversity in marine reserves"
Proceedings of the National Academy of Science, 101: 8251-8253.

Chen, C.A., Ablan, M.C.A., Hsui, T.-C., McManus, J.W., Tuan, V.S., Cabanban, A.S. and Shao, K.T. (2004)
"Mitochondrial DNA analysis of the genetic structure among populations of the six bar wrasse, Thllassoma hardwicki, in the northern South China Sea,
Zoological Studies, 43(4): 803-812.

Chen, C.A., Ablan, M.C.A., Hsui, T.-C., McManus, J.W., Tuan, V.S., Cabanban, A.S. and Shao, K.T. (2004)
"Variable Numbers of Tandem Repeats (VNTRs), Heteroplasmy, and Sequence Variation of the Mitochondrial Control Region in the Three-spot Dascyllus, Dascyllus trimaculatus (Perciformes: Pomacentridae)"
Zoological Studies, 43(4): 803-812.

Butler IV, M.J. (2005)
"Benthic fisheries ecology in a changing environment: Unravelling process to achieve prediction"
Aquatic Living Resources, 18: 301-311.

Lecchini D., Planes, S. and Galzin, R. (2005)
"Experimental assessment of sensory modalities of coral-reef fish larvae in the recognition of their settlement habitat"
Behavioural Ecology & Sociobiology, 58: 18-26.

Ceccarelli, D.M., Jones, G.P. and McCook, L.J. (2005)
"Effects of territorial damselfish on an algal-dominated coastal coral reef"
Coral Reefs, 24(4): 606-620.

Messmer, V., van Herwerden, L., Munday, P.L. and Jones, G.P. (2005)
"Phylogeography of colour polymorphism in the coral reef fish, Pseudochromis fuscus, from Papua New Guinea and the Great Barrier Reef"
Coral Reefs, 24(3): 392-402.

Lindeman, K.C and DeMaria D. (2005)
"Juveniles of the Caribbean's largest coral reef snapper do not use reefs"
Coral Reefs, 24(3): 359.

Hixon, M.A. and Jones, G.P. (2005)
"Competition, predation, and density-dependent mortality in demersal marine fishes"
Ecology, 86(11): 2847-2859.

Chittaro, P.M., Usseglio, P., and P.F. Sale. (2005)
"Variation in fish density, assemblage similarity and relative rates of predation among mangrove, seagrass, and coral reef habitats"
Environmental Biology of Fishes, 72(2): 175-187.

Lee, O., Nash, R.D.M., Danilowicz, B.S (2005)
"Small-scale spatiotemporal variability in ichthyoplankton and zooplankton distribution in relation to a tidal-mixing front in the Irish Sea"
ICES Journal of Marine Science, 62: 1021-1036.

Hepburn, R.I., Dixon, B and Heath, D.D. (2005)
"Population genetic analysis of juvenile bicolor damselfish (Stegastes partitus) at three spatial scales across the Meso-American Barrier Reef System"
Molecular Ecology, 6: 1059-1062.

Ceccarelli, D.M., Jones, G.P. and McCook, L.J. (2005)
"Foragers versus farmers: roles of two behavioural groups of herbivorous fishes on coral reefs"
Oecologia, 145: 445-453.

Brophy, D., Danilowicz, B.S. and King, P.A. (2006)
"Spawning season fidelity in sympatric populations of Atlantic herring (Clupea harengus)"
Canadian Journal of Fisheries and Aquatic Sciences., 63(3): 607-616.

Srinivasan, M. and Jones, G.P. (2006)
"Extended breeding and recruitment periods of fishes on a low latitude coral reef"
Coral Reefs, 25(4): 673-682.

Lee, O., Danilowicz, B.S.and Dickey-Collas, M. (2006)
"Temporal and spatial variability in growth and condition of dab (Limanda limanda) & sprat (Sprattus sprattus) larvae in the Irish Sea"
Fisheries Oceanography, 15(6): 490-507.

Wilson, S.K., N.A.J. Graham, M.S. Pratchett, G.P. Jones and N.V.C. Polunin. (2006)
"Multiple disturbances and the global degradation of coral reefs: are reef fishes at risk or resilient?"
Global Change Biology, 12(11): 2220-2234.

Behringer, D.C. and Butler IV, M. J. (2006)
"Density-dependent population dynamics in juvenile Panulirus argus (Latreille): the impact of artificial density enhancement"
Journal of Experimental Marine Biology and Ecology, 334(1): 84-95.

Nardi, K., Newman, S.J., Moran, M.J. and Jones, G.P. (2006)
"Vital demographic statistics and management of the baldchin groper (Choerodon rubescens) from the Houtman Abrolhos Islands"
Marine and Freshwater Research, 57: 485-496.

Hare, J.A., S. R. Thorrold, H. Walsh, C. Reiss, A. Valle-Levinson, and C. M. Jones. (2006)
"Biophysical mechanisms of larval fish ingress into Chesapeake Bay"
Marine Ecology Progress Series, 303: 295-310.

Jones, G.P., Santana, L., McCook L.J. and McCormick, M.I. (2006)
"Resource use and the impact of three herbivorous damselfishes on coral reef communities"
Marine Ecology Progress Series, 328: 215-224.

Walther, B.D. and Thorrold, S.R. (2006)
"Water, not food, contributes the majority of strontium and barium deposited in the otoliths of a marine fish"
Marine Ecology Progress Series (MEPS), 311: 125-130.

Smith-Keune, C., Jerry, D.R., Evans, B.S., McCormick, M.I., Munday, P.L. and Jones, G.P. (2006)
"Development and characterization of eight new microsatellite markers for the haremic sandperch, Parapercis cylindrica (Family Pinguipedidae)"
Molecular Ecology Notes, 6:1036-1038.

Ablan, M.C.A. (2006)
"Microsatellite loci for studies on population differentiation and connectivity of the red-bellied yellow tail fusilier, Caesio cuning (Caesionidae)"
Molecular Ecology Notes, 6:170-172.

Hogan, J.D., Fisher, R. and Nolan, C. (2007)
"Critical swimming speed of settlement-stage coral reef fishes from the Caribbean: a methodological and geographical comparison"
Bulletin of Marine Science, 80(1): 219-231.

Annis, E. R., Incze, L. S., Wolff, N. and Steneck, R. (2007)
"Estimates of in situ larval development time for the lobster, Homarus americanus"
Journal of Crustacean Biology, 27(3): 454-462.

Fisher, R. and Hogan, J.D. (2007)
"Morphological predictors of swimming speed: a case study of pre-settlement juvenile coral reef fishes"
Journal of Experimental Biology, 210(14): 2436-2443.

Feary, D.A., Almany, G.R. Jones, G.P. and McCormick, M.I. (2007)
"Coral degradation and the structure of tropical reef fish communities"
Marine Ecology Progress Series, 333: 243-248.

Jones, G.P., M. Srinivasan and G.R. Almany. (2007)
"Population connectivity and conservation of marine biodiversity"
Oceanography, 20(3): 100-111.

Almany, G.R., Peacock, L.F., Syms, C., McCormick, M. I. and Jones, G.P. (2007)
"Predators target rare species in coral-reef fish assemblages"
Oecologia, 152: 751-761.

Feary, D.A., Almany, G.R., McCormick, M.I. and Jones, G.P. (2007)
"Habitat choice, recruitment and the response of coral reef fishes to coral degradation"
Oecologia, 153: 727-737.

Cowen, R.K., and S. Sponaugle. (2008)
"Larval dispersal and marine population connectivity"
Annual Reviews in Marine Science, 1: 443-466.

Sadovy de Mitcheson, Y., Cornish, A., Domeier, M., Colin, P. L., Russell, M., and Lindeman, K.C. (2008)
"A global baseline for reef fish spawning aggregations"
Conservation Biology, 22(5): 1233-1244.

Planes, S., Jones, G.P., Thorrold, S.R. (2008)
"Larval dispersal connects fish populations in a network of marine protected areas"
Proceedings of the National Academy of Science USA.

Pratchett, M.S., Munday, P.L., Wilson, S.K., Graham, N.A.J., Cinner, J.E., Bellwood, D.R., Jones, G.P. Polunin, N.V.C. and McClanahan, T.R. (2008)
"Effects of climate-induced coral bleaching on coral-reef fishes — ecological and economic consequences"
Oceanography and Marine Biology: An Annual Review, 46: 251-296.

Coral resistance to disease

Rosenberg, E., Kushmaro, A., Kramarsky-Winter, E., Banin, E. and Loya, Y. (2008)
"The role of microorganisms in coral bleaching"
ISME Journal (Journal of the International Society for Microbial Ecology), 32(5): 723-735.

Leverette, C.L., Warren, M., Smith, M.A. and Smith, G.W. (2008)
"Determination of carotenoid as the purple pigment in Gorgonia ventalina sclerites using Raman microscopy"
Spectrochimica Acta Part A, 69(3): 1058-1061.

Vizcaino M., Johnson W, Kimes N, Williams K, Torralba M, Nelson K, Smith G, Weil E, Morris P. (2009)
"Vibrio coralliilyticus strains and Caribbean sister phylotypes isolated from a diseased octocoral exhibit high antimicrobial resistance"
Environmental Microbiology.

Ecological mechanisms and outcomes

Hoegh-Guldberg, O. (2005)
"Low coral cover in a high-CO2 world"
Journal of Geophysical Research, 110: C09S06.

Hoegh-Guldberg, O. (2006)
"Complexities of coral reef recovery"
Science, 311: 42-43.

Donner, S.D., Skirving, W.J., Little, C.M., Oppenheimer, M. and Hoegh-Guldberg O. (2005)
"Global assessment of coral bleaching and required rates of adaptation under climate change"
Global Change Biology, 11(12): 2251-2265.

Leggat, W., Dixon, R., Saleh,S. and Yellowlees, D. (2005)
"A novel carbonic anhydrase from the giant clam Tridacna gigas contains two carbonic anhydrase domains"
FEBS, 124(3): 185-193.

Brown, B.E. and Bythell J.C. (2005)
"Perspectives on mucus secretion in corals"
Marine Ecology Progress Series, 296: 291-309.

Genin, A., Jaffe, J., Reef, R., Richter, R. and Franks, J. (2005)
"Swimming against the flow"
Science, 308: 860-862.

Lesser, M. P. (2006)
"Oxidative stress in marine environments: Biochemistry and physiological ecology"
Annual Review Physiology, 68: 253-278.

Roff, G., Hoegh-Guldberg, O. and Fine, M. (2006)
"Intra-colonial response to Acroporid "white syndrome" lesions in tabular Acropora spp. (Scleractinia)"
Coral Reefs, 25(2): 255-264.

Leggat, W., Ainsworth, T.D., Dove, S.G. and Hoegh-Guldberg, O. (2006)
"Aerial exposure influences bleaching patterns"
Coral Reefs, 25(3): 452.

Shenkar, N., Fine, M., Winter, E. K. and Loya, Y. (2006)
"Population dynamics of zooxanthellae during a bacterial bleaching event"
Coral Reefs, 25(2): 223-227.

Fine, M., Roff, G., Ainsworth, T.D. and Hoegh-Guldberg, O. (2006)
"Phototrophic microendoliths bloom during coral "White Syndrome"
Coral Reefs, 25(4): 577-581.

Davy, S.K., Burchett, S.G., Dale, A.L., Davies, P., Davy, J.E., Muncke, C., Hoegh-Guldberg, O. and Wilson, W. H. (2006)
"Viruses: Agents of coral disease?"
Diseases of Aquatic Organisms, 69(1): 101-110.

Pantos, O. and Bythell, J.C. (2006)
"Bacterial community structure associated with white band disease in the elkhorn coral Acropora palmata determined using culture-independent 16S rRNA techniques.
Diseases of Aquatic Organisms, 69(1): 79-88.

Smith, J.E., Shaw, M., Edwards, R.A., Obura, D., Pantos, O., Sala, E., Sandin, S.A., Smriga, S., Hatay, M. and Rohwer, L. (2006)
"Indirect effects of algae on coral: algae-mediated, microbe-induced coral mortality"
Ecology Letters, 9(7): 835-845.

Thornhill, D. J., Daniel, M.W., LaJeunesse, T.C., Bruns, B.U., Schmidt, G.W. and Fitt, W.K. (2006)
"Natural infections of aposymbiotic Cassiopea xamachana scyphistomae from environmental pools of Symbiodinium"
Journal of Experimental Marine Biology & Ecology, 338(1): 50-56.

Rodríguez-Román, A., Hernández-Pech, X., Thomé, P. E., Enríquez, S. and Iglesias-Prieto, R. (2006)
"Photosynthesis and light utilization in the Caribbean coral Montastraea faveolata recovering from a bleaching event"
Limnology and Oceanography, 51(6): 2702-2710.

Gleason, D.F., Edmunds, P. J. and Gates, R. D. (2006)
"Ultraviolet radiation effects on the behavior and recruitment of larvae from the reef coral Porites astreoides"
Marine Biology, 148(3): 503-512.

Kelman, D., Kashman, Y., Rosenberg, E., Kushmaro, A. and Loya, Y. (2006)
"Antimicrobial activity of Red Sea corals"
Marine Biology, 149(2): 357-363.

Garpe, K.C., Yahya, S.A.S., Lindahl, U. and Ohman, M.C. (2006)
"Long-term effects of the 1998 coral bleaching event on reef fish assemblages"
Marine Ecology Progress Series, 315: 237-247.

Kramarsky-Winter, E., Harel, M., Siboni, N., Ben Dov, E., Brickner, I., Loya, Y. and Kushmaro, A. (2006)
"Identification of a protist-coral association and its possible ecological role"
Marine Ecology Progress Series, 317: 67-73.

Rosenfeld, M., Shemesh, A., Yam, R. and Loya, Y. (2006)
"Impact of the 1998 bleaching event on Ð180 records of Okinawa corals"
Marine Ecology Progress Series, 314: 127-133.

Todd, B.D., Thornhill, D.J. and Fitt, W.K. (2006)
"Patterns of inorganic phosphate uptake in Cassiopea xamachana: a bioindicator species"
Marine Pollution Bulletin, 52(5): 515-521.

van Oppen M. J. H. and Gates, R. D. (2006)
"Conservation genetics and the resilience of reef-building corals"
Molecular Ecology, 15: 3863-3883.

Stat, M., Carter, D. and Hoegh-Guldberg, O. (2006)
"The evolutionary history of Symbiodinium and scleractinian hosts—Symbiosis, diversity, and the effect of climate change"
Perspectives in Plant Ecology, Evolution and Systematics, 8(1): 23-43.

Raven, J., Caldeira, K., Elderfield, H., Hoegh-Guldberg, O., Liss, P., Riebesell, U., Shepherd, J., Turley, C. and Watson, A. (2006)
"Ocean acidification due to increasing atmospheric carbon dioxide"
Royal Society (Policy Document), 12/05: 68.

Hoegh-Guldberg, O. (2006)
"[Perspective] The complexities of coral reef recovery"
Science, 311: 42-43.

Papina, M., Meziane, T. and van Woesik, R. (2007)
"Acclimation effect on fatty acids of the coral Montipora digitata and its symbiotic algae"
Comparative Biochemistry and Physiology. Part B., 147(4): 583-589.

Field, S.N., Glassom, D. and Bythell, J.C. (2007)
"Effects of artificial settlement plate materials and methods of deployment on the sessile epibenthic community development in a tropical environment"
Coral Reefs, 26(2): 279-289.

Hughes, T.P., Rodriques, M J., Bellwood, D.R., Ceccarelli, D., Hoegh-Guldberg, O., McCook, L., Moltschaniwskyj, N., Pratchett, M. S., Steneck, R.S. and Willis, B. (2007)
"Phase shifts, herbivory and the resilience of coral reefs to climate change"
Current Biology, 17(4): 360-365.

Anthony, KRN, Connolly, SR and Hoegh-Guldberg, O.(2007)
"Bleaching, energetics and coral mortality risk: effects of temperature, light and sediment regime"
Limnology and Oceanography, 52(2): 716-726.

Ainsworth, T.D., Kvennefors, E.C., Blackall, L., Fine, M. and Hoegh-Guldberg, O. (2007)
"Disease and cell death in White Syndrome of Acroporid corals on the Great Barrier Reef"
Marine Biology, 151(1): 19-29.

Sampayo, E., Franceschietis, L., Hoegh-Guldberg, O.and Dove, S. (2007)
"Niche partitioning of closely related symbiotic dinoflagellates"
Molecular Ecology, 16(17): 3721-3733.

Levy, O., Appelbaum, L., Leggat, W., Gothlif, Y., Miller, D. J. and Hoegh-Guldberg, O. (2007)
"Light-responsive cryptochromes from a simple multicellular animal, the coral Acropora millepora"
Science, 318: 467-470.

Allers, E., Niesner, C., Wild, C. and Pernthaler, J. (2008)
"Microbes enriched in seawater after addition of coral mucus"
Applied and Environmental Microbiology, 74 (10): 3274-3278.

Stat, M. and Gates, R. D. (2008)
"Vectored introductions of marine endosymbiotic dinoflagellates into Hawaii,
Biological Invasions, 10(4): 579-583.

Thornhill, D.J., Kemp, D.W., Bruns, B.U., Fitt,W.K. and Schmidt, G.W. (2008)
"Correspondence between cold tolerance and temperate biogeography in Western Atlantic Symbiodinium (Dinophyta) lineage"
Journal of Phycology, 44(5): 1126-1135.

Manning, M. M. and Gates, R. D. (2008)
"Diversity in populations of free-living Symbiodinium from a Caribbean and Pacific reef"
Limnology and Oceanography, 53(5): 1853-1861.

LaJeunesse, T.C., Reyes Bonilla, H., Warner, M.E., Wills, M., Schmidt, G.W. and Fitt, W.K. (2008)
"Specificity and stability in high latitude eastern Pacific coral-algal symbioses"
Limnology and Oceanography, 53(2): 719-727.

Jantzen, C., Wild, C., el-Zibdah, M., Roa-Quiaoit, H.A., Haacke, C. and Richter, C. (2008)
"Photosynthetic performance of giant clams, Tridacna maxima and T. Squamosa, Red Sea"
Marine Biology, 155(2): 211-221.

Edmunds, P. J. and Gates, R. D. (2008)
"Acclimatization in tropical reef corals"
Marine Ecology Progress Series, 361: 307-310.

Houk, P. and van Woesik, R. (2008)
"Dynamics of shallow-water assemblages in the Saipan Lagoon"
Marine Ecology Progress Series, 356: 39-50.

Wild, C., Mayr, C., Wehrmann, L.M., Schöttner, S., Naumann, M., Hoffmann, F. and Rapp, H.T. (2008)
"Organic matter release by cold water corals and its implication for fauna-microbe interaction"
Marine Ecology Progress Series, 372: 67-75.

Zvuloni, A., Mokady, O., Al-Zibdah, M., Bernardi, G., Gaines, S.D. and Abelson, A. (2008)
"Local scale genetic structure in coral populations: A signature of selection"
Marine Pollution Bulletin, 56(3): 430-438.

Stat, M., Morris, E. and Gates, R. D. (2008)
"Functional diversity in coral-dinoflagellate symbiosis"
Proceedings of the National Academy of Science (PNAS), 105(27): 9256-9261.

Reynolds, J.C.M., Bruns, B.U., Fitt, W.K. and Schmidt, G.W. (2008)
"Enhanced photoprotection pathways in symbiotic dinoflagellates of shallow-water corals and other cnidarians"
Proceedings of the National Academy of Science (PNAS)., 105(36): 13674-13678.

Naumann, M., Niggl, W., Laforsch,C., Glaser, C. and Wild, C. (2009)
"Coral surface area quantification – evaluation of established techniques by comparison with computer tomography"
Coral Reefs, 28(1): 109-117.

van Oppen, M. J. H., Leong, J. C. and Gates, R. D. (2009)
"Coral-virus interactions: a double-edged sword?"
Symbiosis, 47(1): 1-8.

Enhance the use of habitat maps for managing coral reef biodiversity

Phinn, S.R., Roelfsema, C.M., Brando, V.B., Dekker, A.G. and Anstee, J. (2008)
"Mapping seagrass species, cover and biomass in shallow waters: An assessment of satellite multi-spectral and airborne hyper-spectral imaging systems in Moreton Bay (Australia)"
Remote Sensing of Environment, 112(8): 3413-3425.

Epidemiology of coral diseases

Cervino, J.M., Winiarski-Cervino, K., Polson, S.W., Goreau, T. and Smith, G.W. (2006)
"Identification of bacteria associated with a disease affecting the marine sponge Ianthella basta, in New Britain, Papua, New Guinea"
Marine Ecology Progress Series, 324: 139-150.

Reshef, L., Ron, E.Z. and Rosenberg, E. (2008)
"Genome analysis of the coral bleaching pathogen Vibrio shiloi"
Archives of Microbiology, 190:185-194.

Zilber-Rosenberg, I. and Rosenberg, E. (2008)
"Role of microorganisms in the evolution of animals and plants: the Hologenome theory of evolution"
FEMS Microbiology Reviews.

Cervino, J.M., Thompson, F. L., Gómez-Gil, B., Lorence, E.A., Goreau, T. J., Hayes, R. L., Winiarski-Cervino, K.B., Smith, G.W., Hughen, K. and Bartels, E. (2008)
"The Vibrio core group induces yellow band disease in Caribbean and Indo-Pacific reef-building corals [Yellow-Band Disease and Vibrio pathogens from the Caribbean and Indo-Pacific]"
Journal of Applied Microbiology, 105: 1658-1671.

Dalit M., Efrony R, Johnson RW, Schaefer AL, Morris PM, Rosenberg E, Greenberg EP, Banin E. (2009)
"Role of flagella in virulence of the coral pathogen Vibrio coralalliiticus"
Applied and Environmental Microbiology.

Efrony, R., Atad, I. and Rosenberg, E. (2009)
"Phage therapy of coral white plague disease: Properties of phage BA3"
Current Microbiology, 58(2): 139-145.

Rypien, K.L. and Baker, D.M. (2009)
"Isotopic labeling and antifungal resistance as tracers of gut passage of the sea fan pathogen, Aspergillus sydowii"
Diseases of Aquatic Organisms.

Kimes NE, Van Nostrand JD, Weil E, Zhou J, Morris PJ. (2009)
"The microbial functional structure of Montastraea faveolata, an important Caribbean reef-building coral, differs between healthy and yellow-band diseased (YBD) colonies"
Environmental Microbiology.

Andras, J. P. and Rypien K. R. (2009)
"Isolation and characterization of microsatellite loci in the Caribbean sea fan coral, Gorgonia ventalina"
Molecular Ecology Resources.

Andras, J. P., Kirk, N. L., Coffroth, M. A., and Harvell, C. D. (2009)
"Isolation and characterization of microsatellite loci in Symbiodinium B1/B184, the dinoflagellate symbiont of the Caribbean sea fan coral, Gorgonia ventalina"
Molecular Ecology Resources.

Kelman, D., Kashman, Y., Hill, R., Rosenberg, E., and Y. Loya. (2009)
"Chemical warfare in the seas: The search for antibiotics from Red Sea corals and sponges"
Pure Applied Chemistry

Estimates in connectivity of Spiny Lobster

Steneck, R.S. (2006)
"Is the American lobster, Homarus americanus overfished? A review of overfishing with an ecologically-based perspective"
Bulletin of Marine Sciences, 78(3): 607-632.

Dolan III, T.W and Butler IV, M. J. (2006)
"The adaptive value of aggregation among juvenile Caribbean spiny lobster: an evaluation using individual-based modeling"
Journal of Crustacean Biology, 26(4): 565-578.

Steneck, R. S. (2006)
"Possible demographic consequences to intraspecific shelter competition among American lobsters"
Journal of Crustacean Biology 26(4): 628-638.

Briones-Fourzán P., Candela, J. & Lozano-Alvarez, E. (2008)
"Postlarval settlement of the spiny lobster Panulirus argus along the Caribbean coast of Mexico: Patterns, influence of physical factors, and possible sources of origin"
Limnology and Oceanography, 53(3): 970-985.

Global assessment of coral diseases and anthropogenic facilitators

Boyett, H.V., Bourne, D.G. and Willis, B.L. (2007)
"Elevated temperature and light enhance progression and spread of black band disease on staghorn corals of the Great Barrier Reef"
Marine Biology, 151: 1711-1720.

Myers, R. and Raymundo L.J. (2009)
"Coral disease in Micronesian reefs: A link between disease prevalence and host abundance"
Diseases of Aquatic Organisms.

Kirk, N.L.,.Andras, J.P., Harvell, C.D., Santos, S.R. and Coffroth, M.A. (2009)
"Population structure of Symbiodinium associated with the common sea fan, Gorgonia ventalina, in the Florida Keys across distance, depth, and time"
Marine Biology, 156(8): 1609-1623.

Kirk, N. L., Andras, J. P., Santos, S. R., Coffroth, M. A. and Harvell, C.D. (2009)
"Population structure of Symbiodinium sp. associated with the common sea fan, Gorgonia ventalina, in the Florida Keys across distance, depth, and time"
Marine Biology.

Impacts of coral disease on coral diversity, community diversity and population

Rypien, K. L., Ward, J. W., and Azam, F. (2009)
"Antagonistic interactions among coral-associated bacteria"
Environmental Microbiology. doi:10.111/j.1462-2920.2009.02027.x.

Rivest, E. Baker, D.M., Rypien, K.L., Harvell, C.D. (2009)
"Nitrogen source preference of Aspergillus sydowii, an infective agent associated with aspergillosis of sea fan corals"
Limnology and Oceanography.

Larval recruitment

Omori, M., Iwao, K. and Tamura, M. (2008)
"Growth of transplanted Acropora tenuis 2 years after egg culture"
Coral Reefs, 27(1): 165.

Local research priority

Raymundo, L.J., Maypa, A.P., Gomez, E.D. and Cadiz, P. (2007)
"Can dynamite-blasted reefs recover? A novel, low-tech approach to stimulating natural recovery in fish and coral populations"
Marine Pollution Bulletin, 54(7): 1009-1019.

Snoussi, M., Kitheka, J., Shaghude, Y., Kane, A., Arthurton, R., Le Tissier, M. and Virji, H. (2007)
"Downstream and coastal impacts of damming and water abstraction in Africa"
Environmental management., 39: 587-600.

Lugendo, B.R., Nagelkerken, I., Jiddawi, N., Mgaya, Y. and van der Velde, G. (2007)
"Fish community composition of a tropical non-estuarine embayment in Zanzibar, Tanzania"
Fisheries Science., 73: 1213-1223.

Measuring reef health cost-effectively using remote sensing

Newman, C.M., Knudby, A.J. and LeDrew, E. (2007)
"Assessing the effect of management zonation on live coral cover using multi-date IKONOS satellite imagery"
Journal of Applied Remote Sensing, 1 (011504): 1-16.

Paddack, M.J. et al. (2009)
"Recent region-wide declines in Caribbean reef fish abundance"
Current Biology, 19(7): 590-595.

Mechanisms of coral disease resistance

Mydlarz, L., Jones, L. and Harvell, C.D. (2006)
"Innate immunity, environmental drivers, and disease ecology of marine and freshwater invertebrates"
Annual Review of Ecology, Evolution and Systematics, 37: 251-288.

Ellner, S., Jones, L., Mydlarz, L. and Harvell, C.D. (2007)
"Within host disease ecology in the seafan Gorgonia ventalina: modeling the spatial immunodynmics of a coral-pathogen interaction"
The American Naturalist, 170(6): E143-E161.

Mechanisms of thermal stress

Ainsworth, T.D., Fine, M., Blackall, L. and Hoegh-Guldberg, O. (2006)
"Fluorescence in situ hybridisation and spectral imaging of coral-associated bacterial communities"
Applied and Environmental Microbiology, 72(4): 3016-3020.

Brickner, I., Frank, U., Oren, U. and Loya, Y. (2006)
"Energy integration between the solitary polyps of the clonal coral Lobophyllia corymbosa"
Journal of Experimental Biology, 209(9): 1690-1695.

Manzello, D., Warner, M., Stebenau, E. Hendee, J. Lesser, M., and M. Jankulak. (2009)
"Remote Monitoring of Chlorophyll Fluorescence in two reef corals during the 2005 bleaching event on Lee Stocking Island, Bahamas"
Coral Reefs, 28(1): 209-214.

Schöttner, S., Hoffmann, F., Wild, C., Rapp, H.T., Boetius, A. and Ramette, A. (2009)
"Inter- and intra- habitat bacterial diversity associated with cold water corals"
The ISME Journal, 1-4: doi:10.1038/ismej.2009.15.

Kleypas, J. A., Buddemeier, R.W., Eakin, M., Gattuso, J-P, Guinotte, J., Hoegh-Guldberg, O., Iglesias-Prieto, R., Jokiel, P., Langdon, C., Skirving, W. and Strong, A.E. (2005)
"Comment on "Coral reef calcification and climate change: The effect of ocean warming".
Response to McNeil et al. (2004) *Geophysical Research Letters*, 32(8): L08601.

Fine, M., Meroz-Fine, M.E. and Hoegh-Guldberg, O. (2005)
"Tolerance of endolithic algae to elevated temperature and light in the coral Montipora monasteriata from the southern Great Barrier Reef"
Journal of Experimental Biology, 208(1): 75-81.

Hoegh-Guldberg, O., Fine, M., Skirving, W., Johnstone, R., Dove, S. and Strong, A.E. (2005)
"Coral bleaching following wintry weather"
Limnolology and Oceanography, 50(1): 265-271.

Rusch, A., Huettel, M., Wild, C. and Reimers, C.E. (2006)
"Benthic oxygen consumption and organic matter turnover in organic-poor, permeable shelf sands"
Aquatic Geochemistry, 12(10): 1-19.

Turcic, K., Pettikiriarachchi, A., Battad, J., Devenish, R., Willmann, P., Dove, S. and Prescott, M. (2006)
"Amino acid substitution around the chromophore of the chromoprotein Rtms5 influence polypeptide cleavage"
Biochemical and Biophysical Research Communications, 340(4): 1139-1143.

Wilmann, P., Battad, J., Petersen, J., Wilce, M., Dove, S., Devenish, R., Prescott, M. and Rossjohn, J. (2006)
"The 2.1Å crystal structure of copGFP, a representative member of the Copepodan clade within the Green Fluorescent Protein superfamily"
Journal of Molecular Biology, 359(4): 890-900.

Wild, C., Laforsch, C. and Huettel, M. (2006)
"Detection and enumeration of microbial cells within highly porous calcareous reef sands"
Marine and Freshwater Research, 272(13): 3297-3305.

Franklin, D.J, Cedres, C. M. M. and Hoegh-Guldberg, O. (2006)
"Increased mortality and photoinhibition in the symbiotic dinoflagellates of the Indo-Pacific coral Stylophora pistillata (Esper) after summer bleaching"
Marine Biology, 149(3): 633-642.

Guppy, R. and Bythell, J.C. (2006)
"Environmental effects on bacterial diversity in the surface mucus layer of the reef coral Montastraea faveolata"
Marine Ecology. Progress Series, 328: 133-142.

Wilmann, P., Battad, J., Beddoe, T., Olsen, S., Smith, S., Dove, S., Devenish, R., Rossjohn, J. and Prescott, M. (2006)
"The 2.0Å crystal structure of a pocilloporin at pH 3.5: the structural basis for pH dependent colour transitions and their linkage to the binding of halides"
Photochemisty and Photobiology, 82(2): 359-366.

Miscellaneous

Berkes, F., Hughes, T.P., Steneck, R.S., Wilson, J. Bellwood, D. R., Crona, B., Folke, C., Leslie, H., Norberg, J., Nystrom, M., Olsson, P., Osterblom, H., Scheffer, M. and Worm, B. (2006)
"Globalization, roving bandits and marine resources"
Science, 311: 1557-1558.

Cherubin, L.M., Kuchinke, C. and Paris, C.B. (2008)
"Ocean circulation and terrestrial runoff dynamics in the Mesoamerican region from spectral optimization of SeaWiFS data and a high resolution simulation"
Coral Reefs, 27(3): 503-519.

Paris, C.B. and Cherubin, L.M. (2008)
"River-reef connectivity in the Mesoamerican region"
Coral Reefs, 27(4): 773-781.

Carpenter, K., et al (2008)
"One-third of reef-building corals face elevated extinction risk from climate change and local impacts"
Science, 321: 560-563.

Wehrmann, L.M., Knab, N.J., Pirlet, H., Unnithan, V., Wild, C. and Ferdelman, T.G. (2009)
"Carbon mineralization and carbonate preservation in modern cold-water coral reef sediments on the Norwegian shelf"
Biogeosciences, 6: 663-680.

Projecting future change

Laforsch, C., Christoph, E,. Glaser, C., Naumann, M., Wild, C. and Niggl, W. (2008)
"A precise and non-destructive method to calculate the surface area in living scleractinian corals using X-ray computed tomography and 3D modeling"
Coral Reefs, 27 :811-820.

Maina, J., McClanahan, T. R, and Venus, V. (2008)
"Meso-scale modelling of coral's susceptibility to environmental stress using remotely sensed data: Reply to comments by Dunne (2008)"
Ecological Modelling, 218(1-2): 192-194.

Reef restoration

Amar, K.O., Chadwick, N.E. and Rinkevich, B. (2008)
"Coral kin aggregations exhibit mixed allogeneic reactions and enhanced fitness during early ontogeny"
BMC Evolutionary Biology, 8(126): 1-10.

Shafir, S., Gur, O.and Rinkevich, B., (2008)
"A Drupella cornus outbreak in the northern Gulf of Eilat and changes in coral prey"
Coral Reefs, 27(2): 379.

Conference Papers

Donate, A., Gilner, J., Ribeiro, E., and van Woesik R. (2007)
"Automatic image segmentation for coral reef monitoring"
International Conference on Computer Vision, Theory and Applications, Barcelona, Spain.

McClanahan, T. R., Cinner, J., Maina, J., Ruiz Sebastian, C., Wilson, S. and Graham, N. (2008)
"Managing fishing gear to encourage ecosystem-based management of coral reefs fisheries"
11th International Coral Reef Symposium, Ft. Lauderdale, Florida, 7-11 July (2008). Abstracts. [Online] http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf.

Mukherjee, M., West, L., Lasker, H., Schmidt, G. and Fitt, W. (2008)
"Antioxidant activity of extracts and secondary metabolites from Pseudopterogorgia sps"
11th International Coral Reef Symposium. Fort Lauderdale, Florida. 7-11 July (2008). Abstracts [Online] http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf.

Kemp, D., Hernandez-Pech, X., Iglesias-Prieto, R., Schmidt, G. and Fitt, W. (2008)
"Micro-niche partitioning and the photobiology of Symbiodinium associated with Montastraea faveolata"
11th International Coral Reef Symposium. Fort Lauderdale, Florida. 7-11 July (2008). Abstracts [Online] http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf.

Fitt, W., Kemp, D., Hernandez-Pech, X., Iglesias-Prieto, R., Thornhill, D., Bruns, B. and Schmidt,G. (2008)
"Bleaching, El Nino, and El Nina: 13 years of seasonal analysis of reef-building corals in Florida, the Bahamas, and the Caribbean"
11th International Coral Reef Symposium. Fort Lauderdale, Florida. 7-11 July (2008). Abstracts [Online] http://www.nova.edu/ncri/11icrs/11icrs_abstractbook_final.pdf.

Keller, B.D., Airamé, S., Causey, B., Friedlander, A., Gleason, D.F., Grober-Dunsmore, R., Johnson, J., McLeod, E., Miller, S.L., Steneck, R S. and Woodley, C. (2008)
"Marine protected areas"
Julius, S.H. and West, J.M. (eds). Adaptation options for climate-sensitive ecosystems and resources.
Synthesis and assessment product 4.4, Washington, DC: U.S. Climate Change Science Program.

Paris CB, Perez-Perez M, Kool J, Aldana-Arnada D. (2008)
"Segregation of Queen conch, strombus gigas, populations from the Yucatan peninsula, Mexico"
Marine Procs of 59th Annual Meeting of the Gulf and Caribbean Fisheries Institute, Belize, 2006. National Marine Sanctuaries Series ONMS-08-07.

Phinn, S.R., Held, A. and Roelfsema, C.M. (2008)
"Australia's Environmental Monitoring Information Needs for a Multi-spectral, Moderate Spatial Resolution Imaging Satellite Program"
Proceedings of the 14th AustralAsian Remote Sensing and Photogrammetry Conference, Darwin, September (2008).

Roelfsema, C.M. and Phinn, S.R. (2008)
"Performance of Remote Sensing Approaches for Mapping Benthic Habitats Over a Range of (Sub-)Tropical Coastal Environments"
Proceedings of the 14th AustralAsian Remote Sensing and Photogrammetry Conference, Darwin, September (2008).

Phinn, S.R., Roelfsema, C.M., Leiper, I. and Mumby, P.J. (2008)
"Mapping Coral Reef Benthic Zones from High-Spatial Resolution Image Segmentation and Photo Transect Data"
Proceedings of the 11th International Coral Reef Symposium, Fort Lauderdale, USA, July 7-11 (2008).

Roelfsema, C.M. and Phinn, S.R. (2008)
"Calibration and Validation of Coral Reef Benthic Community Maps from High-Spatial Resolution Satellite Data"
Proceedings of the 11th International Coral Reef Symposium, Fort Lauderdale, USA, July 7-11 (2008).

Leiper, I., Phinn, S.R. and Roelfsema, C.M. (2008)
"Mapping Coral Reef Benthic Communities with High Spatial Resolution Image Data"
Proceedings of the 11th International Coral Reef Symposium, Fort Lauderdale, USA, July 7-11 (2008).

Horoszowski, Y., Brethes, J.-C. and Rinkevich, B. (2008)
"Gardening Coral Reefs – New insights for coral reef restoration by using branching corals as ecosystem engineering species"
11th International Coral Reef Symposium, Fort Lauderdale, Florida, USA. 7-11 July (2008).

Moulding, A., Gilliam, D., Kosmynin, V. and Dodge, R. (2008)
"Natural and enhanced coral reef recovery after injury"
11th International Coral Reef Symposium, Fort Lauderdale, Florida, USA. 7-11 July (2008).

Omori, M., Iwao, K., Taniguchi, H. and Tamura, M. (2008)
"Mass culture of reef building corals in open water at Akajima Marine Science Laboratory"
11th International Coral Reef Symposium, Fort Lauderdale, Florida, USA. 7-11 July (2008).

Carpenter, K., et al (2008)
"A global assessment of the threat of extinction for reef-building corals"
11th International Coral Reef Symposium, Fort Lauderdale, Florida, USA. 7-11 July (2008).

Morse, A.N.C. (2008)
"Nanoscale Display of Biomolecular Signals Provides Tools for Coral Restoration"
*6th International Symposium on Bioscience and Nanotechnology,*Toyu University, Tokyo, Japan, November (2008).

Wild C, Haas A, Naumann MS, Mayr C, el-Zibdah M. (2009)
"Comparative investigation of organic matter release by corals and benthic reef algae – implications for pelagic and benthic microbial metabolism"
Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, USA.

Niggl W, Glas M, Laforsch C, Mayr C, Wild C. (2009)
"First evidence of coral bleaching stimulating organic matter release by reef corals"
Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, USA.

Mayer FW, Duewel S, Haas A, Jantzen C, Naumann MS, Jeschke JM, Wild C. (2009)
"A web-based information management solution for experimental data from the field of coral reef ecology"
Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, USA.

Rosenberg, E. (2009)
"From bacterial bleaching to the hologenome theory of evolution"
Proceedings of the 11th International Coral Reef Symposium, Ft. Lauderdale, USA.

Omori, M. (2009)
"Coral reefs at risk: the role of Japanese science and technology for restoration"
Proceedings of the 1st International Symposium of Coral Husbandry in Public Aquaria, 16-21 April 2007, Arnhem, The Netherlands).

Other

Sadovy, Yvonne. (2004)
"Spawning aggregations need managing: an update on the work of the Society for the Conservation of Reef Fish Aggregations"
Secretariat for the Pacific Community Information Bulletin, 12:29-30.

Hogan, J.D. (2007)
"Behaviour, Recruitment and dispersal of coral reef fish larvae: Insight into the larval life-stage"
Ph.D. thesis, University of Windsor.

Thiessen, R.J. (2007)
"Connectivity among populations of bicolour damselfish (Stegastes partitus) along the Mesoamerican barrier reef"
M.Sc. thesis, University of Windsor.

Jiddawi, N.S and Hamad, K. (2007)
"Fisheries Survey Report - 'The Fishery Census of Zanzibar - (2007)'"
Fisheries Department Report Series 4.

Laura T. David, Eileen Peñaflor, Erlinda Salamante, Victor Ticzon, Robert Franklin Canto. (2007)
"Tutorial for Coastal Ocean Remote Sensing using Bilko 3.2".

Sale, P.F., M.J. Butler IV, A.J. Hooten, J.P. Kritzer. K.C. Lindeman, Y.J. Sadovy de Mitcheson, R.S. Steneck, and H. van Lavieren. (2008)
"Stemming Decline of the Coastal Ocean: Rethinking Environmental Management"
UNU-INWEH, Hamilton, Canada.

Morse, A.N.C. (2009)
"Nanoscale Display of Biomolecular Signals for Coral Restoration"
Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou, China. *Invited Oral Presentation*. January 2009.

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