

Reef Resilience Review 2009-2013

This newsletter was prepared by The Nature Conservancy under cooperative agreement award #NA09NOS4190173 from the National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Conservation Program, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA, the NOAA Coral Reef Conservation Program, or the U.S. Department of Commerce.





November 2009

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Network Making Progress**

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**To Join the network or submit
updates, contact:**

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For more information about The
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Resilience Practitioners Network, Making Progress

As we continue to work to improve the resources and opportunities we offer through the Resilience Practitioners Network, we are thrilled to announce some additions to our team. Rebecca Cerro ni and Michelle Machasick are joining Stephanie Wear to implement the ambitious plans laid out for our Reef Resilience Program over the next 4 years. You can expect to be hearing more from them in the coming months as we begin to roll out our new activities.

Please check out the new homepage for www.reefresilience.org! We are continuing to develop our 'members only' space where you will be able to log on, load your profile, share information about your work, and seek out other managers that are facing similar challenges. We'll make an announcement when the space is ready.

Some new activities planned for the network include quarterly case study webinars and expert calls where members can hear from experts and discuss current problems. The first in the series of Resilience Webinars and Hot Topic calls is scheduled for **December 8, 2009** and will include information about activities happening in the next year. Register for the Resilience Webinar: [10:00 AM EST](#) or [7:00 PM EST](#).

All of these changes are the result of the great suggestions we have received from you all — so keep them coming. Stay tuned as all of these new tools become available!

Guam Resilience Training

Coral reef managers from Micronesia participated in the training workshop series entitled “Reef Resilience and Climate Change: A Workshop for Coral Reef Managers” in August in Guam. Participants included more than 25 experts in coral reef management from Guam, the Commonwealth of the Northern Mariana Islands, Palau, the Republic of the Marshall Islands, and the Federated States of Micronesia (Kosrae, Chuuk, Pohnpei, and Yap).

The workshop focused on:

- the impacts of climate change in Micronesia,
- how to respond to mass coral bleaching events,
- the principles of resilience and incorporating resilience into management and Marine Protected Area (MPA) design
- early warning systems available to managers to predict when bleaching may occur and how to communicate about the threats to coral reefs.

There was also a focus on the human element of the issues surrounding climate change and mass bleaching with information on the socioeconomic impacts of these events, how to monitor these impacts and the concepts of social-ecological resilience.

As with past workshops, the main goal beyond communicating the latest climate change science and management strategies is for participants to strengthen partnerships with their fellow managers and share strategies, local management actions and lessons learned. Tangible outcomes included draft bleaching response plans and MPA designs that emphasize resilience to climate change. The workshop was sponsored by NOAA with support from The Nature Conservancy, Guam Department of Agriculture, Guam Environmental Protection Agency, Guam Coast Management Program, the University of Guam Marine Laboratory, and the East West Center in Honolulu, Hawaii. The workshop offered a great opportunity to highlight the [NOAA Coral Reef Watch Bleaching Area Alert Product](#) and [several new predictive tools recently released by NOAA](#). Please contact NOAA at coralreefwatch@noaa.gov if you have any questions about these tools.

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Spotlight on [Kenya](#)

The coral reefs found within Kiunga Marine National Reserve are comprised of mainly patch reefs, with fringing reef in the northern part. These reefs are home to over 50 genera (4 of which are globally-rare), 150 identified coral species, as well as over three hundred species of fish. Additionally, seagrass beds form the most extensive wildlife habitat in the KMNR, and are located from the low tide level to about 10m depth. Mangroves also provide critical habitat for various species, serving as forage and resting areas for sea turtles and nursery grounds for juvenile fishes. These mangrove-dominated environments equate to



Workshop participants discuss data collection plans prior to the field trip to see Guam's coral reefs.

© Mark Eakin/NOAA



about 20,000 ha, approximately 30% - 40% of Kenya's mangrove stock.



These areas have been disturbed in the recent past by bleaching events including the 1998 El Niño event, and harmful algal blooms (i.e., red tides in 2002). Climate change, El Niño Southern Oscillation (ENSO) related events, and human causes such as over-fishing, are also a threat to this area.

The primary goal of the reserve is to safeguard the biodiversity and integrity of physical and ecological processes of KMNRR, for the health, welfare, enjoyment and inspiration of present and future generations. Although resilience principals were not initially taken into consideration during the design of the reserve in 1979, they have since played a major role in the management of the reserve. In 1998, the mass bleaching event triggered interest in the effects of climate change, and subsequently resilience principles were incorporated into the management plan. Currently, coral reef resilience monitoring is being implemented due to the development of an International Union for Conservation of Nature (IUCN) methodology.

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Recent Publications and Other Resources

[Webcast of Charlie Veron's talk at Royal Society in London "Is the Great Barrier Reef on Death Row?"](#)

[Coping with Commitment: Projected Thermal Stress on Coral Reefs under Different Future Scenarios by S. Donner](#)

[Resilience of Coral-Associated Bacterial Communities Exposed to Fish Farm Effluent by Garren et al.](#)

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Upcoming Events

[East Asian Seas Congress 2009](#), November 23-27, 2009
Manila, Philippines

[Healthy Parks Healthy People Congress](#), April 11-16, 2010
Melbourne, Australia

[2nd Asia Pacific Coral Reef Symposium](#), June 20-24, 2010
Phuket, Thailand; Abstracts due: January 31, 2010

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Reef Resilience Review

February 2010 Newsletter

Distributed by the [Global Marine Initiative](#)

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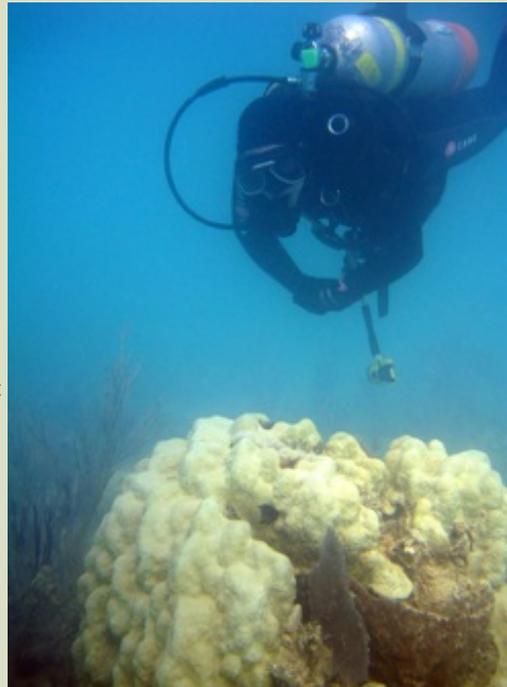
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Cold Water Disturbance Response Monitoring in South Florida

As part of the Florida Reef Resilience Program (FRRP), The Nature Conservancy coordinates the Disturbance Response Monitoring (DRM) program, which is made up of a network of scientific divers from public agencies, universities and other non-governmental organizations. This monitoring network includes members spanning the region from the Dry Tortugas to the St. Lucie Inlet on Florida's east coast.

Conducting annual surveys over an eight week period during summer peak bleaching temperatures is the primary task of this group of scientific divers. Coral bleaching data from these surveys allow scientists to zero in on which corals and reefs have been more or less resilient in years past by measuring coral species diversity, abundance, and size and how resilient they are at present by assessing their condition.



Meaghan Johnson diving over a recently dead coral head

© Caitlin Lustic, TNC

In January 2010, a week of record low temperatures in South Florida caused water temperatures to drop as low as 45° F or 7° C, far below the typical lows of the upper 60's F, or 20° C. There has not been a cold weather event like this since 1977, when it snowed in Miami. These sustained cold water temperatures triggered severe coral bleaching and even outright coral death. Early reports of coral mortality in the nearshore waters prompted The Nature Conservancy to alert the FRRP Partners and issue an emergency request for the scientists to conduct the disturbance response surveys. The ability to mobilize a rapid response underscores the importance of a coral bleaching response plan. In this case, even though the DRM surveys are typically focused on warm water coral bleaching, they were designed and ready for use in disturbance situations such as this one.

The surveys are taking place over a three week period immediately following the event to assess the extent of the cold water damage. Survey sites are based on a probabilistic sampling design, which creates new sites for each sampling event. Sea Surface Temperature (SST) data from the University of South Florida has also been incorporated into the selection of these sampling sites to focus efforts on sites where the water was the coldest. Once the surveys are complete, the divers will enter their data into an online database that will be queried for immediate results. Results from these surveys will help us to better understand which reef areas and species may be more resilient during these cold water events. Additional monitoring will continue over the next several months to track how individual reefs and corals are able to respond and recover from this disturbance.

For more information on the DRM program (e.g. data results, lessons learned) please check out our case study featured on the [Reef Resilience website](#).

Spotlight on Bonaire

Bonaire is a crescent shaped island situated in the southern Caribbean approximately 100 km north of Venezuela. The small undeveloped satellite island of Klein Bonaire is located approximately 750 m off the western shore of Bonaire and is internationally recognized as having wetlands of significance by the RAMSAR Convention on Wetlands and is part of the Bonaire National Marine Park (BNMP). The park encompasses 2,700 hectares of fringing coral reef, seagrass and mangrove ecosystems (the largest semi-enclosed seagrass and mangrove bay in the Netherlands Antilles), and contains diverse habitats from the shore to intertidal environments, and from coral reefs to deep water environments.



The mission of the BNMP is to protect and manage the island's natural, cultural and historical resources, while allowing ecologically sustainable use for the benefit of future generations. The BNMP strongly believe that the first step to ensure healthy and resilient corals is to protect water quality and reduce all stresses. Within this framework, the BNMP has been taking different conservation and management actions to address the distinct problems of overfishing, coastal development, pollution, and negative impacts of tourism.

In addition to fishing pressures, Bonaire is experiencing rapid coastal development. To minimize the impact of construction practices, the BNMP developed a booklet of [Construction Guidelines](#), together with various governmental agencies, local waste management and construction companies, land owners and local NGOs. The BNMP has also run an intensive nutrient monitoring program; preliminary data show that the levels of dissolved nitrogen are high and that the most probable cause is due to sewage and unsustainable irrigation practices in the coastal zone. To mitigate this sewage water input to the sea, the BNMP is working together with resort operators to establish "water balances," and to improve fresh water and waste water management.

[READ MORE...](#)

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Recent Publications and Other Resources:

[Marine Reserves Enhance the Recovery of Corals on Caribbean Reefs](#)

[Impact of Herbivore Identity on Algal Succession and Coral Growth on a Caribbean Reef](#)

The [January/February 2010 issue of MPA News](#) features a good list of publications focusing on environmental and socioeconomic impacts of climate change, as well as strategies for addressing those impacts in response to the December 2009 UN Climate Change Conference in Copenhagen.

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Upcoming Events

New [Online Reef Resilience Course](#) March 1, 2010

[Healthy Parks Healthy People Congress](#), April 11-16, 2010
Melbourne, Australia

[2nd Asia Pacific Coral Reef Symposium](#), June 20-24, 2010
Phuket, Thailand; Abstracts due: January 31, 2010

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May 2010 Newsletter

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Rapid Response Plan: How Important is it?

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Spotlight on Aldabra Atoll, Seychelles

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Rapid Response Plan: How Important is it?

Over the past six months, from the Great Barrier Reef to the Florida Keys to the Indo-Pacific coral reef, MPA managers have held their collective breath as vessel groundings, extreme cold snaps, and coral bleaching have affected coral reefs within protected areas. In disasters and bleaching situations, what can coral reef managers do?

Managers should prepare for such events by developing response plans ahead of time. The response plans can be applied both to disasters (like ship groundings) and bleaching situations, and include: setting ecosystem monitoring protocols; coordinating monitoring teams among multiple agencies; planning how to communicate about the event; and discussing how to implement management interventions.

In January 2010, this process played out when colder-than-usual (45°F) temperatures in South Florida waters threatened coral reefs with bleaching. This led The Nature Conservancy to mobilize a Disturbance Response Monitoring (DRM) program that had been put in place with partners in the



The severity and frequency of local and global scale threats are causing mass bleaching events and serious declines in coral reef ecosystems worldwide.

© Bruce Carlson

FRRP (Florida Reef Resilience Program). The primary task of the South Florida DRM program is to conduct dive surveys over an eight-week period, monitoring impacts of an event. Even though the surveys have typically focused on warm water coral bleaching, they were also designed for application to other disturbance situations such as cold water disturbance. The ability of the FRRP to respond quickly with a well-trained monitoring team underscores the importance of a coral bleaching response plan.

Meanwhile, in the virtual world – at www.conservationtraining.org – twenty-seven coral reef managers and scientists from throughout the Caribbean are enrolled in an online course from March through May 2010. Every day they share their hopes, lessons learned and challenges they face in managing coral reefs with one another as they draft bleaching response plans for their respective geographies.

This is particularly important given what we expect to see in the Caribbean this summer. If the bleaching events being reported in Southeast Asia and the Western Indian Ocean are any indication (and they are!), Caribbean coral reef managers should be preparing to respond to predicted bleaching events in their locales. There are many ways to prepare, both in the way you plan to communicate with key audiences – to how you coordinate monitoring teams – to management action taken to protect highly sensitive habitats. It is never too early to start thinking about this.

For more information on developing your own bleaching response plans, [click here](#).

What's New in the Reef Resilience Toolkit?

[Ocean Acidification](#) is now among the many topics included in the Reef Resilience Toolkit. In this new section, you will find a discussion of [Ocean Chemistry Essentials](#), that includes an excellent video demonstration by Jane Lubchenco, Administrator of NOAA. Also included in this section is information on the impacts of ocean acidification and management strategies to prioritize. In addition to this new topic, we have also updated several of our case studies and added four new case studies from [Raja Ampat](#), [Mozambique](#), [Wakato bi](#), and [Sumatra](#). If you are interested in contributing a case study, please contact us at resilience@tnc.org!

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Spotlight on Aldabra Atoll, Seychelles

[Aldabra Atoll](#), a large raised atoll in the Western Indian Ocean, has been described as one of the wonders of the world as its isolation in a remote area of the Indian Ocean, combined with an inhospitable terrestrial environment, has preserved it in a relatively natural state. Although increasing levels of human stresses are contributing to the decline of the world's coral reefs, Aldabra has thus far escaped the worst of these direct stresses, and provides an ideal natural laboratory for studying tropical marine ecosystems and related environments.



Aldabra Atoll was severely affected by the 1998 coral bleaching event, experiencing coral mortality of approximately 66% at 10 m depth, and 38% at 20 m depth. In addition to these natural disturbances and global climate change, the Aldabra area is also subjected to low-level human threats, including illegal fishing, poaching, and pollution.

The Aldabra Marine Program began its first resilience study in 1998 with the assistance of the [IUCN](#) and [CORDIO](#). Surveys were used for monitoring purposes, and developed to understand coral reefs and other components of the protected area. The [IUCN-CORDIO resilience assessments](#) followed in 2008. Because this area is essentially pristine, barely touched by local human impacts but affected by climate change induced coral bleaching, it can serve as a reference site for other resilience case studies.

Monitoring reef condition at Aldabra Atoll
© Pierre Pistorius

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Recent Publications and Other Resources:

[Threatened Corals Provide Underexplored Microbial Habitats](#)

[Predictive Modeling of Coral Disease Distribution within a Reef System](#)

[Estimating the Potential for Adaptation of Corals to Climate Warming](#)

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Upcoming Events

[Free Self-paced Online Reef Resilience Course](#)

[Sustainable Ocean Summit](#)

June 15-17, 2010
Belfast, UK

[International Climate Change Adaptation Conference](#)

June 29-July 1, 2010

Gold Coast, Queensland, Australia

[24th International Congress for Conservation Biology](#)

July 3-7, 2010

Edmonton, Alberta, Canada

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Reef Resilience Review

August 2010 Newsletter

Distributed by the [Global Marine Initiative](#)

Communicating Bleaching Incidents to Stakeholders:
When bleaching hits my reef who do I tell first? What should I say?

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Communicating Bleaching Incidents to Stakeholders: When bleaching hits my reef who do I tell first? What should I say?

In a year in which we may face the most extensive coral bleaching since 1998, where warm La Niña conditions threaten the health of corals in Thailand, Malaysia and other parts of Southeast Asia, as well as the Caribbean, it is more important than ever for managers to think carefully about how we communicate these bleaching events to constituents.

When corals bleach, or suffer other effects of climate change, managers from around the world need tools on how to effectively communicate these incidents to their constituents, including dive operators and other businesses dependent on the reef, tourists, and even governments. Who should they tell first? Is it the media? Actually, their first audience will most likely be those dependent on the reef, such as dive operators, as well as any



June 2010 Caribbean Training of Trainers Workshop participants
© Stephanie Wear



The educational puppet show used in Kimbe Bay strengthened conservation messages on marine

involved government officials. If a manager already has a close relationship with those groups, they can reach out to them directly via email or phone. Next, it is time to think about the best way to talk to the press. This may be the time to send out a press release describing a bleaching event, and what the incident means for coral reefs.

What kinds of messages are most effective? Do we lead with gloom or hope? We talk a lot about how to describe the effects of climate change. While we don't want to use up all of our credibility at once, we want our audience to understand the severity of the situation. We want them to empathize with the situation, and at the same time, we do not want to alienate them with 'gloom and doom' messages. In the end, what a manager decides to communicate to the public will need to be specifically tailored to their audience, the audience's level of engagement and knowledge about climate change, and its causes and effects.

We think that the best way to figure out first steps in the event of a bleaching event is to develop a communications strategy ahead of time. Check out [templates](#) and [case studies](#) of effective uses of communications on our [website](#).

In the Caribbean this year, we trained over 25 trainers on how to develop their own communication plans and how to train others to communicate effectively about bleaching events. From June 20-24, 2010, marine park managers representing over 20 Caribbean countries came together in Key Largo, Florida with a singular goal in mind—to become Trainers on tools to build resilience into management activities.

Participants completed an [online Reef Resilience course](#) and developed draft bleaching response and/or communications plans. After four intensive days together, participants had in-depth knowledge of our different communication opportunities and challenges. They were equipped to go home and reach out to local constituents, as well as train others on how to effectively communicate the impacts of climate change related coral bleaching events. These trainers will become resources in the region for local managers and others dependent on Caribbean reefs.

Even before you take an online course, or attend a training workshop—here are four steps to help you get started in developing your climate change/bleaching communications response:

- [Monitor NOAA's Coral Watch Reef Alerts](#)
- If you are relying on a volunteer network for monitoring and first response, make sure you have a system in place to communicate to them if a bleaching event is predicted.
- If you think that your best bet for reaching fishermen and/or to tourism operators is radio, make sure you use any funding available to develop radio spots.
- Work with your partners to develop a communications plan before

Spotlight on Sumatra

Situated off the northern tip of Sumatra, Indonesia, the [reefs of Weh and Aceh islands](#) host a high diversity and variety of marine endemic species. The Wildlife Conservation Society (WCS) is working with local governments and communities to adopt sustainable marine resource practices and innovative management initiatives that will benefit local resource users and help rebuild local communities.

The primary conservation goal is to improve both the effectiveness of coral reef management and the condition of coral reef resources themselves. Conservation strategies include assessing coral reefs and identifying critical habitats; assessing socioeconomic needs and perceptions of marine resource use and conservation; developing community co-management and marine protected area networks; building capacity of government and local NGO's in marine resource management; conducting and supporting marine awareness and education programs in schools; and assisting communities in developing alternative livelihood projects.

To gather some of the first comprehensive data on FSAs in the region, 60 fishers from 7 districts on the island of Weh were interviewed. Results of the community interviews indicate that many fishers possess reliable knowledge of spawning areas, species and times.

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Recent Publications and Other Resources:

Online talks that may be of interest:

- [How We Wrecked the Ocean](#) – Coral reef ecologist Jeremy Jackson on the state of the ocean today
- [Glimpses of a Pristine Ocean](#) – Marine Ecologist Enric Sala shares images, and surprising insights and data, from some of the most pristine areas of the ocean

[Overestimating Fish Counts by Non-Instantaneous Visual Censuses: Consequences for Population and Community Descriptions](#)

[The Loss of Species: Mangrove Extinction Risk and Geographic Areas of Global Concern](#)



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Upcoming Events

[3rd International Conference on the Management of Coastal Recreational Resources](#)

October 27-30, 2010

Grosseto, Tuscany, Italy

[International Meeting on Marine Resources](#)

November 16-17, 2010

Peniche, Portugal

[Euro ISRS 2010 Symposium: Reefs in a Changing Environment](#)

December 13-17, 2010

Wageningen, the Netherlands

[2nd International Marine Conservation Congress](#)

May 14-18, 2011

Victoria, British Columbia, Canada

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Reef Resilience Review

Reminder: Reef Resilience and Responding to Climate Change Workshop for the Western Pacific

[Ocean Acidification: Coming to a Reef Near You](#)

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November 2010 Newsletter

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Reminder: Reef Resilience and Responding to Climate Change Workshop for the Western Pacific

The Nature Conservancy, in partnership with NOAA, and with support from the John D. and Catherine T. MacArthur Foundation, will offer a Workshop for Trainers from throughout the Western Pacific to learn about building resilience into reef management and the tools available for addressing the impacts



Western Pacific Resilience Workshop participants
© Stephanie Wear/TNC

of climate change. The workshop will take place June 3-7, 2011 in Koror, Palau and will bring together managers/trainers from throughout the Western Pacific to learn and share ideas that will lead to more effective long-term coral reef management. The workshop is designed to provide an atmosphere of exchange and creative problem solving so that participants leave with a specific training plan for their locale. Space is limited to 25 participants for this workshop and selection is competitive.

Conservancy's Reef Resilience Program, visit www.reefresilience.org

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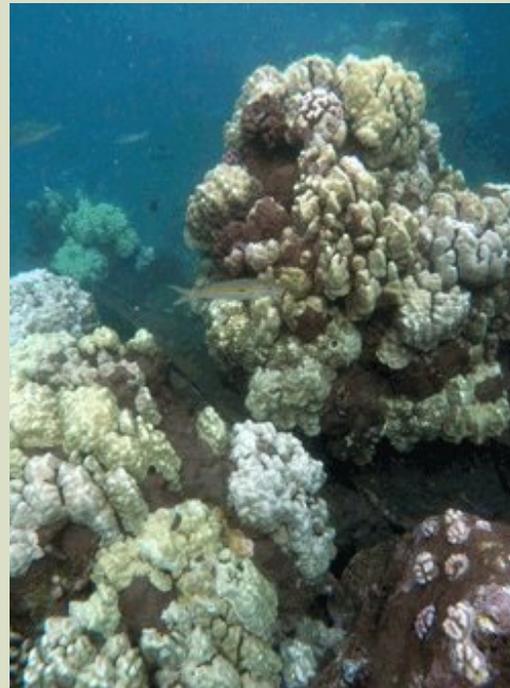
For more information on the workshop, visit our [website](#).

Application Deadline: November 30, 2010. [Download the application](#).

Ocean Acidification: Coming to a Reef Near You

The [Reef Resilience Toolkit](#) provides reef managers with a wide variety of resources on how to deal with the threats of global warming to reefs. But global warming is not the only threat from increased atmospheric concentrations of carbon dioxide (CO₂). Increasing atmospheric CO₂ is changing the ocean's chemistry. Ocean acidification occurs when CO₂ in the atmosphere reacts with water to create carbonic acid, decreasing both ocean pH and the concentration of the carbonate ion, which is essential for reef building calcification.

Although the [chemistry](#) of this effect is well understood, the full consequences of ocean acidification for marine ecosystems and human well-being are only beginning to be revealed. Warming seas and ocean acidification are already affecting reefs by causing mass coral bleaching events and slowing the growth of coral skeletons, threatening coral reef resilience.



Lana`i, Hawai`i

Changes in ocean chemistry can have extensive direct and indirect effects on organisms and the habitats in which they live. Studies of marine calcifiers indicate that most, but not all, exhibit reduced [calcification](#) with increased ocean acidification (Fabry et al. 2008).

© Stacey Kilarski

Declining pH may affect organisms in ways that extend beyond declining calcification or metabolic performance including altering important ecological interactions.

- interactions between species during different life stages
- shifting competitive pressures
- alterations in predation will come into play as communities respond to acidification

Furthermore, synergistic effects of other stressors, such as nutrient input, increased sea surface temperature and sea level rise will each play a role in determining alterations of marine communities in high CO₂ conditions.

For reef managers, this means that extra attention must be paid to managing those stressors that can be managed – including fisheries management to maintain healthy trophic structures. Additionally, reef managers can focus attention on coastal zone management planning which addresses nutrient input.

Management Tips:

- Prioritize protection of [habitats](#) likely to be resistant to impacts of acidification: Reefs in carbonate rich areas, well-flushed reefs, reefs dense with seagrass meadows, and reefs rich in macroalgae.
- Proactively review management plans to incorporate the latest research into an adaptive approach to address ocean acidification impacts.
- Integrate coral reef management with land-use and coastal zone planning and practices to reduce pollutants (notably, ammonium compounds, nitrogen and sulfur oxides) that increase the acidity of local waters.

For more information, check out our new [Ocean Acidification](#) section of the [Reef Resilience Toolkit](#).

Spotlight on Florida Keys: [Florida Reef Resilience Program](#) (FRRP)

The Florida Reef Resilience Program (FRRP) region includes the Dry Tortugas and Florida Keys and is located at the convergence of the subtropical and temperate climate zones and the northernmost edge of shallow coral reef development. The region has experienced several significant disturbances during the last three decades, along with the chronic stresses of climate change; eutrophication from inadequate wastewater and storm water management systems; coastal development; overfishing; destructive fishing practices; boat groundings; anchor damage and diver impacts.



Meaghan Johnson of The Nature Conservancy performs reef surveys as part of the FRRP-DRM
© Erich Bartels

The FRRP is a multi-year effort that began in 2004 to develop management approaches and tools to cope with climate change and other stresses on South Florida's coral reefs. The program facilitates sharing knowledge and best practices for resilience-based management among the State of Florida, the National Oceanic and Atmospheric Administration, and Australia's Great Barrier Reef Marine Park Authority. The Nature Conservancy is coordinating the FRRP in conjunction with these agencies and a Steering Committee of reef managers, scientists, reef user-group representatives and other conservation groups.

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Recent Publications and Other Resources:

[Rising to the Challenge of Sustaining Coral Reef Resilience](#)

With coral reefs under threat, UN report urges [coordinated protection measures](#).

[Science to Action](#) has several new booklets available for download on coastal and ocean resources and the successful implementation of marine managed areas (MMAs) to maximize the benefits to people and nature

[National Oceanic and Atmospheric Administration](#) and [National Fish and Wildlife Foundation](#) have opened a grant competition through their [Coral Reef Conservation Fund](#) to provide funding for projects that address priority topics in U.S. and international coral conservation. They will host a [webinar on the application process](#) on December 1, 2010

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Upcoming Events

[Euro ISRS 2010 Symposium: Reefs in a Changing Environment](#)

December 13-17, 2010

Wageningen, the Netherlands

[11th National Conference on Science, Policy and the Environment: Our Changing Oceans](#)

January 19-21, 2011

Washington, DC, United States

[2nd International Marine Conservation Congress](#)

May 14-18, 2011

Victoria, British Columbia, Canada

[12th International Coral Reef Symposium](#)

July 9-13, 2012
Cairns, Australia

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"Reefs at Risk Revisited" Report released: 75% of World's Coral Reefs Currently Under Threat

[Spotlight on Agatti Conservation Region, Lakshadweep, India](#)

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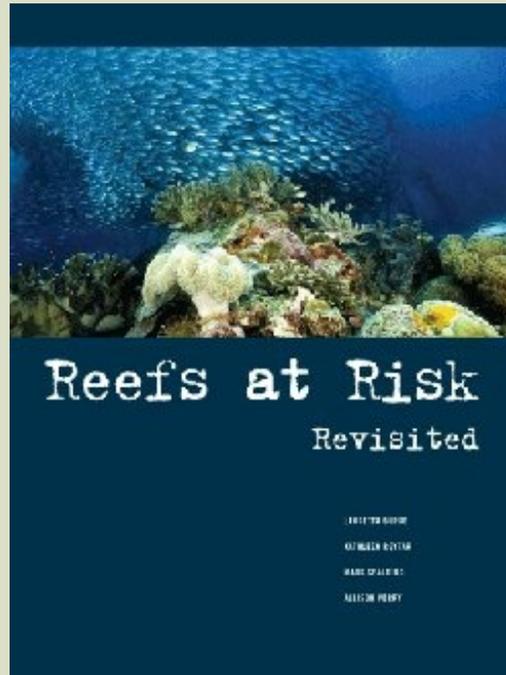
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"Reefs at Risk Revisited" Report released: 75% of World's Coral Reefs Currently Under Threat

A comprehensive analysis of coral reefs conducted by over 25 environmental organizations and hundreds of scientists finds that 75 percent of the world's coral reefs are currently under threat. "Reefs at Risk Revisited" is the most detailed assessment of the threats to the world's coral reefs ever undertaken.

Originally released in 1998, "Reefs at Risk" served as an important resource for policymakers to understand and address the threats of



"Reefs at Risk Revisited" presents a comprehensive analysis and a detailed assessment of the status of and threats to the world's coral reefs.

Conservancy's Reef Resilience Program, visit reefresilience.org.

This newsletter is brought to you through the generous support of the John D. and Catherine T. MacArthur Foundation and NOAA's Coral Reef Conservation Program.

reefs. For the first time, the analysis includes threats from climate change, including warming seas and increasing ocean acidification. The report shows that local pressures — such as overfishing, coastal development and pollution — pose the most immediate and direct risks, threatening more than 60 percent of coral reefs today.

© The Nature Conservancy

"Reefs at Risk Revisited" is being released by the World Resources Institute, along with The Nature Conservancy, the WorldFish Center, the International Coral Reef Action Network, Global Coral Reef Monitoring Network, the UNEP-World Conservation Monitoring Center, and a network of more than 25 organizations.

"This is about people as well as nature," said Dr. Mark Spalding, senior marine scientist at The Nature Conservancy and lead author of the report. "Coral reefs keep our food supplies stable, act as a magnet for tourism dollars and produce life-saving compounds found in medicines for cancer, heart disease and HIV. When we secure the reefs, we safeguard human futures too."

Read the full article [here](#).

Spotlight on Agatti Conservation Region, Lakshadweep, India

The Lakshadweep Islands are a group of islands off the coast of Kerala in the Arabian Sea. This biodiversity hotspot is home to over 700 species of fishes, 150 species of corals, 12 species of marine mammals, 20 species of reptiles, 95 species of birds, 600 species of mollusks, 200 species of echinoderms, 2000 species of lower invertebrates, 95 species of marine algae, and



more than 400 species of terrestrial plants. In addition, the uninhabited islands of Lakshadweep are the second largest nesting grounds for green and hawksbill turtles.



The Agatti Conservation Reserve is the result of collaborative efforts between Bombay Natural History Society, Lead International, and funding from the Darwin Initiative to conduct intensive ecological and social surveys on all of Lakshadweep's 11 inhabited and 14 uninhabited islands.

The uninhabited islands of Lakshadweep are highly diverse and host the second largest nesting grounds for Green and Hawksbill sea turtles.

© Deepak Apte

The protection of Agatti's coral reef was motivated by its unique biodiversity and the pressing livelihood needs of Agatti's fishing community, who directly depend on these biologically diverse resources.

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Recent Publications and Other Resources:

[Caribbean Corals in Crisis](#)

[Outlook Report on the State of the Marine Biodiversity in the Pacific Region](#)

[Endangered Species Coalition Report "It's Getting Hot Out There"](#)

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Upcoming Events

[Reef Resilience Webinar: Facilitating Difficult Discussions with expert facilitator Ann Weaver](#)

Wednesday, March 23, 4:00pm Eastern Daylight Time

Register [here](#)

[11th International Coastal Symposium](#)

May 9-14, 2011

Szczecin, Poland

[2nd International Marine Conservation Congress](#)

May 14-18, 2011

Victoria, British Columbia, Canada

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**Reef Resilience Team
Returns Home from Reef
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July 2011 Newsletter

Distributed by the [Global Marine Initiative](#)

Reef Resilience Team Returns Home from Reef Resilience Workshop in Palau



Participants and coaches at the Palau Reef Resilience Workshop. © TNC

We've just returned from Palau, where we hosted the [Pacific Islands Reef Resilience Training of Trainers Course](#). After participating in a 4-month [Online Reef Course](#), reef managers and educators came from Kosrae, New Zealand, Guam, American Samoa, Independent Samoa, Solomon

For more information about The Nature Conservancy's Reef Resilience Program, visit reefresilience.org.

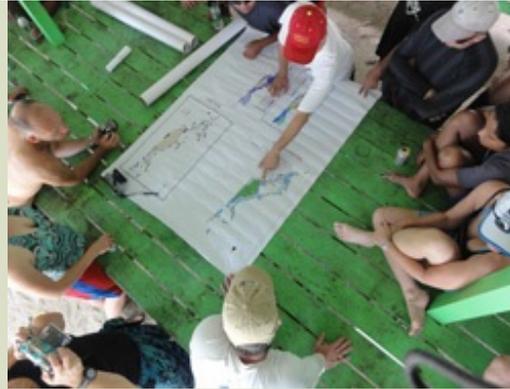
This newsletter is brought to you through the generous support of the John D. and Catherine T. MacArthur Foundation and NOAA's Coral Reef Conservation Program.

Islands, Pohnpei, Saipan, Hawaii, Palau, and Fiji for this in-person training. Participants spent five days together sharing knowledge, learning new skills, and developing training and outreach plans for their respective geographies. Since returning home, some have already begun putting the wheels in motion for implementing their plans! For instance, we've just received news from Chris Bone from [Oceanswatch](#) about the successes of new outreach activities he has implemented in Vanuatu, with more to come. Great going Chris!

We are excited about all the great ideas and enthusiasm put forth from this group, and we look forward to learning about the progress they are making to improve the management of coral reef resources in their communities. It is always wonderful to be in Palau and was encouraging to see coral recovery happening in Palau's reefs after being so heavily impacted by the 1998 global bleaching event. In fact, the reefs are looking fantastic! Please stay tuned-- we will be holding a similar course for coral reef managers and educators in Southeast Asia next June. If you are from the region and interested, keep an eye out for our course announcement in October.

Spotlight on the Guam-CNMI-Palau Fisher Exchange

Taking place over the course of five days in 2010, the fisherman learning exchange was designed to provide the opportunity for practitioners and stakeholders from Guam, the Commonwealth of the Marianas Islands (CNMI), and Palau to interact directly with and learn from their peers in other islands, and share successes and lessons learned, both politically and technically in terms of marine conservation and fisheries management. In July 2010, the exchange was implemented to promote community-led conservation efforts and greater awareness of the need for community-stakeholder involvement in the design and implementation of marine conservation. This was done in order to support fisheries management, by providing fishermen from Guam and CNMI with the chance to visit a community putting this into practice in Palau.



*Reef managers from the Western Pacific discuss reef resilience principles in the MPA network of Palau.
© Stephanie Wear/TNC*

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Recent Publications and Other Resources

Publications:

[Rapid Evolution of Coral Proteins Responsible for Interaction with the Environment](#)

[Global Human Footprint on the Linkage between Biodiversity and Ecosystem Functioning in Reef Fishes](#)

[Ocean Acidification and Warming Will Lower Coral Reef Resilience](#)

[How Much Time Can Herbivore Protection Buy for Coral Reefs Under Realistic Regimes of Hurricanes and Coral Bleaching?](#)

Resources:

[2012 Funding Opportunity: Regional Ecosystem Prediction Program, "From Science to Management: Improving Management of Mesophotic Coral Ecosystems in the U.S. Caribbean"](#)

[Coral Reef Targeted Research \(CRTR\) Program Resources](#)

[Demonstration of Coral Reef Scenario Evaluation Tool \(CORSET\)](#)

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Upcoming Events

[World Conference on Marine Biodiversity](#)

September 26-30, 2011

Aberdeen, Scotland

[Second International Conference on Marine Mammal Protected Areas \(ICMMPA 2\)](#)

November 7-11, 2011

Fort-de-France, Martinique

[1st International Marine Conservation Think Tank](#)

November 25-28, 2011

Christchurch, New Zealand

[4th International Tropical Marine Ecosystem Symposium](#)

December 5-8, 2011

Guadeloupe

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Reef Resilience
Review

September 2011 Newsletter

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Course Announcement: Reef Resilience and Responding to Climate Change, Workshop for Southeast Asia

Application Period Now Open!



© TNC

The Nature Conservancy, in partnership with NOAA, and with support from the John D. and Catherine T. MacArthur Foundation, will offer a Workshop for Trainers from

Reef Resilience and Responding to Climate Change: Workshop for Southeast Asia

[2nd Reef Resilience Conference: Planning Resilience, October 18-20, 2011, and 26th US Coral Reef Task Force Meeting, October 21, 2011](#)

[Students of 2011 Training of Trainers Make Big Moves in Saipan!](#)

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For more information about The Nature Conservancy's Reef Resilience Program, visit reefresilience.org.

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throughout Southeast Asia to learn about building resilience into reef management and the tools available for addressing the impacts of climate change. The workshop will take place June 4-8, 2012 in Bali, Indonesia and will bring together coral reef professionals from throughout Southeast Asia to learn and share ideas that will lead to more effective long-term coral reef management. The workshop is designed to provide an atmosphere of exchange and creative problem solving so that participants leave with a specific training plan for their locale. Space is limited to 25 participants from Southeast Asia for this workshop and selection is competitive

For more information on the workshop, [visit our website](#).

Application Deadline: November 21, 2011

Download the application ([pdf](#)) and ([doc](#)).

2nd Reef Resilience Conference: Planning Resilience, October 18-20, 2011, and 26th US Coral Reef Task Force Meeting, October 21, 2011

You are invited to the 2nd Reef Resilience Conference: Planning for Resilience (RRC) hosted by The Nature Conservancy (TNC) in conjunction with the 26th US Coral Reef Task Force Meeting. The meetings will be held at the Marriott Harbor Beach Hotel in Fort Lauderdale, Florida, USA, October 18-21 2011.

The 2nd Reef Resilience Conference is the Official Workshop of the 26th US Coral Reef Task Force meeting and will be focused on Planning for Reef Resilience and incorporating Reef Resilience into the broader Coastal and Marine Spatial Planning Process. This workshop will be a valuable opportunity for NOAA, the State of Florida, members of the US Coral Reef Task Force and other major partners in the Florida Reef Resilience Program to connect with a broad range of experts in planning and reef resilience.

Please register via www.uscrtfandrrc.com.

Please note: There is no charge to attend but registration is required. Information on field trips, hotel accommodations and agendas is also available on the website.

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Students of 2011 Training of Trainers Make Big Moves in Saipan!

We are excited to report that our 2011 class of Resilience Trainers has been an enthusiastic bunch, already implementing several training activities in their respective geographies. Steven Johnson and Steven McKagan have even made the local news with their recent activity focused on educating the public about coral bleaching and climate change. Below is an excerpt from the Saipan Tribune with a link to the full story. Way to go Stevens!

“Nearly 70 volunteers from the local dive, snorkel, and education communities learned how to identify varying stages of coral bleaching at a recent workshop aimed at raising awareness about coral reef resiliency and climate change in the CNMI.

The three-hour workshop sponsored by The Nature Conservancy and the National Oceanic and Atmospheric Administration featured presentations on climate change and coral reef resiliency by marine biologists and ecologists from the Division of Environmental Quality and NOAA's Pacific Islands Regional Office. In addition to raising awareness about coral reef resiliency in the CNMI, another goal of the workshop is to create a network of volunteer monitors who can help gather current data on the bleaching status of the CNMI's corals.”

[READ MORE](#)



CoralWatch coaches from CRM, DFW, NOAA, DEQ and APASEEM meet in Saipan.

© Saipan Tribune

Recent Publications and Other Resources

Publications:

[Global Gradients of Coral Exposure to Environmental Stresses and Implications for Local Management](#)

Recent report published on the [major coral reef fish species](#) of the South Pacific with basic information on their biology and ecology

[Ongoing global biodiversity loss and the need to move beyond protected areas](#): a review of the technical and practical shortcomings of protected areas on land and sea

[Projecting Coral Reef Futures Under Global Warming and Ocean Acidification](#)

Resources:

There is a [funding opportunity available through the NOAA Coral Reef Conservation Program](#), for domestic grants to support coral reef conservation projects in shallow water coral reef ecosystems, including reefs at mesophotic depths, in the US and its jurisdictions. Funding Opportunity Number NOAA-NOS-OCRM-2012-2003014 or CFDA Number 11.482

[Sign up for NOAA's Bleaching Alert E-mails](#) and Report Bleaching in your Location

Upcoming Events

Upcoming Webinar: Caribbean Lionfish Invasion Part 2
Dates to be announced shortly!

[64th Gulf and Caribbean Fisheries Institute Conference \(GCFI\)](#)

Puerto Morelos, Mexico
October 1- 4, 2011

[4th International Tropical Marine Ecosystem Management Symposium \(ITMEMS4\)](#)

Gosier, Guadeloupe
December 5-8th, 2011

[25th International Congress for Conservation Biology \(ICCB 2011\)](#)

Auckland, New Zealand
December 5-9, 2011

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Reef Resilience
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**Planning for Resilience:
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Reef Resilience Newsletter: December 2011

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**Planning for Resilience: 2nd Reef Resilience
Conference and 26th US Coral Reef Task
Force Meeting**



Journalists from the Society of Environmental Journalists interview a panel of coral reef experts on reef resilience-related topics. © TNC

This past October, the 26th U.S. Coral Reef Task Force (USCRTF) Meeting in partnership with the 2nd Reef

reefresilience@tnc.org.

For more information about The Nature Conservancy's Reef Resilience Program, visit reefresilience.org.

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Resilience Conference (RRC) was held in Fort Lauderdale, Florida. The mission of the USCRTF, to lead, coordinate, and strengthen U.S. government actions to better preserve and protect coral reef ecosystems, was met with the Workshop's theme "Planning for Resilience" to address spatial planning within Florida and in the wider Caribbean and Gulf of Mexico.

Coordinated by the Florida Reef Resilience Program, a consortium of local and state agencies and partners and chaired by The Nature Conservancy (TNC), the meeting was a successful 2-day workshop with presentations on subjects including the Florida Reef Resilience Program, the Climate Change Action Plan for Florida Coral Reef Systems, Reef Resilience Science updates, and Coastal Marine Spatial Planning (CMSP) for Coral Reef Ecosystems. A group of representatives from recreational fishing, commercial fishing and diving industries throughout the world presented on their personal views of CMSP conservation strategies in "Voices of the Reef", which was a smashing hit with participants. Another success was the International Reef Resilience Practitioners Workshop, where several reef and reef resource managers presented their application of reef resilience trainings, workshops, and learning exchanges in their locale.

U.S. residents say Hawaii's coral reef ecosystems worth \$33.57 billion per year: Executive Summary on the Economic Valuation of Hawaii's Coral Reefs

This study employed a scientifically developed national Internet survey of more than 3,200 households – a representative sample of all U.S. residents, not just Hawaiians or coastal dwellers. From June through October 2009, the survey allowed the public to express its preferences and values for protection and restoration of the coral reef ecosystems around the main Hawaiian Islands.

"Hawaiians, as well as residents from across the United States, treasure Hawaii's coral reefs, even those citizens who never get to visit," said Jane Lubchenco, Ph.D., under secretary of commerce for oceans and atmosphere and NOAA administrator. "This study illustrates the economic value of coral reefs to all Americans, and how important it is to conserve these ecosystems for future generations."

[Read More](#)

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Spotlight on the Mesoamerican Reef

Stretching for 625 miles along the coastline of Honduras, Guatemala, Belize and Mexico, the Mesoamerican Reef (MAR) is the second largest barrier reef in the world. It encompasses a rich mosaic of ecosystems host more than 500 fish species, 60 coral species, 350 mollusk and other marine mammals, algae and seagrasses. It is home to critically endangered species, like the largest population of manatees in the Western Caribbean, saltwater crocodile, sea turtle (green, hawksbill and loggerhead), Nassau and Goliath grouper, and the largest aggregation of whale sharks in the world.



Map of Mesoamerican Reef . © TNC

The main threats affecting the MAR are overfishing, pollution from inland and coastal settlements, runoff from agriculture, sedimentation, coastal ecosystems conversion due to coastal development and inappropriate tourism practices. Climate change driven stressors are pushing ecosystems to their limits and affecting their capacity to sustain human use and pressure.

[Read More.](#)

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Recent Publications and Other Resources

Publications:

[Critical Thresholds in Ecosystem-Based Management \(EBM\) of Coral Reef Fisheries](#)

[Good coastal management practices in the Pacific](#): Experiences from the field.

[Adapting to a Changing Environment: Confronting the Consequences of Climate Change](#) is a new book proposing solutions to the social and ecological challenges posed by climate change.

[Differential Responses of the Coral Host and Their Algal Symbiont to Thermal Stress](#)

[The Diversity of Coral Reefs](#): What Are We Missing?

[Present Limits to Heat-Adaptability in Corals](#) and Population-Level Responses to Climate Extremes

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Upcoming Events

[Coral Reefs of the Gulf Conference](#)

January 17-19, 2012
Abu Dhabi, UAE

[2012 Global MPA Enforcement Conference](#)

February 19-23, 2012
San Francisco, CA

[12th International Coral Reef Symposium](#)

July 9-13, 2012
Cairns, Queensland, Australia

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Reef Resilience
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Training Managers in Southeast Asia: Our 3rd Reef Resilience Training of Trainers takes off to a great start!

[Sharing marine and watershed resource management from Hawaii to Palau](#)

[Spotlight on the Lesser Sunda Ecoregion](#)

[Recent Publications and Other Resources](#)

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Reef Resilience Newsletter: February 2012

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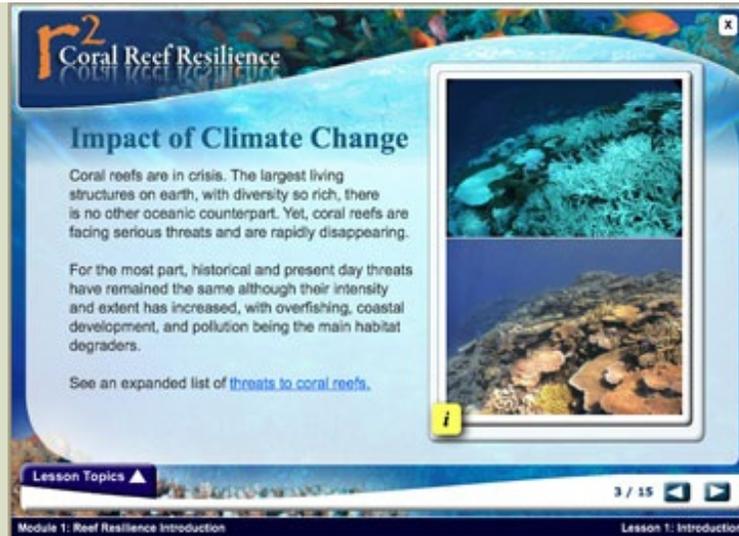
Training Managers in Southeast Asia: Our third Reef Resilience Course for Trainers takes off to a great start!

Just a few weeks ago, our newest group of coral reef and resource practitioners started the Reef Resilience Training of Trainers course. We are very excited to work with this very enthusiastic group, who represent countries from throughout the Southeast Asia region including Malaysia, Thailand, Papua New Guinea, the Philippines, Vietnam, the Marshall Islands, Myanmar, and several provinces in Indonesia. Within the first week, course participants were actively engaging in conversations about how they see reef resilience principles already being used in their locations. This week's lessons focus on the basics of coral bleaching and ocean acidification – discussed also in our online [Reef Resilience Toolkit](#).

To join the Resilience Practitioners Network or to submit updates, contact us at resilience@tnc.org.

For more information about The Nature Conservancy's Reef Resilience Program, visit reefresilience.org.

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First web-based training module of the Reef Resilience Training of Trainers course. © TNC

Explore more information on the [courses and trainings offered through our program](#).

Sharing marine and watershed resource management from Hawaii to Palau

Two weeks ago, The Nature Conservancy sponsored a delegation of Hawaiian and American Samoan community members to participate in a learning exchange with the Republic of Palau. Over the course of one week, Palauan leaders and community members shared their experience in merging traditional and modern governance systems in the management of marine resources and watersheds. Participants had the opportunity to learn about current efforts lead by communities, state and national governments, and NGOs in



Hawaii-Palau learning exchange participants

Palau for conservation and management of their natural resources. Challenges and lessons learned were discussed with local stakeholders to better understand how Palau's experience can contribute to resource management efforts in Hawaii.

pictured here with the Palauan Council of Chiefs at the national capitol. © TNC.

The experience reinforced the importance of looking to your neighbors for new ideas and inspiration. We look forward to seeing all that comes out of this rich experience. We will be sharing the results of this exchange in our next newsletter and on [our website](#). For reflections on this experience, check out [Stephanie Wear's blog on Cool Green Science](#). Huge thanks goes to the John D. and Catherine T. MacArthur Foundation and NOAA's Coral Reef Conservation Program for helping to make this experience possible!

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Spotlight on the Lesser Sunda Ecoregion

At the southern end of the Coral Triangle, the Lesser Sunda Ecoregion stretches from Bali to Timor-Leste, covering an area of more than 45 million hectares. This region is of outstanding conservation value for coastal ecosystems. Coral reefs are highly diverse and have high levels of endemism, and six species of endangered sea turtles nest on the beaches of many small islands. This area is a major migratory corridor for cetaceans between the Indian and Pacific Oceans with 21 species of marine mammal including blue whales and sperm whales recorded. Other large marine species such as dugongs, manta rays and whale sharks are also common in this region.



The Lesser Sunda Ecoregion is an important migratory corridor for cetaceans. © APEX Environmental.

Although the islands of the Lesser Sunda are sparsely populated (ca. 13 million), resource management issues include destructive and overfishing and harvesting of cetaceans and turtles, coastal development and mining.

These practices threaten both conservation values and sustainable resource use. Developing an MPA network is one strategy to reduce these threats and, by incorporating principles of resilience, to also address the threat of climate change.

[Read More.](#)

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Recent Publications and Other Resources

["Caribbean Creep" Chills Out:](#) Climate Change and Marine Invasive Species

[Hot, Sour, and Breathless:](#) Oceans Under Stress

[Settling into an Increasingly Hostile World:](#) The Rapidly Closing "Recruitment Window" for Corals

[Report and Online Tool: Climate Change in the Pacific:](#) *Scientific Assessment and New Research*

Follow us on [Twitter](#) and [Facebook](#) for coral reef news and R2 Program updates!

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Upcoming Events

[41st Annual Benthic Ecology Meeting](#)

March 21-24th, 2012

Norfolk, Virginia

[Climate Adaptation in Action Conference 2012](#)

June 26-28, 2012
Melbourne, Australia

[12th International Coral Reef Symposium](#)

July 9-13, 2012
Cairns, Queensland, Australia

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Reef Resilience
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Introducing the new Reef Resilience Program Manager: An interview with Petra MacGowan

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Reef Resilience Newsletter: May 2012

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Introducing the new Reef Resilience Program Manager: An interview with Petra MacGowan

We are thrilled to introduce you to Petra MacGowan! Petra is our new Reef Resilience Project Manager and is taking on the leadership of our Reef Resilience Program. Petra began working with us last November and we are excited for you to engage with her via our trainings, webinars, and other communications. Petra comes to us from Hawaii, where she had been managing the Hawaii Coral Program for the state.



© Petra MacGowan
Petra began her work with the Hawaii Division of Aquatic Resources as a NOAA Coral Fellow and soon after took on a leadership role in the program. During her time in

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Hawaii, Petra lead the interagency Hawaii Coral Reef Working Group as well as strategic planning efforts for the Hawaii Program and the NOAA Coral Reef Conservation Program (CRCP). Petra will be leading her first Training of Trainers workshop in Bali in June. You can also expect to hear her voice as she leads our webinar series – with the next webinar coming up in late May. Stephanie Wear will continue to work with Petra and together they will ensure continued growth and new opportunities for the Reef Resilience Program. Please join us in welcoming Petra to the Reef Resilience Network!

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Changes to the online Reef Resilience self-paced course

Just a few weeks ago, our program unveiled a new structure to our online Reef Resilience self-paced course curriculum in a effort to better tailor to the varying professional and educational needs of our many students. The curriculum has been separated into three major 'Focus Areas': **(1) Principles of Reef Resilience**, **(2) Resilient MPA Design** and **(3) Managing for Reef Resilience**. Each of the focus area courses is an integral part of the broader Reef Resilience Curriculum however now students can complete one 'Focus Area' at a time and will receive a certificate of achievement for each area. Each course now only takes an average of 3-4 hours to complete.

The courses incorporate the new science, lessons learned, case studies, and practices that have been included in the Coral Reefs module of the [Reef Resilience toolkit](#), and is designed to accelerate the knowledge and facilitate access to essential information and tools needed to incorporate resilience principles into management strategies.

To see these changes, begin or continue with these online courses, please go to www.conservationtraining.org. Create or enter your log in information to go to the home page. Then, find our course by navigating to the 'Courses' tab on the toolbar, and selecting 'Water' and 'Oceans'.

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Spotlight on Wakatobi, Indonesia

At the southern end of the Coral Triangle, the Lesser Sunda Ecoregion stretches from Bali to Timor-Leste, covering an area of more than 45 million hectares. This region is of outstanding conservation value for coastal ecosystems. Coral reefs are highly diverse and have high levels of endemism, and six species of endangered sea turtles nest on the beaches of many small islands. This area is a major migratory corridor for cetaceans between the Indian and Pacific Oceans with 21 species of marine mammal including blue whales and sperm whales recorded. Other large marine species such as dugongs, manta rays and whale sharks are also common in this region.



Coral reef in Wakatobi Marine National Park of SE Sulawesi, Indonesia. © Burt Jones and Maurine Shimlock/Secret Sea Visions.

Although the islands of the Lesser Sunda are sparsely populated (ca. 13 million), resource management issues include destructive and overfishing and harvesting of cetaceans and turtles, coastal development and mining. These practices threaten both conservation values and sustainable resource use. Developing an MPA network is one strategy to reduce these threats and, by incorporating principles of resilience, to also address the threat of climate change.

[Read More.](#)[Back to top »](#)

Recent Publications and Other Resources

[Challenges for managing fisheries on diverse coral reefs](#)

[Contrasting patterns of coral bleaching susceptibility in 2010 suggest an adaptive response to thermal stress](#)

[Co-management of coral reef social-ecological systems](#)

[Long-term impacts of non-sustainable tourism and urban development in small tropical islands](#): Coastal habitats in a changing climate: Lessons learned from Puerto Rico

[Threatened Reef Corals of the World](#)

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Upcoming Events

[Rio+20: United Nations Conference on Sustainable Development](#)

June 20-22, 2012

Rio de Janeiro, Brazil

[Climate Adaptation in Action Conference 2012](#)

June 26-28, 2012

Melbourne, Australia

[12th International Coral Reef Symposium](#)

July 9-13, 2012

Cairns, Queensland, Australia

[International Conference on Fisheries and Marine Sciences \(MarineFish 2012\)](#)

August 5-10, 2012

Brisbane, Australia

[International Conference on Managing Protected Areas under Climate Change \(IMPACT\)](#)

September 24-26, 2012

Dresden, Germany

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[Spotlight on Maui, Hawai'i](#)

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Reef Resilience Newsletter: August 2012

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Highlights from the 12th International Coral Reef Symposium



Terry Hughes giving the opening address of ICRS 2012.

© ICRS 2012

“Marine scientists can afford to be more optimistic about the future,” stated ICRS plenary speaker, the Chief Scientist at The Nature Conservancy, Peter Kareiva. “We give messages of sacrifice and doom and gloom... messages of fear ... and that does not work because as any social scientists will tell you, that leads to a state of paralysis.”

Just a few short weeks ago, the 12th International Coral Reef Symposium (ICRS) brought together thousands of people from universities, local organizations and agencies, and NGOs across the globe—all to focus on coral reefs.

Hundreds of presentations were given each day of the conference, organized into no less than twenty-two themes ranging from technologies for coral reef science and modeling reef futures, to ocean acidification and human impacts on coral reefs, to management and monitoring and social, economic, and cultural perspectives.

Check out the links below for some of the many conference highlights including:

- [Release of the Consensus Statement on Climate Change](#) by symposium organizers with signatures of over 3000 supporters
- Peter Kareiva's optimistic plenary speech "[Just How Fragile are Coral Reefs? - It Depends](#)", which gives a fresh outlook on the future of coral reefs, by TNC's chief scientist.
- The televised discussion [Can Coral Reefs Survive the 21st Century?](#) with leading experts Helene Marsh, of James Cook University and Jeremy Jackson, the Senior Scientist Emeritus at the Smithsonian Institute.
- The pre-conference presentation of the inaugural [State of the Coral Triangle Reports](#) from the six nations of the Coral Triangle Initiative.

Also available on the ICRS2012 website are a multitude of resources from the conference, including [conference proceedings](#), [ePoster presentations](#), and [plenary speeches](#).

Daily newspapers were handed out to ICRS delegates with stories on memorable and important moments for the conference:

Monday, 9 July: [Welcome to Cairns](#)

Tuesday, 10 July: [Let the Symposium begin](#)

Wednesday, 11 July: [Research in the clouds](#)

Thursday, 12 July: [Praise for courageous colleagues](#)

Friday, 13 July: [Jackson gives Darwin Medal address](#)

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The Reef Resilience Program team of The Nature Conservancy is excited to announce the hire of Jordan Jobe, our new Reef Resilience Network Manager. Jordan comes to us after recently spending a year living and travelling in East Africa. Before this, she completed a Masters of Environmental Management from the Yale School of Forestry and Environmental Studies with a concentration in the Social Ecology of Conservation and Development. As part of her Master's program, Jordan spent a summer in Fiji researching ICM policy in the South Pacific, and visited the USVI with a "Coastal Zone



Jordan Jobe, the new Reef Resilience Network Manager. © Nathan Karres

Management" course. Prior to graduate school Jordan was a Peace Corps Volunteer in Western Samoa, where she worked with a local non-profit organization on village based coral reef conservation projects including restoration and management activities. Jordan will be managing the Reef Resilience online network of coral reef managers and practitioners and will also support the other aspects of the program, including Reef Resilience newsletters, webinars, and the 'Reef Resilience and Responding to Climate Change' Workshop for Trainers. Please join us in welcoming Jordan!

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Spotlight on Maui, Hawai'i

The Hawaiian Islands are the most isolated archipelago in the world, located over 2000 miles from the nearest continental land mass. More than 1.3 million people live in the main Hawaiian Islands and upwards of 7 million people visit annually. While the ocean and its resources are a valuable and essential part of Hawaii's economy, lifestyles, and Hawaiian cultural heritage, the sheer number of people directly and indirectly affects coral reef health. Recent studies have shown that Maui's coral reefs have declined by 35 percent over the past 10 years. In an effort to address this decline, The Nature Conservancy (TNC) has been collaborating with local partners in building community capacity to care for, manage, and monitor marine resources. Efforts have focused on three areas: site-specific community-based marine conservation



Maui Nui Marine Resources Council. ©TNC Hawaii.

planning, building a network of community-based marine managed areas, and effective conservation for marine protected areas.

[Read More](#)

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Recent Publications and Other Resources

[NOAA Coral Reef Conservation Program announces the Domestic \(U.S.\) Coral Reef Conservation Grants competition for FY13](#)

[Evidence That Marine Reserves Enhance Resilience to Climatic Impacts](#)

[Effects of Marine Reserves versus Nursery Habitat Availability on Structure of Reef Fish Communities](#)

[Research Priorities in the Insular Pacific: Transforming Research into Regional Management](#)

[Larval Export From Marine Reserves and the Recruitment Benefit for Fish and Fisheries](#)

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Upcoming Events

[International Conference on Managing Protected Areas under Climate Change \(IMPACT\)](#)

September 24-26, 2012

Dresden, Germany

[4th International Conference on Estuaries and Coasts \(4th ICEC\)](#)

October 8-11, 2012

Hanoi, Vietnam

[65th Annual meeting of the Gulf and Caribbean Fisheries Institute](#)

5-9 November 2012

Santa Marta, Colombia

[2012 MPA Conference](#)

November 25-29, 2012

San Francisco, California, USA

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Reef Resilience
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Reef Resilience Newsletter: November 2012

Distributed by the [Global Marine Team](#)

**Puerto Rico Signs the
Caribbean Challenge
Initiative**

[Workshop
Announcement: Reef
Resilience and
Responding to Climate
Change](#)

[Learning Exchange
Webinar Announcement](#)

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Puerto Rico Signs the Caribbean Challenge Initiative



A meeting of the Senior Officials held in Jamaica in July, 2012. Pictured are the Jamaican Minister of Water, Land, and Environment and Climate Change-Hon. Robert Pickersgill, British Virgin Islands Dr. the Hon. Kedrick Pickering, Deputy Premier and Minister for Natural Resources and Labour, and Puerto Rico Dept. of Natural and Environmental Resources Secretary Hon. Daniel Galán Kercadó, as well as TNC staff working on the Caribbean Challenge Initiative. © The Nature Conservancy

In July 2012, Puerto Rico became the tenth government to commit to participating in the Caribbean Challenge Initiative (CCI). Through this Initiative, ten governments have committed to effectively conserve at least twenty percent of their near-shore marine and coastal environment by 2020. Puerto Rico has recently taken this one step further: On October 9th 2012, the Governor of Puerto Rico, Luis G. Bursett Fortuño, and the Secretary of the Department of Natural and Environmental Resources (DNER), Daniel Galán Kercadó signed the “Puerto Rico Declaration 20 by 20”, which outlines specific objectives to guide Puerto Rico’s CCI efforts.

To join the Resilience Practitioners Network or to submit updates, contact us at resilience@tnc.org.

For more information about The Nature Conservancy's Reef Resilience Program, visit reefresilience.org

www.tnc.org.
This newsletter is brought to you through the generous support of the John D. and Catherine T. MacArthur Foundation and NOAA's Coral Reef Conservation Program.

Under this Declaration, Puerto Rico has made some important commitments worth highlighting:

- Development of a long-term strategic plan for a protected areas system. This plan will provide a strategic vision and direction for the Puerto Rico Protected Areas System through 2050 and be revisited at least every five years in order allow for adaptive management.
- Strengthening and prioritization of environmental and ecosystem restoration efforts to further restore and help Puerto Rico become more resilient
- Investment in technical capacity building of government staff, NGOs, private sector and local communities engaged in the protection, conservation and sustainable use of biodiversity.
- Promotion of the development of collaborative agreements with local governments, local communities, NGOs, the academic institutions for the management of protected areas.
- Commitment to a long term program of environmental outreach, education and awareness building for all sectors of society based on a strategic outreach marine/coastal protected areas education plan.
- Establishment of sustainable finance mechanisms, such as tourism-related fees.

This exciting Puerto Rican commitment is the direct result of the strong partnership between local resource management agencies, NGOs and the federal government to effectively manage the region's reefs. Through funding from the National Atmospheric and Oceanographic Administration, The Nature Conservancy has assisted with coordination of the DNER Coral Committee and served an advisory role for members and the Secretary. The DNER Coral Committee serves as a forum for local government resource managers to regularly meet and identify joint coral reef conservation priorities. Over the past year, TNC staff helped to facilitate conversations within the Committee to better understand the opportunity of Puerto Rico's participation in the CCI. The Committee recognized that participation in the CCI was an

important step for coral reef conservation efforts and was able to effectively advocate to the Secretary and Governor for Puerto Rico's involvement.

To see the full text of the Puerto Rico Declaration or learn more, contact [Raimundo Espinoza](#) for more information on Puerto Rico's exciting work! To learn more about the CCI go to [TNC's website](#), the [CamPAM website](#), or [GLISPA's website](#). Other participating CCI governments include; the Bahamas, Dominican Republic, Jamaica, Grenada, Antigua and Barbuda, British Virgin Islands, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines.

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Workshop Announcement: Reef Resilience and Responding to Climate Change, Workshop in Zanzibar, Tanzania June 2013

We are pleased to announce that The Nature Conservancy, in partnership with CORDIO and NOAA, and with support from IUCN and the John D. and Catherine T. MacArthur Foundation, will offer a workshop for coral reef managers from the following countries: Somalia, Kenya, Tanzania, Mozambique, South Africa, India and the islands of Madagascar, Seychelles, Mauritius, Egypt, Sudan, Eretria, and Djibouti. Participants will learn about building resilience into reef management and the tools available for addressing the impacts of climate change. The meeting will bring together marine managers/trainers to learn and share ideas that will lead to more effective long-term coral reef management. The workshop is designed to provide an atmosphere of exchange and creative problem solving so that participants leave with a specific training plan for their locale. Resources recently developed through major international collaborations will be highlighted and distributed to participants (e.g., Resilience Toolkit, Reef Managers Guide to Bleaching, etc.). The workshop will be facilitated by regional and global experts in coral reef management.



Participants in the Reef Resilience Trainer's Workshop in Palau in June, 2011. © Stephanie Wear

For more information on the workshop, visit our [website](#).

Application Deadline: December 14, 2012

[Download the application \(pdf\).](#)

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Reef Resilience Webinar: Learning Exchanges: Creative Collaboration for Increasing Effective Management

November 27th, 2:00pm Hawaii Time 00:00 GMT

Learning exchanges are one of the most powerful ways to spur and enhance conservation projects, but can also be challenging. Join us for a webinar on Learning Exchange best practices based on a recently implemented exchange between community members in Hawaii and Palau. Manuel Mejia from the Nature Conservancy of Hawaii, and Steven Victor from The Nature Conservancy of Palau, as well as Hi'ilei Kawelo, Executive Director of Paepae o He'eia, O'ahu, Hawai'i will discuss a two-part learning exchange focused on community-based MPA efforts. They will present an overview of the exchange and its objectives, highlight suggested best practices for planning an effective, fun, and rewarding learning exchange, and review some of their lessons learned. This presentation will conclude with a Q&A session.

To join, [Register Here](#).

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Spotlight on Fiji's Trainer's Conference

Yashika Nand, in collaboration with the Wildlife Conservation Society (WCS) Fiji, led a two-day reef resilience training workshop for partners of the Fiji Locally Managed Marine Area network (FLMMA), including representatives from communities and conservation organizations. The goal was to introduce 21 reef managers to the concept of adaptive management using the principles



of reef resilience. The workshop focused on low-technology, low-cost community-based techniques to identify resilient reefs and help communities protect them within a network of MPAs. Emphasis was placed on the components of reef resilience and their use in the design of resilient MPAs as a better management strategy for facing climate change impacts. The goal is not to replace existing management strategies, but to help reef managers adapt their management plans as new information becomes available.



Participants in the Reef Resilience Training Workshop led by Yashika Nand, in collaboration with the Wildlife Conservation Society of Fiji. ©Yashika Nand.

One of the most important outcomes of the reef resilience training workshop was the community based bleaching response plan that was developed during one of the group activities which could be adapted to most of the communities within Fiji. The other achievement of the workshop was the enthusiasm participants generated to implement reef resilience principles in different parts of Fiji. Most of the community representatives went back to their sites with an implementation plan that includes updating communities about impacts of climate change, the concepts of reef resilience and resilient MPA design as a priority.

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Recent Publications and Other Resources

Online Resource: [Ocean Health Index](#)

Online Resource: [Invasive Lionfish: A Guide to Control and Management](#)

Online Resource: [OpenChannels.org](#)

OpenChannels.org is designed to become your comprehensive source for news, guidance, and community discussion on sustainable practices in ocean planning and management. Are you interested in Marine protected areas? Ecosystem-based management? Marine spatial planning? OpenChannels seeks to provide the information and expertise you need. Through a searchable literature library, discussion forums, live chats with marine conservation experts, and an instructional video library, you can share knowledge and best practices with peers worldwide.

The 27-year decline of coral cover on the Great Barrier Reef and its causes. De'ath et al. October 1, 2012. [Available online at PNAS.](#)

Prioritizing Key Resilience Indicators to Support Coral Reef Management in a Changing Climate. McClanahan et al, 2012. [Available online at PLOS One.](#)

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Upcoming Events

[National Marine Protected Areas Center Webinar Series](#)

Fall 2012

[2012 MPA Conference](#)

November 25-29, 2012

San Francisco, California, U.S.A

[ASLO 2013 Aquatic Sciences Meeting](#)

February 17-22, 2013

New Orleans, Louisiana, U.S.A

[12th International Coastal Symposium](#)

April 8-12, 2013

Plymouth, England

[26th International Congress for Conservation Biology](#)

July 21-25, 2013

Baltimore, Maryland, U.S.A.

OpenChannels/MPA Center Webinar:

Thursday, December 13, 2012, 1 pm EST/10 am US PST/6 pm GMT

Can You Hear Me Now? Research and Tools on Ocean Communication

Presenter: Bill Mott, Director and Wei Ying Wong, Communications Project Director, The Ocean Project

[Click here to register.](#)

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Reef Resilience Newsletter: February 2013

Distributed by the [Global Marine Team](#)

Writer's Workshop

In December 2012, the Reef Resilience Program partnered with The Nature Conservancy's Central Science team to host a writing workshop for Caribbean Coral Reef managers. This workshop worked with 14 managers to polish their writing skills and help prepare a manuscript for publication in an academic journal, newspaper, or magazine.

According to one participant from Trinidad, Jahson Alemu I, "This was definitely a great experience for all that attended and more similar workshops should be conducted to build capacity among other coral reef managers. Three weeks later, I was able to submit to a peer reviewed journal, and I'm currently awaiting feedback."

For more information, contact us at resilience@tnc.org.

To join the Resilience Practitioners Network or to submit updates, contact us at resilience@tnc.org.

Learn more about The Nature Conservancy's [Reef Resilience Program](#).

This newsletter is brought to you through the generous support of the John D. and Catherine T. MacArthur Foundation and NOAA's Coral Reef Conservation Program.

Reef Resilience Program Updates

In January, managers from Kenya, Tanzania, Yemen, Sudan, Somalia, Maldives, Mozambique, Madagascar, Seychelles, India, Egypt and South Africa began this year's Reef

Resilience Training of Trainer's course. The Reef Resilience and Responding to Climate Change Workshop will take place in June in Zanzibar, Tanzania in June.

Our January webinar was on "Ridge to Reef Management for Coral Health", presented by Drs. Stacy Jupiter and Carissa Klein. [Watch the webinar on YouTube.](#)

On Our Network

In January, the [Reef Resilience Network](#) was officially launched! The Reef Resilience Network is a community space for coral reef managers from around the world. The site provides an interactive online resource for finding up-to-date science and tools, management support, and experts in different regions.

In future newsletters, we will be providing a brief summary of important discussions happening on the network. We invite those who are directly involved with coral reef conservation in the role of managers, practitioners, marine biologists, researchers or scientists to join our network. If you're interested in learning more, please email resilience@tnc.org.

Upcoming Events

[Understanding Ecological and Social Resilience in Island Systems: Informing Policy and Sharing Lessons for Management.](#) This symposium from April 9-11, 2013, in New York City, is supported by the Reef Resilience Program at The Nature Conservancy (among others) and organized by the American Natural History Museum's Center for Biodiversity and Conservation.

[International Congress for Conservation Biology.](#) July 21-25, 2013 in Baltimore, Maryland.

[7th Mexican and 1st Panamerican Coral Reef Congress.](#) October 8-11, 2013 in Yucatan, Mexico.

In the News

[Invasive lionfish](#) were featured in the New York Time's always-interesting "Scientist at Work Blog"

The Huffington Post discusses [coral's sex life](#).

How the [live coral trade may actually protect coral reefs](#).

Nature.com discusses recent research on how [genes may help some coral handle climate](#)

[change.](#)



Reef Resilience Review

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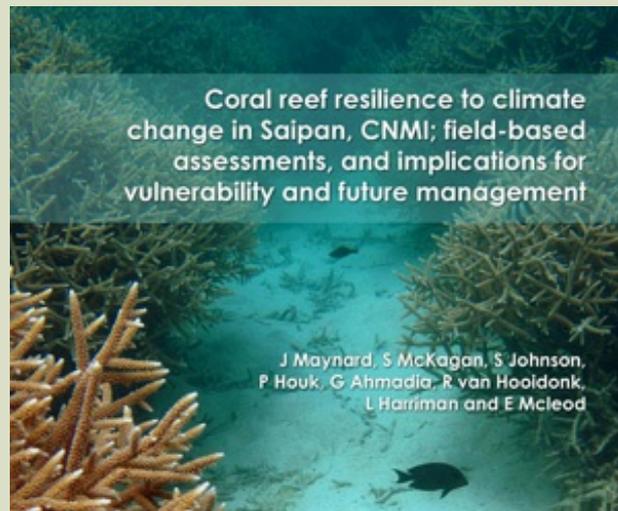
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Reef Resilience Newsletter: March 2013

Distributed by the [Global Marine Team](#)



Implementation of a Reef Resilience Assessment in Saipan

The recently published report, Coral reef resilience to climate change in Saipan, CNMI; field-based assessments and implications for vulnerability and future management (Maynard et al 2012), presents the results of the first field-based implementation of a reef resilience framework from 35 sites around Saipan. The framework is based on McClanahan's 2012 work that suggests that the following variables be evaluated to compare the resilience potential of coral reef sites:

- coral diversity
- bleaching resistance
- recruitment
- herbivore biomass
- macroalgae cover

- temperature variability
- nutrient input
- sedimentation
- fishing access
- coral disease
- anthropogenic physical impacts

Some of the suggestions for managers coming out of the assessment include:

- considering additional management and enforcement at four of the top ten high resilience sites that are not currently in protected areas
- giving the sites with high resilience and high coral cover special attention to facilitate tourism opportunities, and
- monitoring and maintaining herbivory at sites especially vulnerable to coral bleaching.

The authors are: Jeffrey Maynard, Steve McKagan, Steven Johnson, Peter Houk, Gabriella Ahmadia, Ruben van Hooidek, Lindsey Harriman and Elizabeth McLeod.

For a PDF of the report, contact us at resilience@tnc.org.

Reef Resilience Program Updates

On March 27th, at 1:00 pm PST we'll host a webinar on Hawaii's Coastal Use Mapping Project: Participatory Mapping to inform coral reef management efforts. [Register for the webinar](#).

Dr. Arielle Levine (San Diego State University/National Oceanic Atmospheric Association) and Emma Anders (State of Hawaii Division of Aquatic Resources) will discuss a project to map coastal human uses at coral reef priority sites on the islands of Hawaii and Maui. Because baseline data on human uses was limited, the project used participatory GIS to engage local resource users, scientists, and stakeholders in creating maps of ocean uses. This project aimed to fill a critical information gap identified by resource managers; to gain a better understanding of the spatial range and intensity of key human activities. This information was gathered to inform State and local planning efforts to protect coral reefs, while reducing user conflict and minimizing impacts on those who depend on marine resources. Using lessons learned from the Hawaii process, participatory mapping was also recently undertaken in American Samoa's Fagaloa region and the St. Thomas East End

Reserve in the USVI, with mapping products available soon.

We've uploaded our [archive of webinars to Youtube](#) to make them easily accessible! Check them out!

On Our Network

The [Reef Resilience Network](#) is a community space for coral reef managers from around the world. The site provides an interactive online resource for finding up-to-date science and tools, management support, and experts in different regions. We invite those who are directly involved with coral reef conservation in the role of managers, practitioners, marine biologists, researchers or scientists to join our network. If you're interested in learning more, please email resilience@tnc.org.

Already a member? Check out [Liz Schrack's newest Resilience 101 blog post](#).

Upcoming Events

[Understanding Ecological and Social Resilience in Island Systems: Informing Policy and Sharing Lessons for Management](#). This symposium from April 9-11, 2013, in New York City, is supported by the Reef Resilience Program at The Nature Conservancy (among others) and organized by the American Natural History Museum's Center for Biodiversity and Conservation. (We'll be there, email us at resilience@tnc.org if you'd like to meet up!)

[International Congress for Conservation Biology](#). July 21-25, 2013 in Baltimore, Maryland.

[Australian Coral Reef Society Annual Conference](#): August 29-30, 2013

[International Marine Protected Areas Conference](#): Marseille and Corsica, France, October 21-27, 2013

In the News

[More MPAs in the Bahamas](#)? Sounds like good news!

[Bad news for the Great Barrier Reef](#): shallow reefs may pass climate danger thresholds in just 30 years.

[Scientist at Work](#) (New York Times) features research in Bali:

Resource: Beautiful [full color poster about invasive lionfish](#) available online



Reef Resilience Review

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Reef Resilience Newsletter: May 2013

Distributed by the [Global Marine Team](#)

Reef Resilience Article in *Science*

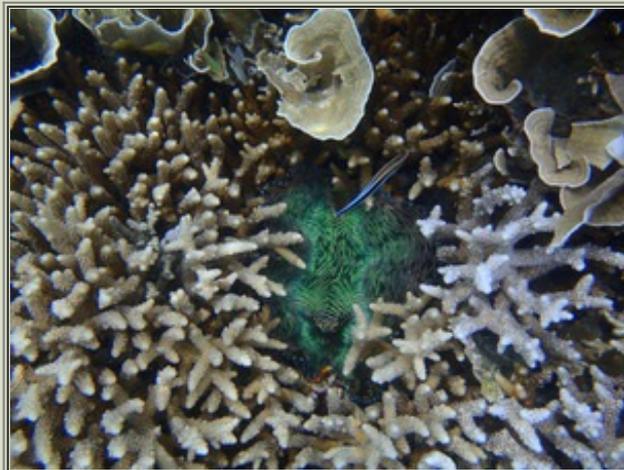


Photo © Steph Wear

Around the world, a growing group of scientists are searching for resilient reefs and then trying to identify what enables them to resist or bounce back from severe environmental stress. The recent article in *Science*, “As threats to corals grow, hints of resilience emerge”, reviews some of the current science of reef resilience and what it might mean for managers. The article provides brief examples of reefs that have bounced back from damage including:

- Hurricane Hole, a sheltered bay off St. John in the U.S Virgin Islands which is thriving despite sea temperatures that killed more than one-half of the region’s reefs.
- Reefs off the Cocos Islands in the eastern Pacific, which were virtually destroyed by bleaching during the 1980s, experienced up to fivefold increases in coral

cover within 20 years.

It also details studies where researchers have been looking at the role of herbivores and connectivity in reef recovery; as well as researching coral physiology and genetics, particularly to understand how some reefs have avoided bleaching.

Finally, the article summarizes some lessons learned from these examples of resilience including the move by many management agencies to try to characterize reefs by their resilience potential. Check out the [full article here](#) for more details and share it with those interested in a summary of some of the science associated with reef resilience.

Reef Resilience Program Updates

Facilitating Resilience in Reef Management in Con Dao, Vietnam

Reef Resilience Trainer Chu The Cuong, from the Marine Environment and Resources, Vietnamese Academy of Science and Technology recently held a workshop for MPA board members, rangers, dive tour operators, and key community members from Con Dao Island. As a result of the workshop a working group (including volunteers, local fishermen and diving tour guides) was set up to collect information on potential bleaching events.

In March, the Reef Resilience Team hosted a webinar on Hawaii's Coastal Use Mapping Project: Participatory Mapping to Inform Coral Reef Management Efforts. [Watch the webinar on YouTube!](#)

We've uploaded our archive of webinars to Youtube to make them easily accessible. [Check them out!](#)

On Our Network

The [Reef Resilience Network](#) is a community space for coral reef managers from around the world. The site provides an interactive online resource for finding up-to-date science and tools, management support, and experts in different regions. We invite those who are directly involved with coral reef conservation in the role of managers, practitioners, marine biologists, researchers or scientists to join our network. If you're interested in learning more, please email resilience@tnc.org.

Already a member? Sam has a question about [coral transplantation](#), and Liz writes about a

recent [coral reef course](#) she helped teach in the Bahamas.

Upcoming Events

- [International Congress for Conservation Biology](#): July 21-25, 2013 in Baltimore, Maryland
- [Australian Coral Reef Society Annual Conference](#): August 29-30, 2013
- [International Marine Protected Areas Conference](#): Marseille and Corsica, France, October 21-27, 2013

In the News

- With heating oceans and ocean acidification, [corals face another threat](#): being eaten from within.
- Finally! The [US removes the last piece of their ship](#) from a reef in the Philippines.
- Wow! [Jellyfish robots? Reef repairing robots?](#)
- Leave me alone! [Isolated coral reefs](#) might be able to heal themselves.
- Apparently lionfish might carry a [risk of ciguatoxins](#) but [eating them](#) is still a way of trying to control population numbers.
- Great write-up on [resilience for the lay-person](#). Which way will the ball bounce?
- And, a [town is required to build artificial reefs](#).



Reef Resilience
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Reef Resilience Newsletter: August 2013

Distributed by the [Global Marine Team](#)

Local and Global Action Needed for Coral Reefs



Photo © John Starmer; Marine PhotoBank

To join the Resilience Practitioners Network or to submit updates, contact us at resilience@tnc.org.

Learn more about The Nature Conservancy's [Reef Resilience Program](#).

This newsletter is brought to you through the generous support of the John D. and Catherine T. MacArthur Foundation and NOAA's Coral Reef Conservation Program.

“Avoiding Coral Reef Functional Collapse Requires Local and Global Action”, a [new paper](#) published in Current Biology by Kennedy et al., models carbonate budgets on Caribbean reefs to emphasize the need for both local actions and a low-carbon economy to prevent further degradation of coral reefs. The authors highlight the importance of the three-dimensional structure of reefs in order to maintain their benefits to people and the marine environment. The maintenance of reef structure requires that the production of carbonate is greater than its rate of erosion. However, climate change impacts such as coral bleaching and other stressors like ocean acidification and

disease can reduce rates of coral production.

The authors couple models of climate change, ecosystem dynamics, and carbonate processes to explore whether reefs could shift to net erosional states (i.e., whether they will erode faster than they can calcify) and they discuss how addressing global and local threats might affect this shift. One interesting conclusion is the suggestion that carbonate budgets could be used to set target levels of coral, water quality, and herbivory to maintain reef growth and structure, as opposed to coral reef assessments that focus on coral cover, coral size distribution, and fish abundance.

The authors found that local management of fisheries (specifically, no-take marine reserves) and watershed management can delay reef loss by at least a decade under “business-as-usual” increases in greenhouse gas emissions. They warn that if greenhouse gas emissions follow the business-as-usual trend, then reefs will eventually erode faster than they can calcify regardless of local conservation measures. Additionally, they found that coral reefs must be initially relatively healthy (at least 20% coral cover), even with lowered carbon emissions and no-take reserves, in order to maintain reef structure!

[This paper](#) provides a clear message that global action to reduce carbon emissions must go hand-in-hand with local efforts, such as no-take reserves and watershed protection. For more information about the article, [email us](#) at resilience@tnc.org.

Online Survey for Reefs Tomorrow Initiative

The Reefs Tomorrow Initiative is gathering local knowledge about marine ecological and social changes in tropical island reef ecosystems around the world. The survey asks questions relating to changes you may have noticed in coastal marine systems and the communities that rely on them as well as how resource managers access information they need. The information gathered will help shape plans for materials that can be used by you or others for improved management of reefs and associated systems. [Take the survey.](#)

Reef Resilience Program Updates

This June, 25 coral reef managers and scientists from Egypt, Maldives, Seychelles, India, Kenya, Tanzania, South Africa, Madagascar, Mozambique and Somalia attended the 4th Reef Resilience and Climate Change Training of Trainers Workshop in Zanzibar, Tanzania.



Prior to the workshop, participants completed a six month online course that included weekly discussions with experts. Workshop sessions included presentations from regional specialists in resilient MPA design, resilience assessments, coral bleaching and social resilience.

Photo © Cherie Wagner; TNC

Trainers visit local reefs and learn how to identify resilience factors.



Participants worked in small groups throughout the week to practice facilitation skills and receive feedback on specific challenges encountered in their work. At the end of the course, 100% of participants agreed that their knowledge of resilience had increased. The next steps for the participants is to lead a Trainer's Project at their sites based on what they've learned, utilizing up to \$2000 in seed funding. We will report back on these projects as they are completed! To download a copy of our 2013 Trainer's Guide, [click here](#).

Photo © Cherie Wagner; TNC

Rod Salm works with Trainers to understand reef resilience.

Introducing the new Reef Resilience Program Assistant, Cherie Wagner

Cherie joined the Reef Resilience team in May 2013 as the new Program Assistant. Her most recent experience includes working on sustainable aquaculture research in Malaysia for the WorldFish Center and marine spatial planning on Vancouver Island, Canada for The Natural Capital Project. She has a Master's degree in Marine Affairs from the University of Washington where she focused on marine





resource use and community-based marine protected area management in the Philippines. She will be managing logistics for Training of Trainers events and Learning Exchanges as well as supporting all other aspects of the Reef Resilience program including the development of webinars, newsletters, and training resources. Please join us in welcoming Cherie!

Photo © Cherie Wagner; TNC

On Our Network

The [Reef Resilience Network](#) is a community space for coral reef managers from around the world. The site provides an interactive online resource for finding up-to-date science and tools, management support, and experts in different regions. We invite those who are directly involved with coral reef conservation in the role of managers, practitioners, marine biologists, researchers or scientists to join our network. If you're interested in learning more, please email resilience@tnc.org.

Already a member? Read about [Vardhan's experience](#) at the Reef Resilience Workshop in Zanzibar, then check out [hundreds of photos](#) from the Zanzibar Training.

Upcoming Events

- [Second Global Conference on Land-Ocean Connections](#): Oct. 2-4, 2013, Montego Bay, Jamaica.
- [7th Mexican & 1st Panamerican Coral Reef Congress](#): Oct. 8-11, 2013, Yucatan, Mexico.
- [International Marine Protected Areas Congress](#): Oct. 21-27, 2013, Marseille & Corsica, France. The Reef Resilience Program Manager will be attending this conference and looks forward to meeting with our network there!
- [8th International Conference on Coelenterate Biology](#): Dec. 1-5, 2013, Eilat Israel.

In the News

- Wow! A [new study](#) estimates there are 6 million reef fishers in 99 countries and territories worldwide.
- Nice work Tuvalu! First [inventory](#) of its marine life, complete.
- Melting ice sheets, sea level rise, oh my! Sea levels [expected to rise](#) 2.5 m with each Celsius degree of warming.

- Is big always better? A [webinar](#) on large marine protected areas given by Aulani Wilhelm of the Papahānaumokuākea Marine National Monument.
- Rado, a participant in the TOT workshop, [writes about his experience](#) in Tanzania at the Blue Ventures blog.
- Great work! A recent participant in the Zanzibar Training of Trainers, Ulli Kloiber, co-authored a [paper](#) on the Chumbe Island Coral Park.



Reef Resilience
Review

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