

CORAL

CURRENT

CORAL REEF ALLIANCE QUARTERLY MAGAZINE **SPRING 2014**

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Marine Protected Areas

What makes some better than others

p. 2

The Power of Networking

Fiji's extraordinary community conservationist network

p. 3

Spotlight on Octocorals

They don't build the reef—but they provide plenty of underwater eye candy

p. 4-5

News from the Reef

More gains in Honduras; Indonesia and Hawai'i form networks of reef advocates

p. 6-7



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On the Cover: A rainbow of soft corals in
West Papua Province, Indonesia. Photo by
Jeff Yonover



PHOTO BY IAN DRYSDALE

A young staghorn coral (*Acropora cervicornis*) and long-spined sea urchin (*Diadema antillarum*) in protected Tela Bay.

NEW SCIENCE

Creating and strengthening marine protected areas (MPAs) are tactics often used to safeguard reef ecosystems. MPAs primarily protect against overfishing, but there is some controversy about their ecological effectiveness. In some places—like the Kahekili Herbivore Fisheries Management Area in Hawai'i—the abundance of key species like herbivorous parrotfishes is increasing, while in other locations, MPAs seem to be having little effect. A recent study in the journal *Nature* provides insights into what could be causing these different outcomes.

Led by Dr. Graham Edgar from the University of Tasmania in Australia, the researchers conducted an impressive study in which they surveyed 964 sites in 87 MPAs around the world. They recorded a number of ecological characteristics, including fish species richness (how many species there are), fish biomass, and both of these metrics

only for large species (those greater than 25 centimeters long). In addition, they looked at the biomass of sharks, jacks, and groupers, all which tend to be heavily targeted by fisheries. Their research examined how these ecological metrics varied as a function of five MPA characteristics: the MPA's regulations (no-take vs. mixed use), level of enforcement, age, size, and isolation. To describe their methods, they coined a new acronym: NEOLI, which stands for No-take, Enforced, Old (over 10 years), Large (over 100 square kilometers), and Isolated.

While we might expect an MPA with any of the NEOLI features to be more effective than a fished area, surprisingly, that's not what the researchers found. In fact, they report that only those MPAs with at least three NEOLI features had higher biomass and species richness of large fishes, and higher biomass of all fishes combined. These "effective MPAs,"

the authors write, “had twice as many large fish species per transect, five times more large fish biomass, and fourteen times more shark biomass than fished areas.” In contrast, MPAs with only two NEOLI features were indistinguishable from fished sites outside the MPAs.

We’ve always known that the design and placement of MPAs is important, but this study demonstrates that we also need to think about more than one MPA characteristic at a time. The study may also help explain some of the contradictory results about MPA effectiveness. Not all MPAs are created equal, so we should not expect all of them to perform the same way. While this instinctively makes sense, this is the first paper to quantify these differences at a global scale.

It is worth noting that the focus of the research was on the performance of single MPAs rather than MPA networks. As discussed in our 2013 annual report edition of CORAL Current, research has shown that a network of MPAs that are close enough to be connected through movement of adults or larvae can have a larger impact than a single MPA. Part of what makes a network so effective is that it spreads risk out across coral reef populations—the marine equivalent of not keeping all your eggs in one basket—while also spreading the social costs of protection across communities. Therefore, the NEOLI criterion of isolation may not apply when thinking about MPA networks.

CORAL has been working to increase the effectiveness of MPAs at our field sites. For example, in Honduras, a no-take area was recently created at Cordelia Banks as part of the management plan CORAL helped to develop. Earlier this year, Tela Bay was granted federal-level protections; we are continuing to engage with those at all levels of government and the local community to ensure that the area’s unique natural resources are protected. In Fiji, the Kubulau Resource Management Committee is establishing more regular enforcement patrols of the Namena Marine Reserve thanks to CORAL and we are actively supporting the Fiji Locally Managed Marine Area network (see “Networking for Conservation Success”). And, in Indonesia, we are convening stakeholders and scientists to design a framework for a new network of locally managed areas.

One of the most sobering aspects of the Edgar paper is that of the 87 MPAs surveyed, only four had all five NEOLI features, and only an additional five had four of them. If we want MPAs to have a positive impact, we have our work cut out for us!



In Fiji’s Namena Marine Reserve, Clark’s anemonefish (*Amphiprion clarkii*) hang out near an anemone (above), while a group of anthias (*Anthias* sp.) and other schooling fish swim above the reef (below).

Figuring out what makes a locally managed marine area successful is one goal of the Locally Managed Marine Area (LMMA) Network, a consortium of marine conservation practitioners in the Indo-Pacific working to increase the effectiveness of fisheries and marine resource management. Community members, land-owning groups, traditional leaders, local decision makers, NGO staff, and scientists and researchers share information, lessons learned, and strategies at meetings, conferences, and site visits. The LMMA network includes representatives from throughout Polynesia, the Americas, Southeast Asia, Micronesia, and Melanesia, with individual countries establishing their own sub-networks under the umbrella organization.

CORAL is an executive committee member of the Fiji Locally Managed Marine Areas (FLMMA) Network, and is helping to develop FLMMA’s strategic plan. FLMMA is the first country-level network to operate independently of the larger global network, and has the most sites. The state has endorsed FLMMA and is in the process of officially transferring the ownership of coastal marine resources back to the *iqoliqoli* (traditional marine resource area) owners.

FLMMA provides information about community-based adaptive management and training in project design and monitoring, data analysis, fundraising, and communications to conservation groups and individuals. Individual projects within FLMMA aim to improve local fisheries or to conserve coral reef biodiversity (or both) by sharing resources.



“FLMMA is the ideal framework for structuring a network of MPAs and the marine management systems that connect ecosystems and communities.”

Annual Report Update

In our 2013 annual report edition of CORAL Current, we mistakenly left one of our most valued partners off of the donor list: CORAL Board member Bill Jesse and his wife Jessica who completed a generous pledge they had made to us in an earlier year. We are very sorry for this omission and thank them both for their leadership and support.



PHOTO BY JEFF YONOVER

The art of camouflage—a soft coral crab (*Hopliphrys oatesii*) wears a crown of soft corals as a disguise.

OctoCorals

SPOTLIGHT ON

The Octocorallia—soft corals, sea whips, sea fans, and sea pens—represent some of the most obvious eye candy on a reef. Because they lack the rigidity of their hard coral cousins (they are in the same phylogenetic class as the reef-building corals, but have skeletons made of tiny spicules or the protein gorgonin instead of calcium carbonate), they move with the currents almost like choreographed dancers, making them favorites of underwater videographers.

Like their hard coral relatives, octocorals feed by extending their tentacles into the water column; they live in colonies so can then share nutrients with their genetically-identical neighbors. As their name implies, octocorals have eight tentacles on each polyp, instead of the six found on hard coral polyps. These eight tentacles are “pinnate,” with small branches coming off of the main tentacle, giving them their delicate, feather-like look.



PHOTO BY JEFF YONOVER



PHOTO BY CHRISTOPHER CROWLEY

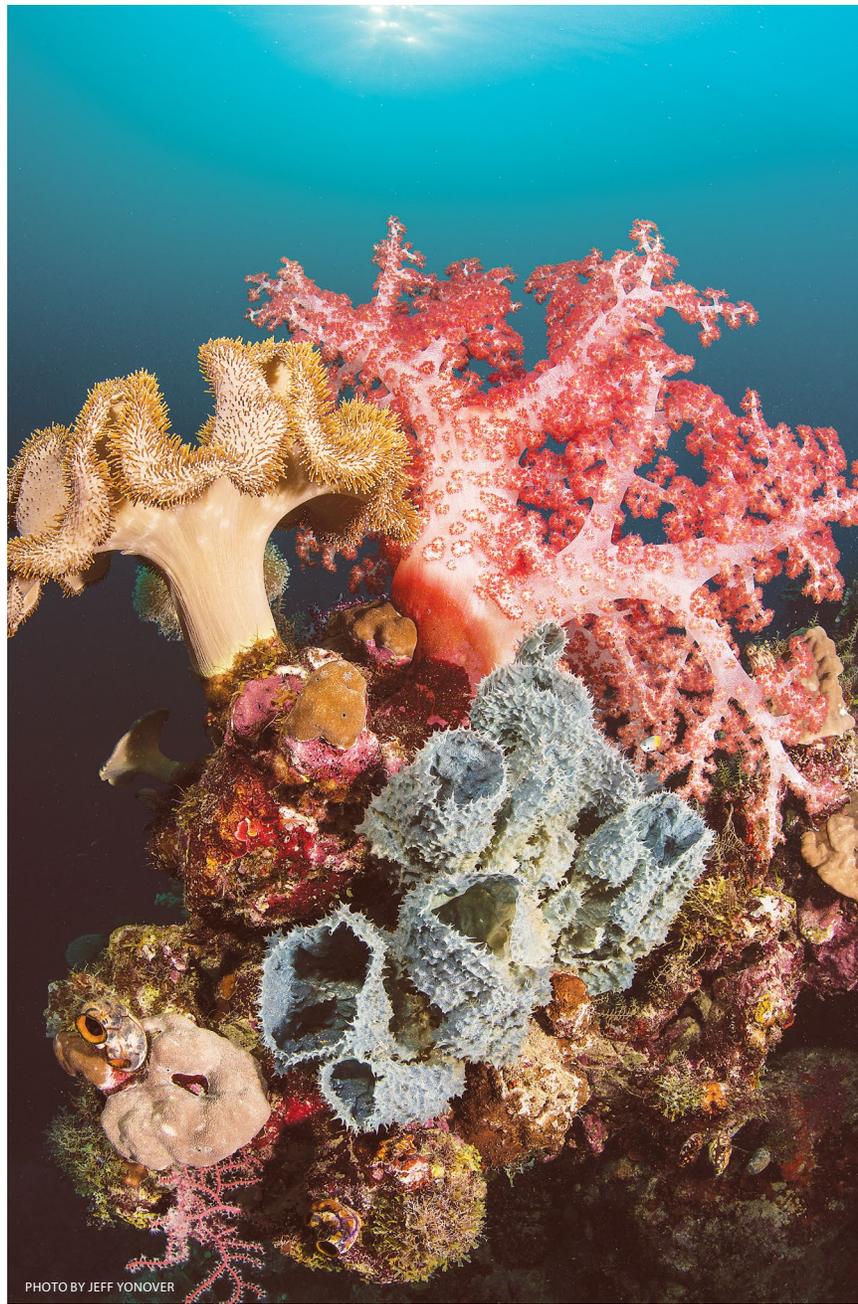
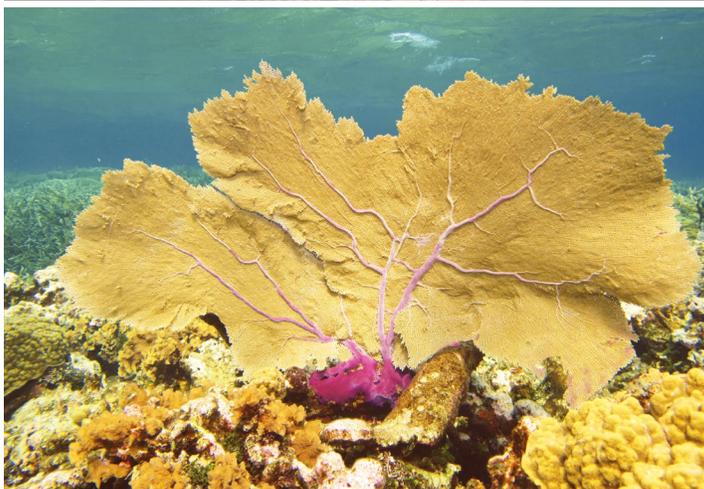


PHOTO BY JEFF YONOVER

Above: Soft corals and sponges cover a reef wall in West Papua Province, Indonesia.

Some soft corals produce terpenoids and other toxic compounds that prevent algae, worms, and barnacles from living on them. These chemicals may also kill other nearby organisms. Scientists are studying these chemicals to determine whether they have beneficial uses for humans.

Left, top to bottom:

Competition for light and space can be fierce on a reef. Soft corals, sea fans, sponges, hard corals, and other animals and plants battle for both; the octocorals seem to have the upper hand on this Indonesian reef.

Octocorals take many shapes and come in many different colors, like this white leather coral and red sea fan in Raja Ampat.

Like hard corals, some octocorals have microscopic algae (zooxanthellae) that live inside the tissue of their polyps. The more brightly colored ones, like this purple sea fan in Roatan, often do not share this mutualistic relationship; their color, instead of coming from the algae, exists within the spicules of the tissue.

News From the Reef

Building Networks of Protected Areas—and People



PHOTO BY IAN DRYSDALE

Elkhorn coral in Tela Bay.

HONDURAS

In January, years of networking and advocacy by CORAL, the Healthy Reefs Initiative, and AMATELA, a Tela-based organization, paid off when the Honduran government designated Tela Bay, which contains some of

the Caribbean's healthiest coral reefs known as Capiro Banks, a federal Site of Wildlife Importance. Close to 800 elkhorn corals (*Acropora palmata*), listed as critically endangered on the IUCN's Red List and threatened under the U.S. Endangered Species Act, live in the Bay, and Capiro Banks has almost four times more live coral cover than most reefs in the region. The reefs also have an uncommonly high density of the long-spined sea urchin, which has seriously declined throughout the Caribbean.

In 2012, after being presented with survey data showing the astounding health and diversity of the Capiro Banks reefs and the impressive number of endangered elkhorn corals, the Honorable David Zacaro, Mayor of Tela, took quick action and declared Tela Bay a municipally protected area, restricting the most destructive practices on the reef. In January of this year, the National Institute of Forest Conservation and Development, Protected Areas and Wildlife (ICF) designated Tela Bay a Site of Wildlife Importance,

recognizing its ecological significance and giving it federal-level protection.

More than 75 percent of the Caribbean's reefs are threatened, and live coral covers only 18 percent of the region's reefs overall. Capiro Banks is thus significant because of its potential to support economically important fish stocks, genetic diversity of corals, and a growing tourism industry. The 800 elkhorn corals growing adjacent to the shoreline protect the mainland—and its gorgeous beaches—from erosion during storms.

The designation came about through extensive collaboration and partnerships, work that was generously supported by Bloomberg Philanthropies and the Oak Foundation. "The Mayor of Tela has shown a tremendous amount of leadership in this effort, supported by CORAL and the other groups on the ground," says Jason Babbie, who works on environment programs at Bloomberg Philanthropies. "I am impressed by how quickly this designation came together for this ecologically important site."

INDONESIA

We continue to build a network of scientists, NGO partners, and community members to help guide planning and management of marine protected areas and reefs in the Buleleng and Karangasem regencies in Bali. This spring, we collected data from those stakeholders and held a workshop of experts from five NGOs, three universities, and three government agencies to identify available science and gaps in research that need to be filled.

One goal is to build an active scientific working group for coral reef management in Buleleng and Karangasem that can be expanded throughout Bali and replicated elsewhere. Says Coral Triangle Regional Manager Naneng Setiasih, "A lot of research ends up in a library corner somewhere, and people do not see how it applies to on-the-ground management. By bringing the scientists to the managers, and making sure research and science is translated into managers' language, we hope to make this information useful and relevant."



A school of green chromis (*Chromis viridis*) swims over a reef of *Acropora* coral in Indonesia.



Maui County mayor Alan Arakawa and Liz Foote chat after snorkeling.

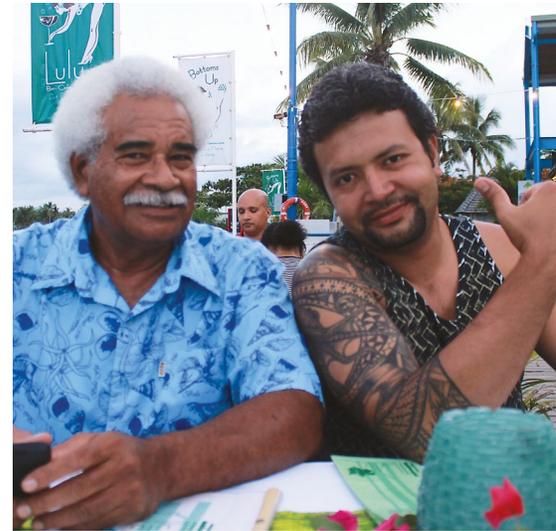
HAWAII

Sometimes building a network of coral reef advocates means getting wet—and on Maui recently, this meant that even the mayor dove in. This spring, field managers Liz Foote and Wesley Crile, along with partners from the West Maui Ridge to Reef Initiative and the Division of Aquatic Resources, are holding a series of “snorkel tours” for local decision makers and other stakeholders. The first one was held at—and in—the Kahekili Herbivore Fisheries Management Area. Before taking to the water, Liz spoke to the group about CORAL’s work with resorts to promote water conservation and support the county’s efforts to expand wastewater reuse infrastructure. A greater network of recycled wastewater pipes will ultimately improve local reef health and conserve potable water supplies.

On the tour, participants saw reef conditions ranging from dead zones to healthy coral with a school of grazing surgeonfishes, a hopeful sign of recovery. Says Liz, “The mayor, who arrived barefoot with his mask and fins in a bucket, and who is an avid waterman, was eagerly engaged and

interested in exploring solutions together. He is supportive of holistic watershed-based conservation strategies in line with the Hawaiian concept of ahupua’a management.” Ahupua’a refers to the traditional Hawaiian practice of managing land and resources from the mountains to the sea.

CORAL’s Hawaii staff is also working with the 15-year old founder of ReefQuest, Dylan Vecchione, to build a “network” of overlapping coral reef images that will be used in ReefQuest’s online educational tool, the “Virtual Reef.” The Virtual Reef uses Microsoft’s Photosynth technology to create a three-dimensional rendering of the reef that can be used to monitor reef health over time (monitoring will take place on a biennial basis). Liz says she will use it in workshops and lesson plans for teachers, as well as when speaking with decision makers. “It’s a great way for people who cannot or do not want to get in the water to see a reef,” she says.



The Fiji Shark Team of Ratu Manoa Rasigitale and Arthur Sokimi take a break from planning for the workshop.

FIJI

A network of nine countries in the Pacific convened for a two-day workshop in February, co-hosted by CORAL, The Pew Charitable Trusts, and the Fijian Government. The workshop was designed to ensure that those responsible for regulating trade of several shark species newly listed under CITES Appendix II have the tools and knowledge they need to do so effectively. It was the culmination of three years of efforts by CORAL and Pew to build support for shark conservation in Fiji. Over 60 people participated, and the group came to several important conclusions. The first was that a non-detriment finding will not be possible for oceanic whitetip sharks and manta ray species, meaning that they will not be permitted to be traded under CITES. The second was that countries in the region need to improve collection and sharing of data about hammerhead sharks. And the third was that Australia and New Zealand will request funding from the CITES Secretariat to support protection of sharks and rays in countries where funding limits protection.

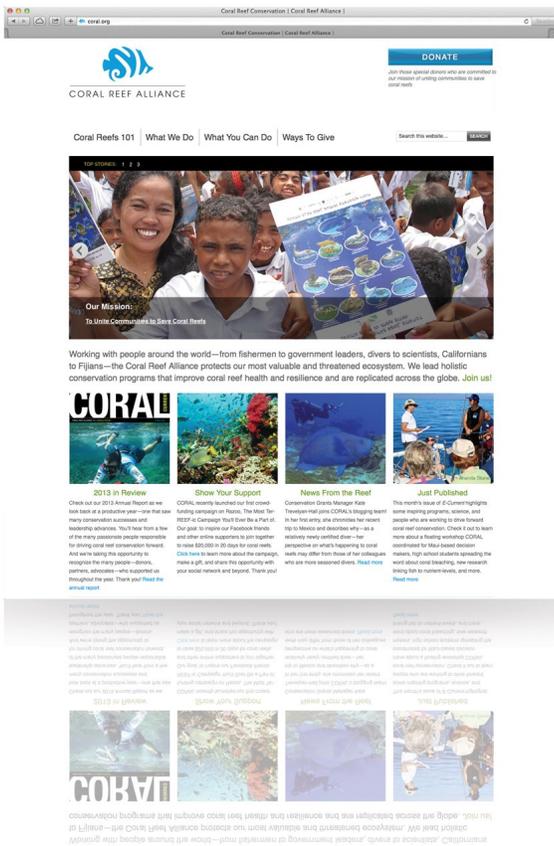
“This workshop was a great success, with excellent participation and collaboration from all the CITES signatories in the region,” says Juliane Diamond, CORAL program manager. “It displayed the power and benefits of connecting and strategizing collectively to address an issue that requires international coordination. It also reflected the excellent partnership that Pew, CORAL, and the Fiji government have developed over the past three years to promote shark conservation in Fiji.”



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CORAL ONLINE

This spring, after more than a year of development, we launched a new and improved website at coral.org. If you haven't checked it out yet, we hope you get a chance to visit soon.

Our website is one of the most important tools we have for connecting with you and other passionate reef stewards. We hope the new architecture and design make it easier for you to learn about coral—and CORAL—and to see the impact of your investments in new sections like our blog.

We have plans to add more sections to the site, including interactive e-cards and a kid's page, and we'd love to know what you want to see. Please email us at communications@coral.org to share your ideas on what we can do to enhance your online experience with CORAL.

coral.org