

CORAL

CURRENT

CORAL REEF ALLIANCE QUARTERLY MAGAZINE **SPRING 2013**

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to save coral reefs.

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Cover photo of stoplight parrotfish (*Sparisoma viride*) by:
Michael Webster

New Science Fish Niche



Photo by Brian Gratwicke, Wikipedia Commons

The orangespine unicornfish (*Naso lituratus*) prefers to eat seaweed.

The next time someone asks you what's so important about biodiversity, tell them about the coral reef fish of Fiji. In a study recently published in *Ecology*, Douglas Rasher of Georgia Tech and his colleagues describe a fascinating case of niche specialization and complementary feeding among multiple kinds of seaweed-eating fish: unicornfish, parrotfish, and rabbitfish. It takes all of them to keep the reef healthy and free of seaweed (macroalgae). Among Rasher's study sites, only protected reefs had a full clean-up crew.

Rasher's previous research in Fiji and Panama showed that chemicals produced by some seaweeds as a defense against pathogens can harm corals by inducing bleaching, or kill them outright. Already, seaweeds are displacing corals on reefs where overfishing has eliminated herbivorous fish.

Rasher and colleagues videorecorded fish consuming brown, red, and green seaweed in paired reserves and in fished areas along the Coral Coast of Viti Levu, Fiji's largest island. Of the 29 species of herbivorous fish on protected reefs, four accounted for 97 percent of the seaweeds eaten. There was a clear division of labor: orange-spine and bluespine unicornfish (*Naso lituratus* and *N. unicornis*) fed on brown seaweed, bullethead parrotfish (*Chlorurus sordidus*) on red seaweed, and forktail rabbitfish (*Siganus argenteus*) on green seaweed. Their diets had little or no overlap.

Fiji has a unique system of reef protection, the Fiji Locally Managed Marine Area Network, in which local villages enforce no-take policies. "Some marine protected areas are well enforced, compliance with a no-take policy is high, and the benefits to reef health and fisheries are evident," says Rasher. Compared with adjacent fished reefs,

protected reefs had up to eleven-fold higher coral cover and 3.3 times more herbivorous fish species. Coral cover increases and seaweed decreases once no-take reserves are established, one reason CORAL is helping to foster marine protected areas around the world, including the Namena Marine Reserve on Vanua Levu, Fiji.

The Fijian fish community is typical of those on Indo-Pacific reefs. Other reefs have other players: in the Caribbean, parrotfish and smaller surgeonfish replace the unicornfish as brown-seaweed specialists. Rabbitfish don't occur in the Caribbean; fortunately, neither does the green seaweed that infests Pacific reefs.

"We have begun to see the importance of herbivore diversity to keeping seaweeds in check on coral reefs," Rasher says. "It has become evident that there is significant niche partitioning among different species of herbivores, and so a diverse group of herbivores is needed to keep seaweeds in check and prevent them from blooming." One implication for reef stewards: "Managers may also give additional attention to certain species of herbivores depending on the state of the reef (healthy or degraded), as some herbivores are more important in preventing algal blooms and some are more important in reversing blooms."

"Overfishing is a problem on coral reefs around the world," says CORAL's Executive Director Michael Webster. "Rasher's results will help us identify solutions that work for both communities and the reefs they depend on. This study makes a strong case for reducing fishing pressure on all species of grazers to promote healthy corals. Otherwise, reefs can lose most of their value to people: fisheries decline, tourism declines, protections from storms are lost, and many kinds of wildlife disappear."

A Tale of Two Reefs

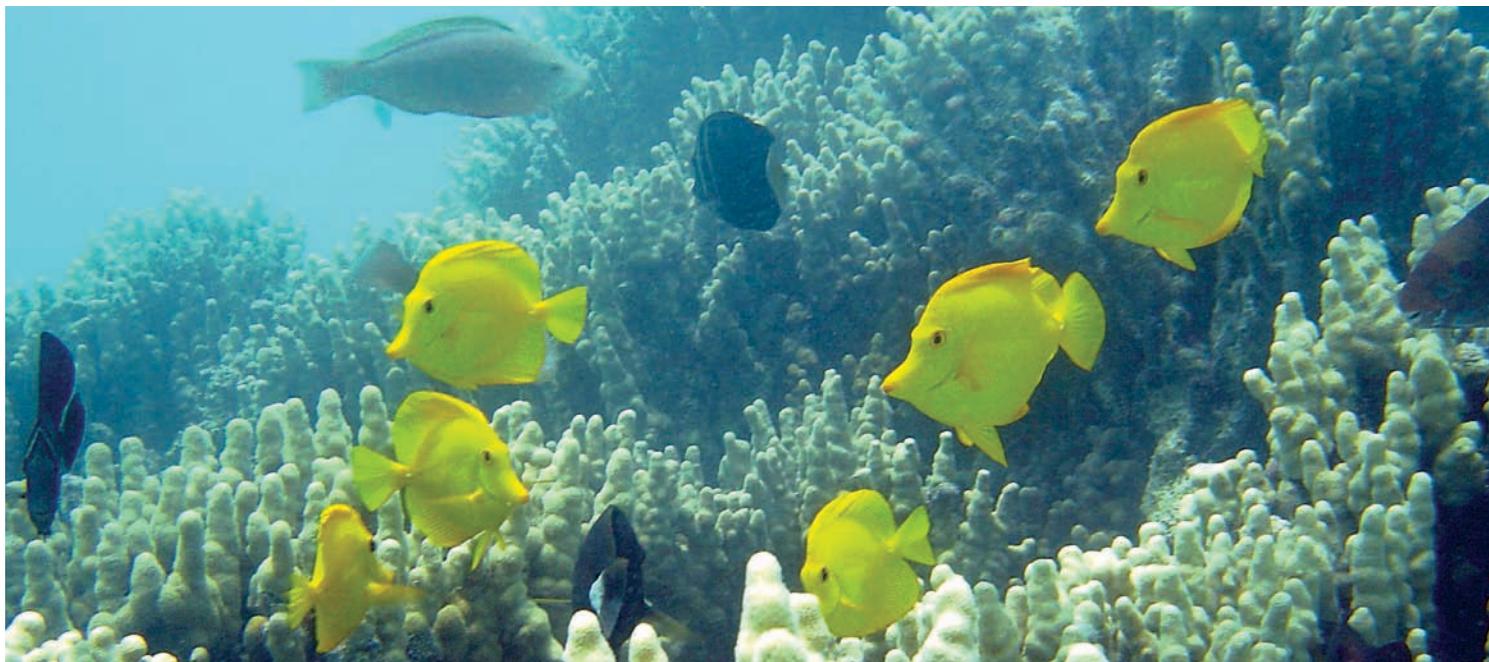


Photo courtesy of NOAA

Yellow tangs (*Zebrasoma flavescens*) visit a reef in Hawai'i. These tangs are just one of the many herbivorous fish that keep algae in check.



I usually do not think of snorkeling as dangerous. But on a recent trip to Maui to assess water quality with Dr. Melissa Garren, a microbiologist at MIT, we found ourselves questioning whether our snorkel trip would be safe. Dr. Garren is an expert on how microscopic organisms like bacteria and viruses affect coral reefs. Scientists are noticing big changes in the kinds and numbers of microbes on reefs, changes that may be contributing to some of the diseases killing corals around the world—and that can be harmful to people as well.

Our snorkel site, Ma'alaea, is polluted by agricultural runoff and municipal wastewater. During our snorkel, we saw that the shallow parts of the reef were covered in algae and urchins, not coral—a sure sign that the ecosystem is out of balance. As we swam farther out, we saw a few large coral heads. But the corals had died in recent decades, and the structure of the reef was eroding. Erosion is a normal process—the calcium carbonate skeletons slowly dissolve in water, coral heads get toppled by storms and urchins, and other animals grind away at this rock while they are feeding and building their own shelters. On a healthy reef, erosion is balanced by coral growth, making the reef a vibrant and complex habitat. On this reef, the work of corals had all but ceased, resulting in the flattening of the reef from a lumpy complex of live corals to “pavement.”

On top of the water quality problems, this reef is heavily fished. On the beach, we saw a row of rods in the water along the shore; spearfishers patrol the reef all day long. In the water, fish larger than my hand were absent, and even small ones were rare.

“Pavement” reefs have little to offer wildlife or people. For the ecosystem, it is all about structure: a complex growing reef provides microhabitats and shelter for thousands of organisms that call a reef home. A pavement reef is good for sea urchins and macroalgae, but not much else.

A few days later, we stood on the Puako coast on Hawai'i Island. Snorkelers were in the water watching wildlife. Surfers were enjoying one of the last winter-time breaks, maintained by corals growing near the water's surface. Rows of houses were sheltered from the worst of the winter waves by corals protecting the coastline. We were told by some community members that these reefs also support significant local fisheries. As we slipped into the water, the contrast to our previous snorkel couldn't have been starker. The water was clear, fish abounded, and the coral covering the bottom was thriving and building the structure of the reef.

It is sometimes hard to raise alarms about coral reefs because many of the detrimental changes take place over decades. Twenty years ago, the now ghostly reef in Ma'alaea had live coral cover similar to the healthy one in Puako. But when corals and fish decline a little bit from year to year, people don't always notice; it just becomes the new normal.

In Puako, residents are well aware of the value of their reef. They recognize that they have a problem with fishing rates that keep getting higher, and they want to explore alternatives that take some pressure off the reef. Puako also has no centralized wastewater treatment facility: people currently use cesspools and septic systems that may be shuttling nutrients and pathogens directly to their spectacular reefs.

Similar to our ongoing program in West Maui, cleaning up Puako's coastal waters will require exploring the costs and benefits of new and better technologies. Perhaps Puako residents can upgrade their cesspools and septic systems, build an artificial wetland, or even connect to a nearby private wastewater treatment facility. As the residents in Puako weigh their next moves, it is heartening to note that the most important first step—citizens committed to saving their reef—is already in place. CORAL hopes to help them take the next step.



Photo by Michael Webster

Spotlight On **Parrotfish**

Queen parrotfish (*Scarus vetula*)

This queen parrotfish was photographed in February off the coast of Bonaire, in the Caribbean Sea. Its colors identify it as a “terminal phase” male that started life as a female. Not only do some parrotfish change sex, most change their color and patterns as they mature, making identification a challenge. Most parrotfish snack on algae, keeping it from overgrowing corals. The name “parrotfish” describes their fused jaws or “beaks”; they use their beaks to scrape at the algae, sometimes grinding up the coral skeleton (with special teeth in their throats) and then excreting it, helping to produce the beautiful white sand on beaches that tourists adore.



Photo by Delek Kaats, Creative Commons

Heavybeak parrotfish (*Chlorurus gibbus*)

The heavybeak parrotfish lives in and around the reefs of the Red Sea, eating algae. All *Chlorurus* species are excavators, and leave identifiable grazing scars on the seafloor as they munch. Their initial phase is this interesting yellowish green color.

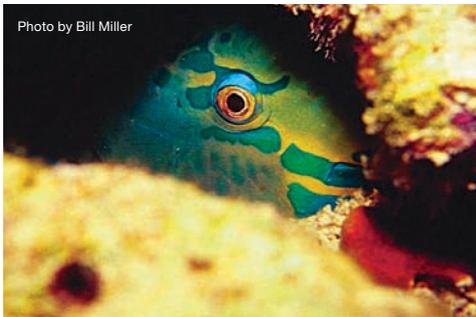


Photo by Bill Miller

Queen parrotfish (*Scarus vetula*)

Some queen parrotfish, like this one resting in a crevice, secrete invisible “sleeping bags” of mucus from their mouths, possibly to mask their scent from predators. Their skin is also covered in a layer of mucus, which may help protect them from UV light.



Photo by Mary Lou Frost

Stoplight parrotfish (*Sparisoma viride*)

Named for the way the terminal males change color—from red to green—the stoplight parrotfish is another algae grazer. Females, like this one, have large black and white scales, with red bellies and fins. Divers often hear parrotfish chomping away on the reef before seeing them.



Photo by Thomas Jundt

Heavybeak parrotfish (*Chlorurus gibbus*)

A Kluzinger’s wrasse swims along with this male heavybeaked parrotfish, a Red Sea endemic. Why? The wrasse may be preying on tiny crustaceans and other critters the parrotfish stirs up from the bottom.

News from the Reef

Sharks and coral reefs make headlines.



Photo by Josef Litt

Manta rays and sharks are now protected off the coast of Raja Ampat, Indonesia.

Sharks Receive Protection at CITES

With an estimated 97 million sharks being harvested each year, serious protection measures can't come soon enough. In March, at the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Conference of the Parties in Bangkok, member nations took action. They agreed to list the oceanic whitetip shark, three species of hammerhead shark (scalloped, smooth, and great), the porbeagle shark, and both species of manta rays in CITES Appendix II, an action that means increased protection but that still allows legal and "sustainable" trade. Countries supporting the listing included Brazil, Colombia, the European Union, Costa Rica, Honduras, Ecuador, Mexico, Comoros, Egypt, the United States, and countries in West Africa, with opposition

coming from Japan, Gambia, India, Grenada, and China. Sharks continue to be overharvested to meet Asian demand for shark fin soup, and through bycatch; fishermen also catch some shark species for their meat, while others kill manta rays for their gill plates for use in Chinese medicine.

Says CORAL's Conservation Programs Director Rick MacPherson, "The immediate outcome of the CITES listing for those species is that these seriously threatened sharks and rays can finally get some breathing room to recover. Of course CITES protections must be enforced or the designations are meaningless. But what these historic steps indicate is that short term financial interests don't always trump long-term conservation vision."



Photo by Josef Litt

Scalloped hammerheads (*Sphyrna lewini*) are one of three species of sharks to receive greater protection under CITES Appendix II.

The Pew Charitable Trust's Angelo Villagomez says CORAL's and many other NGOs' efforts undoubtedly contributed to the vote. "CITES decisions are not made by consensus, but by a vote. Fiji, Mexico, Honduras, and the United States were very supportive of the CITES shark proposals, and CORAL's work on domestic campaigns in CITES member countries surely played a part in that."

Fiji

The CITES decision comes as CORAL continues to push for greater shark protections in Fiji. CORAL has been publishing an ongoing series of editorials in the *Fiji Sun*, urging the government to adopt stronger standards — including a possible temporary moratorium on shark fishing — in its new National Plan of Action for Sharks. In late January, CORAL assisted the Fijian government and the *Fiji Times* in an investigation of the deaths of 27 baby scalloped hammerhead sharks on Nukulu Island.

And with Pew, our partners in this initiative, CORAL taught a "Pacific Shark School" in January in Suva. The school brought together shark conservation leaders from different islands to focus on strategies for conservation and work plans for each place.

"The most valuable part of the shark school was seeing how the training encouraged and inspired participants," says Rick MacPherson. "It takes more than just ideas to succeed in conservation. It takes passionate and skilled professionals to bring home the win. The shark school was an exciting opportunity to unite shark conservationists across the Pacific, who returned to their home campaigns with new tools and energy."

Indonesia

Greater protection for sharks and rays is also on the way in Indonesia, where the Regency Government of Raja Ampat signed the shark and manta ray sanctuary it had designated back in 2010 into law. CORAL and many other NGOs—as well as CORAL's partner, the Misool Eco Resort—had advocated for years for better shark protections in

Indonesia. The law protects sharks and rays in 46,000 square kilometers (18,000 square miles) of ocean off the coast of Raja Ampat.

Sharks are already starting to show signs of recovery in marine protected areas there. Andrew Miners, Managing Director of the Misool Eco Resort, says the sanctuary "sends a clear signal to the national government that the destructive fishing of sharks and rays is extremely detrimental to Indonesia's growing marine tourism industry and the local communities that are supported by it." Manta ray tourism in Indonesia generates more than \$15 million per year vs. \$4.5 million from a manta ray fishery.

CORAL is also working to create a network of locally managed protected marine areas in the Sunda-Banda region of Indonesia, which will benefit sharks and rays.

Honduras Embraces its Reefs

In Honduras, the groundswell of interest in conserving coral reefs continues. CORAL's Field Manager Jenny Myton recently appeared on "Frente a Frente," the most viewed show on Honduran national television, to talk about Cordelia Banks, CORAL's voluntary standards for sustainable marine tourism, the responsible seafood guide, and why reefs are important to every Honduran. Since her appearance on the show, she has been inundated with calls, including from government representatives.

"The most important comments I've received are people telling me, 'I now know why the reefs are so important' or 'I didn't know you shouldn't eat shark and turtle,'" says Jenny. "Now they know they have alternatives and can make better choices."

Jenny also led a scuba and sustainable marine recreation training for Tela's municipal and federal government officials and a local NGO, Prolansate, at the request of the Mayor of Tela, who is interested in having the coral reefs of Capiro Banks declared a Site of Wildlife Importance before the end of the year. To that end, CORAL and the Healthy Reefs Initiative will assess the reef using the Atlantic Gulf Rapid Reef Assessment standard protocols to verify and delineate its extent and condition—and to provide the necessary documentation and basis for designating the reef a Site of Wildlife Importance.



Photo by Ian Drysdale

Jenny Myton, left, leads a Sustainable Marine Recreation training for government officials.



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You're Protecting Reefs Today—But What About Tomorrow? Leave a lasting legacy of healthy coral reefs.



A male Whitley's boxfish (*Ostracion whitleyi*) in Hawai'i.

Although coral reefs urgently need your help today, they will also need your stewardship for countless tomorrows. By including CORAL in your estate plan, you will protect these life-giving ecosystems far into the future—without placing an undue financial burden on you or your family.

Discuss with your financial advisor which giving option makes the most sense for you and your circumstances, but some ideas include:

- Providing for CORAL directly in your will
- Listing CORAL as a partial beneficiary of your 401(k) or other retirement plan, life insurance, or financial accounts
- Establishing a charitable gift annuity or charitable trust with CORAL

When you choose one of these options, you will join a select group of forward-thinking donors who have already named CORAL in their estate plans. If you do make legacy gift arrangements for CORAL, please let us know! We'd love to thank you and list you with our other legacy donors—when you step forward, others are likely to do the same.

Contact Sarah Freiermuth, Development Director, at 415.834.0900 x305 or sfreiermuth@coral.org for more information or to share the great news that you are making plans for coral reefs!

Thank you!