Subsistence and commercial fishing, expanding tourism and coastal development are among the stressors facing ecosystems in Micronesia.

LITTLE ISLANDS, BIG STRIDES

Inspired individuals and Western donors built a modern conservation movement in Micronesia. But the future of reefs there is as tenuous as ever.

By Eli Kintisch

A miracle in a conference room

Kolonia, Federated States of Micronesia — Conservationist Bernd Cordes experienced plenty of physical splendor during a ten-day trip to Micronesia in 2017, his first visit to the region in six years. Iridescent fish darted out from tropical corals. Wondrous green islands rose from the light blue sea. Manta rays zoomed through the waves off a beach covered in wild coconut trees.

But it was inside an overheated conference room on the island of Pohnpei that Cordes witnessed

perhaps the most impressive sight on his trip. There, on the nondescript premises of the Micronesia Conservation Trust, or MCT, staff from a dozen or so environmental groups operating across the region attended a three-day session led by officials at MCT, which provides $1.5 million each year to these and other groups. Cordes wasn't interested, per se, in the contents of the discussions.

After all, these were the kind of optimistic PowerPoint talks, mixed with sessions on financial reporting and compliance, that you might find at a meeting between a donor and its grantees anywhere in the world.

Yet in that banality, for Cordes, lay the triumph. MCT funds projects ranging from a shark sanctuary that covers 2.5 million square miles to a network of marine protected areas, or MPAs. The meeting itself was tangible evidence of a steadily maturing conservation movement in a region where none really existed in 2000. "It was moving," Cordes says. "You had a local donor talking to organizations from Palau all the way to Marshall Islands. That didn't happen eight years ago, let alone twenty years ago." From a few individuals, the movement has grown to encompass local groups, advocates, government officials, and a regional, reliable funding source. Conservation, says Willy Kostka, MCT's executive director, "has become a sustainable movement in Micronesia and there's no stopping."

A handful of small countries in a remote corner of the Pacific Ocean came to embrace modern conservation, adapt it to their own traditions, and make it their own. That's surely the story of local leaders, like Kostka, who were dedicated to the cause long before their compatriots or governments embraced it. But also central to the progress in Micronesia has been Western philanthropy, which fueled the change. When Cordes returned to the region in 2017—accompanied by colleagues

Most households in the Federated States of Micronesia rely on subsistence fishing.

and this writer—it was on behalf of the David and Lucile Packard Foundation. Since 1998, the Foundation has spent more than $100 million in eight countries—Indonesia, the Philippines, Malaysia, the Federated States of Micronesia, Palau, Solomon Islands, Fiji, and Papua New Guinea (PNG). That's one of the largest and most consistent sources of marine conservation funding in the region. Micronesia's conservation movement offers lessons for protecting wild places far beyond its sandy shores.

But conservationists there are certainly facing big challenges of their own. Overfishing, pollution, and coastal development have already harmed their reefs, and each stressor is intensifying. Climate change, meanwhile, is steadily warming and acidifying the waters that are so central to Micronesian societies. Damage to the ecosystem is "going slower than what you would see in other regions because of all the [conservation] efforts," says Kostka. But now that the movement has matured, it's facing daunting challenges. "In the next ten, fifteen years we really need to double, quadruple our efforts in order to change and to stop this decline."

Our trip focused on two countries in Micronesia where the Foundation has supported the most work: Palau and the Federated States of Micronesia, or FSM. The occasion of the journey was bittersweet for local conservationists. The Packard Foundation is now ending its work in the Western Pacific and refocusing its marine conservation efforts on the six nations with the biggest impact on global ocean resources. Yet there was progress to celebrate in both FSM and Palau, which in separate ways have each played a leadership role for conservation in Micronesia. For its part, Palau has made environmental stewardship a selling point for tourism, highlighting the aquatic life off its shores and in its wondrous Jellyfish Lake. The country has designated MPAs over a third of its coastal area and established groundbreaking fishing regulations on a key set of reefs. FSM, meanwhile, has significantly expanded its own MPA network and recently created new protections on offshore fishing in the expansive zone of ocean it controls.

Reviving a traditional conservation ethic

Growing up in Pohnpei in the 1950s, fisher Dakio Paul loved fishing off an island his family owned called Kehpara, also known as Black Coral Island. Teeming with turtles, seabirds, and other marine life, the island had been shown in surveys to host as many as 20,000 grouper, a key tropical species, in annual giant swarms of spawning fish on a nearby reef. Historically, local chiefs banned fishing during such periods so as to protect the populations' numbers. This was the traditional way to manage fishing, and to punish violators. But around 1970, Paul left Pohnpei and moved to Saipan.

FSM had changed rapidly while he was gone. Islands in the region saw increases in population, large influxes of U.S. aid, shifts to a cash economy, and more motorboats, fishing tools, and new technologies. Fishing was becoming a more individual activity, and ties to customs that protected reefs weakened. "Motor engines on speed boats allow a so-so fisherman to become a master fisherman," says Umai Basilius with the Palau Conservation Society. GPS and sonar fish finders have only enhanced the trend. In the 1980s, foreign fishing vessels, mostly from much larger Asian countries, harvested Micronesian reef fish, increasing the pressure on marine ecosystems.

In 1995, after two decades living abroad, Paul returned to Pohnpei and was dismayed to find a very different Kehpara. Overfishing had decimated the grouper population, and boats had damaged nearby reefs. Complaining to the government was no use—in his absence the government itself had become part of the problem, having provided boats and fishing equipment to citizens to promote the industry. His neighbors and family "had become accustomed to fishing wherever and whenever they wanted," wrote the authors of *Nature's Fortune* in 2013.

So Paul took matters into his own hands. He personally declared Kehpara closed to fishing, and began patrolling its waters himself with a 15-horsepower engine, a bottle of bourbon, a flashlight, and a shotgun. He fired on at least one occasion: a warning shot when a fisher didn't heed his call to leave. But most did, and the fishing respite allowed the reef to recover. "After nearly three years of constant vigilance, local fishermen began to notice a difference—fish population and sizes increased not only in the protected area but also in adjacent areas, a spill-over effect," noted the Conservation Society of Pohnpei. "Astonished fishermen [were] converted by their own observations." In 1999, the Pohnpei legislature declared Black Coral Island and eight other marine sites off-limits to fishing and dispatched periodic patrols.

Paul patrolled its waters with a bottle of bourbon, a flashlight, and a shotgun. He fired on at least one occasion.

Individuals like Dakio Paul, who passed away in 2008, catalyzed the birth of modern conservation in Micronesia. FSM and Palau only gained independence in 1986 and 1994, respectively, and like many developing nations, it's proven difficult for them to protect natural resources that are in high demand from global fisheries and tourism industries. The nascent Palauan government's priorities "were really building infrastructure and capacity for education [and] health," says Ann Singeo, who heads a Palauan conservation and development group called the Ebiil Society. During that period, fish from the nation's reefs were being promoted as a lucrative export to Asia.

In 1994, an ambitious Palauan government official named Noah Idechong persuaded chiefs in the newly independent country to proclaim a traditional bul, or closure, on spawning areas, and then led the effort to pass Palau's first environmental law. It regulated certain fishing and banned export of some of the country's most threatened species. His goal at the time, he says, was to "reinvigorate the traditional conservation ethic." Efforts by Micronesians like Idechong helped put this small island nation on the global environmental map.

Among the international environmental groups paying attention to Micronesia during the 1990s was The Nature Conservancy, or TNC, which was in the process of establishing branch offices in FSM and, later, Palau. By the late nineties, state and national authorities in Palau had established ten modestly sized protected areas along Palau's coastlines and one large protected area in the Rock Islands. TNC worked with Idechong to create the Palau Conservation Society (PCS). "Noah and the other founders had a vision," says Charlene Mersai, who worked with Idechong early on at PCS. "It took TNC and Packard to make it happen."

In 1996, the Packard Foundation made a modest grant to help start PCS. That was the same year that Hewlett-Packard co-founder David Packard passed away. On his death, several billion dollars in stock was transferred to the Foundation, a transfer that coincided with a skyrocketing boom in tech-related stock prices. Micronesia's incredible biological diversity, combined with nascent conservation efforts there, suggested fertile ground for investment to the Foundation's board, which included several members with a passion for ocean conservation. So in 1998, with its enlarged endowment, the Foundation decided to invest more heavily in the

Western Pacific, a region that had thus far received little attention from Western philanthropists. The initial goal was to spend $5 million per year in seven Western Pacific countries, from Indonesia in the west to FSM in the east. No end date was set for that investment. "We were trying to help the movement get off the ground," says Cordes.

The Foundation had initially assumed that major, Western science-driven groups—primarily TNC and the World Wildlife Fund—would be natural grant recipients for the work. But in a job interview in 1999 before he was hired to manage the newly created Western Pacific program, Cordes was asked by the Foundation's conservation director how he would spend the program's $5 million budget that year. "You know what," Cordes recalls saying, "I probably won't spend it all. It's too much money right away."

Cordes, like others in the community, felt that grassroots groups—even if they were untested—were critical to starting a conservation movement. So he sought a balance in supporting new local organizations and established international ones. He feared that granting large sums in countries that had yet to develop viable local conservation groups could put too much emphasis on the funders' agendas.

In developing its program in the region, the Foundation targeted what scientists had recently dubbed "the bulls eye"—the region spanning parts of Southeast Asia and Melanesia with the highest level of marine biodiversity on the planet. Some conservationists felt the Foundation should prioritize research to identify sites of high biodiversity and to guide their protection. But at a meeting in Bali in 2000, Foundation staff hosted an informal discussion with ocean scientists to ask what kind of marine science they should fund to inform conservation. Cordes recalls, to his surprise, the researchers' response: "Don't invest much in science right now." The state of scientific knowledge regarding marine habitats in the Pacific was pretty low, they said. "But we know enough to know that things are getting worse," he recalls them saying. "And it's better for you to put the majority of the money into action now."

So the Foundation did. Cordes still funded scientific efforts to support conservation in the region, but it was a lower priority than activities that directly protected habitats, promoted conservation through media, and trained conservation professionals. Between 1998 and 2017, the Foundation gave roughly $16 million to more than twenty organizations in Palau and FSM.

The conventional method of protecting marine areas was not going to work in Micronesia.

The seeds of a movement

The relatively plentiful funding, combined with the small size of the conservation community, allowed the Packard Foundation to apply what Cordes called a "fail-safe" approach with local grantees. "We were comfortable with some trial and error as long as, over time, it was clear that the cumulative effect was building momentum," he later wrote. Packard "allowed us to develop our own ideas," says Kostka, who ran the Conservation Society of Pohnpei from 1998 to 2006. "To implement the programs, make mistakes, grow from those mistakes."

Deciding whether to stick with troubled grantees could be challenging. A 2008 audit of the Palau International Coral Reef Center (PICRC), a research institute and aquarium, revealed that more than $180,000 had been used inappropriately. Cordes and Foundation colleague Pam Seeto agonized over whether to cut ties with PICRC. In the end, they decided to help PICRC conduct an internal overhaul, which included new staff and procedures, and the organization gradually righted the ship. "I was really impressed when we were down, that they were able to come in and help us," says current PICRC CEO Yim Golbuu, who at the time was a researcher at PICRC.

While the Foundation supported the development of organizations, it also provided funding to strengthen the field skills of conservation practitioners, many of whom were just beginning their careers. The Western Pacific program devoted roughly $2.7 million to strengthen individual skills and know-how in Palau and FSM between 1998 and 2016, including leadership training and nonprofit management. Seeto, an easygoing marine scientist who served as the Foundation's regional advisor, contributed heavily to the Foundation's skills-building investments and spent "enormous amounts of time" with grantees, she recalls, reviewing reports and proposals, providing strategic advice, and offering technical guidance.

It's unusual for an American foundation to have full-time staff working so far from the United States, but Micronesian partners were mostly thankful for the help. "Packard doesn't come in and say we want to do this," says Idechong of his longtime funding partner. "I know what help I need. So that has been sort of the relationship with me and Packard." The training, too, won plaudits. "No matter what experience I had in the past, as coordinator, as an anthropologist, as a marine researcher—I needed that administration experience," says Mersai, who began her career in conservation in

1998 at the Palau Conservation Society. Now a seasoned pro, she serves as Palau's national conservation coordinator in the finance ministry.

Grantees were mostly eager for the capacity-building, but there wasn't always funding available for sustained, multi-year training for each individual or organization. A more efficient approach was needed. In 2000, a TNC staff member named Audrey Newman spent a year-long sabbatical with a program at the Foundation called Organizational Effectiveness. She helped develop what would become, with support from both organizations, the Micronesians in Island Conservation network. The network brought together conservation professionals from across the region for regular retreats, trainings, and shared projects. By 2010, the network had linked 34 local organizations and government agencies in the region and helped its members launch several initiatives, including the Chuuk Conservation Society in FSM in 2005. "Those friendships, those relationships continue to help us in our respective work," says Mersai, who recently connected an FSM-based official with Palauan colleagues for meetings related to climate change adaptation.

Palau protects its shores

Despite its diminutive size—its total land area is smaller than the city of Albuquerque, N.M.—Palau maintains one of the most extensive systems of MPAs in the world, comprising roughly 40% of its nearshore marine territory. That network formed relatively quickly in the early 2000s. In previous decades, FSM and Palau had established a handful of defined protected areas, but most were generally regarded as "paper parks"—delineated on maps but not consistently respected by fishers or

regulated by enforcement agencies on the water.

From the beginning of the Foundation's involvement in Micronesia, TNC was a close partner. The nonprofit was a natural collaborator, with offices, existing conservation programs, and local partner organizations. Over the two decades that the Foundation supported marine conservation in the region, TNC received more than a dozen grants for work in Micronesia. But the partnership required TNC to undergo an ideological shift. Like other Western conservation organizations, the group used science to guide conservation and protected area decisions, and relied on governments to enforce those decisions, usually over large areas of territory in the United States and Europe. "It was the Western kind of top-down, national-parks-lock-it-up philosophy," says Newman, who left TNC in 2010 after working there for 25 years.

Cordes had seen the pros and cons of this approach to MPAs in the Philippines, Malaysia, and western Indonesia. In those countries, national governments had the legal authority to declare "no-take" parks over large swaths of land and nearshore territory, with mixed results. But he doubted that centralized, government-led MPA declarations were feasible in countries with decentralized and traditional governance systems. "That conventional approach to MPAs was not going to work very well in Solomon Islands, PNG, Fiji, Palau, and Micronesia," Cordes recalls thinking. So he aimed to fund both large, science-driven no-take reserves and smaller, community-identified multi-use areas.

As they found ways to protect coastal habitats like reefs and mangroves, the Foundation, TNC, and other partners integrated customary claims to resources and, equally important, the local use of them. "In the Pacific Islands, management occurs at the micro-level," says Mersai. The term for multi-use MPAs that the Foundation embraced

was Locally Managed Marine Area, or LMMA. This approach recognizes how people use and manage their coastal resources, especially fisheries, rather than trying to lock them up. It recognizes that allowing such direct use was at least as important as biodiversity values in motivating change.

TNC's staff in Micronesia chose to "rethink and adjust its role," says Newman. For one thing, the new strategy put the nonprofit in the position of "coaching and enabling" local partners, she says, instead of conducting conservation activities itself. In this case, the initial local partners were the Palau Conservation Society, a nonprofit based in Koror, and the Conservation Society of Pohnpei, based in Kolonia.[1]

For its part, the Packard Foundation made it clear to the conservation communities in Palau and FSM that it wasn't advocating for organizations and local municipalities to eschew scientific input in selecting areas to protect. But Packard was prioritizing protection of places that had local significance to existing communities and their fishers. At first, says Umaii Basilius of the Palau Conservation Society, a majority of Palau's MPAs were set up by the individual states using a multi-use, LMMA-like approach, but what little national government funding was available to the states went for road and office maintenance, not enforcement of conservation rules.

TNC worked with several partners including Noah Idechong, who by then had become a lawmaker in Palau's National Congress, to strengthen and finance the protected area system through legislation. In 2003 Palau's lawmakers passed the Protected Area Network Act, or PAN Act, enabling states to create new or to strengthen existing protected areas as part of a network recognized by the national government and informed by both science and traditional knowledge.

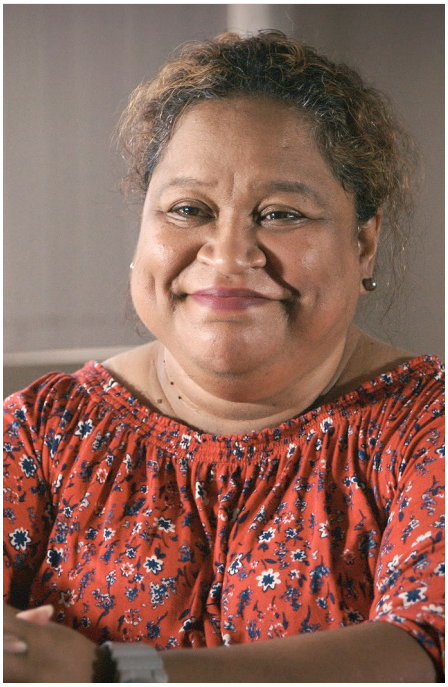
The law also created a "Green Fee" of $15 per visiting tourist, dedicating the money solely to funding those PAN sites and state departments of conservation.

Momentum in the conservation community was growing, and Palau's conservation-minded president, Tommy Remengesau Jr., had a vision beyond his borders. In 2006, he led a coalition of states in the region to agree to what they dubbed the "Micronesia Challenge." Each state pledged to "effectively conserve" at least 30 percent of nearshore marine environments and 20 percent of their total land area by 2020. "Time for each Pacific leader to make conservation a priority," Remengesau told his fellow leaders. FSM, the Marshall Islands, Guam, and the Commonwealth of the Northern Marianas all signed on.

By 2007, wrote Cordes, "the momentum had been built and the marine conservation movement was making headlines." The Foundation and its partners had originally hoped, in 2000, to establish 25 to 35 well-managed MPAs across the Western Pacific. But by 2007, in Palau, FSM, and the rest of the region there were more than 300 new, mostly small, MPAs—a number well "beyond anyone's expectations," he wrote.

The following year, Palau created the PAN Fund, which set up the rules for using the Green Fee money to fund the PAN sites. By 2017, the fee was raising $2 million per year, the maximum allowed under the rules, with most going back to states within Palau for conservation projects. Essential to the PAN's success, says Umai Basilius, is that the legislation required protected areas to submit management plans and be accountable for the funds they received. Palau now boasts 34 sites in 15 of its 16 states, comprising some 645 square miles.

That amounts to 41 percent of Palau's nearshore marine area, though PICRC's Yim Golbuu says that if one only counts areas completely closed to fishing, the total is just 14 percent.



Marine protected areas require effective management to succeed, says Umai Basilius.

Each protected area has its own rules and objectives, as agreed upon by local communities. For example, the main goals of the Helen Reef protected area in Hatohobei state, a low-lying atoll in Palau's far southwest, are preparing for rising seas and protecting against foreign poachers, some of whom have used cyanide and dynamite to harvest fish.

In the central state of Ngardmau, by contrast, conservation zones protect against overuse by tourists, who visit the reefs and an inland waterfall. The PAN Fund underpins the entire system, says Umiich Sengebau,[2] Palau's minister for Natural Resources, Environment and Tourism, since it will provide "sustainable finance even after major donors like Packard [leave.]"

[1] TNC chose Bill Raynor, a Californian who made Pohnpei his home 35 years ago, to head the TNC-Micronesia program. Subsequently Raynor had a hand in most of the programs the Packard Foundation funded in the region. Raynor passed away in 2015, but his conservation legacy is evident everywhere in Micronesia.

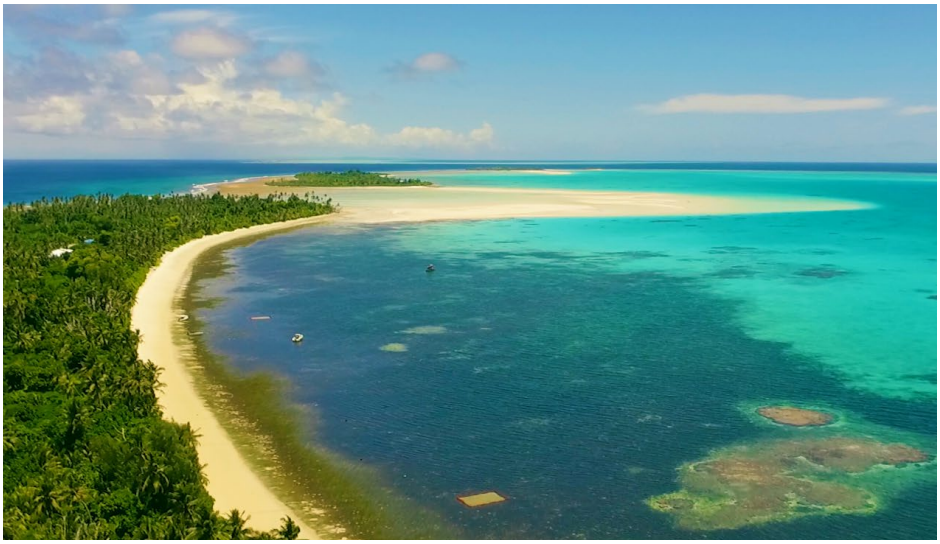
[2] Sengebau is former deputy director of TNC's Micronesia program.

Palau's more than 100,000 annual tourists may represent a crucial source of conservation funding, but they also pose a genuine environmental threat.[3] New hotels mean more pollution and dredging to expand coastlines, and higher demand for fish to feed the hotels' customers. "Asian tourists," for example, "like to go in big groups. When they go onto the reef they like to catch reef fish for themselves to eat," says Yvonne Sadovy, a marine biologist at the University of Hong Kong. Marine biologist Pat Colin of the Coral Reef Research Foundation in Koror says that, when compared to more densely populated Asian countries like the Philippines or Indonesia, Palau's reefs experience "reduced pressure or exploitation." But he fears that could change. "There are Palauans who want a million tourists a year here and those million tourists, if they come, they're going to want to eat a fish." In addition, a proposed road outside Koror could have tremendous impacts on coastal development.

MPAs don't directly challenge the tourism industry. Unlike strict limits on hotel and road development, MPAs can be used to promote tourism by protecting the marine habitats tourists come to see via snorkeling and diving, while MPA rules can simultaneously limit the impact on these areas. In 2004, the Foundation supported a well-funded initiative to measure and mitigate the impacts of a major new road on Palau's main island. But other than efforts related to that road and the MPAs, wrote Cordes, the Foundation and its partners "didn't focus enough during the 2000s on the growth of the tourism industry, and on hard measures to set some sensible limits on it."

Rules for fish hunters

Palau's northernmost states, the sparsely populated Ngarchelong and Kayangel, include wide swaths of ocean dotted with sandy atolls. The channels between them teem with fish. But the fish are smaller than they were forty years ago, and there are far fewer of them.



Kayangel is the northernmost state in Palau and consists of three small atolls.

In the 1980s, commercial fishing increased in Palau, driven by outsiders. Asian boats, in particular, came looking for reef fish, and the populations of big, colorful species like grouper, parrotfish, and emperors plummeted. That spurred Idechong, before he joined Palau's legislature, to promote national legislation to limit outside fishing. At the same time, he encouraged the chiefs of Ngarchelong and Kayangel to call a bul on sport fishing. By 2000, both states had set up conservation areas to protect their reefs, including a temporary closure of Ebiil channel, a crucial spawning area for fish on Ngarchelong. Three years later, after advocacy by the newly created Ebiil Society, Ngarchelong permanently closed the channel.

Unfortunately, overfishing continued in the vicinity that wasn't closed off. In 2008, representatives from the northern reefs approached Idechong. Past work with PCS and surveys conducted with the Ebiil Society confirmed what the fishers had seen on their boats: an ailing ecosystem. "We have created protected areas," they told Idechong, "but the fishery is still declining."

Soon after, TNC, with Foundation support, invited Australian fish scientist Jeremy Prince to the island. In 2012, Prince spent a week with men from Ngarchelong and Kayangel fishing all around the archipelago. By examining the gonads of the fish they collected, they understood why the fishery was declining: 60 percent of the fish had been caught before they were mature enough to reproduce. "We are eating tomorrow's fish," wrote Steven Victor, who now heads the TNC Micronesia program. "Like farmers who eat their own seeds, we are eating away our future."

Five years later, I'm in a fishing boat hurtling north along Palau's west coast to see what the fishers created in response: one of the most sophisticated fisheries management systems in Micronesia. Green cliffs, palm trees, and flying fish are among the scenery on the hour-long boat ride, which takes us from Koror to low-slung Ngarchelong state to pick up some fishers, and then on to even more low-slung Kayangel. As the fishermen and community leaders chat, their mouths are red with the juice of chewed betel nut, a mild stimulant that's ubiquitous across the region.

[3] For its part, FSM receives far fewer tourists, so it can't look to establish a lucrative Green Fee to fund its MPA network. At the same time, it doesn't have to be as concerned about increased consumption tied to tourism.

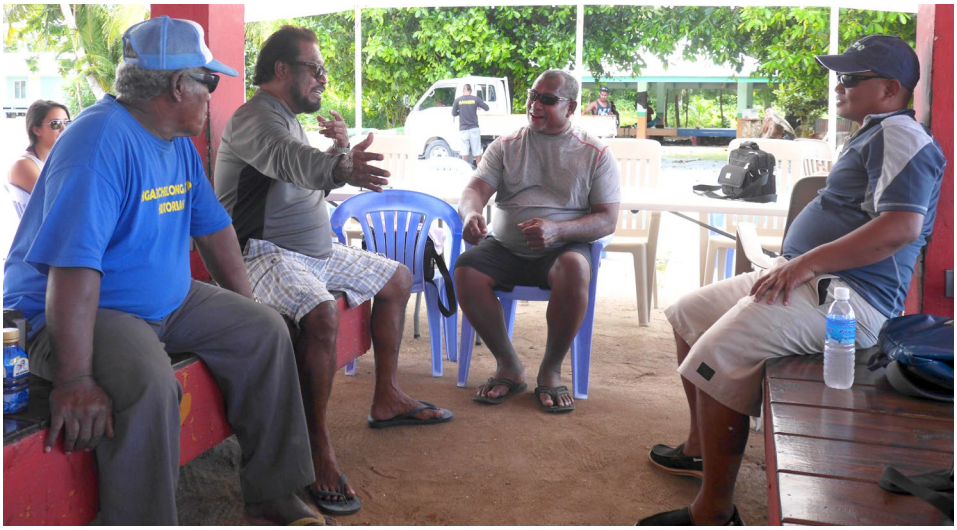
Kayangel is a remote island far from the capital of a country that is itself a distant destination. We walk along a dock into a small green building: the conservation rangers' office and one of the few dozen structures on the tiny island. There, some in black t-shirts labeled "Kayangel State Conservation Officer," the rangers explain the rules the state finalized in 2012, the first-ever such fishing regulations in Palau. The system established a fish permitting system and set a three-year fishing moratorium on five types of fish, giant clams, and crustaceans. Twelve other types of fish can be harvested, but only if they meet minimum size requirements that rangers confirm when they inspect coolers in fishing boats. The fishers, working with TNC scientists, set those minimum sizes so as to ensure that most fish caught have already reproduced at least once.

When he was growing up on the island in the 1990s, recalls ranger Blodak Inawo-Quichocho, two police officers served to keep the peace, not to protect the reefs. But now the PAN Fund provides roughly $130,000 annually to support the conservation rangers' salaries, equipment, and fuel. "Thank God for the PAN, as we're able to monitor our own waters," says Quichocho. Palauans and tourists are the main visitors the rangers encounter, but in recent years the team has tussled with poachers from Vietnam and China.

After visiting with the rangers, we sit with fishers to discuss the cooperative they created linking fishers in Kayangel with those on Ngarchelong. One fisher, Billy Kemesong, says he didn't think that fish size mattered until he saw the scientific data. Now he "believes in the project," he says, and has joined a new cooperative TNC helped create that hopes to improve economic opportunities for fishers in both states.

Harper Skang, a Ngarchelong fisher and tribal elder, was struck when he first met Prince. "Hurry back," he told the Australian, "before the fish are all gone." But now he's optimistic about the ecosystem's trajectory. After one of Ngarchelong's key fish spawning sites was protected for two years, he says, "the fish became very big and [there are] lots of them." Data on fish recently surveyed by PICRC at 190 sites in the area suggest some populations may be rebounding, says Prince, who's returning soon to Palau to gather more data.

and Pam Seeto left in 2012. Claussen had previously worked in Palau to help with conservation financing and organizational management efforts, including efforts, including assisting PICRC to overhaul its strategy and operations in 2008. His goal at the time was to ensure alignment among different groups' capacity and their projects. "Too many groups were being generalists," says Green, who has served as regional advisor to the Foundation since 2012. That engendered some competition and some redundancies.



Conservationists Noah Idechong and Steven Victor meet with local authorities, community leaders, and fishers to discuss the cooperative.

The cutting edge of conservation in Micronesia

The Northern Reefs project is a complex and sometimes difficult affair, involving national and state agencies in Palau, a research center, and three nonprofit groups. But that's just the kind of cooperation needed to link traditional conservation practices, like the bul, with science-based fisheries management techniques. The work reflects an approach that John Claussen, the current Foundation program manager, and Stuart Green promoted after they took over the Foundation's Western Pacific program when Bernd Cordes

But on this project the community has served some complementary roles. PICRC provides science, the Palau Conservation Society works with the states and agencies, TNC serves as a project manager, and two state agencies contribute training and support. Foundation staff hope the Northern Reefs project can set a national example of inter-state cooperation, since despite the country's small size, states, and nonprofit groups too often fail to work together on conservation efforts.

The project also highlights TNC's international connections. In the case of the Northern Reefs, those ties allowed it to link the fishers with Prince, whose method of promoting healthy fish populations include the important step of regulating the

size of fish that fishers are allowed to catch. (It's an approach long used to regulate industrial and recreational fisheries that has only recently been tried in small island countries.) In partnership with Prince, the community has set limits so that fishers only keep fish whose size indicates that they have probably reproduced sufficiently to replace themselves.

The fish-measuring approach, used in other parts of Palau, also showed promise in Kayangel. So TNC has since shared it with fisheries managers across the world, including in Kenya, Indonesia, and California, as an affordable way to assess and manage fisheries. Since it engages fishers directly, says Prince, it is "worth its weight in gold as a communication tool."

On a more fundamental level, the promising early results from Kayangel and Ngarchelong illustrate an important truth emerging in Micronesia: on their own, MPAs are insufficient for conservation and reviving fisheries. "In the past we overemphasized the MPAs without broader consideration of resource use requirements," says Claussen. "The challenge is building these protected areas alongside clear resource management approaches and enforceable regulations for these."

Prince says the data shows that effective enforcement of such restricted areas can protect species within their borders, if the areas are large enough to protect entire fish populations. Fishers, including Harper Skang, have commented that an MPA sometimes will provide "spillover" to maintain nearby fisheries that are under harvesting pressure. But Prince says his experience and recent studies suggest that protected areas "have been oversold for their use in managing fisheries outside their boundaries." Fish, it turns out, "are more homebodies than we thought." That has two implications for management.

First, it underscores how important effectively enforced protected areas are. Second, it means that regulating fishing outside an MPA's boundaries is essential. Unfettered fishing just outside a protected area will decimate populations of fish that migrate in and out unless there are some sensible rules to make the fishing of spillover sustainable.

Micronesian fish are shrinking

A friendly teenage girl with a gold tooth helps shoppers at her store select from the day's catch in a plastic cooler by the curb, weighing their choices in plastic grocery bags on this sweltering afternoon. The fish on offer here in Kolonia's seaside market include coral trout (*sawi* in Pohnpeian) and parrotfish (*mowmwmei*). None are longer than a foot and most have yet to reach reproductive age.

On their own protected marine areas are insufficient for conservation and reviving fisheries.

"Ten, fifteen years ago Pohnpei fishermen would be embarrassed to bring some of the fish that you are seeing now in the market," says Willy Kostka. When he was a boy, his father owned a fish market in Kolonia, and he says today's fish are "sort of class C or D fish that nobody would buy in the old days." The fact that clams and other crustaceans are also available underscores a shift in Pohnpeian values.

"You're not a good fisherman if you're selling things that can't run away from you. That culture has to change back to what it was before in order to help us manage our fisheries better," says Kostka.

Demand is far outstripping supply, with tragic results. On average, citizens of the state of Pohnpei in FSM eat more than 205 pounds of fish annually, among the highest amount in Micronesia.[4] To provide that catch, fishers now prefer to hunt at night, underwater, using a flashlight and a spear gun. Fishers can harvest schools of sleeping fish, taking dozens at a time.

Pohnpei's fishers harvest roughly 4,000 tons of fish from the island's reefs each year. But those reefs only produce about 1,100 tons of fish annually. As fishers have depleted these resources since 1970, the average bumphead parrotfish, a common reef species, has shrunk in size by 80 percent and decreased in abundance by 71 percent. Pohnpei has a "thriving coral reef fishery that is poorly documented, infrequently monitored, marginally managed, and is experiencing unsustainable levels of fishing," wrote fisheries scientist Kevin Rhodes in a recent paper.[5]

Fishers are well aware of the problem, says Kostka. "They understand that what they're doing is not good for the ecosystem or, ultimately, for them in the future. But they have to put food on the table," he says. Without tourism or other sustainable sources of income, it's been hard for Pohnpei and the other states of FSM—Chuuk, Kosrae, and Yap—to stem the overfishing crisis. That despite the fact that roughly a fifth of the country's lush coastal zones are in MPAs, most of which were created and maintained with help from the Conservation Society of Pohnpei.

[4] Rhodes, Kevin et al. "Marine Ecological Footprint Indicates Unsustainability of the Pohnpei (Micronesia) Coral Reef Fishery." Environmental Conservation 42, no. 2 (2015): 182–90. doi:10.1017/S037689291400023X.

[5] Ibid.

But these MPAs are not yet effectively protecting wildlife. A substantial barrier to enforcing FSM's protected areas is the country's decentralized and disparate government agencies, most of which are underfunded. Despite the prevalence of nighttime fishing, for example, key wildlife authorities that monitor MPAs generally don't work after 5:00 p.m. or on weekends. Though local, rather than state, officials, are authorized to report violations, only state officials have the authority to issue fines, and legal consequences are rare. Within FSM's four states, considerable power is held at the hyper-local level; Pohnpei, for example, has eleven municipalities. For the system to work as a unit, each layer of jurisdiction and enforcement must coordinate, which rarely happens.

Fishers on Pohnpei and the other islands of FSM have seen losses in their fisheries but don't yet feel a real crisis, says the Packard Foundation's Stuart Green. In fishers' minds, he says, "things are kind of 'ok.' It's hard to motivate people under those conditions to act." A particularly severe coral bleaching event in 1998 in Palau helped kick-start action in that country, but FSM hasn't had a similar watershed event.

Another factor is that while FSM has an increasingly conservation-minded and active civil society—represented, among others, by Conservation Society of Pohnpei (CSP) and equivalent organizations in FSM's other three states—not enough of that conservation ethic and expertise has filtered into the government. Might more pressure from donors have driven FSM to accelerate political support for conservation? Around 2009, CSP requested that the Packard Foundation support, in addition to its MPA work, the hiring of a staff member whose job it would be to focus on state conservation policy. The Foundation agreed, but in the end, CSP was unable to find someone suitable for the job. Soon after, CSP's executive director left and the idea was dropped. Now Cordes wonders whether he should have "provided more encouragement" to pursue the idea and become much more involved in policy reform.

Jurisdictions and agencies coordinate poorly, hampering enforcement of environmental rules.

Even as the movement has blossomed, hiring and retaining talented individuals has been an ongoing challenge for the conservation community across Micronesia. Lisa Andon, MCT's deputy executive director, says that as groups in the region have matured, their staffs have become "more sustainable," partly by developing their own skills to train new employees. But the pressures to leave FSM are considerable. Under a longstanding legal agreement, it's easy for FSM's citizens to work, go to school, or serve in the military in the United States. As a result, many young and talented individuals who might have ended up helping to build local conservation efforts have found work stateside instead.

Trust in the future

Despite the conservation movement's struggles to gain momentum in FSM, the country has still shone as a conservation hub for the region. That's in part because of MCT, which is based in Kolonia. In 2002, TNC worked with local conservation leaders and Kostka, who ran CSP at the time, to create MCT. The goal was to secure sustainable financing for conservation in the region and provide a local source of leadership on the issue. The Packard Foundation supported the idea and became an early partner in its development.

Initially, the focus was on creating a local fund that could distribute support from outside donors to organizations working in FSM's four island-states. In 2004, with a $30,000 grant from the Packard Foundation and support from TNC, MCT began with two employees. "We had $30,000, and we weren't even sure we were going to be able to pay [salaries]," says Andon, who was then, as now, the deputy executive director. But the Foundation provided a bit more funding so MCT could start making grants and do its own fundraising. The organization's

The Micronesia Conservation Trust, run by Willy Kostka, funds projects across the region.

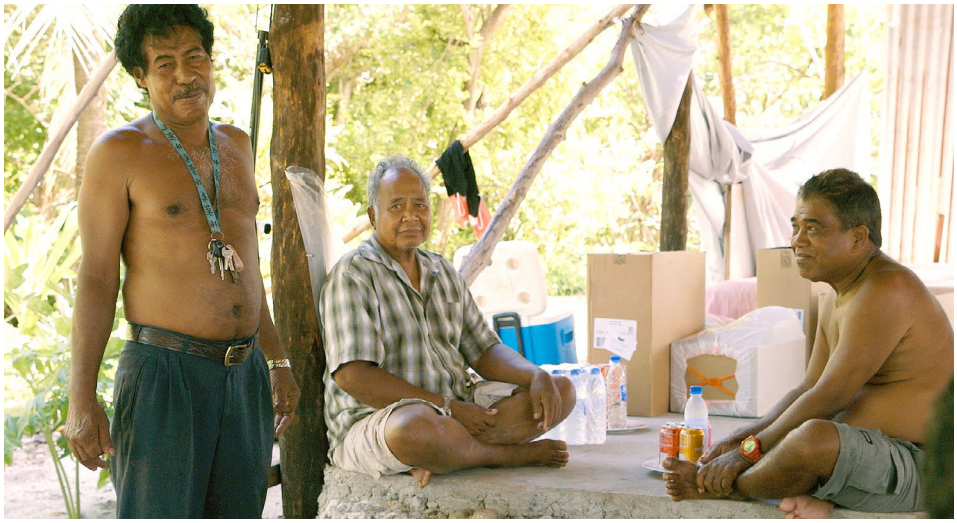
work soon encompassed all of FSM and, subsequently, the rest of the region. After the Micronesia Challenge was announced in 2005, MCT was eventually chosen to manage it and to disburse funds for conservation areas "of biological significance." With money it raises from other sources, MCT also supports activities that are not necessarily biodiversity driven, such as improved management of a fishery whose primary values are economic or as a source of local food.

Over the last decade, international organizations, nonprofits, and individual countries have donated a total of $18.5 million to the Micronesia Challenge's endowment fund, and the money is influencing conservation in the region in myriad ways. The first Challenge disbursement was made in January of this year. It took the form of a payment of investment returns to Palau's Protected Area Network Fund from their portion of the fund.[6] (The arrangement has created an incentive for FSM and the Marshall Islands to develop their own protected areas networks, akin to the PAN.) Under current rules, their individual MPAs cannot receive Challenge support until they institutionalize a true network.

Meanwhile, the Challenge has influenced other funders—and other regions. Jason Cole of the Margaret A. Cargill Philanthropies (MACP) says the Challenge was the "main reason" his philanthropy began funding work in Micronesia in 2011. And the Challenge has inspired similar efforts among developing countries in other regions facing threats to their marine habitats. Five countries formed the Western Indian Ocean Coastal Challenge in 2007; six Southeast Asian countries agreed in 2009 to protect habitats under the Coral Triangle Initiative;[7] and nine countries signed on to the Caribbean Challenge Initiative in 2013.[8] "None of us knew this would take off like this and have the impact it's had," says Trina Leberer, TNC's Pacific division director.

And while President Remengesau had initially been spurred to action by a prior conservation pledge by Fiji's government,[9] he had good advice from a variety of local conservationists, including Tiare Holm, who had recently become the head of the Palau Conservation Society and helped prepare a speech the President made to introduce the Challenge.

As for MCT, the organization has matured in the last five years, receiving accreditation by the United Nations' climate Adaptation Fund in 2015 and the Green Climate Fund in 2017. It has also bolstered its financial and grant-making procedures with new staff and software. Several years ago, MCT also became a formal grant-making partner with the World Bank's Global Environment Facility.



Fisheries in Kitti, FSM are imperiled by lax enforcement of regulations, say local officials.

The existence and success of the Challenge owes much to the Packard Foundation's investment in the region since 1998. The Micronesians in Island Conservation network, for example, "was critical for laying the groundwork" in regional capitals to turn the idea into a reality, says Leberer.

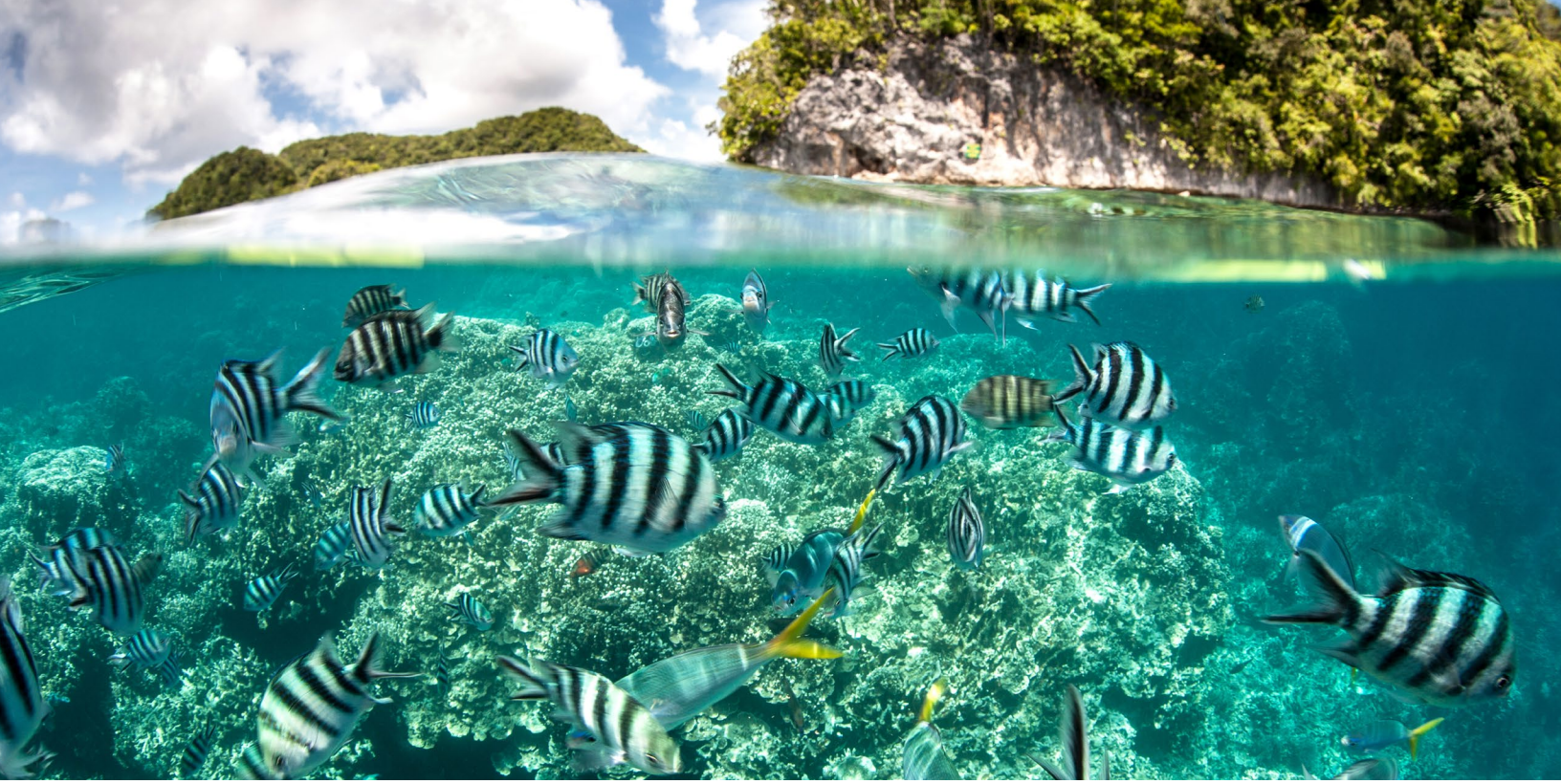
MCT's track record and its support from Packard has earned the organization respect from other donors. MACP, for example, began funding MCT in 2011 when Kostka told the philanthropy that there were worthy projects that needed support. "They're funding the best projects that come through," says Cole.

[6] MCT, "Press Release: MCT Makes the First Funds Transfer from Palau's MC Endowment Fund to the Palau PAN Fund," http://www.ourmicronesia.org/images/Press_release_MC_Disbursement_to_Palau.pdf, accessed April 6, 2017.

[7] Coral Triangle Initiative, "History of CTI-CFF," http://www.coraltriangleinitiative.org/about, accessed April 6, 2017.

[8] Caribbean Challenge Initiative, Home Page, http://caribbeanchallengeinitiative.org/, accessed April 6, 2017.

[9] Secretariat of the Pacific Regional Environment Programme, "Celebrating the Tenth Anniversary of the Micronesia Challenge," http://www.sprep.org/biodiversity-ecosystems-management/celebrating-the-tenth-anniversary-of-the-micronesia-challenge, accessed April 6, 2017.



That clout extends to the political scene in Pohnpei, where the organization is among the most influential nonprofit groups in FSM. Recently MCT helped promote a successful effort by the FSM's Congress to expand its no-commercial-fishing zone from 12 to 24 miles from every island's coastline. This expanded range represents 10 percent of FSM's entire exclusive economic zone, or EEZ. Now MCT and its partners are working with FSM's government to utilize for conservation a portion of the fees it collects from commercial fishers operating in the country's 1.3 million square miles of ocean territory. Those monies could then be used to fund conservation areas throughout FSM, like the Green Fee does with tourist fees in Palau.

Paper parks are not enough

A day trip by boat around Pohnpei's verdant coastline provides a glimpse of change coming to FSM, albeit slowly. We are headed to Kitti, a jurisdiction on the southwest portion of the island where a tenth of the municipality's population, some 700 individuals, are fishers.According to the municipality, many regularly violate the rules of MPAs inside and outside the municipality's boundaries. But today Kitti is taking a step toward protecting its resources by announcing a new conservation initiative.

We arrive at windswept Peniou Island, at the southern tip of Pohnpei, and sit on plastic chairs under a spacious if unruly assemblage of tarps, sheet metal, and wood. The dull ringing of stone striking stone announces the ceremony's beginning: four men pound the root of the kava plant to make sakau, a traditional mud-colored drink that confers mild narcotic effects. Kitti's mayor, Luhken Moanlap, is the jocular emcee for the proceedings, which are mostly in Pohnpeian, with occasional English explanations to the guests from the Packard Foundation. As is customary, several of the dignitaries who offer remarks wear no shirt with their trousers. While the men mark the occasion by taking turns drinking sakau out of a coconut shell, women sit in the back on blankets, in the shade.

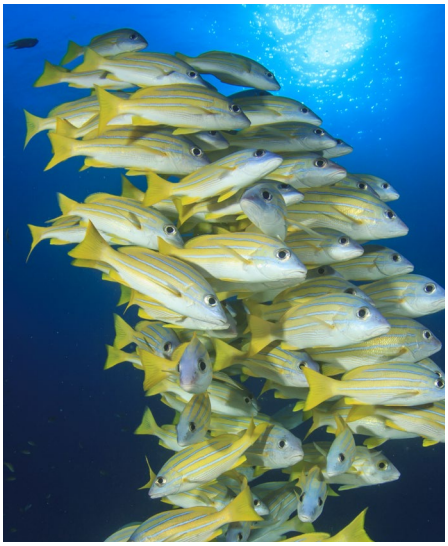
The tribe's chief, Soukisoahnloang Nahnmwarki, smiles quietly in a hammock during the ceremony, and signs a 24-page document along with the other officials. The plan acknowledges that "harvesting pressure" and "lax adherence to and enforcement of natural resource regulations" are to blame for the decline of Kitti's fisheries. For starters, the Kitti government plans to add a natural resources coordinator to its 27-person municipal staff. The plan also announces a new "Kitti Municipal Government Locally Managed Marine Area," though no new rules are proposed yet. The document, which is not a legal agreement, is essentially a plan to make a plan so that resources "should be protected, managed and preserved" for future generations. "Manage today for tomorrow," the mayor exhorts the group as the ceremony concludes.

As Micronesians accelerate their conservation efforts, the threats to their reefs are growing. On one hand, reefs in Palau and FSM appear to be less degraded, and more resilient, than those in much more densely populated countries like Indonesia or the Philippines.

But ocean acidification and warming water temperatures affect every reef, regardless of local management. Marine biologist Peter Houk of the University of Guam says that climate change seems to be increasing the frequency of disturbances on reefs, reducing the time they have to recover. "We have gone from a ten-year disturbance cycle to a five-year disturbance cycle," he says. The window for recovery is narrowing.

While Palau and FSM have primarily dedicated their attention to the reefs that ring their shores, the countries have both in recent years recognized the importance of the offshore fisheries that surround their islands further out at sea. In 2009, Palau created a shark sanctuary in its waters. Six years later, it proposed requiring observers aboard all long-line tuna boats in its EEZ. Then it announced plans to close 80 percent of its EEZ to all fishing, with the remaining 20 percent open to its own fishers. That ocean reserve, which has been enacted into law and is planned to be in full force by 2021, will be the sixth-biggest fully protected marine area in the world. FSM's president, meanwhile, signed a law in 2018 that would close 10 percent of its EEZ to commercial fishing. That's an important step for a country that in 2014 derived more than a third of its revenue from access to its fisheries. "There's hope, but for the fisheries to recover it's not going to happen in two years," says PICRC's Adele Isechal. "It took twenty years for us to get to where we are."

On our way back to Kolonia we pass Black Coral Island, where two decades ago Dakio Paul patrolled with his bourbon, flashlight, and shotgun to save the reef. Since an impressive recovery in the early 2000s, scientists say, fishers have often ignored seasonal rules meant to protect the massive spawning groups of fish. As a result, acknowledges the Kitti plan, "populations of spawning groupers have dramatically declined."



Coastal ecosystems face threats from outside and inside their borders.

A legacy in Micronesia

In 2016, the Packard Foundation decided to refocus its marine conservation programs on the six nations that have the biggest impact on the world's oceans: Indonesia, China, Japan, the United States, Mexico, and Chile. "We have been tremendously impressed with what our partners in Micronesia have achieved over the past 20 years," says the program's manager, John Claussen. But the major countries that are the subject of the new focus are "where we see the greatest potential to influence the health of the global ocean." So Foundation funding and programs in Micronesia, including in Palau and FSM, will end by 2020.

The departure of the region's most important marine conservation donor will surely leave a void, says Jason Cole of MACP, as Packard Foundation support has been "something that people have been able to depend on for a long time." In 2014 Stuart Green of the Packard Foundation called Wayne Andrew, who heads the Hatohobei Organization for People and Environment, a conservation nonprofit that protects Helen Reef and Tobi island in southern Palau. After a small transition grant, Green told him, the Foundation would be ending financial support for his organization. Green says it was "one of the hardest conversations [he's] had" in his job as the Foundation's advisor in the region. Andrew calls it "devastating." The Foundation has funded the 163-square-mile Helen Reef MPA since 2000, when it was created.

Lolita Gibbons-Decherong, Palau Conservation Society.

"This movement definitely has strong legs that won't go away when Packard leaves," says Leberer.

Groups are going to have to fill that gap," says Cole. But he says Packard has not only provided local organizations with invaluable experience working with major Western donors, but has also conferred international "credibility" upon smaller groups working in remote developing countries with low profiles. "They've been able to fundraise with the fact that they have been successful with Packard," he adds. Indeed, Andrew says during the last three years his group has been "energized each day" to secure new sources of funding, and recent grants include funding from the U.S. Agency for International Development for a climate adaptation project, and from MCT for marine conservation.

Wayne Andrew, Hatohobei Organization for People and Environment.

A dry erase board at MCT lists current incoming grants from MACP, the European Union, several U.S. agencies, and other funders. "This movement definitely has strong legs that won't go away when Packard leaves," says TNC's Trina Leberer.

That enduring impact may be most evident in the people that received the Foundation's support early in their careers. Now they're the stalwarts of Micronesian conservation. In a recent evaluation of the Packard Foundation's Western Pacific program, Cordes reflected on the Packard's training and support for Willy Kostka, for example. Given the success of CSP and MCT, Cordes wrote, funding Kostka was one of the best "early investments of funding the Program would ever make."

More than a dozen other recipients of Packard funding convene on a warm April evening for a picnic to mark the Foundation's departure. We are outside PICRC's office, and the building's curved white roof is bathed in red light from a postcard-worthy sunset. Almost a decade before, Packard staff had agonized over whether to continue funding the beleaguered organization, deciding ultimately to help it recover. Among those who stand to publicly thank the Foundation are Steven Victor, who directs TNC's Micronesia program, and Yim Golbuu, now a PhD scientist and PICRC's CEO. At the time of PICRC's troubles, both had been researchers there. The Packard Foundation's continued support helped them grow their careers in conservation.

"I enjoyed the ride, I learned a lot and I've made a career out of it," says Wayne Andrew when it's his turn to speak. "On behalf of the people of Tobi Island," he adds, "thank you very much." Later I ask him if efforts to halt foreign fishing off Helen Reef had restored the ecosystem. In 2000, he says, island elders and scientists had surveyed coastal sites for trochus, a sea snail prized by foreign fishers for its hard, conical shell. The elders "would walk for hours and only find one shell," he says. Since then, however, the community has set rules limiting their harvest, locals have been trained as conservation officers, and national patrol boats respond when they're needed to ward off intruders. At the coastal sites now, he says, "you can fill a big sack of rice full of trochus. And that goes to show that when we give time to nature, it will heal and replenish itself." □

When we give time to nature, it will heal and replenish itself.

The conservation community is stronger than ever as the Packard Foundation exits Palau.

Eli Kintisch is a writer and producer in Washington, D.C. He traveled to Palau and FSM in April and May of 2017 to write this piece. He was supported in writing this article through a grant by the David and Lucile Packard Foundation to California Environmental Associates.