

A Collaboration to Conserve our Coral Reefs

Highlights of a 10-year Partnership between The Nature Conservancy, the NOAA Coral Reef Conservation Program, and the U.S. Coral Reef Jurisdictions

September 2019



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The Nature Conservancy, NOAA Coral Reef Conservation Program, and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Efforts focus on supporting implementation of innovative planning and science to reduce reef threats and improve resilience. Successful strategies are shared and amplified through training and connecting coral reef managers globally.

HAWAII:

498 people engaged in training workshops and learning exchanges

205 mi² of coral reefs directly impacted

20 sites* provided with technical support

FLORIDA:

328 people engaged in training workshops and learning exchanges

204 mi² of coral reefs directly impacted

28 sites* provided with technical support

PUERTO RICO:

646 people engaged in training workshops and learning exchanges

371 mi² of coral reefs directly impacted

21 sites* provided with technical support

CNMI:

60 people engaged in training workshops and learning exchanges

70 mi² of coral reefs directly impacted

5 sites* provided with technical support

REEF RESILIENCE NETWORK:

4,100+ managers engaged through in-person and online training courses

986 stakeholders engaged through participant-led trainings

52 on-the-ground implementation projects funded

GUAM:

50 people engaged in training workshops and learning exchanges

87 mi² of coral reefs directly impacted

2 sites* provided with technical support

U.S. VIRGIN ISLANDS:

190 people engaged in training workshops and learning exchanges

60 mi² of coral reefs directly impacted

4 sites* provided with technical support

AMERICAN SAMOA:

61 people engaged in training workshops and learning exchanges

50 mi² of coral reefs directly impacted

1 site* provided with technical support

*Sites include community sites and/or protected areas.



American Samoa

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for American Samoa's reefs.

Where We Work

American Samoa is an archipelago in the central South Pacific Ocean comprised of five volcanic islands (Tutuila, Ta'u, Ofu, Olosega, Aunu'u, Nu'utele) and two coral atolls (Rose Atoll and Swains Island). The coral reefs and coasts of American Samoa are home to over 2,700 species of Indo-Pacific corals, invertebrates and fish. However, the reefs face negative impacts from local sources of pollution and sedimentation. Additionally, severe natural disturbances, including a major outbreak of crown-of-thorns starfish, several bleaching events and hurricanes, have impacted reef resources over the past several years.

Our Approach

Coral reef conservation in American Samoa is advanced by providing technical assistance and building the capacity of local government and community partners to support management efforts that increase the resilience of local reef systems. Partnership efforts focus on developing and delivering trainings

to boost the effectiveness of marine protected areas (MPAs), monitoring efforts, strategic planning and advisory group development, as well as foster shared learning through regional learning exchanges.

Our Accomplishments

Our work has directly benefited approximately 50 square miles of coral reef habitat. Partnership efforts have provided technical support to 14 agencies and organizations, resulting in the training of 61 individuals on reef resilience principles.

- **Developed strategic communications plans** with eight agencies for climate change preparation projects to increase the effectiveness of work planned with local communities.
- **Completed and formally adopted a Conservation Action Plan (CAP)** with the village of Fanga'alu to assess the main threats to coral reef resources and develop strategies to reduce impacts from those threats.



- **Trained 19 people from American Samoa in data analysis** to improve the analytical expertise within resource monitoring and management programs in American Samoa (See Success Story on page 5).
- **Trained 22 practitioners to create and manage effective projects.** Participants learned how to manage project teams to execute coral conservation work.
- **Facilitated an Organizational Management Workshop for the American Samoa Coral Reef Advisory Group (CRAG).** Members and Staff assessed how CRAG functions and developed a plan for improving how CRAG supports coral reef management in American Samoa.
- **Hosted a collaborative workshop on reef resilience principles**—the first of its kind in American and Western Samoa—for 32 individuals representing 13 groups from the islands. The workshop sparked a productive discussion on how a marine protected area (MPA) network could be created in the Samoan archipelago and developed recommendations to more efficiently implement the Two Samoas Initiative, a partnership to promote conservation of the shared ecosystems of the Samoan archipelago.
- **Coordinated and implemented learning exchanges to share successes and lessons learned** between partners, foster better understanding of community-led marine stewardship and catalyze on-the-ground action.
- **Managers and environmental practitioners from Micronesia visited American Samoa to share their experience implementing the Micronesia Challenge.** Participants were exposed to the concept of MPAs as mixed-use areas, community-based management approaches and the value of incorporating traditional knowledge in the management process. Participants from American Samoa visited Palau to learn about the efforts that Palauan National and State Governments and coastal communities are implementing to help support coral reef conservation and capacity building for fisheries management.





Success Story: Using Data Analysis to Protect Reefs

Data analysis is a valuable skill that enables resource managers to make informed decisions and better identify conservation priorities. Through the Partnership, resource managers in American Samoa were provided formal data analysis training and technical support. They have used their new data analysis skills to increase the effectiveness of monitoring efforts throughout the territory by re-designing the country's coral reef monitoring program, including the development of a new water quality monitoring component, to assess watershed health from ridge to reef.

Participants were then able to use the new, more effective monitoring program design to successfully apply for watershed development funding and conduct water quality and biological monitoring in 28 watersheds around Tutuila, the main and largest island of American Samoa. In one watershed, data collected showed land-based pollution was causing poor water quality in streams, which in-turn was impacting reef health. As a result of this information, the community of Vatia implemented rain garden projects to reduce land-based pollution.

Resource managers are now working towards developing a suite of village-based report cards to share water quality data in an accessible format to help community members make informed decisions.

Alice Lawrence from American Samoa's Department of Marine and Wildlife Resources (DMWR) hopes many more workshops will be held. "I've never seen so many Samoans rave about stats. The excitement and consistent attendance were unprecedented", she shared. Motusaga Vaeoso, also from the DMWR, echoed Lawrence's praise and said the analytical skills she learned through the workshop have made her work much easier and have enabled her to extract new insights from her data.

By enhancing local resource managers' ability to collect and analyze data, Partnership efforts are supporting American Samoa to implement novel management ideas and communicate monitoring findings in new ways, enabling local communities to take direct action to conserve their coral reefs.



Florida

The Nature Conservancy, NOAA Coral Reef Conservation Program, and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for Florida's reefs.

Where We Work

Florida's bank-barrier reef system supports 1,400 species of marine plants and animals, including more than 40 species of coral and 500 species of fish. This chain of reefs stretches from the remote Dry Tortugas up through the areas offshore of Monroe, Miami-Dade, Broward, Palm Beach and Martin counties. These reefs are as much a part of South Florida's cultural landscape as they are a foundation of the biological and ecological seascape. From the earliest Floridians, people have derived sustenance from the sea. Florida's coral reefs generate \$6.3 billion in local sales and provide 71,000 jobs annually.

Our Approach

Building on what has worked in other regions, Florida is working to develop and promote resilience-based management strategies to enable its coral reefs to adapt to global climate change and withstand local threats. Projects engage a diverse set of partners to improve reef health and enhance the sustainability of reef-dependent commercial and recreational enterprises.

Our Accomplishments

Our work has directly benefitted 204 square miles of coral reef habitat. Partnership efforts have supported the comprehensive collection of coral reef monitoring data across the Florida Reef Tract and the training of 328 people in coral reef survey methods, resulting in 2,510 sites surveyed. This is the longest-standing cross-jurisdictional approach to informing reef management in the state.

- **Developed the "Florida Reef Tract Coral Bleaching Response Plan"** to provide a strategic approach for monitoring bleaching and other events, as well as protocols for early warning, impact assessment, communications and management actions.
 - » **Coordinated 13 survey teams of scientific divers to conduct up to 250 coral reef surveys annually to monitor and assess bleaching.** In 2014, survey results showed severe bleaching from Dry Tortugas through Biscayne National Park, making it the most significant coral bleaching event since the Florida Reef Resilience



Program began in 2005. In 2016, surveys showed substantially lower levels of bleaching; however, high disease prevalence and disease mortality was recorded at numerous sites, **leading to adaptation of monitoring protocols for better documentation of Stony Coral Tissue Loss Disease.**

- » **Post Hurricane Irma, survey methods were utilized to determine impacts on coral reefs,** resulting in the prioritization of reefs for restoration efforts (See Success Story on page 8).
- » **Designed and supported the successful transfer of Florida Reef Resilience Program (FRRP) Disturbance Response Monitoring (DRM) effort to the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWRI).** Annual DRM surveys, previously coordinated by The Nature Conservancy since 2005, have now been incorporated into the state's monitoring program to increase sustainability of the DRM effort and more firmly establish linkages between the monitoring information and reef management actions.

- Provided coordination and technical support to develop, inform and implement two public planning processes to improve the management of Florida's coral reefs.
 - » **Collected, and provided decision makers and stakeholders access to reef tract-wide data** to increase effective, comprehensive, science-based on-the-ground management efforts.
 - » **Collaborated with state partners to support the analysis of resilience across the Florida reef tract.** Recommendations from the summary report were shared with local partners.



Success Story: Collaborative Monitoring for Effective Reef Management

Through Florida's Reef Resilience Program (FRRP), the Partnership has supported coordination between scientists from 13 partner agencies for 14 years. Since 2005, more than 2,000 FRRP Disturbance Response Monitoring (DRM) surveys have been completed to document bleaching impacts and inform disturbance response efforts.

Although it was originally designed to document the effects of coral bleaching, the FRRP's DRM survey method is adaptable to other coral reef disturbances. In 2015, 250 surveys documented a disease outbreak along the Florida Reef Tract. Data analysis showed this was the largest disease outbreak—in terms of range and impacted coral colonies—documented through 14 years of surveys. Strategic communication materials were created and outreach to local media was conducted to raise awareness of the disease outbreak and its impact on coral reefs. As a result, articles were published locally as well as in the Washington Post. In 2017, DRM methods were modified and utilized to pinpoint the location of the coral disease front advancing along the Florida Reef Tract.

In 2017, Hurricane Irma crossed over the Florida Keys with sustained winds of 130-miles per hour and gusts as high as 160-miles per hour. Massive damage was inflicted on Florida's

coral reefs and island infrastructure. Capitalizing on longstanding FRRP partnerships between public agency reef managers, academic institutions and NGO's, DRM survey methods were adapted yet again to determine hurricane impacts on coral reefs from Miami to Key West. These assessments resulted in the prioritization of reefs for restoration efforts and the immediate deployment of restoration efforts at 14 percent of the survey sites ranked as top priorities for stabilization.

“Adapting the Disturbance Response Monitoring protocol has enabled the collection of data on hurricane-related reef conditions and the ongoing coral disease outbreak; this vital data is directly informing management actions.”

—Joanna Walczak, Southeast Regional Administrator for the Florida Coastal Office of the Florida Department of Environmental Protection



Hawai‘i

The Nature Conservancy, NOAA Coral Reef Conservation Program, and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here’s a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for Hawai‘i’s reefs.

Where We Work

Hawai‘i’s reefs provide conservation, cultural and economic benefits to coastal communities, generating more than \$1 million a day from fishing, tourism and other ocean-dependent businesses. The islands of Maui Nui, Moloka‘i, Lana‘i, Molokini and Kaho‘olawe have some of the largest and healthiest coral reefs in the state. But these natural treasures are threatened by land-based sediments and pollutants, overfishing, climate change and invasive species, causing a 90 percent decline in some of Hawai‘i’s most valuable nearshore fisheries and reducing live coral cover on some reefs by up to 40 percent. In 2015, Hawai‘i experienced unusually high ocean temperatures and the first mass coral bleaching event in its history, with some reefs experiencing up to 90 percent coral mortality. Impacts from rising sea surface temperatures, sea levels and acidification are predicted to intensify as the climate continues to change. The pace and scale of our conservation efforts must increase to meet Hawai‘i’s goal of effectively managing 30 percent of nearshore waters by 2030.

Our Approach

Since 2001, The Nature Conservancy’s Hawai‘i marine program has been building local community capacity to protect and restore coastal and marine resources and ensure conservation results endure. We support community partners through strategic conservation planning, science-based monitoring and research, direct management of local threats, strategic communications and outreach, and community engagement for improved local management. Our collective conservation work is grounded in Hawai‘i’s rich traditional knowledge and history of sustainable resource management. This accessible and participatory approach has resulted in increased community capacity and public support for improved marine resource protection.

Our Accomplishments

Our work has directly benefited more than 200 square miles of coral reef habitat at 20 sites. Partnership efforts have provided



“The Maui Nui Makai Network has played the role of kaka’o, they are our ‘helping hands’ and essential partners, empowering and enabling us to accomplish so much more than we could alone.” – Claudia Kalaola, Nā Mamo O Mū’olea

training and technical assistance for nearly 500 individuals, developed 10 new management plans to improve coral health and supported 14 organizations directly and through regional networks.

- **Built Maui Nui’s first community network with partners**, organizing six community groups into the Maui Nui Makai Network to manage over 20 square miles of important marine habitat. The Partnership facilitated semi-annual Network meetings, resulting in a governance framework, strategic plan, intellectual property rights agreement, fiscal sustainability, how-to-guide for community-based planning, website to broaden outreach and community engagement, and increased capacity for effective co-management with the State.
 - **Developed 10 site-based conservation action plans (CAPs)** in partnership with the State Department of Land and Natural Resources (DLNR) for existing marine life conservation districts (MLCDs) and community areas that harbor beloved reefs where people live and work. The plans identify conservation actions and traditional Hawaiian practices that can be taken to address threats to coral reefs. Many of the plans are being actively implemented to improve reef habitat.
 - **Completed reef and reef fish baseline monitoring at seven Maui sites and established the most comprehensive baseline in west Hawai’i.** When scientists reported that one West Maui community site had no fish of reproductive
- size, the community developed an administrative rules proposal to rebuild fish stocks.
 - **Developed a sustainable finance plan** in collaboration with the State of Hawai’i’s Division of Aquatic Resources (DAR) for the Molokini Shoal MLCD. The plan is being used by DAR to seek more secure funding for this and other State marine protected areas.
 - **Formed the South Kohala Coastal Partnership** to strengthen collaboration and community partnerships and support management implementation of projects that abate threats to the region’s coral reefs.
 - **Organized 10 field trips for key decision makers** to educate them about the Ka’ūpūlehu Marine Reserve and the National Estuarine Reserve at He’eia.
 - **Translated science into accessible summaries** and interactive presentations that the Conservancy and partners have used to build broad community and public support for effective community-based management of local marine resources.
 - **Assessed the effectiveness of a voluntary rest area for ‘opihi (*Cellana exerata*),** a prized intertidal fishery species. The study found ‘opihi size and abundance increased in both the voluntary no-take areas and in many areas down current.



Success Story: A Community Unites to Save Its Reef

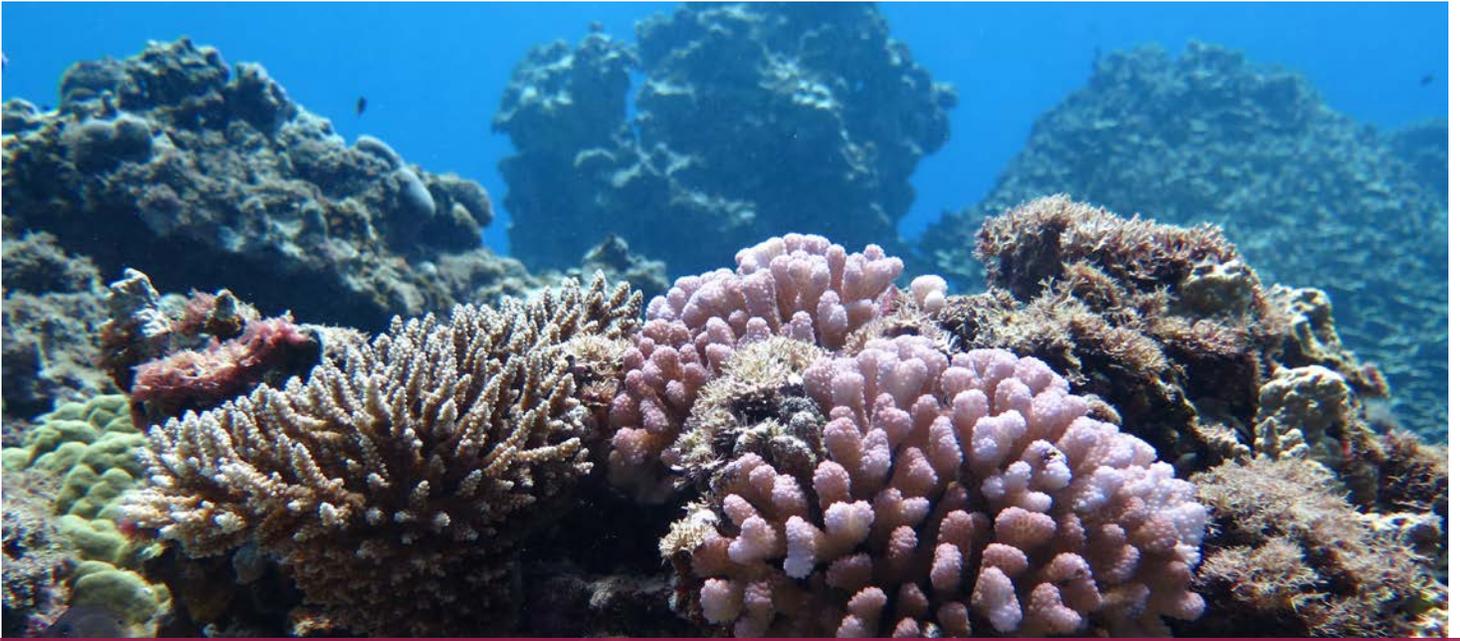
In the 1980s, the coral reefs of Wahikuli and Honokōwai radiated exuberant colors through Maui’s shallow waters, earning the nickname “rainbow reef.” The reef teemed with fish species loved for their delicious flavors—like weke and kumu (goatfish), awa (milkfish), uhu (parrotfish) and nenu (chubs). So, when this beloved reef began to disappear, the community became concerned.

Thirty years later, to understand why Rainbow Reef was dying and to identify actions to protect this reef and others along Hawai‘i’s coastline, the Partnership provided Hawai‘i’s DLNR and local communities across Maui Nui with technical support to create 10 site-based conservation action plans (CAPs).

At Wahikuli and Honokōwai, the CAP identified degraded water quality as one of the greatest threats to coral reef health. Prior to and since this linkage between coral health and pollutants was identified, multiple agencies and organizations in West Maui rallied to reduce land-based pollution. But a lack of baseline water quality data made it difficult to measure progress. To address this issue, the Partnership supported development of a standardized coastal water quality monitoring plan. With approval for the plan secured from the State Department of

Health, the Conservancy and partners raised funds to collect water quality data at Wahikuli-Honokōwai and other reefs across Maui.

This water quality monitoring program, called **Hui O Ka Wai Ola (Association of the Living Waters)** was launched with local partners in 2016 and now has more than 40 community volunteers who collect water samples at nearly 40 sites. The information is being used to inform local reef management and the program is currently being shared with the international reef management community as a model to improve local water quality and protect reefs. Today, with baseline water quality data established, partners at Wahikuli-Honokōwai are well positioned to make measurable progress towards improving the health of Hawai‘i’s coral reefs.



Commonwealth of the Northern Mariana Islands

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for CNMI's reefs.

Where We Work

The Commonwealth of the Northern Mariana Islands (CNMI) is comprised of 14 islands extending over 370 miles in the western Pacific. Coral reefs are an important part of CNMI's cultural heritage; unfortunately, a growing population and increased development have exacerbated threats to coral reef ecosystems, leading to reduced coral health. These effects are most noticeable on the island of Saipan, where approximately 90 percent of CNMI's population resides.

Our Approach

Partnership efforts focus on providing technical support and capacity building for local staff to conduct watershed planning and prioritization of coral reef management efforts; secure sustainable financing for marine protected areas (MPAs); increase effectiveness of monitoring efforts; engage youth

in conservation; and support local NGO advisory group development. To amplify conservation momentum in the region and foster shared learning, the partnership also supports regional learning exchanges and activities conducted within the framework of the Micronesia Challenge, a commitment to conserve at least 30 percent of nearshore marine resources and 20 percent of terrestrial resources by 2020.

Our Accomplishments

Partnership efforts have directly benefited approximately 70 square miles of coral reef habitat, provided 5 sites with technical support and resulted in the training of at least 60 people.

- **Completed and formally adopted two Conservation Action Plans (CAPs).** A collaborative, science-based approach was used to identify and preserve priority coral resources and measure these efforts at two sites (Talakaya



Watershed, and Garapan). Plan implementation has begun at both sites.

- **Supported the exploration of a sustainable financing mechanism** to support conservation as part of the broader Micronesia Challenge for a regional Endowment. The endowment will provide a sustainable financing source that supports the preservation of the marine resources that are crucial to the survival of Pacific traditions, cultures and livelihoods (See Success Story on page 14).
- **Completed an inventory and review of social science work** conducted in CNMI to inform the development of socio-economic monitoring protocols and a plan which allows for a unified approach to socio-economic monitoring across CNMI.
- **Supported enhanced capacity of non-governmental organizations (NGOs)** by providing five years of technical assistance through board training, strategic planning and the development of fundraising plans for local NGOs.
- **Completed a threat assessment for the Managaha Marine Conservation Area** to determine priorities for conservation

efforts.

- **Completed a social marketing campaign** to reduce poaching in the Managaha Marine Conservation Area. The campaign increased knowledge sharing among community members about the historical, cultural and economic significance of the area to increase community support for fishing regulations.





Success Story: Fostering Future Coral Reef Conservationists

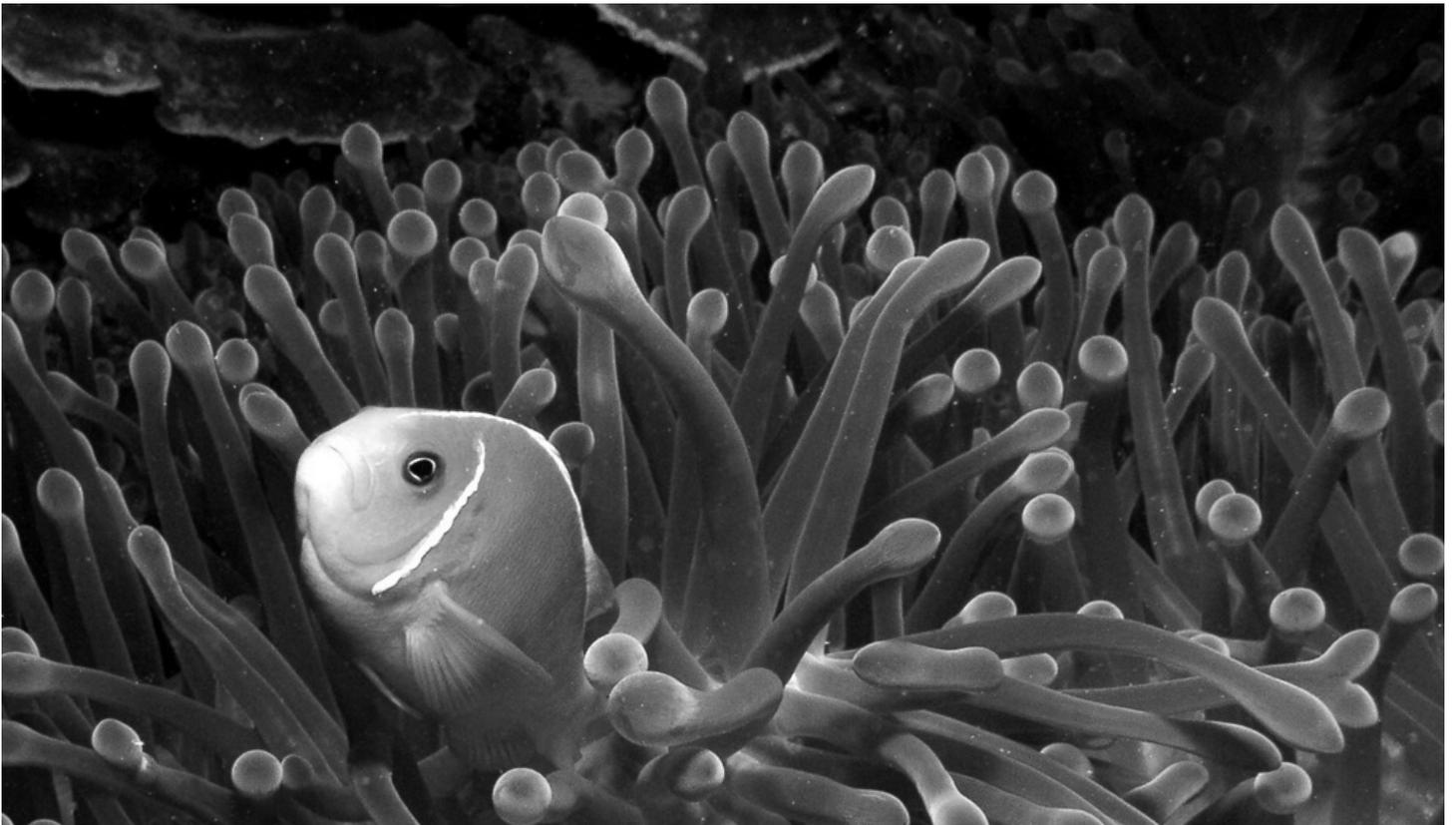
The Mariana Islands Nature Alliance (MINA), a non-profit organization which receives capacity building support from the Coral Reef Conservation Partnership, is fostering the next generation of conservationists at the Tanapag Middle School on the island of Saipan, CNMI.

Tanapag is a close-knit fishing community within proximity to the Managaha Marine Conservation Area (MMCA), an area often referred to as the “jewel of CNMI”. Prior to being made an MMCA, the area was historically fished by the Tanapag community, making their support of the MMCA key to its effectiveness. In 2012, under support from MINA, sixth-grade students at Tanapag Middle School began hosting community events, such as beach clean-ups, to show pride and concern for the islands’ marine resources. To formalize their efforts, students formed the Micronesia Challenge Club, an after-school club which focuses on conservation of CNMI’s natural resources.

“The club gets the children outside, into the beaches, forests and jungles for hands-on science and conservation learning”,

said Kodep Ogumoro-Uludong, a former member of MINA who worked closely with the students. The club garnered attention when students donated \$1,000 of their club funds to the CNMI Micronesia Challenge Endowment Fund. The fund provides sustainable funding for the management of protected areas in CNMI. The students hoped their contribution would inspire further support for the endowment from the CNMI government and private sector.

Inspired by the Tanapag Middle School Club, another Micronesia Challenge Club was formed at Kagman High School, also on Saipan. The Kagman Club has held beach clean-ups and is fundraising for future club activities. Kodep said, “Now that the youth of the islands are involved, there’s much more conservation awareness throughout the entire community.”



Guam

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for Guam's reefs.

Where We Work

The waters of Guam are home to 5,000 species of marine organisms, many of which rely on healthy coral reefs for survival. In Guam's nearshore waters, the combined area of coral reef and lagoon is approximately 26 square miles—nearly 13,000 American football fields. Guam's coral reefs are estimated to be worth \$127 million per year, making them crucial to the economic, cultural, political and social viability of Guam.

Our Approach

Partnership efforts focus on providing technical support and capacity building for local staff to conduct watershed planning and prioritization of coral reef management efforts; increase effectiveness of monitoring efforts; and support local

NGO advisory group development. To amplify conservation momentum in the region and foster shared learning, the partnership also supports regional learning exchanges and activities conducted within the framework of the Micronesia Challenge, a commitment to conserve at least 30 percent of nearshore marine resources and 20 percent of terrestrial resources by 2020.

Our Accomplishments

Partnership efforts have directly benefited approximately 87 square miles of coral reef habitat, provided 2 sites with technical support and resulted in the training of at least 50 people.

- **Completed and formally adopted Conservation Action Plans (CAPs) at two sites** (Cetti Bay and Manell-Geus



Watershed). Plans resulted in increased community awareness and restoration efforts in the upper watersheds, including invasive species removal efforts targeting bamboo and invasive algae on the reefs.

- **Trained 30 government resource managers** to communicate the potential impacts of climate change to facilitate action by local agencies and stakeholders and reduce Guam’s vulnerability to climate change and other threats.
- **Trained nine resource managers in effective project development and team management** to improve execution of coral conservation work throughout Guam.
- **Held a learning exchange for fishers from Guam** to learn about alternative management approaches being used successfully across the Micronesia region. As a result, two attending fishermen went on to establish the Humatak Community Foundation, a community-based conservation organization (See Success Story on page 17).
- **Supported the enhanced capacity of local non-governmental organizations** through facilitation and completion of a needs assessment, strategic planning development and support for the Humatak Community Foundation.
- **Five Guam youth attended a learning exchange in Palau** to increase awareness and understanding of community-based resource management.



Success Story: Humatak Community Foundation Update

Jesse and Joe Quinata are brothers who grew up in Umatac, Guam on land that has been in their family for generations. They have fished their whole lives and have seen the ocean in Guam change. When the brothers go fishing, they catch only about two fish in four hours—much less than the old days.

“People don’t use the same practices,” Jesse explains, “or fish for the same reasons. Fishing in Guam is now economic.”

To learn what might be done to improve fishing practices and restore fish populations in Guam, Jesse and Joe attended a learning exchange in Palau supported by the Partnership. There, the brothers had the opportunity to visit one of Palau’s many marine conservation areas. Bobbing offshore in a small fishing boat, the group spoke about conservation as they caught one fish after another. A Palauan host explained, “The real fisherman is not the fisherman who catches a lot of fish. It’s the fisherman who understands the seasonal changes, the ethics of conservation and the whole process about fishing.” Joe reflects on how fishing in Palau feels different: “In Palau, fishermen value traditional ways. They’ve been conserving fish for years, and because of that they have plenty.”

Inspired by Palau’s abundance and approach to resource management, Jesse and Joe established a conservation organization for their village—The Humatak Community Foundation. The Foundation promotes land and water conservation as part of the community’s cultural heritage.

“We’re celebrating what we have and working toward conserving for our kids and our kids’ kids,” Joe says. He points toward a lone fisherman standing knee-deep in the bay where the brothers grew up, “I want to be able to have my kids do what that man’s doing...fishing,” he continues.

Since attending the learning exchange in 2011, Jesse and Joe have continued building the Foundation to promote their vision of a better forever—*Nihi ya ta na’ maolek mo’na para famagu’on-ta*, as they say. The Foundation has implemented various projects and programs to support marine conservation in Guam, such as the Umatac Coral Reef Ambassadors movement, which blends traditional beliefs with environmental values and provides the community with life-long learning experiences to promote awareness, teamwork and a future-focused mindset. They’ve also created the Humatak Tree Planting Legacy Program which protects the health of marine ecosystems by mitigating land-based pollution and focuses on maintaining the balance between current needs for natural and cultural resources and the obligation of sustaining resources for future generations.

But they’re not stopping there, Jesse and Joe have even larger ideas. They plan to open the Humatak Heritage-Based Community Charter School, “the school without walls”, as Joe calls it. Here, science will be learned at the mountain ridges, riverbeds and coastal reefs instead of in classrooms. Students will learn skills necessary to become contributing citizens, life-long learners and perhaps the next generation of conservationists.



Puerto Rico

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for Puerto Rico's reefs.

Where We Work

Puerto Rico's coastline is home to more than 1,930 square miles of shallow coral reef ecosystems, including mangrove forests and seagrass beds. These habitats support more than 677 species of fish and 237 species of coral. However, over 93 percent of Puerto Rico's coral reefs are threatened by sedimentation, algal growth, overfishing, bleaching and climate change.

Our Approach

Coral reef conservation efforts in Puerto Rico build on successes in neighboring Caribbean islands and foster collaboration among stakeholders at the federal, regional, and local levels to ensure ocean habitats are protected for the benefit of people and nature. Effective management of marine and coastal protected areas is achieved through policy analysis and support of cooperative management efforts with local communities and stakeholders. Additionally, science-based decision-making

tools, including new technologies to determine sustainable harvest levels, monitor catch sizes, and drive accountability, have been developed to ensure sustainable management of key fisheries.

Our Accomplishments

Our work has directly benefited approximately 371 square miles of coral reef habitat. Partnership efforts have resulted in the training of 36 people in ecosystem-based adaptation and 610 commercial fishers in data reporting, provision of on-site management assistance to eighteen coral reef sites, and four sites supported in aspects of management planning.

- **Developed the first prototype for an electronic reporting application specific to Puerto Rico.** This technology supports more informed, timely and effective management decisions for reef fisheries.
- **Supported training of fishers in responsible fishing practices,** including regulations, license and permit



requirements, through the development of the Commercial Fishers Education Program Guiding Document.

- **Developed human-use maps and GIS geodatabase for Culebra Island** to identify human stressors to coral reefs. The spatial information developed supports integrated coastal zone management efforts. All data is available to managers and the general public.
- **Puerto Rico joined the Caribbean Challenge Initiative (CCI) by committing to conserve at least 20% of nearshore marine environments as national marine protected areas by 2020** and create a National Conservation Trust Fund. Nature Conservancy staff advised the Puerto Rican CCI delegation, provided technical support to draft the Puerto Rico Declaration, participated in key meetings leading to a summit, and hosted the first ministerial CCI meeting. The PR Natural Protected Areas Trust Fund is currently being developed and will be fully functional by 2019.
- **Provided technical support to develop the first document to assess Puerto Rico's vulnerability to climate change** ("Puerto Rico State of the Climate Report"). Based on this

report, the governor of Puerto Rico issued five executive orders which mandate all public agencies to create climate adaptation plans for public infrastructure.

“ The electronic reporting application benefits commercial fishers by providing them with personal records of their catch and making it easier to enter and send their data using their phones, tablet, or computer.”

–Daniel Matos, Fisheries Research Laboratory, Department of Natural and Environmental Resources (DNER)



Success Story: Enhancing Resource Management through Technology and Engagement of Fishers

Fishers play a major role in the local economy of Puerto Rico. Between 2010 and 2015, fishermen across Puerto Rico landed close to 2.4 million pounds of seafood, generating revenues of about \$8.6 million per year. Unfortunately, many of Puerto Rico's vital fisheries are threatened by overfishing.

Traditionally, fishers have manually recorded and shared their harvest data using simple pen and paper, but this method is time-consuming and prone to error. In 2016, the Partnership supported development of Puerto Rico's first electronic reporting application and data viewing platform. This new, mobile technology allows fishers to quickly and easily collect their harvest data and share it with fisheries managers, allowing for more informed management decisions across all of Puerto Rico's commercial fisheries.

To date, the Partnership has trained approximately 65 fishers in the use of the new electronic reporting technology. By 2020, it is expected that no less than 70 percent of commercial fishers in Puerto Rico will enter their harvest data electronically.

In addition, in collaboration with the Puerto Rico Department of Natural and Environmental Resources and the Caribbean Fishery Management Council (CFMC), the Partnership has supported development of the first ever Commercial Fisher's Education Program (PEPCO) to increase understanding of commercial fishing regulations, license and permit requirements, and basic fisheries management and conservation concepts. To date, 514 commercial fishers from across Puerto Rico have participated.

In 2017, in collaboration with CFMC, the Partnership developed the first PEPCO workshop manual which contains all information provided through PEPCO courses with easy to follow instructions, pictures, and figures for fishers who aren't able to attend the workshop.

The fishing community has been incredibly receptive of both the new electronic reporting application and education program. Fishers are beginning to view fisheries improvement as a collaborative process—they have even advocated for the closure of certain fisheries to allow fish populations time to rebound.

Andres Maldonado, a commercial fisher of conch and lobster, said "this new technology [electronic reporting] will make things easier and save us time; fishers are receptive to technologies that help them improve their working conditions."



U.S. Virgin Islands

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for the U.S. Virgin Island's reefs.

Where We Work

The U.S. Virgin Islands (USVI) consists of three main islands — St. Croix, St. John and St. Thomas. These islands are home to hundreds of species of plants, fish and birds. Millions of tourists visit the islands each year, supporting local livelihoods and communities. The tourism sector in the U.S. Virgin Islands constitutes almost 32 percent of Gross Domestic Product and supports 29 percent of employment. However, increased ocean temperatures and acidity, overfishing and pollution have damaged reefs in the Virgin Islands. In parts of the Virgin Islands, populations of elkhorn corals, a key reef-building species, have decreased by 90 percent since the 1980s.

Our Approach

In the USVI we bring together cutting-edge science and technical support to rebuild reefs, support effective management and produce long-term marine protections. Through partnership with some of the world's leading coral science organizations, new coral restoration techniques are

being developed and tested to grow large numbers of corals faster than ever and with greater survival rates. Based on needs identified by local partners, we provide support for policy development, management planning, strategy implementation, and the development and implementation of community engagement efforts.

Our Accomplishments

Our work has directly benefited approximately 60 square miles of coral reef habitat. Additionally, Partnership efforts have resulted in the training of nearly 200 individuals and the completion of eight new plans to directly support coral reef management and site-based coral reef restoration.

- **Mapped and quantified protection provided by coastal ecosystems in the USVI** to help local resource managers and decision makers identify coastal habitats that reduce risks from coastal hazards to local communities by providing storm protection, as well as to explore potential impacts of management actions (such as the removal or



restoration of nearshore habitat).

- **Created response plans for coral bleaching and vessel groundings** resulting in the creation of a BleachWatch program and the training of more than 140 volunteers to assess and respond to coral bleaching.
- **Outplanted 13,073 elkhorn and staghorn corals**, directly enhancing 6,536 square meters of coral reef within the St. Thomas East End Reserve and the St. Croix East End Marine Park.
- **Created a coral restoration plan for the East End Marine Park** that included outplanting corals throughout the park, creating a demonstration site, and offering snorkeling tours as an opportunity for community engagement.
- **Completed and shared human-use maps for the St. Croix East End Marine Park**; maps were created through a participatory mapping workshop and will be used to inform management efforts.
- **Supported management activities at the St. Thomas East End Reserves (STEER)** to increase management effectiveness and build capacity at the site by: conducting a visitor willingness-to-pay study; fieldwork for watershed assessments, contaminants, and biological monitoring; and developing models to analyze the impacts of sea level rise in the territory.
- **Held a USVI Climate Change Ecosystem-based**

Adaptation (EBA) Workshop that facilitated stakeholders in developing strategies to incorporate climate adaptation into disaster response, site-level management, and coastal zone planning resulting in the first climate change policy document in the USVI.

- **Over 38 participating Reef Responsible Restaurants** have been trained and have voluntarily made commitments to improve their best practices when purchasing locally harvested seafood. Additionally, more than 1,000 participants engaged through Reef Responsible community events.

“Coral Patrol volunteers allow the Park to extend its impact much further than is possible with its small staff. More eyes and more hands truly multiply the impact of work we do and allow us to do much more.”

–Caroline Potts, Manager, East End Marine Park, St. Croix, USVI



Success Story: Empowering Citizen Scientists to Protect Reefs

Increasing sea surface temperatures, and prolonged occurrences of these increases, have caused several mass bleaching events around the world in the last two decades. Fortunately, the U.S. Virgin Islands have not seen a mass bleaching event since 2010; even still, they are taking steps to be prepared should another mass bleaching event occur.

In 2011, the USVI developed a bleaching response plan that outlines a two-tiered process for monitoring and responding to coral bleaching events. The first tier is the BleachWatch VI program, a citizen science-based program that trains recreational divers and snorkelers to recognize bleaching and other climate change-related impacts and to report their observations.

“As managers, we can’t always get in the water as much as we’d like. That’s where programs like BleachWatch VI come in—it helps put eyes on the reef to inform us of current conditions and alert us of any significant changes”, said Leslie Henderson, Coral Reef Initiative Coordinator for the USVI Dept. of Planning and Natural Resources.

To date, the BleachWatch VI program has successfully trained more than 104 volunteers to assess and report coral bleaching.

“BleachWatch addresses a local coral reef management need while simultaneously providing a perfect avenue for coral reef education”, said Leslie. “Getting the community involved and teaching them not only to enjoy the reef but look at it with a more scientific eye helps foster a deeper appreciation of coral reefs. BleachWatch gives the average USVI resident an opportunity to get to know, and love, their local reefs a little better.”

The second tier of the bleaching response plan includes advanced monitoring surveys carried out by marine professionals. Together, these volunteer-based and professional monitoring efforts can enhance reef resilience by informing conservation efforts.

In 2017, reef managers from the USVI traveled to Florida, where there has been significant bleaching in recent years, to learn from reef managers. Coral managers in the USVI applied lessons learned in Florida to enhance and update the USVI bleaching response plan. The updated plan now includes a communications plan and clear designation of partner responsibilities. These updates help to further prepare the USVI management community to monitor and document the impacts of climate change on coral reefs and inform response and restoration efforts.



Reef Resilience Network

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. Here's a peek at how that partnership translated to work on-the-ground and in-the-sea – and what that means for coral reefs around the world.

Where We Work

Coral reefs cover less than one tenth of one percent of the ocean, yet they are among the most biologically diverse, culturally significant and economically valuable ecosystems on the planet. The Reef Resilience Network (the Network) works around the world to accelerate and leverage solutions for improved conservation and restoration of coral reefs and reef fisheries.

Our Approach

Healthy coral reefs provide billions of dollars in food, jobs, recreational opportunities, coastal protection and other important goods and services to people around the world. However, 75 percent of the world's reefs are under threat from pollution, unsustainable fishing practices and global climate change.

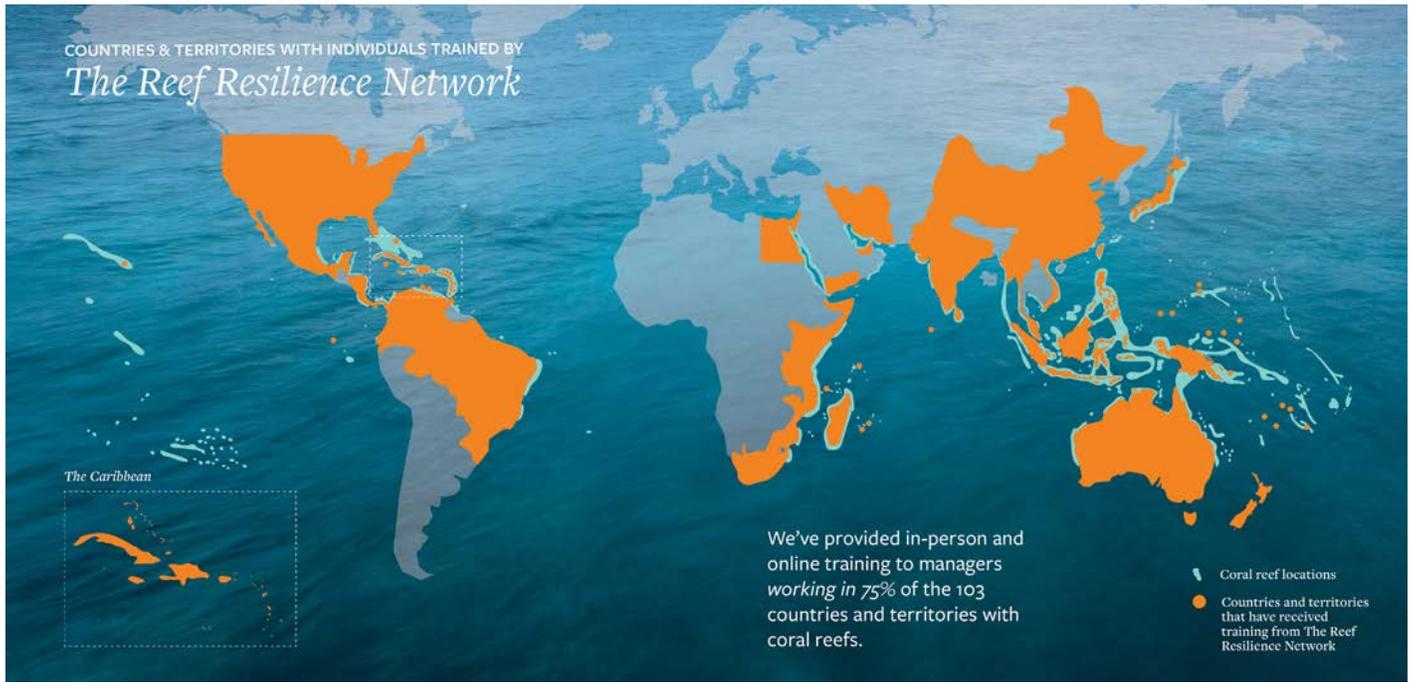
To help marine managers on the front lines of coral reef conservation address these threats and mobilize action for improved coral health, the Network connects them with peers,

content experts, tools and operational knowledge. More specifically, the Network:

- Synthesizes and shares the latest science and management strategies to keep busy managers inspired and in-the-know.
- Connects coral reef managers to peers and experts to share resources and lessons learned to inform and improve management decisions and inspire greater collaboration.
- Supports on-the-ground action by providing training and seed funding to launch education, monitoring and threat abatement projects.

Our Accomplishments

The Network has provided in-person and online training to more than 4,100 managers working in 76 percent of the 103 countries and territories with coral reefs, resulting in participant-led trainings for an additional 986 stakeholders. Our reach stretches even further through online connection activities, such as



webinars and discussion forums, resulting in a better informed and networked cohort of marine resource managers.

- **Connected global managers and practitioners to peers and leading experts in coral-related fields through 42 e-newsletters, 50 interactive webinars on hot topics in reef management (attended by 2,100 managers), and the Network Forum**, an online discussion forum to share ideas and resources.
- **Worked with experts to synthesize information on science and management tools and techniques and create searchable summaries of journal articles about resilience science and case studies highlighting successful management strategies—and then shared these products with resource managers via our online toolkit.** More than 190,000 individuals have visited the network website to read 59 case studies, 145+ summaries of cutting-edge resilience science articles and new featured content that includes reef restoration, blue carbon, communication, community-based climate adaptation and coral reef fisheries.
- **Designed and executed trainings for 1,300 managers to help them incorporate resilience concepts into their management strategies, apply cutting-edge science to resource management and encourage increased knowledge sharing within and across regions.** In addition to in-person trainings, we provided online trainings in English, French, and Spanish to 2,700 participants. Through these trainings—for 1,300+ individuals in 24 countries that received project seed funding—managers and practitioners

from around the world have:

- » Developed and implemented response plans for coral bleaching, coral disease and invasive species.
- » Applied new reef monitoring programs and protocols to inform resilience-based management strategies.
- » Created a coral restoration area that incorporates resilience-based management principles.
- » Developed a new reef resilience program in the U.S. Virgin Islands that has shaped policy, made critical management decisions and created a coral bleaching monitoring and response plan.
- » Incorporated reef resilience principles into existing spatial management plans to support the long-term health of coral reefs.
- » Applied resilience science to the design of Marine Protected Area (MPA) networks.
- » Built the capacity of people at all levels—managers, enforcement personnel, educators, policy-makers, students, community members, fishermen, tourism operators, and more—to strengthen community resilience and mobilize action for improved coral health.
- » Applied new tools for community-based climate adaptation.
- » Produced publishable journal and media articles.



Success Story: Using Art to Protect Reefs in Puerto Rico

With funding and mentorship support from the Reef Resilience Network, artist Paco Lopez-Mujica of Arrecifes Pro Ciudad—a community-based organization that manages the Isla Verde Marine Reserve in Puerto Rico—developed a cooking oil recycling program to protect the health of Isla Verde’s coral reefs. Over time, cooking oil from condominiums builds up and blocks pipes carrying wastewater, resulting in sewage overflows in the streets and on the beach. Sewage carries harmful levels of nutrients and sediment into coastal waters that can harm coral reefs and fish communities. To encourage residents to take action to keep cooking oil out of their pipes, Paco designed a graphic manual with artistic illustrations that inform residents on proper cooking oil disposal. He also held meetings at eight condominiums located near the Isla Verde Marine Reserve. All eight condominiums voluntarily adopted and implemented the cooking oil recycling program, and the program has since expanded throughout Isla Verde. In addition, Paco is working with the municipalities of San Juan and Carolina and expects the recycling program to be adopted throughout both regions in the near future. Paco next hopes to determine the long-term impact of the cooking oil recycling program. To help him achieve this,

the Environment Protection Agency has provided Arrecifes Pro Ciudad with monitoring equipment to collect water quality data in the Marine Reserve.

“ Before the Reef Resilience online course and training, I didn’t know much about marine conservation. I was a rookie. This training taught me useful lessons about the value of coral reefs and the important relationship between coral reef health and urban regions.”

—Paco Lopez, Arrecifes Pro Ciudad



Micronesia

The Nature Conservancy, NOAA Coral Reef Conservation Program and seven U.S. coral reef jurisdictions completed a \$13.5 million, 10-year partnership to support the effective management and protection of coral reefs. In Micronesia, partnership efforts focus on site-based work in both Guam and CNMI while also fostering shared learning throughout the entire region.

Where We Work

Coral reef health and resilience is paramount in Guam, Commonwealth of the Northern Mariana Islands (CNMI), Palau, the Federated States of Micronesia and the Marshall Islands. These five jurisdictions cover 6.7 million square miles and encompass 2,000 islands inhabited by nearly 500,000 people speaking 12 languages. The area is also home to over 1,300 fish species and more than 480 coral species, with annual benefits valued at \$800 million. In response to increasing pressures from climate-related impacts and locally induced human impacts, efforts to blend traditional conservation practices with modern methods are underway to protect these natural resources.

Our Approach

In Micronesia, coral reef conservation is advanced by providing technical and financial assistance to support the management efforts of local government agencies, non-governmental

organizations and community partners. To amplify conservation momentum in the region, activities are conducted within the framework of the Micronesia Challenge, a commitment to conserve at least 30 percent of nearshore marine resources and 20 percent of terrestrial resources by 2020. Partnership efforts focus on site-based work in both Guam and CNMI while also fostering shared learning throughout the entire Micronesia region. Through implementation of learning exchanges and trainings, we aim to boost the effectiveness of protected areas, support strategic planning and conduct effectiveness assessments.

Our Accomplishments

Our work has directly benefited approximately 2,000 square miles of coral reef habitat. Partnership efforts have provided technical support to 37 organizations, brought together 29 organizations for learning exchanges and resulted in the training of staff from 25 organizations on reef resilience principles.



- **Developed 18 Conservation Action Plans (CAPs)** to address threats to coral reefs with climate change impacts integrated into 10 plans. Some results of the CAPs include:
 - » **Establishment of marine conservation agreements on the island of Yap between 6 communities** and the Yap Community Action Program to establish protected areas and form the Yap locally managed marine area network.
 - » **Development of management plans for 13 of the 15 existing marine protected areas in Palau** to enable access from the Palau Protected Areas Network Office for financing of implementation activities.
- **Coordinated with governments, partners and working groups across Micronesia to develop and implement the following tools and structures to implement and measure the effectiveness of Micronesia Challenge efforts:**
 - » **Developed the Marine Protected Areas Management Effectiveness (MPAME) tool** to standardize evaluation of effectiveness of site management and document the accumulated impacts of protected sites. Results are being used to produce a scorecard which tracks the progress of the Micronesia Challenge. Eight sites have completed MPAME evaluations and the Palau Protected Areas Network (PAN) has adopted the tool to evaluate all 13 of its sites.
 - » **Developed the Micronesia Finance and Administration-Operations Network (MFAN)** to strengthen conservation organizations in the region by enhancing the management skills of Operations staff.
- Individuals from 16 organizations participated in a workshop to teach financial and administrative skills.
 - **Coordinated and implemented learning exchanges to share successes and lessons learned** between partners, foster better understanding of community-led marine stewardship and catalyze on the ground action.
 - » **Participants from Pohnpei and Yap visited Palau to learn about watershed partnerships, through which several terrestrial managed areas have been established**, based on lessons learned from the Belau Watershed Alliance, a network of Palau communities engaged in watershed management. Yap participants rallied their eight villages to establish the Tamil Resources Conservation Trust, which has since developed a management plan and established a marine protected area (MPA).
 - » **Traditional and elected leaders from the Republic of the Marshall Islands (RMI) visited Palau to learn about protected areas management efforts.** Palauan traditional and elected leaders then visited RMI to support the passage of the RMI Protected Areas legal framework to implement Micronesia Challenge goals.
 - **Coordinated the participation of over 100 fisherman, scientists, resources managers, NGOs, State agencies and community members in the 1st Pohnpei State Coastal Fisheries Symposium** to share the latest information on the state of Pohnpei's coastal fisheries. The event resulted in a commitment from state leaders to better manage Pohnpei's coastal fisheries and coral reef stewardship efforts.



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