

2017 ANNUAL REPORT





Hope.

That is something we all need amidst the challenges we face due to climate change. Our coral reefs have a level of sensitivity that makes them particularly vulnerable to many anthropogenic changes and yet we are finding that corals have a resilience and tenacity that can provide hope in unexpected and inspiring ways. I am very optimistic that we can turn the tide of declining reefs if we align our efforts and all of us get involved today.

While we don't have a lot of time, we have the tools through science, partnerships and community to make an impact. At CORAL, our approach focuses on the creation of Adaptive Reefscapes: networks of coral reefs that can regenerate and adapt if we create enough of the right conditions. Our strategic vision is to expand our Adaptive Reefscape work from four reefscapes (Mesoamerican Reef, Fiji, Hawai'i and Indonesia) to 10 in just a few short years. Our ability to scale and grow quickly will have a direct impact on our collective ability to save the reefs that are struggling around the world. Fortunately, we have a talented staff of leaders ready to dive in.

We know we can't save coral reefs alone so we are building stronger and larger alliances globally to engage partners and individuals to support this work. At the same time, we are deepening our knowledge base by continuing to work with world-class scientists to better understand corals and their inner workings while linking more closely with coastal communities to heighten the engagement of those most impacted by these changes. And we are already starting to see a difference. In Honduras, for example, action by local communities is leading to greater biomass of fish, cleaner water from managed watersheds and well-monitored marine parks that keep out illegal fishing. I'm especially impressed with the dedicated individuals who are making it their life's work to ensure the reefs closest to their families are healthy and prosperous for future generations.

I've spent most of my career working with and running organizations that rapidly adapt to changing conditions, whether it is large market swings, rapid growth or new strategic challenges. CORAL is at the forefront of some very exciting challenges and the need to expand our efforts will be critical over the next several years. I hope you will join us in this important journey and I deeply appreciate your support for CORAL.

Gratefully,

Kris Billeter, Board Chair





A Way Forward.

In 2016, I did my first dive to Molokini Crater off the coast of Maui. Sadly, the skeletons of dead cauliflower corals were everywhere, with an occasional survivor to break up the brown seascape with vibrant purple or caramel colored colonies. Many of these corals died in 2015, when Hawaiian waters got particularly hot, triggering widespread coral bleaching.

I went back to Molokini a few months ago and was delighted to see that an important change was already underway. If you looked carefully amidst the dead corals, you could find baby coral colonies that were about the size of a quarter. These small corals are the offspring of corals that survived coral when the water got hot, so there's a good chance that they inherited some of their parent's ability to withstand coral bleaching. In other words, with the arrival of these new baby corals, Molokini's reefs may be adapting to a changing environment.

At CORAL, our goal is to save coral reefs around the world. Coral reefs are changing very quickly due to climate change and local threats. For reefs to survive, the corals themselves will have to adapt to these changing conditions. But what do we need to do to help corals adapt? To answer this question, we are pioneering new kinds of science and the answer is clear: corals will have a better chance of adapting if communities protect a diverse, connected and large network of reefs, which we call an Adaptive Reefscape. In this Annual Report, we share some of our recent scientific results about how to design Adaptive Reefscapes and illustrate how we are working with our partners to create an Adaptive Reefscape demonstration site in the Mesoamerican Region.

As a next step, we at CORAL are organizing much of our work into three initiatives that ensure that reefs have clean water, healthy fisheries and are part of intact ecosystems, making them better able to recover from stresses like warming waters, just as we are seeing at Molokini. Our initiatives are designed to be replicable, whereby solutions that work in one place can be applied in many others, and we are sharing these solutions with communities and organizations around the world.

As you will see in this year's Annual Report, the best available science tells us that there's still time to save coral reefs. We are looking forward to partnering with you in the year to come to ensure coral reefs, and the people who depend on them, not only adapt but prosper in a changing world.

Thank you for your continued support,

Dr. Michael Webster, Executive Director

Coral reefs are in crisis

In addition to local-level threats, such as overfishing and pollution, coral reefs now face global-level threats like warming oceans, which can cause coral bleaching. When these threats combine, it severely compromises the ability of corals to grow, reproduce and thrive. Today, a startling 75 percent of our coral reefs are threatened, and one-third of all reef-building corals are considered at risk of extinction.



OUR SOLUTION: ADAPTIVE REEFSCAPES

CORAL has launched a new era of reef conservation for a changing world with Adaptive Reefscapes – networks of **healthy reefs** that are able to **adapt to climate change** because they are **diverse, connected and large**.

What makes a healthy reef?

Healthy reefs are free from direct threats, such as pollution and overfishing, which degrade and weaken reefs, making them more susceptible to coral bleaching and disease. One of the best ways we can help reefs is by reducing these immediate threats so that reefs are healthier and more capable of withstanding change over the long-term. CORAL addresses direct threats through our three *Signature Initiatives*.



Healthy Fisheries for Reefs curbs the overfishing of herbivorous fish, which are important because they feed on macroalgae, a competitor of corals that can quickly overtake reefs.

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Clean Water for Reefs reduces water pollution from sewage and stormwater, which dump harmful sediments and nutrients on coral reefs and enable the proliferation of macroalgae.



Intact Reef Ecosystems reduces the destruction of reef habitat from human activities, such as unsustainable tourism and use of boat anchors.

How can corals **adapt to climate change**?

Corals don't all respond to environmental change in the same way. We see variation between coral species, between individuals of the same species and even between coral polyps in the same colony. During bleaching events, for example, some corals die, some bleach and later recover and some show signs of resistance to bleaching altogether. Other corals surprise us by doing well in unexpected places, such as murky waters or high-temperature lagoons. This diversity of responses gives us hope that corals possess enough diversity to adapt to current and future environmental change.

Why are Adaptive Reefscapes **diverse**, **connected and large**?

Our Science of Adaptation work tells us that by protecting a diverse portfolio of reefs that are connected to one another across large regions, we create the enabling conditions for rapid adaptation; in other words, Adaptive Reefscapes enable "nature's survivors" to reveal themselves and spread their genes to future generations.

- Safeguarding *diversity* in all its forms from types of reefs and habitats to species and genes – is essential to ensure that nature has plenty of options to work with to find the corals of the future.
- Rapid adaptation requires networks of reefs that are *connected* enough to facilitate gene flow via the movement of baby corals, so that well-adapted corals can spread between different healthy reefs and repopulate degraded reefs.
- Unlike small networks, which are vulnerable to a single disturbance such as a storm or disease outbreak, *large* networks of reefs protect against losing everything at once.

To learn more, watch our videos on why reefs should be <u>diverse</u>, <u>connected</u> and <u>large</u>.

Our accomplishments

In 2017, we continued developing our Adaptive Reefscapes demonstration sites in Fiji, Indonesia and the Mesoamerican Region. Success in these regions will provide a blueprint for coral reef conservation globally. We also established an important partnership with The Nature Conservancy, who will be implementing our approach in Caribbean islands. We aim to continue inspiring others to replicate our Adaptive Reefscapes approach in order to maximize our global impact. By 2019, we estimate that Adaptive Reefscapes will be in progress in sixteen key coral reef regions of the world.



What global changes mean for coral reefs

When ocean temperatures get too warm for too long they cause coral bleaching, a process whereby stressed corals expel the symbiotic algae that provide them with their main food source and brilliant colors. While there are no records of significant bleaching before the 1980s, in the past 20 years, there have been three global coral bleaching events: in 1998, 2010 and 2014-2017. This most recent event was the longest and most widespread bleaching event ever recorded. Warming oceans can also lead to stronger tropical storms, which can damage coral reefs, and outbreaks of coral disease that often follow bleaching events. Climate change is one of the most challenging threats to tackle due to its rapid pace and concerns about whether corals will be able to adapt quickly enough to survive into the future.





OUR SCIENCE OF ADAPTATION WORK

CORAL is filling critical gaps in scientific knowledge by collaborating with researchers to understand the processes by which corals adapt to rapid environmental change and the ways in which conservation actions can facilitate natural adaptation. **We do this by...**

...asking the right questions

CORAL is collaborating with researchers to build a suite of powerful mathematical models to simulate different future scenarios for coral reefs and help us answer questions like:

- What sorts of diversity are important to protect to help corals adapt?
- How should we distribute management effort across a region to maximize adaptation?
- How large does a network have to be to ensure that corals within it have both enough diversity and connectivity to facilitate evolution?

... uniting the scientific community

The Coral Adaptation Challenge was launched to unite some of the world's most prominent coral experts answer the question: *What is the probability that reefbuilding corals can adapt to rising ocean temperatures by the year 2100?* This question first arose at the International Coral Reef Symposium in Honolulu, Hawai'i in June 2016. A few months later, CORAL announced the Coral Adaptation Challenge and released a request for proposals. From the pool of applicants, three working groups were awarded small grants to carry out their proposed research. In April 2017, CORAL led a workshop in which the working groups and other experts shared, evaluated and synthesized results. The results of the Adaptation Challenge are now being submitted to a peer-reviewed scientific journal, with the goal of sharing our findings with a larger audience.

...using science to inform conservation

As we investigate these scientific questions, we are simultaneously applying the answers to real-world conservation. In each of our focal regions, we are assessing existing management efforts and determining where new investment of resources will have the biggest conservation impact. Our cutting-edge Adaptive Reefscapes approach is based on what we've learned through our Science of Adaptation work; namely, that by protecting a diverse portfolio of reefs that are connected to one another by the movement of baby corals across large regions, we increase the probability that corals can adapt to climate change.

To learn more about how we make Adaptive Reefscapes a reality, see <u>"Reefscapes in Action"</u>.



Healthy Fisheries for Reefs

The Threat: Unsustainable fishing

Overfishing affects more than 55 percent of the world's coral reefs. When people catch too many fish on a reef, whether for food or the aquarium trade, the entire ecosystem is affected.

On healthy reefs, seaweeds (also called macroalgae) are kept at low levels thanks to intense grazing by herbivorous fish, like parrotfish and surgeonfish. When these fish disappear, the delicate balance of the coral reef ecosystem is disrupted, and macroalgae can grow unchecked, smothering reefs and making it harder for baby corals (coral larvae) to settle. Due to a growing human population and increased demand for seafood, many reefs are now overfished.

Overfishing leads to declines in fish catch, which fishers often respond to by intensifying their effort and taking whatever they can, regardless of size or species. This cycle can lead to the collapse or near-collapse of fish stocks, which not only threatens the economic stability and food security of local communities but puts coral reefs at significant risk.





OUR SOLUTION: HEALTHY FISHERIES FOR REEFS

CORAL's Healthy Fisheries for Reefs Initiative protects coral reef ecosystems from the effects of unsustainable fishing by improving fisheries management.

SPOTLIGHT: How communities in Fiji are applying our success in Namena to create Healthy Fisheries for Reefs in Waivunia



The Namena Marine Reserve (Namena), Fiji's largest no-take MPA and a top global dive site, forms part of the traditional fishing grounds *(iqoliqoli)* of the Kubulau community. Over 15 years

ago, CORAL began working with the Kubulau community and private businesses to develop a sustainable management system that would protect Namena's fisheries from overexploitation while providing tangible benefits to the community.

As the Kubulau community has moved towards autonomous management, we have expanded to three new sites that have been strategically selected for their ability to contribute to a nascent Fijian Adaptive Reefscape. One of these sites, the Waivunia community in near Savusavu in Cakaudrove Province, is currently pilot-testing a unique collaboration with the government. In this collaboration, the community is working with key government ministries to play a greater role in setting the management priorities of their *igoligoli*.

In 2017, our first full year working with the Waivunia community, we created the enabling conditions for long-term conservation success, including helping the community engage with government ministries to voice and obtain support for their needs. We also supported the hire of an MPA Coordinator, who has been building interest in community-based conservation, conducting trainings with the community (e.g., on boat safety) and informally collecting tips from informants and using them to carry out impromptu patrols to curb illegal fishing.

We are pleased to report that we now have the backing of the *Tui* (chief) of Cakaudrove province for our conservation work. Our expansion to Waivunia has demonstrated the replicability of our Namena model and is making a meaningful contribution to our goal to create a network of effectively co-managed MPAs in Fiji that benefit both people and coral reefs.



The Threat: Land-based Pollution

Clean water is vital for both communities and coral reefs. Around the world, landbased pollution causes severe damage to coral reefs, poses risks to human health and threatens the tourism industry.

Directly discharged sewage and inadequately treated wastewater from cesspools and septic tanks allow high levels of nutrients, bacteria, chemicals and pathogens to enter the marine environment. Other land-based activities - like farming, logging and mining produce pollutants such as fertilizers, pesticides and sediments, which run off the landscape when it rains and end up in the ocean.

An overabundance of nutrients upsets the delicate balance of coral reef ecosystems. For example, excess nitrogen from wastewater or fertilizer fuels the overgrowth of algae which can kill corals by smothering them, blocking their access to sunlight and promoting coral disease. High levels of sediment runoff can also kill corals by suffocating them and blocking their access to sunlight.





OUR SOLUTION: CLEAN WATER FOR REEFS

CORAL's Clean Water for Reefs Initiative protects coral reef ecosystems from land-based sources of pollution through wastewater management and watershed restoration.

How citizen scientists in Puako, Hawai'i are taking action to ensure

SPOTLIGHT:



Along the coast of Puakō on Hawai'i Island. experts have found that residential cesspools and septic tanks release raw sewage into the marine environment. In 2014, **CORAL** launched Clean Water for Reefs Puako-

a collaborative, community-driven project aimed at resolving Puako's sewage problem. CORAL is working with the Puakō community, government officials and other stakeholders to replace Puako's outdated wastewater infrastructure.

A key part of this project is monitoring the ecological, environmental and social benefits of improved wastewater management. We are collaborating with researchers from the University of Hawai'i at Hilo (UHH), The Nature Conservancy and Hawai'i Institute of Marine Biology to develop a science-based monitoring plan for Puakō's coral reefs. This ambitious 10-year plan was finalized and published in 2017.

We believe conservation is most effective when communities are able to play a direct role in protecting their ocean resources. In 2017, we launched the citizen science component outlined in the monitoring plan in order to facilitate the involvement of our community-based partners. Our citizen science volunteers operate probes, take water samples and record data at six key sampling sites along the Puakō shoreline. We rely on the UHH Analytical lab to analyze the samples for nutrients and bacteria. both of which are important indicators of water pollution.

This citizen science project increases community awareness of wastewater impacts, enables the active participation of community members, provides a cost-effective way to conduct long-term monitoring and contributes critical water quality data to government databases. The combination of rigorous science, community engagement and collaboration with diverse stakeholders. helps build the profile of our project and catalyze similar projects and partnerships at a larger scale across Hawai'i.



Intact Reef Ecosystems

The Threat: Habitat Destruction

The coral reefs we see today are hundreds of years in the making. Like trees, coral reefs are living structures that can take years to regenerate once destroyed. Since most coral species grow less than an inch per year, reef destruction can have long-lasting consequences.

Unfortunately, many human activities directly damage or destroy coral reefs and associated habitats like mangroves and lagoons. Coral mining, a process by which chunks of coral reefs are extracted for use as bricks or other construction material, has caused extraordinary damage in some regions of the world. Particularly beautiful coral species are often harvested unsustainably for jewelry or souvenirs.

Blast fishing and cyanide fishing use dynamite and poison respectively to stun and trap fish. Boat anchors are often dropped directly onto reefs. Even divers and snorkelers can cause damage by trampling reefs and wearing sunscreen. All of these activities degrade reef ecosystems, harming corals, fish and other reef life.



OUR SOLUTION: INTACT REEF ECOSYSTEMS

CORAL's Intact Reef Ecosystems Initiative protects coral reefs from human activities that directly damage reefs and explores innovative techniques to restore previously degraded reef ecosystems.

SPOTLIGHT: How a trash management plan in Tulamben, Indonesia is contributing to an Intact Reef Ecosystem



implement an innovative project called Photovoices with coastal communities in North Bali. The project trains community members to photograph environmental issues they feel are important and analyze the photographs to identify trends and set conservation priorities. They then use those photos as a powerful communications tool. Through the evocative medium of photography, communities are able to visually convey to local leaders, visitors and government officials the environmental threats they face. Photovoices enables us to facilitate discussions and develop collaborative action plans to resolve chronic and emerging environmental issues. In the community of Tulamben in North Bali, the Photovoices project exposed trash as a persistent problem threatening both coral reefs and human health. The community previously thought the trash was coming from outside the community, but the photographs revealed something unexpected – that the community themselves were contributing to the trash problem. In 2017, we improved trash management by building the capacity of staff at a local recycling center. We helped create a set of standard operating procedures for staff and trained them in best practices for improving efficiency in collection, sorting and selling materials.

We also began working with a local woman's group that has created a business around collecting and sorting waste for recycling. In the near future, we plan to work with this group to turn trash into handicrafts that can be sold to tourists. Our efforts in Tulamben are effectively creating win-wins for people and conservation by creating livelihoods and reducing the amount of trash that makes its way to coral reefs.

Making Adaptive Reefscapes a Reality

CORAL's Adaptive Reefscape approach is currently active in the Mesoamerican Region, Fiji, Indonesia and Caribbean islands.

Our Adaptive Reefscapes blueprint is designed to be replicable and scalable, using the following steps:

- 1. **Develop a Regional Plan** that draws on cutting-edge science, builds on existing efforts and unites stakeholders around a concerted effort to save coral reefs.
- 2. Establish Networks of Healthy Reefs by creating partnerships, working with communities to reduce threats and engaging policymakers to create legal protections for reefs.
- 3. **Refine, Exit and Repeat,** ensuring that local leaders have the tools they need for long-term success and sharing our findings with a global network of partners.





REEFSCAPES IN ACTION

SPOTLIGHT: How we are applying our innovative Adaptive Reefscapes approach in the Mesoamerican Region



CORAL's vision is for 35 percent of the MAR's coral reefs to be included in a Mesoamerican Adaptive Reefscape that extends from Mexico to Honduras. Reefs in Honduras are likely to be important source populations for corals in Belize and Mexico, yet they have some of the least developed management systems in the region.

CORAL has worked in the MAR for over 12 years, with a current focus on three priority sites in Honduras – Roatán, Utila and Tela Bay. By achieving durable conservation results in the southern MAR, we are filling a substantial gap in effective reef protection in the region and making a meaningful contribution to the world's first Adaptive Reefscape. We help keep this network of reefs healthy and resilient by reducing direct threats through our three Signature Initiatives:

Healthy Fisheries for Reefs

One of the most immediate threats in the Mesoamerican Region (MAR) is the overfishing of herbivorous fish that help control the growth of macroalgae. CORAL collaborates with partners in Honduras to improve their capacity for effective management of Marine Protected Areas (MPAs), including improving fisheries management and enforcing fishing regulations. In 2017, we helped our long-time partners Roatán Marine Park (RMP) expand by adding critical staff to their team, purchasing a boat and engine to support patrols, and conducting trainings for rangers. RMP's efforts are paying off: fish biomass has measurably improved around western Roatán.



Across Honduras' coastal municipalities, directly discharged sewage allows high levels of nutrients and pathogens to enter the marine environment, threatening the health of both corals and humans. On Roatán, poor water quality threatens a tourism industry that receives over one million visitors a year. Thanks to our efforts to connect homes and businesses to a wastewater treatment facility, in August 2017, the public beach in West End, Roatán met EPA-safe swimming standards for the first time. To replicate this success, we continue to engage with the Inter-American Development Bank and other communities to improve wastewater infrastructure across Honduras' coastal municipalities.



In our core sites of Roatán, Utila and Tela Bay, we work with partners and other stakeholders to reduce anchor use by installing moorings, to promote sustainable tourism and to ensure that reef-associated habitats, like mangroves and lagoons, support coral reef ecosystems. In 2017, Honduras' first coastal managedaccess fishery was established in Laguna de los Micos – a lagoon near Tela Bay where juvenile reef fishes grow up. CORAL played a key role in the declaration of this managed-access fishery, which creates an important model for fisheries reform in the southern MAR.



Coral Reef Alliance

Statement of activities for the fiscal year ending on June 30, 2017

Support and Revenue

Net assets, end of year

Individual contributions	1,039,471
Foundation & government grants	1,781,732
Other revenue	684
Total support and revenue	\$2,821,887
Expenses	
Program services	2,525,739
Management & general	256,183
Fundraising	337,558
Total expenses	\$3,119,480
Net Assets	
Change in net assets	(297,593)
Net assets, beginnng of year	2,387,916



The financial results presented on this page are summarized from our audited June 30, 2017 financial statements; the complete statements can be obtained online at **coral.org** or by calling **510.370.0500.**

\$2,090,323



The Coral Reef Alliance is honored to have a dedicated community of supporters who believe in our mission to save coral reefs. Thank you for all that you do.

Suzanne Frey

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