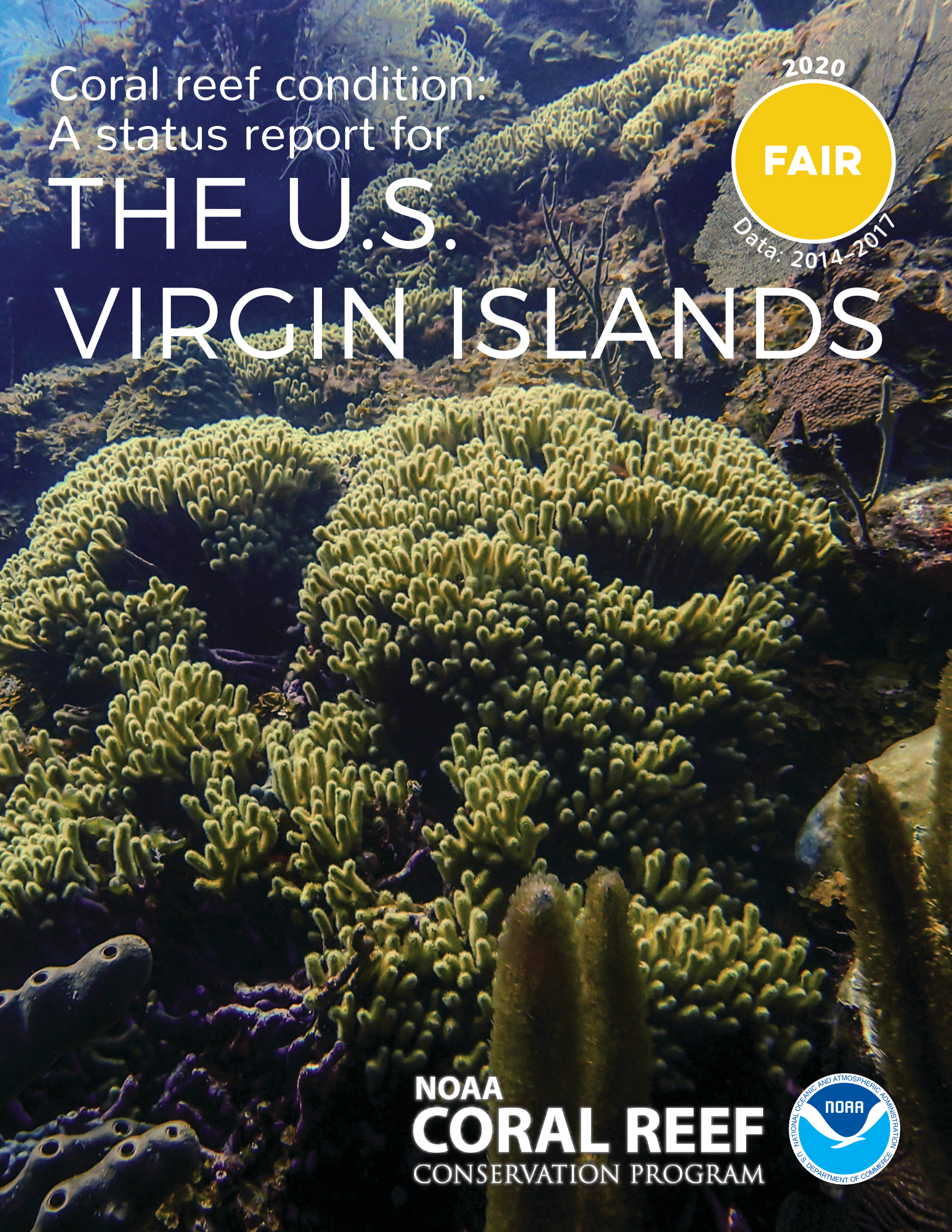

Coral reef condition:
A status report for
THE U.S.
VIRGIN ISLANDS
2020
FAIR
Data: 2014-2017
NOAA
CORAL REEF
CONSERVATION PROGRAM
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

# CORAL REEFS ARE IMPORTANT

Healthy coral reefs are among the most biologically diverse ecosystems on Earth and have high cultural and economic significance. They provide billions of dollars in food, jobs, tourism, coastal protection, and other important goods and services to people around the world. Located in the Caribbean Sea, the U.S. Virgin Islands are part of an island chain in the Greater Antilles archipelago that include St. Thomas, St. John, St. Croix, and about 50 outlying islands and cays. Coral reefs are an integral part of life in the U.S. Virgin Islands, influencing everything from the economy and employment to food and island health. Even the islands' housing and infrastructure benefit from the reefs' capacity to protect the shoreline from powerful wave energy.

*Corals break oncoming waves before they hit the shore. Photo: Christine Munisteri.*

## Coral reef ecosystems are integral to the economy of the U.S. Virgin Islands

The people of the U.S. Virgin Islands love their beaches and clear water ; so do the visitors who come from around the world. Healthy reefs support the islands' culture and livelihoods — both directly and indirectly. From banking to water sports , hotels to transportation , real estate to fishing , healthy reefs provide many benefits. Everyone has a responsibility to preserve these benefits for generations. What actions can you take so the shared benefits coral reefs provide continue into the future?


**1917**
The land now comprising the U.S. Virgin Islands is purchased from Denmark.

**1959**
Establishment of Virgin Islands National Park.
*Logo: National Park Service.*

**1961**
Establishment of Buck Island Reef National Monument.

**1962**
Addition of nearly 9 mi² to Virgin Islands National Park.

**1972**
The Island Resource Foundation, a nonprofit NGO, is established in established in the Territory.

**1972**
Dr. Jack Randall conducts fisheries research at Lameshur Bay on St. John.

**1972**
The West Indies Laboratory begins operations in St. Croix.

**1978**
Virgin Islands Coastal Zone Management Act signed into law.

**1983-1986**
Island Resources Foundation and partners conduct Virgin Islands Resource Management Cooperative reports, which establish baseline data for St. John.

**1989**
Hurricane Hugo strikes the islands.

**1992**
Establishment of Salt River Bay National Historic Park and Ecological Reserve.

**1993**
Spawning site closures: Mutton Snapper, Red Hind.

# REEFS ARE UNDER THREAT

Coral reefs are declining globally, and this has significant ecological, social, cultural, and economic impacts for us. In the U.S. Virgin Islands, coral reefs are threatened by coral disease, pollution, climate change, and other stressors.

### Land-based sources of pollution

Land-based sources of pollution include sediment, nutrients, and other pollutants that run into the ocean from land, usually through runoff after heavy rain events. Pollution can hurt coral reefs by smothering corals that are accustomed to living in clear water. The added nutrients from pollution enable algae and cyanobacteria to bloom over the reef, limiting sunlight for slower-growing corals. Harmful chemicals found in pollution can also disrupt and even kill sensitive reef creatures. Control and prevention of pollution is particularly important, but is challenging to address due to the islands' steep hillsides, frequent, heavy rainfall, and the close proximity of shallow coral reefs to the shore.

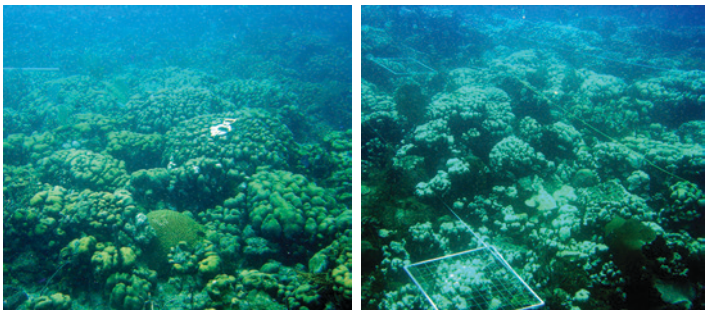
### Coral disease

In addition to chronic threats—both local stressors like pollution as well as global stressors like climate change—an emergent coral disease outbreak known as Stony Coral Tissue Loss Disease, has made coral disease the most prominent threat to the resilience of these reefs. Scientists from local and federal agencies and universities are working together with citizen science groups and community partners to combat this new threat. The public is encouraged to report sick or dead corals to the USVI Department of Planning and Natural Resources and avoid impacted reefs.

*A large coral colony is infected with Stony Coral Tissue Loss Disease. Photo: Leslie Marie Henderson.*

### Climate change

Climate change is considered the greatest global threat to coral reefs. Human-induced greenhouse gas emissions are warming the oceans, and as a result, mass coral bleaching events and disease outbreaks are becoming more frequent. In 2005, the U.S. Virgin Islands suffered a major coral bleaching event, followed by a disease outbreak where U.S. Virgin Islands lost nearly half of its corals in an extensive die off. Major bleaching occurred again in both 2010 and 2019.



*Tektite Reef off St. John in 2004 (left) and in 2005 (right) during a bleaching event. Photos: National Park Service.*

**GREEN** = biology and hurricanes **LIGHT BLUE** = governance related to marine/reef management **PINK** = social/economic **BLUE** = general historic/government events and governance

**1995** Hurricane Marilyn strikes the U.S. Virgin islands.

**1999** Establishment of Hind Bay Marine Conservation District.

**2000** Buck Island Reef National Monument expanded to include additional 29.7 mi².

**2001** Establishment of Virgin Islands Coral Reef National Monument.

**2005** Grammanik Bank offshore fishing closure.

**2005** Coral disease and bleaching event.

**2006** Corals *Acropora cervicornis* and *Acropora palmata* are listed as Threatened under the Endangered Species Act.

**2006** Harvest of Nassau Grouper prohibited.

**2008** Invasive lionfish (*Pterois* sp.) introduced to U.S. Virgin Islands.

**2010** Coral bleaching event.

**2012** Invasive seagrass, *Halophilia stipulacea* first reported. *Photo: NOAA.*

**2014** Five more stony coral species are listed as Threatened under the Endangered Species Act.

**2017** Hurricanes Irma and Maria hit the U.S. Virgin Islands.

**2019** Stony coral tissue disease identified in St. Thomas.

**2019** Coral bleaching event.

# SURVEYING DAMAGE FROM IRMA & MARIA

Shallow, nearshore coral reefs provide valuable protection to coastal infrastructure from storm surges and waves. They reduce wave energy during tropical storms and hurricanes, which has the potential to save both lives and millions of dollars every year. This ecosystem service highlights the importance of coral reefs for coastal resilience and disaster readiness.

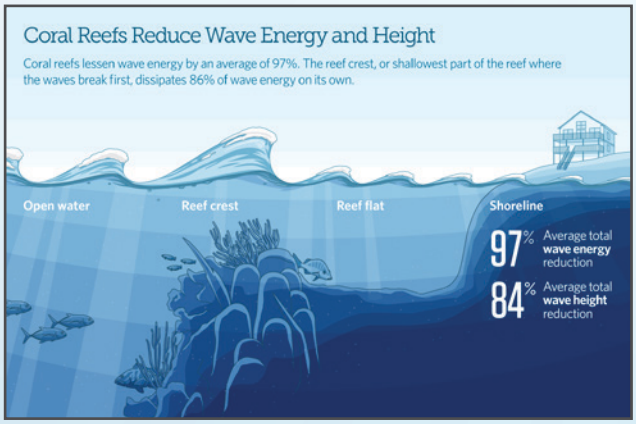



*Diagram depicting how reefs decrease wave impacts to coastal areas. Image: The Pew Charitable Trusts.*

However, the same reefs that provide protection to coastal communities are also susceptible to storm damage themselves. In September 2017, Hurricanes Irma and Maria hit the U.S. Virgin Islands, causing catastrophic damage to the islands and island communities. Coral reefs were also heavily damaged. Corals were broken and dislodged by intense wave energy and terrestrial debris that landed in the water. Shallow nearshore reefs received the most damage. After the hurricanes, limited emergency restoration was conducted at select sites. Approximately 2,500 loose coral fragments were stabilized across the territory. However, this represents only a small fraction compared to the number of fragments lost. Additional restoration is critical for these nearshore reef systems in order for them to continue to provide the valuable ecosystem service of coastal protection.

*A diver recovers a large coral colony fragment. Photo: Leslie Marie Henderson.*

# RESTORING THE U.S. VIRGIN ISLANDS' REEFS

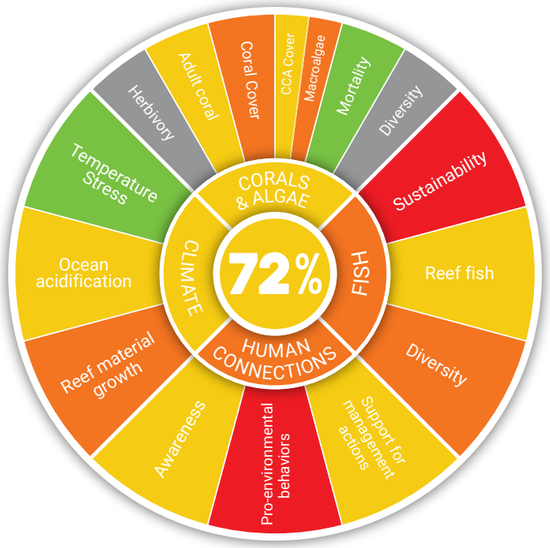
Coral reefs in the U.S. Virgin Islands, with their inspiring coral structures, colorful fish, and other vibrant marine life, provide livelihoods and recreation for many residents. Because of their significant ecological, cultural, and economic value, healthy coral reefs improve the well-being of communities and the economy in the U.S. Virgin Islands. Therefore, it is important to conserve these reefs. While the data in this report were collected by NOAA scientists and partners in the U.S. Virgin Islands for the National Coral Reef Monitoring Program, you don't necessarily need to be a scientist to contribute to reef monitoring and restoration. These efforts typically include an extensive collection of ecological and biological data, and many scientists are eager to enlist concerned citizens to help with that collection.


*Divers help restore coral reefs in the U.S. Virgin Islands. Photo: Jason Quetel.*

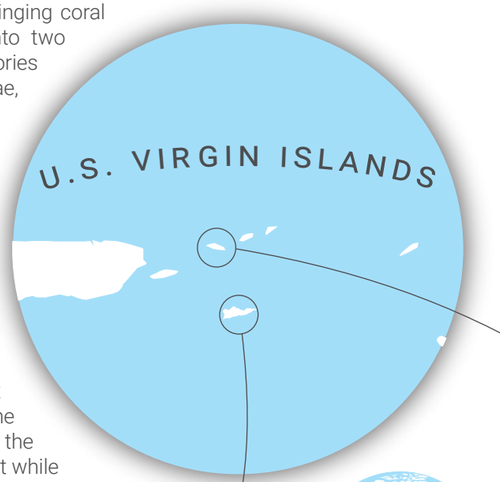
If you want to help grow our understanding of coral reefs, consider getting involved in a citizen science project! Citizen science projects involve members of the public who participate in the collection and analysis of environmental data, often times in collaboration with professional scientists. One such example is Virgin Islands Reef Response, a program centered on coral restoration. Located on St. Thomas, 'reef responders' (scientist and non-scientist alike) work to simultaneously increase coral cover and diversity around the islands and to enable communities eager to mitigate the adverse impacts to marine habitat. Much of the data collected and used to inform reef management and policy in the U.S. Virgin Islands would not exist without the help of citizen science efforts from VI Reef Response, The Nature Conservancy, or diving groups organized by local residents.

# U.S. VIRGIN ISLANDS CORAL REEFS ARE IN **FAIR CONDITION**

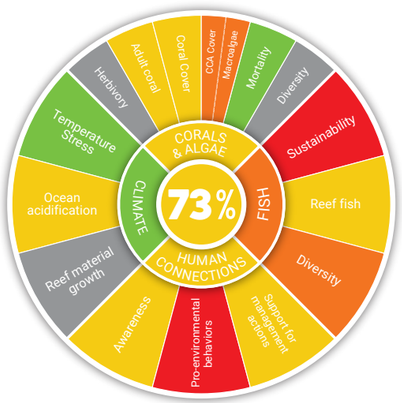
## U.S. VIRGIN ISLANDS




The United States Virgin Islands are an unincorporated Territory located southeast of Florida between the Atlantic Ocean and the Caribbean Sea. The Territory consists of three major islands and a network of smaller ones, all of which are surrounded by fringing coral reefs. The U.S. Virgin Islands were divided into two sub-regions to evaluate condition of four categories as the relate to coral reef health—corals & algae, fish, climate, and human connections (see Key Themes & Indicators for descriptions). The U.S. Virgin Islands' coral reefs are in fair condition overall. Coral cover and macroalgae cover are impaired, while adult coral populations and CCA cover are fair. Fish are moderately to severely impacted, and the sustainability of fish populations is critical. The overall fair score for climate reflects how intensely climate-related impacts are negatively affecting coral reef health. Ocean acidification is a global problem and a particularly significant stressor for coral reef ecosystems throughout the Caribbean. Reef material growth is impaired in the U.S. Virgin Islands. Island-wide surveys show that while awareness of coral reef issues and support for management actions are moderate, pro-environmental behaviors are severely lacking. More work needs to be done to raise awareness and improve on-the-ground actions aimed at protecting and restoring coral reefs. Overall, the Territory is struggling against threats, such as pollution, overfishing, and climate change.




## ST. CROIX

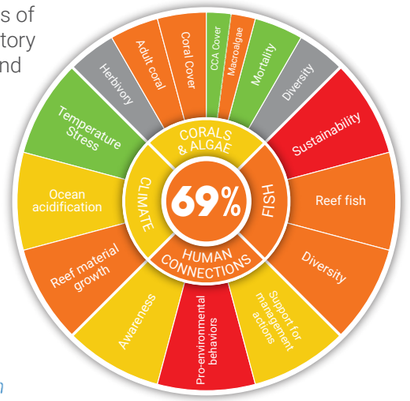


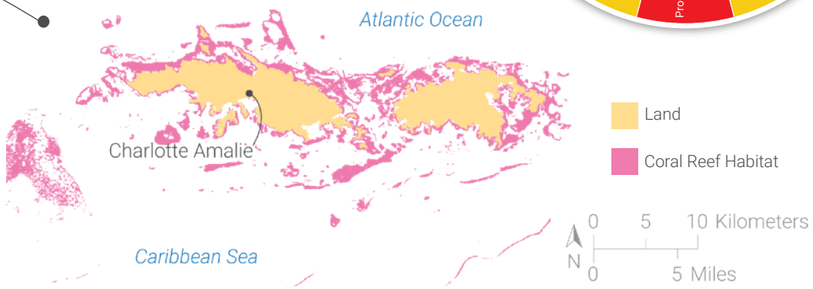


St. Croix is the largest island in the U.S. Virgin Islands, sitting 42 miles south of St. Thomas and St. John. While historically an agriculture-driven economy, St. Croix's economy is currently driven by tourism and industry (manufacturing). St. Croix's coral reefs are in fair condition, meaning they are moderately impacted. The corals & algae that support the overall reef ecosystem are in fair condition. St. Croix's fish populations are impaired by overfishing, pollution, and climate change. Human connections to the reef, indicated by awareness, support for management, and pro-environmental behaviors, are moderate. Protection and restoration are needed to improve the condition of these reefs.

## ST. THOMAS & ST. JOHN

St. Thomas and St. John are two of the larger islands of the U.S. Virgin Islands chain. The capital of the Territory (Charlotte Amalie) is located on St. Thomas, the island home to just over half of the Territory's population. St. Thomas and St. John's coral reefs are impaired overall. Corals, algae, and climate conditions are fair, meaning they are moderately impacted. Fish are impaired overall and sustainability of fishes is critical. Additionally, human connections to the reef are impaired, meaning people's connections to reefs are lacking. Protecting coral reefs from pollution and overfishing can improve the health of these reefs.




## WHY A STATUS REPORT?

Effective coral reef conservation cannot be accomplished without an informed and engaged public. This status report is part of an ongoing series of documents to track the status and trends of coral reefs across the U.S. and its territories. **The USVI coral status report is part of a larger effort to provide the public and decision-makers with information about managing and conserving coral reef ecosystems.**

**This status report provides a geographically specific assessment of U.S. Virgin Islands coral reef condition for the period 2014–2017. The U.S. Virgin Islands were divided into two sub-regions based on data resolution, geographical features, and impacts to the ecosystem. Data were collected by NOAA's National Coral Reef Monitoring Program. For more detailed information on methodologies, indicators, thresholds, and scoring, visit http://www.coris.noaa.gov (keyword: status report).**

### What do the scores mean?

**90–100% Very Good**
All or almost all indicators meet reference values. Conditions in these locations are unimpacted, or minimally impacted or have not declined. Human connections are very high.

**80–89% Good**
Most indicators meet reference values. Conditions in these locations are lightly impacted or have lightly declined. Human connections are high.

**70–79% Fair**
Some indicators meet reference values. Conditions in these locations are moderately impacted or have declined moderately. Human connections are moderate.

**60–69% Impaired**
Few indicators meet reference values. Conditions in these locations are very impacted or have declined considerably. Human connections are lacking.

**0–59% Critical**
Very few or no indicators meet reference values. Conditions in these locations are severely impacted or have declined substantially. Human connections are severely lacking.

**Insufficient Data**
Not scored.

# WHAT IS A HEALTHY REEF?

Snorkeling in the Virgin Islands' blue waters today reveals a world vastly different from what prior generations saw. The health of our coral reefs has declined steadily over time—in part because of declining water quality, overfishing, climate change, and coral disease. Because ecosystems change over time, both in the presence and absence of humans, each successive generation of island residents has their own definition of what a healthy reef looks like. Unfortunately, as young people begin to dive and formulate personal impressions of these marine habitats, the current state of the reefs may begin to be normalized as "healthy." But this does not have to become the new normal.

*Man fishing with casting net, St. Thomas (1918). Photo: University of the Virgin Islands.*

It is vital to keep today's assessment of the coral reefs and associated reef fisheries in the context of the coral reefs our grandparents knew. The days of an epic nearshore spearfishing trip, full of large grouper, snapper, parrotfish, and triggerfish may be in the past, but how we steward our resources today will have a great impact on what future generations may experience in the years ahead.

# REEFS OF THE DEEP

For this status report, NCRMP collected biological samples at depths of up to 100ft. However, in the Virgin Islands, extensive reef systems extend well past 100ft depth. These mesophotic reefs make up three quarters of available reef habitat across the Virgin Islands. Cooler waters at these depths provide a potential shield for corals from thermal stresses more common to reefs in the shallows. Additionally, mesophotic reefs are often sites where many economically important species of fish gather in large numbers at predictable times of the year to spawn and replenish their stock.

# KEY THEMES & INDICATORS

## CORALS & ALGAE

Corals & algae make up the base of the coral reef ecosystem, providing food and shelter for fish, shellfish, and marine mammals. The indicators for corals & algae are:

- **Coral cover**, a measure of what percentage of the bottom (benthos) is living stony coral.
- **Macroalgae cover**, a measure of what percentage of the bottom (benthos) is macroalgae.
- **Crustose coralline algae (CCA) cover**, a measure of what percentage of the bottom (benthos) is crustose coralline algae.
- **Adult coral**, a measure of the density of reproductive age coral species.
- **Herbivory**, a measure of the level of grazing pressure by fish on corals and algae.
- **Mortality**, a measure of the amount of old dead coral skeleton exposed as scars on live coral colonies.
- **Diversity**, a measure of unique coral species present.

## FISH

Coral reefs serve a vital ecological role for fish species. Fish are important to the ecology of the reef, the economy, and the livelihoods of local communities. The indicators for fish are:

- **Reef fish**, a region-specific measure of density for selected fish species.
- **Sustainability**, a measure of human-related fish mortality relative to natural fish mortality.
- **Diversity**, a measure of unique fish species present.

## CLIMATE

Climate affects all components of a reef system. Climate change and ocean acidification influence reefs across the globe, but conditions vary at the regional and local level. The climate indicators are:

- **Temperature stress**, which evaluates the frequency and severity of high temperature events.
- **Ocean acidification**, which indicates if the water chemistry is suitable for the growth of corals and other calcifiers.
- **Reef material growth**, which is a calculated measurement of the yearly gain or loss of three-dimensional reef habitat.

## HUMAN CONNECTIONS

Coral reef management agencies protect reef resources through management plans, public education, and involving communities in managing their resources. The indicators for human connections are:

- **Awareness**, an indicator of residents' familiarity with threats to and the importance of reefs.
- **Support for management actions**, an indicator of support for reef management activities.
- **Pro-environmental behavior**, an indicator of residents' participation in activities to protect the environment.

# TAKING ACTION TO IMPROVE REEF HEALTH

There are many positive actions that we can take to protect and restore reefs from threats throughout the U.S. Virgin Islands. Local and federal governments as well as community groups strive to guide the public towards coral-friendly behaviors. It is a big, complex job that requires a variety of approaches. The table below highlights a few of the ongoing and future projects and programs taking place throughout the islands.

| Challenge | Current Action | Future Action |
|---|---|---|
| Lack of awareness among community members of coral reef health and threats | Ongoing outreach to communities; development of audience-specific messaging about coral reefs | Implement consistent messaging through audiences' favored channels and media |
| Uncertainty surrounding extent of future climate change impacts | Coastal resilience coordinator hired for the territory | Begin incorporating resilience in planning; monitoring of climate change stressors and indicators |
| Insufficient enforcement of USVI coastal and marine regulations | Increase compliance through outreach | Increase cross and interagency response missions and agreements, cooperation and communication |
| Cumulative impact of diverse shoreline and marine stakeholders, and their priorities | Permitting process allows review and dialogue; hearings allow public input | Consistent stakeholder-oriented messaging to clarify purpose of permitting |

# WHAT YOU CAN DO TO HELP

**There are many threats to coral reefs. Here are a few actions YOU can take to help conserve coral reefs:**

**Respect your island home and the beach you love by disposing of trash appropriately. Don't dump in ghuts.**

**Obey all natural reserve regulations, and do not drop your anchor in reef areas. Instead, use designated mooring buoys, or drop anchor on sandy bottom areas.**

**Support initiatives that preserve and protect coral reefs.**

**Be responsible for the fishing gear you use.**

**Only catch enough fish for you and your family. If you don't fish, choose seafood that is sustainably harvested.**

**Educate yourself about coral reefs and the creatures they support.**

**Don't stand on or touch live coral. Don't take pieces of corals home with you.**

**Participate in volunteer-based/citizen science initiatives aimed at coral restoration.**

**Reduce single-use! Say no thanks to plastic drinking straws, cutlery, and bottles.**

**Have your septic system inspected annually to ensure proper functionality.**

## Status report working group

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## About this status report

This status report is a joint product of NOAA's Coral Reef Conservation Program (CRCP) and the University of Maryland Center for Environmental Science. Science communication, design, and layout by Nathan Miller, Caroline Donovan, Heath Kelsey, Max Hermanson, and Annie Carew. March 2020.

## Acknowledgements

The CRCP supports effective management and sound science to preserve, sustain, and restore valuable coral reef ecosystems for future generations. For more information, visit coralreef.noaa.gov .Cover photographed at Cane Bay, St. Croix in 2017 by Sarah Groves.



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*The status report working group during the workshop in St. Thomas, USVI, May 2019.*

NOAA CORAL REEF CONSERVATION PROGRAM

University of Maryland CENTER FOR ENVIRONMENTAL SCIENCE