

Addressing Global Threats at Local Scales in Coral Reef Communities: Outcomes and Lessons Learned from the NOAA/CRCPC Partnership





**Florida
Reef Resilience
Program**

A Public and Private Partnership

The Nature Conservancy



Protecting nature. Preserving life.™



Institute for
Marine Remote Sensing



Southeast
Florida
Coral Reef
Initiative

Acting above to protect what's below.

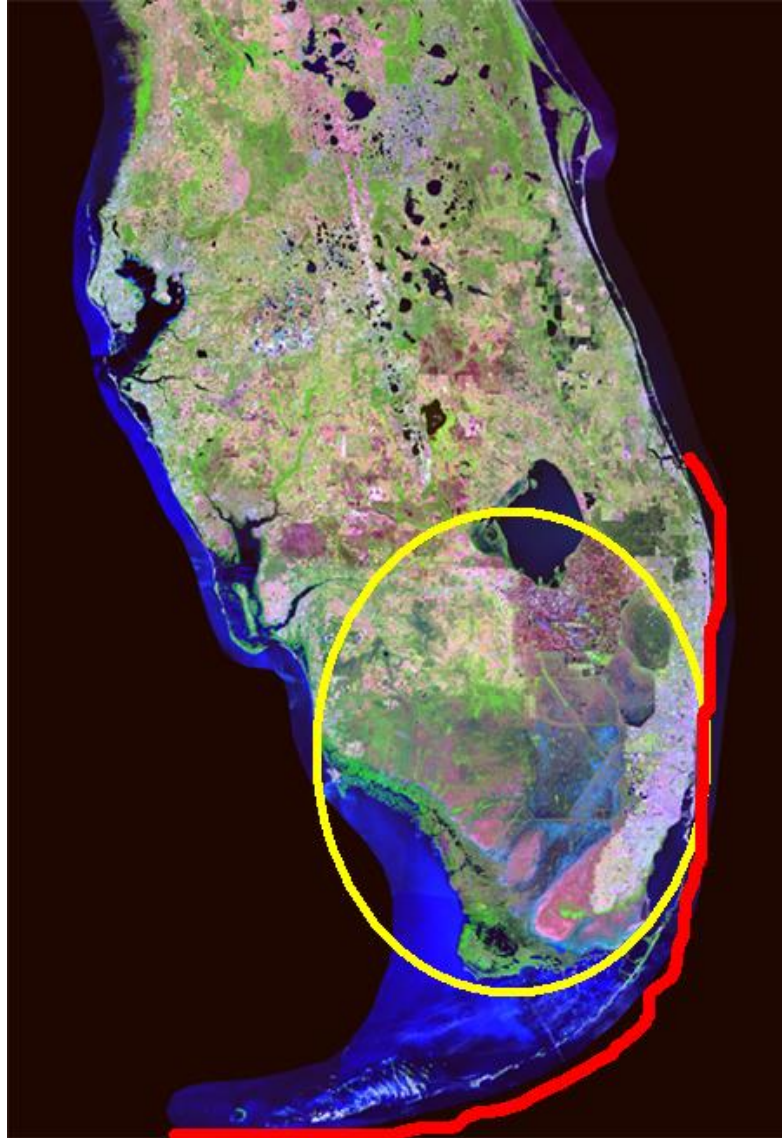


UNIVERSITY OF MIAMI
ROSENSTIEL
SCHOOL of MARINE &
ATMOSPHERIC SCIENCE



NOAA
CORAL REEF
CONSERVATION PROGRAM

Where are Florida's Coral Reefs?

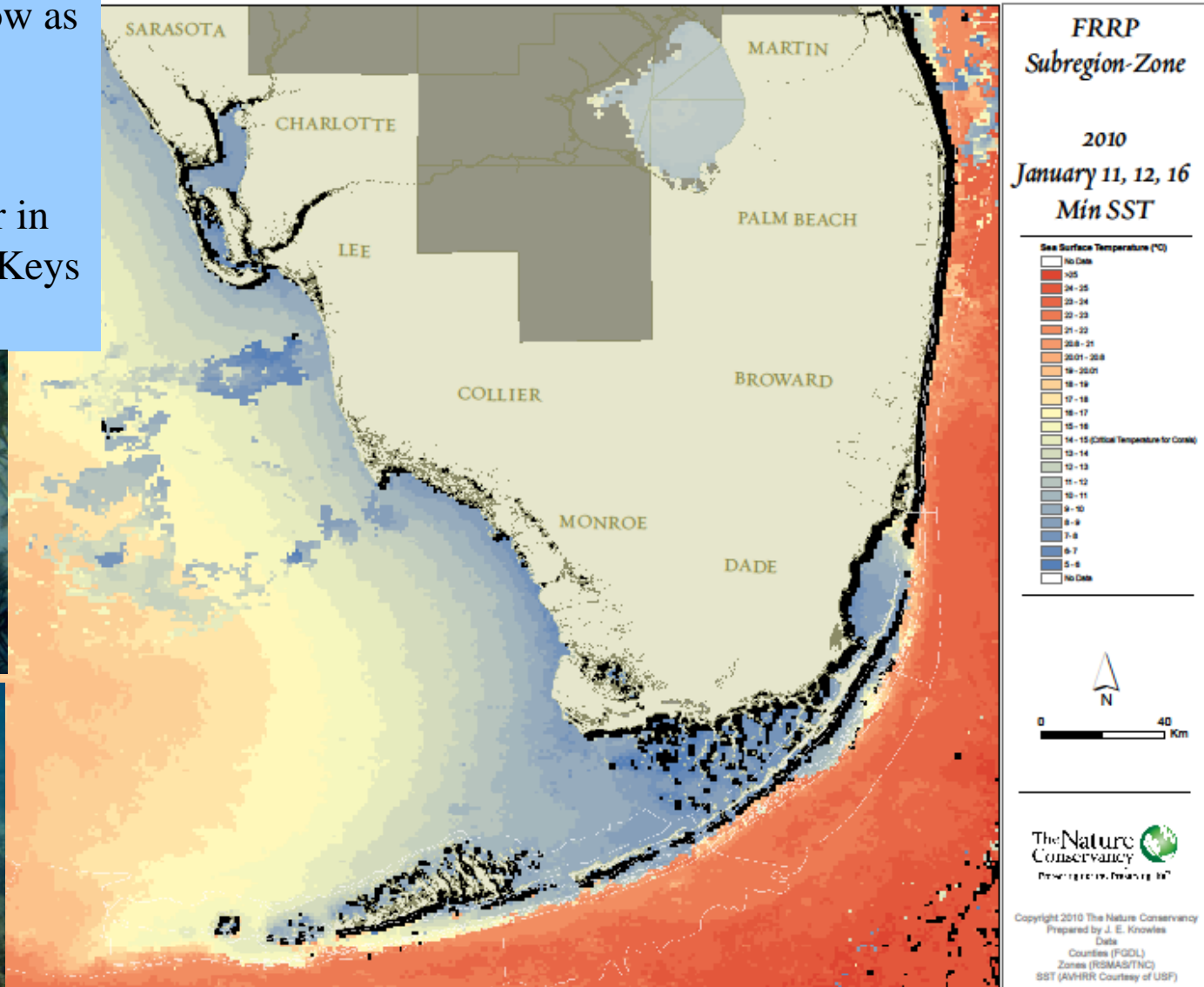


Disturbance Response Monitoring (DRM)

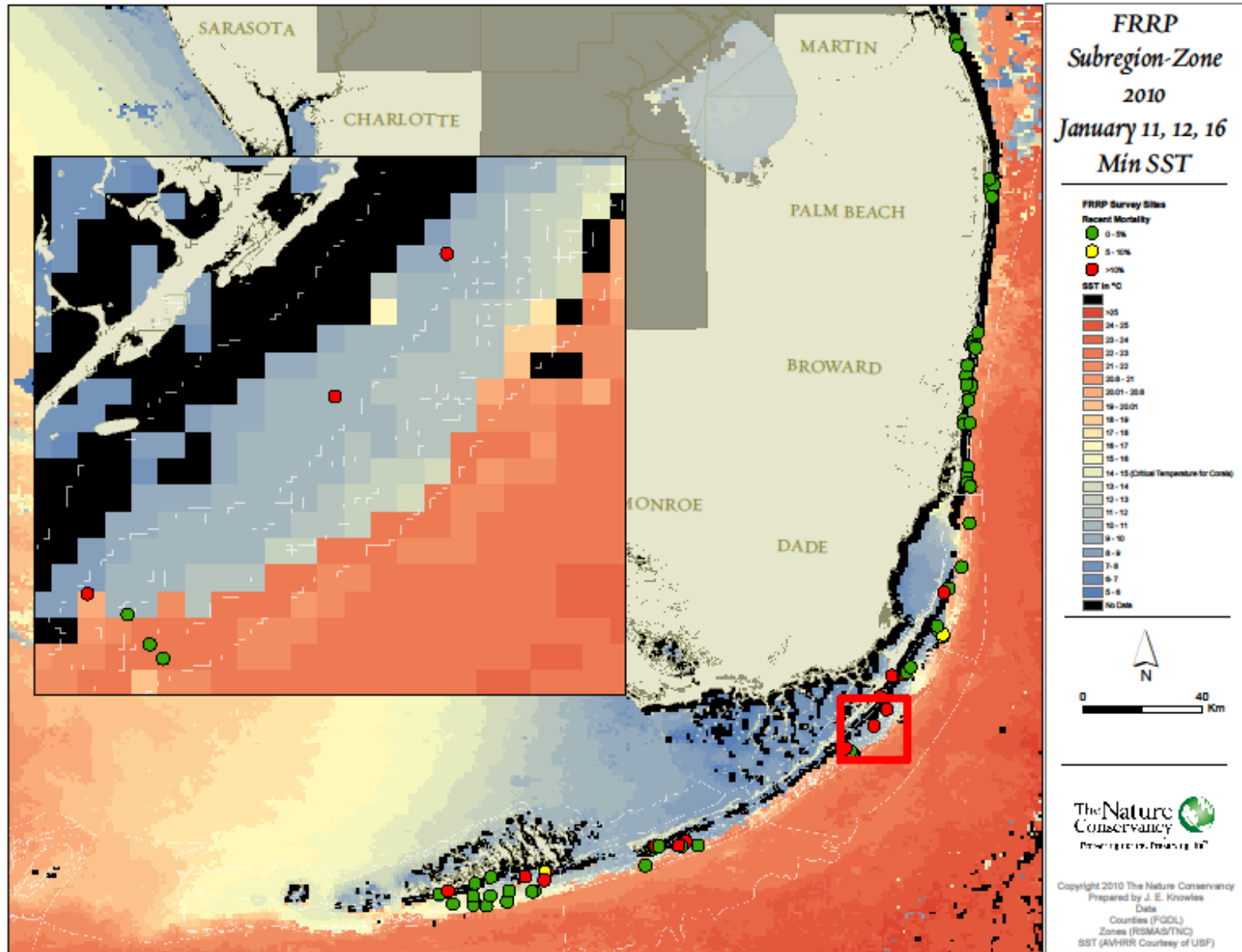


2010 January Cold Water Event

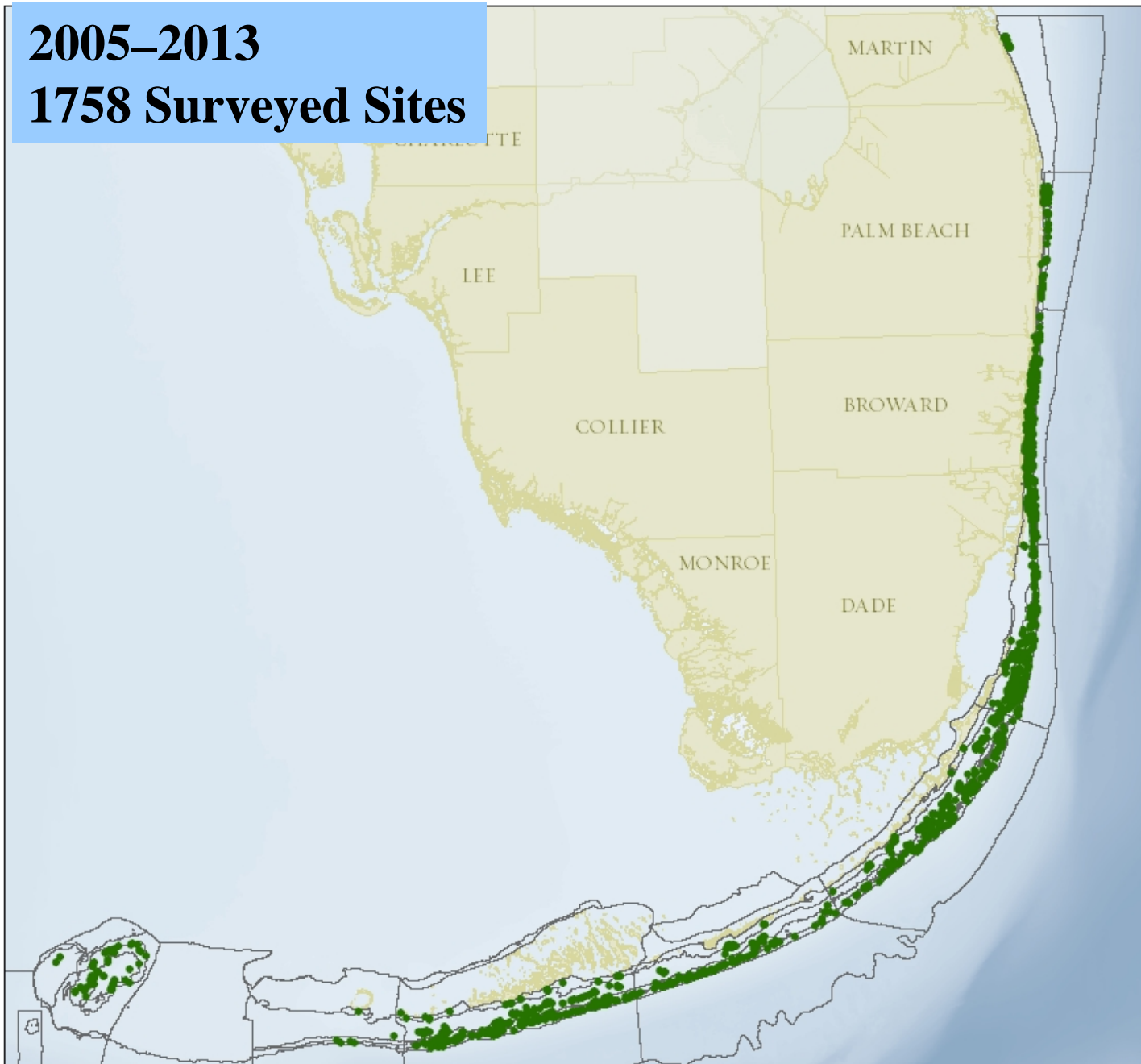
- Water Temperature as low as 8°C
- 15°C is critical low temperature for Corals
- Most Severe Cold Water in Upper Keys and Middle Keys Nearshore Zones



2010 January Cold Water Event



2005–2013 1758 Surveyed Sites



FRRP
Subregion-Zone

2005-2010

1186
Surveyed Sites



The Nature
Conservancy 
Preserving nature. Preserving life.

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Prepared by M. Johnson
Data
Counties (FGDL)
Zones (TMC)

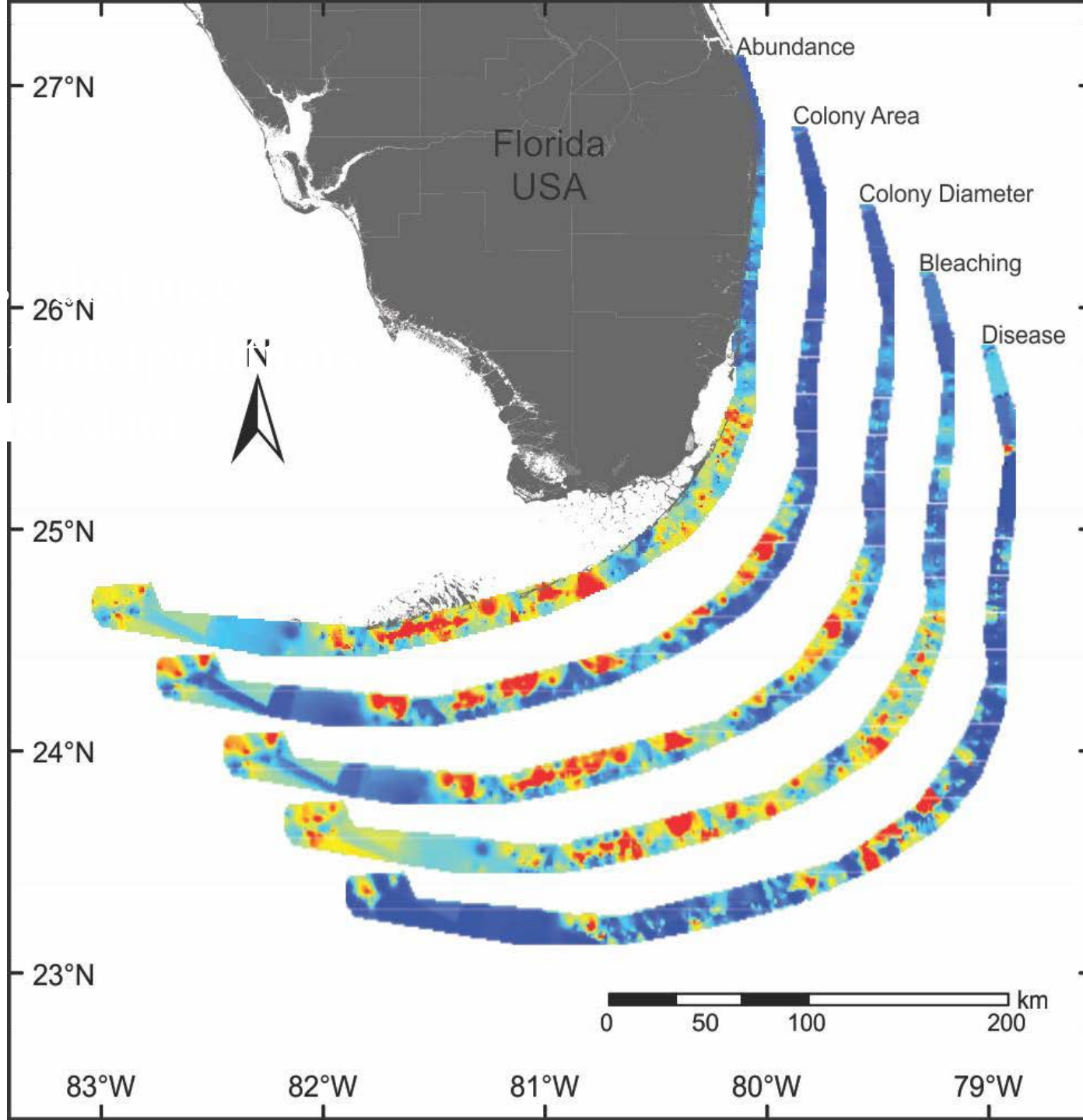


Photo by Mow Marine Laboratory

Florida Reef Tract

Coral Bleaching Response Plan






WWW.FRRP.ORG

The Florida Reef Resilience Program - Data

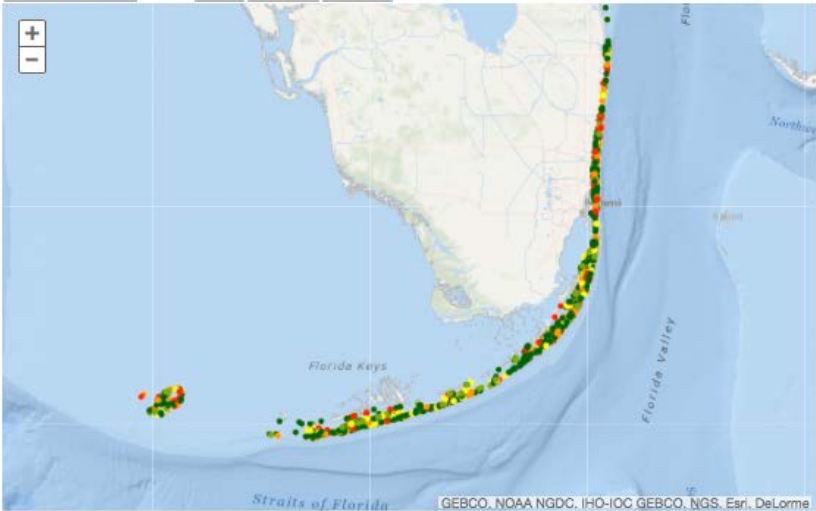
frpp.org/data/

Home About Us Florida's Reefs Coral Restoration Coral Monitoring **Data** Get Involved Publications & Resources Courses




Data



Variable to Display Filter by: Year Species Disease



GEBCO, NOAA NGDC, IHO-IOC GEBCO, NGS, Esri, DeLorme



FRRP Surveyors: click the icon to login to the online data entry system.



Generate Report Click the icon to generate reports from the collected FRRP data

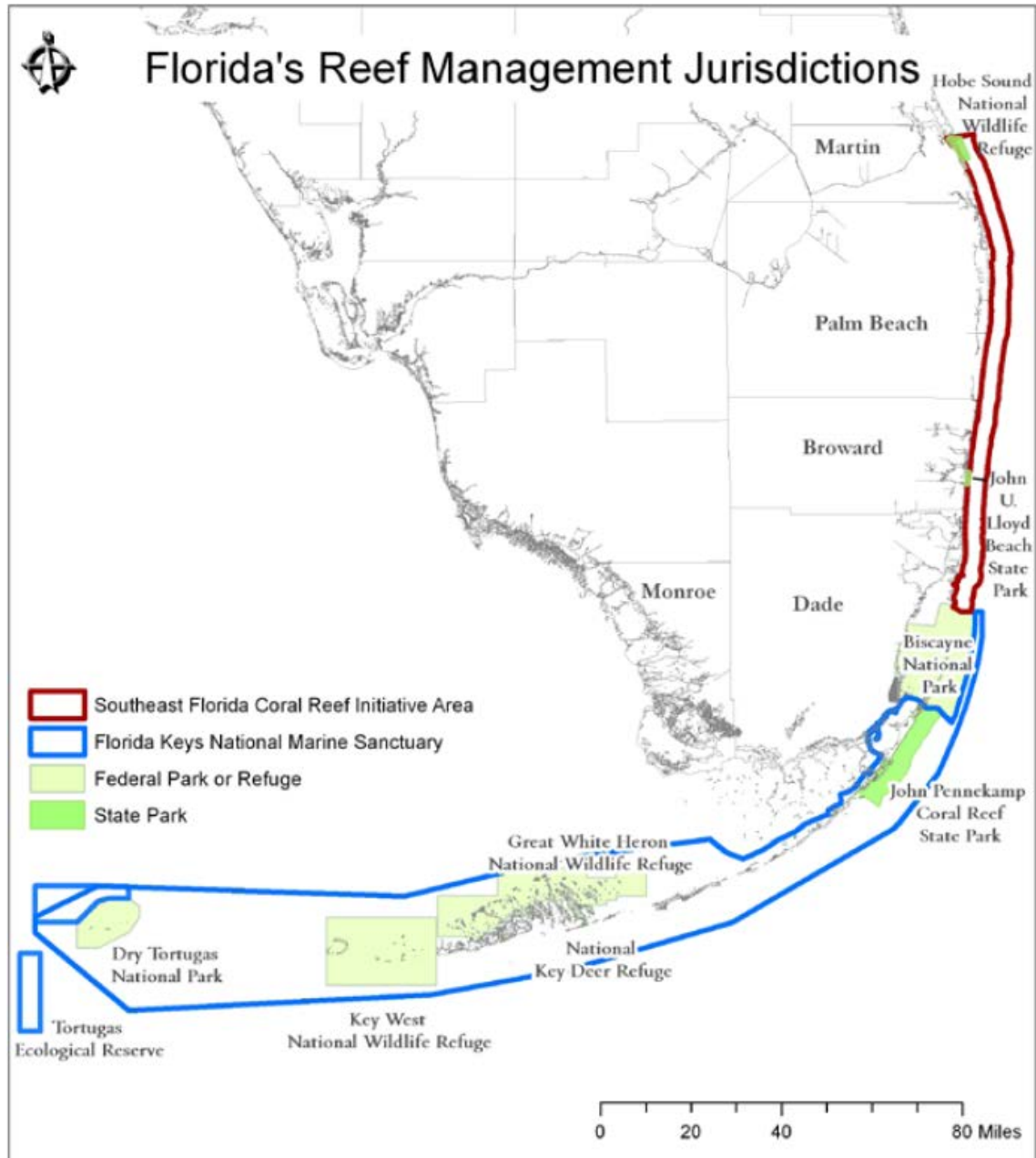
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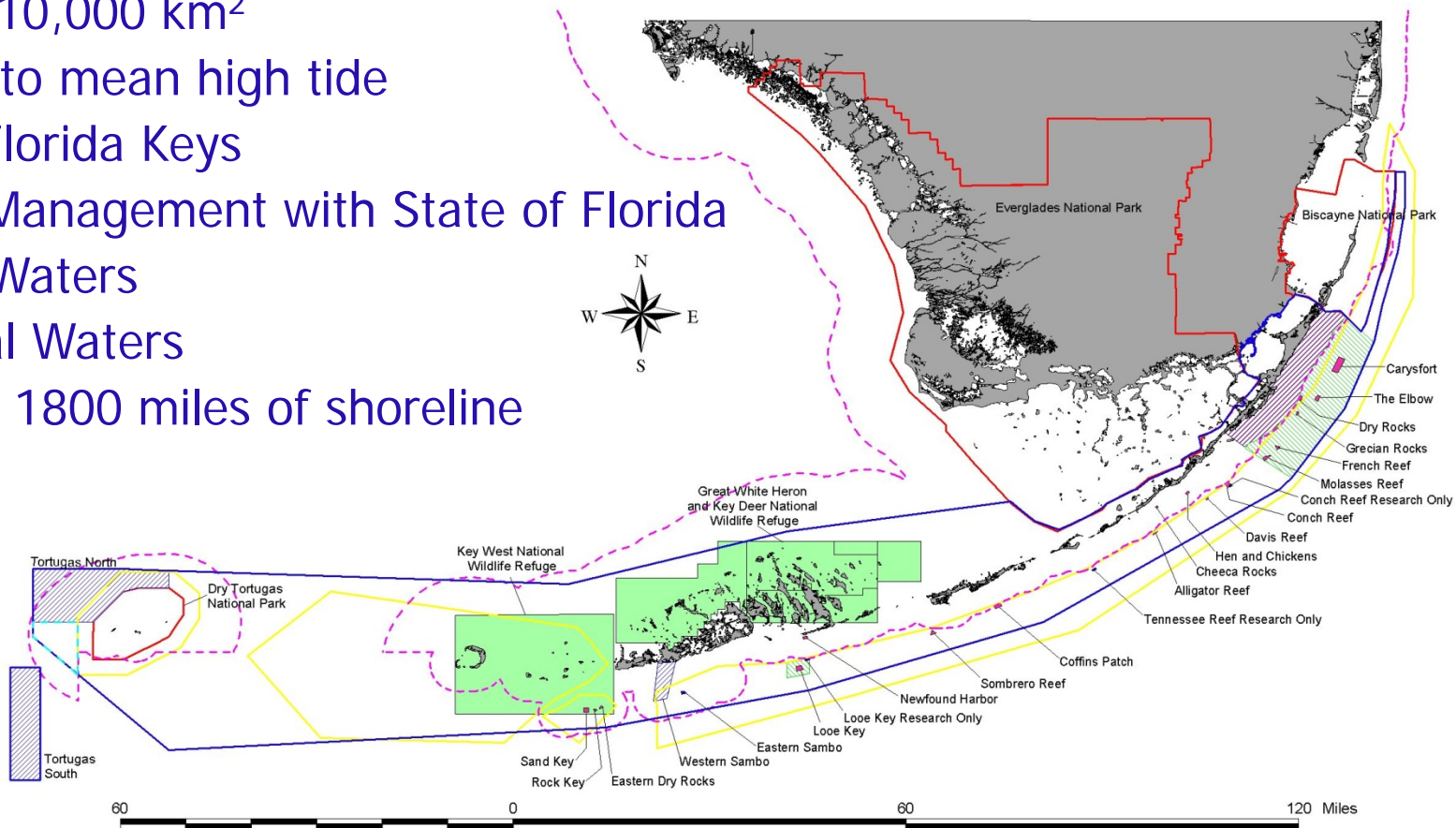
Improving Management of Florida's Reefs.



Florida Keys National Marine Sanctuary



- 2900 nm² / 10,000 km²
- Jurisdiction to mean high tide
- Surrounds Florida Keys
- Co-trustee Management with State of Florida
- 60% State Waters
- 40% Federal Waters
- 1600 Keys / 1800 miles of shoreline





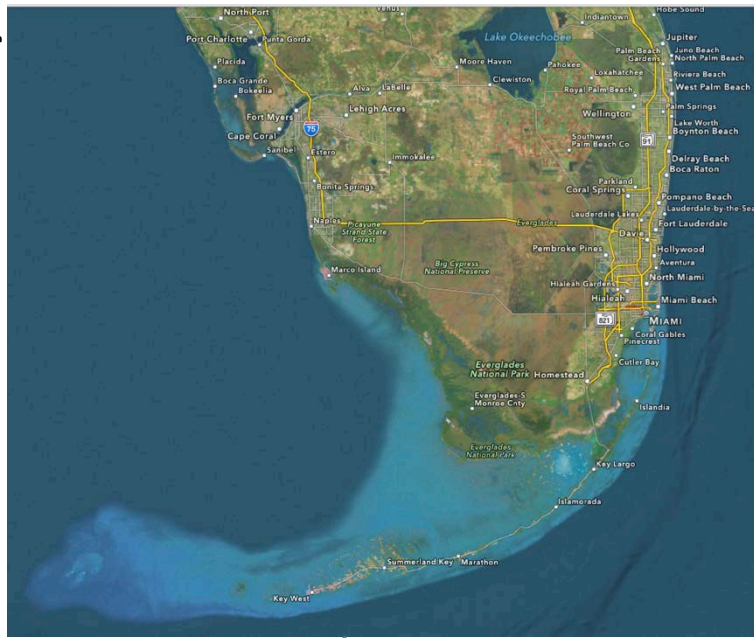
OUR FLORIDA REEFS

YOUR VOICE, OUR FUTURE





Florida Reef Managers

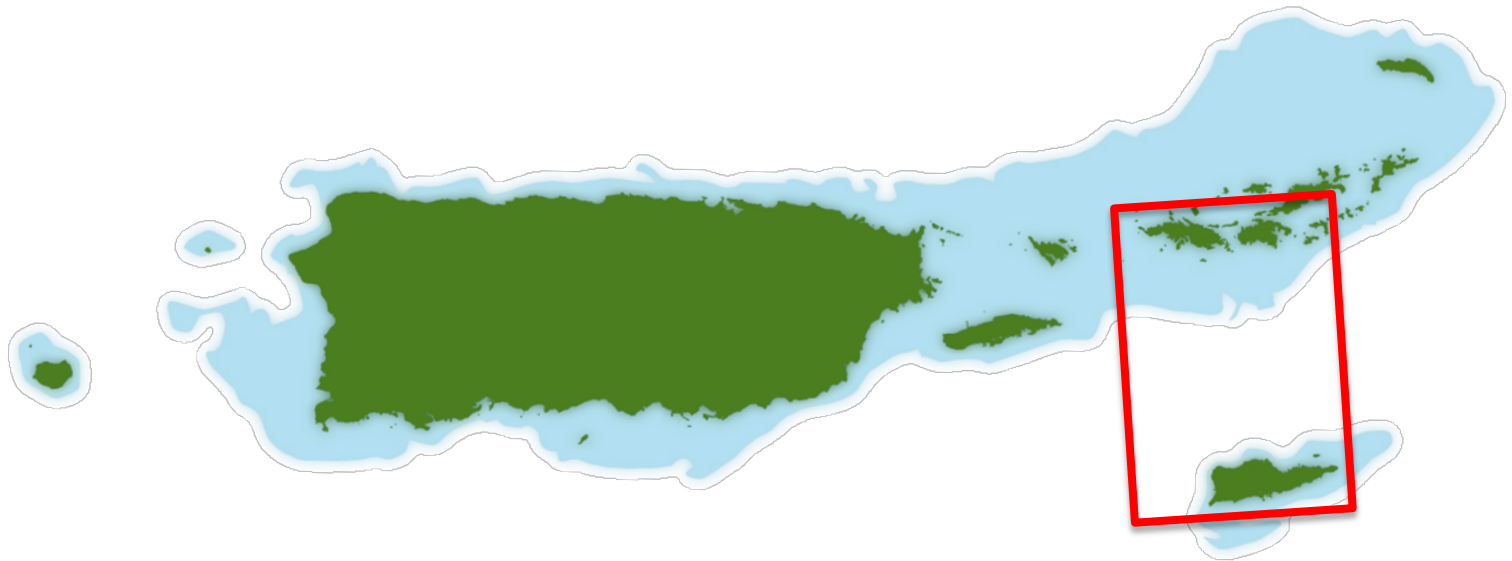
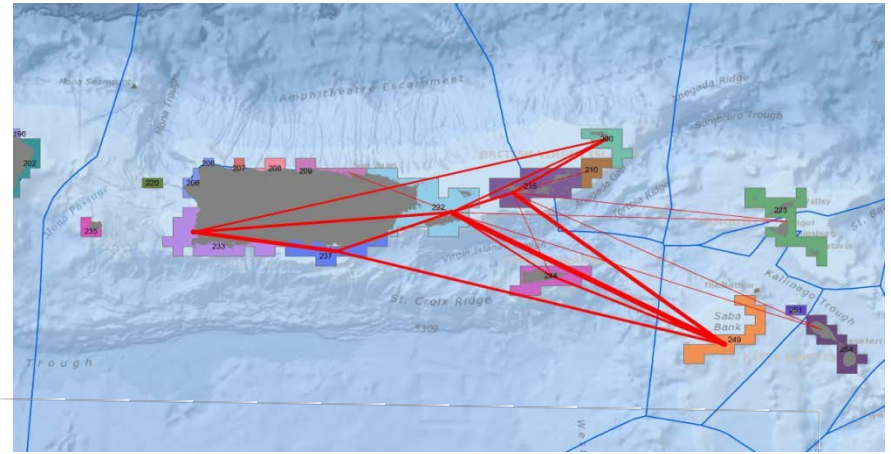


Caribbean Reef Managers

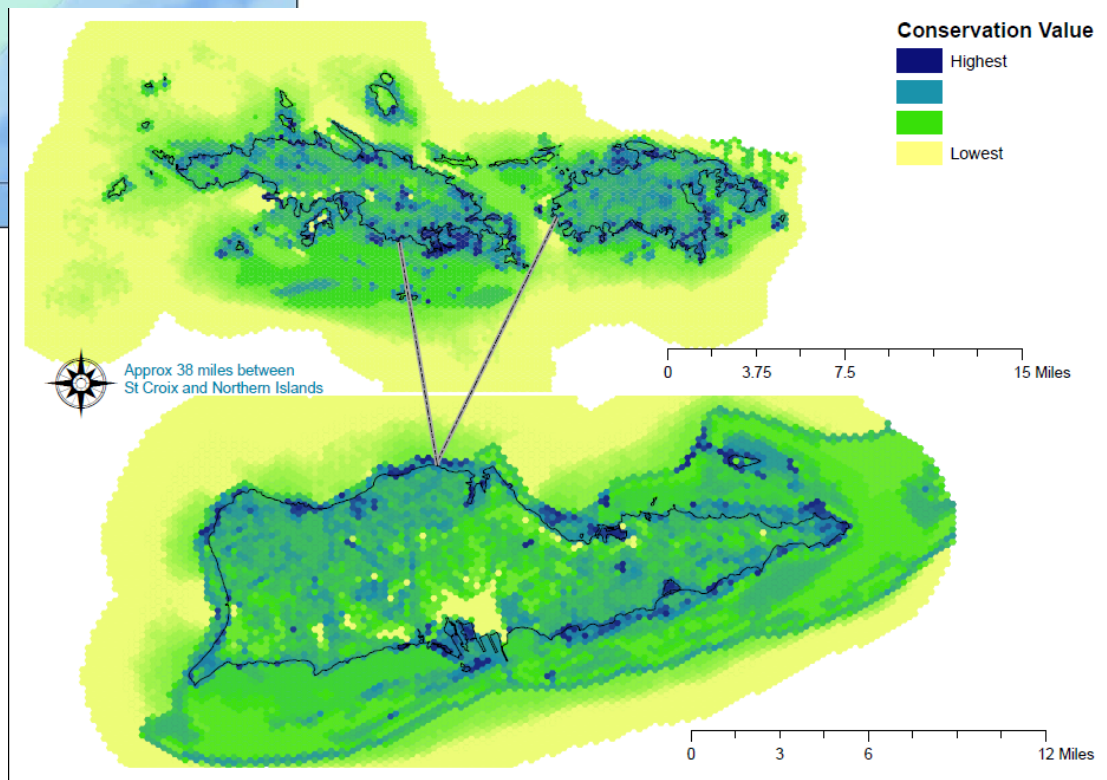
Partnerships for Coral Reef Conservation in the Virgin Islands



Aaron Hutchins, Program Director
Virgin Islands and Puerto Rico



VIRGIN ISLANDS: PROTECTED AREAS





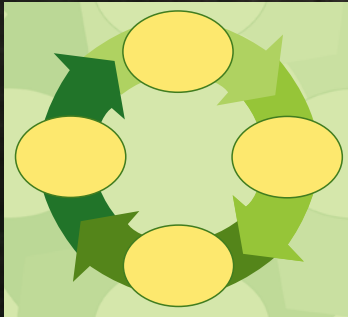
Coral Assembly 2011



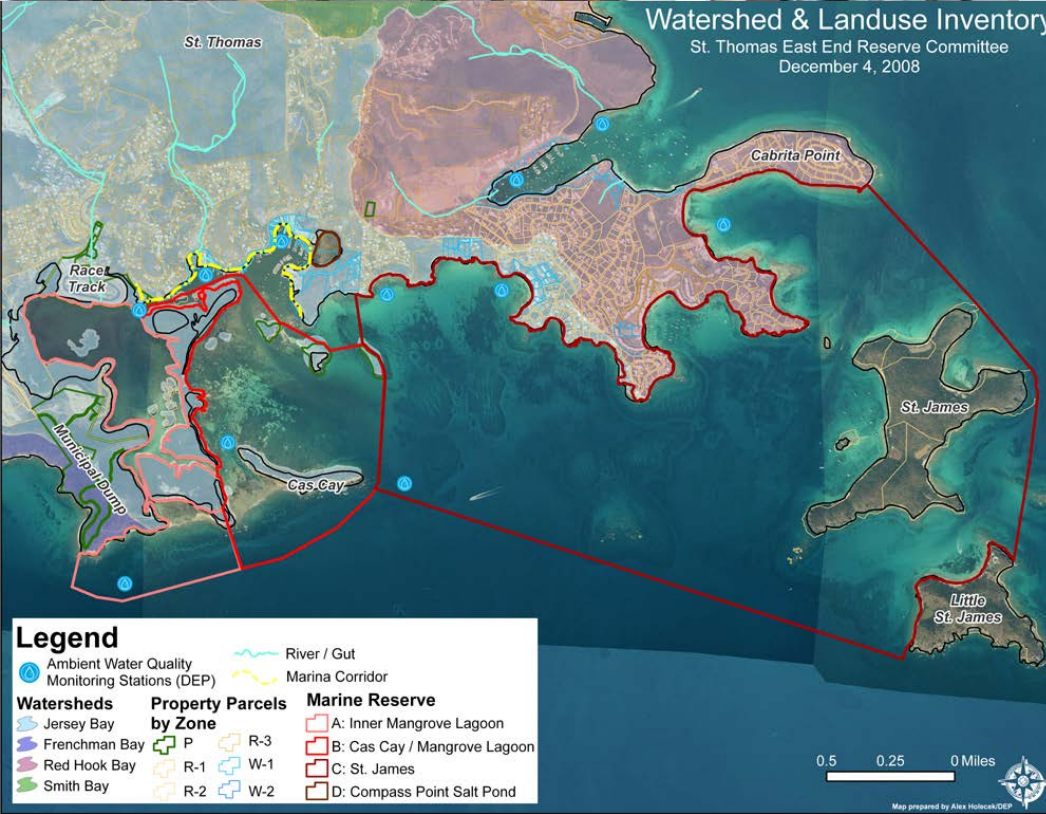
Puerto Rico, US and British Virgin Islands:
Improving Regional Reef Management

www.reefconnect.org





CAP LOGO NEEDED



St. CROIX EAST END MARINE PARK

Management Plan Summary Document

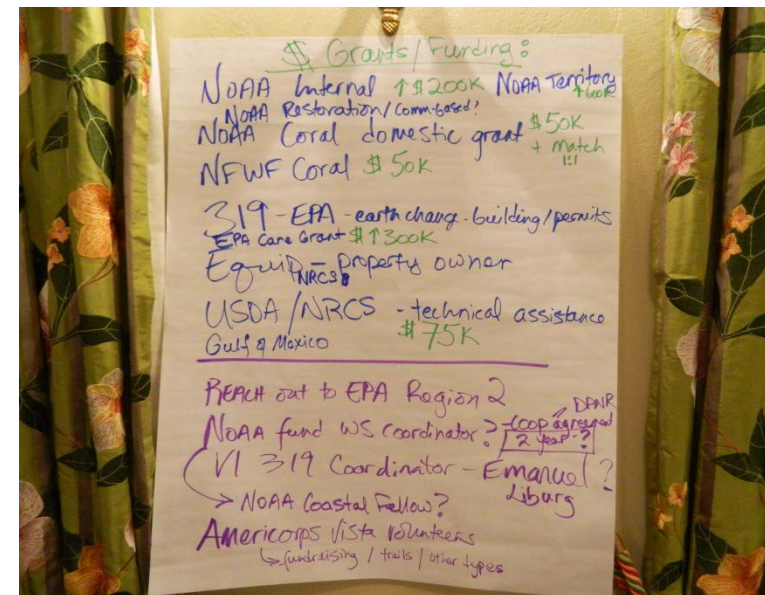
November 2013

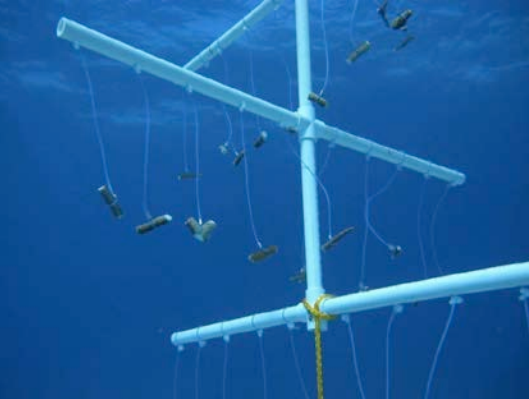


The St. Croix East End Marine Park (STXEEMP)

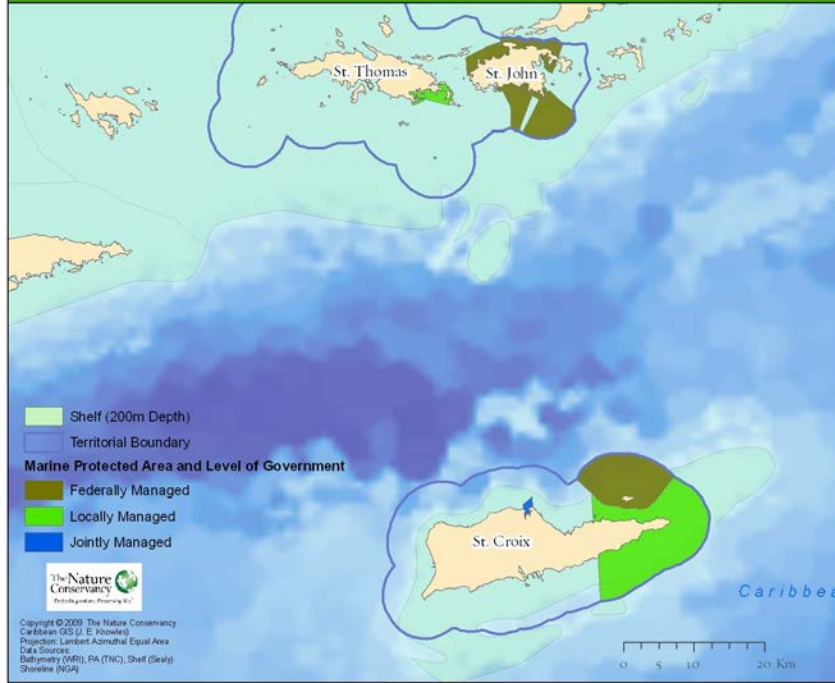
The updated 2013 STXEEMP management plan contains the roadmap for effectively conserving the coastal and marine, natural and cultural resources of the east end of St. Croix.

In recognition of the importance of adjacent natural and cultural resources as well as the imminent threats to them, a collaborative planning process between the STXEEMP community and the Virgin Islands Department of Planning and Natural Resources, implementation partners, University of the Virgin Islands and The Nature Conservancy was initiated in July 2012 to update the 2002 management plan, provide the long term vision for the area and guide near-term (3-5 years) objectives and activities. The updated management plan does not contain any new rules or regulations that do not already exist in VI Code.

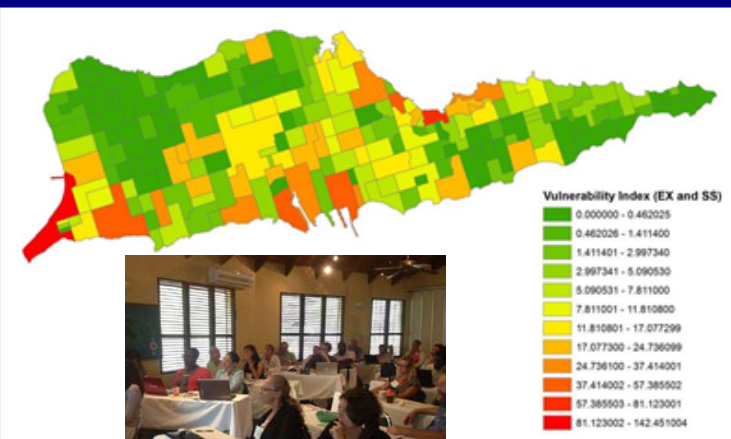
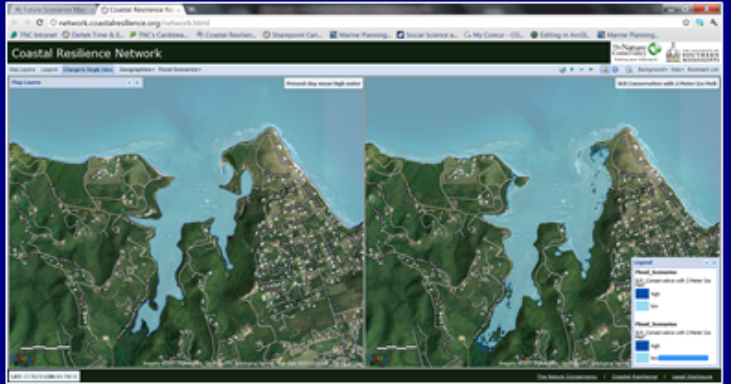




VIRGIN ISLANDS: PROTECTED AREAS



VIRGIN ISLANDS
MARINE PROTECTED AREA
N E T W O R K



USVI Climate Change Ecosystem-based Adaptation Allowing for Resilient Coastal Communities

In the US Virgin Islands, high resolution satellite imagery and GIS-based models are being used to identify and prioritize high risk and vulnerable coastal and marine sites subject to the effects of sea level rise, increasing storm surge and intensity, and altered precipitation patterns. The impacts of future SLR and storm surge scenarios are being validated by incorporating community perception, knowledge and historic events as a baseline to better understand how ecosystem-based adaptation solutions can help increase people and nature's resilience to these impacts.

The Virgin Islands Department of Planning and Natural Resources, The Nature Conservancy, and partners participated in a two-day strategy clinic in June 2013 to review current knowledge, refine planning tools, and start to identify strategies such as for coastal restoration. Using TNC's Coastal Resilience site to map scenarios and be able to visualize impact, vulnerability and adaptive capacity, we can further promote the role of ecosystem-based adaptation to address impacts of climate change as a priority for the management of natural resources and protection of coastal communities.



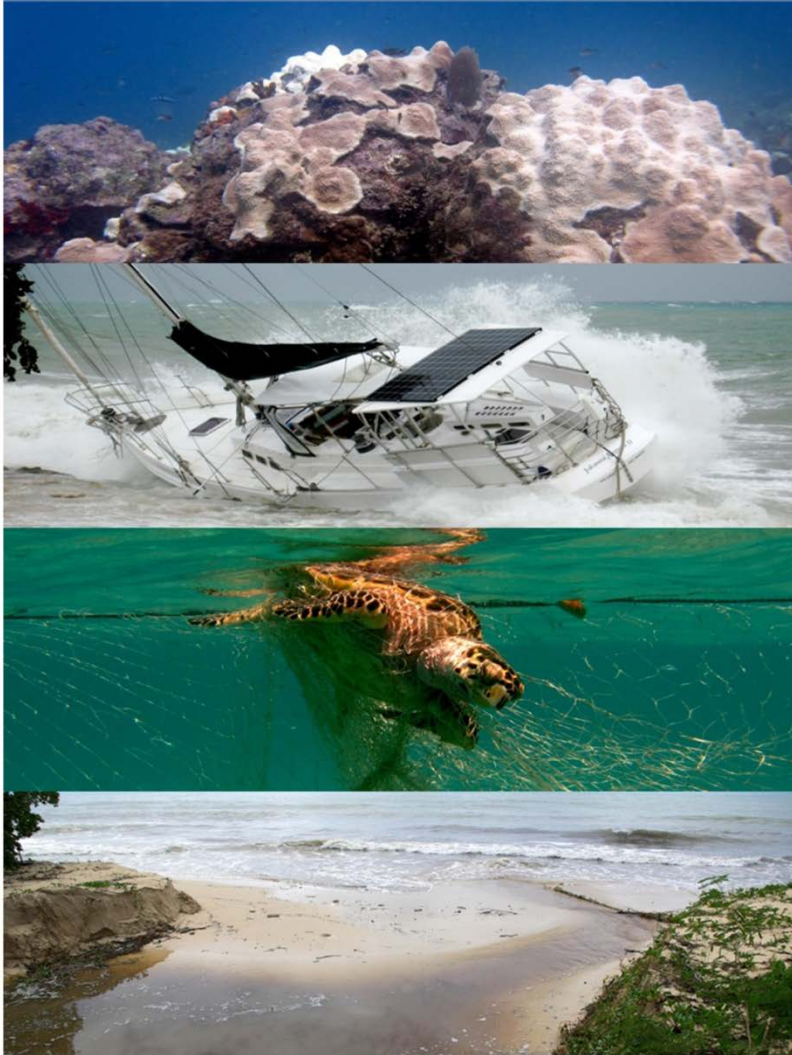
<http://coastalresilience.org>

This project is made possible with award #NA09NDS4190173, "Addressing Global Threats at Local Scales in Coral Reef Communities" a cooperative agreement with The Nature Conservancy and National Oceanic and Atmospheric Administration's Coral Reef Conservation Program. The Nature Conservancy provided matching funds.



Questions? Please contact Jeanne Brown at

VI Reef Resilience Program



USVI CORAL REEF DISTURBANCE RESPONSE POINTS OF CONTACT

For response, emergency triage, and damage claims for impacts to coral reefs

US Coast Guard

Oil or Hazmat: USCG National Response Center 1(800)424-8802
Sector San Juan: (787) 289-2041

NOAA Damage Assessment and Restoration Program – Coral Restoration Team

Puerto Rico: (787) 667-7750
Florida: (727) 647-6538

National Park Service

Buck Island, St. Croix: (340) 773-1460 (x235)
St. John: (340) 693-8950 (x225)

USVI Department of Planning and Natural Resources Division of Environmental Enforcement

St. Croix: (340) 773-5774 | (340) 513-4747 (mobile)
St. Thomas/St. John: (340) 714-9538 | (340) 643-6001 (mobile)

Reef Responsible

...see food sustainably



USVI FISH FACT CARDS

JANUARY 2014

Reefponsible List



Good Choice

Dolphinfish
Lionfish
Tuna
Tilapia
Wahoo

Go Slow

Groupers
Grunts
Jacks
Parrotfishes
Queen Conch
Snappers
Surgefish
Spiny Lobster
Swordfish
Triggerfish
Whelk

Don't Eat

Groupers
Goliath
Nassau

Parrotfishes
Blue
Midnight
Rainbow



The Nature Conservancy
Protecting nature. Preserving life.



DOLPHINFISH

Good Choice

Dolphinfish

Other Names: *Coryphaena hippurus*, Mahi Mahi
Identifying Characteristics: Large dorsal fin from above the eye to base of tail.

Good Choice

Biology

Max length: 5 ft
Common length: 2-4 ft
Found in small schools of a few males and many females. Feeds on fish and zooplankton. Fast growing, pelagic (open ocean), and highly migratory.

Important Info

Popular with recreational anglers and very important to commercial fisheries.

IUCN Red List Status: Least Concern



MUTTON SNAPPER

Go Slow

Mutton Snapper

Other Names: *Lutjanus analis*
Identifying Characteristics: Fine blue lines below the eye. A black spot on mid-body line, just below the rear dorsal fin.

Go Slow

Biology

Max length: 2.5 ft
Common length: 1-2 ft
Found in small schools during the day. Feeds day and night on fish, crustaceans, cephalopods, and gastropods.

Important Info

Some reports of ciguatera poisoning. Closed season April 1 - June 30 but may vary yearly as a result of annual catch limit.

IUCN Red List Status: Vulnerable



NASSAU GROUPEr

Don't Eat!

Nassau Grouper

Other Names: *Epinephelus striatus*
Identifying Characteristics: Black saddle spot on base of tail. Notched Dorsal fin.

Don't Eat!

Biology

Max length: 4 ft
Common length: 1-2 ft
Feeds on fish, crabs and other crustaceans. Very curious.

Important Info

Illegal to harvest this species in local and federal waters around the USVI. Reports of ciguatera poisoning. Overharvesting at spawning aggregations severely reduced their numbers.

IUCN Red List Status: Endangered

BEST MANAGEMENT PRACTICES:

A Guide for Reducing Erosion in the British Virgin Islands



88 -

...ss a drainage ditch,
...ed runoff speed re-
...settle out. A check
...adequate vegeta-
...or pea gravel-filled
...s which will not be
...ficant rainfall, check
...sediment should be
...berly disposed of so
...rosion at edges and

...s to slow runoff, al-
...drainage area above

...actices are prob-
...allow a high pro-

...practices are prob-
...allow a high pro-

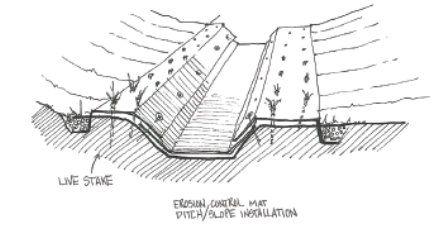
Stormwater conveyance is simply a mechanism to guide stormwater in a way that reduces flooding or sedimentation in receiving waters. There are a number of simple designs that can be implemented but in larger scale projects, flow capacity will need to be calculated and stormwater conveyance design will need to be developed by an engineer. The key point to remember here is that if stormwater can be controlled, it will be cheaper than mitigating the impacts caused by uncontrolled water flow.

4.3.2. Stormwater Conveyance

4.3.2.1. Lined Channels (Drainage Swales)

A drainage swale is an excavated lined channel that directs runoff to a desired location such as a sediment trapping device. These channels are lined with grass, sod, mats, or geotextiles. In order to determine the best type of lining, calculations of the volume and velocity of stormwater runoff to be conveyed will have to be identified by a qualified engineer.

This type of sediment control device is only effective on flatter slopes (< 8% / 4.57° for most designs).

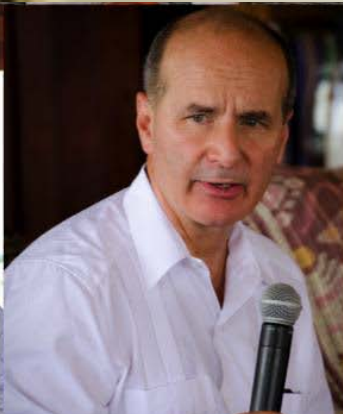


CARIBBEAN SUMMIT

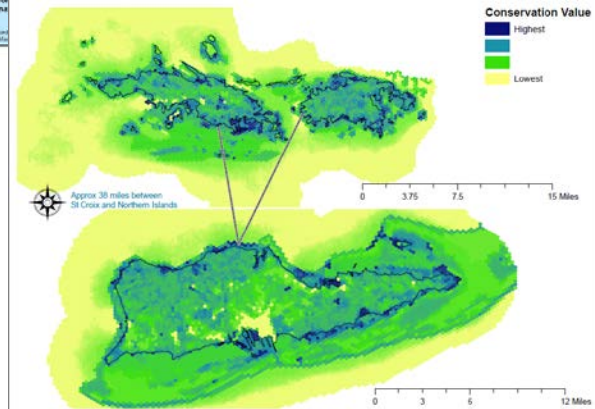
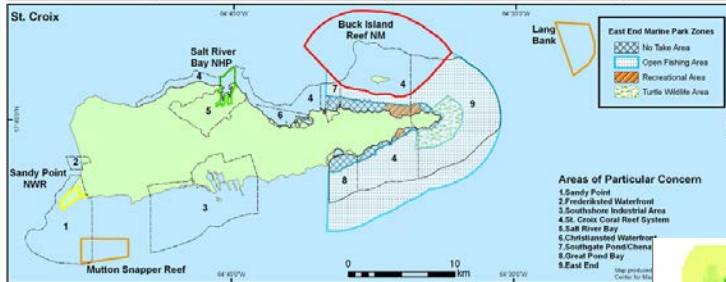
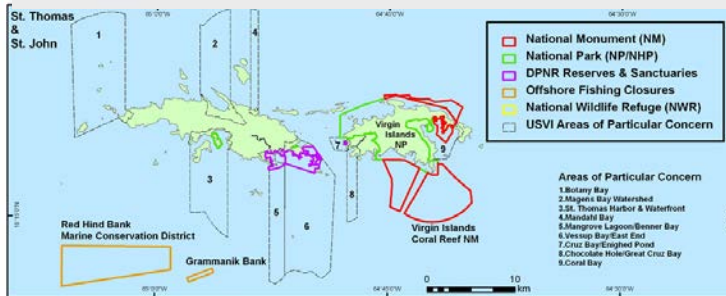
OF POLITICAL AND BUSINESS LEADERS

MAY 17-18th
2013

North Sound, Virgin Gorda
British Virgin Islands



VI Park System





The Nature
Conservancy



Conservando la naturaleza.
Protegiendo la vida.



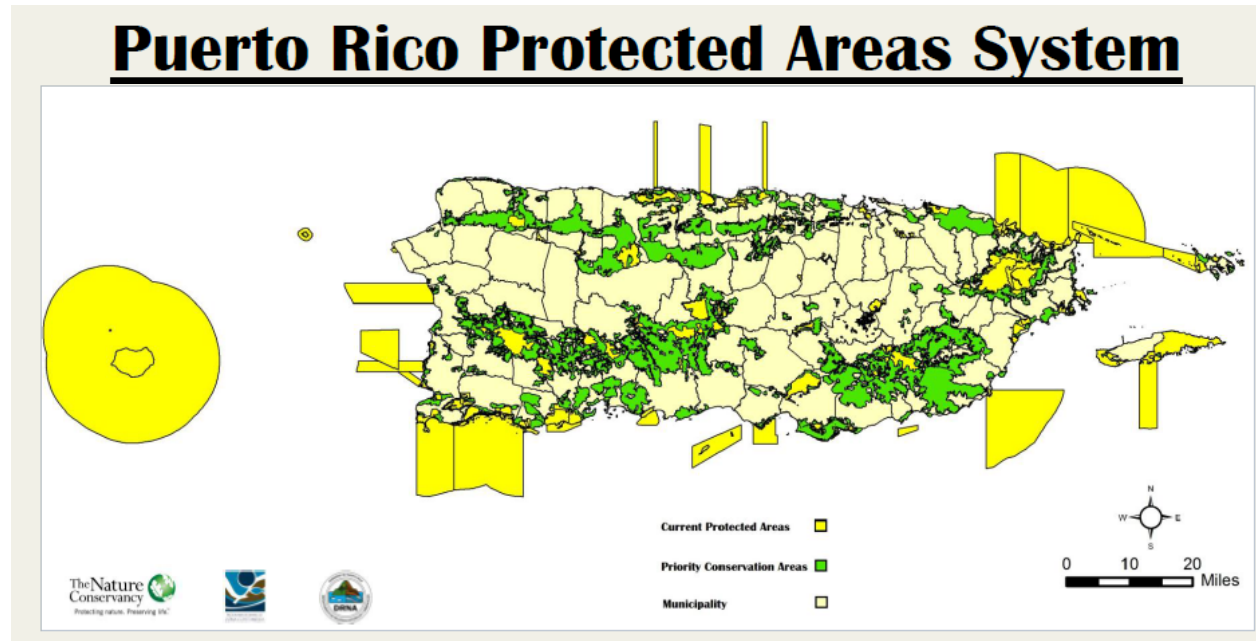
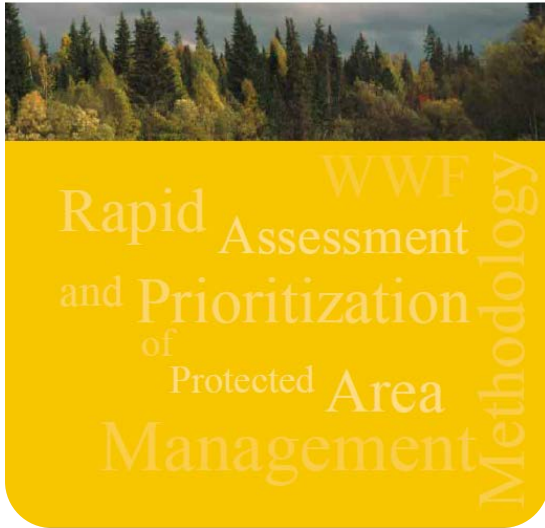
Puerto Rico: A NOAA facilitated endeavor

Raimundo Espinoza
The Nature Conservancy
Caribbean Program-San Juan, Puerto Rico

Puerto Rico RAPPAM




WWF
Rapid Assessment and Prioritization
of Protected Area Management
(RAPPAM) Methodology



1st Protected areas and system assessment
for the Commonwealth's reserves

1ER. CONGRESO DE ÁREAS NATURALES PROTEGIDAS DE PUERTO RICO



 *Viernes 22 de Junio 2012*

1st. Puerto Rico Natural Protected Areas Congress

Forum to present
successes, failures and
lessons learned in
Protected Area
management





2012

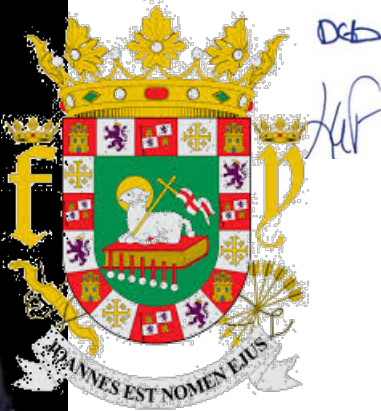
GLOBAL MPA
ENFORCEMENT
CONFERENCE

WILDAID



DECLARATION OF COMMITMENT TO THE CARIBBEAN CHALLENGE BY PUERTO RICO: “THE PUERTO RICO 20 BY 20 DECLARATION”

The Government of Puerto Rico agrees to formally join the Caribbean Challenge Initiative and effectively conserve at least twenty percent (20%) of its near-shore marine and coastal environment by 2020 and to put in place sustainable finance architecture that will generate long-term funding for the marine and coastal environment and our protected area system.



In order to implement this **Puerto Rico 20 by 20 Declaration**, we further agree to:

3. Foster and strengthen partnerships between the Government, NGOs, private sector and local communities engaged in conservation of natural resources and sustainable use of biodiversity.
4. Establish sustainable finance mechanisms, such as tourism-related fees, that support and encourage a flow of funds for the protection, conservation and sustainable use of our biodiversity.
17. Agree to review progress to achieve the “Puerto Rico 20 by 20 Declaration” on a biennial basis.

Signed by:

Luis G. Fortuño-Burset
Governor of Puerto Rico

Daniel J. Galán-Kercadó
Secretary
Department of Natural and
Environmental Resources



Caribbean Challenge Initiative (CCI)

Leadership to provide for the sustainable use, conservation and effective management of marine and coastal resources

THIRD SENIOR OFFICIALS MEETING (SOM3) & FIRST MINISTERIAL MEETING

to prepare for the Caribbean Summit of Political and Business Leaders

March 18 - 21, 2013 · San Juan, Puerto Rico



***The Caribbean
Challenge
Initiative &
Puerto Rico:
Integrating
Private and
Public sectors
for
Conservation
Success***



Ecosystem based Adaptation Workshop



The Caribbean Landscape Conservation Cooperative
Providing conservation science for an uncertain future



Ecosystem-based Adaptation Allowing for Resilient Ecosystems

The Puerto Rico Climate Change Council, the Caribbean Landscape Conservation Cooperative, and partners invite you to participate in a 2-day strategy clinic to identify and enhance the role of ecosystem-based adaptation in Puerto Rico

Time: 9:00 am - 5:00 pm
Date: Thursday, September 27, 2012
Place: Copamarina Beach Resort, Route 333, km 6.5, Guánica, Puerto Rico

WORKSHOP GOALS:

- To further promote EbA as a priority for the management of natural resources
- To further EbA work and collaborations in Puerto Rico and
- To share EbA knowledge with key stakeholders

Please RSVP to [Raimundo Espinoza](mailto:Raimundo Espinoza at respinoza@tnc.org) at respinoza@tnc.org;
Space is limited to 40 participants

Questions? Please contact:
Ernesto Diaz, ediaz@drna.gobierno.pr or Bill Gould, wgould@fs.fed.us



Cooperativa para la Conservación del Paisaje en el Caribe
Proveyendo ciencia de la conservación para un futuro incierto



Adaptación Basada en Ecosistemas Permitiendo la Resiliencia de los Ecosistemas

El Consejo de Cambio Climático de Puerto Rico, la Cooperativa para la Conservación del Paisaje en el Caribe, y socios los invitan a participar en un taller de 2 días para identificar y potenciar el rol de las estrategias de adaptación basadas en ecosistemas en Puerto Rico

Hora: 9:00 am - 5:00 pm
Día: jueves, 27 de septiembre de 2012
Lugar: Copamarina Beach Resort, Route 333, km 6.5, Guánica, Puerto Rico

OBJETIVOS DEL TALLER:

- Para promover aun más AbE como una prioridad para el manejo de los recursos naturales
- Para continuar avanzando el trabajando y las colaboraciones de AbE en Puerto Rico, y
- Para compartir el conocimiento de AbE con el publico interesado

Por Favor RSVP a [Raimundo Espinoza](mailto:Raimundo Espinoza at respinoza@tnc.org) at respinoza@tnc.org;
El espacio será limitado a 40 participantes

Información adicional:
Ernesto Diaz, ediaz@drna.gobierno.pr or Bill Gould, wgould@fs.fed.us



Current and Future Coastal Hazards

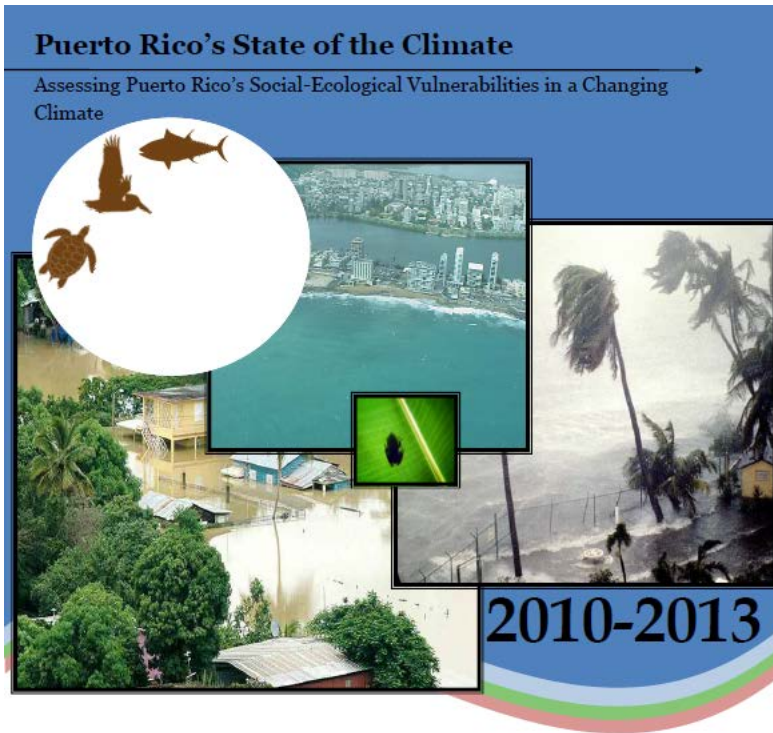
Risk assessment for all the coastal municipalities in Puerto Rico



Dr. Adam Whelchel –TNC CT Chapter

Puerto Rico Climate Change Council (PRCCC)

Puerto Rico's State of the Climate
Assessing Puerto Rico's Social-Ecological Vulnerabilities in a Changing Climate



2010-2013



CONSEJO DE CAMBIOS CLIMÁTICOS
CLIMATE CHANGE COUNCIL
PUERTO RICO



EXECUTIVE SUMMARY—ENGLISH VERSION

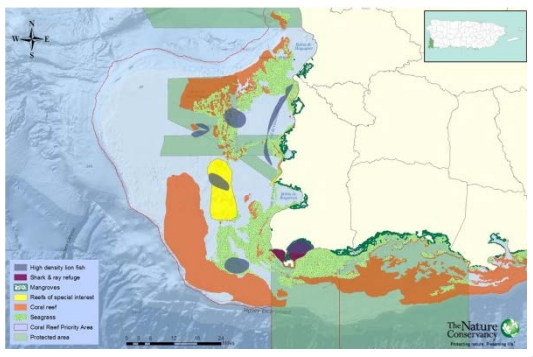


Human Use Mapping in SW Puerto Rico

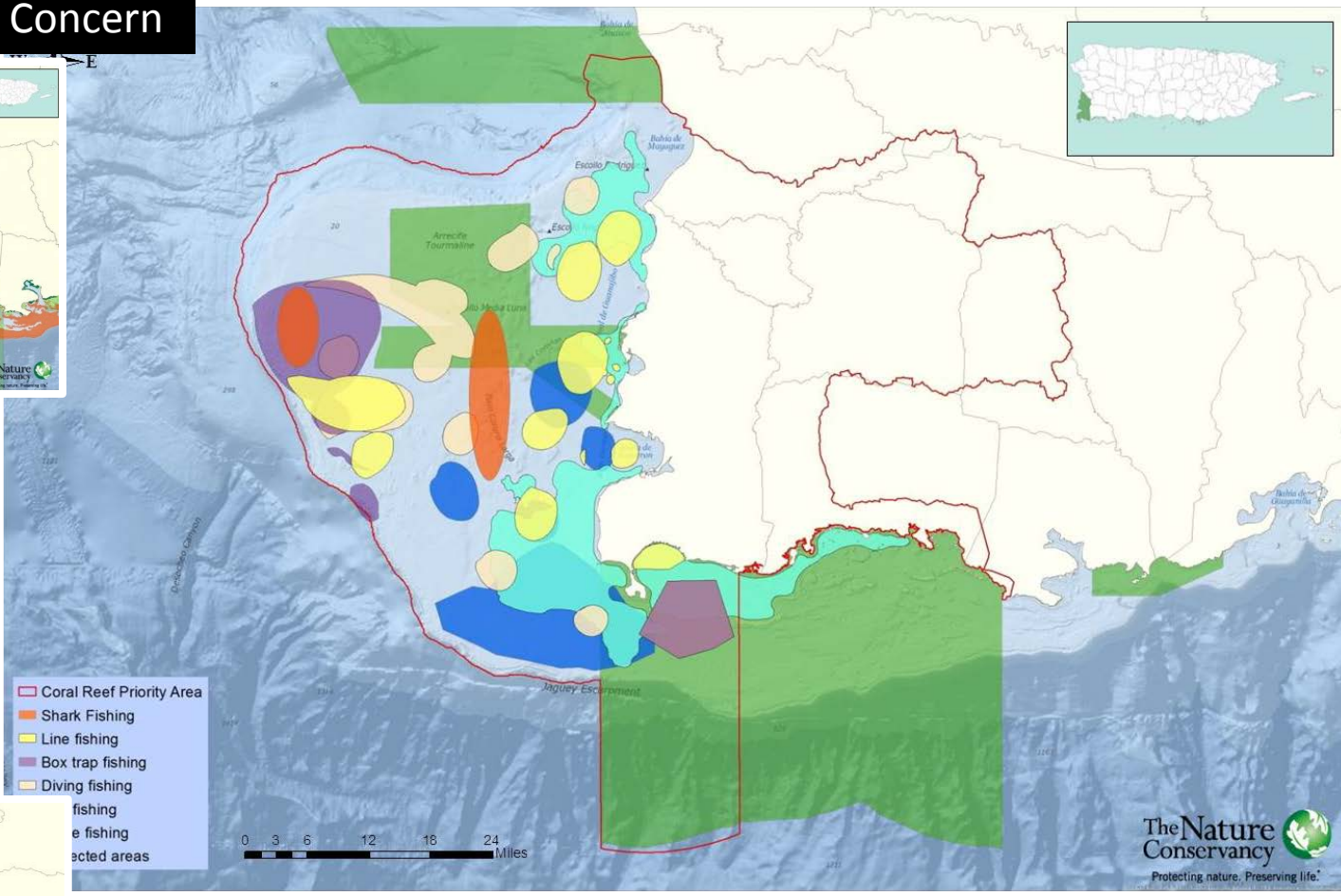
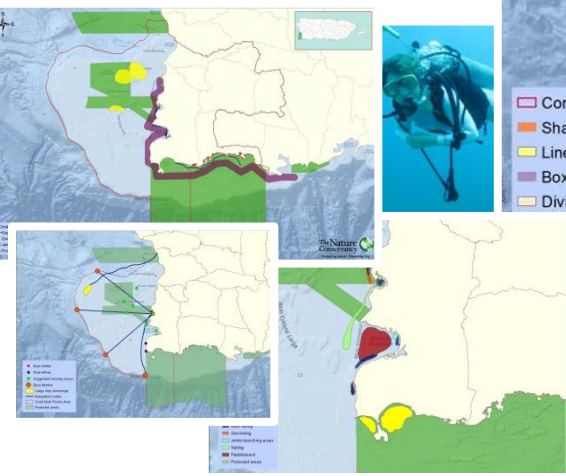


Human Use Mapping Cabo Rojo

Ecosystems and Areas of Concern



Recreational Activities



Fishing Activities within the Cabo Rojo Coral Reef Priority Area

Cabo Rojo CAP



Cabo Rojo Watershed Management

EARLY ACTION PROJECTS FOR THE CABO ROJO PRIORITY MANAGEMENT AREA



PAUL STURM
 RIDGE TO REEFS
 ROBERTO VIQUEIRA -RIOS
 LOUIS MEYER-COMAS
 PROTECTORES DE CUENCAS
 AUGUST 8, 2013



Table 1. Initial early action restoration projects			
Project	Description	Potential Sponsors	Initial Ranking/ Cost
3. Bioretention Green Infrastructure	Address stormwater runoff from a busy street by creating a bioretention facility next to a parking area for a vacation resort area to treat stormwater runoff before it flow into coastal waters	Municipality of Cabo Rojo, NRCS, DNER, NFWF, NOAA	High, Very High for a demonstration project visible by many visitors and residents \$25k - \$30k
4. Connect the town to an advanced sewerage system	Connect the town to an advanced sewerage system to limit nutrient and other contamination of nearshore	PRASA, EPA, USDA Rural Dev	Very high but very complex and expensive
5. Cliff and highly erodible soil erosion at Joyuda subwatershed neighborhood	Area downstream of the eroding cliffs and runoff generating area (5 & 6) plus significant amounts of impervious cover from high density development. Volume control of stormwater runoff (reuse) etc and potential to create a regenerative stormwater conveyance	Developer/ FWS/ NRCS/ NFWF	Very high but very complex -- source control is critical \$500k-\$1M
6. Stabilization of bare / degraded upland soils			

Table 1. Initial early action restoration projects			
Project	Description	Potential Sponsors	Initial Ranking/ Cost
7. Stream stabilization of a highly eroding ravine	Area downstream of the eroding cliffs and runoff generating area (5 & 6) plus significant amounts of impervious cover from high density development. Volume control of stormwater runoff (reuse) etc and potential to create a regenerative stormwater conveyance	Developer/ FWS/ NRCS/ NFWF	Very high but very complex -- source control is critical \$500k-\$1M

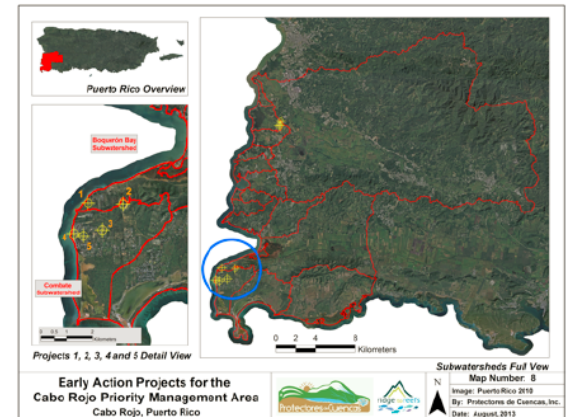


Figure 1. Project locations in and around the Combate subwatershed

The Cabo Rojo Project



Juvenile lemon shark. Photo: Kristine Stumdi



Raimundo Espinoza

respinoza@tnc.org



Hawaii Marine



Kim Hum
Roxie Sylva
Chad Wiggins

Emily Fielding
Leilani Warren
Rebecca Most

Manuel Mejia
Eric Conklin
Keo Lopes



A satellite-style map of the Pacific Ocean, showing the Hawaiian Islands chain in the center. A small white star is placed on the islands. The surrounding continents of North America, South America, and Australia are visible in shades of green and brown. The ocean is a deep blue. In the top left corner, there is a small yellow speech bubble icon.

★ Hawai'i

**“Islands on the surface seem
separate from one another,
but, if you look closer, they are
all connected in the deep.”**

- Papali'i Failautusi Avegalio



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Ed Zayas

Where
We Work







2013



2009

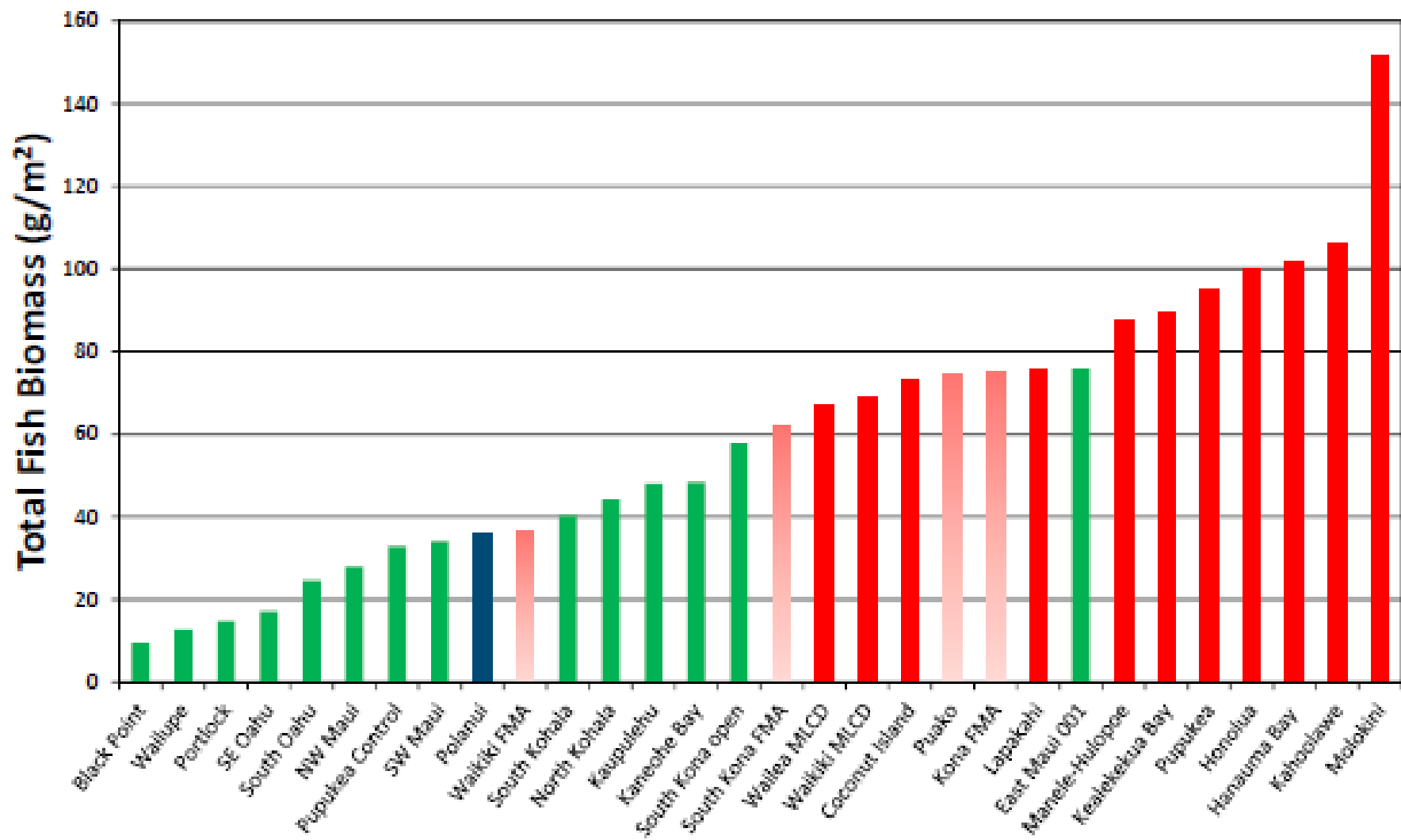
How We Work



2013

Where
We Work





How
We Work







A photograph of a man in the ocean, shirtless and wearing dark shorts, casting a large, clear fishing net. The net is spread out in the air, creating a dynamic, flowing shape. The background shows a blue sky with some clouds and a distant shoreline with mountains. The water is dark blue with white foam from the waves.

We do not heal by looking at the *sickness*.
We heal by looking at the wellness.

~Raylene Kawaiaea



PACIFIC ISLANDS

Trina Leberer
Director, Micronesia Program
tleberer@tnc.org

THE MICRONESIA CHALLENGE



- Area of Conservation Influence
- Partner/Project Site

The Nature Conservancy
Protecting nature. Preserving life.

NORTHERN
MARIANA
ISLANDS

P A C I F I C
O C E A N

MARSHALL
ISLANDS

FEDERATED STATES OF MICRONESIA

Majuro

INDONESIA PAPUA NEW GUINEA

Samoa

Tutuila

Manua

Rose Atoll

Image courtesy of Paul Anderson



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MICRONESIAN CHIEF EXECUTIVES' SUMMIT



Eddie Baza Calvo
Governor
Territory of Guam

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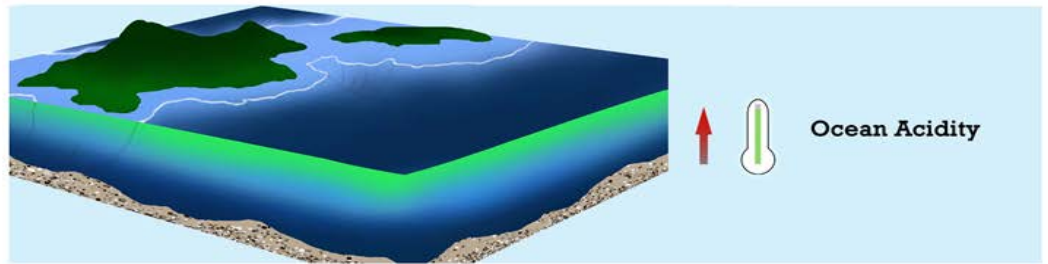
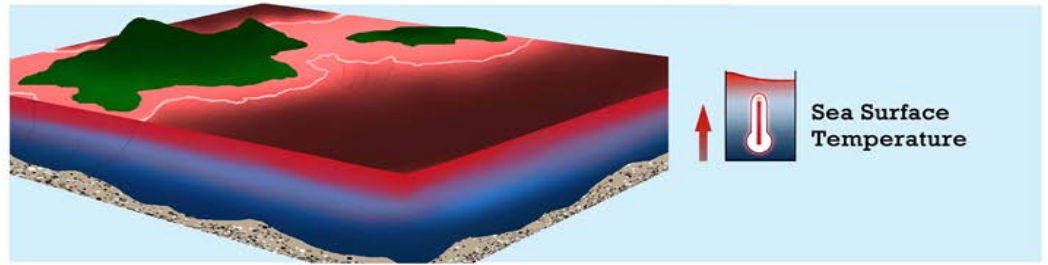
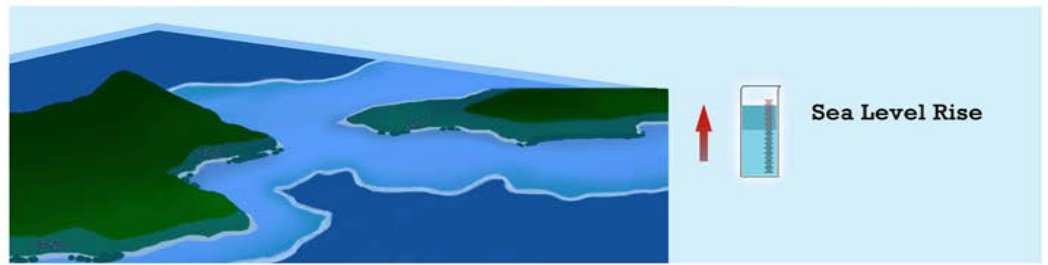
Photo by Bill Millhouser



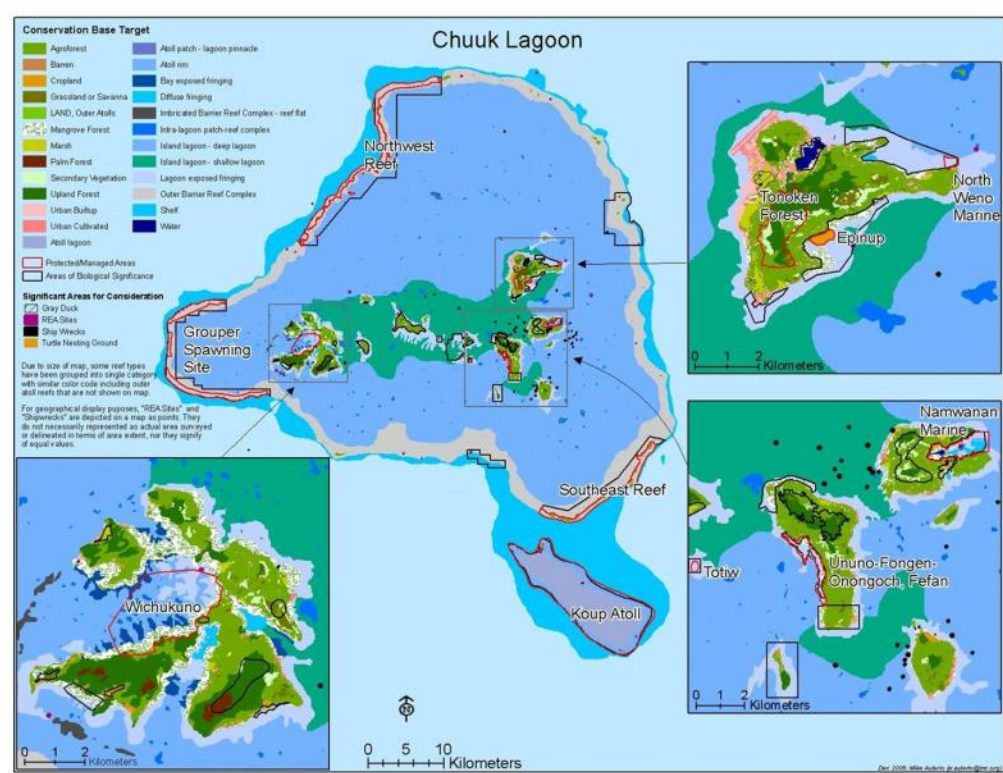
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Projected Climate Change Impacts in Micronesia

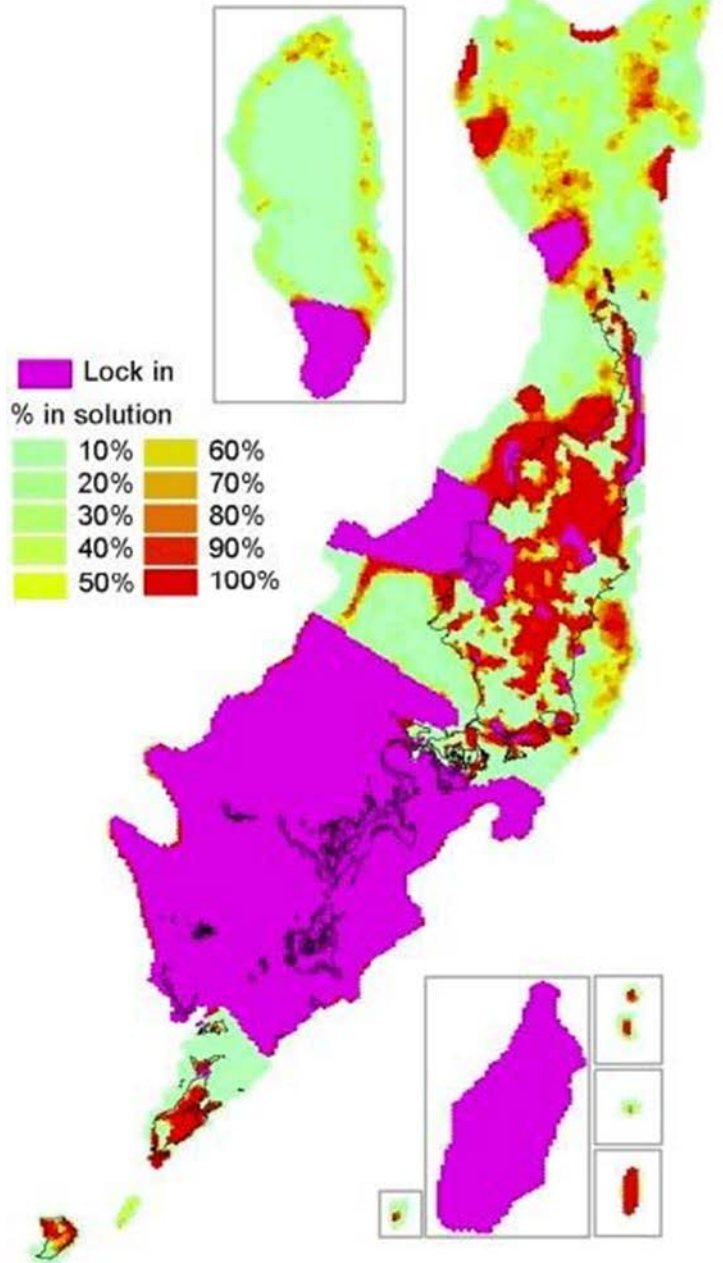






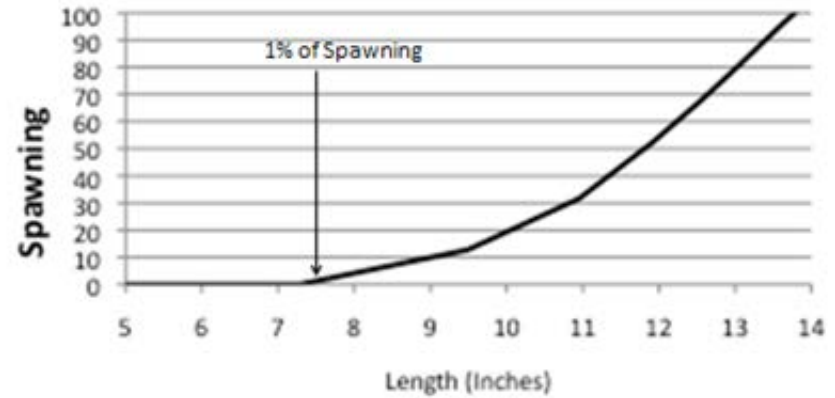
Palau Protected Areas Network Design

Exiting Protected Areas in Purple

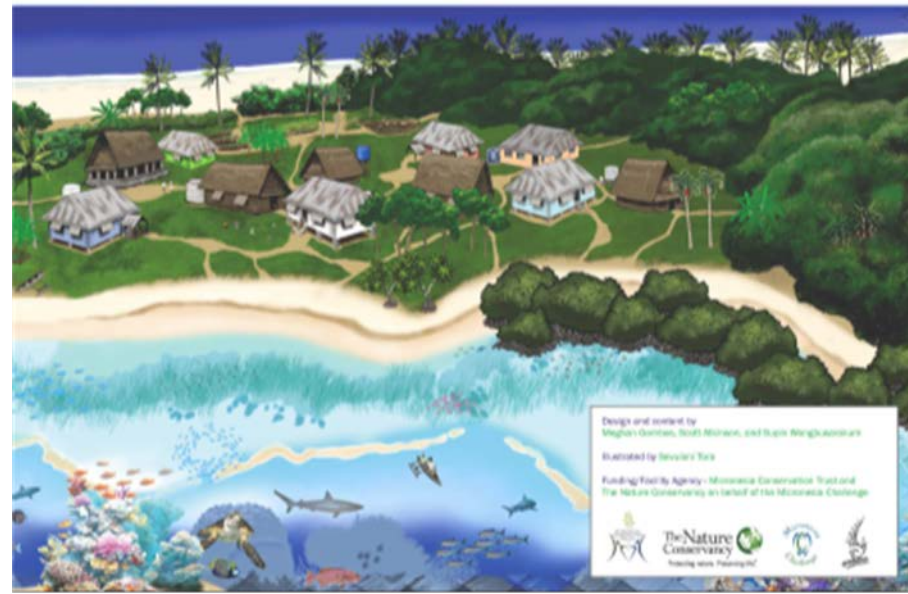


Rekruk – Spotcheek snapper

Spawning by Length



ADAPTING TO A CHANGING CLIMATE



Design and content by
 Meghan Gorman, Scott Wilson, and Brian Fitzgibbon
 Illustrated by Jessica Tate
 Funding from the Agency - Micronesia Conservation Trust and
 The Nature Conservancy on behalf of the Micronesia Challenge

Vulnerability Assessment

TARGET RESOURCES	CURRENT STATUS OF TARGET	THREATS (non-climate)	CLIMATE HAZARDS	EXPOSURE	SENSITIVITY	IMPACTS	ADAPTIVE CAPACITY (Social and Natural Resources)	VULNERABILITY
What social and natural resource targets are most important to your community and why?	What is the current status of your targets? (poor, fair, good, very good)	What are the non-climate threats to your priority social and natural resource targets?	Which of the projected climate hazards and impacts are of most concern to our community and why? How do they impact this target?	How much area of your target resource is affected by climate change events? Specify which events? (All/ Most/ Some/ Little/ None)	How severely will your target resources be impacted by increased climate events? And why? (Severely/ Moderately/ Hardly)	What are the current and likely impacts from these events to your target resources and your community? (Severely/ Moderately/ Hardly)	How would you rate the ability of your target resources to cope with impacts climate change hazards? (High/ Medium/ Low)	Rate the vulnerability of each target resources (High/ Medium/ Low)
							<i>Social</i>	<i>Social</i>
							<i>Natural</i>	<i>Natural</i>
							<i>Social</i>	<i>Social</i>
							<i>Natural</i>	<i>Natural</i>

Disturbance and recovery cycles are basis



Effectively managed



Disturbance event
(predator starfish)

5-7 years



Not effectively managed



We are One

Business Plan and Conservation Campaign



© FAO



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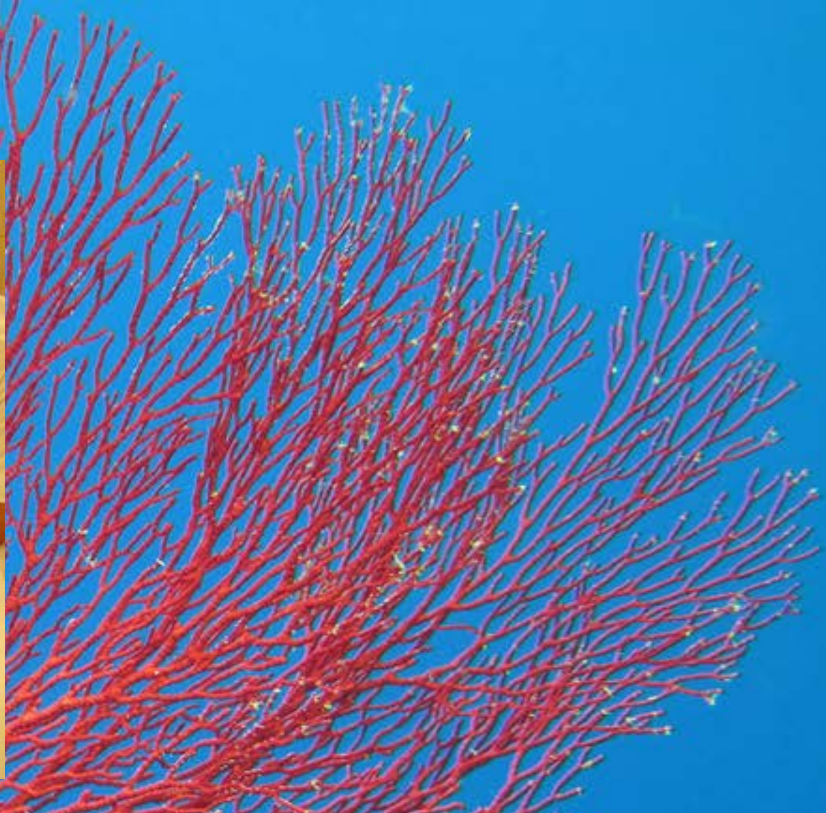
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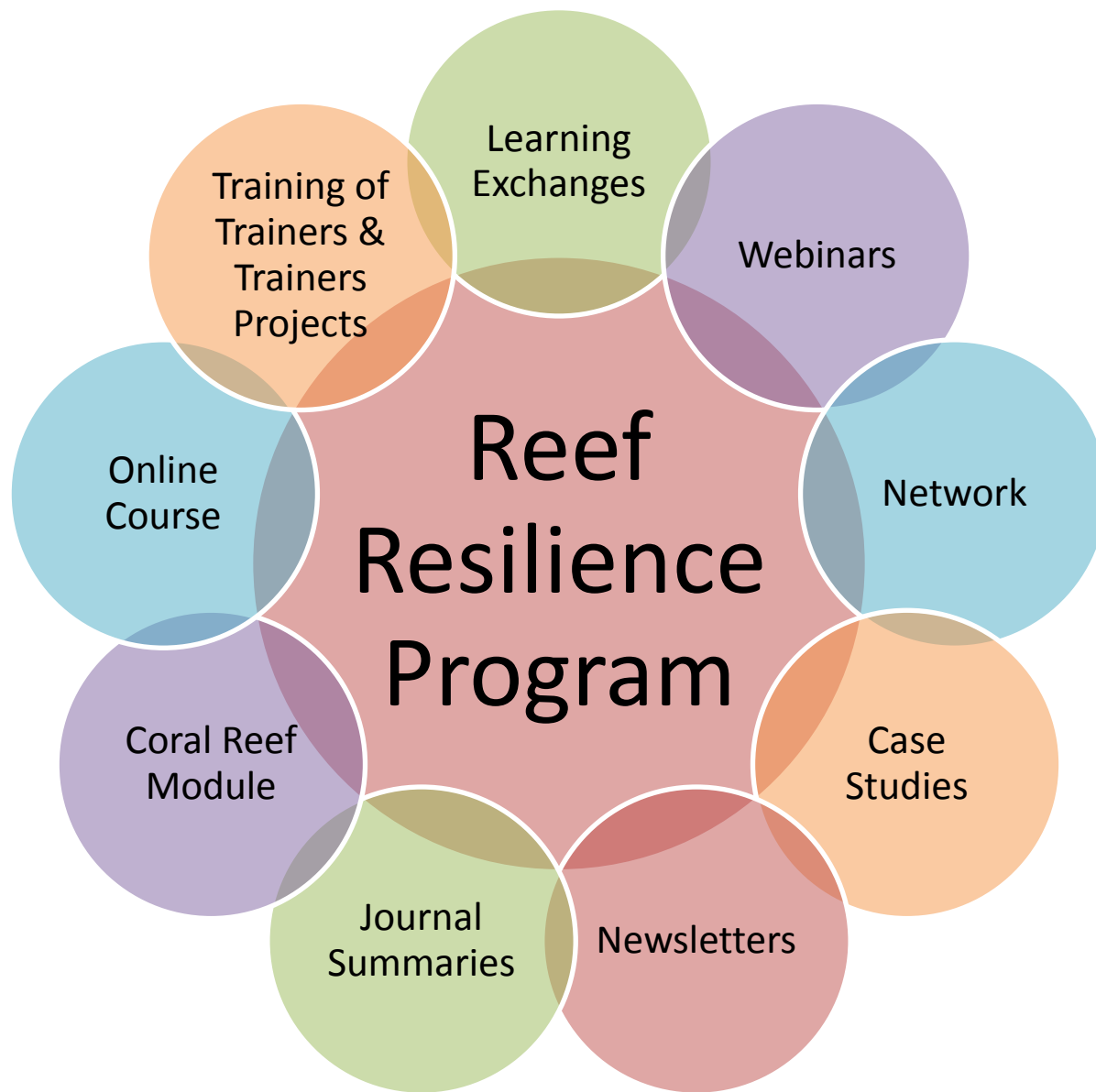


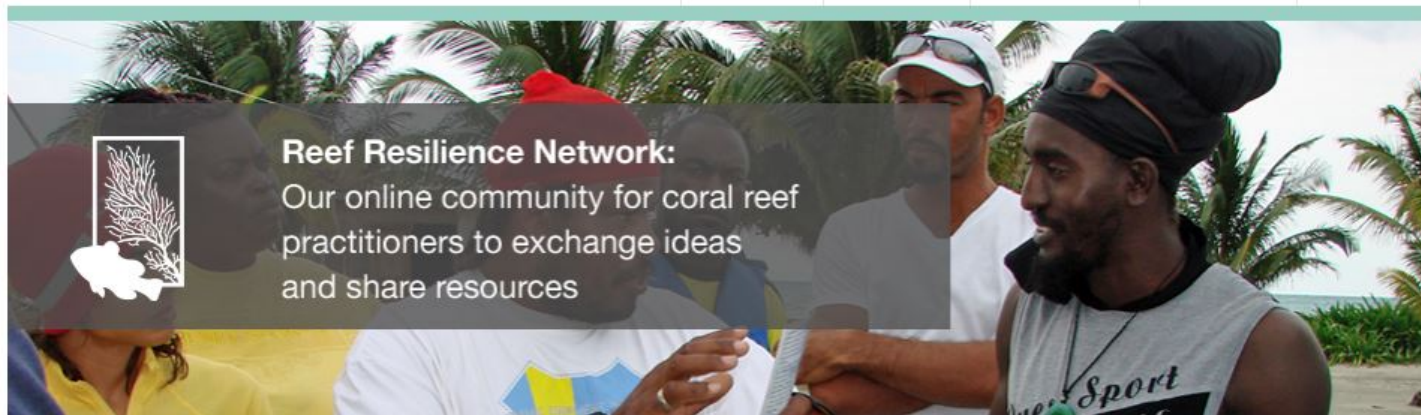


Reef Resilience










The Reef Resilience Toolkit provides the latest information, guidance, and resources to help managers address the impacts of climate change and local threats to coral reefs.

[Read more...](#)



Coral Reef Module

The latest science and management information on coral reef resilience.


[Read more...](#)



Journal Summaries

Papers and publications freely downloadable from this website and others from external sites.

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Reef Resilience Network


Our online community for coral reef practitioners to exchange ideas and share resources.


[Read more...](#)

In The News [Follow](#)

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RT @BrettWHowell: Fun blog by @HuffPostTravel: 17 Signs You're Actually Addicted To The Ocean
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16,000+
unique
visitors

1,000
DVDs
distributed

Coral Reefs

A Module of the Reef Resilience Toolkit



Introduction

- ▶ Reefs and Resilience
- ▶ Stressors
- ▶ Management Approaches
- ▶ Management Strategies
- ▶ Resilient MPAs
- ▶ Monitoring and Assessment
- ▶ Communication
- ▶ Case Studies
- ▶ Resources

The Coral Reef Module is a resource that provides detailed information about the stressors facing coral reef ecosystems, and offers specific guidance on building resilience into daily management activities and the design of marine protected area networks.

Quick Look

For conservation managers, the module compiles the latest scientific research and tools to help address impacts of climate change and other major threats and promote healthy reefs that persist over time. **Watch** the video for an introduction, **go** directly to a section of the module using the navigation menu that appears on the left of each page, or **click through** the slides below to see what's inside.

Introduction to the Coral Reef Module (3:30)

Rod Salm, advisor to TNC's Indo-Pacific program, invites us to dive in.



Translate This Site

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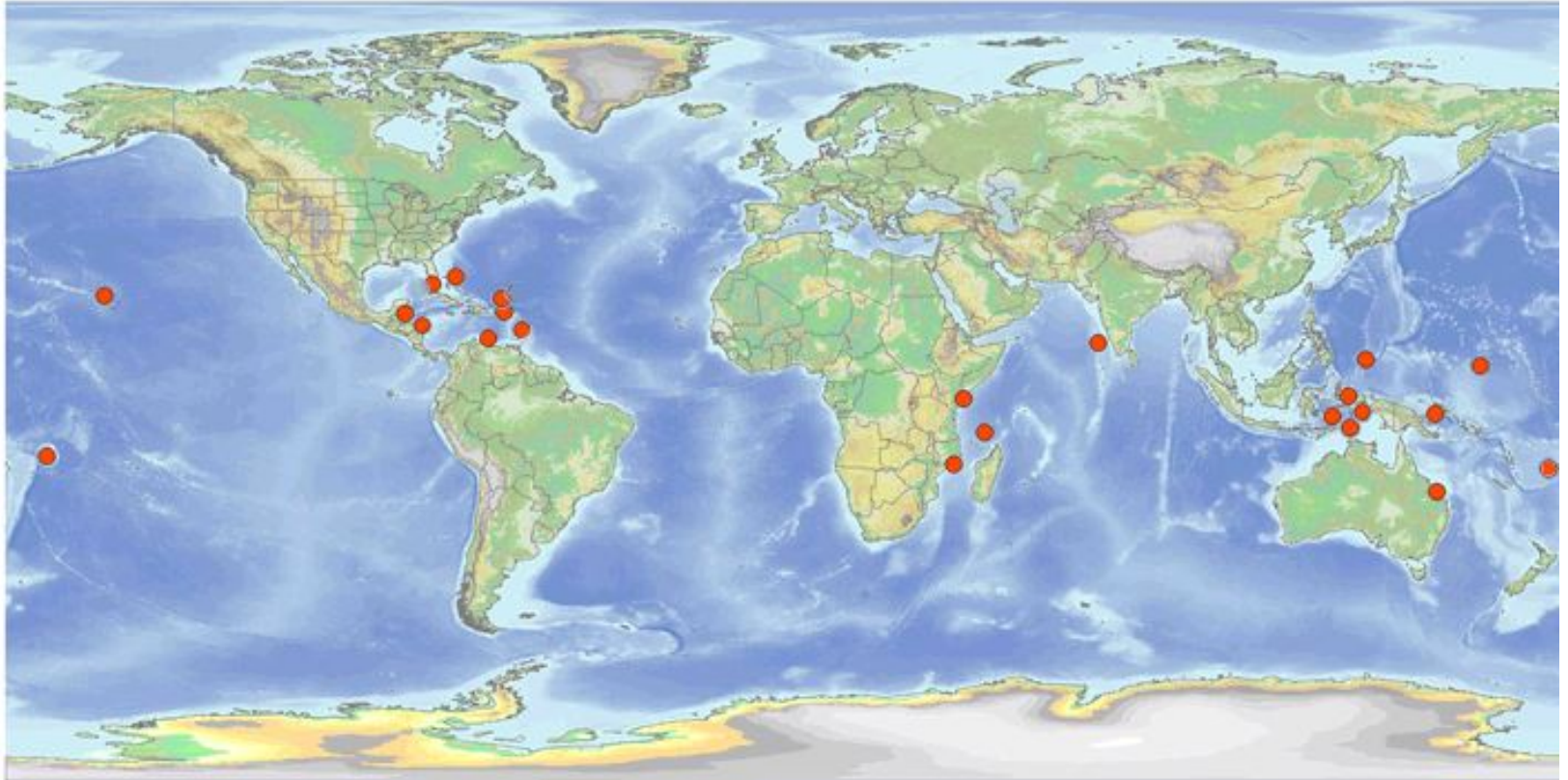
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Reefs and Resilience focuses on the value of coral reef ecosystems, describes the current status of reefs worldwide, and discusses the definition of resilience. Information is also provided on ecological, biological, chemical, and physical factors used to assess coral reef resilience.



32 case studies--18 countries



75+ journal article summaries on MPAs, climate and ocean change, bleaching, and fisheries management

650+ people
30 issues of newsletter

17 webinars
600+ people
1000+ views



NEWSLETTER
December 2013

Reef Resilience
Program Updates

On Our Network

Upcoming Events

In the News

To join the Resilience
Practitioners Network or to
submit updates, contact us at
resilience@inc.org.

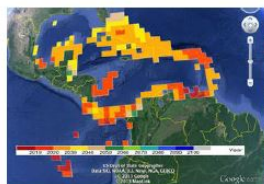
Learn more about The Nature
Conservancy's [Reef Resilience
Program](#).

*This newsletter is brought to
you through the generous
support of NOAA's Coral Reef
Conservation Program.*

Follow @ReefResilience

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Tool shows future predictions of bleaching and acidification



A new [Google Earth
tool](#) contains the most
recent projections of coral
bleaching and ocean
acidification for all coral
reef areas. The projections
are based on climate
models from the IPCC's
Fifth Assessment Report.
Using this tool, managers

can go to areas of interest and view:

- The years by which two thermal stress levels known to cause bleaching are projected to occur twice per decade and annually
- Projected declines in aragonite saturation state as well as corresponding declines in calcification

The use of the tool and images obtained from it will help coral reef managers to communicate about the threats posed to reefs by climate change with their colleagues, stakeholders and with policymakers.

The [associated paper](#) summarizes the results of the projections and highlights that under the fossil-fuel aggressive emissions scenario, there are no refugia from the onset of annual severe bleaching or the effects of ocean acidification. Under this scenario, by 2053, 90% of all coral reef areas will experience annual severe bleaching. There are opposite latitudinal gradients in these threats to reefs, meaning that areas projected to experience annual bleaching later are exposed to the effects of acidification for longer.

Reef Resilience Webinar

Restoring a Reef Flat: Benefits of Invasive Algae Removal in Hawai'i



Ariel view of Maunaloa Bay after 2 million pounds of invasive algae has been removed. Photo © Manuel Mejia



reef resilience network

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2014 Bleaching?

Started by Jordan Jobe in [Interesting News or Topic](#). [Last reply](#) by Jordan Jobe on Monday.

6 Replies 2 Likes

Hi Everyone- We are starting to hear from folks who are experiencing bleaching at their sites. Are you experiencing bleaching? Want to share what's going on with the Network? Post below (with pictures, if you have them?)Thanks for keeping all of us...

[Continue](#)

Tags: [bleaching](#)



Ask the Expert with Dr. Rod Salm

Started by Rod Salm in [Ask the Expert](#). [Last reply](#) by Jordan Jobe Dec 16, 2013.

46 Replies 4 Likes

We hope you were all inspired by your contact with www.reefresilience.org and the training workshop to dive right in and assess your reefs for resilience and apply your findings to select MPAs for a...

[Continue](#)

ABOUT

Edit

The Reef Resilience Network is a community of coral reef managers from around the world. This site provides an interactive online resource for finding up-to-date science and tools, management support, and experts in the area. The Reef Resilience Network exists to help coral reef managers and practitioners get the support and advice they need to better

100+ members



500+ students

88 countries

1,200+ participants

Bahasa, French, Spanish

OVERVIEW OF CORAL REEFS AND RESILIENCE



CONTINUE



Reply by [Vineeta Hoon](#) on April 20, 2013 at 11:23am

Hi David,

As an NGO we are not directly involved in management actions in Lakshadweep. However we have been influencing management actions through advocacy, involving community in reef related activity monitoring, conducting community based socioeconomic monitoring surveys, developing teacher orientation programs to include marine examples in the class rooms etc. Discussing legal options for involving community in setting up MPAs. Small steps but it will lead to forming a pressure group for co-management.

[Reply](#) [Message](#) [Edit](#)



Reply by [David Obura](#) on April 21, 2013 at 1:08am

Hi Vineeta, thanks for your reply ... in fact, I like to think of 'management' as just one aspect of responses that there might be - essentially by a responsible agency, whereas in more general terms society responds in an 'adaptation' framework. Thus the social and advocacy work that you do can be an important element in building capacity and scope for specific management responses. These small steps are vital, I think, in developing a general culture that demands active management - it provides managers with a supportive group of stakeholders!!

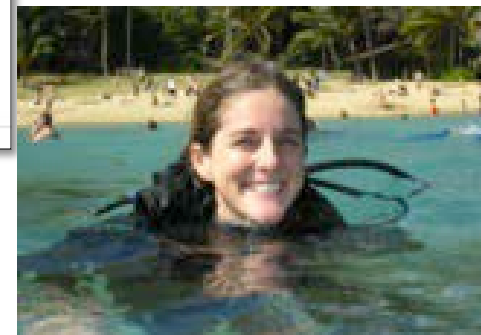
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Rod Salm



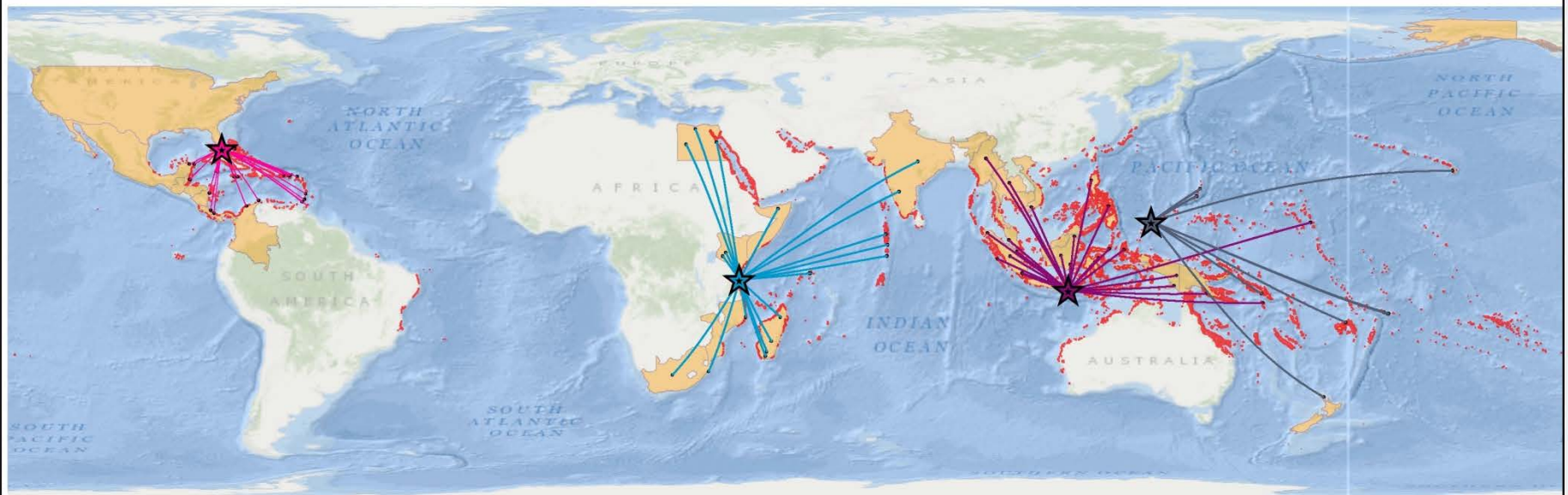
Paul Marshall



Elizabeth McLeod

95 managers -- 47 countries & territories -- 4 trainings

Reef Resilience Training of Trainer's Workshops, 2010-2013



Location of Workshop		Participant Origin	Coral Reef
★ Bali, Indonesia	★ Zanzibar, Tanzania	—	👉
★ Koror, Palau	★ Florida, USA	—	



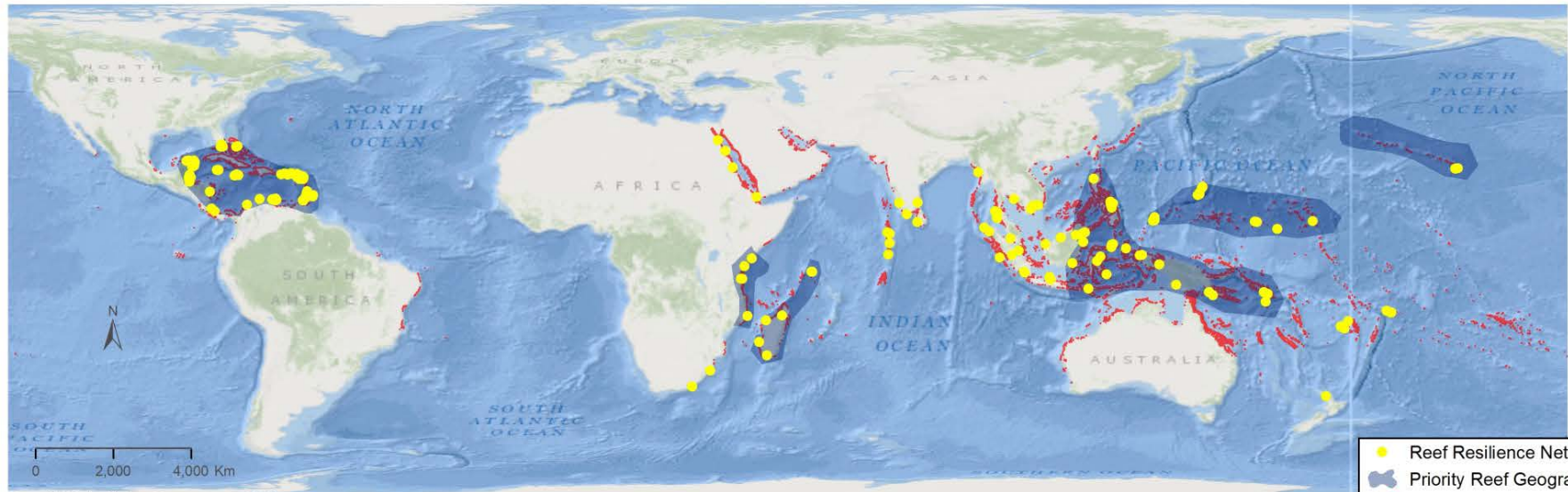
44% lead projects
\$55,782+ funding
33 projects
23 countries
900+ people





9 exchanges





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- Reef Resilience Network
- Priority Reef Geographies
- Coral Reefs



Australian Government
**Great Barrier Reef
Marine Park Authority**

