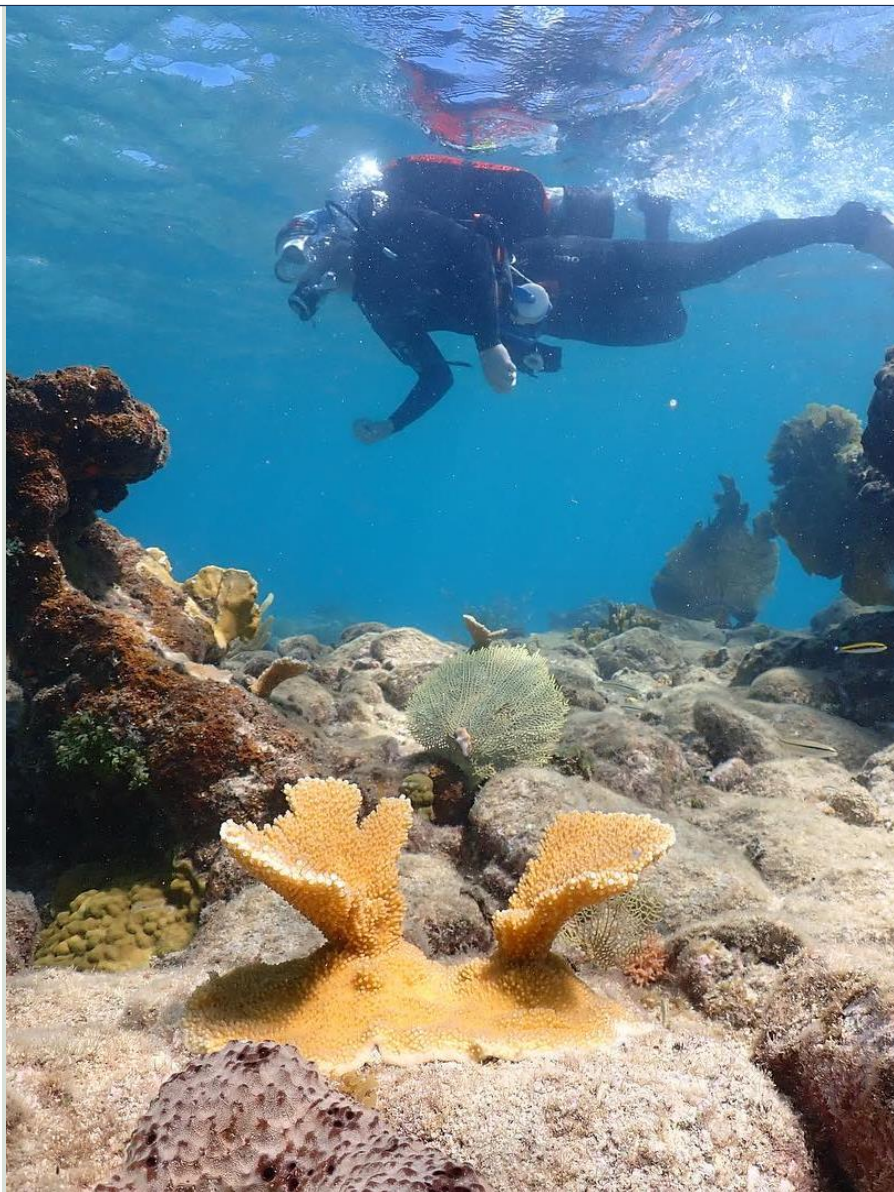


Marine Disease and Restoration



Introduction

Coral Disease and Restoration



Photos by Brandt and Smith lab members

Meet The Team

Faculty & Staff



Sonora Meiling, M.Sc.*



Sonora Meiling, M.Sc.*



Kayla Budd*



Samuel Gittens Jr.*



Nicholas Durgadeen*



Dr. Marilyn Brandt
Research Professor



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Jason Quetel



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Brad Arrington, M.Sc.*



Sarah Von Hoene



Rachel Ionata, M.Sc.



Natasha Bestrom, M.Sc.*



Chloe Camacho*

*UVI graduate



Ancestral Virgin Islander

Meet The Team

Students



Amanda Badai



Dr. Becky Gibbel



Shamoy Bideau



Davis Strobel



Avery Coble



Veronica Williamson



Odessa Matthew



Kadejsa Tonge



Kahlifah Powell



 Ancestral Virgin Islander

Meet The Team

Coral Restoration Ecology Lab



Dr. Robin Smith
Research Assistant Professor



Casey Whalen
Coral Larval Technician



Alexandra Cormack

Makayda Gustave
Undergraduate
Researcher



Ancestral Virgin Islander

Coral Disease



Research Goals And Objectives Marine Disease

MD1	Biodiversity and disease
MD2	Water quality and disease
MD3	Model the spread and impact of multi-species coral disease.
MD4	Share disease research



Research Goals And Objectives Marine Disease



MD1: Disease & Diversity

MD1	Biodiversity and disease
MD2	Water quality and disease
MD3	Model the spread and impact of multi-species coral disease.
MD4	Share disease research



Results, Outcomes & Accomplishments – MD1: Disease and Diversity

Compare disease incidence among experimental species assemblages



NSF Collaborative RAPID grant – analyze samples from a multi-species SCTLD transmission experiment





Alphaflexivirus Genomes in Stony Coral Tissue Loss Disease-Affected, Disease-Exposed, and Disease-Unexposed Coral Colonies in the U.S. Virgin Islands

A. J. Veglia,^a K. Beavers,^b E. W. Van Buren,^b S. S. Meiling,^c E. M. Muller,^d T. B. Smith,^e D. M. Holstein,^a A. Apprill,^f M. E. Brandt,^e L. D. Mydlarz,^b A. M. S. Correa^a



www.nature.com/ismecom



ARTICLE OPEN

Experimental transmission of Stony Coral Tissue Loss Disease results in differential microbial responses within coral mucus and tissue

Naomi Huntley^{1,2}, Marilyn E. Brandt¹, Cynthia C. Becker^{2,3}, Carolyn A. Miller^{1,2}, Sonora S. Meiling¹, Adrienne M. S. Correa⁴, Daniel M. Holstein⁵, Erinn M. Muller^{1,6}, Laura D. Mydlarz⁷, Tyler B. Smith¹ and Amy Apprill^{1,2}

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nature communications

Article

<https://doi.org/10.1038/s41467-023-38612-4>

Stony coral tissue loss disease induces transcriptional signatures of in situ degradation of dysfunctional Symbiodiniaceae

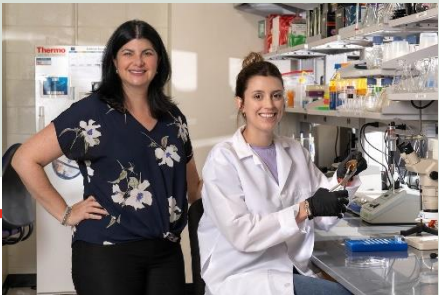
Received: 3 November 2022

Accepted: 10 May 2023

Published online: 22 May 2023

Check for updates

Kelsey M. Beavers¹, Emily W. Van Buren¹, Ashley M. Rossin², Madison A. Emery¹, Alex J. Veglia³, Carly E. Karrick³, Nicholas J. MacKnight¹, Bradford A. Dimos¹, Sonora S. Meiling⁴, Tyler B. Smith⁴, Amy Apprill⁵, Erinn M. Muller⁶, Daniel M. Holstein², Adrienne M. S. Correa³, Marilyn E. Brandt⁴ & Laura D. Mydlarz¹✉



Research Goals And Objectives Marine Disease



MD2: Disease, Water Quality & Temperature Stress

MD1	Biodiversity and disease
MD2	Water quality and disease
MD3	Model the spread and impact of multi-species coral disease.
MD4	Share disease research

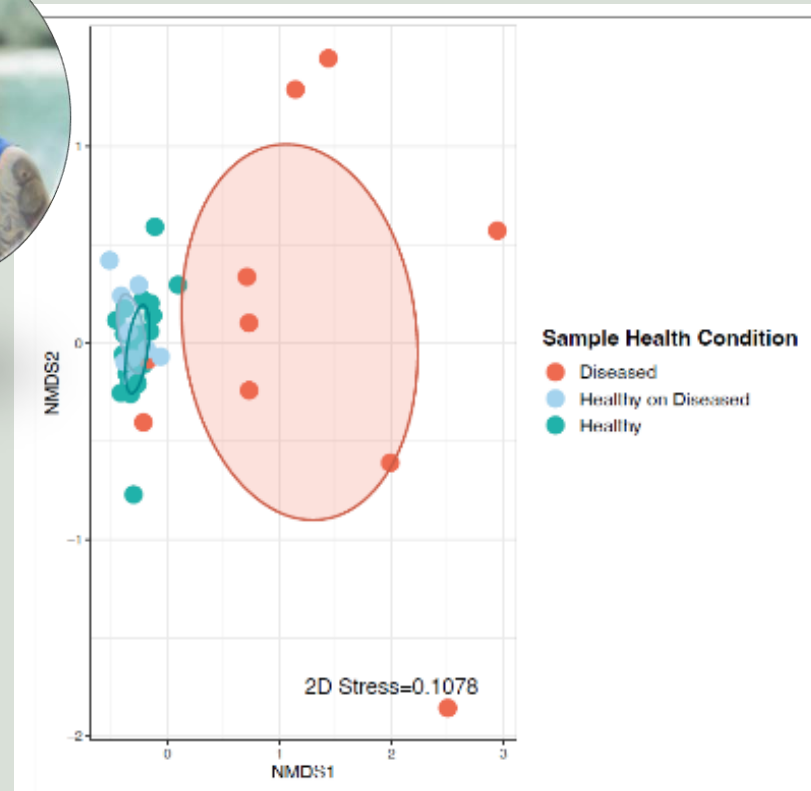


Results, Outcomes & Accomplishments – MD2: Disease, Water Quality & Temperature Stress



Test effect of water quality and temperature stress on disease prevalence

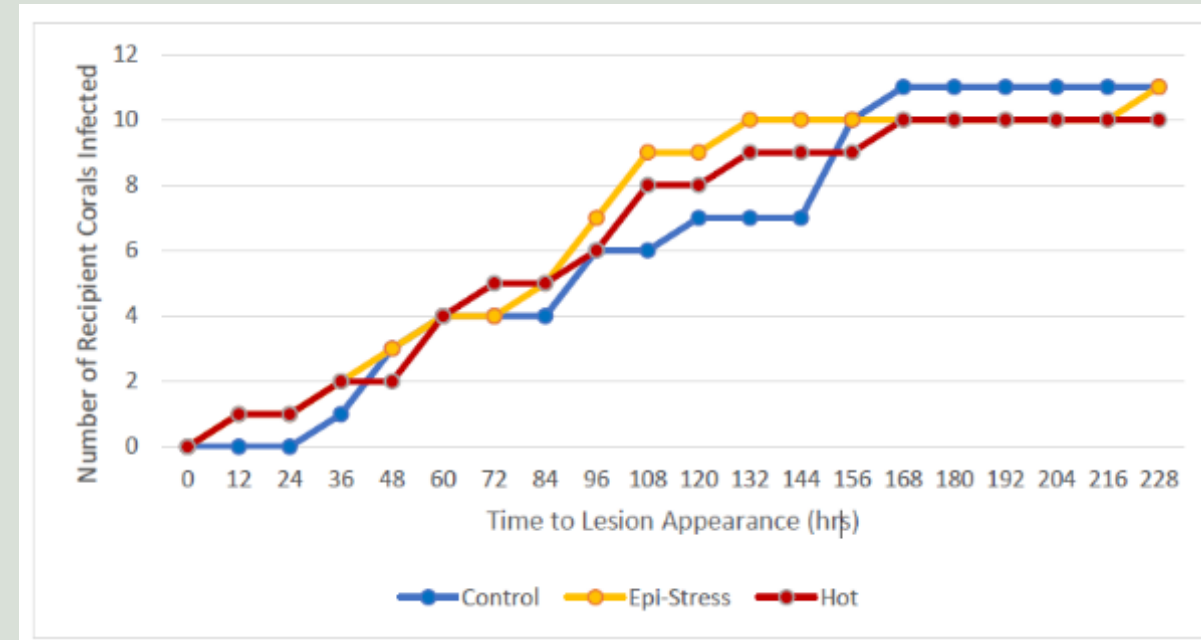
- ✓ Water quality sampling for two consecutive years (ongoing)
- ✓ NASA EPSCoR grant for satellite comparison (C of C, KSU)
- ✓ WRRRI grant for microbial sampling and analysis (WHOI)



Results, Outcomes & Accomplishments – MD2: Disease, Water Quality & Temperature Stress

Test effect of water quality and temperature stress on disease transmission

- ✓ Temperature stress disease transmission experiment completed in 2022

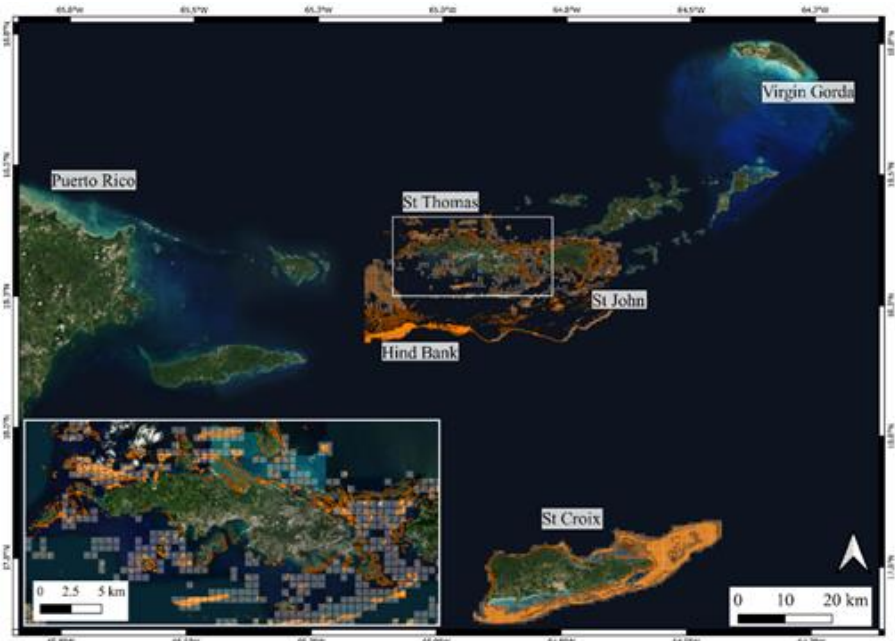


Research Goals And Objectives Marine Disease

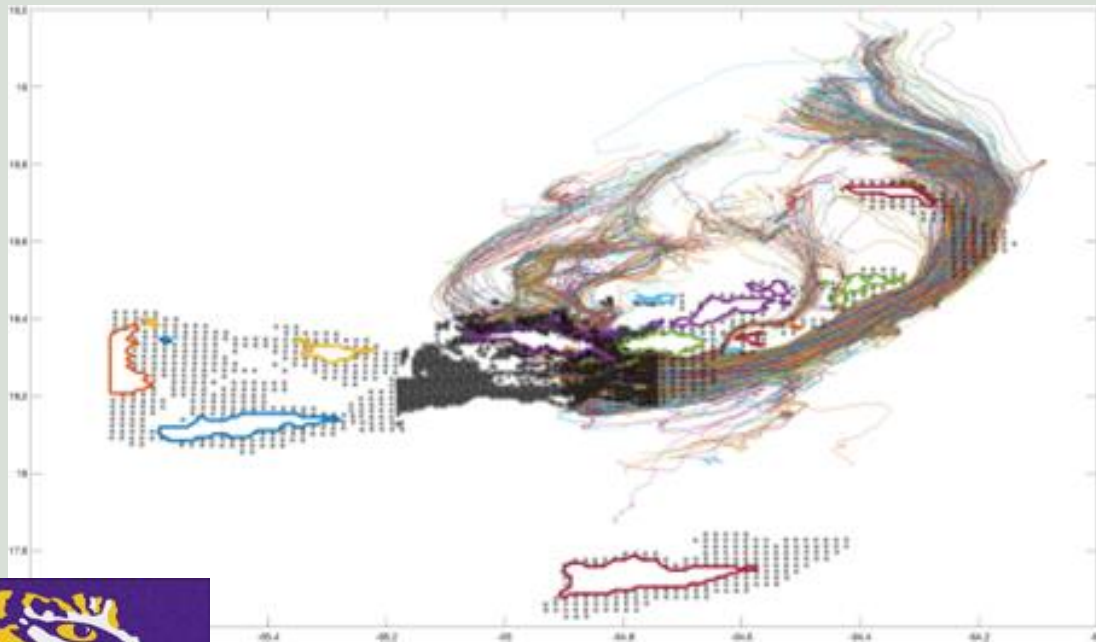


MD3: Predict the spread of disease

MD1	Biodiversity and disease
MD2	Water quality and disease
MD3	Model the spread and impact of multi-species coral disease.
MD4	Share disease research



Results, Outcomes & Accomplishments – MD3: Predict the spread of disease



Use hydrodynamic model outputs to parameterize a connectivity model

- ✓ Hydrodynamic model runs completed and used by D. Holstein's lab in initial testing. More work needed.

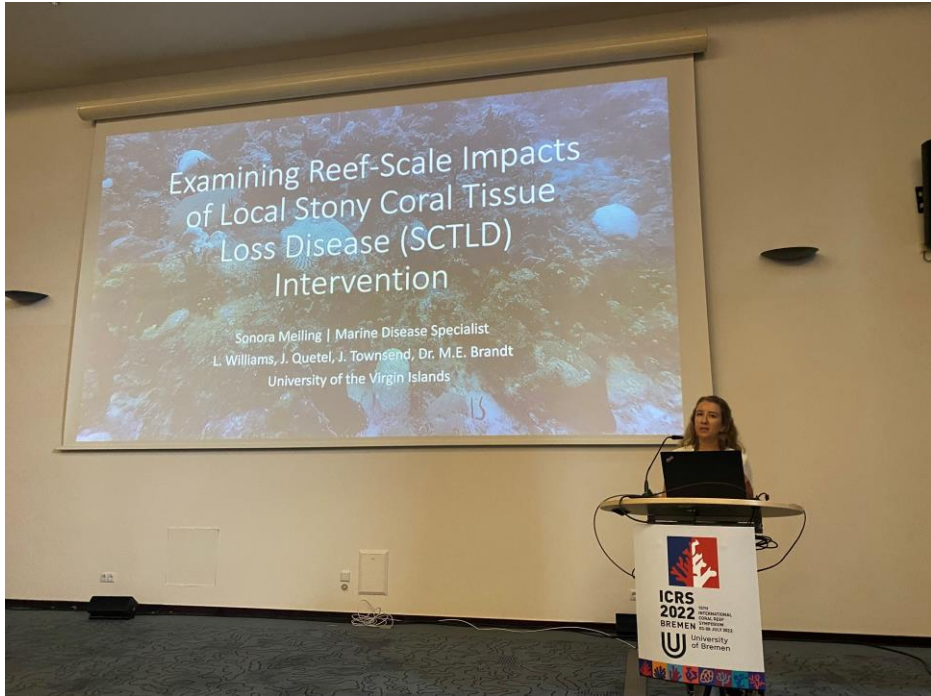


Research Goals And Objectives Marine Disease



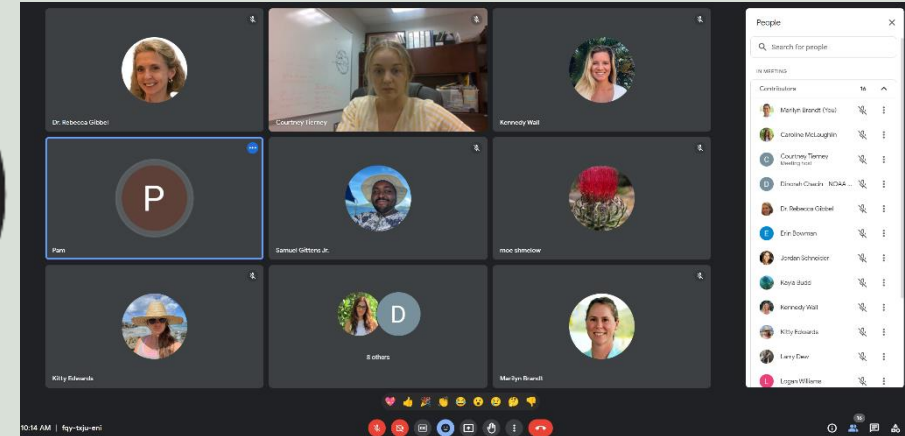
MD4: Share disease research

MD1	Biodiversity and disease
MD2	Water quality and disease
MD3	Model the spread and impact of multi-species coral disease.
MD4	Share disease research



Results, Outcomes & Accomplishments – MD4: Share disease research

Vicoraldisease.org



- ✓ Vicoraldisease.org hosted by Brandt lab and managed by VI Department of Planning and Natural Resources (DPNR)
- ✓ M. Brandt, S. Meiling and other Brandt lab members are regular contributors to the Virgin Islands Coral Disease Advisory Committee (VI-CDAC)
- ✓ Regular interviews with local news agencies



Researchers Uncover Some Secrets of Stony Coral Disease, Still Search for Its Cause

By Bernettia Akin July 22, 2023



Specter of Coral Bleaching Hangs Over V.I.

By Bernettia Akin August 23, 2023

Results, Outcomes & Accomplishments – MD4: Share disease research

TEDx Saint Thomas



- ✓ 1 poster and 9 oral presentations about USVI coral disease research at the 2022 International Coral Reef Symposium
- ✓ 2 posters and 1 oral presentation at the 2023 Association of Marine Laboratories of the Caribbean meeting

Coral Restoration



Research Goals And Objectives Restoration

MR1	Expand capacity for restoration ecology research in the U.S. Virgin Islands
MR2	Diversity and Restoration
MR3	Water quality and Restoration
MR4	Share restoration research

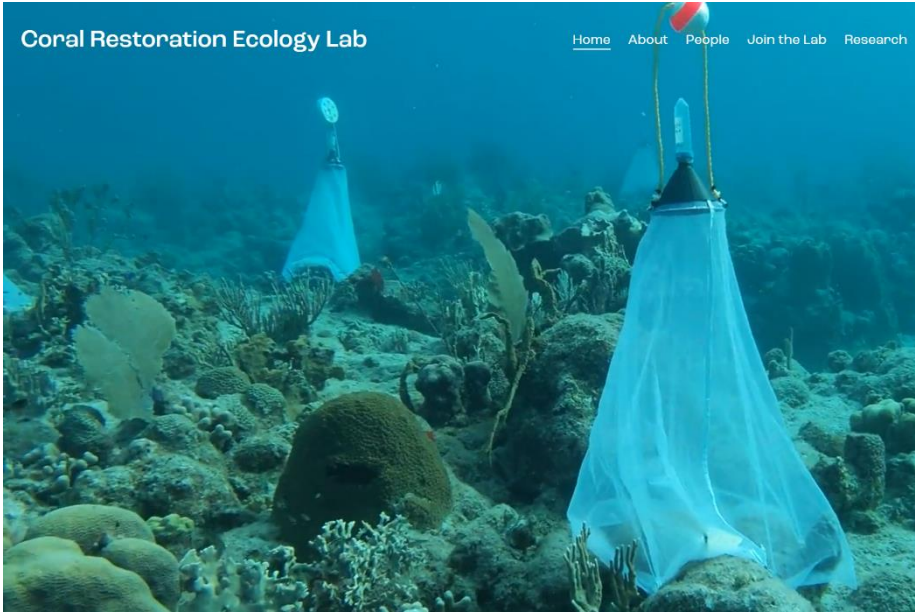


Research Goals And Objectives Restoration



MR1: Expand capacity

MR1	Expand capacity for restoration ecology research in the U.S. Virgin Islands
MR2	Diversity and Restoration
MR 3	Water quality and Restoration
MR4	Share restoration research



Results, Outcome Accomplishment



National
Marine Sanctuary
Foundation



THE UNIVERSITY OF
ALABAMA AT BIRMINGHAM



Scalable Coral Restoration using Selective-Breeding and Assisted Evolution Technologies

- ✓ Construction of large-scale
Larval Rearing Units
- ✓ Symbiont diversity surveys for
parental selection.
- ✓ Completed 12-month captive
gametogenesis & spawning
- ✓ Pre-trial fertilization and
settlement onto RFID
substrates.



University of the Virgin Islands



Research Goals And Objectives Restoration



MR1	Expand capacity for restoration ecology research in the U.S. Virgin Islands
MR2	Diversity and Restoration
MR 3	Water quality and Restoration
MR4	Share restoration research

MR2: Diversity and Outplanting

Perform diversity outplanting experiment

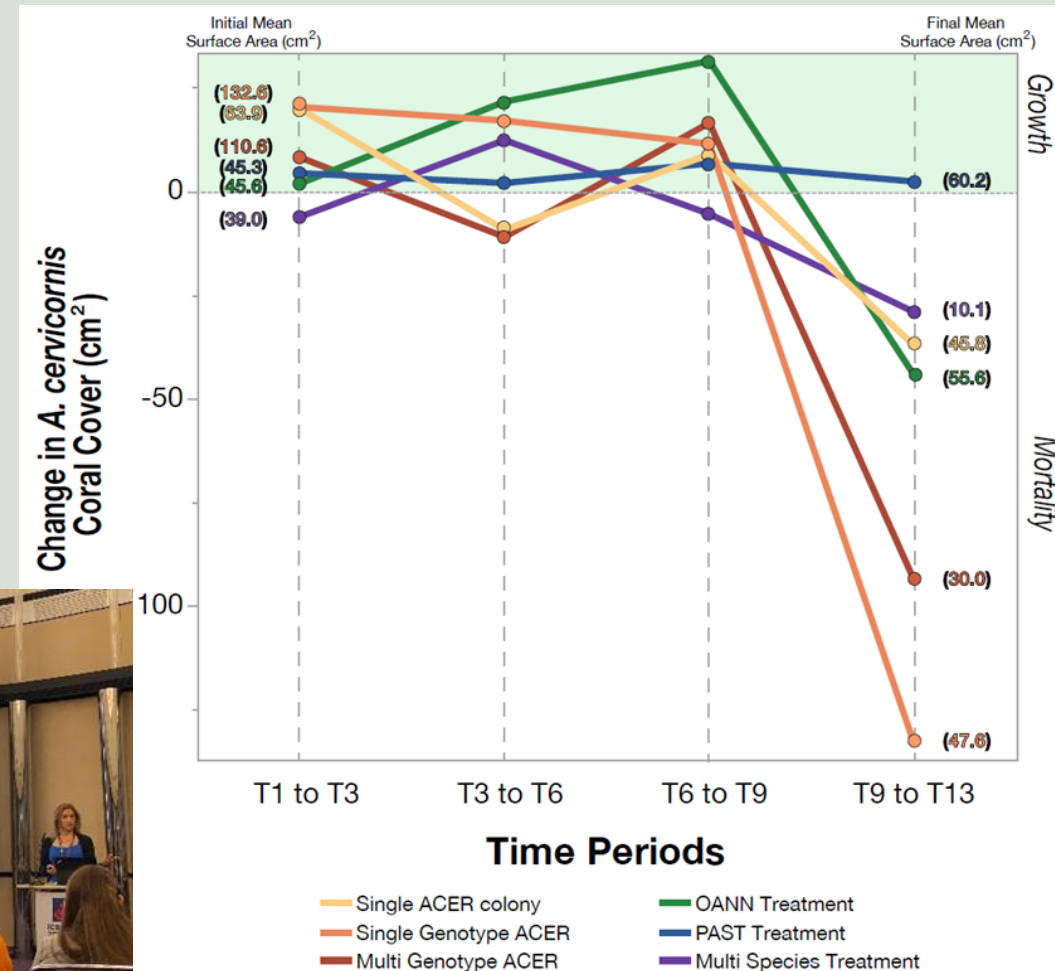


Results, Outcomes & Accomplishments – MR2: Diversity and Outplanting



Perform diversity outplanting experiment

- ✓ Experiment deployed in January 2022
- ✓ Preliminary results presented at ICRS July 2022

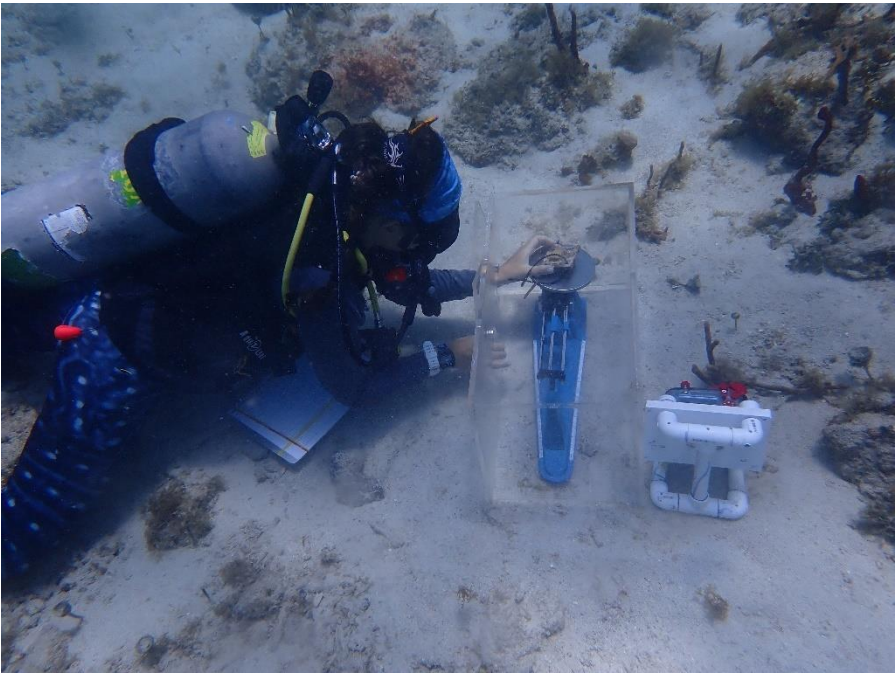


Research Goals And Objectives Restoration



MR3: Water quality and restoration

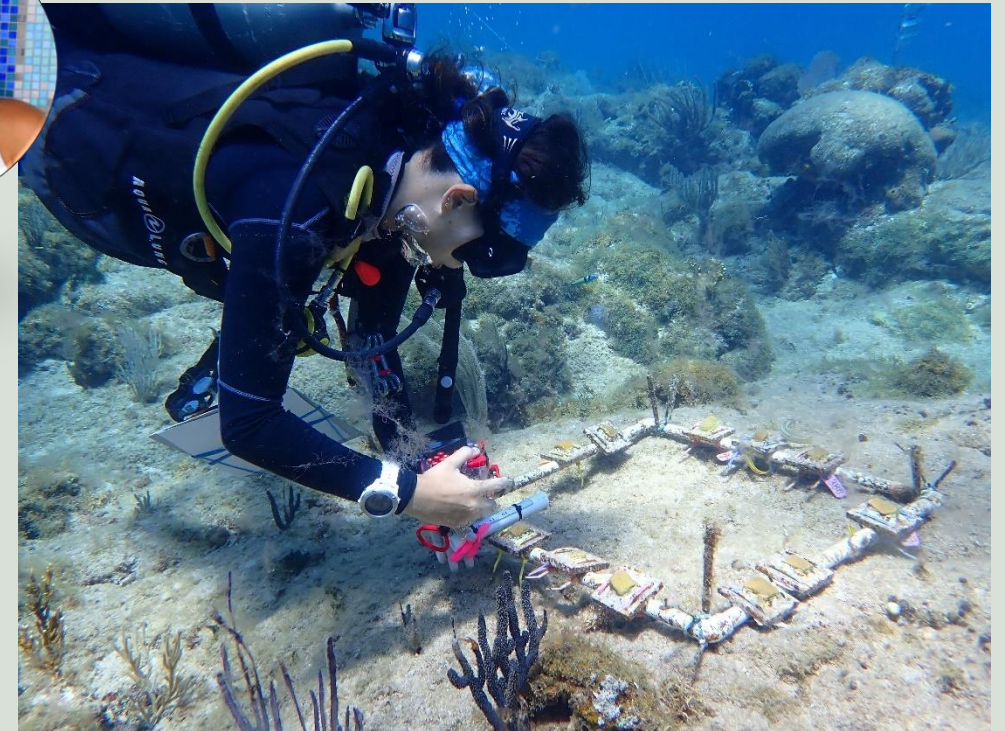
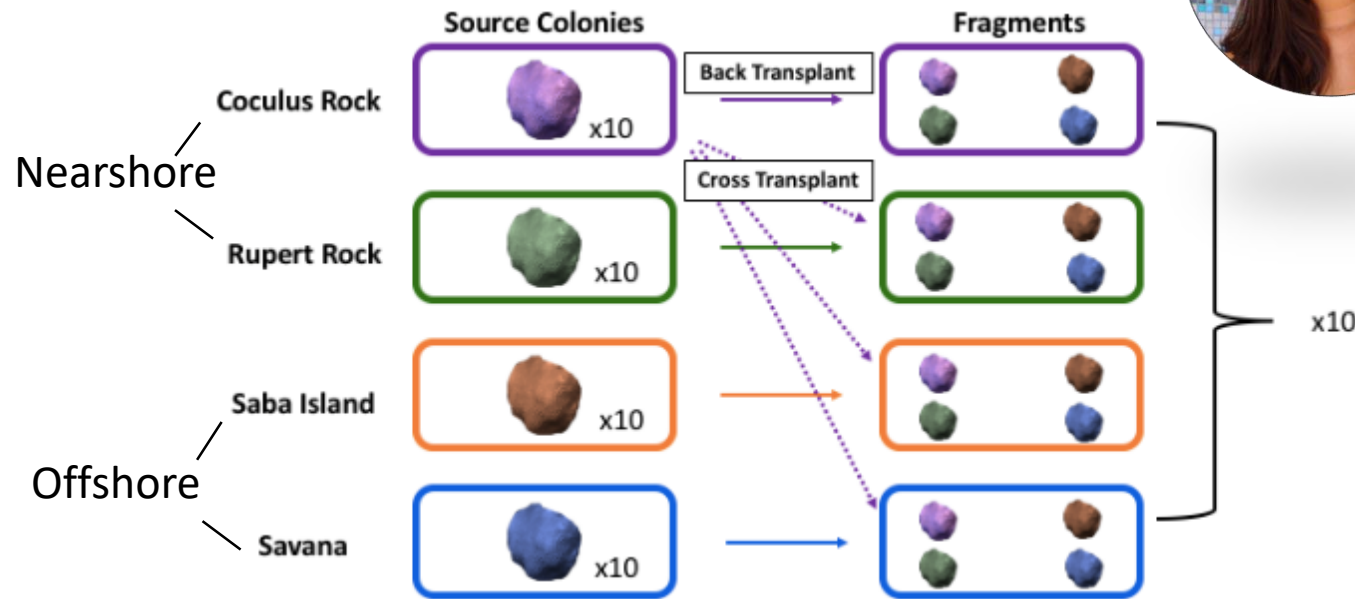
MR1	Expand capacity for restoration ecology research in the U.S. Virgin Islands
MR2	Diversity and Restoration
MR 3	Water quality and Restoration
MR4	Share restoration research



Results, Outcomes & Accomplishments – MR3: Outplanting and Water Quality

Perform water quality outplanting experiment

- ✓ Adeline Shelby's MMES thesis experiment deployed in January 2023
- ✓ Complemented with water quality sampling



Research Goals And Objectives Restoration



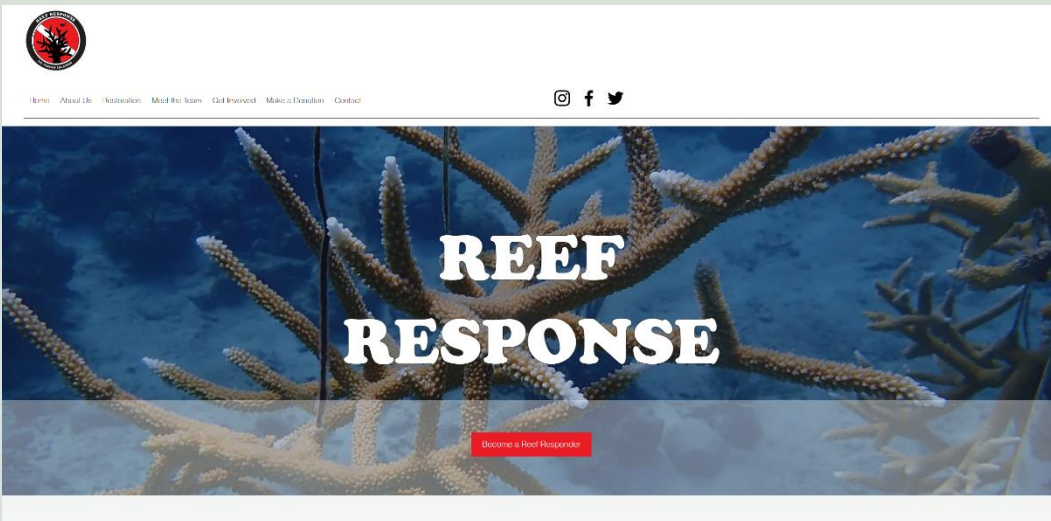
MR4: Share restoration research

MR1	Expand capacity for restoration ecology research in the U.S. Virgin Islands
MR2	Diversity and Restoration
MR 3	Water quality and Restoration
MR4	Share restoration research



Results, Outcomes & Accomplishments – MR4: Share restoration research

- ✓ Reefresponse.org
- ✓ Educational signage at Lovango Cay, in process for Hull Bay



Reefresponse.org



Results, Outcomes & Accomplishments – MR4: Share restoration research

- ✓ Coral Chronicles booklet published
- ✓ Reef Response video almost complete



The Coral Chronicles

2022 + 2023

Corals in Crisis

The Lovango Resort and Beach Club has partnered with Reef Response to help corals in crisis. Learn how our partnership is helping save corals and support coral research.

Project Overview

Project overview by Marilyn, officina alordumquis ut que vidi di odit et et eviles equat illomed quae quae magate nam rem etus, nam, commis molerores voluorevran.

Project overview by Marilyn, officina alordumquis ut que vidi di odit et et eviles equat illomed quae quae magate nam rem etus, nam, commis molerores voluorevran.

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Reef Response_draft

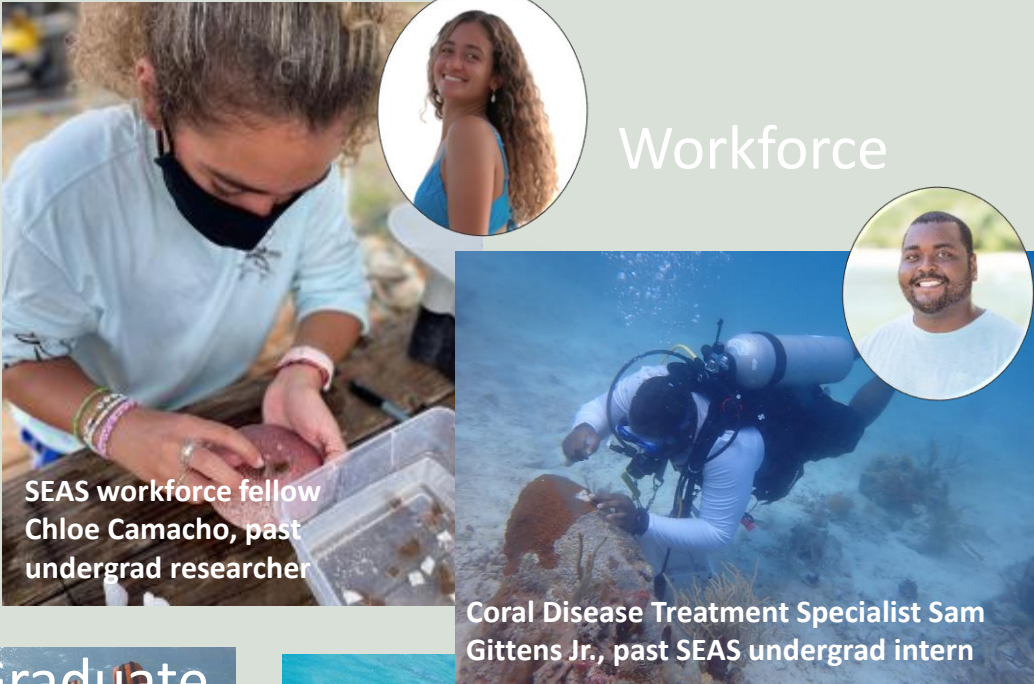
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Results, Outcomes & Accomplishments – MR4: Share restoration research

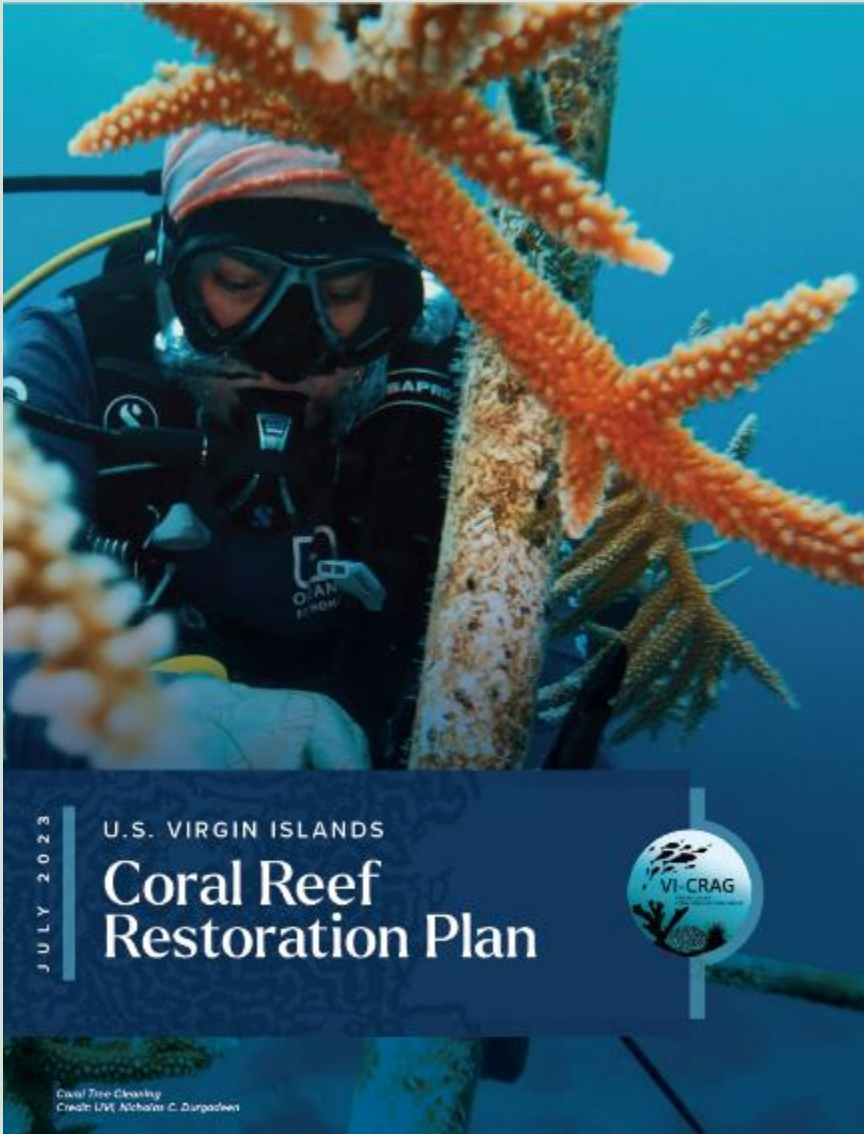
- ✓ 1 poster and 2 oral presentations focused on coral restoration at the 2022 International Coral Reef Symposium
- ✓ 1 poster and 4 oral presentations at Reef Futures 2022
- ✓ 3 posters at Association of the Marine Labs of the Caribbean meeting 2023



Diversity



Broader Impacts



Authors & Acknowledgements

This U.S. Virgin Islands Coral Reef Restoration Plan was made possible with input and contributions from a number of individuals and organizations. NOAA's Coral Reef Conservation Program (CRCP) and The Nature Conservancy Reef Resilience Network provided funding for facilitation and production of the Plan. The planning team, collectively known as the Virgin Islands Restoration of Coral Squad (VIRACS), was coordinated by Leslie Henderson, NOAA Office for Coastal Management (OCM), with facilitation by Gabrielle Johnson, NOAA CRCP, and Jane Israel, JU Solutions LLC.

Photo Credit: Leslie Henderson

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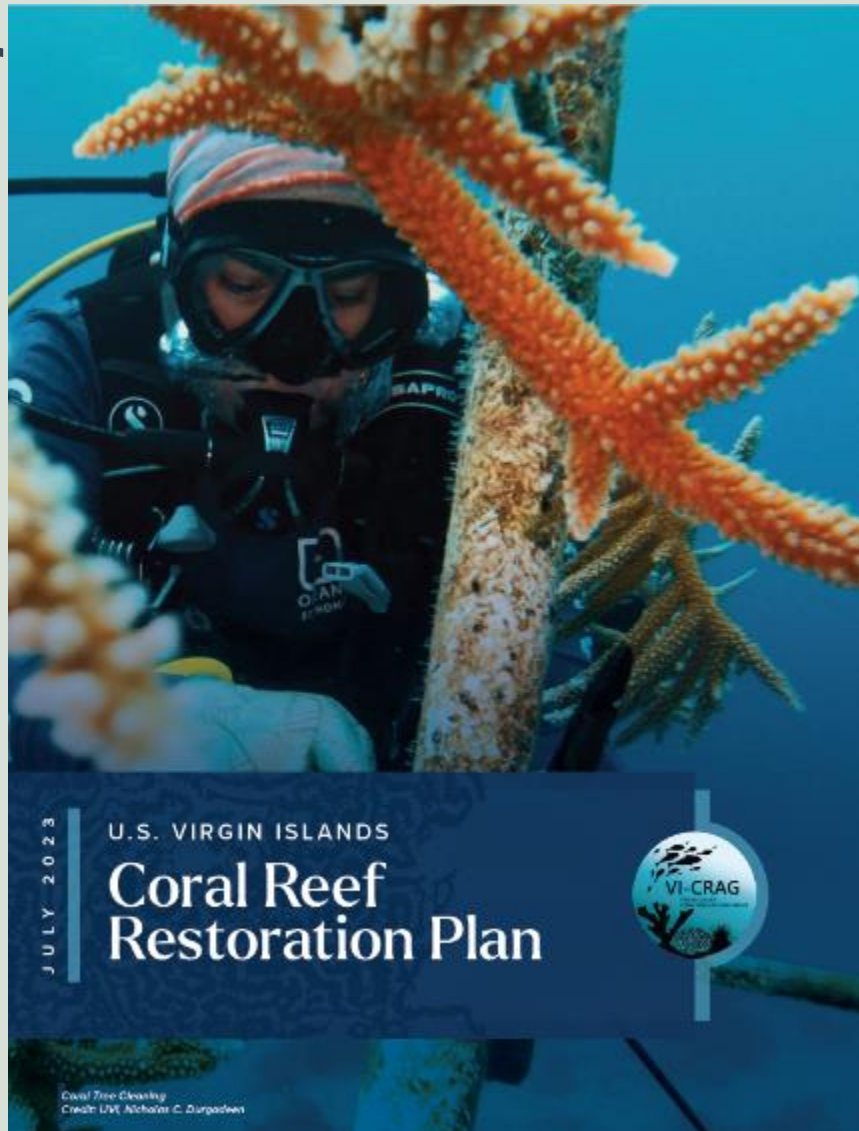
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2 USVI CORAL REEF RESTORATION PLAN

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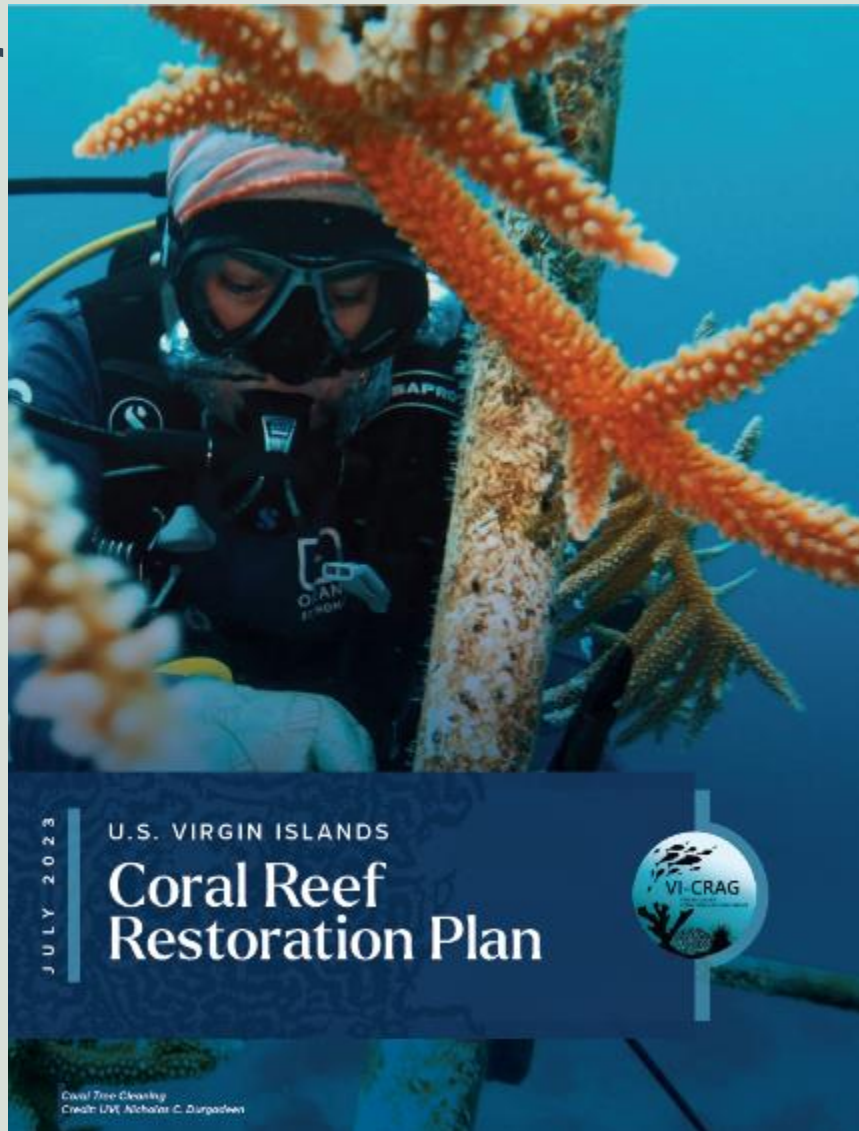
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Broader Impacts



Coral Disease Outbreak Response Plan for the United States Virgin Islands



Senora Meiling

Coral Disease Outbreak Response Plan for the USVI

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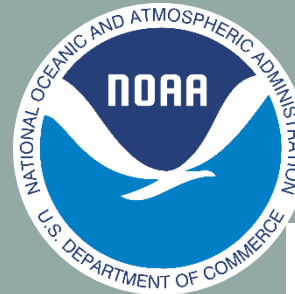
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Coral Disease Outbreak Response Plan for the USVI

iii

Collaborations





Thank you

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