



Fore-C: Forecasting coral disease in the tropical Pacific

Presenting: Megan Donahue & Jamie Caldwell

Hawaii Institute of Marine Biology



Megan Donahue
Jamie Caldwell
Austin Greene



Mark Eakin
Erick Geiger
Gang Liu
Jacquie De La Cour
Derek Manzello



Scott Heron



UNSW
THE UNIVERSITY OF NEW SOUTH WALES

Tracy Ainsworth

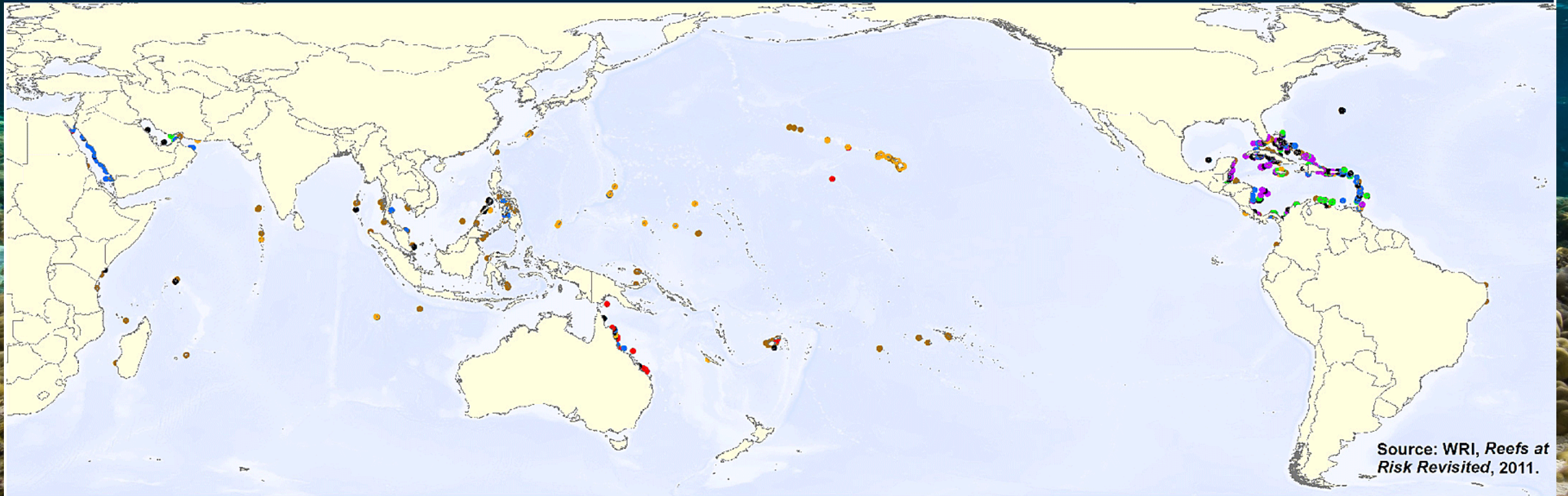


THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

Bill Leggat
Tess Moriarty



GLOBAL INCIDENCES OF CORAL DISEASE, 1970 – 2010



Source: WRI, *Reefs at Risk Revisited*, 2011.

● Black-band disease ● Growth anomalies ● White plague ● White syndrome ● White-band disease ● Yellow band disease ● Other disease



U.S.

NORTHWESTERN
HAWAIIAN ISLANDS

MAIN HAWAIIAN
ISLANDS

MARIANA
ARCHIPELAGO

PACIFIC REMOTE
ISLAND AREAS

AMERICAN
SAMOA

AUSTRALIA

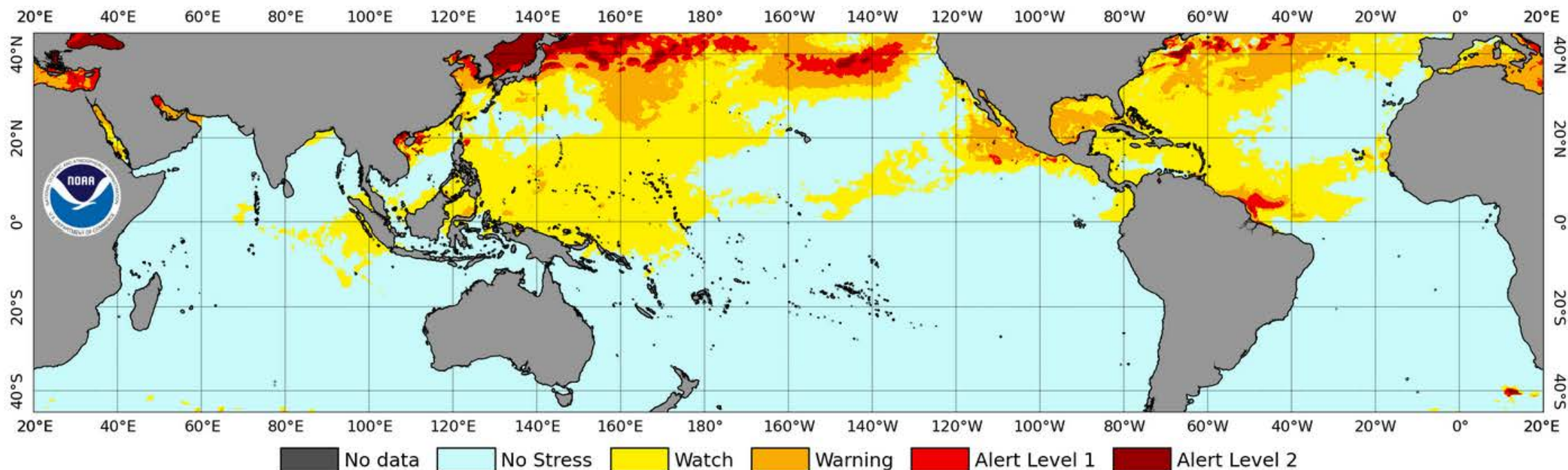
CORAL
TRIANGLE

Australia

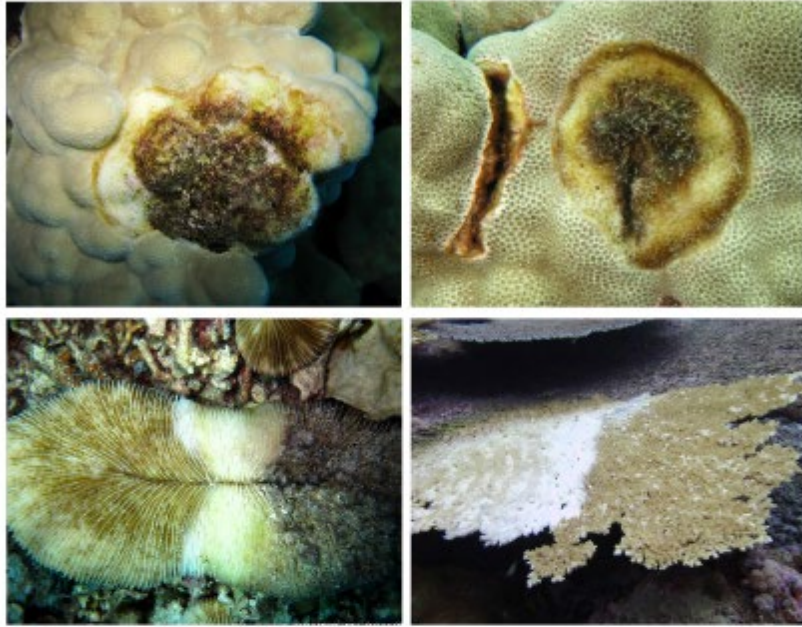


Daily Global 5km Satellite Coral Bleaching Heat Stress Alert Area (Version 3.1, released August 1, 2018)

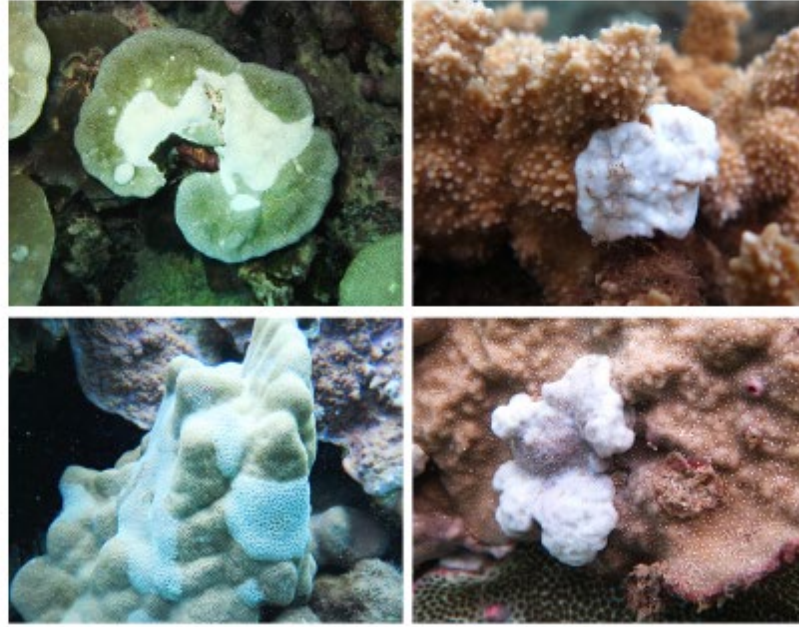
NOAA Coral Reef Watch Daily 5km Bleaching Alert Area 7-day Maximum (v3.1) 8 Aug 2021



TISSUE LOSS

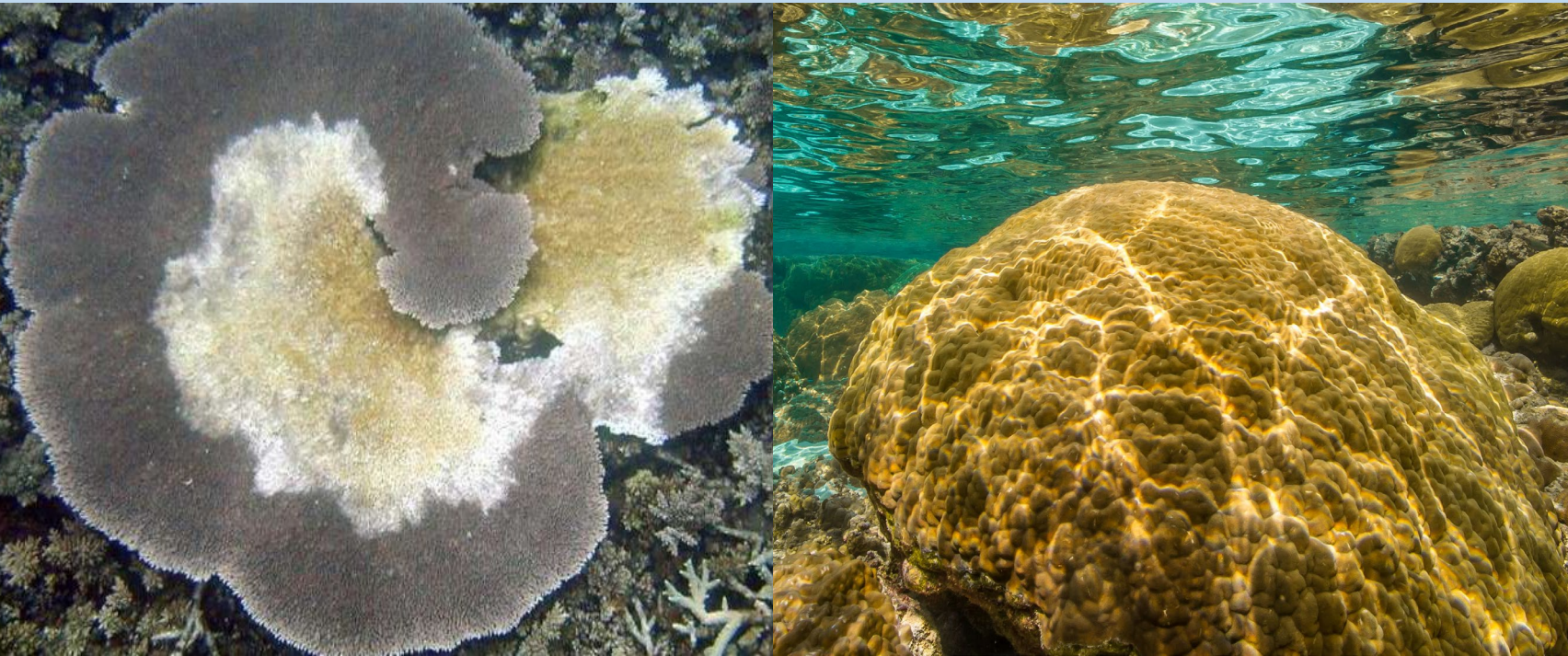


UNUSUAL GROWTHS



An early warning system for coral disease

- Five Pacific regions
- Multiple disease types
- Multiple host species
- Drivers
 - SST anomalies
 - OC anomalies
 - Night time lights



Data



New experimental product



NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)



Coral Reef Watch
USCRTF | CRCP | NCRMP | CoRIS

[DOC](#) > [NOAA](#) > [NESDIS](#) > [STAR](#) > [CRW](#)

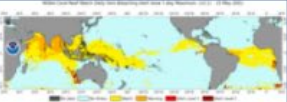


[Coral Reef Watch Home](#)

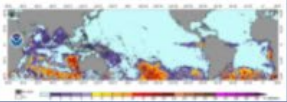
[About Us](#)

[Products Overview](#)

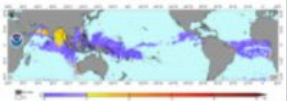
[Near-Real-Time Data](#)
(5km Resolution)



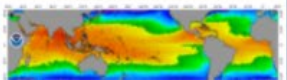
[Bleaching Alert Area \(Alerts\)](#)



[Degree Heating Week \(DHW\)](#)

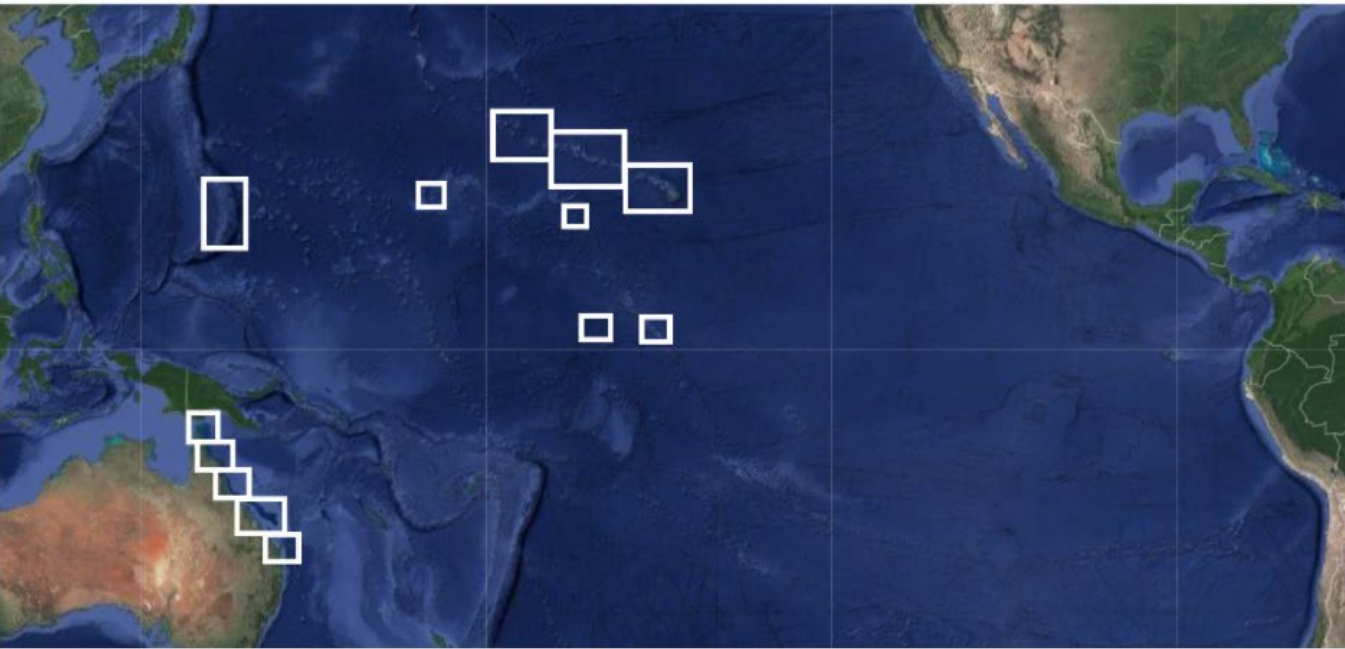


[HotSpot](#)



Multi-Factor Coral Disease Forecast

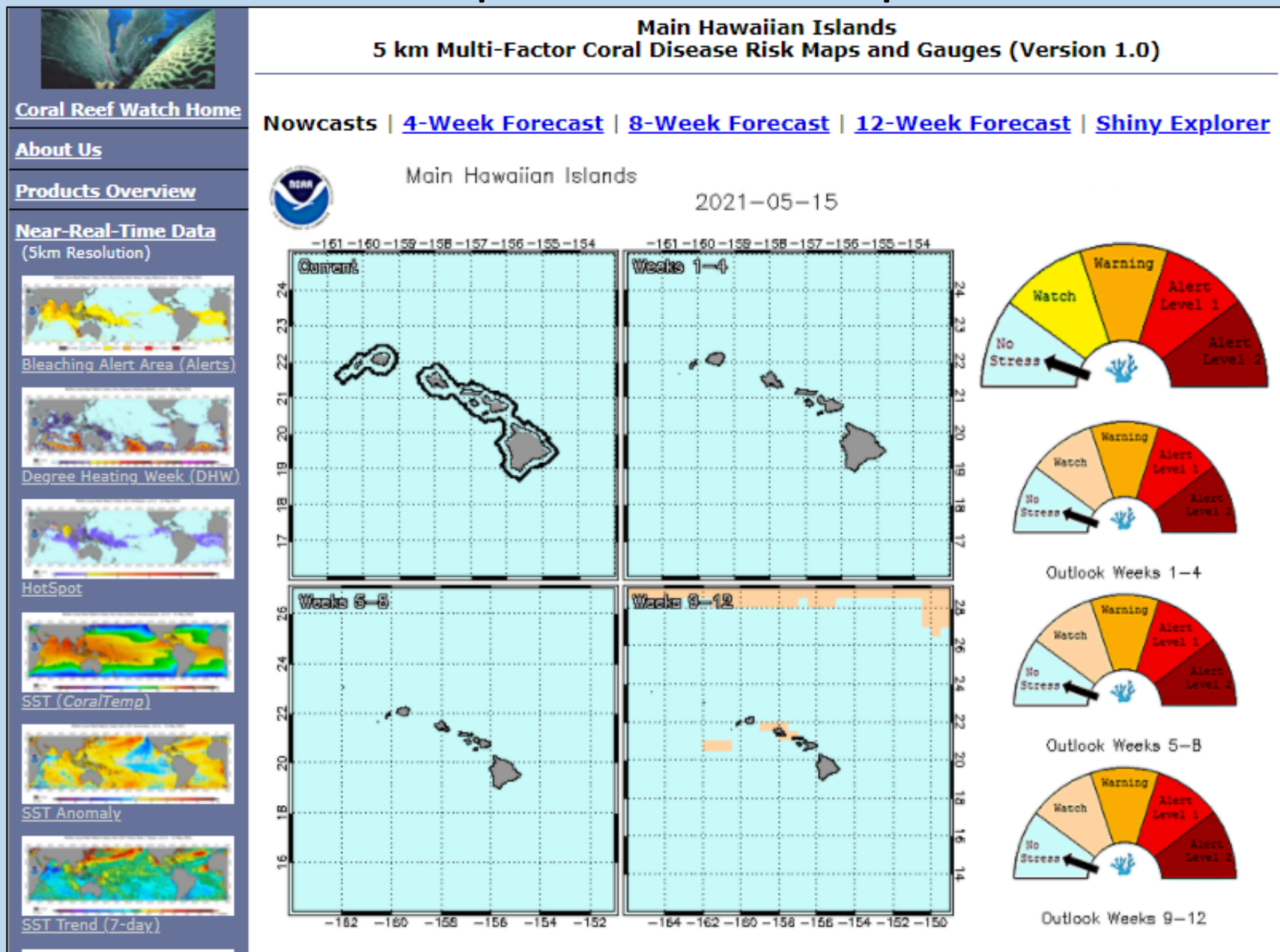
(Version 1.0, released May 4, 2021, experimental product)



Click on a region or select from dropdown:

Multi-Factor Coral Disease Forecast Product Description

New experimental product



Network of End Users



Partners

TNC
NOAA
CRAG/DMWR
NPS
GBRMPA
U of Guam

Forecasts



Scenarios





U.S.

NORTHWESTERN
HAWAIIAN ISLANDS

MAIN HAWAIIAN
ISLANDS

MARIANA
ARCHIPELAGO

PACIFIC REMOTE
ISLAND AREAS

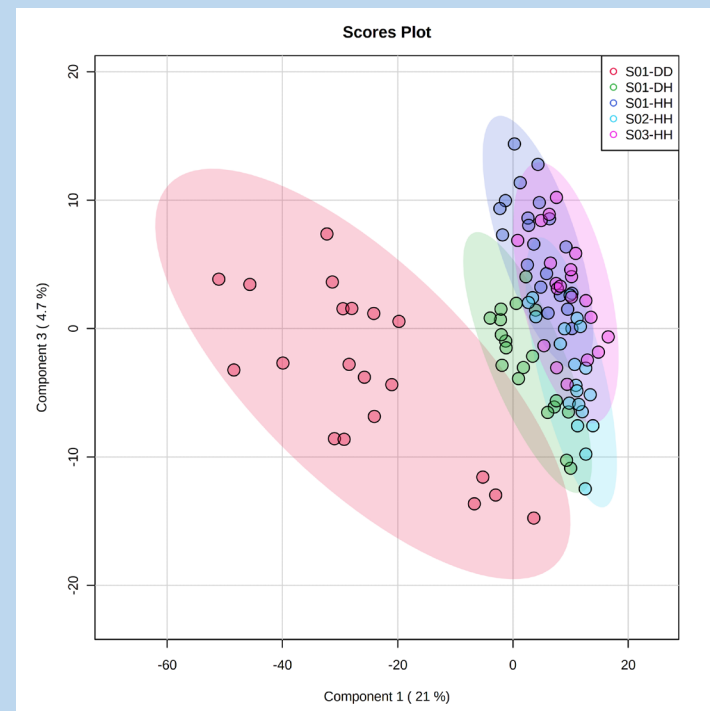
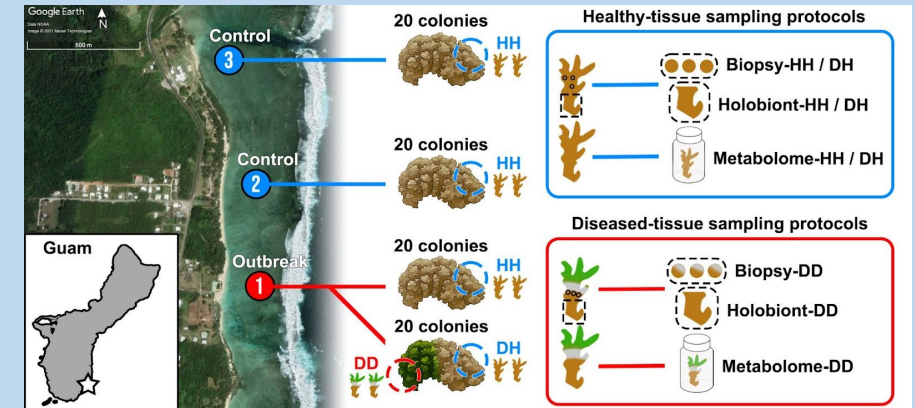
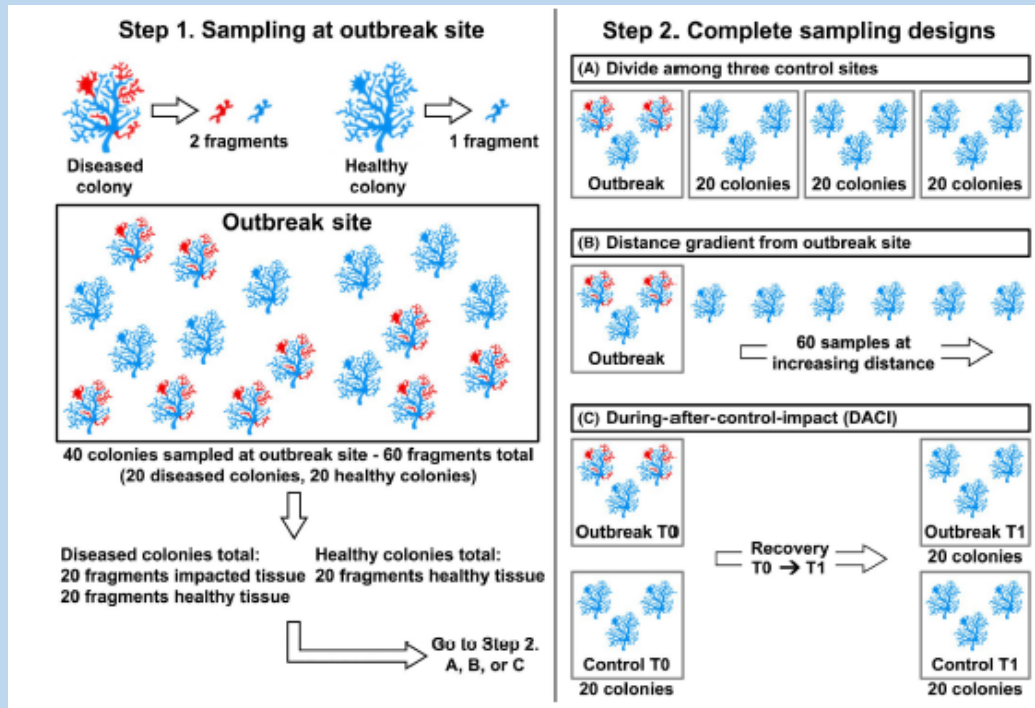
AMERICAN
SAMOA

CORAL
TRIANGLE

AUSTRALIA

Australia

Austin Greene¹  | William Leggat²  | Megan J. Donahue¹  | Laurie J. Raymundo³  |
Jamie M. Caldwell^{1,4}  | Tess Moriarty^{2,5}  | Scott F. Heron^{4,6}  | Tracy D. Ainsworth⁵ 





Optimal Spatiotemporal Scales to Aggregate Satellite Ocean Color Data for Nearshore Reefs and Tropical Coastal Waters: Two Case Studies

Erick F. Geiger^{1,2,3*}, Scott F. Heron^{1,2,4,5}, William J. Hernández^{1,2,6}, Jamie M. Caldwell⁵, Kim Falinski⁸, Tova Callender⁹, Austin L. Greene⁷, Gang Liu^{1,2,3}, Jacqueline L. De La Cour^{1,2,3}, Roy A. Armstrong¹⁰, Megan J. Donahue⁷ and C. Mark Eakin^{1,2}



**SCIENTIFIC
REPORTS**
nature research

Coral Disease Time Series Highlight Size-Dependent Risk and Other Drivers of White Syndrome in a Multi-Species Model

Austin Greene^{1*}, Megan J. Donahue¹, Jamie M. Caldwell^{1,2}, Scott F. Heron^{3,2,4}, Erick Geiger^{4,5} and Laurie J. Raymundo⁶

OPEN

Case-control design identifies ecological drivers of endemic coral diseases

Jamie M. Caldwell^{1,2*}, Greta Aeby³, Scott F. Heron^{2,4,5} & Megan J. Donahue¹