National Coral Reef Monitoring Program

PACIFIC ISLANDS FISHERIES SCIENCE CENTER
OCEAN AND CLIMATE CHANGE TEAM
2022 MARIANA ISLANDS MISSION REPORT

NOAA CORAL REEF CONSERVATION PROGRAM

OAP NOAA OCEAN ACIDIFICATION PROGRAM

NCRMP climate monitoring overview

The NOAA Pacific Islands Fisheries Science Center's Ocean and Climate Change (OCC) Team executes the climate monitoring component of NOAA's National Coral Reef Monitoring Program (NCRMP) in the U.S. Pacific Islands. NCRMP climate data are used to document the status and trends of coral reef ecosystems, assess the impact of environmental and climate stressors on reef communities, and inform adaptive management strategies. Most NCRMP climate monitoring is conducted at fixed sites that are surveyed repeatedly through time in order to track changes in environmental drivers and associated coral reef ecosystem responses.

About this mission report

This mission report provides an overview of the NCRMP climate survey efforts conducted as part of the *Rainier Integrates Charting, Hydrography, and Reef Demographics* (RICHARD) mission that took place from 11 April to 11 August 2022. The OCC Team completed 677 dives at 85 survey sites around 9 islands within the Mariana Archipelago, collecting data on subsurface temperature, seawater carbonate chemistry, carbonate accretion and erosion rates, and coral community structure and composition (see page 2 for summary of NCRMP climate data streams and methods). An accompanying summary of data and results will

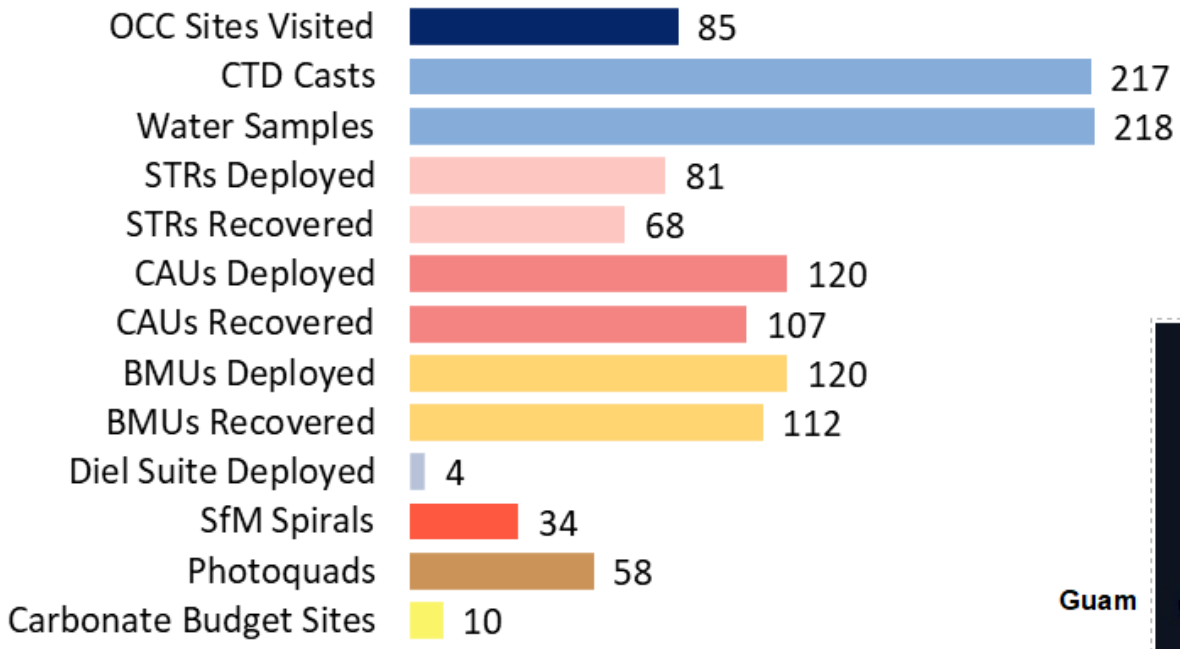


Figure 1 (above): Summary of OCC team field work completed during the FY22 RICHARD mission. See page 2 for description of data streams (colors in this figure correspond to the colors in the descriptions on page 2).

Figure 2 (
Locations of fixed climate (OCC) sites in the Mariana Archipelago.

Funding for this mission was provided by the NOAA Coral Reef Conservation Program (project #743) and the NOAA Ocean Acidification Program (project #20676). For more information and data requests, contact hannah.barkley@noaa.gov or visit https://www.coris.noaa.gov/monitoring/climate.html. Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. This document may be referenced as: PIFSC. 2023. Pacific Islands FIsheries Science Center--Ocean and Climate Change Team--2022 Mariana Islands Mission Report. NOAA Fisheries Pacific Science Center, PIFSC Special Publication, SP-23-03, 4 p.

National Coral Reef Monitoring Program

PACIFIC ISLANDS FISHERIES SCIENCE CENTER
OCEAN AND CLIMATE CHANGE TEAM
2022 MARIANA ISLANDS MISSION REPORT

CTD
Conductivity-Temperature-Depth

Collects temperature, salinity (from conductivity), and depth (from pressure) profiles up to 30 m at biological survey sites.

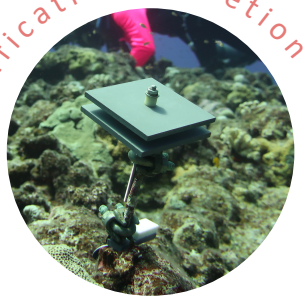
H_2O
Water Samples

Paired with CTD casts to collect water samples at 1 m depth, which are analyzed for total alkalinity (TA) and dissolved inorganic carbon (DIC) to track ocean acidification.

STR
Subsurface Temperature Recorder

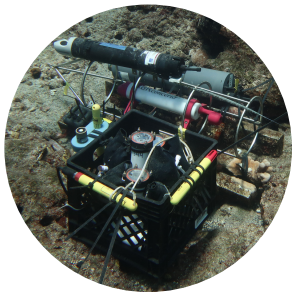
Temperature loggers secured to a reef at 5 m, 10 m, and 15 m depth, recording temperature every five minutes over a three year period to measure temperature and thermal stress.

CAU
Calcification Accretion Unit



Two 10 x 10 cm plates anchored to the reef in groups of five per fixed site, used to estimate rates of reef net carbonate accretion by measuring calcified material accreted over three years.

DS
Diel Suite



Temporal data collection instrument package that measures light, conductivity, temperature, depth, pH, dissolved oxygen, total alkalinity, and dissolved inorganic carbon data at nearshore reefs.

BMU
Bioerosion Monitoring Unit

A 1 x 2 x 5 cm block of dead coral skeleton mounted on the reef, used to estimate rates of reef bioerosion by measuring changes in volume over three years.

SFM
Structure-from-Motion

Georeferenced imagery collected in a 12-m diameter circle to create a 3D mosaic of fixed sites providing metrics such as rugosity, coral demography, and growth rates.

PQ
Photoquads

Thirty photos taken along a 15-m transect line to analyze benthic community cover at fixed sites using CoralNet.

CB
Carbonate Budgets

Census-based assessments used to calculate carbonate production and erosion rates at biological survey sites.

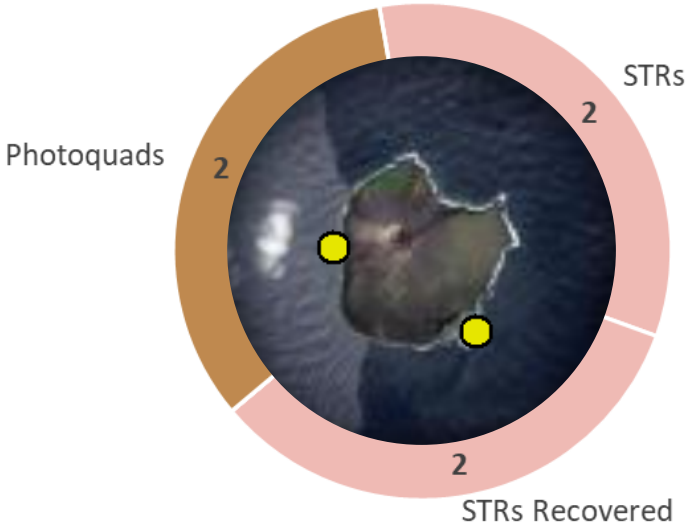
National Coral Reef Monitoring Program

PACIFIC ISLANDS FISHERIES SCIENCE CENTER
OCEAN AND CLIMATE CHANGE TEAM

NOAA CORAL REEF CONSERVATION PROGRAM

NOAA OCEAN ACIDIFICATION PROGRAM

FARALLÓN DE PÁJAROS



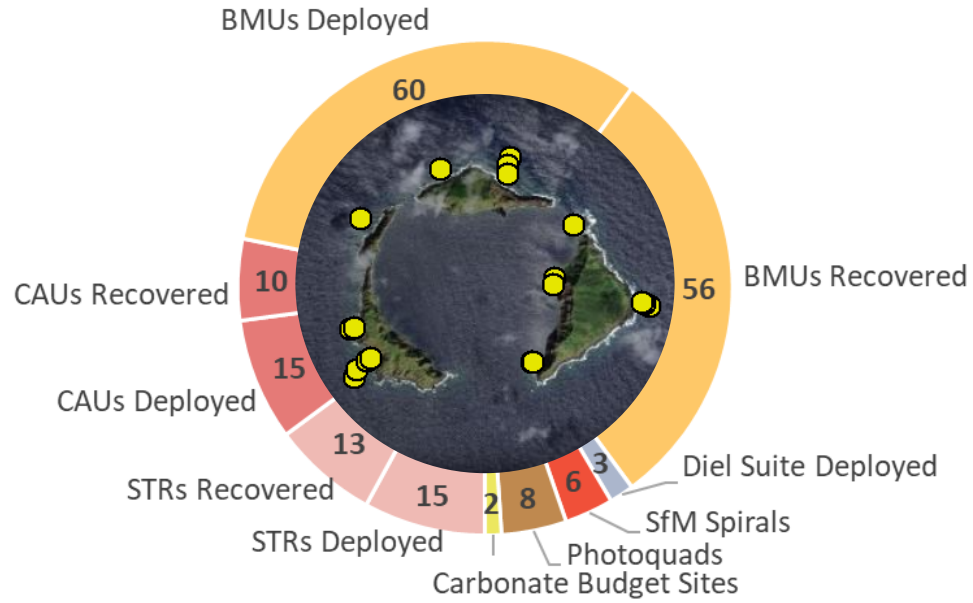
2

OCC SITES VISITED

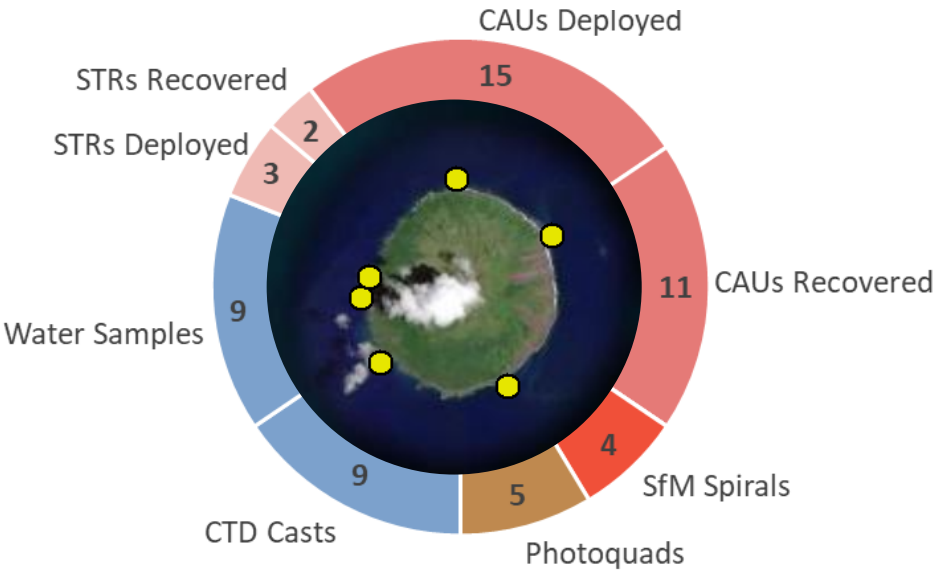
MAUG

16

OCC SITES VISITED



ASUNCION



7

OCC SITES VISITED

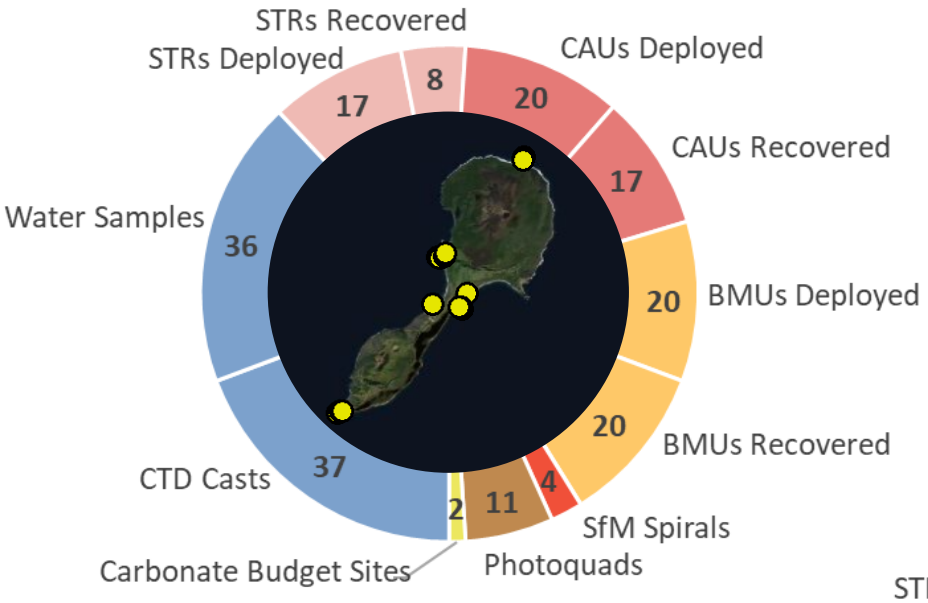
Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

National Coral Reef Monitoring Program

PACIFIC ISLANDS FISHERIES SCIENCE CENTER
OCEAN AND CLIMATE CHANGE TEAM
2022 MARIANA ISLANDS MISSION REPORT

NOAA CORAL REEF CONSERVATION PROGRAM
NOAA OCEAN ACIDIFICATION PROGRAM

PAGAN



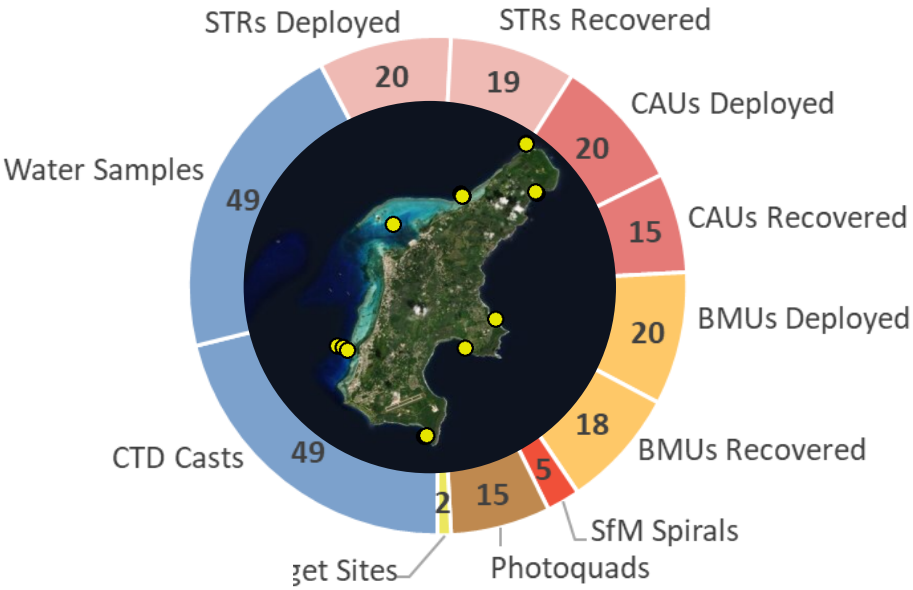
14

OCC SITES VISITED

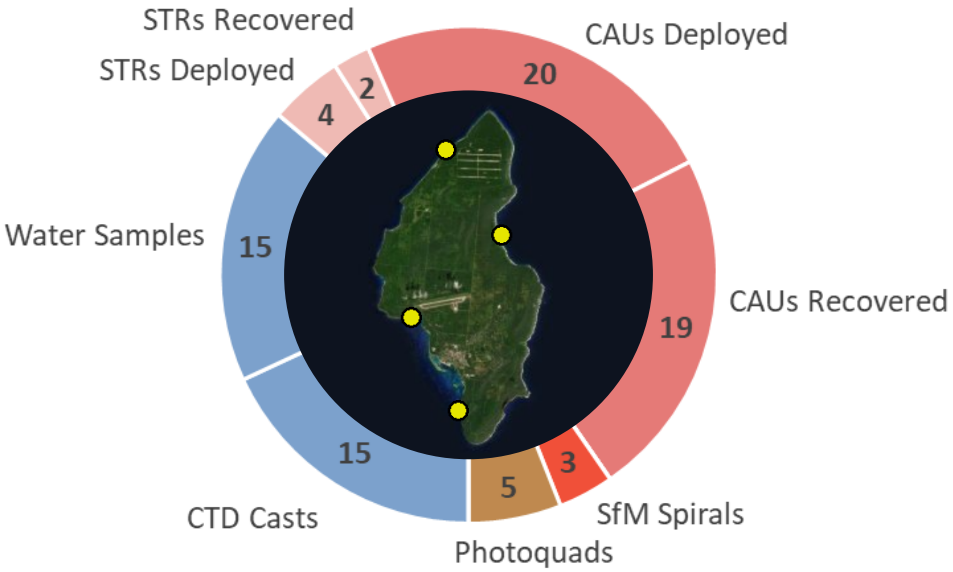
SAIPAN

17

OCC SITES VISITED



TINIAN



5

OCC SITES VISITED

Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

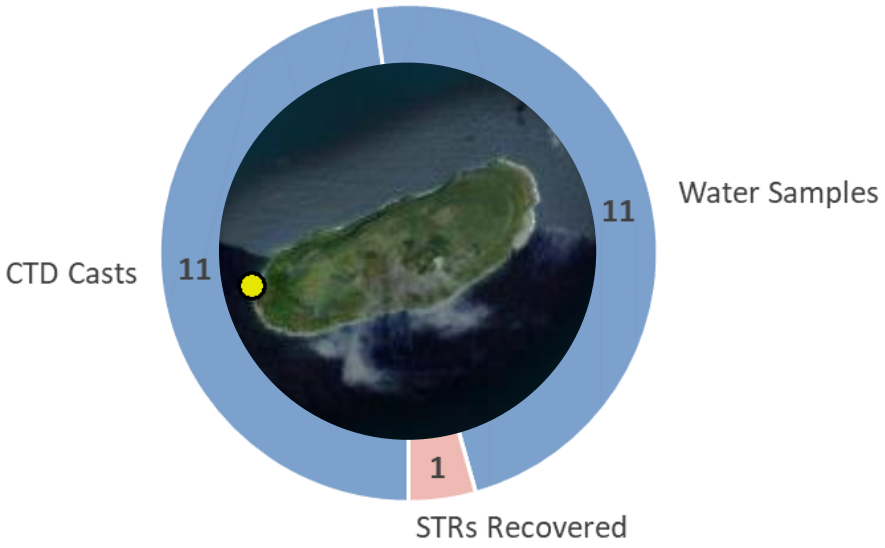
National Coral Reef Monitoring Program

PACIFIC ISLANDS FISHERIES SCIENCE CENTER
OCEAN AND CLIMATE CHANGE TEAM

NOAA CORAL REEF CONSERVATION PROGRAM

NOAA OCEAN ACIDIFICATION PROGRAM

AGUIJAN



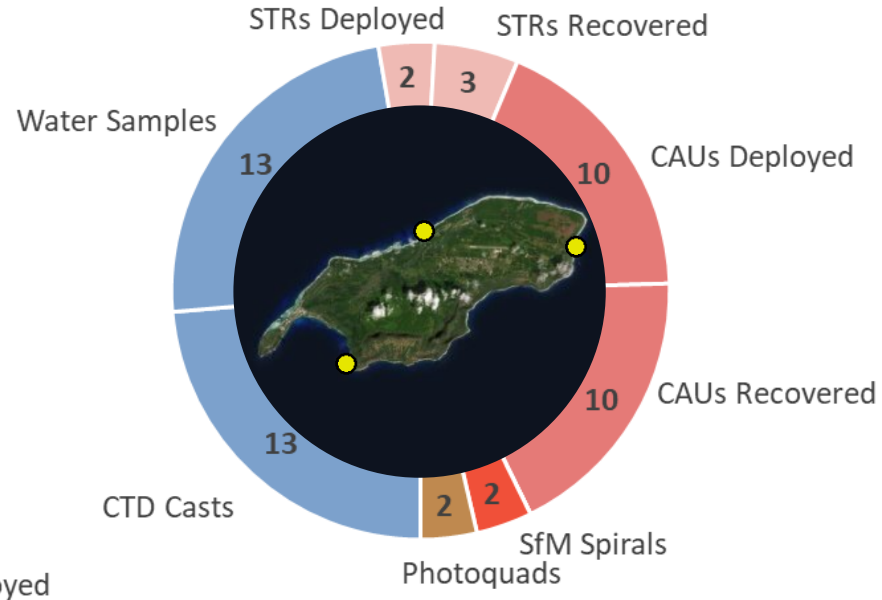
1

OCC SITE VISITED

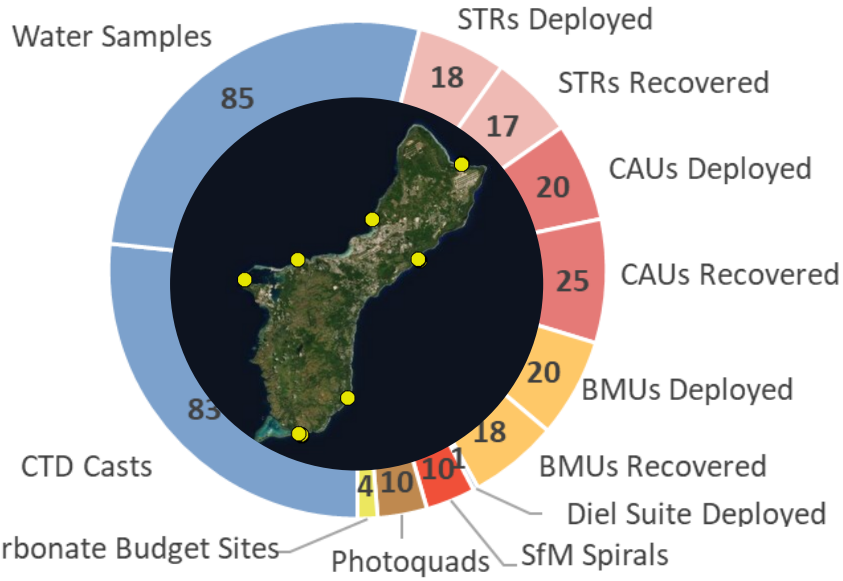
ROTA

3

OCC SITES VISITED



GUAM



19

OCC SITES VISITED

Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community