



Pacific Reef Assessment and Monitoring Program

Ocean and Climate Change Monitoring Summary the Pacific Remote Islands Marine National Monument 2018¹

Introduction

The Ecosystem Sciences Division (ESD) of the Pacific Islands Fisheries Science Center monitors physical and chemical oceanographic conditions to investigate the long-term impacts of climate change and ocean acidification on coral reef ecosystems of the U.S.-affiliated Pacific islands. These research efforts have established temporal and spatial baselines that are being used to understand changes over time. During the 2018 Pacific Reef Assessment and Monitoring Program (Pacific RAMP) research expedition, the ESD completed climate impact assessment surveys in the Pacific Remote Islands Marine National Monument. This summary report provides a brief overview of survey effort and preliminary data.

Survey effort

Climate impact assessment surveys in the Pacific Remote Islands Marine National Monument occurred from May 31 to August 16, 2018 at the following locations: Howland Island, Baker Island, Jarvis Island, Kingman Reef and Palmyra Atoll. A range of instrumentation and survey techniques were used to investigate water temperature, water chemistry, physical dynamics of water motion, and biological reef accretion and bioerosion.

Table 1. Summary climate impact assessment surveys from the research expedition in the Pacific Remote Islands Marine National Monument. Instruments are abbreviated as follows: STR (subsurface temperature recorder), CAU (calcification accretion unit), BMU (bio-erosion monitoring unit), CTD (conductivity temperature and depth), and EAR (ecological acoustic recorder).

Activity	Baker	Howland	Jarvis	Kingman	Palmyra
STR Deployment	5	6	15	6	20
STR Retrieval	7	6	12	6	18
CAU Site Deployed	4	3	5	5	4
CAU Site Recovered	4	4	4	5	7
BMU Site Deployed	0	0	3	0	3
BMU Site Recovered	0	0	3	0	3
CTD Cast and Water Sample	6	7	25	13	24
EAR Retrieval	1	0	2	0	0
Soundtrap Deployment	0	0	2	0	0
Soundtrap Retrieval	1	0	2	0	0
Diel Suite Investigation	1	0	1	0	1

¹ PIFSC Data Report DR-19-035.
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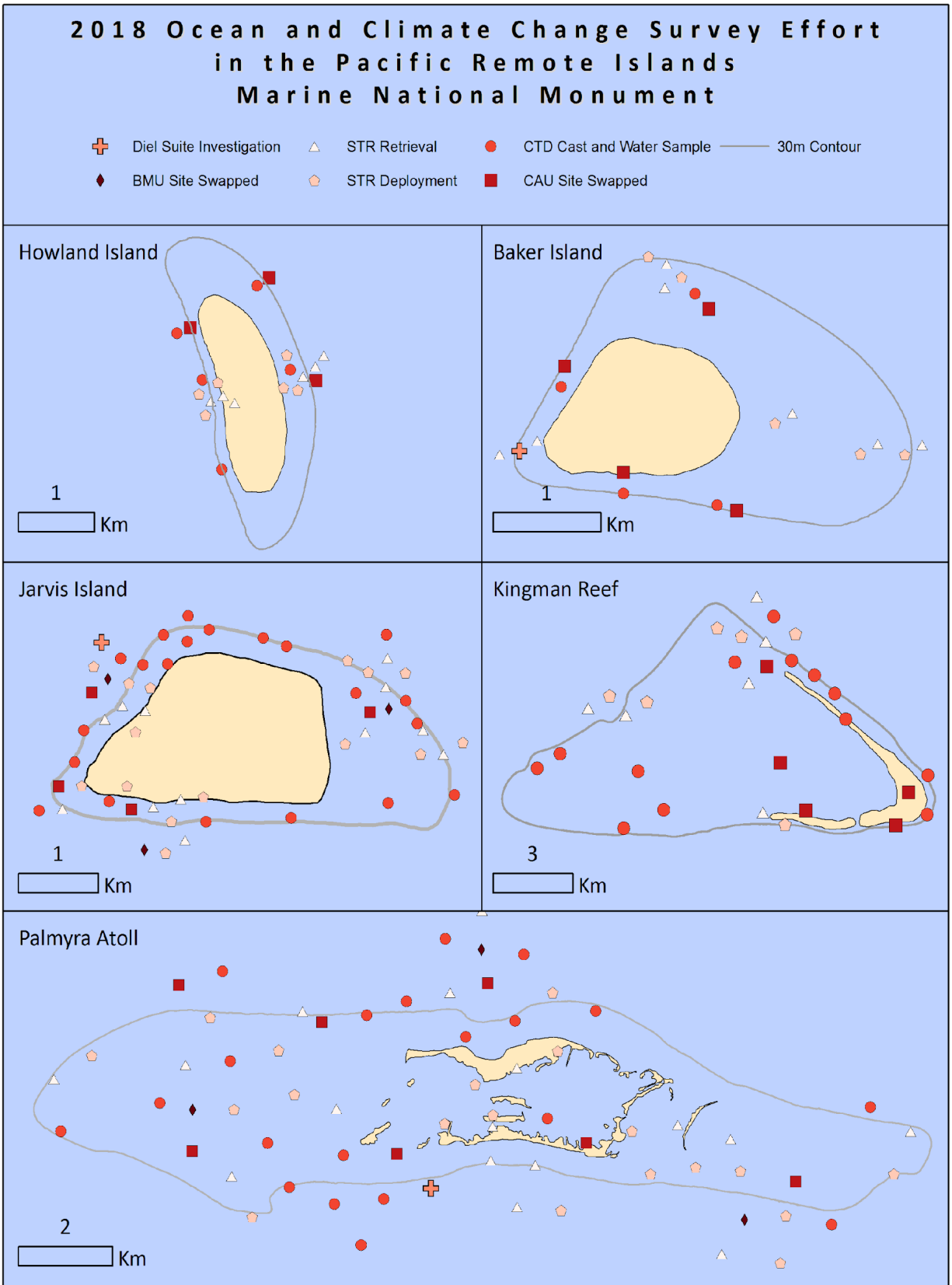


Figure 1. Locations of climate impact assessment surveys the Pacific Remote Islands Marine National Monument in 2018. Note: Marker points that share a location are displayed dispersed around that shared location on the map.

Preliminary observations

A brief subset of data generated during the climate impact assessment surveys from 2018 in the Pacific Remote Islands Marine National Monument is visualized in the following figures.

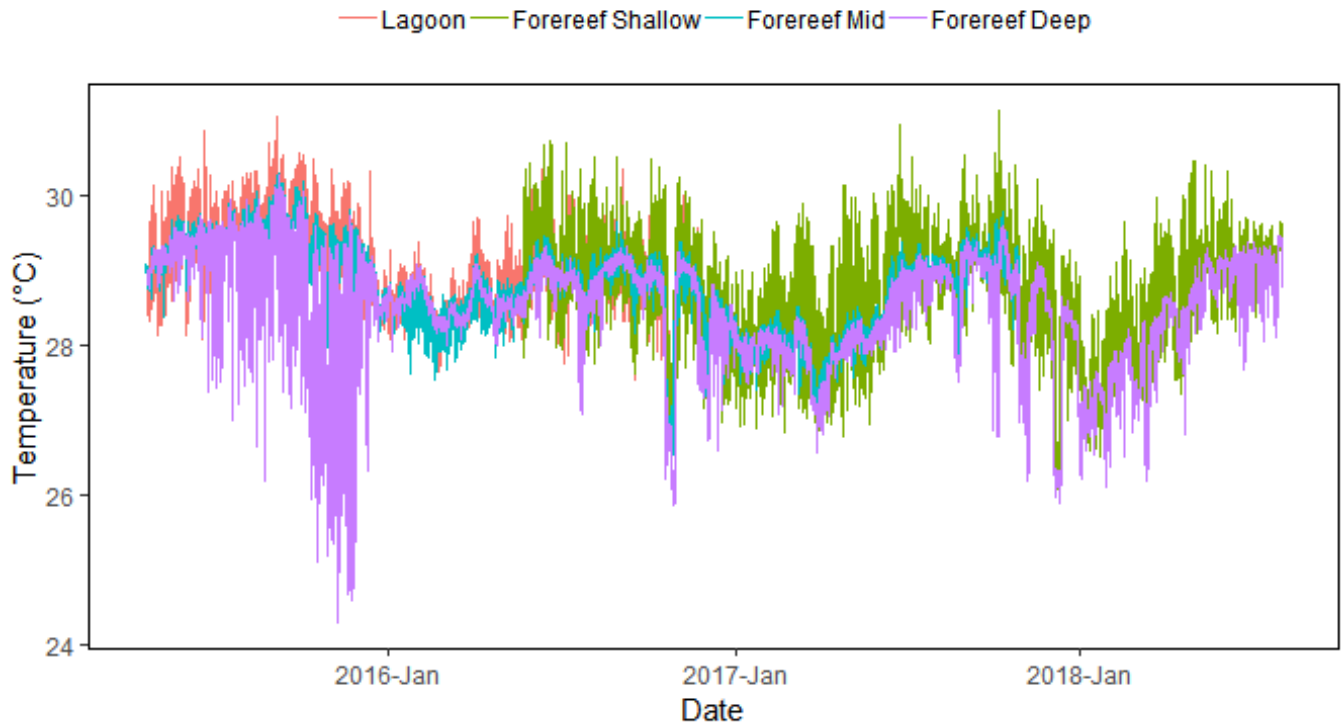


Figure 2. Time series from temperature sensors programmed to sample at five-minute intervals at Palmyra Atoll. Depths per respective zone/strata category are as follows: lagoon (1 m), forereef shallow (5 m), forereef mid (15 m), and forereef deep (25 m). Interannual and seasonal variability are visible between 2015 and 2018.

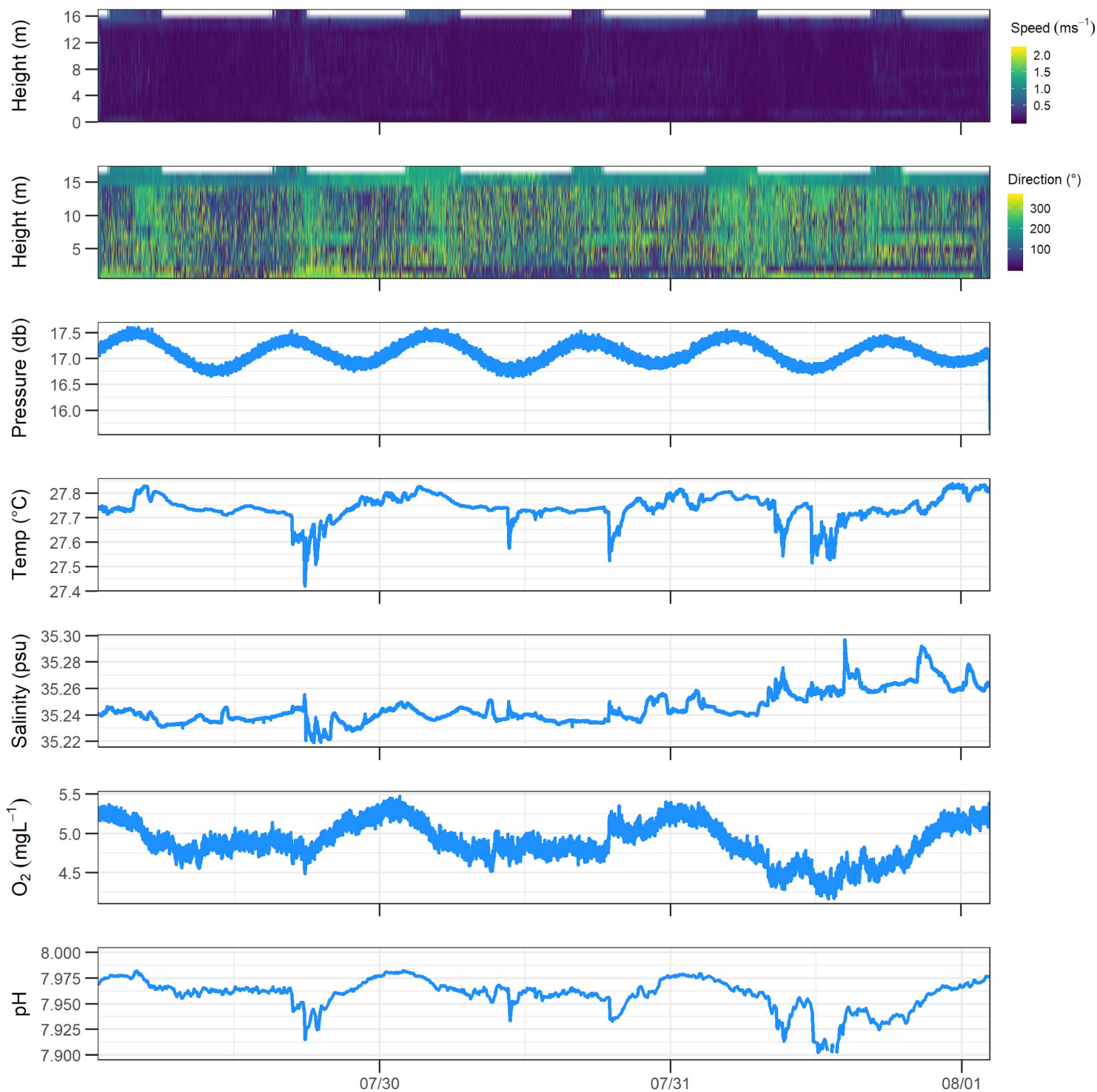


Figure 3. Time series records of current speed, current direction, pressure, temperature, salinity, pH, and dissolved oxygen (DO) from a diel carbonate chemistry monitoring suite deployment at Jarvis Island in the northwest forereef from July 28 to July 31, 2018.

Survey sampling design & methods

Climate impact and assessment surveys rely on a diverse array of instruments, sample collections, and survey methods to gain insight into ocean processes influencing coral reef ecosystems across the U.S.-affiliated Pacific Islands.

About the monitoring program

Pacific RAMP forms a key part of the National Coral Reef Monitoring Program of NOAA's Coral Reef Conservation Program (CRCP), providing integrated, consistent, and comparable data across US Pacific islands and atolls. CRCP monitoring efforts have these aims:

- Document the status of reef species of ecological and economic importance
- Track and assess the status and trends of US coral reef ecosystems in response to environmental stressors and human activities
- Evaluate the effectiveness of specific management strategies and identify actions for future and adaptive responses

In addition to the ocean and climate change monitoring outlined here, Pacific RAMP efforts include interdisciplinary monitoring of coral populations and benthic communities, fish populations and assemblages, invertebrate diversity and abundance, and coral reef habitat assessments and mapping. Data are available upon request.

For more information

[Coral Reef Conservation Program](#)

[NOAA Pacific Islands Fisheries Science Center](#)

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