DATA MANAGEMENT PLAN

Data Management will follow the Division of Ocean Sciences Sample and Data Policy (NSF17037) and will be made publicly accessible within two years of collection through the Biological and Chemical Oceanography Data Management Office (BCO-DMO) and other OCE approved data and sample repositories (described below).

Products of Research

Experimental design, sample archiving, and data synthesis protocols will follow procedures outlined by the NSF RCN Coral Bleaching Research Coordination Network (Award # 1838667). Experimental protocols will be made available through secure platforms for sharing reproducible methods (i.e., Protocols.io, GitHub).

Abiotic data

This project will produce inorganic carbon measurements from analysis of the discrete samples (total alkalinity and total carbon) and high-frequency measurements (total alkalinity and pH) from the autonomous micro-sensors. Other supporting environmental data (i.e., temperature, salinity, dissolved oxygen, irradiance, etc.) from the mesocosms, incubations, and the autonomous weather station at HIMB will be included alongside the carbon measurements for each experimental period.

Biological data

All biological data will be stored with a standardized metadata table outlining the parameters measured, species, morphology, colony used, and environmental conditions. Photographs of each coral colony used will also be documented. Biological samples will be stored for potential future use in accordance to NSF RCN Coral Bleaching Research Coordination Network sample archiving protocols.

Outreach and Curriculum Materials

This project will produce educational material that will support outreach and curriculum development of our education partners (Hawai‘i Institute of Marine Biology Education Program and Texas State Aquarium). This material will focus on environmental problems facing local coastal communities. Products of these learning modules and science-inquiry labs will be developed into teaching case studies and made publicly available through describe data Dissemination methods and peer reviewed publications. Live stream videos of the virtual coral reef research expedition will be publicly available as a live-stream and archieved as a video file (mp4) for later viewing. Pre and post surveys of focusing on the learn goals for each program will be provided.

Data Format, Storage, and Preservation

This project will generate several types of data and each will be archived in both raw and meta-data formats. Ancillary data that are of tabular format (i.e., spreadsheets, comma-separated values, etc.) will be documented in Ecological Metadata Language (EML) in preparation for subsequent data archiving.

All experimental results will be archived as detailed spreadsheets including all associated metadata describing all aspects of the experimentation (i.e., abiotic and biological). Images taken during the experiments will be stored as JPEG and made publicly available. High frequency measurements of carbonate parameters will be entered into spreadsheets for each experiment alongside important metadata (treatment, morphology, temperature, salinity, oxygen). Access to data will be provide through Microsoft Office packages (spreadsheets, documents, etc.) for easy accessibility for end users.

Data will be accessible to all project team members during the grant period using secure website repositories (e.g., Google Drive, OneDrive) and external harddrives maintained by the postdoctoral researcher. Additionally, these data will be redundantly achived on the Texas Digital Library (TDL)

Dspace repository maintained by the College of Science and Engineering information technology staff at TAMU-CC. The server hard drives are set up and capable of full recovery even in the case of multiple simultaneous disk failure. Additionally, the server drives are backed up to an independent server operated by TAMU-CC. This will allow full recovery of data in the event of failure of the local laboratory server.

This information will be openly available to all and will be maintained for perpetuity within NOAA's National Ocean Data Center (NODC). The liaison responsible for the Hawaiian and US-affiliated Islands in the Pacific is Mr. Patrick Caldwell. He has been based within the Department of Oceanography, University of Hawai'i at Mānoa since 1987. This effort continues under the NOAA/NESDIS/NCEI.

Data Dissemination & Policies for Sharing and Public Access

The primary data generated as part of this proposal will be published in a timely manner in refereed journals. All data, software, code etc. produced by this project will be deposited in searchable open access databases: The Integrated Earth Data Applications (IEDA) repository, the National Center for Ecological Analysis and Synthesis Data Repository and DataDryad. Any R code will be made available to the public on a CRAN site as well as SorgeForge and GitHub. Links to the data will also be included in peer reviewed publications in a format that will allow others to re-evaluate the data in the future or to duplicate the experiments. Additionally, links to presentations, posters, and any publications resulting from this grant will be made publicly available and links will be posted to the BCO-DMO site.

All data will be readily available to share other researchers through NODC within a reasonable time needed for quality assurance, analysis and initial publication. We will encourage and facilitate sharing by adding notes to publications that direct interested parties to the source data. No privileged or confidential information is involved. We do not see any need to retain principal legal rights to intellectual property developed under this NSF grants proposal and will freely disseminate information on novel aspects of our design for the mesocosms and CO_2 delivery system. Our wish is that products of the work be useful and widely available.

Curriculum materials produced over the course of the project will not have any restrictions on re-use, re-distribution or the production of derivatives for educational purposes and will be archived in multiple locations. Links to Texas State Aquarium Aquavision Coral Reef Expedition live-streams will be archived and publicly available via a variety of web-based platforms (YouTube, Vimeo, etc).

Roles and Responsibilities

PI Keisha Bahr will be responsible for creating and maintaining the data and sample storage and sharing system. Bahr will also be responsible for reporting in the Annual and Final Reports on the data management, preservation and access for the whole project. PI Ellen Briggs will assist in data management curation. PIs Chris Sabine and Kuʻulei Rodgers will provide oversight and guidance to ensure longevity and accessibility of generated data.