

DATA MANAGEMENT PLAN

1. GENERAL INFORMATION

This Data Management Plan (DMP) was created on July 30, 2014 for submission to the National Science Foundation as required by NSF guidelines. The purpose of this DMP is to ensure the preservation and sharing of data collected during the proposed research to investigate the influence of thermal history on coral growth response to recent and predicted end-of century ocean warming across a cascade of ecological scales, which would be conducted at the University of North Carolina at Chapel Hill (UNC). In addition to serving as the DMP for this proposal, a modified form of this plan would also be provided to all participants involved in the proposed research and PI Castillo will hold annual sessions to review the details of the DMP.

2. PROJECT INFORMATION

This Data Management Plan (DMP) covers data that would be collected by PI Castillo, his postdoctoral fellow, graduate students, research technician, and undergraduate research assistants all of whom would carry out the proposed research.

3. DATA RECORDING, STORAGE, BACK-UP, AND SECURITY

All experimental and analytical activity will be logged in designated high-quality laboratory notebooks that will be digitized, entered into spreadsheets, and archived on laboratory data drives and automatically backed-up daily on both external university servers and through offsite third-party *Iron Mountain* and/or *CrashPlan* servers. Laboratory notebooks will also be permanently stored in secure cabinets. The University of North Carolina at Chapel Hill's experience with and commitment to secure data archiving is well established and this DMP would conform to UNC's Information Security Policies. This includes storage of the primary data drives in secure locations and password protection of these drives.

4. ACCESS, SHARING AND RE-USE OF DATA

Pursuant to the NSF Award & Administration Guide (AAG) Chapter VI.D.4., PI Castillo would encourage and facilitate sharing with other researchers, at no more than incremental cost and within a reasonable time following publication of the research, the primary data, samples, physical collections and other supporting materials created or gathered in the course of the proposed research. The data collector, creator or principal investigator shall have rights to first use of the data. There should be no additional restrictions or permissions required for accessing the data once the research has been published. Privileged or confidential information would be released only in a form that protects the privacy of individuals and subjects involved. The PI is not aware of any reasons that might prohibit the sharing and re-use of the data from the proposed research once it has been published.

Data obtained through the proposed project would be archived and made openly available to the public through the NSF-funded Biological and Chemical Oceanography Data Management Office (BCO-DMO; <http://www.bco-dmo.org/>), as well as through one or more of the following specialized databases (depending on the specific type of data collected): the NSF-sponsored US Ocean Carbon and Biogeochemistry Data Management Office (<http://ocb.who.edu/>), the World Data Center for Marine Environmental Sciences (<http://www.wdc-mare.org/>), the Caribbean Coastal Data Center (<http://www.uwimona.edu.jm/cms/ccdc/ccdc.html>), the Publishing Network for Geoscientific and Environmental Data (PANGAEA; <http://doi.pangaea.de/>), the Atlantic Oceanographic and Meteorological Laboratory (AOML) Environmental Data Server (<http://www.aoml.noaa.gov/envids/index.php>), the Carbon Dioxide Information Analysis Center (CDIAC; <http://cdiac.esd.ornl.gov/home.html>), the Ocean Biogeographic Information System (OBIS; <http://iobis.org/>), the Woods Hole Oceanographic Institute Data Center (<http://www.who.edu/page.do?pid=7140>), and/or the NOAA Paleoclimatology Program data repository administered by the National Climatic Data Center (<http://www.ncdc.noaa.gov/paleo/>). In addition, data would be made readily available to relevant entities and organizations locally in Florida, Belize and Panama including but not limited to: (Florida) the Florida Fish and Wildlife Research Institute, the Florida Keys National Marine Sanctuary, (Belize) the Belize Fisheries Department, the Southern Environmental Alliance, the Toledo Institute for Development and Environment, the Hol-Chan Marine

Reserve, the University of Belize, (Panama) the Smithsonian Tropical Research Institute –Bocas Del Toro Research Station, the University of Panama, the Autoridad Nacional del Ambiente (National Authority for the Environment), and the Ministerio de Desarrollo Agropecuario (Ministry of Agricultural Development).

5. PUBLICATION OF DATA

Pursuant to the NSF Award & Administration Guide (AAG) Chapter VI.D.4., the PI and other investigators performing the proposed research would, in a timely manner, prepare and submit for publication all significant findings that result from this research. Authorship of the resulting publications would reflect the relative contributions of those involved. Publication would occur primarily through peer-reviewed journals, but also through non-peer reviewed articles, government reports, the PI Castillo's professional webpage (<http://www.unc.edu/~kdcastil/>), and through presentations at international meetings, workshops, universities, and research centers. The investigators would also communicate the findings through public outreach activities, including presentations to local K-12 audiences, continuing education programs, local HBCUs (such as North Carolina Central University) and other community colleges, and state and federal legislatures.

6. DATA QUALITY CONTROL

Certified or inter-laboratory calibrated standards that are matrix-matched to the investigated material would be used for all relevant analyses. A maximum of 10 analyses would be bracketed by duplicate analyses of the appropriate certified standards along with procedural blanks. Samples would always be analyzed in duplicate, and in triplicate when possible. As a further measure to control analytical quality, randomly selected samples would be run as blind replicates within single sessions and also across different analytical sessions.

7. PRESERVATION AND LONG-TERM MANAGEMENT OF DATA

All data collected through the proposed research (including scanned copies of the laboratory notebooks) would be permanently archived on UNC secure servers and on third-party servers as described above. The PI is not aware of any specific financial considerations that would impact the long-term management and preservation of these data. The research staff at UNC involved in the proposed research, as well as the University's archival staff, would review this DMP annually to ensure that data management protocols are up-to-date and compliant with university, state and federal policies.

8. LEGAL GUIDELINES AND REQUIREMENTS

The PI is not aware of any sensitive data, including personal identifiers, which would be collected through the proposed research. The PI is also not aware of any copyright or licensing issues associated with the data to be generated from the proposed research.