

Data management plan for 2241906 "Collaborative Research: modifiers of ocean acidification effects on top-down control in eelgrass habitat"

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Overview. This project comprises laboratory and field studies to quantify the effects of environmental stressors on ecosystem function in seagrass habitats. At both sites we will conduct experiments designed to precisely control levels of CO₂, nutrients, and structural complexity in outdoor, flow-through mesocosms in order to measure biological responses of seagrass, algae, and mesograzed epifauna. These experiments will generate data on ecological and physiological processes (growth rates, consumption rates, predation rates) as well as samples of plant, algal, and animal biomass that will be processed for chemical and/or nutrient content. We also will conduct *in situ* field experiments controlling CO₂ levels within seagrass habitat in San Diego. Field experiments will generate data on plant and algal growth and biomass, and epifaunal biomass and diversity. All mesocosm and field experiments also will generate environmental data, including time series for temperature, nutrient, and light levels. We will hold an initial meeting with all project participants before research begins to ensure clear and uniform standards for data collection, storage, and security. At this meeting we also will agree upon policies for data sharing, dissemination, and authorship on resulting publications.

Data and metadata collection. Each data record will contain: experiment or time series designation, time, date, location, and sample number. Each data set will also be associated with a set of metadata to include: descriptions of standards used for measurement, sampling procedures, sample treatment and preparation, and analytical procedures. Standardized spreadsheets will contain all metadata and be used to track samples through each stage of analysis, and will include information on the time and identity of the researcher running the assay, any notes on deviation from standard protocols, quantities of material utilized at each step, and date and time of most recent updates. After quality control and quality assurance by the relevant subset of researchers, the data will be shared with all study personnel. All investigators using data will be required to cite and acknowledge the originators, whether or not restrictions apply to its use. Students will be heavily involved in data collection and will be trained by the PI at each institution in proper experimental techniques and in procedures for data collection, entry, curation, and analysis.

Data Management, Ownership, and Dissemination: Project participants. Data files will be held on at least three password-protected computers, as well as in cloud storage. Data also will be backed up regularly on dedicated hard drives. Environmental data collected during this project will be made available to all project participants in a timely fashion following initial quality control and quality assurance processing by originators. We will use a restricted access folder on Google Drive to facilitate data sharing and communications among the project participants. Primary responsibility for maintenance of the database will reside with the lead PI at each institution. Data will be co-owned between the PIs and students basing theses on the proposed project. Data ownership will be spelled out in a Data Ownership Agreement that is signed both by the student and their advisor. Agreements generally stipulate that students will be first author on any resulting publications from thesis projects, and also designate requirements for other contributors to achieve coauthorship.

Data Management and Dissemination: Broader scientific community. Environmental data resulting from the experiments and field sampling, as well as biological data where appropriate, will be posted to a public access scientific database via the BCO-DMO no more than two years after collection. We will consult with BCO-DMO staff to identify appropriate data for submission, and appropriate standards. We will publicly disseminate results via conference papers and posters, invited seminars, and peer-reviewed publications. We will produce peer-reviewed publications as the project progresses; publications

resulting from experiments for objectives 1 - 3 (mesocosm experiments) will be submitted before project completion, with remaining results (field work conducted in year 3) submitted quickly upon project completion. If appropriate, the data will ultimately be formally published in electronic format as a data paper in the Ecological Society of America's Ecological Archives.