

Data Management Plan

Expected data

The proposed project will yield valuable field data and model output describing dissolved oxygen dynamics in multiple U.S. estuaries. Expected primary data from the four one-month field campaigns will include dissolved oxygen concentrations, temperature, salinity, currents, the partial pressure of CO₂ in air and water, and air–water CO₂ fluxes. Secondary (derived) data will include lateral oxygen fluxes, gross primary production (GPP), ecosystem respiration (ER), net ecosystem production (NEP), and gas transfer velocity (k_w). The primary model output will include long-term (2006–2019) time series of daily GPP, ER, NEP, and k_w at the 16 selected estuarine sites of the U.S. National Estuarine Research Reserve System (NERRS). The modeling activities will also produce a set of optimized model parameters that will allow estimation of GPP, ER, NEP, and k_w from routinely measured variables, such as photosynthetically active radiation, wind speed, wind direction, water temperature, salinity, and turbidity.

Data storage and sharing

Over the course of the research project, intermediate model output will be hosted by The Pennsylvania State University's Institute for CyberScience (ICS) through its Advanced Cyber Infrastructure (ICS-ACI). ICS-ACI active storage is achieved through DDN 12KX40 and GS7K flash storage array systems. ICS implements various security measures to ensure that data stored on the ICS-ACI system remain safe. ICS-ACI requires a strong password and two-factor authentication for access, and all access can be audited by ICS staff. To mitigate the potential for malicious software and security attacks, ICS-ACI employs automated weekly scans for identifying and patching software vulnerabilities. Processed model output, field data, and all other project-generated data will be stored on The Pennsylvania State University's Department of Meteorology server. A dedicated Penn State Box account (Box) with unlimited storage capability will also be set up for the project. The Box site will facilitate collaboration between project participants via easy file-sharing between the institutions and will also serve as an additional backup for all project-generated data. Outside data access requests will be facilitated by the lead investigator and preliminary data will be provided to interested parties outside of project investigators upon request.

Data archiving

All data generated during this project will be permanently archived at the Biological and Chemical Oceanography Data Management Office (BCO-DMO), to ensure public access. Field campaign data will be made available within two years of collection (i.e., starting no later than spring 2022). An example of Najjar's usage of BCO-DMO is the NSF-funded DANCE (Deposition of Atmospheric Nitrogen to Coastal Ecosystems) project. The BCO-DMO data archive was created in late 2006 to serve PIs funded by the NSF Geosciences Directorate (GEO) Division of Ocean Sciences (OCE) Biological and Chemical Oceanography Sections and (with augmented funding in 2010) by the Office of Polar Programs (OPP) Antarctic Sciences (ANT). BCO-DMO manages and serves oceanographic biogeochemical, ecological, and companion physical data and information developed in the course of scientific research and contributed by the originating investigators. The BCO-DMO data system facilitates data stewardship, dissemination, and storage on short and intermediate time-frames. We will work with the

BCO-DMO staff to manage our field data and model output and prepare the appropriate supporting documentation for each data submission. The BCO-DMO staff will also provide us with additional assistance to coordinate interactions with other data repositories that are suitable for archival of our data, such as the National Centers for Environmental Information.