Advanced Biometrics: Heavy Metals in Estuarine Copepods

A Data Management Plan created using DMPTool

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Template: BCO-DMO NSF OCE: Biological and Chemical Oceanography

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Advanced Biometrics: Heavy Metals in Estuarine Copepods

Data Policy Compliance

The project investigators will comply with the data management and dissemination policies described in the NSF Award and Administration Guide (AAG, Chapter VI.D.4) and the NSF Division of Ocean Sciences Sample and Data Policy.

Pre-Cruise Planning

Question not answered.

Description of Data Types

The project will produce several observational and experimental datasets, described in the list below. In addition to the datasets described below, educational resources produced by the project, including data and images, will be made available for public use on the COSEE.net website. All data resulting from this project will be published and made openly available to the research community and the public within 1 year of completion of this project through Biological & Chemical Oceanography Data Management Office (BCO-DMO; https://www.bco-dmo.org/).

Datasets:

Meteorological Observations
- Wind, wavy, cloudy, sunny, tide

Physiochemical and Other Environmental Data
- Water Temperature, dissolved oxygen, nitrates, ammonium, phosphates, turbidity, pH, and water flow rates during copepod collection at each collection site.
- Collection site depth

Copepod Population and Community Data
- Seasonal and annual copepod species richness, abundance, and distribution within the Apalachicola estuary.

Copepod Heavy Metal Concentrations from EDX
- Copepod species-specific tissue and system level of heavy metal concentrations (%)

Copepod Heavy Metal Concentrations from AA
- Comprehensive species-specific copepod heavy metal concentrations (mg of heavy metal/mg of body mass)
- Heavy metal concentrations for water samples form each collection site (mg of heavy metal/ml of water)
- Heavy metal concentrations for sediment samples (mg of heavy metal/ mg of soil)

Data and Metadata Formats and Standards

Field observation data will be stored in flat ASCII files, which can be read easily by different software packages. Field data will include sample collection date, collection time, GPS coordinates, collection site identifier, meteorological observations (windy, wavy, cloudy, sunny, etc.), collection site depth, plankton tow method (horizontal, vertical, oblique), towing depth range, towing duration (minutes), towing distance (meters), average towing speed (knots or meters), description of plankton tow (brand, mesh size, opening, length), type of flowmeter, volume of water containing copepod samples, how samples processed and sorted, specific units of measure,
description of any equipment used, additional collection notes (highlight irregularities or unusual occurrences) as appropriate. Quality
flags will be assigned according to the ODS IODE Quality Flag scheme (IOC Manuals and Guides, 54, volume 3;  
http://www.iode.org/mg54_3 ). Metadata will be prepared in accordance with BCO-DMO conventions (i.e. using the BCO-DMO
metadata forms) and will include detailed descriptions of collection and analysis procedures.

Data Storage and Access During the Project

At the start of the project funding, the PIs will convene to establish standard data recording protocols that will include naming,
processing, and storage conventions for all data collected in the project. This meeting will also set standards to ensure that all
obtained research data will be annotated with collection meta-data (see list of metadata fields below). Once other project personnel are
recruited all participating students and staff will undergo a dedicated data management training session to implement the data
collection standards and protocols established by the PIs. At this time the PIs will convey the data recording standards and
procedures so that project personnel are trained in data management best practices. This training will also include annotation methods
of all research data with the appropriate metadata.

The investigators will store project data (including spreadsheets, ASCII files, images, and PDFs of scanned logs) on laboratory
computers that are backed up by the University’s central IT organization. The Principal Investigator (PI) has also established an
electronic storage folder on the Lincoln Memorial University cloud server for data storage and sharing among project investigators.
Personal computers in all laboratories are backed after each access to onsite external hard drives, and weekly to an offsite hard drive.

Mechanisms and Policies for Access, Sharing, Re-Use, and Re-Distribution

The data for each collection trip, be will be made available through the BCO-DMO data system within one-year from the date of
collection. Additionally, all end of project data will be made available through the BCO-DMO data system within one-year from the
completion of the project. The project investigators will work with BCO-DMO data managers to make project data available online in
compliance with the NSF OCE Sample and Data Policy. Data, samples, and other information collected under this project can be made
publically available without restriction once submitted to the public repositories.

Data produced by this project may be of interest to chemical and biological oceanographers, and climate scientists interested in the
role of climatic changes on the distribution and impact of heavy metals withing an estuary. We will adhere to and promote the
standards, policies, and provisions for data and metadata submission, access, re-use, distribution, and ownership as prescribed by the
BCO-DMO Terms of Use (http://www.bco-dmo.org/terms-use).

Plans for Archiving

As our project will be the first of its kind to utilize EDX and AA to generate pairwise assessments of heavy metal concentrations
coupled with physiochemical data, there are currently no established standards for archiving our data. Consequently, project
investigators will work with BCO-DMO to ensure that project data are submitted to the appropriate national data archive, and that
proper and complete documentation are archived along with the data.

Roles and Responsibilities

Each PI will be responsible for sharing his/her subset of data among the project participants in a timely fashion. As data are
generated, they will be entered into Morpho, a free resource for associating Ecological Metadata Language (EML) with archived
datasets. Each member of the project team conducting research will take responsibility to annotate their data with the metadata.
Each PI will be responsible for managing a specific research data type and supervising students working with that data type to ensure
that all data is being properly processed, documented, and stored.
The Lead PI, L. Brandt, will coordinate the overall data management and sharing process and will submit the project data and metadata
to the Biological and Chemical Oceanography Data Management Office (BCO-DMO) who will be responsible for forwarding these data
and metadata to the appropriate national archive.
<table>
<thead>
<tr>
<th>Data Type</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copepod diversity and abundance; physiochemical data</td>
<td>LaRoy Brandt</td>
</tr>
<tr>
<td>EDX heavy metal concentrations</td>
<td>Stan Kunigelis</td>
</tr>
<tr>
<td>AA heavy metal concentrations</td>
<td>Gavin Kirton</td>
</tr>
</tbody>
</table>