DATA MANAGEMENT PLAN

Description of Data Collected:

Data collected for this project will include: (1) Current native and non-native sessile marine invertebrate abundances in bays near Ketchikan (Alaska), San Francisco (California), La Paz (Mexico), and Panama City (Panama). (2) Diversity, abundance, and predation rates of associated predators of the sessile invertebrate communities at each study site. (3) Recruitment rates of sessile marine invertebrates at each study site over the course of our one year experimental timeframe. (4) Measurements of environmental parameters at each study site (salinity, temperature, dissolved oxygen, clarity, chlorophyll a, and flow rates).

At least five specimens of each sessile invertebrate species will be preserved from each region as a voucher. See Specimen Curation below for details on voucher curation. Photographs of all experimental panels retrieved for sampling will also be taken to accompany vouchers.

The data do not include any information on human subjects, socially controversial topics, or financial matters, and thus there are no personal privacy, confidentiality, security, or property rights concerns.

Specimen Curation:

We will use a custom built laboratory information management system created at the Smithsonian Environmental Research Center (SERC) for voucher curation as the primary specimen repository for this project. This database has been designed specifically for sessile invertebrate surveys and currently holds an inventory of approximately 116,000 vouchered specimens from past sampling events at 42 sites (coastal estuaries) throughout North America, Central America, the Caribbean and Australia. Standardized collection protocols will ensure that all samples, regardless of their source location, will enter our data management system in a unified manner, allowing formal tracking of specimen identification (through unique specimen bar-codes) and linkage to all associated metadata for collection and site details.

Data Management:

The two graduate students funded on this project, based at Temple University, will be trained in data management and will be the principal data curators, under the supervision of the PIs, during their tenure on the project. They will be trained by SERC staff, via regular trips to the SERC facility, to implement data entry and established QA/QC protocols. At the end of the project the Principal Investigators will be responsible for long-term data curation and management. Data will be stored in hard copy and as electronic files on hard drives in our Temple University laboratory. The electronic files will also be archived (including back-ups) on our departmental file server, which is located in a secure location on the Temple University campus. Data, videos of predator activity, and photographs of experimental communities will be retained indefinitely throughout the careers of the Principal Investigators.

Data Dissemination and Sharing:

Publication. The Principal Investigators, with the assistance of our collaborators, postdoctoral scholar, and graduate and undergraduate students, will ensure that results are published in the peer-reviewed primary literature and presented at national or international conferences in a

timely manner (funding is budgeted for the TU personnel to attend a conference in Years 2 and 3). Results will also be disseminated to the public via our outreach efforts detailed in our Project Description.

Data Registry and Sharing. To follow NSF OCE standards, our primary data repository will be the Biological and Chemical Oceanography Data Management Office (BCO-DMO). Metadata will be registered with BCO-DMO upon initiation of the project and the final data will be submitted within two years of the completion of data collection.

Web-based Information Portal for Non-Native Species. Collaborators will be able to view their non-native species occurrence data from a web-based front-end server at SERC known as the National Estuarine and Marine Exotic Species Information System (NEMESIS). NEMESIS will provide site, species, and specimen level summaries, rich with images, maps, taxonomic trees, charts and relevant NIS (Non-Native Invasive Species) information about coastal invasions across North and Central America (http://invasions.si.edu/nemesis/index.jsp). Over time and with permission from our collaborators this information will be made open access to the general public via NEMESIS. As part of this project, we will also develop region-specific portals for the database to aid invasive species management for regional stakeholders and government agencies in our partner countries.

Distributed Database System. Our distributed database system, NISbase (http://www.nisbase.org), will provide supplemental NIS information to our project, allowing integration of occurrence data in NEMESIS with that from other databases on marine species distributions. NISbase uses an XML (extensible markup language) based data standard to cross-query and merge information (and mapping) from our network of data providers. The NISbase community currently consists of twelve unique data partners from around the world, each providing access to their online aquatic and marine NIS data. The information shared by NISbase currently includes species profiles and geographically referenced records of non-natives, derived from the synthesis of literature, museum, and field collections by our providers. We will add new data providers to NISbase to augment coverage of Mexico and Panama.

International Biodiversity Information Exchange. While general access to these data is important, we feel it is also necessary to ensure that data and specimens have an opportunity to get repatriated to their point of origin. Each collaborating institution will have the opportunity to receive a database of their data and a representative set of their vouchers specimens. We will also provide each collaborating institution with the tools and technical assistance to participate in global data sharing projects such as the Global Biological Information Framework (GBIF), the Oceanographic and Biological Information System (OBIS) and the Global Invasive Species Information Network (GISIN).