

Coastal Systems Network

Ani St. Amand, Jorge Lorenzo-Trueba, Robert Mahon

The idea in a nutshell

We propose a network of coastal observatory sites (the Coastal Systems Network) focused around understanding and predicting change in human and natural systems.

Specific, differentiated recommendation

This network is composed of “observatories” which each incorporate both a more developed and a less developed coastal environment. These observatories are each representative of broader systems. They are proposed by groups of PIs and centered around research-driven questions. The organizational structure of this network incorporates a more dynamic PI structure to broaden participation. Each observatory will be founded by a proposal co-authored by multiple PIs from different disciplines.

Data collection will be driven by PI-group research objectives. Long-term, systematically collected data will be obtained using multiple platforms, providing opportunities for cross-site comparison. A well-supported central public repository for all data and site metadata ensures the availability and accessibility of this data to stakeholders, urban planners, institutions, and unaffiliated researchers. Each observatory

requires a data manager tasked with uploading data from each site to the central repository. This network and corresponding data repository enables PIs to leverage other structures within NSF (i.e. Community Surface Dynamic Modeling System, Critical Zone Observatories, Long Term Ecological Research,) in order to integrate existing data and models.

The Coastal Systems Network helps researchers obtain data inputs and output constraints for process-based and predictive models and incorporates coupled human and physical environment system dynamics into modeling frameworks. The integration of qualitative and quantitative data is encouraged but methodological frameworks are left to the PIs to develop. While we encourage the leveraging of existing legacy data, we understand that the long-term, integrated data types needed to address research problems may not be available in existing databases.

What impact or value does it seek to deliver?

The Coastal System Network facilitates comparisons between physical environmental systems and human-modified systems to address a broad range of research objectives and questions. Observatories will collect long-term information on human activities, decisions, infrastructure, as well as physical and biological processes. This data will be integrated and available in an openly accessible database to enable iterative evaluation of predictive coupled dynamical system

models. This integrative network approach combines the expertise of researchers from diverse fields, bringing socio-political, economic, environmental, climatic, and earth sciences perspectives to examine this data and relevant issues of coastal change.

What is the reasoning or supporting evidence behind it?

Studies of coastal systems require data with high spatial and temporal resolution, multidisciplinary approaches and methodologies, and dynamical systems modeling. The nature of limited funding and related resources necessitates that research questions be addressed at targeted, but representative sites where high intensity collaboration, research activity, and data collection can occur with broader environmental applications at the forefront of thinking. The potential benefits of a Coastal Systems Network approach is strongly supported by the successes of other site-based frameworks currently and previously funded by NSF. Strengths and weaknesses, as well as lessons learned from similar structures such as the Critical Zone Observatories, Long Term Ecological Research, and Experimental Watersheds provide both structural insights and justification for such an approach.