

The Coastal Hub-Net Ecosystem

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In a nutshell

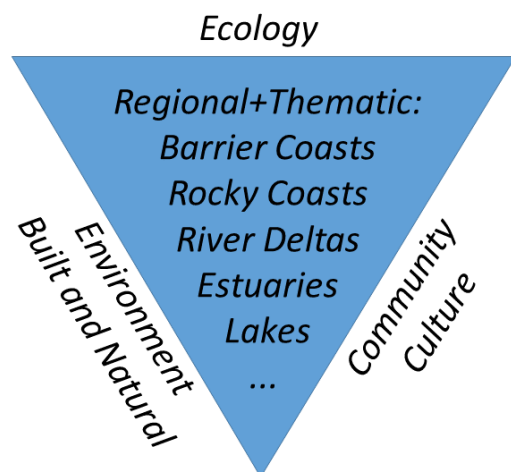
As a concept for developing NSF CoPe, we envision an ecosystem-like net consisting of a central data hub, linked research hubs, and parallel scalable research frameworks within each research hub. The research hubs would be built around regional and thematic topics, and connect closely with stakeholders and communities. This eco-net would support research development, community integration, data management and visualization, and global impact. This paper focuses primarily on the regional+thematic hubs. Two related papers concern “The Data Hub” and “Scalable Research for Coastal Communities.”

Specific, differentiated recommendation: A network of regional theme-based hubs for convergent multi-disciplinary stakeholder-connected research

Each hub would be a ***sustained evolving regional presence*** that functions to enable and facilitate coordinated convergent science and engineering project that serve the needs of coastal communities and stakeholders. The envisioned regional hubs would serve multiple interconnected functions. They would lead efforts in ***synthesizing existing data and knowledge***. The hubs would be involved in ***early, sustained, long-term engagement with stakeholders***. Yet, the year-to-year focus of the work would evolve, guided by ***periodic co-production of an evolving research agenda*** for the region by inter-disciplinary scientists and local stakeholders through planning and prioritizing activities.

Impact and value of regional theme-based hubs

The hub would ***facilitate connections*** between and among interdisciplinary scientists, other existing networks, boundary organizations, local stakeholders, or agencies. It would ***support multiple inter-related research projects*** that study the interconnected system, including physical (built and natural) and ecological systems as well as interactions and



feedbacks with the cultural system and communities (Figure 1). The thematic areas of concern in each region may differ, and may include considerations of barrier island coastlines, rocky coasts, deltas, estuaries, lakes, islands, and other settings.

To provide needed research support, the hub would **develop and make available infrastructure** support and enable coordinated progress by various inter-disciplinary research groups with funded projects. Research projects would be characterized by **integrated theoretical, observational, and modeling approaches** from the outset to foster holistic understanding (see, for example, Scalable Research Framework for Coastal Communities concept paper).

The hubs would provide **strong specific incentives** for scientists, stakeholders, agencies. For example, streamlined access to research infrastructure and resources for investigations and opportunities to embed with science and stakeholder communities in the region would be available. Stakeholders would have sustained opportunities to bring forward relevant societal issues and gain access to potential solution scenarios and tools. Further, opportunities would be created to leverage efforts with agencies at various levels to enable the transition of new discoveries to management and decision-making.

Figure 1: *The hubs support the study of the coupled physical, ecological, and human system and are selected based on regional*

Finally, the various regional theme-based hubs would be inter-connected across regions with other hubs to propagate cross-cutting methodologies and solutions. Data visualization, archival, storage and access would be coordinated across hubs via, potentially, a central data hub (see Data Hub concept paper) enabling broad knowledge transfer across and among scientists, agencies, and stakeholders.

Reasoning: How hubs can help accelerate progress and avoid pitfalls

Progress on research aimed at finding solutions to pressing societal problems can be accelerated - and more straightforwardly transitioned to applications - if **inter-disciplinary research projects can be actively coordinated** to take advantage of synergies and provide leveraging opportunities. Such coordination and leveraging can be effectively facilitated by a net of regional hubs. Each hub would be a **sustained evolving regional presence** that functions to enable and facilitate coordinated convergent science and engineering project that serve the needs of coastal communities and stakeholders. The resulting increased understanding will translate to solutions of problems across the globe.

Seeking coordination and synergies among diverse projects and groups can bring **broader participation, more efficient operation, and unexpected, transdisciplinary discoveries**. For example, integration of Traditional Ecological Knowledge can markedly enhance coastal habitat mapping. Further, when science seeks to address community-related problems, the most technically sound research plan can meet strong resistance without stakeholder support. For example, in Louisiana, coastal community opposition to river-sediment diversions for coastal restoration has resulted in barriers that could potentially have been avoided if solutions were developed in collaboration with the communities and stakeholders. Sustained, responsive, and evolving theme-based hubs can aid in this process.

In summary, sustained regional theme-based hubs provide a sustained yet nimble way to facilitate accelerated progress on important coastal societal issues and enable synergy and leveraging among coordinated interdisciplinary and engaged research projects.