

**Coastal Action Research Organizations Utilizing Scientific Equity Liaisons  
(CAROUSEL):  
The Incubator Hub Model**

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**1. Motivation**

We interpret that the ultimate aim of CoPe is to create a platform for understanding coastal problems through basic and applied research lenses that enables the equitable participation of underrepresented communities. Our enthusiasm for these goals is matched by an appreciation for the importance of creating Hub infrastructure and processes that resonate with the vision and goals of the National Science Foundation. The idea that structure is linked to function has parallels in each of the disciplines represented in CoPe, including but not limited to STEM, the behavioral and social sciences, and humanities. Our intent is to create a hub model structure that (1) improves scientific innovation; (2) catalyzes stakeholder engagement; (3) creates and sustains a culture of inclusion; (4) serves to connect communities in constructive ways; and (5) prevents and removes barriers to knowledge production, dissemination and action.

**2. Structure of the CAROUSEL Incubator Hubs**

***2.1. Overview of Incubator Design***

We propose the **Incubator** model for Hubs (Fig. 1), borrowing from the entrepreneurial concept for businesses that creates space and resources to rapidly catalyze innovation and productivity otherwise unavailable at the small, start-up scale. Here, our Hub of Coastal Action Research Organizations Utilizing Scientific Equity Liaisons (CAROUSELs) describes a way to organize sub-national (scale undefined) Incubator Hubs in a way that also pursues a philosophy of “Hubs Not Clubs,” using a series of rotating advisory membership roles, changing challenge themes, and applications for incubator resource use to galvanize and organize interdisciplinary, problem-driven, and community-connected research ideas and case studies as a means to meet CoPe goals.



**Figure 1.** Proposed Incubator hub model. Hubs would be situated regionally, with spatial scope and number of hubs to be determined. Each Incubator would consist of a physical space with minimal support staff and virtual meeting capabilities. This design allows for scientific, community, outreach, and partner teams to come together to develop needs assessments, scientific proposals, and science-based solutions.

## 2.2. CAROUSEL Incubators are

### **Dynamic Hubs**

Our CAROUSEL design incorporates three Incubators, allowing for rapid, stakeholder-driven identification of problems and needs, cross-disciplinary collaboration on basic science, and iterative adaptation of science-based solutions, while ensuring equity and broad engagement. Membership on each will be rotating and staggered, allowing for incorporation of fresh ideas and perspectives, identification of broad sets of coastal challenges, and responsiveness to changing scientific and community needs, while also retaining institutional knowledge. To create a culture of inclusion across the Hub, initial membership in Hub activities will also be linked to in-person training carried out by permanent CAROUSEL staff that provides ethical expectations and frameworks. This inclusive culture creates a welcoming space for underrepresented communities of all kinds (e.g. people, disciplines, geography).

#### 2.2.1. The Cross-Community Incubator

Science-based needs within the spatial purview of CAROUSELS will be identified at the community level, by members of a rotating *Cross-Community Incubator*. This Incubator will be fluid, and evolve based on the needs of the community. Membership in this Incubator will include scientists, community “pacesetters”, governmental managers, community agents, community based members of federal organizations (e.g., Sea Grant outreach agents), and members of non-governmental organizations (e.g., The Nature Conservancy). This group will be sensitive to changing community and coastal challenges, and will specifically put forth the needs of underrepresented, underserved, and socially vulnerable populations.

#### 2.2.2. The Advisory Board Incubator

The *Advisory Board Incubator* of each CAROUSEL, oversees and is charged with ensuring equitable practices at the Research Group Levels. Members of this group will rotate on a staggered time-scale (suggested 5 years). The Advisory Incubator is

charged with setting “Challenges” (i.e discovery/basic research ideas) based on the Cross-Community Incubator’s list of research priorities. This Incubator should nurture ideas and help to accelerate innovation. This includes the tangible aspects of providing support for research, managing staff for data services, and work space for short-term Incubator collaborations. Permanent staff will also facilitate matchmaking amongst communities, workshop activities, and training related to the goal of an inclusive culture.

### *2.2.3. The Challenge-Response Incubator*

The *Challenge-Response Incubator* will be largely ad-hoc, derived from the community of cross-disciplinary scientists across career stages with the most relevant knowledge to the current set of Challenges. Charged with responding to emerging issues through development of community integrated scientific proposals and adaptation of best practices derived from the most up-to-date science from across disciplines. It will also retain stakeholder engagement to ensure community needs are continuously addressed. It is envisioned that multiple *Challenge-Response Incubators* will be active at a given time, working on e.g., scientific proposals, funded projects, white papers, manuscript preparation, as well as community relevant solutions such as management plans, executive summaries, and communication products across coastal challenges.

### **2.3. CAROUSEL Incubator Set-Up and Logistics**

Initial Stage of Development:

- 1) Creation of a *Cross-Community Incubator*:
  - a. Regional hubs
  - b. Cross-Community Incubator to define Advisory Incubator composition
- 2) Institutional-level application for *Advisory Incubator*
  - a. Must be proven pacesetters in research and community engagement
- 3) Some permanent staff to facilitate data sharing and management, use of Incubator physical space, day to day activities

### **2.4. National Coastal Incubator Academy**

The *National Coastal Incubator Academy* (NCIB) will span the regional CAROUSELS and serve as a virtual and physical platform for the cross-CAROUSEL sharing of scientifically vetted research results and locally sourced “best practices”. This will serve as a meeting and educational space to bring together disciplinary experts to address “grand challenges” facing coastal and scientific communities across CAROUSEL regions (e.g., sea-level rise and recurrent flooding, harmful algal blooms, etc.). Models for design of the NCIB could include the Community Surface Dynamics Modeling System (CSDMS).

### **2.5. Incubator Assessment & Evaluation**

CAROUSELS will be reviewed by a board composed of NSF program managers, external advisors, and members of other CAROUSELS. Evaluation will be performed

at regular intervals, with feedback to inform the Advisory Incubator. This board will serve as an “Honest Broker” that helps reflect back to Incubators how well they are achieving research and equity goals. An example model may include the Long Term Ecological Research (LTER) network. External evaluation related to specific projects will also be a component of supported challenges, using disciplinary appropriate evaluation techniques.

### **3. Guiding Philosophy: “Hubs Not Clubs”**

***The guiding philosophy, “Hubs Not Clubs,” reflects the need to ensure that participation in research is interdisciplinary, fluid, open to new participants, and is open to a range of communities, including scientific communities and the communities in which research is conducted (with a focus on under- represented coastal community members).***

CAROUSEL incubators include defined community positions that represent the diversity of disciplines, stakeholders, and decision-makers appropriate for a given region. This structure is intended to be permanent, **but the membership of this structure is not permanent**. Rotating seats on each of the three incubators within a given CAROUSEL will safeguard that new voices and ideas are incorporated and heard. Leadership of research teams will explicitly include under-represented groups, and will be consciously interdisciplinary. Membership will be staggered in time to promote turnover of personnel within teams to energize new ideas while preserving some institutional knowledge. The mix of members will account for disciplines, under-represented groups, and the career stage of researchers. Key to this effort will be the identification of “pacesetters,” participants from scientific, managerial, and stakeholder groups who are new to the field, and who bring new ideas to research projects.