Title: Informal Science Networks to Catalyze Community Engagement

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Concept: Leverage the reach, trust and expertise of informal science centers to promote broad and effective community engagement in coastal issues.

Background:
There are increasing needs for broadening science literacy to address pressing problems at the intersection of science and society. These needs are particularly acute given the increasing body of evidence that we have entered the "Anthropocene" era, as earth system processes are now being altered by humans on a global scale. Addressing these complex global issues – such as climate change, sea level rise alterations in nutrient cycles, coastal erosion, large-scale droughts, and emerging disease vectors – require adaptive changes in our collective behavior and policies. These changes require advancing public understanding, engagement, and participation.

However, productive discourse and engagement is lacking. For example, recent data from the Yale Project on Climate Communication found that 64% of Americans discuss climate change only occasionally or not at all with friends and family. The barriers to communication are not simply lack of interest or information. Several national studies have confirmed that a clear majority of visitors to museums are concerned about global climate change and related issues including sea level rise and ocean acidification. There is in fact an abundance of information available, though much of it overwhelming, politically polarizing, or even contradictory.

In order to be more effective, we need to apply cognitive and social science research to address the substantial cognitive, social, cultural and psychological barriers to understanding complex earth system science topics. These include inherent complexity and uncertainties associated with the behavior of complex systems; mental models that can overly simplify issues in ways that are incorrect; and polarization of news media and fragmentation of public understanding across political and ideological boundaries.

Opportunity:
Informal science learning centers (ISLCs) are well positioned to foster effective public discourse and community engagement given their large reach, high degree of public trust, convening power, and interpretive expertise. There are more than 1,500 informal science centers across the US, which collectively reach more than 60% of the population, with a high concentration in coastal areas.

Informal science centers can serve as:

- science translators (building bridges between expert knowledge and the public);

- conveners (creating space for de-politicized conversations about important social and environmental issues); and
- civic facilitators (helping to build relationships and trust both within and beyond their walls). In an era where partisanship has increased and trust in many institutions has decreased, the general public continues to view museums as trusted and unbiased.

Informal science centers can play a pivotal role in strengthening climate know-how, promoting effective public discourse, and motivating community level action.

Recommendations:

1. Use evidence-based techniques for communication and engagement
By building on careful empirical research to understand what people already value, believe, and understand, communication strategies can be designed to translate complex science in a way that allows people to examine evidence, make well-informed inferences, and embrace science-based solutions.

2. Focus on place-based solutions to empower communities
By focusing on specific applications and solutions to real-world problems, crisis-framing and despair is minimized. Appealing to strongly held universal values and concepts, such as responsible management and stewardship, can minimize polarization and contention. By focusing on collective solutions, the public can see themselves as potential participants in community issues, rather than simply as individual consumers of knowledge.

3. Build professional and social networks to reinforce engagement and action
In dealing with complex and challenging issues, support from others can stimulate hope, confidence, and a sense of self-efficacy. Social norming and reinforcement can help to motivate and sustain civic engagement and action.

4. Deploy an adaptable and scalable approach to maximize impact
Strategies such as tools/techniques that are locally adaptable, "train the trainer" models, and network building enable widespread applicability, high impact and return on investment.

Impacts:

Key outcomes of this approach include the following:

- Member of the public become more knowledgeable about relevant science; hopeful that they can address associated challenges; confident that they can talk about these issues with others; likely to believe that talking with community leaders lead to community level change; and likely to engage in community-level community action to address climate change.

- Community organizations in participating communities gain new tools, information, and resources that, combined into shared action plans, can advance community climate know-how and community-driven responses to the threats and challenges they face, and to increase the potential for shared action to help create more livable and sustainable communities.

- Community leaders demonstrate increased science know-how on climate change issues and more broadly see the role of informal science centers as integrated community partners, rather than simply a destination to visit.

- Informal science centers deploy new strategies and tools for community engagement and facilitating community change; build new partnerships with which to define shared priorities moving forward; and develop new perspectives on our role in helping communities better address their needs and priorities.

- Other communities and organizations can participate in and build on this new capacity-building model.

Together, these impacts can broaden participation effectively and at a large scale.

Supporting Evidence:

Networks of informal science centers, such as the NSF-funded National Network for Ocean and Climate Change Interpretation (NNOCCI, www.nnocci.org) and Nanoscale Informal Science Education Network (NISE Net) have demonstrated that by activating the resources of widely trusted institutions such as aquariums, zoos, and other informal science learning centers, we can break through obstacles such as the perceived complexity of science and political polarization to create a space to have productive, fact-based climate change conversations and overcome barriers to community action.

There is abundant evidence that these conversations inspire visitors to informal science centers to drive community-level strategies to address climate change and other issues at the intersection of science and society. Instead of simply conveying information, this approach enables informal educators to facilitate "meaning-making"—helping people process information relative to their personal experiences and context. This "non-persuasive" approach promotes understanding of causes and consequences rather than advocating particular policies or actions – consistent with NSF's on helping the public to become better-informed decisionmakers.