
# Collective Advice for Advancing the Success of Collaborative Research

## WORKSHOP SUMMARY REPORT | MAY 2018

National Estuarine Research Reserve System Science Collaborative

# COLLECTIVE ADVICE FOR ADVANCING THE SUCCESS OF COLLABORATIVE RESEARCH

Report prepared by:
Julia Wondolleck, University of Michigan School for Environment and Sustainability. With help from Kaitlyn Pritchard and Lynn Vaccaro, NERRS Science Collaborative.

About the Science Collaborative
The National Estuarine Research Reserve System's Science Collaborative supports collaborative research that addresses coastal management problems important to the reserves. The Science Collaborative is managed by the University of Michigan Water Center through a cooperative agreement with the National Oceanic and Atmospheric Administration (NOAA). Funding for the research reserves and this program comes from NOAA.

To learn more about the reserve system visit: www.coast.noaa.gov/NERRS
To learn more about the Science Collaborative, visit: www.graham.umich.edu/water/nerrs

You may also contact the Science Collaborative at: nerrs-info@umich.edu

Cover page photo credits:
Lower left: Taken by James Rassman at Waquoit Bay NERR
Lower right: Taken by Madison Lytle at North Carolina NERR

## Introduction

In recent years, the scientific community has become increasingly aware of the need to address a gap between scientific research and policy and management decisions. Collaborative research, which integrates scientists and decision makers into the research process and fosters two-way communication and learning, presents an alternative to traditional research that can help bridge this gap.

In November of 2017, the National Estuarine Research Reserve System Science Collaborative team organized a workshop for their research and integrated assessment grant recipients. Participants included 37 people that lead or co-lead 20 projects funded by the Science Collaborative in 2015, 2016 and 2017. Workshop discussions were facilitated by Dr. Julia Wondolleck, a professor of environmental policy and planning at the University of Michigan and a member of the Science Collaborative team.

We have captured the collective findings and advice of workshop participants in this guidance document in hopes that it can serve as a resource for those interested in developing end user-driven collaborative research projects, both in the National Estuarine Research Reserve System and beyond.

This summary document is organized into three sections.

- Section I. Factors that enable effective end user-focused collaborative science
- Section II. Challenges and strategies associated with collaborative science
- Section III. Potential strategies for funders

# Section I. Factors that Enable Effective End User-focused Collaborative Science

Workshop participants were asked to consider the question: **"From your experience, what factors enable effective end user-focused collaborative science; what are the important ingredients?"**

The factors expressed during the ensuing one-hour interactive discussion encompassed three major categories: collaborative process characteristics; roles, characteristics and attitudes of those involved; and project topic and context. The factors identified in each category are presented below.

## 1. Project Topic, Context and Resources

A few enabling factors offered by workshop participants reflected the reality that collaborative science does not occur in isolation of external influences that can affect a process in both positive and negative ways, nor in the absence of sufficient resources.

**Enabling Factors:**

- Research is based on a topic of shared interest to project team and end users
- Project capitalizes on current event that increases interest and motivation in the project
- Pre-existing relationships between scientists and end users
- Support of higher-level management in the organizations of end users
- Presence of pre-existing organizational structures that connect end users, e.g., reserves
- Team and partners have necessary resources and support to help sustain the process and relationships

## 2. Collaborative Process Characteristics

Collaborative science occurs within a process of engagement between end users, project team members and, often, broader members of a community of practice or place. Notably, many workshop participants raised factors related to what they viewed to be critical aspects of the collaborative process that enabled productive engagement.

**Enabling Factors:**

- Goals and objectives are clearly stated, jointly defined, and bite-sized
- Roles and responsibilities for project team and end users are clearly defined and documented
- Effective and clear communication of expectations and understanding of problems
- Challenges are recognized and discussed
- Involvement of an advisory committee that plays a leadership role rather than a receiving role
- End users engaged in all stages of the project to foster ownership and understanding
- Two-way learning is facilitated between scientists and end users
- Planned meetings as well as less formal interaction on end users' turf
- Effective leveraging of end user networks
- Broad engagement balanced with a manageable project group size
- Grounding in solid science
- Built-in time for end users to test products, benefits, and science

## 3. Roles, Characteristics and Attitudes of Those Involved

What actually transpires within a collaborative process is a function of the roles, characteristics and attitudes of those involved. A textbook model collaborative process without committed and effective participants is unlikely to succeed. Reflecting this reality, half of the enabling factors offered by workshop participants spotlighted characteristics and qualities of project team and end user involvement in collaborative science projects. These ideas are summarized in the following three tables.

### Project Team Roles and Characteristics

**Enabling Factors:**

- Lead principal investigator understands all the pieces of the project (scientific and collaborative goals)
- Strong collaborative lead and technical team with interest in and knowledge of issues
- Collaborative lead effectively translates and transfers ideas between scientists and end users
- Project coordinator manages the process, including organizing meetings and managing logistics
- Team is known to end users as an unbiased and trustworthy source of information
- Team understands end users' goals and unique constraints
- Team empowers end users to assume new roles and responsibilities
- Team has interest and skills in interacting with non-scientists
- Team engages early and often in conversation
- Team recognizes importance of end user participation and project buy-in
- Team recognizes and emphasizes shared goals and mindsets

### Project Team Attitudes and Perceptions

**Enabling Factors:**

- Flexible and adaptive to unexpected changes in the project
- Humility and ability to admit what they do not know
- Patience and understanding that collaboration is a long-term investment
- Willingness to listen more and talk less
- Open-minded to different perspectives, opinions, and expectations
- Recognition and appreciation of cultural context
- Recognizes importance of end user participation and project buy-in
- Willingness to compromise on contentious issues
- Maintains a sense of humor

### End User Role and Perceptions

**Enabling Factors:**

- Feels a sense of ownership and stake in the project
- Has a preexisting relationship with and trust in the project team
- Believes that their input is valuable and will be used
- Has a clear understanding of their role, including time commitment, decision-making authority, etc.
- Is able to express their needs rather than being told by researchers
- Provides support in the research process and field work
- Helps identify data gaps and offers site-specific knowledge

# Section II. Challenges and Strategies Associated with Collaborative Science

A brief online survey was sent to workshop participants prior to the Providence meeting asking one question: **"What challenges have you encountered or do you anticipate encountering with end user-driven collaborative research?"** About half of the workshop participants provided a quick response to this question. Their responses highlighted three major categories of challenges:

1. Challenges related with end user engagement
2. Challenges associated with the collaborative process
3. Challenges encountered at the interface of projects and the public

These challenges – and strategies for addressing them – provided the starting point for the workshop's afternoon discussion. Participants had the opportunity to share specific challenges they had encountered within each category as well as offer examples of additional categories. Several participants raised concerns about what happens once the science has been produced and the project officially ends. They lamented that action on the science products sometimes languishes during this transition period and they struggled with how to continue to support end user action when time and budget was lacking. This fourth category of challenges was added for discussion:

4. Challenges and strategies in transitioning from research to application

## 1. Challenges related with end user engagement

It is one thing to commit to conducting research in collaboration with end users, it is quite another to effectively act on that promise. End users are not all alike. They are busy just like everyone else, have different needs and interests in the research, and sometimes need to be motivated to engage with the collaborative science project. Workshop participants identified several challenges associated with end user engagement in their research.

**Challenges Encountered or Anticipated:**

- End users have varying levels of understanding of the science and the research process
- End users have different goals and needs for the end products
- The project team needs to manage and balance the expectations of both end users and the research team
- The project team needs to clarify and understand what end users want
- Projects with a greater number of end users require more effort and compromise
- Everyone is busy; "getting the ear" of end users to ensure useful products can be challenging
- End users may not take the research results seriously
- End users and research team members have differing capabilities and capacities
- It is difficult getting the technical teams to sufficiently translate the science for end users

**Potential Strategies:**

- Recognize that different end users have different needs, levels of responsibility, and opportunities to engage
- Be specific about the different ways in which end users can contribute to advancing the project
- Be upfront about the time commitment involved
- Establish an advisory committee to provide a regular forum for communication with end users
- As possible, compensate end users to incentivize and enable their sustained involvement (i.e. stipends, travel support, honoraria, etc.)
- Meet end users in their space and at their events as a way to acknowledge the value of their time and the team's commitment to hearing from them
- Help end users get recognition and buy-in from their superiors for their work with the project
- Engage end users in field visits and field work; take advantage of these opportunities to solicit their site-specific local knowledge and ideas
- Build time into the process for feedback and iteration to help clarify end user needs and goals for the end products

## 2. Challenges associated with the collaborative process

Collaborative science is inherently a different approach to conducting research. It is not the traditional research paradigm under which most scientists have been trained. Hence, it was not surprising that many of the workshop participants identified challenges associated with the collaborative process. While they are all quite familiar and comfortable conducting research, conducting that research in a collaborative manner with end users proved challenging in several respects.

**Challenges Encountered or Anticipated:**

- The collaborative process is unfamiliar. Principal investigators and technical folks don't always understand the process and the role of the collaborative lead
- It takes time!
- Personnel changes/turnover among end users and team members upends the relationships that are essential to collaboration
- Skepticism about the value of collaborative science (within the research team as well as among end users and the public)
- Balancing the research experimental design and statistical methods with end users' real-world management needs
- Managing good intentions and promises with the realities and paradigms of scientific research
- Managing the collaborative process in the face of research uncertainties and time lags
- Balancing collaborative interactions with the reality of constrained time and resources for the research
- Many projects engage graduate students and postdocs who feel compelled to prioritize science over end user engagement

**Potential Strategies:**

- Provide training for the project team about the collaborative science process
- Discuss the conceptual model about collaborative science with all people involved in the project so everyone is working with the same understanding
- Create a charter document clarifying roles and responsibilities of team members and end users
- Make use of readily available collaborative toolkits developed by groups experienced with collaborative processes (i.e. the NERRA Collaborative Toolkit)
- Tap Sea Grant and/or other extension opportunities for support
- Tap the expertise and experience of previous Science Collaborative project teams (i.e. "who has been down this road before and can show us the way?")
- Use varied communication strategies that recognize the different needs and understandings of the research team and end users
- Proactively have smaller meetings to carefully plan the larger team and end user meetings
- Prioritize getting graduate students' names on projects and products
- Have graduate students dedicate a chapter of their theses to collaboration and end user engagement
- In the long term, make efforts to expand the paradigm of science to include collaboration

## 3. Challenges encountered at the interface of projects and the public

Most collaborative science projects involve field experiments, restoration activities, infrastructure installations and/or habitat modifications that are readily visible to the public and, at times, can spark concern. At the same time, many collaborative science projects can benefit from broader community awareness of the research in order to both enable feedback and acquisition of local knowledge as well as to build broader support for the research and its products. Workshop participants noted several challenges at the interface of their projects and the public.

**Challenges Encountered or Anticipated:**

- Helping the public both understand and value (or at least not oppose) the project and its associated research activities
- Managing the conflicts that sometimes arise with outside groups
- Engaging the broader community for feedback and support
- Providing sufficient public outreach so that the research products and recommendations are adopted
- Widening the circle of potential end users within the public can ensure attention to the research and its products but also poses tradeoffs
- Developing compelling communication tools that can convey the science to non-scientists

**Potential Strategies:**

- Modify the NOAA Science Collaborative project two-pager to make it speak to a local community - not just researchers and end users
- Track the influence of projects over time, thereby elevating and validating their prominence and value to the community
- Find ways to percolate the projects' accomplishments through community networks
- Leverage resources for outreach by engaging other agencies and organizations
- Market the projects in innovative ways; use social media

## 4. Challenges and strategies for transitioning from research to application

The final set of challenges discussed by workshop participants concerned the actual application of the science produced through their projects. Once a project comes to an end and no funds or project team time are available to assist with implementation, project products can languish. Workshop participants were concerned that this missing link warranted attention in order to ensure that collaborative research projects have sustained impact.

**Challenges Encountered or Anticipated:**

- Securing funding for implementation of products
- Finding ways for the project and products to live on despite the end of the research and disbanding of the project team
- Lack of capacity of the research team to assist with implementation
- While commitment to action on the research exists, how to translate that commitment to action is unclear

**Potential Strategies:**

- Encourage team members to remain available for occasional calls, meetings and consultations post-project
- Make post-project transition plans part of proposed activities and budget from the outset
- Discuss next phase funding needs early in the project and be attentive to potential opportunities throughout the project
- Enlist help from project sponsor and all participants in identifying and advocating for additional support
- Seek resources from foundations, other NOAA programs, NGOs, and other entities with an interest in seeing action on the project's findings
- Take full advantage of support available through the Science Collaborative to make project products and data available and communicate about your work more broadly, such as through the Science Collaborative webinar series or other communications support

## Section III. Potential Strategies for Funders

During the prior discussion about challenges and strategies, a number of ideas emerged for research funders specifically. This category of ideas, summarized below, is useful for the Science Collaborative planning and these ideas could ultimately find their way into a product for other research funders.

### How can research funders help teams address challenges of collaborative research?

**Ideas related to the collaborative process:**

- Compile a list of facilitators
- Provide training on metadata
- Help project teams with pre-survey of end users
- Provide tools for document project impact
- Clarify the spectrum of end users that reserves could potentially engage
- Provide examples of how different teams have "tiered" end users
- Facilitate the conversation about learning from failures/challenges
- Web tool developer to provide direction and advice
- Mentoring match-making to connect new principal investigators with experienced principal investigators
- Share 'process' documents that have been developed, including Digital Coast
- Facilitate collaborative approaches within NERRS by understanding how different sectors are collaborating as end users and helping developing management plans and CTP strategies

**Ideas related to the transition phases:**

- Consider incentives and/or requirements for teams to develop a transition plan for getting research findings into application after project ends
- Offer dedicated funding for next steps
- Assess and help generate interest from foundations

# Appendix A. Workshop Agenda

| | |
|---|---|
| 8:30 am | **Breakfast** |
| 9:00 am | **Welcome and introduction**<br><br>*Jen Read outlines the workshop objectives and agenda. Participants provide a brief introduction of themselves, including name, affiliation, Science Collaborative project topic, project stage and an issue they would like to discuss today.* |
| 9:45 am | **Breakout #1: Factors and facilitate successful collaborative research**<br><br>*In small groups, participants share their experiences and generate a list of factors that facilitate successful projects. Julia Wondolleck leads a large group discussion to develop a common list that could serve as a resource for the group and others.* |
| 11:00 am | **Break** |
| 11:20 am | **Research on the drivers of usability and impacts**<br><br>*Maria Lemos shares findings from her social science research on the impacts emerging from collaborative research approaches. Questions and open discussions are encouraged during the second half of this section.* |
| 12:05 pm | **Network Lunch** |
| 1:05 pm | **Breakout #2: Challenges and strategies for collaborative research projects**<br><br>*In small groups, participants identify challenges and potential strategies for collaborative research projects, Julia helps the group integrate ideas and develop a summary for those interested in collaborative research.* |
| 2:20 pm | **Break** |
| 2:40 pm | **Topic area round tables**<br><br>*Small groups are formed based on project topics. Participants have a chance to reflect on how prior discussions relate to their topic area. Groups are encouraged to identify remaining questions and opportunities for synergy across projects.* |
| 3:25 pm | **Group discussion: Key takeaways**<br><br>*All are invited to share final reflections and remaining questions.* |
| 4:00 pm | **Wrap up, exit Survey and thank you**<br><br>*The meeting wraps up and participants complete a short evaluation form.* |
| 4:30 pm | **Conclude** |

# Appendix B. Workshop Participant List

*Funded Project Participants*

| Name | Affiliation | NERRS Science Collaborative Project Title |
|---|---|---|
| Beth Darrow | University of North Carolina Wilmington | Evaluation of ecosystem services associated with shellfish culture operations in coastal regions served by reserve |
| Troy Alphin | University of North Carolina Wilmington | |
| Craig Cornu | Institute for Applied Ecology (OR) | Quantification and dissemination of carbon stocks data for Pacific Northwest tidal wetlands |
| Jude Apple | Padilla Bay NERR (WA) | |
| Jim Rassman | Waquoit Bay NERR (MA) | Expanding blue carbon implementation: increasing greenhouse gas model application in tidally restricted and restored marshes |
| Amy Dibble | Coos County (OR) | An estuarine and shoreland use and zoning integrated assessment for the Coos estuary, Oregon |
| Jill Rolfe | Coos County (OR) | |
| Jenni Schmitt | South Slough NERR (OR) | |
| Steve Miller | Great Bay NERR (NH) | Exploring the trends, the science, and the options of buffer management in the Great Bay Watershed |
| Coowe Walker | Kachemak Bay NERR (AK) | Promoting resilient groundwater resources and holistic watershed management at Kachemak Bay |
| Syverine Bentz | Kachemak Bay NERR (AK) | |
| Michael Piehler | University of North Carolina Chapel Hill | Multi-faceted collaborative research to manage stormwater impacts on coastal reserves |
| Rachel Noble | University of North Carolina Chapel Hill | |
| Kristi Arend | Old Woman Creek NERR (OH) | Quantifying wetland contributions to reducing nutrient loading to Lake Erie |
| Song Qian | University of Toledo | |
| Daniel Rogers | Stonehill College | Evaluating effectiveness of different oyster aquaculture strategies for nitrogen loading remediation |
| Ginny Edgcomb | Woods Hole Oceanographic Institution | |
| Peter Sheng | University of Florida | Assessing and enhancing the value of coastal marshes for protecting coastal communities from storm surge and flooding |
| Amanda Spivak | Woods Hole Oceanographic Institution | Evaluating the impact of hydrologic alterations on salt marsh sustainability in a changing climate |
| Tonna-Marie Surgeon-Rogers | Waquoit Bay NERR (MA) | |
| Mike Kennish | Rutgers University | Investigating the interconnectedness of climate change, nuisance mosquitos, and long-term resilience of salt marsh systems |
| Rick Lathrop | Rutgers University | |
| Alison Watts | University of New Hampshire | Using DNA methods to monitor invasive species and biodiversity in estuarine systems |
| Kelley Thomas | University of New Hampshire | |
| David Sutherland | University of Oregon | Improved understanding of sediment dynamics and direct management applications for South Slough and Coos Bay Estuary |
| Brian Yellen | University of Massachusetts | Quantifying effects of dam removal on sediment transport and wetland sustainability in the Hudson River estuary |
| Jon Woodruff | University of Massachusetts | |
| David Ralston | Woods Hole Oceanographic Institution | |
| Jen West | Narragansett Bay NERR (RI) | Thin-layer sediment placement: evaluating an adaptation strategy to enhance coastal marsh resilience across the NERRS |
| Kenny Raposa | Narragansett Bay NERR (RI) | |

### *Funded Project Participants*

| Name | Affiliation | NERRS Science Collaborative Project Title |
|---|---|---|
| Ona Ferguson | Consensus Building Institute, Inc. | Assessing ecological and physical performance of sustainable shoreline structures |
| Stuart Findlay | Cary Institute for Ecosystem Studies (NY) | |
| Denise Sanger | Ace Basin NERR (SC) | Evaluating living shorelines to inform regulatory decision-making in South Carolina |
| Peter Kingsley-Smith | South Carolina Department of Natural Resources | |
| Sharleen Johnson | South Carolina Department of Natural Resources | |
| Nikki Dix | Guana Tolomato Matanzas NERR (FL) | Re-engineering living shorelines to halt erosion and restore coastal habitat functioning in high-energy environments |
| Christine Angelini | University of Florida | |
| Eric Sparks | Mississippi State University | End-user derived research to improve the effectiveness, sustainability, and prevalence of coastal restoration projects |
| Just Cebrian | Dauphin Island Sea Lab (AL) | |

### *Science Collaborative Team Members*

| Name | Affiliation |
|---|---|
| Maeghan Brass | NERRS Science Collaborative, University of Michigan |
| Maria Carmen Lemos | NERRS Science Collaborative, University of Michigan |
| Dwayne Porter | NERRS Science Collaborative, University of South Carolina |
| Jen Read | NERRS Science Collaborative, University of Michigan |
| Dwight Trueblood | NERRS Science Collaborative, NOAA |
| Lynn Vaccaro | NERRS Science Collaborative, University of Michigan |
| Julia Wondolleck | NERRS Science Collaborative, University of Michigan |

43725-MAY-2018