Dr. Julia Wondolleck

Associate Professor,
School for Environment and Sustainability,
University of Michigan

Date: November 30, 2017
Time: 3.00 – 4.00 p.m. (EST)

National Estuarine Research Reserve System Science Collaborative

COLLABORATIVE SCIENCE FOR ESTUARIES
WEBINAR SERIES

Impactful Science: An Assessment of Characteristics, Grantee Reflections, and Lessons Learned

Summary Notes:

Julia has been a faculty member at the University of Michigan's School for Environment and Sustainability for the past 30 years and is a member of the NERRS Science Collaborative team at the University of Michigan.

She teaches courses in Collaborative Natural Resource Management, Environmental Conflict Management, Negotiation, and Mediation.

Julia has written several books on conflict and collaboration in the management of public natural resources, including her latest on marine ecosystem-based management.

Impactful Science: An Assessment of Characteristics, Grantee Reflections, and Lessons Learned

Julia Wondolleck
University of Michigan
School for Environment and Sustainability
November 30, 2017

Summary Points:

The NERRS Science Collaborative is unique in its collaborative approach to research and in its explicit focus on producing science and products that are useful for management. It engages end users in research with the belief that the science produced will be truly useful.

Prior to U-M being awarded the contract to administer the Science Collaborative program in 2014, Julia had been working with resource managers in federal agencies to help them embed collaborative approaches in their management and planning processes but had never worked with NERRS nor on collaborative processes in conducting research.

The goal of this project was to learn about both the NERRS system and collaborative science by reviewing projects that had been conducted in the previous five years when Science Collaborative had been administered by the University of New Hampshire.

Assessment Objectives & Process

- Objectives
  - Determine notable characteristics
  - Distill major lessons learned
- Process
  - Examination of all summary and final reports, supplemental documents
  - Synthesis of grantee reflections in final report
- Product: White Paper

Summary Points:

Our assessment involved reviewing Science Collaborative research project reports to determine notable characteristics of collaborative science and glean lessons learned. The goal was to understand the nature of Science Collaborative projects (what exactly is collaborative research as administered by the NERRS?). We wanted to gather insights that could inform U-M's Science Collaborative team as they moved forward in administering the Science Collaborative program.

We looked at 31 Science Collaborative projects conducted between 2010-2014. Our assessment results in a white paper,* which I will present on the following slides.

*The white paper can be found on the University of Michigan School for Environment and Sustainability Ecosystem Management Initiative website: http://seas.umich.edu/ecomgt/pubs/reports/NERRS_Science_Collaborative_APRIL_2017.pdf

Assessment Overview

I. Characteristics of the Research Projects

II. Characteristics of the Collaborative Process

III. Grantee Reflections on the Experience

IV. Summary Observations

Summary Points:

Our assessment and the resulting white paper took the following form. We examined the characteristics of the research projects:

- What focal issues are addressed by Science Collaborative projects?
- What is the system of interest to the research?
- What is the scale of interest and influence for the research?
- What is the nature of the Science produced?

The characteristics of the collaborative process:

- Who serves in the collaborative lead role?
- Who are the intended end users of Science Collaborative research?
- What is the level of end user engagement in projects?
- How are research results and products disseminated to end users?

Grantee reflections on their experience:

- How did involvement of intended users impact the applied science components of the project?
- What did they find most challenging or unexpected about the project?
- Did they have all the skill sets on the team that you needed? Did their budget include sufficient resources to execute the project?
- What do they know now that they wish they had known when they started?

This presentation will share these results, and provide summary observations at the end.

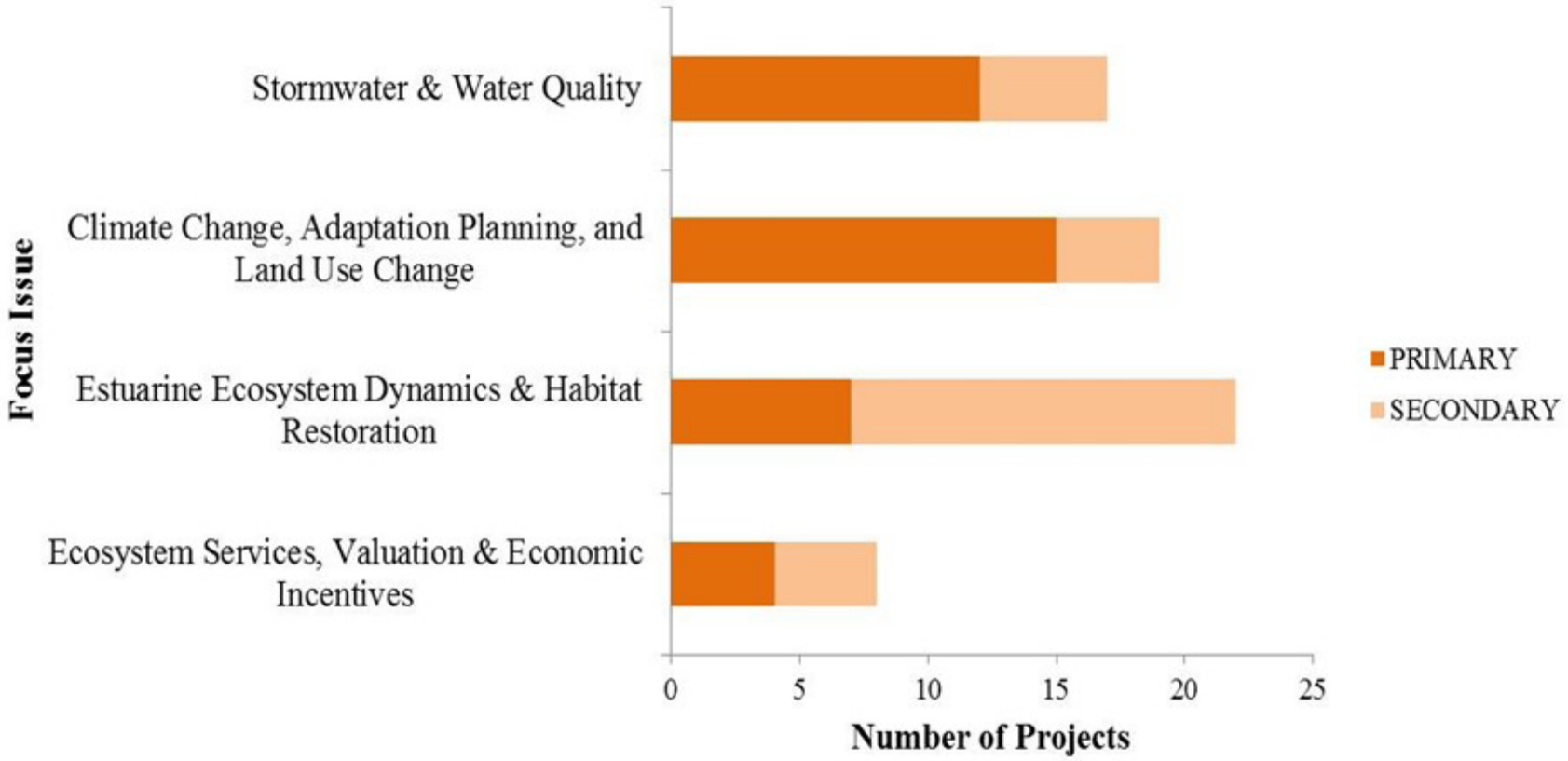
I. Research Project Characteristics

- Focal issues
- Scale

Summary Points:

As noted on the previous slide, several research project characteristics are discussed in the white paper, but for the presentation I plan to focus on just two - focal issues and issues of scale - since they are particularly revealing about collaborative science within the NERRS.

Project Focal Issues



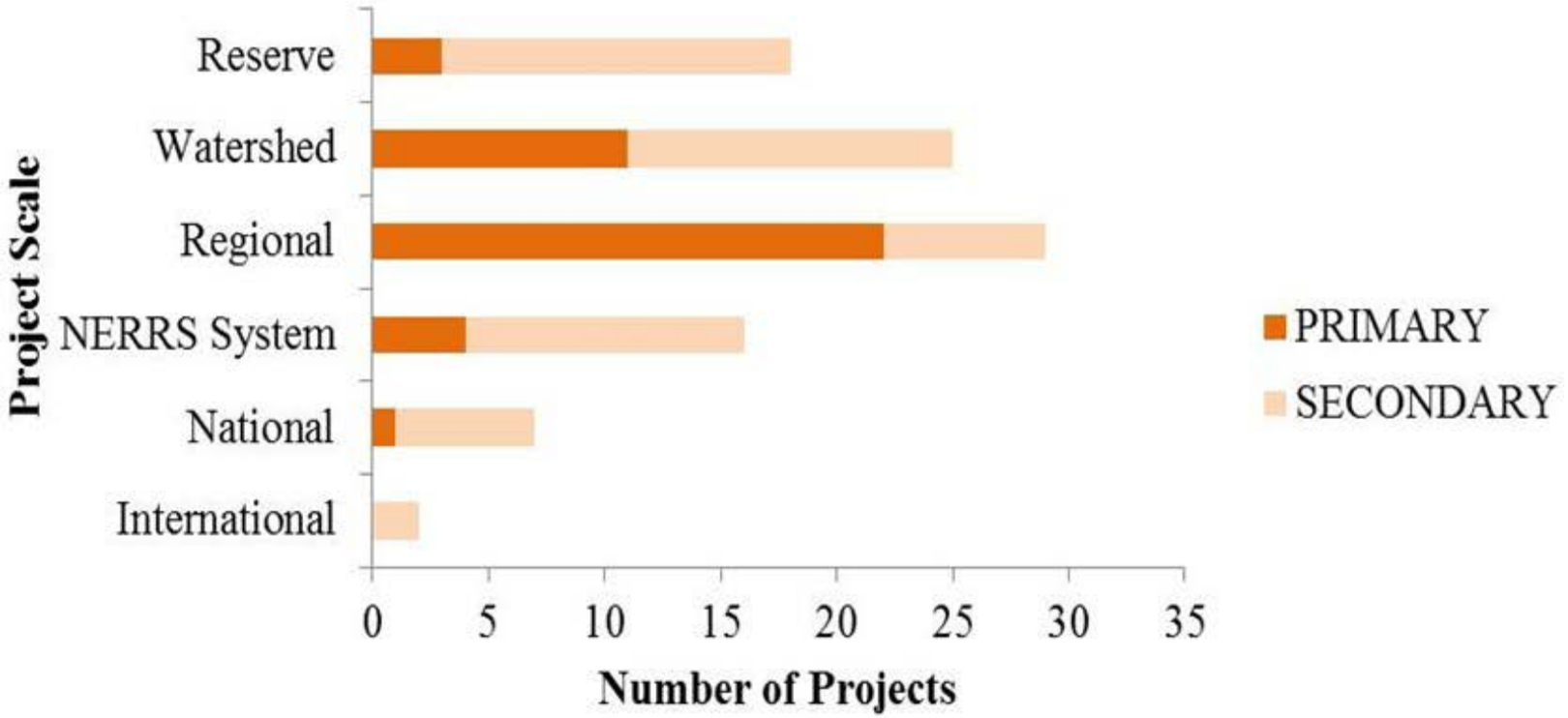
Summary Points:

Projects focused on four major topical categories:

- *Stormwater and Water Quality* - These projects sought to address water quality issues from point and nonpoint source pollution, with particular focus on understanding hydrologic and hydraulic flows, patterns of nutrient loading, and new methodologies for stormwater mangement.
- *Climate Change, Adaptation, and Land Use Planning* - These projects focused on creating climate adaptation plans, refining climate vulnerabilitty assessment techniques, and/or assesment of likely climate change impacts on ecosystem dynamics.
- *Estuarine Ecosystem Dynamics and Habitat Resotration* - Projects sought to provide insight about natural dynamics to help improve management and stewardship of ecosystems.
- *Ecosystem Services, Valuation, Economic Incentives* - Sought to identify and quantify priority ecosystem services and investigate economic-based incentives for restoration and preservation

Projects could have multiple primary and secondary focal issues depending on how indepth the project addressed each topic.

Scale of Project Focus



Summary Points:

It was initially surprising to find that most projects were focused at a watershed or regional scale, rather than a reserve scale, given that projects focused on reserve management priorities.

However, this makes sense in thinking about the goal of individual reserves, which is to improve local estuarine health and support science-informed management of the local ecological systems within which reserves reside. In order to do this, it is imperative that reserves look beyond their own boundaries, which is what most of these projects did.

Projects could have multiple primary and secondary scales depending on how in-depth the project addressed each topic.

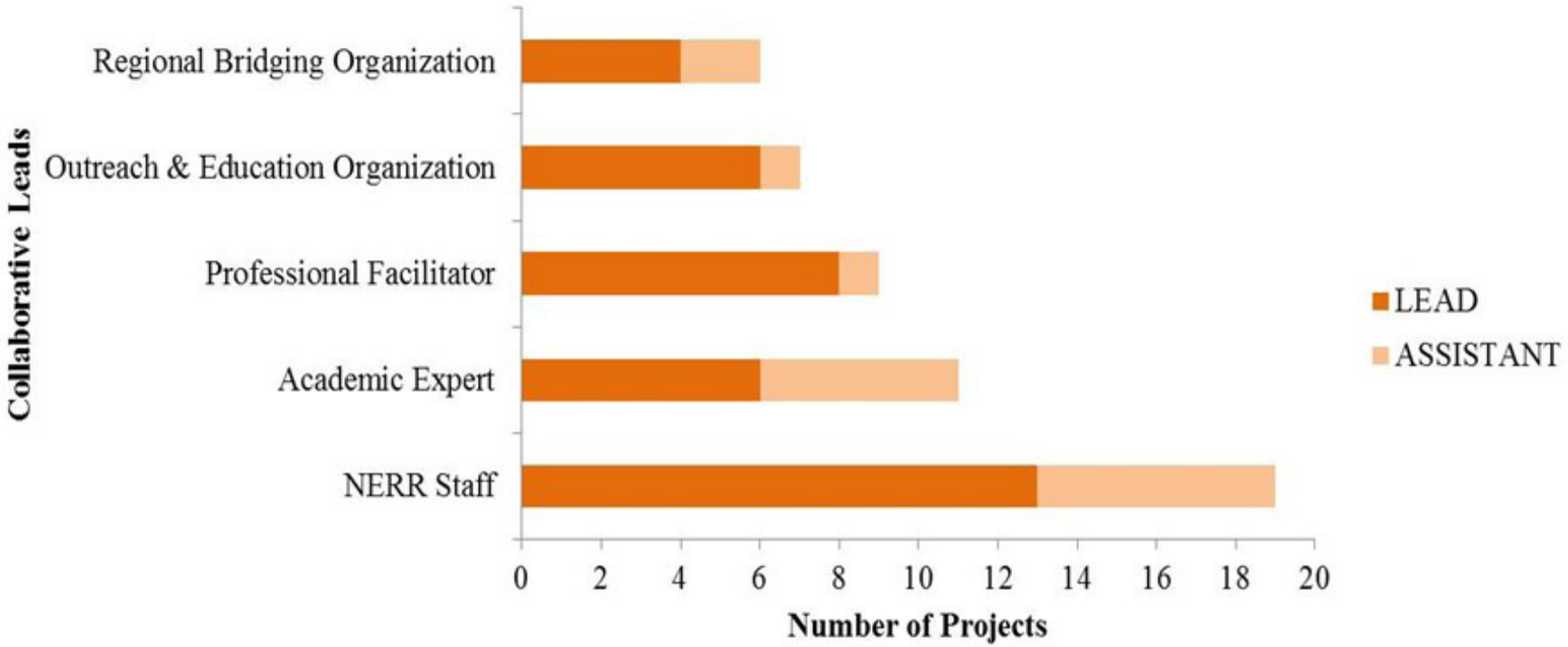
II. Characteristics of the Collaborative Process

- Collaborative lead
- Intended end users
- Level of end user engagement
- How results are disseminated to end users

Summary Points:

We examined four characteristics of the collaborative process for facilitating collaborative research between scientists and end users of the science.

Who is the Collaborative Lead?



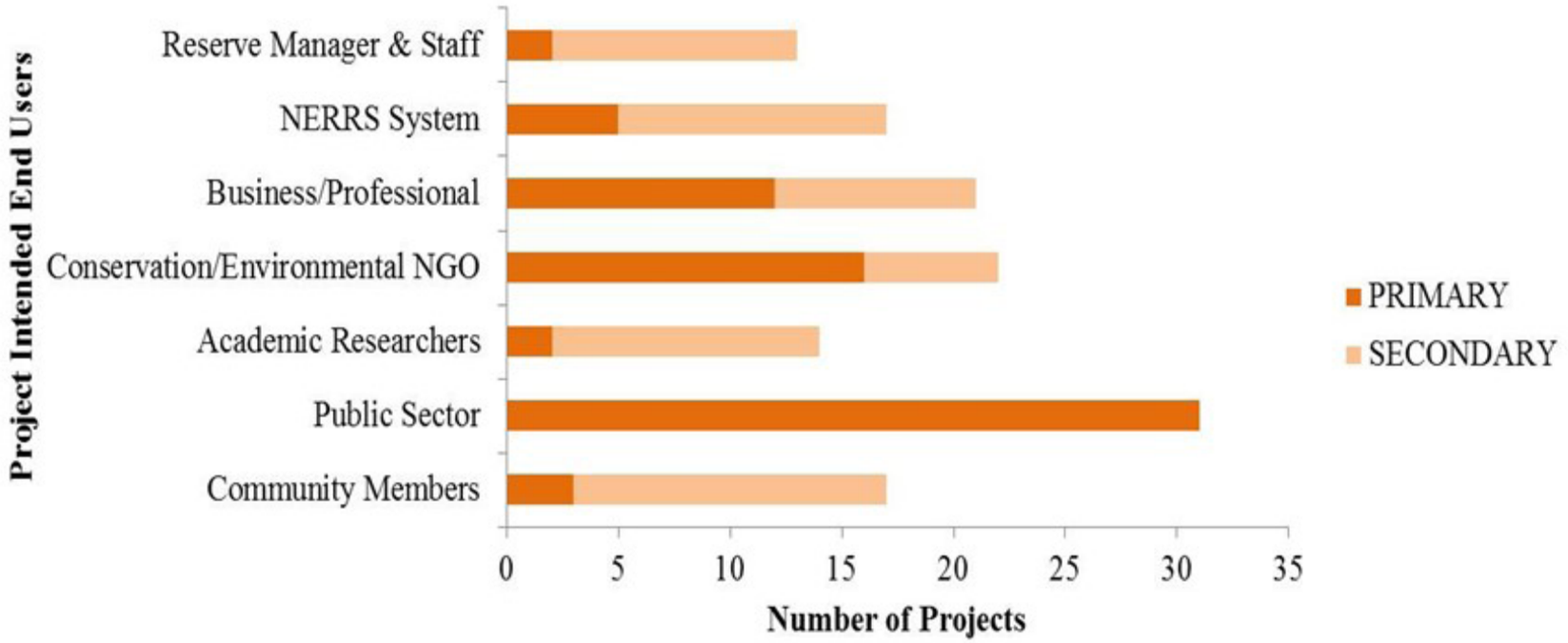
Summary Points:

A unique aspect of Science Collaborative projects is they are required to have a team member ("Collaborative Lead") who is explicitly responsible for ensuring that collaboration occurs during the research process between scientists and end users. The RFP requires proposals to identify who will fill this role and what their qualifications are for doing so. Projects have collaborative leads as well as assistants.

This role was filled by individuals from a number of different domains, including:

- NERRS staff (typically the Coastal Training Program Coordinator)
- Academic experts in collaboration
- Professional facilitators from the private sector
- Outreach or educational organizations (e.g. Sea Grant or Coastal Services Center)
- Respected, knowledgeable individuals from regional bridging organizations that had a convening or partnership building mission (i.e. California Coastal Conservancy, Coos Watershed Association)

Who are the Intended End Users?



Summary Points:

Science Collaborative projects are required to identify and engage end users of the science.

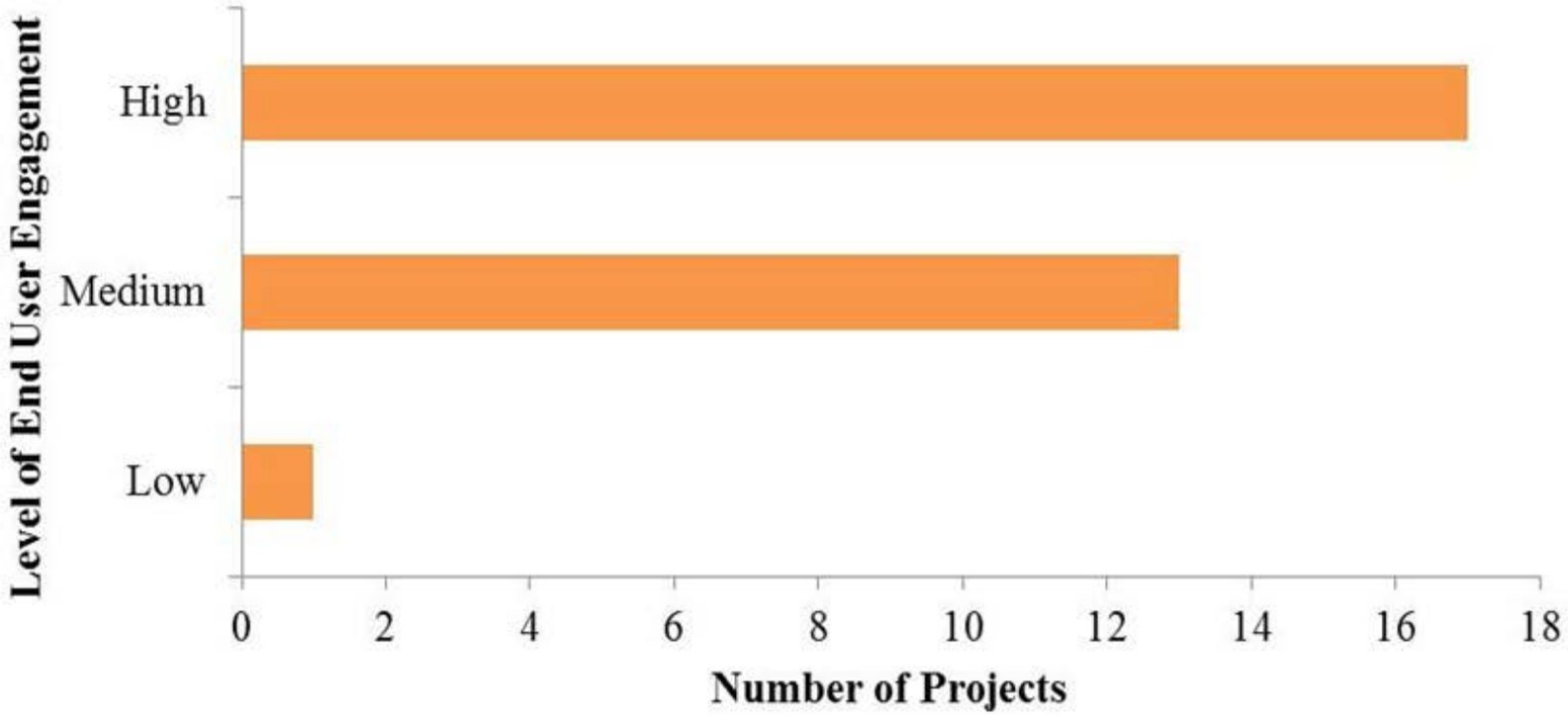
It was expected that the primary intended end users would be the reserve managers, but this was not the case. All 31 projects had public sector entities as their primary end users, which reflects the mission of the reserves to enhance management of the broader coastal ecosystem in which the reserve resides.

Primary end users included:

- *Local, county, state agencies, local planners, utilities* - these end users have jurisdiction or play a central role in the management of resources that affect estuarine ecosystem in some way
- *Environmental and conservation organizations* - i.e. local and regional land trusts, research nonprofits, watershed organizations
- *Private sector organizations* - i.e. engineering firms, environmental consultants, fishermen, etc.

Projects could have multiple primary and secondary end users depending on how indepth the project addressed each topic.

Level of End User Engagement?



Summary Points:

In examining the extent to which end user engagement occurred, the majority of projects provided frequent opportunities for end user involvement through standing advisory councils, workshops, and site visits. Many end users played central roles in data gathering, monitoring, and, in some cases, data analysis. Only one project was found to have a low level of engagement with end users.

Primary Methods for Science Transfer

- Implementable Products (68%)

  (Plans, Guidelines, Protocols, Recommendations)
- Co-produced Science (55%)
- Direct Transfer (45%)

  (Demonstrations, Trainings, Workshops, Technical Assistance, Site Visits)
- Indirect Transfer (12%)

  (Journal Articles, Website, Reports, Newsletters, Conference Presentations)

Summary Points:

There were four major pathways by which project teams transferred science to end users.

While all projects produced journal articles, final reports, conference presentations, and other forms of indirect transfer, their *primary* method for transferring science to end users was more direct, interactive, and substantive. This is indicative of collaborative science changing the traditional research paradigm.

Only 12% used indirect transfer as their primary method, which is notable because this is the predominant pathway in traditional scientific research.

Please see the final report for greater detail on each of these transfer methods.

III. Grantee Reflections

1. Impact of intended users?
2. Challenges?
3. Sufficient skills and resources?
4. Lessons learned from the experience?

Summary Points:

The Science Collaborative final reporting guidelines asked seven open-ended questions to grantees to ascertain their final thoughts and reflections on collaborative science projects. For this webinar, we chose to focus on four questions pertinent to collaborative science.

Grantee responses provided valuable insights into what collaborative science entails, how it is different from traditional scientific research, and the unique characteristics of the reserves and NERRS community.

Final Report Question 1

"How did collaboration with intended users impact the applied science components of the project?"

1) Research Focus & Process (55%)

- Objectives, methods and priorities
- Contributed local knowledge and data
- Assisted with the research

2) Researcher Motivation & Understanding (45%)

3) Form and Content of Final Product (33%)

Summary Points:

Over half of the researchers indicated that the involvement of intended end users had a notable impact on their research focus and process, influencing their objectives, methods, and priorities.

End users often contributed new, local knowledge and data that researchers otherwise would not have been aware of or able to access.

A surprising impact was on researchers' motivations and understanding. Researchers stated that the involvement of end users advanced their own understanding and perspectives on the issues and increased their enthusiasm and energy for the project.

Some researchers were surprised at end users' preferences for the form of final products. They learned new things about end users' constraints and needs, which were important in shaping the final products

Final Report Question 2

"What did you find most challenging or unexpected about the project?"

1) Collaborative Process Challenges (75%)

- Integration of Collaboration & Applied Science
- Personnel Changes & Relationship Impacts
- Time involved
- Unfamiliarity with New Process

2) Research Process Challenges (56%)

3) Unexpected? (28%)

- Enthusiasm of End Users
- Beneficial Ripple Effects

Summary Points:

Most grantees found the collaborative process to be challenging in a number of ways, including integrating the collaborative process with the applied science process.

Personnel changes have an outsized impact on collaborative research because relationships are foundational and matter in a unique way.

Researchers were surprised by the amount of time needed to conduct collaborative research. Collaboration involves working with more people and requires more logistical coordination.

Lack of familiarity with collaboration was a key challenge because it is a new paradigm and different from how scientists are traditionally trained to conduct research.

Some were surpised by end users' enthusiasm for their project and noted that this energized the research process.

Final Report Questions 3 & 4

"Did you have all of the skill sets on the team that you needed?"

"Did your budget include sufficient resources for the project?"

1) Leveraged Additional Skills & Expertise (50%)
2) Leveraged Additional $$ Resources (40%)
3) Made do with Less

Summary Points:

Although most researchers said they could have used more funding to complete their projects, which is a frequent sentiment in academic research, most said they were able to make it work by leveraging additional skills/expertise and by improvising.

- This is revealing about the culture of the NERRS community. The NERRS system has a can do attitude and is apt to problem solve to find a way to address resource gaps in innovative and resourceful ways.

- NERRS is successful in improvising in the face of limited resources because they are embedded in a larger network of agencies, organizations, and communities. They have long standing partnerships in this network that enable leveraging and innovation

Final Report Question 6

"Please describe any lessons learned, obstacles, accomplishments or anything else you would like us to know about your experience on this project."

- Ancillary Benefits (50%)
  - New relationships & partnerships
  - Subsequent research influenced
  - Stronger stakeholder/research connections with Reserve
  - New networking opportunities
  - Became better professionals
- Observations about Collaborative Science (35%)
  - It's different and takes getting used to
  - Sometimes end users need to be educated about project relevance

Summary Points:

Ancillary Benefits:

- Grantees noted that they had received a host of ancillary benefits that they believed they would not have received if their projects were not conducted in a collaborative manner.

Observations about Collaborative Science:

- Some researchers noted the need for scientists to improve their listening skills and display a level of humility in working with end users that is not necessarily characteristic of the traditional scientific process.

- One challenge is that end users sometimes need to be educated about a project's relevance. Sometimes researchers see a need that end users have not yet perceived and it can be difficult to get them involved in early stages of project.

Transformative Impact of the Process

"Many people who were involved in this project have candidly stated that it made them better professionals – better engineers, better regulators, better scientists, better facilitators, and better project managers."

Summary Points:

We read a number of statements about how collaborative research involvement had a transformative impact on researchers.

One Reserve Manager involved in a project spotlight the transformative impact of the collaborative science process, noting that it made everyone better professionals in their domains.

Summary Observations

- Collaborative Science is Unfamiliar and Requires More Time and Additional Skill Sets
- Synergies and Ripple Effects
- Reflects NERRS Collaborative Culture & System Orientation
  - Ecosystem vs. Reserve Focus
  - Leveraging Strategies
  - Science Diffusion within an Extended Network
  - Two-way Learning

Summary Points:

Researchers funded through the Science Collaborative are achieving influence by working beyond the typical academic/ practitioner boundary line and exercising leveraging strategies for accessing additional resources, information, and connections for their projects.

Projects reflected an innovative, can do mindset that is representative of the NERRS system overall.

Projects transferred science to end users through the extended network each reserve has cultivated. That network is also being expanded by Science Collaborative research projects. NERRS are deeply embedded within and nurturing communities concerned with estuarine ecosystems. This level of embeddedness is unique among resource management agencies.

Two-way learning was a key characteristic of collaborative science projects. Scientists did not hand over knowledge to end users at the end, hoping it would be used in most instances; scientists and end users were truly collaborative, working together to enhance the potential of these projects.

Thank you!
Questions?

For more information:

Julia Wondolleck

juliaw@umich.edu

"NERRS Science Collaborative Projects: An Assessment of Characteristics, Grantee Reflections & Lessons Learned"

Julia M. Wondolleck, Anna Bengtson, Dietrich Bouma, University of Michigan, April 2017.

Questions & Responses:

What are some of the issues research teams found related to integrating collaborative and applied science?
The biggest issue is that the collaborative research process is new and unfamiliar, and researchers were not accustomed to collaborating with non-researchers. This integration of collaborative and applied science required them to integrate a new set of actors into the research process, find new ways to facilitate ongoing conversation with end users, and learn how to best understand the perspectives and needs of end users - all things that were unfamiliar.

Were you able to distinguish between projects that were end user-initiated versus those that were proposed by scientists?
Projects that had the highest end user engagement were those that engaged end users ahead of the project to see what they needed. If a project is going to be useful to end users, researchers need to sit down with them before a project begins to understand their needs, constraints, and potential content of final reports or products - that's the true definition of 'collaboration.' Some researchers with less experience in collaborative research are still figuring out how to facilitate that dynamic and how to be flexible and adaptive in the face of the time and budget constraints associated with research grants. Researchers need to really understand the value-added of effective collaboration in order to take the time to navigate the complexity of the collaborative science process.

Thank you!
Questions?

For more information:

Julia Wondolleck

juliaw@umich.edu

"NERRS Science Collaborative Projects: An Assessment of Characteristics, Grantee Reflections & Lessons Learned"

Julia M. Wondolleck, Anna Bengtson, Dietrich Bouma, University of Michigan, April 2017.

Questions & Responses:

Do you have any insights into reducing barriers to conducting collaborative science?

We have now gleaned these observations and lessons learned from the prior five years of the Science Collaborative where end user integration was the primary focus. Now that we understand what those challenges or barriers are, we are focusing on learning how to address those challenges. A few things to note:

- The NERRA website has a tool on effective collaboration (http:// www.nerra.org/how-we-work/collaborative-project-toolkit/).
- The Science Collaborative has funded a Science Transfer project led by Chris Feurt at Wells NERR that's being conducted in partnership with 12 different reserves to learn how challenges and conflicts in collaborative science have been managed. The project is just getting underway now, but they hope to have a pilot training conducted early next year. The final product should be available in a year and a half and will be helpful for collaborative researchers both in and outside of the NERRS system.

Have you looked at other examples of similar programs, for instance NSF's Coastal Seas Program?

That's something that Maria Lemos (U-M Professor and Science Collaborative Team Member) is looking at as part of her research on the co-production of science in a number of different programs, but one thing we hope to do is transfer knowledge across these different programs.