



**Embedding Public Engagement with Science at
Long-term Ecological Research Sites
Year 3 Final Evaluation Report**

Submitted To: Hubbard Brook Research Foundation

February 25, 2021



Table of Contents

Evaluation Overview	1
Evaluation Activities.....	2
Outcomes and Key Findings.....	5
Recommendations and Reflections	13
Appendices.....	15
A. Revised Project Evaluation Logic Model	
B. Year 1 Measures and Summaries of Results	
B1. Leadership Team Baseline Survey Highlights	
B2. Hubbard Brook Advisory Council Roundtable Survey Summary	
B3. Harvard Forest-Hubbard Brook Joint Meeting and Training Survey Results	
C. Year 2 Measures and Summaries of Results	
C1. Hubbard Brook Pests and Pathogens Roundtable Survey Results	
C2. Hubbard Brook Scientist Roundtable Interview Protocol	
C3. NELF Explorer User Survey	
C4. NELF Explorer User Survey Summary (Survey 1 and 2)	
C5. NELF Explorer Train the Trainer Workshop Evaluation Results	
C6. Forest Science News Subscriber Survey	
C7. Forest Science News Subscriber Survey Results	
C8. Hubbard Brook Committee of Scientists (and Stakeholders) Workshop Survey	
C9. Hubbard Brook Committee of Scientists (and Stakeholders) Workshop Survey Summary	
C10. Harvard Forest-Hubbard Brook Collaborations Incubator Survey	
C11. Harvard Forest-Hubbard Brook Collaborations Incubator Survey Summary	
D. Year 3 Measures and Summaries of Results	
D1. Hubbard Brook Ice Storm Symposium Speaker and Audience Surveys	
D2. Hubbard Brook Ice Storm Symposium Speaker and Audience Survey Results	
D3. Harvard Forest-Hubbard Brook Stakeholder Interview Protocols	
D4. Harvard Forest-Hubbard Brook Stakeholder Interview Summary	
D5. Key Project Leadership Interview Protocol	

Public Engagement With Science at Long-Term Ecological Research Sites

Final Evaluation Report

Evaluation Overview

RMC Research designed evaluation activities to provide formative and summative feedback to Harvard Forest and the Hubbard Brook Research Foundation (Hubbard Brook) on their plan to embed public engagement with science (PES) into the cultures and practices of Long-Term Ecological Research Sites (LTERs) in the northeastern US. The purpose of this project was to build PES mechanisms into long-term ecosystem studies that create on-going, open exchanges between scientists and members of various groups, particularly stakeholder groups that rely on the ecosystems being studied. Staff at the LTERs, as well as the scientists, would apply gains in PES learning theory and practice, ultimately expanding PES beyond the activities of individual scientists by scaling up to long-term, multi-institution scientific initiatives. In addition, a social science research component was included in the project as a means to expand the collaboration and provide insights to Harvard Forest and Hubbard Brook, as well as for them to help build on the existing body of literature with regard to PES.

For purposes of the evaluation, the project contained three goals that were tied to five questions, listed below. Some project and evaluation activities were tied directly into answering the evaluation questions, while other activities had a more indirect, though no less related, connection. Additionally, as the project progressed, new project activities and work arose as a result of the relationship building and communication involved, which lead to new evaluation activities. These activities became both part of the project and outcomes of the project, demonstrating the effectiveness of the project’s attempts to embed PES into the two institutions.

Project Goals	Evaluation Questions
<ol style="list-style-type: none"> 1. To build knowledge about the mutual learning that takes place among stakeholders and scientists in face-to-face engagement settings. 2. To build knowledge about scientists’ and stakeholders’ views of PES (attitudes and efficacy) and how these might change over time with PES experiences. 3. To produce evidence-based PES practices, strategies, and resources for long-term ecological research programs. 	<ol style="list-style-type: none"> 1. To what extent does PES@LTERs build knowledge about the learning that takes place among adult stakeholders and scientists in face-to-face engagement settings? 2. To what extent does PES@LTERs build knowledge about how scientists’ and stakeholders’ views of PES (attitudes and efficacy) change with individual and progressive PES experiences? 3. To what extent does PES@LTERs produce evidence-based PES practices, strategies, and resources that support mutual learning between ecosystem scientists and stakeholders? <p><i>Culminating Focus Questions:</i></p> <ol style="list-style-type: none"> 4. To what extent did using a collaborative model strengthen PES at the institutional level?

Project Goals	Evaluation Questions
	5. What lessons were learned and what benefits were provided by including a social science research component to the project?

This report summarizes the evaluation activities and key finds across all three years of the PES at LTERs project. The first section describes the major evaluation activities that occurred each year of the project, including the evaluation purpose and program and/or evaluation shifts, as appropriate. Rather than discuss findings from activities individually, they are grouped together by themes and connected to the evaluation questions in a way that allows for a deeper understanding of the results in the section that follows, Outcomes and Key Findings.

Evaluation Activities

Year 1

During Year 1, RMC’s activities focused on the following areas with the primary goal of collecting baseline data.

Regular meetings: RMC held regular, monthly discussions with key project staff on the Leadership team to gain insights into current project activities and to share observations and any other information that can be put to immediate use. These discussions allowed for a running documentation of changes in participant knowledge and behavior regarding embedded PES at the two LTER sites, and they enabled evaluators to document unanticipated shifts in project plans (staffing changes, schedule changes, etc.) and account for resulting changes in evaluation activities.

Leadership team survey: Members of the leadership team at Harvard Forest and Hubbard Brook were given an online survey in spring 2018 to obtain a baseline understanding of what PES currently looks like at their respective institutions and to collect information on what they hope to see change over the course of the project.

Hubbard Brook Advisory Council Roundtable survey: In May 2018, Hubbard Brook held a Roundtable event with stakeholders and scientists. As well as this being a specific PES activity and a chance for dialogue between the two groups, the Roundtable focused on helping Hubbard Brook choose a topic to focus their synthesis product development on. It also provided an introduction to the Advisory Council concept to stakeholder participants and provided them with background Hubbard Brook science. Survey data on the usefulness of the format for the purpose, changes in knowledge, and satisfaction/comfort with the dialogue process was collected from all stakeholders and one scientist.

Workshop/joint meeting survey: In April 2018, Harvard Forest and Hubbard Brook held a joint meeting and PES training session for scientists. Survey data was collected from participants to gauge their excitement and interest in participating in the PES project, increases in knowledge, and sense of collaboration between the two institutions.

Speaker’s bureau survey: RMC designed a brief survey that could be handed out by Harvard Forest and Hubbard Brook presenters at the end of speaking engagements. The six-question survey was intended to gain feedback on the quality and usefulness of presentations in order to provide feedback both to speakers and the institutions.

Scientist survey: RMC had planned to survey the core scientist team to learn their initial thoughts about what PES is, their confidence and interest in engaging with the public, and how/if engagement has

affected their work. In order not to overwhelm participants, evaluation questions were added to the larger survey conducted by the social scientist working with the project. Unfortunately, this method did not provide the needed results. Since evaluation questions were primarily open-ended, respondents tended to skip them, probably due to overall survey length. As a result, baseline data from the core scientists is not available. RMC instead collected retrospective interview data as a way to capture change over time (see Year 3).

Year 2

Year 2 evaluation activities built on the baseline data collection while expanding to include additional sources of data.

Regular Meetings. RMC held regular, monthly discussions with key project staff on the Leadership team to gain insights into current project activities and to share observations and any other information that can be put to immediate use. These discussions allowed for a running documentation of changes in participant knowledge and behavior regarding embedded PES at the two LTER sites, and they enabled evaluators to document unanticipated shifts in project activities and adjust or adapt evaluation activities immediately. For example, the evaluators used the regular meetings to report on data received, brainstorm ways to increase response rates, and redirect evaluation efforts to match project activities. The meetings also served as a means for evaluators to capture unanticipated outcomes. For example, evaluators learned about a spin-off roundtable being planned by a scientist and the evaluators created a survey and conducted an impromptu interview with the scientist to collect additional data.

Evaluation Retreat and Logic Model Revision. RMC co-planned and hosted an in-person retreat with key project staff in April 2019 to review the project activities to date, review evaluation data collection, and identify gaps and needs. RMC worked with the project staff to revise and better align the logic model with current project activities and to plan additional evaluation activities through Year 3. The meeting and resulting logic model also served as a springboard for prioritizing and setting timelines for specific data collection activities to inform anticipated outcomes.

Pests and Pathogens Roundtable Survey and Follow-up Scientist Interview. In February 2019, a Hubbard Brook scientist used a roundtable format to conduct a meeting on Pests and Pathogens. RMC designed, collected and analyzed a survey on usefulness of the meeting format, comfort in sharing thoughts and opinions, level of participation, increase in knowledge about the subject, what they will use the information for, and other topics of interest. In March 2019, RMC conducted an interview with the scientist to learn more about the catalyst for the meeting, goals for using a roundtable format, PES activities the scientist participated in, value of the roundtable in engaging the public and informing science, perceptions of changed in culture, and ways Hubbard Brook can foster PES in their work.

Joint Hubbard Brook—Harvard Forest Incubator Meeting Survey. Hubbard Brook and Harvard Forest held a joint meeting in March 2019. RMC designed, collected and analyzed a survey to gauge participants' perception on PES, changes in opinions, shifts in thinking about PES, how the meeting format impacted a sense of collaboration, learn what participants liked about the meeting, learn what participants need to improve PES knowledge and skills, and what they suggest for improving future joint meetings.

Hubbard Brook Committee of Scientists (and Stakeholders) Observation and Survey. In July 2019 Hubbard Brook held a Committee of Scientists workshop on Ecological and Community Resilience in the White Mountains and for the first time, invited members of the Hubbard Brook Advisory Council. The workshop was designed to share patterns in Hubbard Brook data and other sources across the region about forest resiliency and the potential links to communities, to facilitate cross-perspective sharing and generate collective thinking, and to generate actionable knowledge about resilience. The organizer

strategically assigned seating and planned a mix of presenters to engage scientists with stakeholders. RMC attended the meeting to observe and designed/collected/analyzed a survey to determine the extent to which participants felt the format of the workshop was useful for its purpose, added to their understanding of others' views, felt comfortable sharing thoughts and ideas, felt engaged in the discussion, built networking opportunities, and to gather perspectives about the benefits and challenges of a format that includes stakeholders and scientists.

Forest Science E-Newsletter Survey. RMC developed a Forest Science News subscriber survey to collect end-user information on affiliation; educational background; quality of the newsletter; frequency of clicks to full articles; quality of articles; extent to which it increased awareness and knowledge, was easy to understand, and draws interest; and, suggestions for improvement.

New England Landscape Futures (NELF) Design Feedback Meeting Observation and Survey. Harvard Forest held a NELF web tool beta test and demonstration in November 2018 to obtain feedback from Regional Conservation Partnership leaders on existing features, what features and resources they think they'd need in order to use the tool in their work and to gather general input. The format of the meeting allowed for participants to explore the story map and web tool and participate in a guided exercise to solicit discussions and questions. RMC observed the meeting and designed, collected and analyzed surveys on what participants learned, their level of engagement, usefulness to their work and how it might be useful in other areas, and suggestions for how to make the tool more useful for engaging the public in conversations about land use.

NELF Train-the-Trainer Survey. Harvard Forest finalized the test version of the NELF explorer and conducted several train the trainer sessions. In an effort to collect data about how NELF presenters felt each training went and to guide them toward asking participants to complete the embedded NELF explorer survey, RMC developed the NELF Explorer Presenter Instructions and Survey. This was intended to be used by all NELF trainers, each time they conducted a training. The presenter survey sought to gather the presenter perspective on the audience's level of prior knowledge, how much they learned, level of engagement, presenters' level of comfort communicating, and sense of how the audience might use the NELF explorer.

NELF End-User Survey. RMC worked with the Harvard Forest NELF engagement coordinator to develop and embed a survey into the NELF tool for end-users. The survey collected information on a voluntary basis from anyone using it to learn their affiliation, frequency of use, how much they learned, how engaging/fun/informative the explorer is, how it might be used, who they would recommend it to, suggestions for making it more useful for engaging the public, and about NELF features and to request what might be added to the tool.

Year 3

In Year 3, in addition to the data collection begun in prior years, the evaluation shifted toward focusing on "bigger picture" questions, specifically Evaluation Questions 4 and 5. Due to COVID-19, some originally planned activities had to be cancelled.

Regular Meetings. RMC continued to hold regular, monthly discussions with key project staff on the Leadership team to gain insights into current project activities and to share observations. In addition to discussions of project activities, discussions allowed for an exchange of ideas around how the project shifted and grown over the course of the three years, as well as conversations about the nature of institutional change.

Stakeholder Interviews. Toward the end of Year 2, RMC developed an interview protocol for Hubbard Brook and Harvard Forest stakeholders and worked with key Leadership staff to identify interviewees

(five from each institution). Interviews took place during the third year and focused on gathering information regarding stakeholders' increases in knowledge about mutual learning, change in opinions regarding PES, and suggestions they had to improve outreach and engagement.

Key Staff and Scientist Surveys and Interviews. A brief written survey and in-depth interviews were conducted with key project staff members (including scientists) at both Harvard Forest and Hubbard Brook to gain a retrospective picture of the project. Participants included three staff from Hubbard Brook, two from Harvard Forest, and the social scientist team member. The interview protocols varied depending the staff member's role, but they were designed to collect information on how/if the project changed PES at each institution or changed the way people thought about PES, how additional work in this area could benefit from this project's findings and learnings, and the value of the social science research component being included in this project and potentially others like it.

Outcomes and Key Findings

Key findings from the three years are discussed below, organized by theme. When appropriate, findings are broken down by specific institution, and references are provided to relevant project outcomes. In projects like this with multiple moving parts and a lot of "behind the scenes" work, results of that work are often nuanced and by nature can be difficult to quantify or categorize. When possible, findings are presented in a way to minimize redundancy.

Outcomes
1. Knowledge about the mutual learning that takes place among scientists and stakeholders as a result of face-to-face PES experiences will increase.
2. Knowledge about how scientist and stakeholder views of PES change over time as a result of PES experiences will increase.
3. Harvard Forest and Hubbard Brook will produce practices, strategies, and resources that support mutual learning between stakeholders and scientists.
4. The collaborative model used by Harvard Forest and Hubbard Brook will strengthen PES at the institutional level.
5. The addition of a social science research component will benefit the overall project and provide lessons for future research.

Finding 1: Hubbard Brook and Harvard Forest increased knowledge about mutual learning through the development of practices, strategies, and resources tailored to their individual institutions.

Hubbard Brook

Hubbard Brook scientists view the roundtable process as a tangible method for engaging the public, but are also seeking new methods of engagement (OUTCOMES 1, 3, 4). In February 2019, a forest ecologist with Hubbard Brook hosted a roundtable on Pests and Pathogens to increase public awareness around what is a sensitive topic for the forest products industry. The scientist noted that there was increased pressure on scientists to demonstrate research relevance in order to obtain funding. It had become necessary for scientists to make the connection between science and all aspects of life clearer, which was at odds with the basic mission of NSF funding, but the roundtables were one way to address the issue.

In March 2020, Hubbard Brook convened a stakeholder symposium related to the Ice Storm Experiment as an alternate method of face-to-face engagement. The event hosted 51 stakeholders and 4 scientists, and targeted professionals from state agencies, woodlot owners, electric utility operators, arborists, weather observers, and journalists. Following a panel of scientist presentations, Hubbard Brook moderated a discussion session.

Scientist involvement in PES activities remains highly individual and project-dependent. Some studies don't readily lend themselves as easily to public engagement, and some scientists are simply not interested or do not feel confident enough to engage with the public using a face-to-face setting or format. Recognizing that that a key aspect of engagement is linking activities with end content, Hubbard Brook has begun the process of synthesizing research to distribute. Two reports—a climate change synthesis study and a research brief summarizing the results of the Hubbard Brook Ice Storm Experiment—have so far been distributed directly to stakeholders who have participated in face-to-face dialogue events, with the intention of broader distribution across participants' networks.

Understanding of the roundtable best practices to foster mutual learning that takes place among participants is increasing (OUTCOME 1). The roundtable format appears to work best when the

“Great to mix grounded perspectives with science and in turn give us non-scientists a deeper window into the science that happens here.”

discussion is focused on a specific topic that's highly relevant and understood by participants. For example, participants at the Pests and Pathogens Roundtable represented a range of backgrounds where all people were familiar with the topic, but not necessarily in agreement about what needed to be done. By giving people who had differing viewpoints a narrowly focused topic and the opportunity to speak and discuss, along with a presentation

of the science, common ground was able to be found. The scientist host noted he thought the roundtable format made this possible, but involving a larger group of participants would probably have been detrimental. Participants at the Pest and Pathogens Roundtable felt strongly that the format was useful for guiding the discussion, and it allowed them to share their opinions and issues with the scientists. The same sentiments were shared by those who participated in the July resilience COS workshop. Some participants also pointed to some challenges related to finding common ground/agreement about terminology and approaches to science, uneven background understanding and use of jargon, managing group dynamics.

Additionally, the roundtable process utilized by the PES at LTERs project includes a feedback loop, and this is appreciated by participants (OUTCOMES 1, 4). For example, participants from the Advisory Council Roundtable during the first year of the project expressed interest in the social science side of resilience. By the second year, the Hubbard Brook Committee of Scientists meeting included Advisory Council guests and a presentation of initial research about the links between ecological and community resilience in Northern New Hampshire. Participants expressed that seeing this direct connection made them feel that they and their time were valued, and they were more likely to continue to participate in the process.

“I think it's important to break down silos and allow [scientists and stakeholders] to meet and understand what drives the other, and what they are passionate about. Provides checks and balances and a more nuanced discussion.”

Harvard Forest

Harvard Forest completed beta testing of the New England Landscape Futures Explorer (NELF Explorer), and began training on its use by employing mutual learning through interactivity and engagement

“[the tool will be useful for] engaging our audiences (municipal officials and conservation oriented citizens) in ‘what if’ and how local decisions will guide future outcomes.”

(OUTCOMES 1, 3). At the November 2018 interactive tool beta testing and outreach workshops at the 2018 Regional Conservation Partnerships Network Gathering, beta testing participants completed a survey on their initial impressions of the NELF Explorer. Eighty-three percent (83%) of the respondents described the NELF Explorer as very engaging and 67% said it would be very useful in their work.

Participants who have undertaken training on the NELF Explorer tool have responded positively, with 60% saying the training made them feel extremely or adequately prepared to lead future NELF Explorer workshops. Respondents enjoyed the session and the scenarios presented, but also mentioned they would like more follow-up assistance as well (e.g., cheat sheets, sample agendas). Harvard Forest since posted online a “How to” video about the NELF Explorer and an FAQ. See below for additional updates on the expanded training and discussion surrounding the NELF Explorer.

Initial feedback from users of the NELF Explorer has been very positive and has included specific suggestions for both improving its usefulness and how to reach audiences who would be interested in using it. Online surveys data has found that 63% of users report they learned either “a lot” or “some” by using the NELF Explorer. Additionally, 88% reported that the NELF Explorer was engaging, and 88% reported it was fun to use. 100% of respondents described the NELF Explorer as “extremely useful” or “very useful” in their work. All respondents reported that they would recommend the NELF Explorer to others.

The NELF Explorer work has opened new channels for Harvard Forest to learn about stakeholder needs through active engagement with the tool, and Harvard Forest is working on producing strategies and resources to meet them (OUTCOMES 1, 3). Over the past year, Harvard Forest has taken advantage of new communication channels and dedicated engagement staff to the task of connecting scientists with stakeholder needs for information. Much of this work has come out of avenues opened by the NELF Explorer work, including NELF monthly chats, the NELF working groups, and general feedback from the community of NELF Explorer users.

Finding 2: The culture of PES at both institution was already strong, but participation in the PES at LTERs project strengthened it.

Project leadership generally agreed that their respective LTER sites placed a lot of importance on public engagement activities. But while public engagement and communication were “built-in” to the institutions at varying levels, there was room for improvement. For example, two respondents indicated it was part of their sites’ founding. One noted strong public education programs and tours, and another noted that activity was high. That said, only member of the project leadership team thought their institution provided “a lot” of opportunities for scientists to engage with stakeholders and other members of the public, while the others indicated only “some” opportunities. The same trend was found with regard to the question of how many scientists regularly participated in public engagement activities. One project staff member pointed out that while the opportunities are available, the scientists have to want to participate, and not everyone does for a variety of reasons.

“Our way of engaging stakeholders has more strategy.”

With regard to the PES at LTERs project, most project leadership staff felt participation resulted in positive changes at their respective institutions, even if it was just the opportunity to share work.

Three of the interviewed staff specifically noted a

positive change in terms of developing a more strategic approach to engagement, and two others pointed to a change in terms of increased understanding of the value of public engagement as a research-based element. Overall, project leadership also felt the PES at LTERs project had produced at least a slight positive change in the number of scientists participating in PES.

PES activities and resources at Hubbard Brook and Harvard Forest were produced as planned and helped scientists and stakeholders engage in PES activities to foster mutual learning. (OUTCOMES 1, 2, 3). At Hubbard Brook, a resilience synthesis project was co-designed with the Hubbard Brook Advisory Council and included a group of stakeholder advisors representing networks in economic and community development, conservation, outdoor recreation, natural resource management, state and federal policy, and local neighborhoods. Throughout the three years, data collection included multiple partners, such as The Nature Conservancy and the NH Department of Health and Human Services, as well as outreach in the form of community interviews. In July 2019, Hubbard Brook reported on the project’s progress during a full-day workshop at the quarterly Hubbard Brook Committee of Scientists meeting, which drew 67 participants, including: PIs, graduate students, stakeholder advisors, and natural resource managers. In May 2020, Hubbard Brook presented an online follow-up presentation to share results with stakeholders.

“There is more recognition of public engagement as a professional pursuit with a body of research and knowledge behind it. It was seen as an aside before.”

Hubbard Brook has also continued to send the Forest Science News e-newsletter, as well as the monthly internal e-newsletter, and is involving the Advisory Council in institutional activities where appropriate, e.g. the 2019 Committee of Scientists meeting. Additionally, Hubbard Brook invited members of the Advisory Council to a joint workshop as part of their annual Committee of Scientists meeting in July 2019. Scientists and stakeholders reported that the joint workshop was useful for generating research ideas and/or advancing actionable science and provided them with a useful networking opportunity. Several people commented that they would like more opportunities for scientists and stakeholders to talk to each other, and they saw benefits in face to face/mixed group discussions with regard to impacts for research and for breaking down barriers between scientists and non-scientists.

In addition to maintaining their Communications Working Group and the Wildlands and Woodlands Initiative, Harvard Forest finished beta-testing the NELF Explorer and increased and expanded trainings on its use. To increase audience reach, Harvard Forest created a NELF Explorer YouTube channel and developed four video tutorials to help participants understand how to use the tool. Harvard Forest also launched five NELF Explorer Working Groups to apply the NELF Explorer to advance conservation planning, communication, and education about the future of the land in New England. Finally, in April 2019, Harvard Forest instituted a monthly “NELF Chat” online meeting to discuss the intersection between responses to the COVID-19 pandemic, land conservation in New England, and scenario planning.

“My understanding [of the science] has increased dramatically...being in a room with the scientists for hours and getting to ask questions has really increased my understanding of their work, especially the current research.”

In interviews with stakeholders at both institutions, the majority reported that their understanding about the science/research conducted at Hubbard Brook or Harvard Forest had increased or changed for the better through participation in planned events and activities, and the institutions’ efforts to increase public engagement with science had been positive and that it mutually benefited both themselves and the scientists.

The planned synthesis and PES embedding activities created new opportunities for mutual learning as well. As a direct result of the PES@LTERs work, both Hubbard Brook and Harvard Forest are finding additional ways to engage stakeholders with learning opportunities and resources (OUTCOMES 3, 4). For example, two spin-off projects were initiated at Hubbard Brook: A citizen’s science project on sugar maple regeneration with the Society for the Protection of New Hampshire Forests, and a Sugar Maple Science Café. These projects are direct outcomes of the interactions and relationships developed through the resiliency roundtable events and the level of responsiveness of the project leadership. A stakeholder advisory board member concerned with the lack of maple regeneration in some watershed areas was able to connect with scientists at the roundtable meetings and develop a pilot project. At

“I think it’s cemented a challenge that exists between the metrics by which scientist have to work, in the discipline and the training you’re provided versus what the public-facing expectations look like. It’s a tension - good to be up front about it.”

“We’re realizing that future funding for science depends upon our demonstrated relevance [and how this research] is going to benefit the American people. We have to make it clearer.”

Harvard Forest, in response to feedback about the NELF Explorer, Harvard Forest created a NELF “how to” video, an FAQ, and a YouTube channel. Harvard Forest also established a NELF Explorer Visioning working group to learn from NELF Explorer feedback provided by users, and to develop a strategic plan for the future of the NELF Explorer, including scoping new modules and enhancements, which would be developed via new rounds of co-production, in

response to requests by NELF Explorer users.

One result of this intentional and repeated engagement is that stakeholders at Hubbard Brook and Harvard Forest consider their participation to be a positive experience and are invested in continuing to find opportunities for mutual learning. They believe that the culture of engagement at each institution has been changing for the better (OUTCOMES 1, 2, 3). Many of the stakeholders at both institutions have a science background themselves and understand the challenges related to engaging non-scientists with basic (non-applied) research and the research process. While most indicated they already felt skilled and comfortable engaging with scientists prior to their involvement due to their backgrounds, a couple suggested that they had become more so since engaging with scientists about their work.

“It’s vital in both directions for informing good policy [for stakeholders] and for scientists to understand the types of questions we have and the way their work is interpreted by the community outside of the small group they tend to work with.”

Seventy percent (70%) of the stakeholders interviewed indicated that their feelings toward public engagement with science had changed in a positive direction as a result of the work with Harvard Forest

“It’s been a wonderful process. I appreciated having the chance to build partnerships with smart scientists. I’ve seen a lot of willingness from scientists to understand the questions my organization is trying to answer and how they might provide data. Exciting partnership.”

and Hubbard Brook. Overall, the majority feels Hubbard Brook and Harvard Forest respect their time and ideas and should be commended for their current attempts. They hope this work is continued in the future.

In interviews, stakeholders provided the following suggestions to further public engagement efforts. Suggestions are broken down by the institution they were made for.

Harvard Forest: do more public tours, remain accessible; maintain focus on application/practicality or focus communication that way; turn clear conclusions from scenarios into policy papers (with highly direct language when there is a clear conclusion); and target specific populations (e.g. legislators).

Hubbard Brook: find meaningful opportunities in-between in-person meetings; ask for feedback during the formative stage (not just after the concept has already been worked out or for feedback); keep engagement genuine and meaningful; continue sharing and connecting across scientists; directly engage policy makers; find and train skilled communicators.

Project leadership generally felt their PES activities were aligned with their key stakeholders, with policymakers/policy advisors and natural resource professionals, science educators, and local community members considered to be most important to their outreach.

Scientists at both Hubbard Brook (63%) and Harvard Forest (36%) have reported noticing a shift in their opinions about PES over the past year as well (OUTCOMES 2, 4) based on survey data collected at the March 2019 Joint Incubator Meeting. Hubbard Brook scientists are more likely to say the shift is due to participation in PES activities. At Harvard Forest, they are more likely to attribute the shift to changes in institutional philosophy, specific PES trainings, or activities across sites. The difference in attribution between the two sites makes sense given where the two institutions began in their PES work and outreach.

“Conflicts can occur between science and outreach because there is often uncertainty in science, making it difficult to make definitive statements that can be easily digestible to the public.”

Finding 3: Collaboration was a positive experience, but it must be done thoughtfully.

The cross-institutional meetings and workshops that are a part of the PES@LTERs project were an important resource. They are valued by scientists at both Hubbard Brook and Harvard Forest and result in increased understanding of PES as well as opportunities for networking and collaboration (OUTCOMES 1, 2, 3, 4). Scientists at both institutions overwhelmingly reported that the workshops and presentations at the March 2019 Incubator Meeting provided them with a better understanding of public engagement with science and will add value to their work. Multiple respondents commented that they would like additional opportunities to have cross-site discussions and activities. The scientists are also interested in additional engagement opportunities, but would also like to see more training provided as well as opportunities to practice their skills. Some respondents suggested scientists may be reluctant to participate in engagement activities because they are unsure if they do it well.

All of the above underlines how engagement leads to additional collaboration, providing new opportunities for Hubbard Brook and Harvard Forest to share their strategies for fostering mutual learning and engagement, thereby affirming their institutional commitment to PES. (OUTCOMES 3, 4). At Hubbard Brook, the citizen science project on sugar maple regeneration with the Society for the Protection of New Hampshire Forests, a direct outcome of the PES at LTER project work, is one example. At Harvard Forest, the new Communications Working Group, established with Highstead to facilitate embedding PES activities and practices, is another. Additionally, project leaders are meeting with advisors from other LTER sites to share progress and learn about the research being conducted at the other institutions, such as the Kellogg Biological Station in Michigan and the HJ Andrews LTER site in Oregon.

The success of the collaboration between Harvard Forest and Hubbard Brook varied depending on staff role in the project, but some key lessons were learned for future work. (OUTCOME 4). Overall, project leadership found value in the cross-site collaboration. The biggest contributor to that was generally agreed to be the sharing that occurred during joint meetings. In particular, the scientists liked the fact that there were two sites involved, which provided them with an opportunity to interact with their peers at other sites, and to interact on a topic that was not just their own research. They also appreciated the chance to learn about how other research sites were organized and conducted business. Project staff noted that learning how other sites operate allowed them to expand their own work as they discovered new methods and approaches. One member of the leadership team, however, pointed out that their role didn't involve them beyond the joint meetings. Another echoed that sentiment, saying that while they enjoyed getting together with colleagues, they questioned how the collaboration materialized beyond the joint meetings since they were not involved. A lack of collaboration between the sites with regard to their on-going projects was mentioned as well.

Several key lessons emerged from the collaboration:

- Collaboration itself is a large lift and logistical challenge. Time must be built into a project like this to intentionally allow for it to happen. Creating working groups is helpful, but cross-pollination of ideas does not just naturally happen. Intentionality is key. Similarly, opportunities for collaboration require a lot of work, so they should be created mindfully, balancing frequency with formality.
- Every site operates differently, and so a “one size fits all” approach or model for public engagement won't work. Each site has to be allowed to build on its existing structures.
- Having the public involved throughout the research cycle is a worthwhile goal, but it does not necessarily fit the way science works or what scientists need and want. Scientists prefer to do their work and then share out, which should be kept in mind when planning PES activities.
- With collaboration you have to constantly expand your horizons. Science is a community process and you have to see what others are doing.
- Dissemination and follow-up are crucial to creating engagement. Funding is helpful for making this a reality.

Finding 4: Partnering with a social scientist benefitted both the research and practice of PES.

The addition of the social science research component strengthened the project and changed how key staff thought about PES in positive ways (OUTCOME 5). All but one of the project leadership team remarked that including a social science research component positively impacted how they think about

“I learned that the goals for engagement for science aren’t often articulated. So now I ground it in theory of planned behavior by incorporating it into my work.”

PES. Responses indicated that team members began thinking about PES in more scientific and structured ways, and that their views on how to approach it expanded. On the leadership team survey, one respondent noted, “The big important change is that the engagement is of higher quality now – it is more strategic and we have more of a capacity to follow

through and link engagement events rather than having one-off events. I also think that we are building institutional relationships with stakeholders, which we weren’t able to do before.”

Participation also influenced the views of the social science researcher, and contributed to his broader work. He raised the issue of the essentialness of social science for evidence-based science communication effectiveness, and that it requires research measurement from a social science lens. But collecting that data can be challenging, in part because it takes time to convince scientists that it’s worth the effort to represent and communicate science well. Additionally, he had the opportunity to observe firsthand the crucial role that a strong, involved engagement staff have on whether scientists are interested and involved in outreach work.

Some of the issues project staff encountered with the social science collaboration were similar to the cross-site collaboration challenges. That is, the structure of the social science work and the PES at LTERs project goals didn’t always align, which limited the ability to see change on the social science survey. Collaboration would have benefitted from being more intentional so that practitioners, scientists, and the researchers involved started with a common understanding. This understanding did build over time, but an intentional collaboration structure would have helped initially.

Finding 5: Institutions that want to do PES well must build it into their internal capacity.

When asked about the factors that contribute to advancing public engagement at their respective research sites, project leadership gave a variety of responses, all of which pointed to the necessity of having key staff focused on that mission. Staff specifically identified needing the capacity to build infrastructure (e.g., being able to build opportunities to act on dialogue and share it), as well as building and maintaining relationships and networks—among the scientists, with various stakeholders, and with similar research sites. The science leadership staff expanded on this theme, pointing out that they are already spread thin with their other responsibilities, and that having professional engagement staff to guide them makes a huge difference.

“This project has given us the space to take these dialogues and understand more and produce materials to be supportive of scientists and stakeholders.”

Over the course of the PES at LTERs project, several leadership team members felt that their roles and perspectives shifted as they learned more about how engagement built (or did not build) at their institutions. Related to the above point, one team member mentioned that they thought building institutional capacity would allow individual scientists to take more initiative in their own involvement. Instead, the project taught them that the scientists need to rely on the engagement staff to provide opportunities. Another team member shifted from thinking that the project would help scientists become better at communication to becoming invested in finding additional ways to enhance existing communication. The loss of a key project staff member at Harvard Forest also resulted in shifting responsibilities that were challenging to deal with.

Recommendations and Reflections

Encouraging scientists to be involved in public engagement work requires multiple tactics and flexibility. Most scientists reported they had received training in PES practices and activities, but they would have appreciated more opportunities for coaching, feedback, or examples to become confident and participate more. Other scientists may not participate due to a sense that their research focus doesn't lend itself to PES. Scientists may also benefit from examples of small shifts they can make at various levels of research, such as creating a simple assessment survey, learning who their stakeholders are, adjusting presentation agendas to include time for discussion, reducing jargon, or creating research study highlight documents that are understood by the general public, legislators, and journalists. Scientists' time, however, is a crucial factor in whether they are interested in participating in PES. It is generally unrealistic to expect scientists to organize their own PES activities (see also below about staffing). In addition, the nature of PES activities must reflect the institutions goals and mission. There is probably not a general approach to PES that will fit every institution or every scientist, and building on existing structures, aptitudes, and interests will help make activities a success.

Stakeholders want to be involved in the scientific process, and they are most engaged when they see that their feedback and information is valued. Most stakeholders at institutions like Harvard Forest or Hubbard Brook are science savvy, even if they are not scientists themselves. They respect the work that scientists do, but they also have a strong sense of knowing when their participation in science events is perfunctory and when they are being meaningfully engaged. Methods to engage stakeholders should be diverse and reflective of institutional goals, as well as stakeholder interests (e.g., Hubbard Brook's Advisory Council or the NELF Explorer Working Groups), but the key is to maintain a core group who can see a through-line of how their participation results in real dialogue or actions at their respective institutions. In addition working with stable groups helps tackle some of the group dynamic challenges inevitable in this type of work. The more often and longer the stakeholders are at the table, the more likely they will participate, understand the jargon, build their understanding of the science, and use the information and tools available to them.

Cross-institution collaboration is time-consuming, but scientists appreciate the exchange of ideas and knowledge. Scientists reported that the opportunity for structured conversation and collaboration across Harvard Forest and Hubbard Brook was at least as important to them as were any formal PES trainings. That said, project leadership acknowledged that collaboration and planning was a time-consuming effort. Overall, the benefits to a project like this probably outweighed the costs, but adequate time and resources need to be available and structures should be put into place to ensure that collaboration is purposeful and that the correct people are involved from the very beginning.

Institutional change is a long process and changes are incremental. Not only does this make data collection challenging, it means staff at Harvard Forest and Hubbard Brook will need to remain proactive in keeping a finger on the pulse of the scientists. Doing so will likely entail regularly collecting feedback from staff and scientists as to their needs and wants, as well as continuing to educate scientists about opportunities and resources at their disposal.

PES must be intentional, and to be successful, adequate resources, staffing, and follow-up must be devoted to it. Successful public engagement doesn't just happen. It must be strategic at the institutional level, and scientists must believe in the goals and have a say in how it is done and for what purpose. One-off events and brief activities may play a role in a larger embedding structure, but even those types of events are most successful when there is follow-through. Just as stakeholders are most engaged when they see results of their participation, scientists and staff benefit the most from PES when there are strategies in place to ensure that information continues to be disseminated on a regular basis. To

that end, it is necessary to have staff with the knowledge, skills, and capacity to embed and sustain PES within an institution.

PES research and practice can mutually support one another. By working directly with a social scientist and learning more about the research and theory behind public engagement, project leadership expanded and refined their views on how to think about PES. It seems likely that learning more about the research would also benefit scientists in general, influencing how they think about public engagement and reasons for participating in it (in much the same way that scientists reported that learning how other institutions did PES broadened their thinking). In reverse, the practical issues around implementing public engagement has the power to shape the questions researchers ask. As previously stated, however, collaboration can be challenging, and the lessons learned from this project will hopefully guide future work in this area.

Appendices

Appendix A

Revised Project Evaluation Logic Model

Project Goals	Evaluation Questions	Activities/Outputs	Outcomes*	Evidence/Data*
<p>1. To build knowledge about the mutual learning that takes place among stakeholders and scientists in face-to-face engagement settings.</p> <p>2. To build knowledge about scientists' and stakeholders' views of PES (attitudes and efficacy) and how these might change over time with PES experiences.</p> <p>3. To produce evidence-based PES practices, strategies, and resources for long-term ecological research programs.</p>	<p>1. To what extent does PES@LTERs build knowledge about the learning that takes place among adult stakeholders and scientists in face-to-face engagement settings?</p> <p>2. To what extent does PES@LTERs build knowledge about how scientists' and stakeholders' views of PES (attitudes and efficacy) change with individual and progressive PES experiences?</p> <p>3. To what extent does PES@LTERs produce evidence-based PES practices, strategies, and resources that support mutual learning between ecosystem scientists and stakeholders?</p> <p>4. To what extent did using a collaborative model strengthen PES at the institutional level?</p> <p>5. What lessons were learned and what benefits were provided by including a social science research component to the project?</p>	<p><i>Dialogue-based synthesis activities.</i></p> <p>Hubbard Brook:</p> <ul style="list-style-type: none"> • Dimensions of Resilience roundtable • 2 reports based on Resilience roundtable work <p>Harvard Forest:</p> <ul style="list-style-type: none"> • New England Landscape Futures (NELF) Explorer and story map • NELF outreach and trainings <p><i>PES-embedding activities.</i></p> <p>Hubbard Brook:</p> <ul style="list-style-type: none"> • PES workshops • Forest-science e-newsletter • HB Monthly internal newsletter • Stakeholder Advisory Council • Speaker's Bureau <p>Harvard Forest:</p> <ul style="list-style-type: none"> • PES workshops • Wildlands and Woodlands Initiative Working Group • Communications Working Group • NELF Explorer Visioning Working Group • NELF Explorer Workshops Working Group <p><i>Leadership collaboration activities.</i></p> <ul style="list-style-type: none"> • Joint Workshop and training planning • Social scientist collaboration with HB and HF • Meetings with project staff, researcher, and evaluators. 	<p>1. Knowledge about the mutual learning that takes place among scientists and stakeholders as a result of face-to-face PES experiences will increase.</p> <p>2. Knowledge about how scientist and stakeholder views of PES change over time as a result of PES experiences will increase.</p> <p>3. Harvard Forest and Hubbard Brook will produce practices, strategies, and resources that support mutual learning between stakeholders and scientists.</p> <p>4. The collaborative model used by Harvard Forest and Hubbard Brook will strengthen PES at the institutional level.</p> <p>5. The addition of a social science research component will benefit the overall project and provide lessons for future research.</p>	<p><i>Outcome 1</i></p> <ul style="list-style-type: none"> • Resilience Roundtable survey and observation • Scientist interviews • Stakeholder interviews • Project staff surveys/interviews • NELF surveys: beta testing, trainer, end user • Pests and Pathogens survey <p><i>Outcome 2</i></p> <ul style="list-style-type: none"> • Resilience Roundtable survey and observation • Scientist interviews • Stakeholder interviews • Project staff surveys/interviews • NELF trainer and user surveys <p><i>Outcome 3</i></p> <ul style="list-style-type: none"> • HB-Nature Conservancy spin-off project • Pests and Pathogens Roundtable • FSN e-newsletter + newsletter survey • Advisory Council (HB) and W&W and CWG (HF) <p><i>Outcome 4</i></p> <ul style="list-style-type: none"> • Project staff surveys/interviews • Workshop/joint meeting surveys <p><i>Outcome 5</i></p> <ul style="list-style-type: none"> • Project staff surveys/interviews

*NOTE: We make the distinction between the research project on scientists' behaviors and the evaluation of the project goals. Evaluation activities are primarily concerned with stakeholder outcomes in order to not duplicate results from the social science research.

Appendix B

Year 1 Measures and Summaries of Results

B1. Leadership Team Baseline Survey Highlights

B2. Hubbard Brook Advisory Council Roundtable Survey Summary

B3. Harvard Forest-Hubbard Brook Joint Meeting and Training Survey Results

Leadership Team Baseline Survey Highlights

Four members of the PES@LTERs Leadership Team completed a baseline survey to gauge what PES currently looks like at their respective institutions and to determine their what they hope to see over the course of the project.

Both institutions were equally represented with two respondents from Harvard Forest and two from Hubbard Brook.

What does public engagement with science currently look like at your institution?

- Respondents all agreed that there is interest in public engagement and that it is important.
- Three respondents noted that the science community need more specific information to do it well and systematically.
 - QUOTE: “People sometimes express hesitance to get involved in public outreach because they don’t feel confident that they know how to do it well.”

Connecting value and opportunity for PES on the institutional level with scientists’ and community’s level of interest.

- The value or importance of PES activities at the two institutions seem to vary. Two respondents reported that their institution places a lot of importance on PES activities, one gave it a four out of five, and the other reported it was somewhat important.
- Two respondents noted a lot of PES opportunities at their institution, one gave a four out of five and the other said their institution only provided a few.
- Two respondents reported that their institution’s PES efforts nearly matched scientists level of interest in PES by giving it a four out of five. The other two were neutral in their responses, giving it only a three. The same responses were given for the alignment between the institution’s efforts and the surrounding community’s level of interest in PES.
- Two respondents reported that scientists regularly engage in PES activities somewhere between a lot and a few, and the other two respondents reported that scientists only engage in a few.

PES Opportunities for Scientists.

- PES opportunities at each institution are robust and vary in terms of the level of commitment required for scientists to participate. For example, respondents noted multiple ways scientists can engage with the public about their work, ranging from newsletters to interactive policy exchanges. They also noted multiple audiences, from school children to policy makers.

Benefits of PES for the institution, scientists and public.

- All respondents specifically noted the value PES has in terms of building awareness and support for the research.
 - Quote: “Increased public visibility and support of science at these sites”
 - Quote: “Raise awareness of [institute] science.”
 - Quote: “Ability to write stronger grants and secure research”
 - Quote: “Improving PES at [institute] will increase the good will.”

- Three respondents also noted the value of PES for societal impact.
 - Quote: “More sharing of knowledge between basic research and decision-making regarding natural resources.”
 - Quote: “Its value and potential to inform environmental decision-making.”
 - Quote: “Ability to have greater societal impact.”

Collaboration between institutions.

- All respondents hope to gain a higher level of collaboration and communication and see the collaboration between the two institutes through PES as a path to get there.
 - Quote: “Greater collaboration between Hubbard Brook and Harvard Forest.”
 - Quote: “Extended impact of science through better communication and new/stronger relationships”
 - Quote: “...stronger long-term financial investment and stability for engagement programs.”
 - Quote: “I hope to learn new PES skills and techniques”

Challenges to PES participation.

- Time and competing demands were noted as potential challenges across three respondents.
 - Quote: “Time productive connections between scientists and stakeholders are not always intuitive.”
 - Quote: “Time, demands of soft-money position with multiple competing priorities...”
 - Quote: “...how to make PES accessible and enjoyable for scientists who are interested...but don’t have a lot of time to devote to PES.”

PES culture vision.

- All respondents hope PES becomes a natural element of the work (e.g., part of the research design, conversations among peers, component of the work), not an added activity.

HUBBARD BROOK ROUNDTABLE SURVEY - DIMENSIONS OF RESILIENCE

Please take about 5 – 10 minutes to complete this survey. The findings will inform future Hubbard Brook Roundtable programs. Please circle your responses. All responses will be reported in the aggregate; no individuals will be identified. Thank you.

	Very Useful				Not At All Useful
1. How useful was the Roundtable format for guiding discussion on resiliency in the Northern Forest?	5	4	3	2	1
	Very Comfortable				Not At All Comfortable
2. How comfortable did you feel sharing your thoughts and opinions?	5	4	3	2	1
	Yes Very Much				No, Not At All
3. Did you feel like you had a chance to fully participate in the Roundtable discussion?	5	4	3	2	1
	Yes, Very Much				No, Not At All
4. Did you feel like your points were acknowledged during the discussion?	5	4	3	2	1
	Yes, Very Much				No, Not At All
5. How prepared did you feel to engage in the discussion?	5	4	3	2	1
6. What would have helped you feel more prepared?					

-over-

	Yes, Very Much				No, Not At All
7. Did the Roundtable increase your knowledge or awareness of the opinions, issues, or concerns of various stakeholders?	5	4	3	2	1

8. What did you learn today that you could apply or incorporate into your life/work/etc.?

9. Share a few topics you would like to learn more about or follow up on.

	Yes, Very Much				No, Not At All
10. Did participating in the Roundtable affect your comfort level in talking about science-related issues with stakeholder groups?	5	4	3	2	1

	Very Satisfied				Not At All Satisfied
11. Overall, how satisfied are you with your participation in the Roundtable?	5	4	3	2	1

12. Do you have any suggestions for how to improve future Roundtable discussions?

13. Are there any additional comments you would like to share?

HUBBARD BROOK ROUNDTABLE SURVEY - DIMENSIONS OF RESILIENCE

Please take about 5 – 10 minutes to complete this survey. The findings will inform future Hubbard Brook Roundtable programs. Please circle your responses. All responses will be reported in the aggregate; no individuals will be identified. Thank you.

	Very Useful				Not At All Useful
1. How useful was the Roundtable format for developing your interest in the work of the Hubbard Brook Research Foundation?	5	4	3	2	1
	Very Useful				Not At All Useful
2. How useful was the Roundtable format for generating ideas about connections between Hubbard Brook science and stakeholder interests?	5	4	3	2	1
	Very Comfortable				Not At All Comfortable
3. How comfortable did you feel sharing your thoughts and opinions?	5	4	3	2	1
	Yes, Very Much				No, Not At All
4. Did you feel like you had a chance to fully participate in the Roundtable discussion?	5	4	3	2	1
	Yes, Very Much				No, Not At All
5. Did you feel like your points were acknowledged during the discussion?	5	4	3	2	1
	Yes, Very Much				No, Not At All
6. Did the Roundtable increase your knowledge or awareness of current ecological research?	5	4	3	2	1
	Yes, Very Much				No, Not At All
7. Do you feel like you had the opportunity to share issues that are important to you with environmental scientists?	5	4	3	2	1

-over-

8. What did you find most interesting about the day?

What do you want to learn more about?

	A Lot	Some	A Little	None	
10. How much prior experience do you have talking with scientists about resilience or other environmental topics?	4	3	2	1	
	1-5 Years	5-10 Years	10-15 Years	15-20 Years	20+ Years
11. How long have you lived in New England?	5	4	3	2	1
	Very Satisfied				Not At All Satisfied
12. Overall, how satisfied are you with your experience today?	5	4	3	2	1

13. What worked best about the Roundtable meeting format? What could be improved?

14. Are there any additional comments you would like to share?

PES at LTERs

Hubbard Brook Dimensions of Resilience Roundtable

Stakeholder Survey Summary

May, 2018

Fourteen community stakeholders completed the post-Roundtable survey. The majority of respondents (64%) had lived in New England for twenty or more years. Another 21% had lived in the area for 10-15 years. Two people had lived in the area fewer than ten years. Most respondents (71%) indicated they had “a lot” or “some” prior experience talking with scientists about environment topics. Only one person said they had none.

Unless otherwise noted, respondents rated their answers on a 5-point Likert scale from Very (5) to Not At All (1). When appropriate, responses to open-ended questions were grouped by theme. Not every respondent answered every open-ended question.

Question	Mean	Std. Deviation	Range
How useful was the Roundtable format for developing your interest in the work of the Hubbard Brook Research Foundation?	4.71	0.47	4-5
How useful was the Roundtable format for generating ideas about connections between Hubbard Brook science and stakeholder interests?	4.64	0.50	4-5
How comfortable did you feel sharing your thoughts and opinions?	4.71	0.47	4-5
Did you feel like you had a chance to fully participate in the Roundtable discussion?	4.933	0.28	4-5
Did you feel like your points were acknowledged during the discussion?	4.86	0.36	4-5
Did the Roundtable increase your knowledge or awareness of current ecosystem science?	4.57	0.65	3-5
Do you feel like you had the opportunity to share the issues that are important to you with environmental scientists?	4.64	0.50	4-5
Overall, how satisfied are you with your experience today?	4.93	0.28	4-5

What did you find most interesting about the day?

Sharing With Others/New Perspectives

Both hearing the perspectives of participants and learning more about the specifics of Hubbard Brook science

Getting to know participants and now each thought about residence

Great talent and diversity at the table

Interactions between folks with different specialties/backgrounds

The broad range of background/professional exp around the table

The different perspectives of all the participants

The diverse backgrounds at the table

The great mix of people

Discussing the Science

Implicit/explicit need to bring human dimensions/social science into ecological research

Resilience discussion; small group discussion

Resilience roundtable first thing in AM

The discussions

What do you want to learn more about?

Broad interest - just the mix of topics that people are considering/researching

Findings from HB research

Have to think about this

How non-Hubbard Brook scientists approach this issue of residence

The impact of tourism in the region

The outcomes

The research project at Hubbard

This study!

What worked best about the Roundtable meeting format? What could be improved?

Being in person

Great flow of the day; a little more direction/facilitation on small group (during Tad's group)

I find it helpful to understand the constraints/needs of the scientists when brainstorming.

I loved the exercise at the beginning of the day

Intro sequence

Mix of small group, large group, and opportunity to talk; after lunch walk

The focus that we were given

Voting was very informative. Some things much discussed drew narrower interest though I'd guess; and the reverse

Are there any additional comments you would like to share?

Great day, thank you!

Great work by Sarah and Anthea!

Welcome contacts discussion with any participants or related issues.

Well done

Harvard Forest – Hubbard Brook Joint Meeting and Training Survey Results

A total of twenty-two people responded to the survey. Since no statistically significant differences were found between respondents from Harvard Forest or Hubbard Brook, results from the groups were combined. Additionally, one respondent reported an affiliation with neither site. That person’s responses did not differ significantly either and were also included.

Participant Backgrounds

Site Affiliation	Involvement with PES Project			Total
	Core Science Team	Actively Involved	Not Involved	
Harvard Forest	1	3	5	9
Hubbard Brook	5	3	4	12
Other			1	1
Total	6	6	10	22

Close-ended Questions

Participants were asked to rate the following statements from on a scale from 1 (Not at all interested/excited) to 5 (It made me very interested/excited). Those who responded “not applicable” are not included in the results.

Question	Mean	Std. Deviation	Range	n
If you are not actively involved with the PES at LTER project, what (if any) effect did today’s meeting have on your interest in the project?	4.09	0.70	3-5	11
If you are actively involved in the PES at LTER project, what (if any) effect did today’s meeting have on your excitement about participating?	4.33	0.65	3-5	12

Participants were asked to rate the following statements from on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Those who responded “not applicable” are not included in the results.

Question	Mean	Std. Deviation	Range	n
Today's meeting helped build a sense of collaboration between Hubbard Brook and Harvard Forest.	4.00	0.67	3-5	23
Today's meeting will improve the synthesis project at my site.	3.79	0.92	2-5	19
Today's meeting helped me better understand public engagement with science.	4.29	0.62	3-5	24
Overall, I will be able to use what I learned from this meeting in my work.	4.12	0.74	3-5	24

Open-ended Questions

Responses are grouped by theme when appropriate.

With regard to engagement with science or your site's synthesis project, please describe one takeaway from your participation in this meeting.

Focus on Goals

- Define, identify your goal
- Focus goals on eventual outcomes, not intermediate tactics
- How can we envision justice goals fit with land conservation, which requires land and money?
- Identifying goals is an essential step
- Need to define realistic goals
- We need to define our goals and engagement identity.
- We need to focus and determine objectives, goals and target stakeholders
- To bring more intention to my interactions with the public in terms of identifying goals of interaction and pre-devising effective frameworks.

Building Public Engagement Skills

- Developing a rapport and warmth with public as scientists is an additional and important objective
- I learned how to better respond to questions.
- It takes lots of skills to effectively communicate science to the public

John Besley's Presentation

- John's talk about communication objectives is very relevant and applicable.
- John's talk*; AAA's talk
- John's theory!
- Need to better understand and apply Besley's work

Evaluation

- Plan how to evaluate effectiveness of engagement
- Skills for evaluating effectiveness of public engagement

Other

- It's difficult, but we do need to find ways to do
- That the basic framing of a project really needs to be adjusted - i.e., "resilience" may not be the best approach
- We have more work to do to focus on the project
- We need to do a better job of engaging a more diverse set of stakeholders

What about the day worked best for you?

Breakouts/Discussions

- Break out sessions were great
- Breakout groups
- Breakouts as "consultants" was great. Way better than typical breakouts.
- Discussion around collaboration
- Discussions
- Discussions around collaborative projects!
- I liked the breakout groups and thought it was productive
- I loved the breakout sessions
- Plenty of time for discussion

Presentations

- Hearing John and Tiffany's perspectives
- I liked John Besley's overview, and the breakout groups best.
- John Bentley's talk
- Presentations by Besley and Lawater
- The morning presentation

Other or Both

- All equally
- Both presentations and discussion
- I think the breakouts and John's training were particularly useful.
- Intro to communication; 2nd break out; importance of "authorization"
- Lots of time for informal engagements. Great colleagues. Great organization.
- Morning presentations and discussions
- That the meeting was just one day
- The format with short, focused talks and then practice applying the concepts after
- Varied frameworks kept it from being boring and allowed for engagement with different people

What suggestions do you have for improvements?

Time

- Either more time or more focused breakaway groups
- I wish there was more time for interaction with the other site (i.e. informal conversations)
- More interaction time that is unstructured
- More time
- More time to cover all the content

More/Less Structure

- Making sure there's structure to all of the breakout groups
- More clearly defined goals and questions in breakout groups
- Slightly less structure and more discussion periods
- The breakout groups were overly structured but somehow too vague at the same time. Not sure they used the expertise here effectively.

Other

- Better organization
- Clear objectives but I did like the way free thinking sent us to unlikely conversations
- For those of us not involved in any of the two projects, it took a while to get up to speed.
- I do still feel like I need help in sharing my research content in non-wonky ways
- Make sure working group understands project they are commenting on (give refresher slide)
- New projector to make it easier to see screen
- None
- Not necessarily an improvement, but a follow up workshop where collaborations and putting these ideas into effect in
- Ok
- Show some successful cases
- Would always be great to have more time for workshopping our projects together in person, but considering how hard it is to get people together I think the time was well used.

Additional comments

- Additional meetings with HF would be useful
- Great meeting, I appreciate the lunch and setting too!
- More prep for break out groups
- Nice job!
- Nice work - this is always challenging
- Our science are explicitly applied to ongoing projects
- Thank you!
- Thanks!

Appendix C

Year 2 Measures and Summaries of Results

C1. Hubbard Brook Pests and Pathogens Roundtable Survey Results

C2. Hubbard Brook Scientist Roundtable Interview Protocol

C3. NELF Explorer User Survey

C4. NELF Explorer User Survey Summary (Survey 1 and 2)

C5. NELF Explorer Train the Trainer Workshop Evaluation Results

C6. Forest Science News Subscriber Survey

C7. Forest Science News Subscriber Survey Results

C8. Hubbard Brook Committee of Scientists (and Stakeholders) Workshop Survey

C9. Hubbard Brook Committee of Scientists (and Stakeholders) Workshop Survey Summary

C10. Harvard Forest-Hubbard Brook Collaborations Incubator Survey

C11. Harvard Forest-Hubbard Brook Collaborations Incubator Survey Summary

PES at LTERs
Hubbard Brook Pests and Pathogens Roundtable
February, 2019

Stakeholder Survey Summary

Eleven community stakeholders completed the post-Roundtable survey. The majority of respondents (70%) had lived in New England for twenty or more years. Another 20% had lived in the area for 10-15 years, and one person reported living in the area fewer than ten years. Most respondents (64%) indicated they had “a lot” of prior experience talking with scientists about resilience or other environmental topics, while 36% indicated “some” experience.

Respondents rated their answers on a 5-point Likert scale from Very (5) to Not At All (1). When appropriate, responses to open-ended questions were grouped by theme. Not every respondent answered every open-ended question.

Question	Mean	Std. Deviation	Range
If applicable, how helpful was the pre-meeting conversation for setting the stage for the Roundtable discussion?	4.50	0.54	4-5
How useful was the Roundtable format for guiding productive discussion about forests pests and impacts?	4.82	0.41	4-5
How comfortable did you feel sharing your thoughts and opinions?	4.91	0.30	4-5
Did you feel like you had a chance to fully participate in the Roundtable discussion?	5.00	0.00	5-5
Did you feel like your points were acknowledged during the discussion?	5.00	0.00	5-5
Did the Roundtable increase your knowledge or awareness of current ecological research?	4.18	0.87	3-5
Do you feel like you had the opportunity to share the issues that are important to you with environmental scientists?	4.64	0.64	3-5
Overall, how satisfied are you with your experience today?	4.91	0.30	4-5

What did you learn today that you could incorporate into your life/work/etc.?

Communication

- A great learning opportunity! A great time of brainstorming and ideas.
- Create awareness of future questions for research/exploration.
- Good reminder to incorporate as many perspectives and knowledge bases into discussions as possible; strong framing of the overall challenge; opening by asking all to share a personal connection to the issue
- Importance of communication and outreach - possibly messaging
- The value of networking.

Science/Industry

- Deeper knowledge/appreciation of connections/complexity of forests/trees/industry/economics/public health and link to invasives.
- I learned a lot about the pallet industry.
- That trade and the flow of wood packaging is complex and not well understood

Share a few topics you would like to learn more about or follow-up on.

Pallets/Shipping

- Current flow of pallets through the industry and economy after they pass ports; technological innovation opportunities for inspection/screening, biotech/control, compliance...
- Pallet/shipping into USA as a vector for invasives.
- Part intercept and SWP data collected by CBP and APHIS
- Tech solutions for inspection, opportunities for disposal/control of pallets post-importation.
- Where do SWP end up after import?

Other

- Forest pests and climate change re vectors
- Knowledge gaps - we needed APHIS - PPQ there, and CBP too! A must - too many unknowns.
- The process of legislation, developing a compelling story

Do you have any suggestions for how to improve future Roundtable discussions?

- Broader representation from related government and industry.
- Knowledge gaps - we needed APHIS - PPQ there, and CBP too! A must - too many unknowns. Otherwise hard to improve. Also super lunch!
- Less small group discussion - you miss the larger discussion
- Among these types of meetings, this was very well designed, prepared, diversity of appropriate invitees, and clarity of goals. Good mix of presentations and brainstorming in small groups.
- Excellent organization and mix of people in the room.
- No

Are there any additional comments you would like to share?

- Enforcement/compliance viewpoint was absent.
- Kudos to the organizers!
- Thank you very much for the invitation.
- Very well done!

Scientist Survey Summary

Four scientists completed the post-Roundtable survey. As with the stakeholders, respondents rated their answers on a 5-point Likert scale from Very (5) to Not At All (1). Not every respondent answered every open-ended question.

Question	Mean	Std. Deviation	Range
How useful was the Roundtable format for guiding productive discussion about forests pests and impacts?	5.00	0.00	5-5
How comfortable did you feel sharing your thoughts and opinions?	4.75	0.50	4-5
Did you feel like you had a chance to fully participate in the Roundtable discussion?	5.00	0.00	5-5
Did you feel like your points were acknowledged during the discussion?	5.00	0.00	5-5
How prepared did you feel to engage in the discussion?	4.25	.50	4-5
Did the Roundtable increase your knowledge or awareness of the opinions, issues, or concerns of various stakeholders?	5.00	0.00	5-5
Did participating in the Roundtable affect your comfort level in talking about science-related issues with stakeholder groups?	3.75	1.89	1-5
Overall, how satisfied are you with your experience today?	4.75	0.50	4-5

What would have helped you feel more prepared?

- I'm not sure - I think the discussion went in a little different direction than I expected (but great!)
- Perhaps Gary's Publication could have been distributed before the discussions

What did you learn today that you could incorporate into your life/work/etc.?

- Incorporate ideas into teaching, generated research ideas to collaborate with social scientists.
- New insights on forest products industry
- Thinking about prevention as a direction for my next career steps (+policy).
- This issue has solution options that incorporate 3 parts of society and we need to inform consumers, private sectors and government to solve the problem.

Share a few topics you would like to learn more about or follow-up on.

- Communications for this event and reaching out to international groups
- I'd like to be informed of the next steps being taken; every thing in general.
- Policy implications - engage the stakeholders

Do you have any suggestions for how to improve future Roundtable discussions?

- Distribute an article or two that frames the issue from the perspective of a scientist who focuses on the forest pests. Also, more women!
- Perhaps a day and a half to have more informal discussions
- No

Are there any additional comments you would like to share?

- Loved the format. Everyone's voice was heard. More women!
- No, thank you for organizing!!
- This was great and thank you!

1. Why were you interested in hosting the pests and pathogens roundtable?
 - a. Why specifically a roundtable rather than another type of community engagement event?

2. What did you hope to get out of the roundtable discussion?
 - a. Did the roundtable format meet those needs?

3. What, if any, other types of PES activities have you participated in?
 - a. at Hubbard Brook or elsewhere

4. Has hosting a roundtable changed the way you think about PES?

5. Can you describe the culture around stakeholder engagement/PES at Hubbard Brook? Have you noticed changes in that culture over the past couple of years?

6. Are there other supports or options you'd like from HBRF to foster stakeholder engagement with your work?

HARVARD FOREST INTERACTIVE MAPPING TOOL – USER SURVEY

NOVEMBER 14, 2018

Thank you for providing Harvard Forest with feedback about the Interactive Mapping Tool. Your responses to this brief survey will contribute to an evaluation of an NSF-funded project on Public Engagement with Science at Long-term Ecological Research Sites. Thank you.

1. Please circle which of the following best describes your current employment:	Conservation group	Land Trust	Regional Planning Commission	State or Local Government	Other (describe): _____
	A Lot		Some		A Little
2. How much new information about land use in New England would you say you learned by using the Interactive Mapping Tool?	5	4	3	2	1
3. What is one new thing you learned from using the Interactive Mapping Tool?					
	Very		Some		Not At All
4. How engaging or fun was it to use the Interactive Mapping Tool?	5	4	3	2	1
	Very		Some		Not At All
5. How useful would this tool be for your work??	5	4	3	2	1
6. In what ways would the tool be useful in your work?					
7. Are there areas outside your work where it might be useful? If so, where and how?					
8. Would you recommend the tool to a friend or colleague? To whom would you recommend it and why? If you wouldn't recommend it, why not?					
9. Do you have any suggestions for how to make the Interactive Mapping Tool more useful for engaging the public in conversations about land use?					
10. Do you have any other comments or suggestions that you would like to share?					

PES at LTERs
Harvard Forest Mapping Tool – User Survey Summary
November, 2018

Survey responses were provided by six people who attended the Mapping Tool Beta-testing and Demonstration session on November 14. Because there are so few responses, data are reported as percents and in actual numbers. Five (5) respondents described their employment as a conversation group, with one (1) person choosing a land trust.

Respondents rated their answers on a 5-point Likert scale from Very/A Lot (5) to Not At All/A Little (1).

Question	5	4	3	2	1
How much new information about land use in New England would you say you learned by using the Interactive Mapping Tool?		50% (3)	50% (3)		
How engaging or fun was it to use the Interactive Mapping Tool?	83% (5)	17% (1)			
How useful would this tool be for your work?	67% (4)	33% (2)			

What is one new thing you learned from using the Interactive Mapping Tool?

- Story map
- That some areas are quite resistant to change - look similar under all scenarios.
- That some scenarios resulted in more land covered as compared to current trends.
- Vulnerability of southern NH (sensitivity varies by region)

In what ways would the tool be useful in your work?

- Adds value to RCP members - exploring and understanding their region and RCP and to rank best impacts of policies - there they control
- Engaging our audiences (municipal officials and conserv. oriented citizens) in "what if" and how local decisions will guide future outcomes
- Getting access to the info in the scenarios themselves. Much easier than raw GIS.
- Land protection planning. Arguments for "tall not sprawl"
- Presenting to local audience the power of conservation
- Showing dramatic changes in dev.

Are there areas outside your work where it might be useful? If so, where and how?

- Kids – Highschool
- Metropolitan planning
- Research on global problem solving
- Share with wider public
- Urban planning
- Visually showing towns the impact of their choices.

Would you recommend the tool to a friend or colleague? To whom would you recommend it and why? If you wouldn't recommend it, why not?

- Yes
- Yes - regional planning agencies
- Yes, RCP leaders, easy, fun, informative, not frustrating with changes we suggested
- Yes, to town planners, other conservations
- Yes! Every land trust. Land planners at regional and town level
- Yes. Everyone in my RCP.

Do you have any suggestions for how to make the Interactive Mapping Tool more useful for engaging the public in conversations about land use?

- Add basic info about the ecosys services of forests – list
- Allow uploading region ships for our analysis
- Gave many during the workshop.
- In graphics, point to my rain tributes - interpret!
- Sliders to adjust exogenous variables.

Do you have any other comments or suggestions that you would like to share?

- Beautiful webpage!
- Great job.
- Thank you, thank you, thank you!
- The scenario development workshop I attended was oddly unsatisfying and hard to connect to the final product. This was much better and more useful.
- There is a third dimension to acknowledging of when planning and global migration that the tool can't address, but which is critical to audience engagement. It should be included only as "food for thought"

**NELF Explorer User Feedback
Data Collected Through May 2019**

Data was collected from twelve respondents. Not all respondents answered all questions.

Affiliation

Academic	4 (50%)
Conservation group	2 (25%)
Land trust	0
Private sector/business	1 (12.5%)
Regional planning commission	0
State/local government	0
Other (Private Operating Foundation)	1 (12.5%)

Frequency using NELF Explorer

First time	2 (25%)
1 – 3 times	4 (50%)
More than 3 times	2 (25%)

Previously completed survey

No	8 (100%)
Yes	0

How much new information about land use in New England would you say you learned by using the Interactive Mapping Tool?

A Lot	Some	A Little	None
5 (63%)	3 (38%)	0	0

What is one new thing you learned from using the Interactive Mapping Tool?

- How some scenarios led to very similar outcomes in certain areas and others lead to very different outcomes (each scenario did not have a different outcome)
- How to navigate the site and use the maps
- how to use the basemap with labels to know where I am when zoomed in
- Much of Fairfield County, CT, will be developed by 2060 if current trends continue.
- So much- brain is about to explode! Particularly enjoyed learning about the four different scenarios and how they were developed.
- the intensity of potential development
- You can change the basemap to show town labels

How engaging is the NELF Explorer?

Very Much	Somewhat	A Little	Not A Lot
7 (88%)	1 (13%)	0	0

Is the NELF Explorer fun to use?

Yes	Somewhat	A Little	Not Really
7 (88%)	1 (13%)	0	0

How useful is the NELF Explorer for your work?

Extremely Useful	Very Useful	Somewhat Useful	Not At All
1 (13%)	7 (88%)	0	0

How can you use the NELF Explorer in your work?

- AP Environmental Science includes Land Use/Smart Growth in their framework, and human impact on the environment is what the course is all about. This directly ties into my work.
- As a means to get people/organizations to think about the implications of land conservation and land use at a regional scale (think bigger than their local area, or at least recognize that land use in other areas will impact their local area)
- convince people how dramatic land-use change can be; to show that there are many possible outcomes and we can control them.
- Discuss land use decisions with neighbors, friends, conservation organizations
- help landowners visualize what's happening in their region
- I can use it now just for my own edification. With some assistance, I should be able to use the tool to gather important stats and to show stakeholders the value of working with scenarios.
- I will use it as an example of scenarios as well as a tool for students to use in their ecology class. Teaching students about protecting natural resources

Are there areas outside your work where the NELF Explorer might be useful? Where and how?

- Yes- I am on a town conservation commission, I could use this to grab data for grant writing and as a visual data source for town meetings, etc.
- Discuss land use decisions with neighbors, friends
- Over drinks with friends.
- Not really.

Would you recommend the NELF Explorer to a friend or colleague? To whom would you recommend it and why? Or if you wouldn't recommend it, why not?

- I'll be recommending the tool to RCPs to use to compare with their own strategic maps. With some added benefits, it would be even better.
- Yes - friends interested in land conservation, on town conservation commissions. To help share scenarios work with them and show how they can share with others. I might not recommend it to folks without high speed internet access. I am also apprehensive about sharing it until I have a better sense of how to frame it for various audiences.
- Yes- land trust people I am connected with, other science teachers, anyone interested in land use and planning.
- Yes, colleagues who are interested in land conservation
- Yes, to anyone involved with conservation and maybe for regional planners
- yes. recommend to Conway School of Landscape Design
- Yes. I would recommend it to teachers as a useful tool.
- Yes. Other teachers so they can use it to engage students and teach the state science standards.

What are your suggestions for making the NELF Explorer more useful for engaging the public in conversations about land use?

- Enable changes to data layer transparency. 2. Select tool for RCP's regions or other clusters of towns. 3. Show relative quantifiable impacts to ecosystem services with each scenario
- Allow selection of multiple municipalities or other divisions at once to either sum or to compare.
- I think it would be useful for some meta-users to have some clear steps of how to use the tool for various instances - 30 minute casual conversation, 1 hour presentation, 5 hour workshop, etc. Having YouTube videos to reinforce various concepts would also be very valuable. When viewing the town/region data, make the town name BIGGER on the graphs/narratives. It would be useful to be able to copy/paste land use numbers on the graphs.
- Make some YouTubes that explain how to use them and how they work (I still don't totally understand how the data in the different scenarios were generated/the technical side).
- search function for "Explore Areas" rather than just zooming out and clicking on an area of interest.
- transparency control so we can see basemaps so we know where we are in the world. User-created information zones (allow us to clump towns?)
- Would have to use it more to answer this

Please rate the following features:

	Extremely Useful	Very Useful	Somewhat Useful	Not At All
Ability to select a custom area of interest	7 (88%)	1 (12%)	0	0
Ability to download data about the current land cover and future scenarios	4 (50%)	2 (25%)	2 (25%)	0
Ability to download maps	2 (25%)	4 (50%)	1 (13%)	1 (13%)
Ability to add your own data to map layers	5 (63%)	2 (25%)	0	1 (13%)
Ability to download the modern and scenario GIS data for specific regions	2 (29%)	2 (29%)	3 (43%)	0
Access to up-to-date curated maps and data about protected land in new England	6 (50%)	1 (13%)	1 (13%)	0
More information about ecosystem services, including forest composition, carbon, harvested wood, status of forest insects and pathogens	4 (57%)	2 (29%)	1 (14%)	0

What other conservation data would you like to see on the NELF Explorer website?

- high biodiversity areas, wetlands
- Ecosystem services
- less is more
- Natures Network, TNC Climate Resiliency, Environmental Justice Zones
- On this or an associated site: parcels for all of New England with attributes.
- protected lands by funding source
- Can't think of anything- this is already a LOT of information!

Provide any other comments or suggestions here.

- csv export for the land use graphs would be great.
- wonderful tool lots of potential uses.

Report a bug problem here.

- map slider does not move on iPad browser (safari and chrome)

NELF Explorer Train the Trainer Workshop Evaluation

May 7, 2019

Eleven respondents completed the survey. Not everyone responded to every question.

Preparedness to lead NELF Explorer workshops	n	percent
Extremely prepared	2	20%
Adequately prepared	4	40%
Somewhat prepared	4	40%
Unprepared	0	0%

Something you liked about the workshop today:

- Collaborative group activity
- Finally getting in-depth overview and chance to explore
- Hearing other peoples' ideas on tool and how to present it
- helped me understand a process to work with the tool
- I liked the case studies. I also liked how willing the H.F. staff was to engage with the teachers who attended.
- It was great to "inhabit" the scenarios - that helped me really get a feel for them! I liked how everyone shared about their own audiences and what kinds of uses/concerns they might have for the tool. It was great to have a combination of educators, scientists, conservationists.
- It was nicely interactive.
- Made me familiar with the tool. Enjoyed seeing the approaches to using the tool (exercises). These gave me ideas for how we could use the tool
- The Case Study/Scenario activities
- The facilitators were extremely thoughtful about having multiple audiences with different usages of the tool and were constantly asking for feedback on materials they could create or data they could add to make the tool more useful. The facilitators were also extremely sensitive and respectful of people's times.
- Variety in activities vs. info, multiple opportunities for questions, feedback.

Did anything surprise you? If so, what?

- Complexity of the tool
- How everyone was able to stay awake and engaged
- How thought provoking and sobering this truly is as an experience
- I liked how everyone participated!

- I thought the presentation would be more geared towards "As a trainer here's what you'll be doing..." It felt more like an initial instruction on how the tool works in general.
- I was surprised to see teachers being trained.
- Interesting information can be obtained on broad scales
- Pleasantly surprised by the story map part and the fact that they are so easy to create!
- No

If you have already led NELF Explorer workshops, will you do anything differently following this training?

- I liked the real specific questions we did (trails, affordable housing)
- Less and simpler methods on the LUCC modeling
- This workshop the facilitators prefaced the activities with asking about goals for a resource before asking how landscape changes in the scenarios affects those resources very helpful
- N/A
- NA

To improve your knowledge or skills as a NELF Explorer trainer, what additional information or resources do you need?

- A better understanding of the needs and questions of different audiences. Maybe there could be an FAQ/talking points for trainers to use with different groups.
- Cheat sheet - "see page XYZ for scenario descriptions"; sample outline for a presentation; list of topics, ideas, info that should always be included (i.e. probability vs. prediction, stickers with info (booklets) compare to recent trends in future - language is confusing)
- Have to dive into provided resources before making this assessment
- How to streamline the content
- I would want a detailed/annotated agenda for a workshop with the key talking points for each section. A walk-through.
- More info on how the future scenarios are calculated, confused on that (not a GIS person)
- More info on the model itself (paper reference will be provided soon as that should be enough)
- more practice
- Practice; summary of background info; maybe teaming up with more experienced trainer once
- Slide decks at PDFs of published papers

Recommend improvements to this training:

- Assuming there is an annotated agenda, show ahead of time the context, outcome, and steps of the training. What will I be able to do after this training? What additional help will be offered?
- Discussion (with groups and report outs) how people would use tool to convince select boards to protect land

- focus on individual property
- I like the idea of asking people to do some prep work before training
- Instead of doing the same type of activity twice - have second activity build on the skills and questions of the first. It's an opportunity to ask more sophisticated questions.
- It was great
- It was really great! Maybe some time at the end for people to develop their own "lesson plans"
- Make spreadsheet of formulas. Provide clear examples of the real objectives of each of the roles - ie, the planners' goals @Sebago example - what do planners do? Clearly define at start.
- We could facilitate the activities in a faster manner.
- None
- Nothing. This was great!

Anything else you'd like to share:

- When designing the workshops, we should imagine the event from the perspective of the organizer and an audience member. What details need to be handled such that the audience member will be successful in learning about and using the training?
- Excellent session and excited to be part of getting this out in the world! Thank you!
- Fun way to spend a day
- Good presentation
- Great job!
- Thank you!
- Thank you! Awesome job!
- Thanks
- Thanks a lot - I learned much.

Forest Science News Subscriber Survey

Thank you for taking the time to complete this feedback form! The survey should take less than five minutes of your time to complete.

1. Which of the following best describes your current employer or other connection to ecosystem topics (check all that apply)?
 - University or research institution
 - Conservation group or land trust
 - Local, regional, state, or federal government
 - Business/industry or industry group
 - Interested community member
 - Other: _____

2. How would you best describe your educational background?
 - a. Degree or coursework in ecosystem science or related scientific field
 - b. Degree or coursework in a scientific field unrelated to ecosystem science
 - c. No educational background in ecosystem science or other scientific field

3. How would you rate the overall quality of Forest Science News (e.g., format, short write-up, number of articles)?

1	2	3	4	5
Very Low		Neutral		Very High

4. How often do you click through one or more articles of Forest Science News?

1	2	3	4	5
Never		Half the time		Every Time

5. Did you find the content of the articles useful or interesting?

1	2	3	4	5
Not Useful		Somewhat Useful		Very Useful

6. In general, would you say Forest Science News:
 - Increased your general awareness, knowledge and understanding of the ecosystem topics presented? Yes/No/Somewhat
 - Is presented in a way that is easy for all audiences to understand? Yes/No/Somewhat
 - Is written/formatted in a way that draws the interest of both scientists and the general public? Yes/No/Somewhat

7. What would you improve or change about Forest Science News to better meet your needs?

Forest Science News Subscriber Survey

Survey Results

Overview and Methodology

A link to the Forest Science News (FSN) newsletter survey first was sent to readers in the October 2019 issue of FSN and again in the November 2019 issue. The survey was closed on December 21, 2019.

Seventy-eight (78) subscribers responded, although not all participants answered all questions. For the quantitative responses, percents may not add to 100 because of rounding. Thirty (30) participants provided written answers to the final question qualitative question. Their responses are grouped by theme and sub-theme.

The complete survey is included in the Appendix.

Quantitative Results

Subscriber Demographics

Current Employer or Connection to Ecosystem Topics (check all)

Employer/Connection	Percent	n
University or research institution	40%	31
Community member	21%	16
Local, regional, state, or federal government	21%	16
Conservation group or land trust	15%	12
K-12 science teacher	6%	5
Retired	6%	5
Business/industry or industry group	5%	4
Other	6%	5

Educational Background

Education	Percent	n
Degree/coursework in ecosystem science or related field	79%	62
Degree/coursework in scientific field unrelated to ecosystem science	10%	8
No educational background in ecosystem science or other scientific field	10%	8

Subscriber Feedback

Overall Quality of Forest Science News

Rating	Percent	n
Very High	49%	38
High	42%	32
Neutral	9%	7
Low	0%	0
Very Low	0%	0

Frequency of Clicking Through One or More Articles

Frequency	Percent	n
Every time	23%	18
More than half	25%	19
Half the time	39%	30
Fewer than half	13%	10
Never	0%	0

How Useful or Interesting is the Content

Rating	Percent	n
Very useful	42%	32
	45%	35
Somewhat useful	13%	10
	0%	0
Not useful	0%	0

FSN: Increased General Awareness, Knowledge, and Understanding of Ecosystem Topics Presented

Rating	Percent	n
Yes	96%	74
Somewhat	4%	3
No	0%	0

FSN: Is Presented in an Easy To Understand Way for All Audiences

Rating	Percent	n
Yes	87%	67
Somewhat	12%	9
No	1%	1

FSN: Written/Formatted in a Way that Draws Interest of Both Scientists and General Public

Rating	Percent	n
Yes	74%	56
Somewhat	26%	20
No	1%	1

Qualitative Results

What would you improve or change about FSN to better meet your needs?

Nothing/Good as is

- Nothing to suggest -- thanks for your good work!
- It works the way it is presently for me. It helps me to see what is going on in the area of forest ecology.
- Nothing
- does a good job as it is
- Not much. I like the format and the content.
- Keep them coming. Very useful and informative.

Content: Accessibility of Information

- Too much jargon in some article descriptions and summations. Maybe tailor to points that a land manager could walk-away with.
- You need a good PR person to proof-read and make easier for the general public to understand
- For me some of the materials could be more student friendly
- The format is very academic with the details of the problem, methods, data, results etc. It assumes that the audience does not trust you and must see the process first. The public is bored by this!! Show the conclusions and results first. Then all the other parts later.
- more articles for general public

Content: Material

- Some materials for middle school reading levels would be nice to have.
- Wouldn't mind content about reports too rather than mostly just published, peer-reviewed material.
- Book reviews
- Perhaps in addition to providing news releases on emerging research, we could also have a scientist's reflections on a topic whether it is changing winter or forest harvests. These could purely be personal reflections meant to engender debate. Another idea is to recruit critical resource questions from the public whether it is a consulting forester or concerned citizen. they could provide a reflection/questions.
- Especially enjoy the Hubbard Brook Highlight; would appreciate a bit more representation of ecohydrology research
- more content

- I would like to see more articles that include the integration of scientific research and historic cultural landscape research. The best example of this I can give is Tom Wessel's work on forest ecosystems and the study of past land uses, and how they affect our landscape at present. Cultural landscapes can be at any scale (site, community, regional, national, global).
- You might consider book applicable book reviews.
- Including the authors of the studies featured in the short write-ups would be useful, though.
- I don't know if this makes sense given the readership but an "Events" or "Upcoming" section would be useful.
- short segment that can be applied to the State of New Hampshire

Content: Presentation and Format

- Put more pictures in the short blurbs- they draw people in.
- Perhaps a few more videos or other mixed media and maybe updates on new publications out about HB.
- I like everything about - particularly the links to the abstracts. I'd have more graphics if I had to make any changes.
- I quite like the format and length.
- I like the short, concise format.

Technology

- For me, it is potentially fascinating, but totally ruined by Constant Contact. Change mail contractors or get Constant Contact to do a decent job of extracting plain text from html. I would be happy to expand on this answer: doug@cs.dartmouth.edu
- Offer the option of a weekly or monthly digest (though this would require having a weekly product)

Other

- I am sorry not to have ideas for you.
- I especially enjoy learning about results that can help inform possible policy actions to protect the environment.
- Have a short survey for which article was the readers favorite. That article gets a shout out !
- ensure it gets wide distribution to all stakeholder groups, not just academics

Appendix

Forest Science News Subscriber Survey

Thank you for taking the time to complete this feedback form! The survey should take less than five minutes of your time to complete.

1. Which of the following best describes your current employer or other connection to ecosystem topics (check all that apply)?
 - University or research institution
 - Conservation group or land trust
 - Local, regional, state, or federal government
 - Business/industry or industry group
 - Interested community member
 - Other: _____

2. How would you best describe your educational background?
 - a. Degree or coursework in ecosystem science or related scientific field
 - b. Degree or coursework in a scientific field unrelated to ecosystem science
 - c. No educational background in ecosystem science or other scientific field

3. How would you rate the overall quality of Forest Science News (e.g., format, short write-up, number of articles)?

1	2	3	4	5
Very Low		Neutral		Very High

4. How often do you click through one or more articles of Forest Science News?

1	2	3	4	5
Never		Half the time		Every Time

5. Did you find the content of the articles useful or interesting?

1	2	3	4	5
Not Useful		Somewhat Useful		Very Useful

6. In general, would you say Forest Science News:
 - Increased your general awareness, knowledge and understanding of the ecosystem topics presented? Yes/No/Somewhat
 - Is presented in a way that is easy for all audiences to understand? Yes/No/Somewhat
 - Is written/formatted in a way that draws the interest of both scientists and the general public? Yes/No/Somewhat

7. What would you improve or change about Forest Science News to better meet your needs?

**Hubbard Brook Committee of Scientists (and Stakeholders) Workshop: Ecological and Community Resilience in the White Mountains of NH
July 12, 2019**

Please take about 5 – 10 minutes to complete this survey. The findings will help us learn more about engagement between Hubbard Brook scientists and stakeholders. Please circle your responses. All responses will be reported in the aggregate; no individuals will be identified.

Thank you!

Which best describes your affiliation? (Check all that apply)

- | | | |
|--|--|---|
| <input type="checkbox"/> Land conservation | <input type="checkbox"/> Academic organization | <input type="checkbox"/> Outdoor recreation |
| <input type="checkbox"/> Land management | <input type="checkbox"/> Private sector/business | <input type="checkbox"/> Local resident |
| <input type="checkbox"/> Regional economic development | <input type="checkbox"/> Student | <input type="checkbox"/> Scientist |
| <input type="checkbox"/> State/local government | <input type="checkbox"/> Community group | <input type="checkbox"/> Other: _____ |

	Very Much				Not At All
1. Did you think the format of the workshop was useful for generating research ideas and/or advancing actionable science at Hubbard Brook?	5	4	3	2	1
2. Did the workshop add to your understanding about how stakeholders and scientists consider issues related to resilience in the White Mountains?	5	4	3	2	1
3. How comfortable did you feel sharing your thoughts and opinions given the mix of stakeholders and scientists?	Very Comfortable				Not At All
4. Did you feel like you had a chance to fully participate in the discussions (e.g., that your points were acknowledged or understood, that you had time to talk)?	5	4	3	2	1
5. Did you feel like you had the opportunity to share issues that are important to you with other participants?	5	4	3	2	1
6. Did the workshop provide you with useful networking opportunities or allow you to build new connections?	5	4	3	2	1
7. How likely are you to follow up on any topics or with people after the workshop?	5	4	3	2	1

	A	Some	A	None
--	---	------	---	------

	Lot		Little		
8. How much prior experience did you have talking with ecosystem scientists or stakeholders about resiliency or other environmental topics?	4	3	2	1	
	Very Satisfied		Not At All Satisfied		
9. Overall, how satisfied are you with your experience today?	5	4	3	2	1

10. What would you say are the **benefits** of this type of workshop format that includes stakeholders and scientists?

11. What would you say are the **challenges** of this type of workshop format that includes stakeholders and scientists?

12. Do you have any suggestions for how to improve this type of learning opportunity?

13. Are there any additional comments you would like to share?

**Hubbard Brook Committee of Scientists (and Stakeholders) Workshop:
Ecological and Community Resilience in the White Mountains of NH
July 12, 2019**

Forty-eight respondents completed the survey. Not everyone responded to every question.

Affiliation (respondents could check all that applied)

Academic organization	17
Community group	1
Land conservation	4
Land management	5
Local resident	6
Outdoor recreation	5
Private sector/business	1
Regional economic development	2
Scientist	18
State/local government	1
Student	6
Other (Consulting biologist, Extension, NGO, Non-profit, Research, Research Institute, Retired, US Forest Service)	8

The following statements were rated from 4 (Very Much/Comfortable/Satisfied) to 1 (Not At All)

	Mean	Std Dev	Range
Did you think the format of the workshop was useful for generating research ideas and/or advancing actionable science at Hubbard Brook?	4.15	(.83)	2-5
Did the workshop add to your understanding about how stakeholders and scientists consider issues related to resilience in the White Mountains?	4.32	(.70)	2-5
How comfortable did you feel sharing your thoughts and opinions given the mix of stakeholders and scientists?	4.48	(.78)	2-5
Did you feel like you had a chance to fully participate in the discussions (e.g., that your points were acknowledged or understood, that you had time to talk)?	4.52	(.78)	3-5
Did you feel like you had the opportunity to share issues that are important to you with other participants?	4.48	(.69)	3-5
Did the workshop provide you with useful networking opportunities or allow you to build new connections?	4.02	(.82)	2-5
How likely are you to follow up on any topics or with people after the workshop?	3.78	(1.03)	1-5
Overall, how satisfied are you with your experience today?	4.55	(.69)	2-5

How much prior experience did you have talking with ecosystem scientists or stakeholders about resiliency or other environmental topics?

A Lot	Some	A Little	None
14 (29%)	24 (51%)	8 (17%)	1 (2%)

What would you say are the benefits of this type of workshop format that includes stakeholders and scientists?

Benefits to scientists/research

- Applicable research - use of research, connecting with public
- As a scientist, provides a great opportunity to hear perspectives of stakeholders
- Bringing a "real" world perspective to the more theoretical/hypothesis-driven scientific approach
- Could help to bridge basic and applied research - something that the Forest Service is increasingly favoring
- Generate new ideas for research and management
- Grounding our science in practical needs
- I believe that this is necessary to developing relevant research questions and collaborations...facilities serendipitous meetings...great to hear the concern of those directly involved, as a student
- Opportunities to think about how to apply basic research in a meaningful way
- Sharing of deep knowledge, anecdotal observations from the field
- Sharing preliminary data is very helpful and great to receive feedback that can be used to influence research

Benefits of mixed-group discussions

- At the minimum it serves as a reminder of the variety of perspectives and priorities of different groups/people. Even better, it helps us decide together on what are actionable items.
- Bi-directional info flow and education
- Chance to communicate and inform our respective work and break down silos
- Communication about wants/needs/issues
- Connecting scientists with more civilian issues
- Conversation, discussion builds community, increases understanding
- Cross-pollination of ideas
- Diversity of options - more info
- Finding common ground
- Great energy - multiple perspectives were valuable. Especially the idea to directly feed management -relevant questions to scientists
- Great to mix grounded perspectives with science and in turn give us non-scientists a deeper window into the science that happens here

- I think it's important to breakdown silos and allow each to meet and understand what drives the other, and what they are passionate about. Provides checks and balances and a more nuanced discussion.
- I think these interactions are so valuable. It's one of the few opportunities I have to interact with stakeholders.
- Interactive - better understanding of both
- It provides understanding for both sides to see what the other groups needs are.
- Learn to recognize different points of view and values
- Learn variety of different perspectives and research activities; see needs for synthesis
- Open discussion, exchange of ideas. Learning perspectives from others
- Sharing cross-field/backgrounds to generate knowledge and understanding
- Start conversation, prevent misunderstandings
- Structured chance to share ideas
- The opportunities to share issues that are relevant
- Thought-provoking. Liked mix of research talk and application
- Understanding diverse perspectives; extending impact of HBEF science; community building

Networking/face-to-face interactions

- Being face to face
- Lots of communication face to face. I liked the assigned seating and move half-way through the day
- Lots of time for open discussion
- Opportunity to connect in person!
- Provides a rare opportunity for these groups to interact
- Providing time to explore these topics and interact with colleagues
- Small group networking and discussion

Other

- It seems to be intellectually stimulating to everyone
- Should focus on real world issues for land managers and community workers, not abstract issues. Perhaps case studies of community resilience.
- TWS interactive workshop encourages growth and development of projects like this one

What would you say are the challenges of this type of workshop format that includes stakeholders and scientists?

Finding common ground/agreement

- Agreeing on priorities and methods for solving problems
- Crossing communication and value barriers. Who gets to define resilience?
- Different perspectives, goals
- Finding common questions and approaches

Background/understanding gaps

- Backgrounds are so different, hard to share much about how we each "know" what we know
- Different foundations of understanding
- Different levels of familiarity with the data.
- Ensuring that conversation is reasonably accessible to all. For example, as a non-scientist, the Q&A convo after Alix's first presentation was somewhat hard to follow/feel like I could contribute to.
- Jargon
- Providing the right level of content, accessible to all; allow for ample discussion, especially at tables
- Speaking the same language and understanding each others' values
- There's often a big gap between the applied knowledge land managers need and the research scientists do at HB

Lack of time/opportunities

- Big topic, fun to discuss, not much time
- Follow-up
- Following it up with anchor; make change
- Getting busy people together when everyone is being driven to "do more with less".
- Having enough time for meaningful discussion
- Time and space is always an issue but the format addressed that well.
- Time limits
- Time! Need more time to get to know one another to increase opportunity to engage more deeply

Personalities/group dynamics

- Falling back into silos! The scientists talking to the scientists, and end-user to end-users
- Getting out of your comfort zone
- Getting the "right" people in the room
- Getting the right mix of stakeholders to the table
- Giving each person the opportunity to participate
- Hard to discuss controversial issues in this setting
- Having a lot of new people and ideas (some of which can be pretty unfamiliar) it can be challenging to keep everything straight
- Keeping small groups on topic
- Probably many "stakeholders" not included
- Some personalities much more over bearing - maybe group too large?
- The large number of people can be challenging but the format allowed for small group convos - great!

Other

- Developing action items is hard

- Don't get anywhere; confused what we're trying to do
- Lack of action items following the workshop
- Language and objectives
- Maybe everyone having time to voice their ideas rather than note them for future thought
- Too much conversations forced by specific content in presentations
- We need to have more of these!
- Wide content areas
- When all talking in small groups - hard to hear

Do you have any suggestions for how to improve this type of learning opportunity?

More opportunities

- Do more frequently with subsets of researchers and stakeholders
- More of them! I enjoyed the opportunity to hear directly from scientists. It would help if we could have opportunities to have stakeholders comment on more specific research projects and ideas that scientists are thinking about.
- Schedule more of these!

Follow-up/More sharing

- Have an online document to promote note taking!
- Hope there will be some feedback (report, synopsis, etc.) to participants
- Share contact info - homework (pre and post workshop) might be good

More time

- It was so quick that it was tough to tackle too much
- More time
- On hour longer would give time for a bit more Q&A which always seemed lively

Increased participation, especially stakeholders

- Find a way for all to participate
- Keeping talks accessible to stakeholders.
- More and wider range of stakeholders needed
- Stakeholders were few relative to scientists

Logistics/other

- A field visit to discuss how different groups "see" a particular landscape, plot, etc. and the priorities relevant to its management
- I wish we'd gotten more things solidly done - for example the WMNF folks said they could make a list of Q's for scientists that they'd like to know the answer to - I wish they'd brought it! Maybe we could've started thinking about how to get students or HBR data together to answer them.
- Identify some anchor items
- Keep up the time allotment for conversation

- Perhaps a little more coaching for speakers on how to make presentations accessible to all
- Shorter discussions after the individual presentations. We ended up using most of our time at the end or one or two rather than all of them. It's easier to process when fresh and in bite-sized chunks.
- Space for co-creating research questions
- Talk with out new data analyses
- We have to have a forum to discuss and explore controversies

N/A

- I think it was arranged really well and some disadvantage in conversation is unavoidable
- I thought this way was fantastic, I hope your ideas/format are able to spread to other foundations
- N/A
- No this was wonderful
- Very good as is

Are there any additional comments you would like to share?

- Doing this at/after the cooperator's meeting was a very good idea and ensured that there would be a good turnout
- Good job!
- Great day!
- Great job, very thought provoking and intellectually stimulating.
- Great meeting! Kudos
- Hard to have the large-group discussions with that table arrangement
- I think we need flux and not concentrations on the chemistry graphs - pools of chemicals somehow factored in? The socio-economic and TNC indices were summed - but some correlation statistic would seem more appropriate given looking for this type of x-y relationship.
- I'll be happy to do this (or other activities) in future
- It could have been useful to have a preliminary brainstorm on why we're talking about resilience. Brainstorm a list of why we care/what's interesting about it. I'd love to hear from the whole group, and it would provide reference for what we really think is important to help us center the discussion and keep us from going down too many rabbit holes.
- It was a great workshop but a very in-depth topic for a one-day discussion.
- It was a very good mix of activities and formats
- N/A
- Nice job!
- Nope! Great day! Thanks
- Thank you for organizing! Identifying perceptions of disservices/services amongst the community
- Thank you!
- Thanks for including me
- Thanks for the opportunity to participate

- Thanks for the opportunity!
- What a wonderful community you have here - I am grateful for the connections I was able to make and I look forward to coming again.

*Collaborations Incubator: Joint Meeting of Hubbard Brook and Harvard Forest Investigators
March 20, 2019*

EVALUATION – PLEASE GIVE US YOUR FEEDBACK

Thank you for helping us with an evaluation of the Embedding Public Engagement with Science at Long Term Ecological Research Sites (PES at LTER) project. We are interested in learning from you about how this meeting met your needs and your general perceptions of the PES at LTER project to date.

THANK YOU!

1. Which institution are you affiliated with?	<input type="checkbox"/> Harvard Forest <input type="checkbox"/> Hubbard Brook
2. Please describe your level of involvement in the PES at LTER project.	<input type="checkbox"/> I am part of the project’s Core Science Team <input type="checkbox"/> I am not part of the Core Science Team, but I’m actively involved <input type="checkbox"/> I am not actively involved with the project.
3. How would you describe your general perception of engaging with non-scientists about your work?	<input type="checkbox"/> Mostly positive <input type="checkbox"/> Somewhat positive <input type="checkbox"/> Neutral <input type="checkbox"/> Somewhat negative <input type="checkbox"/> Mostly negative
4. Have you noticed a shift in your opinion about engagement in the last couple years?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. If you answered Yes to question 4, what brought about that shift? (Check all that apply.) If you answered No, skip.	<input type="checkbox"/> A shift in philosophy at my institution <input type="checkbox"/> Participation in PES activities (general) <input type="checkbox"/> A specific PES training or activity <input type="checkbox"/> A specific PES tool or resource <input type="checkbox"/> The ecosystem topic I happened to be involved with lent itself to public engagement <input type="checkbox"/> Other: _____

	Strongly Agree	Agree	Disagree	Strongly Disagree	N/A
6. Today’s meeting helped build a sense of collaboration between Harvard Forest and Hubbard Brook.					
7. Today’s meeting was relevant to my work.					
8. Overall, I think the discussions today will add value to my work.					
9. Overall, today’s meeting and the PES@LTERs project in general have provided me with a better understanding of public engagement with science.					

*Collaborations Incubator: Joint Meeting of Hubbard Brook and Harvard Forest Investigators
March 20, 2019*

Please complete each statement:

10. What worked best about today's meeting was...	
11. To improve my knowledge or skills around public engagement with science, I still could use...	
12. To improve the usefulness of future joint Hubbard Brook/Harvard Forest meetings and activities, I recommend...	
13. Anything else you'd like to share:	

Collaborations Incubator: Joint Meeting of Hubbard Brook and Harvard Forest Investigators

March 20, 2019

Twenty respondents completed the survey. Not everyone responded to every question.

Affiliation

Harvard Forest	11 (55%)
Hubbard Brook)	8 (40%)
Both	1 (5%)

Level of involvement in the PES at LTER project

I am part of the project's Core Science Team	5 (25%)
I am not part of the Core Science Team, but I'm actively involved	6 (30%)
I am not actively involved with the project.	9 (45%)

How would you describe your general perception of engaging with non-scientists about your work?

Mostly positive	Somewhat positive	Neutral	Somewhat negative	Mostly negative
12 (60%)	7 (35%)	1 (5%)	0	0

Have you noticed a shift in your opinion about engagement in the last couple years?

Affiliation	Yes	No
Harvard Forest	4 (36.4%)	7 (63.6%)
Hubbard Brook)	5 (62.5%)	3 (37.5%)
Both	1 (1.0%)	
<i>Total</i>	<i>10 (50%)</i>	<i>10 (50%)</i>

What brought about that shift? (Only those who said Yes. Multiple responses possible.)

	Harvard Forest	Hubbard Brook	Both	<i>Total</i>
A shift in philosophy at my institution	2	0	0	2
Participation in PES activities (general)	3	4	1	8
A specific PES training or activity	2	2	1	5
A specific PES tool or resource	0	0	0	0
The ecosystem topic I happened to be involved with lent itself to public engagement	1	2	1	4
Other: Cultural change	1	0	0	1

The following statements were rated from 4 (Strongly Agree) to 1 (Strongly Disagree)

	Mean	Std Dev	Range
Today's meeting helped build a sense of collaboration between Harvard Forest and Hubbard Brook	3.26	(.56)	2 -4
Today's meeting was relevant to my work.	3.37	(.50)	3-4
Overall, I think the discussions today will add value to my work.	3.50	(.51)	3-4
Overall, today's meeting and the PES@LTERs project in general have provided me with a better understanding of public engagement with science.	3.65	(.49)	3-4

What worked best about today's meeting was...

Presentations, Workshops, or Both

- Afternoon activity
- Break out sessions; expert talks
- Breakout session #1; about working/talk
- Engaging presentations
- Ezra's presentation and active engagement of us; small group discussions
- Ezra's talk and activities
- I liked group discussion but maybe needed more formal note taking and report out. Maybe some "interest groups" organized ahead of time.
- I probably got the most out of informal discussions at LMAT etc. The talks were an ice breaker.
- Mix of presentations and group discussions
- The flow of the agenda; Ezra's talk was the highlight
- Small-group discussion format and afternoon handouts

Cross-site and In-person Interactions

- Bring Harvard Forest and Hubbard Brook scientists together
- Hearing other perspectives of the science of communication
- HF & HB sitting around tables and discussing work and clarifying areas of overlap & areas missing at one of the sites.
- Joint HBEF and Harvard brainstorming
- Meeting people
- Semi-structured, cross-site conversations were engaging; topic of framing facilitating can see how the tools will be useful in the future
- The framing work; opportunity to interact with internal colleagues in person
- The time given to both discussions of public engagement and opportunities for collaboration

To improve my knowledge or skills around public engagement with science, I still could use...

Training

- A 2 day workshop
- Communication impacts analysis metrics/strategies
- Help with successful frames to use
- HF - specific workshop
- Menu of frames to choose from for most effective messaging - still can feel like I am flying blind
- More on the reframing
- More tools, research, practice evidence
- More training
- Specific help in framing issues

Practice

- Lots of practice
- Lots of training and practice
- More practice with family
- Practical interview skills, especially a live interview
- Practice
- Practice, trial and error, experiencing what works and what doesn't
- Practice! I need to work on framing.
- Practice. I need to do more of this to get better at it.

To improve the usefulness of future joint Hubbard Brook/Harvard Forest meetings and activities, I recommend...

- A concrete item list at the end of each get together
- A field walk component where group could practice talking about a research project or forest
- Continuing the small group discussions with specific questions
- Get like people to talk to each other (site manager to site manager, for example). Start with introduction of what we each do.
- Getting a tour of Harvard Forest
- Guidance from Michael Gilmore
- Have more clear action items - would be nice to see conversations more beyond just talking
- Longer periods to interact with the other team
- Maybe some "interest groups" organized ahead of time.
- More brainstorming on specific projects. Small group gatherings
- More informal time to interact
- More meetings
- More Meetings!
- More time to interact in person cross-site; more time to brainstorm collaboration; follow up mechanism or collaboration
- Regular (semi-annual) get-togethers
- Research collaboration
- Working groups for follow-up?

Anything else you'd like to share:

- Excellent workshop. I have a public engagement talk I give repeatedly. Things I will reframe.
- Framing discussion good but time too limiting. Well done day!
- Great day!
- It is nice to talk in smaller groups from the "other team."
- Nice job! It was fun and productive.
- Thank you
- Thank you for the next-level sci-comm thought your workshops provide!
- Thank you!
- Thanks so much for your good work.
- Thanks!
- The framing workshop was outstanding. Definitely the best part of the day in terms of engaging my interest and helping me understand that coherent, long-term messaging across sites could help change public discourse and policy
- The meeting was focused a lot around the needs of the scientists (prob. point of the grant) but it would be great to have follow up opportunities for communications teams to talk about collaboration.

Appendix D

Year 3 Measures and Summaries of Results

***D1. Hubbard Brook Ice Storm Symposium
Speaker and Audience Surveys***

***D2. Hubbard Brook Ice Storm Symposium
Speaker and Audience Survey Results***

***D3. Harvard Forest-Hubbard Brook
Stakeholder Interview Protocols***

***D4. Harvard Forest-Hubbard Brook
Stakeholder Interview Summary***

D5. Key Project Leadership Interview Protocols

Speaker Instructions

Please distribute the enclosed Audience Feedback forms to your audience. Make sure to leave 5 minutes following your talk for your audience to complete the form. Collect completed forms, complete the Speaker Information form below and send to: Sarah Garlick.

Audience Feedback

Thank you for taking the time to complete this feedback form. The survey should take less than five minutes of your time to complete.

1. What was your purpose in attending this meeting/lecture/discussion? (check all that apply)
 - to learn more about the topic for my personal interest
 - to learn more about the topic for professional interest
 - to share my concerns about the topic
 - to build my community's or organization's knowledge-base
 - to inform future policy issues
 - Other: _____

2. How would you rate the quality of the presentation?

5	4	3	2	1
Very High				Very Low

3. How well did the presentation meet your needs?

5	4	3	2	1
Very Well				Not Well

4. What could the presenter have done to better meet your needs?

5. How will you use the information you learned?

Additional Comments/suggestions

Hubbard Brook Ice Storm Symposium

March 2, 2020

Speaker and Audience Survey Results

Speaker Results

Survey data was collected from three scientist speakers. Not all respondents answered all questions, and some provided more than one response to each question. Additional reflections provided by the scientists are included to document the event and the learning/engagement opportunities provided.

Background Information. Only two speakers provided background information, but they each often provided more than one response per question.

Presentation Type:

- Informal Discussion (1 response)
- Professional Lecture (2 responses)

Discussion Type:

- Q&A Period (1 response)
- Other: Symposium (1 response)

Primary Audience Type:

- Business/Professional (2 responses)
- Government/Policy makers (2 responses)
- Open Community (1 response)

Context:

- Panel proposed by ISE scientists – invited by PIs (1 response)

How do you hope the audience will use the information you presented?

- Deciding about managing forests for resilience (?) and to prepare for ice events. (1 response)

Presentation Feedback

The numbers (percents) presented represent the total each response option received.

	A lot	Moderate amount	Neutral	Not much	Nothing/not at all
Prior to the talk, how much do you think your audience knew about ice storms?	2 (67%)	1 (33%)			
How much do you think your audience learned about ice storms from your presentation?	2 (67%)	1 (33%)			
How engaged do you think your audience was with the topic?	3 (100%)				
How much did your presentation involve participants to discuss/provide feedback/ask questions?	2 (67%)	1 (33%)			
How confident did you feel in communicating and engaging effectively with your audience?	1 (33%)	2 (67%)			

Additional Reflections

Two scientists offered additional thoughts after the symposium. They are presented here, verbatim, for documentation purposes even though they were not part of the original survey.

- I agree that the whole event was an excellent example of how stakeholder engagement can play a positive role in scientific decision making. First of all, it was a great audience, with a nice mix of stakeholders and scientists, so a lot of credit goes to the people who organized and planned the event. Let’s not forget that you can’t have stakeholder engagement unless you come up with methods, approaches and events to do that. More evidence for the importance of interface organizations. Second, is the value of stakeholder observations. These are people who spend a lot of time in the woods and make detailed observations, often from very specific and specialized viewpoints. It’s a unique and valuable source of information for scientists studying the same forests. So yes, this was an excellent example of how stakeholder engagement can play a positive role in scientific decision making.
- I also agree that this was a good example of how stakeholder involvement can inform scientific decision making. One of the things that really struck me was hearing that the people who didn’t do salvage cutting after the ice storm of 1998 seemed to regret it because although the trees survived, the quality of the wood was poor. We’ve been focused mostly on how the storm affected tree survival and advising people not to harvest based on that, without fully

understanding the long-term impacts on timber value. It's a little out of my realm, but it would be interesting to look at timber sale data and quantify the revenue lost due to tree decay caused by ice storm damage.

Audience Survey Results

Thirty-five (35) audience members responded to the survey. According to the presenters, the audience was a mix of scientists and other stakeholders from business, professional organizations, government, policy organizations, and interested community members. Not all respondents answered all questions.

Background Information

Purpose for attending the Symposium. Respondents were instructed to check all that applied.

Purpose	Number of Responses
To learn more about the topic for my personal interest	15
To learn more about the topic for professional interest	20
To share my concerns about the topic	1
To build my community's or organization's knowledge-base	6
To inform future policy issues	2
Other	

Prior familiarity with Hubbard Brook.

Familiarity	Number (Percent) of Responses
Very Familiar	5 (20%)
Somewhat Familiar	16 (64%)
Not At All Familiar	4 (16%)

Of those who reported they were only "Somewhat Familiar" or "Not at All Familiar," everyone responded that participating in the symposium increased familiarity their familiarity either "A Lot" (10 responses, 59%) or "A Little" (7 responses, 41%).

Presentation Feedback

The numbers (percents) presented represent the total each response option received.

	Very Much /A lot	Somewhat / A Little	Not Much / Not Well	Nothing / Not At All
How useful was the symposium format for learning about current research about ice storms?	18 (58%)	8 (26%)	1 (3%)	4 (13%)
How much did the event increase your knowledge or awareness of current ecological research?	20 (67%)	10 (33%)		
How relevant was the research shared today to your life, work, etc.?	17 (57%)	10 (33%)	3 (10%)	
How comfortable did you feel sharing your questions and thoughts during the discussion session?	22 (73%)	5 (17%)	3 (10%)	
How well did the presentations meet your needs or expectations?	21 (70%)	8 (27%)	1 (3%)	

Overall quality of the presentations.

Rating	Number (Percent) of Responses
Very High	18 (72%)
High	4 (28%)
Neutral	
Low	
Very Low	

Open-Ended Feedback

What could the presenters have done to better meet your needs?

Topics

- I was more curious on wildlife impacts, so I will be happy to search the website/other resources to learn more
- More discussion of future related research
- Provide 5-10 min about the history of HB and what they do
- They were fine, presented well; I was more interested in the individual tree/damage, but research was more forest focused
- Would love a longer more in depth presentation. Great high level view of the experiment. So much more we could go over.

Materials

- A couple of the tables were a little hard to understand

None/NA

- Can't think of anything
- It was very well done
- N/A
- Nothing - info presented was great! Would love a longer session.
- Nothing. It was very well organized and appeared to be very successful. Pretty thorough for a brief presentation
- They were very clear and as a lay person I found every question I had was answered eventually
- Very well done

*If you had a question about New Hampshire's forests, would you call a researcher from Hubbard Brook?
Why or why not?*

Yes

- Absolutely! I am thrilled to have a connection at HB!
- Being state govt, we may reach out to our more regularly contacted state/fed partners. But we may reach out to HB in the future
- Definitely, particularly because of the long term nature of their data set
- On specific issues I would
- Yes
- Yes - at a minimum or a starting point or to direct me to other resources
- Yes - great resource to work with on ice impacts

- Yes - seem to know their subject
- Yes, to get info directly from the experts
- Yes! They are amazing!
- Yes! We have reached out in the past as their work is of great importance to operations.
- Yes.
- Yes. Putting names and bios together with faces in the room made these scientists seem much more "approachable".

No/Unsure

- Hadn't thought about it
- They seemed very open to discussion but unlikely I'd feel the need to reach out

What did you learn today that you could incorporate into your life/work/etc.?

Content – Ice Storms and Ecology

- Better appreciation for impact of ice storms in the NE. We are lucky to have HB's research available to help forest owners in the region. The creativity of your science is impressive!
- Carbon/Nitrogen/Carbon sink capacity of forests changing?
- High level perspective communities should have to anticipate future damage and management of past damage from ice storms.
- Measure effects of the 98 storm on Squam Ridge vegetation. Need to go back and sample area samples and see what long term outcomes are.
- Potential long term forest health issues related to changes in nitrogen
- Specifics about how traps? fail such as conifers? have less ice damage than hardwoods
- That .5" of ice is when to expect significant disturbance (or a little less)
- The long term impacts to forests from ice storms
- We see that our ice storm post warning criteria (.5") is pretty well calibrated with damage

Content – Other

- A better understanding of HB research
- Presentation styles and types of data analysis
- There's lots of work to be done to inform the general public and the fed. govt.

Other

- improve observation
- Inspired by the possibility of "big" science and the unique role of HB to pursue experiments such as this
- NA

Share a few topics you would like to learn more about or follow up on.

- No responses

Do you have any suggestions for how to improve future events like these?

Content and Materials

- Bibliography of relevant publication
- Damage by tree species; affects in open growth trees; differences in damage based on branch angle from trunk, where break occurred on branch; specifics on ice accretion measure where breaking begins and how increases effect specific branches(based on species)
- I would like to learn more about other research; specifically climate change.
- Thank you for putting this together! Please share any relevant papers and results along with the presentations to the attendees.

Format

- Great venue, lunch was an unexpected bonus. Introductions at the outset were helpful.
- Hold one in summer to have trip/meeting out in the forest
- Keep providing lunch it was excellent
- See #9. Food was excellent, thank you for lunch!
- I was surprised that more reps from (and owner groups and forest mgmt. companies and presenters) didn't attend this very informative presentation. Connect with NH Timberland Owners Assoc., Granite State Chapter of Soc. of American Foresters (SAF)

Frequency

- Longer event, more frequent updates.
- Do more!

Other

- Any change not necessary
- Good event
- I look forward to your next

Are there any additional comments you would like to share?

- No responses

HARVARD FOREST Stakeholder Interview Protocol

Thank you for agreeing to be interviewed. My name is _____, and I'm an evaluator working with Harvard Forest on a National-Science-Foundation-funded project to study the effectiveness of Public Engagement. Two of the goals of the project are to build knowledge about how scientists and stakeholders think and feel about Public Engagement, and how scientists at Harvard Forest can build practices and resources to encourage engagement.

I am reaching out to you based on your involvement with Harvard Forest's New England Landscape Futures project. In our conversation, I'll also refer to it as the "Scenarios" project for short. As a reminder, as a participant in this project you helped to generate future scenarios for land use in New England. Then Jonathan Thompson's Lab at Harvard Forest modeled land use under the scenarios from 2010 to 2060, and the resulting maps are now available online via the NELF Explorer tool.

Your responses will be confidential and only reported in the aggregate. No quotes will be directly attributed. So please be honest.

This interview should take 20-30 minutes. Before we begin, do you have any questions?

1. Can you describe your background and how and when you came to be involved with Harvard Forest and the Scenarios project?
2. How would you describe your skill and comfort level when it comes to speaking with or engaging with scientists at Harvard Forest? Have your feelings about working with scientists changed since you started working with the Scenarios project team? (Outcome 1)
3. How has your understanding of the science that's done at Harvard Forest changed since you began participating in the Scenarios project? (Outcome 1)
4. How do you feel in general about the idea of public engagement with science/science communication? (Outcome 2)
5. How has your understanding of public engagement with science changed since working with Harvard Forest on the Scenarios project? (Outcomes 1, 2)
6. What do you think or hope can be achieved by having land use stakeholders and Harvard Forest scientists engage more directly with each other? (Outcomes 1, 2)
7. Do you feel like Harvard Forest scientists are doing enough to engage stakeholders? What kinds of engagement activities would you like to see more or less of? (Outcome 3)
8. Do you feel like Harvard Forest scientists are supported, encouraged, and/or rewarded for participating in public activities? What more do you think Harvard Forest could be doing to help facilitate engagement? (Outcome 3)
9. Is there anything else about your involvement with Harvard Forest or Scenarios project you'd like to share?

HUBBARD BROOK Stakeholder Interview Protocol

1. Can you describe your background and how and when you came to be involved with Hubbard Brook?
2. How would you describe your skill and comfort level when it comes to speaking with or engaging with scientists? Has that changed since you started working more closely with Hubbard Brook? (Outcome 1)
3. How has your understanding of the science that's done at Hubbard Brook changed since becoming a member of the Advisory Council or participating in their Roundtable events? (Outcome 1)
4. How do you feel in general about the idea of public engagement with science/science communication? (Outcome 2)
5. Has your understanding of or feelings about public engagement with science changed since working with Hubbard Brook? If so, in what ways? (Outcomes 1, 2)
6. What do you think or hope Hubbard Brook can achieve by having stakeholders and scientists engage more directly with each other? (Outcomes 1, 2)
7. Do you feel like Hubbard Brook is doing enough to engage stakeholders? What kinds of engagement activities would you like to see more or less of? (Outcome 3)
8. Is there anything else about your involvement with Hubbard Brook you'd like to share?



**PES at LTERs
Hubbard Brook/Harvard Forest Stakeholder Interview Summary
January 2020**

Interviewee Background Information

Ten community stakeholders were interviewed between September – November 2019. Five were associated with Hubbard Brook and five with Harvard Forest. Interview participants' backgrounds and work areas included land and land trust management, policy work, forestry, ecology, and environmental planning. Only half of the interview participants indicated having a formal science background or some science background.

Findings and Changes Over Time

Increases in Knowledge About Mutual Learning (Outcome 1)

Nine out of ten interviewees noted that their understanding about the science/research conducted at Hubbard Brook or Harvard Forest had increased/changed for the better. Only one person said their understanding was the same.

Eight interviewees felt that efforts to increase public engagement with science was positive. One person said they were ambivalent and another stated that the process was frustrating. When asked what they hoped could be achieved by having stakeholders and scientists work together, nine indicated that it was a positive effort and there were mutual benefits. Only one person indicated that it would depend because they felt the purpose was not always clear.

Changes in Stakeholder Views Over Time (Outcome 2)

Seven out of ten participants responded that they felt skilled and comfortable engaging with scientists, while the remaining three felt "moderately" or "somewhat" comfortable. Eight participants indicated that their level of comfort had not changed significantly as a result of recent work with the institutions, hinting at their long histories working with both institutions (and others) and the nature of their work. Two reported they had become more comfortable communicating and engaging with scientists since engaging in the work.

Seven interviewees indicated that their feelings toward public engagement with science had changed in a positive direction as a result of the work. Three did not feel any change: one indicated that they felt positively before and continue to feel that way; one said their involvement highlighted how challenging the work is; and another indicated they were ambivalent about PES before and mostly feel the same way now.

Practices, Strategies and Resources (Outcome 3)

When asked if they felt Hubbard Brook or Harvard Forest were doing enough to engage stakeholders, all interviewees indicated that they felt the institutions were doing a lot in this area. Four interviewees felt they could probably do more to bring in other groups not currently engaged, including communicating with different groups. One also noted that the recent roundtable format (i.e., the Committee of Scientist

meeting, July 2019) was much more engaging and should be used as a model for future engagement endeavors.

Suggestions to Improve Engagement Efforts

Eight respondents provided the following suggestions to further public engagement efforts. Suggestions are broken down by the institution they were made for:

Harvard Forest

- do more public tours, remain accessible
- maintain focus on application/practicality or focus communication that way
- turn clear conclusions from scenarios into policy papers (with highly direct language when there is a clear conclusion)
- target specific populations (e.g. legislators)

Hubbard Brook

- find meaningful opportunities in-between in-person meetings, ask for feedback during the formative stage (not just after the concept has already been worked out or for feedback).
- keep engagement genuine and meaningful
- continue sharing and connecting across scientists
- directly engage policy makers
- find and train skilled communicators

Key Ideas and Themes

Increases in Knowledge About Mutual Learning (Outcome 1)

1. Stakeholders **increased their level of understanding about the science** as a result of working more directly with scientists in a collaborative way.
 - “Maybe I’ve gotten to where I look at the scientists with more respect and gratitude for the work and deliverables we’re seeing.”
 - “I was familiar with some of the projects previously...my understanding of the individual scientists has gotten better...I understand their need and desire to do outreach about their work.”
 - “My understanding [of the science] has increased dramatically...being in a room with the scientists for hours and getting to ask questions has really increased my understanding of their work, especially the current research.”
 - “The Committee of Scientists meeting over the summer was one of the best experiences I’ve had with [the institution] to get an understanding and hear from scientists and learn what’s going on.”
 - “I really didn’t have any idea the number and scope of projects going on there!”
 - “I’ve come to realize it’s more complicated than I thought originally...I would say [now] I understand more of the ‘why’.”
2. Stakeholders seemed to recognize the **balance needed for scientists** to focus on the science/research and engaging the public.
 - “I think it’s cemented a challenge that exists between the metrics by which scientist have to work, in the discipline and the training you’re provided versus what the public-

facing expectations look like. It's a tension - good to be up front about it. The public expects science to provide answers to questions that are very applied and useful. Whereas for the scientists, to be successful you have to do stuff that's novel and cutting edge, so generally you're focused in in a very narrow topic that builds toward a larger issue, but it's not immediately applicable."

- "I don't know enough to say...if we reach out to them, they can come."
- "I'm not sure what to compare it with."
- "It's harder than I realized...there are so many things competing for people's attention...it's really hard even to talk the language."
- "I think with the resources institutions have [supported and encouraged engagement]...more is always better."
- "Communication is a perpetual problem for science. It's complicated stuff, and we operate in a world that can't handle complexity. That wants easy, black-and-white answers. So the topic is challenging, then layered on top of it are researches who aren't good communicators. It's a double whammy in legitimately engaging the public and policy makers with the science."

Changes in Stakeholder Views Over Time (Outcome 2)

3. Scientist/stakeholder **engagement is highly valued** by stakeholders and is strengthened when it is meaningful and genuine.
 - "We can create a better future for ourselves and the next generation of people living in New England."
 - "Communication is really key and important for people to help them improve their lives and manage resources...improve policy...outreach provides context to science."
 - "I think it's important that there be more communication. I find it distressing in the climate discussion that science has become the political tool."
 - "It's vital in both directions for informing good policy [for stakeholders] and for scientists to understand the types of questions we have and the way their work is interpreted by the community outside of the small group they tend to work with."
4. Stakeholders indicated that the **engagement/communication culture at both institutions was changing in a positive direction.**
 - "It's been a wonderful process. I appreciated having the chance to build partnerships with smart scientists. I've seen a lot of willingness from scientists to understand the questions my organization is trying to answer and how they might provide data. Exciting partnership. It's early days, but I've talked about it with higher-ups in my organization. It's a good model."
 - "My perception is that there is a real awareness that there is a need to communicate to lay-people...there is a level of enthusiasm among scientists...it has become part of the culture."
 - "I felt like the researchers were asking and listening genuinely. They wanted to know what we were most concerned about and what they could do to be useful early on in the process. They also had a great presenter who did a great job of explaining the science. So both of those things helped me feel like we had more engagement. And the communications pieces – the people they've had explaining things have been good at it

lately. That's a more recent development. Hasn't always been the case with the roundtables over the years."

- "One of the things I've noted is that each institution has a different culture. Some see collaboration as valuable and others not. Hubbard Brook and Harvard Forest are in it for the long term – they are generous and that makes me want to work with them. It is a cultural thing – it's just a pleasure to work with them. They think about their own interests and mine as well. They are trying to be part of something much bigger – to strengthen our forester community. I suspect their Board emphasize the right things."
- "The [institution] are really good about checking in with everyone. That everyone who worked on it felt in the loop."
- "I like the leadership and people who work there always want to know how it applies on the ground – something that wasn't asked very much before. The scientists are very interested in what I need and different approaches and problems."

Practices, Strategies and Resources (Outcome 3)

5. Stakeholders are **interested in expanding who is included as stakeholders** to add value to the science and ensure the "right" issues were being addressed, at the right time in the research process.
 - "...we need to expand the audience for these tools. We have our [usual audience] that get it and are interested...how do we get this in front of other people and get them to support the work we're doing?"
 - "My guess is that there are stakeholders that aren't linked in. For example, under-resourced communities that don't have ways to participate. So, moving beyond the normal networks – reaching beyond those communities who have other ideas."
 - "While we're a diverse collection, we're not representative of stakeholders at large...group was invited that didn't participate, so the selection of who participated was narrow."

Leadership (Key Project Staff) Interviews: End of Project Capture of the PES Project

Interview Protocol 1: Sarah G (HB), Marissa (HF)

Interview Protocol 2: John B

Interview Protocol 3: Cathy (HF), Pam (HB), Peter (HB), Johnathan (HF)

Protocol 1 Interviews: Sarah G (HB), Marissa (HF)

Thank you for participating today! This is an opportunity to reflect on your experiences with the project, your perceptions about any institutional changes regarding the culture of PES, what you consider the value and challenges of including a social science research component to the project, and reflections going forward. This exercise is meant to be reflective in nature, so you are encouraged to think about personal epiphanies or anecdotes; along with structural or institutionalized shifts.

Before we begin, do you have any questions for me?

1. In your own words, how would you describe “the state of public engagement” at your institution? *Prompts: would you say more scientists understand it? More do it or ask about it?*
2. Have you noticed any changes in that since the beginning of this project? What sort of changes? *Prompt: survey response(s)*
3. In what ways does your personal participation or your institution’s participation match or differ from what you expected?
4. What project activities do you think contributed the most to embedding PES? *Prompt: also collaboration*
5. What do you think contributed to any challenges the project faced? What were those challenges?
6. How did the collaboration between Harvard Forest and Hubbard Brook strengthen or add to the project? What were the drawbacks or challenges of that collaboration?
7. What were some of the lessons learned from that collaboration if you were to do it again?
8. How did embedding a social science research component strengthen or add to the project? What were the drawbacks or challenges of doing so?
9. What were some of the lessons learned from that collaboration if you were to do it again?

10. Did including a social science component change how you think about or embed PES?
11. What would you say are the key take-aways from this sort of collaborative work, whether with other institutions or researchers?
12. Upon reflection, what would you do differently in terms of the project itself? Why?
13. Is there anything else you'd like to share about the project?

Protocol 2 Interview: John B

Thank you for participating today! This is an opportunity to reflect on your experiences with the project, your perceptions about any institutional changes regarding the culture of PES, what you consider the value and challenges of including a social science research component to the project, and reflections going forward. This exercise is meant to be reflective in nature, so you are encouraged to think about personal epiphanies or anecdotes; along with structural or institutionalized shifts.

Before we begin, do you have any questions for me?

1. Have you noticed any changes PES engagement at Hubbard Brook of Harvard Forest since the beginning of this project? What sort of changes?
2. In what ways does your personal participation in the project match or differ from what you expected?
3. How did embedding a social science research component strengthen or add to the project? What were the drawbacks or challenges of doing so?
4. What were some of the lessons learned from that collaboration if you were to do it again?
5. Did working with LTER sites change how you think about PES? Will change it influence your research going forward?
6. What would you say are the key take-aways from this sort of collaborative work, whether with other institutions or researchers?
7. Upon reflection, what would you do differently in terms of the project itself? Why?
8. Is there anything else you'd like to share about the project?

Protocol 3 Interviews: Cathy (HF), Pam (HB), Peter (HB), Johnathan (HF)

Thank you for participating today! This is an opportunity to reflect on your experiences with the project, your perceptions about any institutional changes regarding the culture of PES, what you consider the value and challenges of including a social science research component to the project, and reflections going forward. This exercise is meant to be reflective in nature, so you are encouraged to think about personal epiphanies or anecdotes; along with structural or institutionalized shifts.

Before we begin, do you have any questions for me?

1. In your own words, how would you describe “the state of public engagement” at your institution? *Prompts: would you say more scientists understand it? More do it or ask about it?*
2. Have you noticed any changes in that since the beginning of this project? What sort of changes? *Prompt: survey response(s)*
3. In what ways does your personal participation or your institution’s participation match or differ from what you expected?
4. What project activities do you think contributed the most to embedding PES? *Prompt: also collaboration*
5. What do you think contributed to any challenges the project faced? What were those challenges?
6. How did the collaboration between Harvard Forest and Hubbard Brook strengthen or add to the project? What were the drawbacks or challenges of that collaboration?
7. Did including a social science component in the project change how you think about PES?
8. What would you say are the key take-aways from this sort of collaborative work, whether with other institutions or researchers?
9. Is there anything else you’d like to share about the project?