Community Resilience through Public Engagement:

A Study of Outreach and Science Communication in a Coastal National Park Site

Jamie Remillard,
University of Rhode Island

Engaged public science communication can support community resilience as policymakers, resource managers, and citizens come to terms with the effects of environmental disturbances, natural disasters, and climate change. Drawing upon field-based ethnographic research of public-facing outreach and education at Fire Island National Seashore (FIIS), the researcher considers how, in the wake of a catastrophic storm, the evolving ethical science communication and public engagement strategies of park rangers might contribute to and strengthen community resilience. A rhetorical analysis of science communication and interpretive practices at FIIS illuminates some affordances and constraints of rhetorical models of science communication and of pedagogies of play for community-based work.

Park rangers at Fire Island National Seashore (FIIS), which is a National Park site situated off the south shore of Long Island, New York, have been working to transform their park interpretation, public outreach, and science communication approaches to make them more interactive. In part, their work responds to Hurricane Sandy,

which on October 29, 2012, delivered a record-setting storm surge along the heavily developed coastlines of New York and New Jersey and became the second costliest storm on record in the U.S. since 1900.

Following Hurricane Sandy, communities near to and within the boundaries of FIIS began to challenge park resource management. The public outcry stimulated an urgency for park interpretive staff to change their public outreach and science education models from outdated approaches that are relatively faithful to a deficit model of public understanding of science to more engaged, interactive strategies (Gross 5–6). In the wake of catastrophic storms and other environmental disturbances, as policymakers, resource managers, and citizens come to terms with the possibilities for and constraints on recovery and mitigation, it seems plausible that moves toward more engaged public science communication—like those represented by park rangers' efforts at FIIS—can contribute to and strengthen community resilience.

This article introduces some preliminary findings from a community-based field study of public-facing outreach and science education at Fire Island National Seashore. I intend neither to establish criteria for nor to evaluate the outcomes of engaged public science communication in the park. Rather, I will consider how certain theories of environmental communication, as well as an emerging pedagogical approach articulated in writing studies can both support and inform park interpreters' approaches to engaged public science communication.

Pedagogies of play, in particular, and theories of public understanding of science, offer useful frames for understanding engaged interaction between science communicators and public audiences and for understanding the potential for engaged science communication to support coastal communities in developing shared understandings of the complex consequences of ecological disturbance, natural disasters, and climate change. Drawing upon my ethnographic field study and rhetorical analyses of observation data, interview data, and documents related to park interpretation, I also suggest that park rangers' practices of engaged public outreach and ethical science

communication in this community setting can inform rhetorical theory related to environmental communication and pedagogies of play.

Shortly after Hurricane Sandy struck, the U.S. Department of the Interior (DOI) allocated $787 million in disaster relief funds to post-storm recovery and mitigation projects. Among these were dozens of studies of coastal natural resources in public lands designed, in part, to illuminate opportunities to "make communities stronger and more resilient" in the face of future storms and climate change impacts ("Interior"). Community resilience does not spring from the resilience of natural resources alone. Park interpretive rangers are responsible for doing the challenging work of synthesizing scientific information, including the findings of more than thirty park-based post-Hurricane Sandy resilience studies and communicating the significance of this research for public audiences. As interpreters, they aim to produce dynamic informative programs that integrate historical, ecological, economic, cultural, political, and structural contexts, to capture the diverse consequences of and understandings of storm impacts.

The new plan for park interpretation at FIIS, which is still a work-in-progress, expands interpretation to engage such diverse understandings, while making in-park programming more interactive. For example, as FIIS park rangers work to transform their interpretive strategies, they are interested in acknowledging some of the complexities of public deliberations over recovery and mitigation efforts. And their new approaches to teaching people about science-based issues in the park take stock of the accounts of individuals who dwell, work, play, and own (or lost) property in places affected by the storm.

I argue that the engaged approaches of public science communication in the park may support community resilience. Community resilience emerges from shared understandings of the consequences of environmental change—whether episodic, perennial, or otherwise—understandings which enable policymakers, experts, and public stakeholders to support and enact science-based and socially just decision-making, not just through official channels, but also informally as civic groups, local organizations, and citizens take responsibility for public lands, by connecting their private property, lifestyles, and

daily practices with public places, values, and consequences, and by becoming stewards of natural resources. But park interpretive rangers' work to generate and reinforce shared understandings of storm impacts and other environmental change is not merely a matter of distributing scientific information, as a deficit model of science communication would suggest (Gross 6, 8, 19).

One challenge that park interpretive rangers encounter that seems acute in relation to science communication about storm impacts is this: ecosystems don't abide the logics that structural resources do. A road, for example, becomes obviously hazardous when it is flooded, but large-scale changes to dynamic natural resources can produce ambiguous impacts, and episodic catastrophic change is, to some degree, viewed as an innate condition of natural ecosystems. Moreover, it is not uncommon for ecosystems to derive benefits from significant and sudden change.

For example, Hurricane Sandy caused ocean waters to tear through Fire Island's dunes, resulting in a breach through which ocean and bay waters now mix freely. At first glance, the breach appears precarious, particularly in light of the fact that developed areas on the south shore of Long Island rely on Fire Island to buffer approaching storms. Still, the breach does not signify a "broken" ecosystem. Preliminary observations suggest that by flushing harmful algae out of parts of a polluted Great South Bay, the breach might create opportunities for commercially, recreationally, and ecologically significant species to rebound. But amid all of the catastrophic, life-changing losses that Hurricane Sandy caused, this story of ecological resilience risks sounding like a silver-lining, particularly among people who live on the south shore of Long Island and thousands of homeowners across Fire Island's 17 in-park communities, all of whom have a stake in pending resource management decisions.

While park managers await the findings of key studies on the breach and other storm impacts, they remain subject to public scrutiny. Recognizing the need to engage with and educate people about the facts of the breach, park interpretive staff at FIIS instituted guided Beach-to-Breach hikes that enable park visitors to witness the breach and talk with park rangers about what is known and how ongoing

studies could inform decision-making. Throughout the 2.6-mile tour, park interpreters solicit participants' questions and oftentimes their personal experiences related to Hurricane Sandy. The program is designed to be an unscripted, dialogic, embodied way of engaging people with FIIS's natural resources. It stimulates open-ended conversation while teaching people about science-based issues in the park.

One interpretive ranger explained to me how new questioning techniques that they are now integrating into their park programming, such as in Beach-to-Breach hikes, bridge the gap between two divergent modes of delivering content: the "guide on the side" mode versus the "sage on the stage" mode. The "sage on the stage" mode is viewed by some as an outdated, disengaged approach to teaching people about park science, while the "guide on the side" mode is to some extent shaping the park's new park interpretive plan.

Early in the summer of 2015, FIIS interpretive rangers convened for two days of training in science communication and park interpretation. Participants joined in a photography shoot and storytelling activities, collaborative writing and role-playing games. They created illustrations and multimodal compositions, and engaged in reflection, crowd-sourcing activities, and open-ended discussion and debate. In pursuit of new approaches for engaging park visitors with park resources, senior park interpretive staff started by training new and seasonal staff through collaborative exploratory activities that called for open-ended outcomes, elicited unpredictable responses, and allowed participants to shape their own learning experiences.

For my study of FIIS outreach and interpretation, I examined how FIIS interpretive staff used such playful methods to teach people about science-based issues in the park, and for this purpose, I drew upon pedagogies of play, as they are articulated in writing studies scholarship. I tentatively defined play as learning activities that are exploratory and relatively open-ended in nature and that welcome unpredictable or creative responses, participant-driven dialogue, or opportunities for participants to shape their own learning.

In situations where public engagement is tied to the need to educate citizens and public stakeholders about science-based issues in public lands, playful approaches are important because they open opportunities for participants to actively influence, generate, and shape their learning experiences. Moreover, playful approaches can do the serious work of communicating scientific knowledge that is necessary for informed decision-making while still honoring local, social, cultural, and political knowledges that might otherwise be marginalized through science communication methods that are faithful to a deficit model.[1] Indeed, to break down the confining work-play dichotomy, Albert Rouzie argues that play does rhetorical work: "play can be serious, work can be playful" (633).

"Serio-ludic" rhetoric appears evident, too, in Susan Jarratt's description of sophistic *techne*, which she describes as rhetorical and playful, ethical and sporting, and averse to fixing on a single version of reality (104). What makes Jarratt's analysis of sophistic *techne* particularly salient in the context of public engagement and science communication is how Jarratt describes playfulness as instrumental in opening a discursive means for challenging the dominance of logos (19, 27, 22–23).

In practice, play eschews tightly orchestrated activities in favor of offering flexibility and choice so that participants can shape their own learning experiences, consider unexpected critical, creative, and rhetorical possibilities, and test ideas.[2] In order to support participant autonomy, play places a high premium on improvisation, exploration, and discovery.[3]

Some interpretive rangers at FIIS regard play and open-ended engagement as serious and consequential for educating park visitors and making their experiences in the park meaningful. But not everybody is on board. For example, during an interpretive staff training that I observed, park rangers learned about and were asked to integrate into park programming a method called facilitated dialogue. The National Park Service training facilitator defined this method as one that "uses a strategically designed set of questions… to guide participants into a semi-structured, meaningful, audience-

centered conversation about a challenging or controversial topic." Facilitated dialogue came under considerable scrutiny.

Some park staff raised concerns about engaging park visitors in conversation about "controversial issues" like climate change because, they said, park visitors' arguments are often unfounded, and they come to the park needing and wanting facts from experts. A few had had experiences with park visitors getting somewhat hostile in discussions of sensitive topics. Some argued that because visitors typically come to the park for recreation, they do not want to be challenged intellectually. Still others said that park visitors expect their tour guides to be "walking encyclopedias" and are more comfortable playing a passive role. Notably, the conversations that FIIS interpretive staff are initiating as they reimagine their interpretive programs and deliberate over opposing interpretive modes have their counterpart in the scholarship of science communication, which also at times takes on a binary character: deficit or contextual, passive publics or active publics, scientific or public, transmission or social inquiry.[4]

My examination of the situated, community-based uses of play represented in park interpretation at FIIS brings to light theoretical implications for the uses of play in the context of ethical science communication. When play and collaborative inquiry stimulated through open-ended strategies such as facilitated dialogue become a preferred means of engaging with public audiences, these practices disrupt traditional modes of engaging with park visitors, and they potentially fracture the underlying assumptions of deficit models of science communication, because play necessarily engages participants, including the personal, local, social, cultural, and political knowledges that participants bring to bear on their learning experience. As such, play can reinforce a rhetorical science communication model in which knowledge circulates reciprocally through interactive practices. Play also reinforces the assumption that public audiences are active and knowledgeable stewards of public natural resources.

These evolving playful science communication and public engagement strategies that park rangers are introducing to FIIS might contribute to and strengthen community resilience as

policymakers, resource managers, and citizens come to terms with the effects of environmental disturbances, natural disasters, and climate change. In addition to educating park visitors, citizens, and other public stakeholders about storm impacts and climate change, the park's new interpretive strategies position park visitors as stewards of coastal natural resources. This public engagement also establishes a means for experts and officials who study and manage public natural resources to learn how diverse publics are making sense of storm impacts and storm mitigation investments. With such an understanding, resource managers, scientists, and science communicators who are accountable to the public can discover how better to engage with and educate people about science-based issues that will impact public resources.

Through deliberate, open, and inviting dialogue, and through interaction that allows for unexpected outcomes, park interpretive staff may find themselves in a position to interpret both the science behind management decisions and the traditionally marginalized and diverse understandings that local publics bring to bear on public debates over storm recovery, resilience research, and the potential consequences of management decisions.

Perhaps there is potential in FIIS's next interpretive staff training, likewise, to engage park staff in challenging conversations about why, how, and in which contexts they can imagine engaging park visitors in improvisational, generative, and meaningful dialogue. Interpretive staff trainings would offer an occasion to address the implicit assumptions about park visitors and local publics that some arguments against facilitated dialogue bring to light and to consider the importance of understanding local, social, cultural, and political knowledges and perspectives.[5] Engaged, ethical science communication would reflect those perspectives and acknowledge that they belong in discussions of park science, particularly in light of the shared mission to "make communities stronger and more resilient." With input from park interpretive staff and publics, playful activities may take on the serious role of supporting resilience among both natural resources and communities of people.

NOTES

1. I see this possibility emerging at the intersections of writing pedagogy, scholarship in community literacy, environmental communication studies, and theories of public understanding of science. Particularly relevant are Rouzie's concept of the serio-ludic, Higgins, Long and Flower's elevation of situated knowledges as resources for public inquiry, Endres's observations about the marginalization of situated knowledges in technocratic models of science communication, and Gross's formulation and critique of a deficit model of public understanding of science. See Rouzie 627–658; Higgins, Long, and Flower 9–43; Endres 49–75; and Gross 3–23.

2. Examples of how play enhances rhetorical awareness by enabling flexibility and choice can be found in Colby and Colby 300–312; Shipka "Sound Engineering" 355–373; and Shipka *Toward* 83–109.

3. For relevant discussions of the affordances of play, and of the improvisation, open-ended exploration, and self-directed discovery that are characteristic of play, see Boquet 68–76; Colby and Colby 305–310; Rouzie 627–658; and Wysocki 13–22.

4. See Gross 3–23; Endres 49–75; and Crick and Gabriel 201–223.

5. While community literacy scholarship has articulated the value of situated knowledges as resources for public inquiry, Endres indicates that such situated knowledges can be limiting because they are marginalized in environmental decision-making. See Higgins, Long, and Flower 9–43 and Endres 49–75.

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Jamie Remillard is a doctoral candidate in Rhetoric and Composition at the University of Rhode Island and a research assistant in the Society, Ecology & Communication Laboratory. She holds an MFA in creative writing from Emerson College and worked for many years as a journalist.