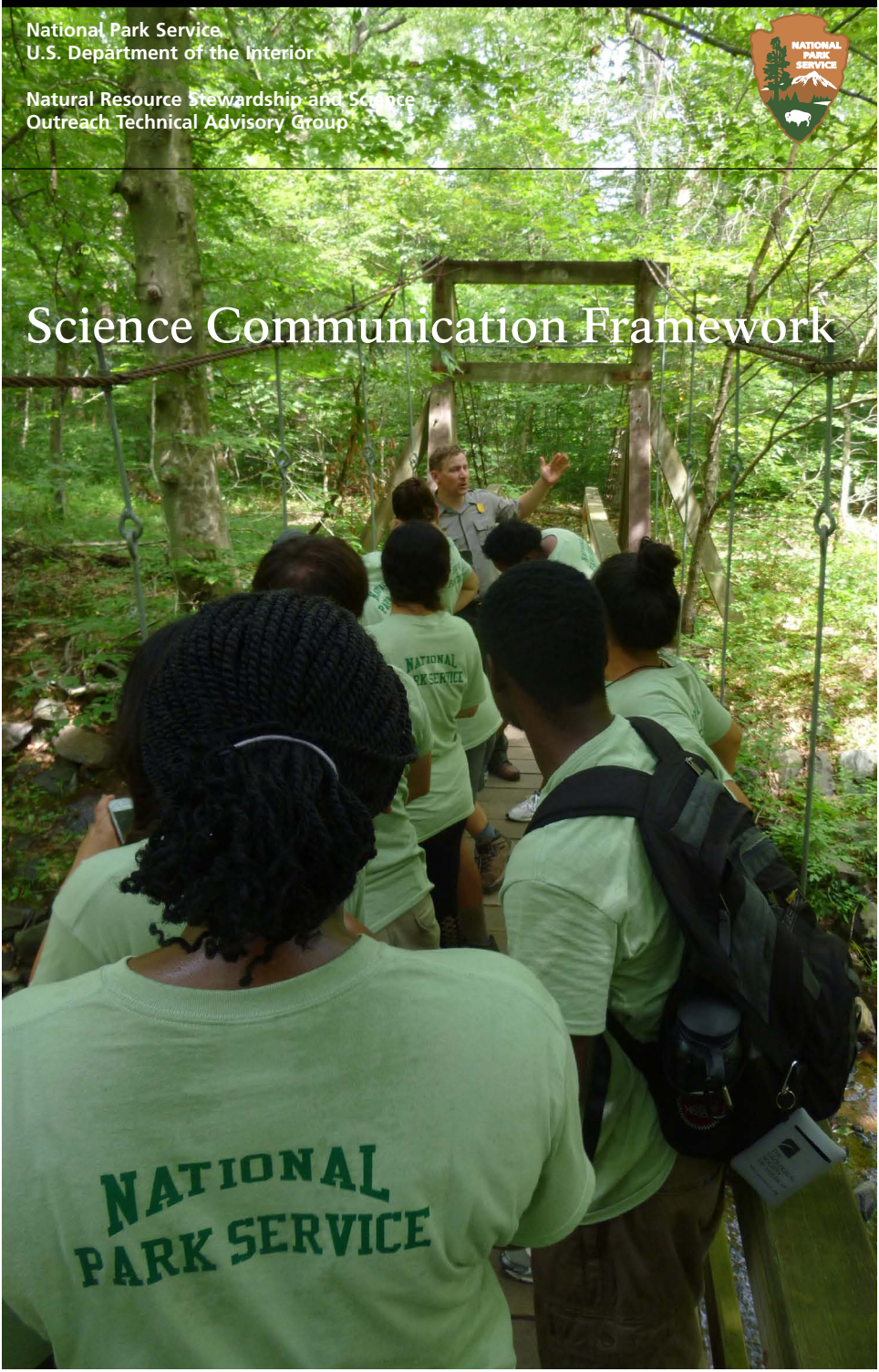
National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Outreach Technical Advisory Group

Science Communication Framework



This framework is the product of the Natural Resource Stewardship and Science directorate's Outreach Technical Advisorty Group (OTAG). OTAG is made up of representatives from each NRSS division and is responsible for improving and integrating NRSS communication. OTAG is chaired by Sara Melena, Office of Education and Outreach. Mike DeBacker, Heartland Inventory & Monitoring Network is the co-chair. Ed Harvey, Water Resources Division chief is the division chief representative.

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Cover
2013 Mosaics in Science participants on an interpretive hike at Prince William Forest Park, Virginia. (NPS photo)

Science Communication Framework

As the National Park Service (NPS) enters its second century, its need for science has never been greater. We need science so we can make good stewardship decisions, inspire all citizens to preserve America's most treasured resources, and provide opportunities to connect people to parks. In short, the environmental challenges confronting the National Park System require science-informed stewardship and a ***scientifically literate*** *citizenry.*

Effective **science communication** is key to meeting these requirements. It will help ensure that rigorous research is accurately applied to management decisions and that our visitors have the opportunity to embrace science as an organizing principle for the world they see around them. For these reasons, the Natural Resource Stewardship and Science (NRSS) directorate prioritizes science communication as one of its core functions.

Scientific literacy helps citizens be interested in and understand the world around them, to engage in the discourses of and about science, to be skeptical and questioning of claims made by others about scientific matters, to be able to identify questions, investigate and draw evidence-based conclusions, and to make informed decisions about the environment and their own health and well-being. (Hacking, Goodrum, Rennie, 2001)

The NPS has a century-long tradition of communicating about resources. Communicating about science, particularly in ways that support improved scientific literacy, is a more recent need that has been building since the introduction of the Natural Resource Challenge. The agency's Management Policies (2006) and key strategic guidance documents acknowledge this need and opportunity. For example:

- One of the key goals identified in the *Natural Resource Challenge* (1999) articulates the responsibility of the NPS in science communication: "Knowledge gained in national parks through scientific research is promulgated broadly by the National Park Service and others for the benefit of society."

- In *National Park Service Science in the 21st Century* (2004), the National Parks Science Committee observes that "each national park should serve as a center of enlightenment. . . As stewards of the parks, the National Park Service has a unique opportunity to improve the scientific literacy of the citizens of this nation and help foster a national stewardship ethic."

Science communication is the use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science:

- Awareness, including familiarity with new aspects of science
- Enjoyment or other affective responses
- Interest, as evidenced by voluntary involvement with science
- Forming or confirming opinions of science-related attitudes
- Understanding of science, its content, processes, and social factors

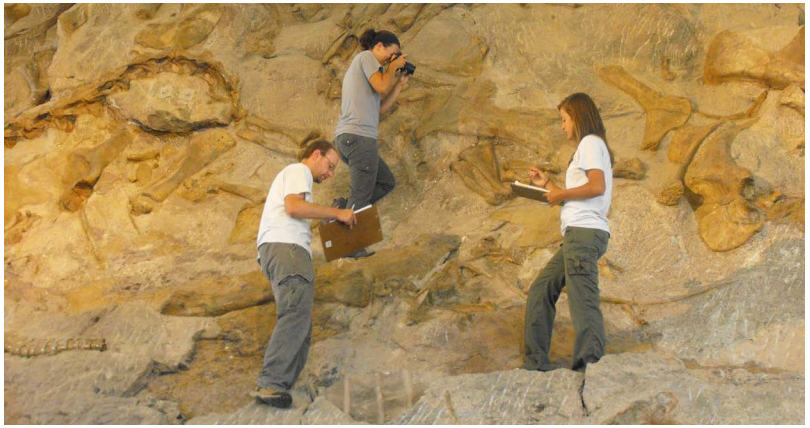
(Burns, O'Connor, Stocklmayer, 2003)

- *A Call to Action* (2011) advocates for "strengthening the NPS role as an educational force based on core American values, historical and scientific scholarship, and unbiased translation of the complexities of the American experience."

- *Revisiting Leopold* (2012) states, "the overarching goal of NPS resource management should be to steward NPS resources for continuous change . . . in order to preserve ecological integrity . . . (and) provide visitors with transformative experiences."

- *Achieving Relevance in Our Second Century* (2014) calls for establishing the National Park Service as an educational institution and strengthening parks as places of learning that teach about our American heritage and develop civic engagement, scientific and historical literacy, and citizen stewardship.

The National Park System offers unparalleled opportunities to enrich the public's understanding and appreciation of the crucial role of science in resource stewardship—and in their own daily lives. Successfully using this opportunity requires partnerships and collaboration among interpreters, communication experts, scientists, natural resource professionals, and others. This framework, and the vision and principles it presents, seizes this opportunity and establishes the Natural Resource Stewardship and Science directorate's role in acting on it.



Paleontology GIP Mindy Homan documents bone conditions with fellow GIP interns on the quarry wall cliff face at Dinosaur National Monument, Colorado & Utah. (NPS Photo by Mindy Homan, GIP)

Purpose and Audience

Scientists and scholars, resource managers and decision-makers, interpreters and other communicators are invited to use this framework to develop strategic science communication products, practices, programs, and structures for funding and accountability. The guiding principles presented in this document will enable us to pursue shared goals and thereby promote science-based resource stewardship and science literacy consistently across the National Park Service and with our partners.

Place-based Using the connections people have with the land, their perceptions of the relationships between themselves and a place (e.g., sense of place; Galliano and Loeffler, 1999) to enhance learning and using the local environment as the context for learning. (NAI, 2006).

Free-choice learning Learning experiences where the learner exercises a large degree of choice and control over the what, when and why of learning. Most environmental learning occurs outside of school through free-choice learning experiences. (Falk, 2005)

Science Communication Vision

By communicating the results and practices of science, the NPS makes informed stewardship decisions, and, by supporting ***place-based, free-choice science learning*** *experiences, increases the nation's science literacy and inspires the public's commitment to preserve our nation's heritage.*

NRSS produces needed information about park resources and values. Sharing information widely and in a way that is useful, meaningful, and actionable enables the NPS to protect natural resources and values now and into the future. The NPS also offers unparalleled opportunities for free-choice scientific learning about resources, places, and heritage. This type of learning builds on an individual's intrinsic motivation to learn and seek relevance in what they are learning. Science communication in NRSS takes advantage of high-quality science, tangible resources, place-based experiences, personal values, civic engagement, and the intellectual and emotional dimensions of learning to preserve park resources and values and inspire interest in, understanding of, and engagement with the world around us.

High school astrobiology interns from Red Bluff High School complete research for the NASA Astrobioligy Intern Program. (NPS Photo)

Science Communication Principles

The following principles present how NRSS approaches science communication. These principles provide clarity, encourage alignment among work groups, and facilitate innovation and efficiency. They serve as practical guides for effective science communication that:

1. Accurately presents current scientific knowledge for informed decision-making.

2. Recognizes and is respectful of public audiences' diverse values, social contexts, beliefs, and worldviews.

3. Provides opportunities for diverse audiences to develop personally relevant intellectual and emotional connections with parks and the resources they protect.

4. Fosters learning about the results and processes of scientific research and thereby promotes a greater understanding of the value of science in decision-making.

5. Strives for the highest level of professionalism through the use of best communication practices (see Reference Document F).

Next page: Some of the Cape Hatteras Young Naturalists get creative with taking notes in the field. (NPS Photo)

Moving from Principles to Action

Achieving this science communication vision requires staff across the directorate and programs like Inventory and Monitoring Networks, Research Learning Centers, and Cooperative Ecosystem Studies Units to engage in and support science communication. To do that effectively, staff should use the framework to guide them in developing and implementing science communication programs and products to meet their strategic goals.

Reference Materials

The following information and resources are available at www1.nrintra.nps.gov/oeo/sciencecommunication.cfm for employees searching for science communication examples and guidance:

Reference Document A - Framework Development Process
Reference Document B - National Association for Interpretation Summary
Reference Document C - George Wright Society Summary
Reference Document D - Science Communication Terminology
Reference Document E - Audiences
Reference Document F - Communication References

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