Climate Change Response Program



Workforce Climate Change Literacy: Needs Assessment and Strategy

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Background

The President's Climate Action Plan (2013) set forth a series of actions to curb carbon emissions and prepare the nation for the unavoidable impacts of climate change. Several of these actions involve managing natural resources for the provision of biodiversity, ecosystem services, carbon storage, and human safety.

Federal land and water management agencies were directed to facilitate climate-resilient investments by tribes, states, municipalities and others through data sharing and policy reform. This direction also required all federal land management agencies to assess changes to policies, regulations, and programs—both realized and proposed—necessary to enhance both carbon sequestration and the resiliency of natural resources to climate change. The interagency Council on Climate Change Preparedness and Resilience convened a Climate and Natural Resources Working Group to coordinate the assessment, and structure a plan for enacting the recommended changes.

In 2014, the Natural Resources Working Group released the results of their work as the Priority Agenda for Enhancing the Climate Resilience of America's Natural Resources. The plan calls generally for the modernization of federal programs (Strategy IV) to build resilience and enhance carbon sequestration, and specifically identifies the need to "strengthen the federal workforce through training to build the climate literacy and capability of natural resource managers." The Department of the Interior (DOI)—among other agencies—was directed to develop a framework for education and training to advance workforce climate literacy and capacity among decision-makers, resource managers, and other relevant staff. In recognizing the value of federal lands to informal education, the Priority Agenda furthermore directs agencies to actively work to incorporate climate change information into existing place-based communication efforts.

The 2014 DOI Adaptation Plan outlines policies and guiding principles for addressing climate change in the stewardship of natural, cultural, and heritage resources. The plan identified outstanding adaptation needs commonly shared by bureaus, including the need to create a climate literate workforce with "broad institutional capacity to effectively address the impacts of climate change on bureau programs and activities." To help address this need, DOI subsequently issued the Departmental Guidance for Enhancing Climate Change Literacy and Capabilities in early 2016, directing all bureaus to assess workforce literacy needs and articulate a workforce training strategy.

The 2010 National Park Service (NPS) Climate Change Response Strategy charted a course for the bureau in responding to climate change. Among the guiding principles outlined in the strategy, the need to enhance institutional capacity and encourage a culture of collaborative learning is deemed crucial to informing all response actions. These aspirations were encapsulated as a formal goal in the larger response strategy (Goal 13).

The NPS and its partners have worked to incorporate climate change into existing training and create original learning opportunities. This document answers the call of the 2016 DOI guidance by summarizing recent NPS efforts to assess climate change training needs and outlining a strategy to enhance workforce climate change literacy.

Summary of Previous Assessments

2011 Intermountain Region Climate Change Training Needs Assessment

In 2010, the NPS partnered with the University of Arizona to conduct an assessment of climate change literacy and training needs (Garfin et al. 2011) for over 5,000 employees in the Intermountain Region. Project leads utilized employee surveys and structured interviews to examine existing climate literacy and training opportunities. Survey questions were tailored to:

- Assess basic and advanced climate literacy
- · Assess the perceived quality of NPS climate change information resources
- Identify preferred methods for delivery of training

Major findings from survey responses (n=609) across these three areas are summarized below.

Climate Literacy

When asked to rate themselves on climate literacy, 90% of respondents rated themselves "excellent", "good", or "fair". Confidence of respondents' self-assessment appeared heavily influenced by job series. Generally, the self-rating was subsequently supported through the correct identification of climate-related terminology and relevant impacts. However, questions involving advanced terminology, cascading effects, climate variability, and climate projections yielded relatively low rates of correct response.

Quality of NPS Information Resources

When asked to rate the quality of NPS climate change information, over 51% of respondents found it to be "average", 16% found it to be "above average" or "excellent, and 33% found it to be "below average" or "extremely poor". Again, responses varied widely with occupational category.

Preferred Methods for Climate Change Training

Respondents identified several key features for preferred climate change training opportunities. Value is placed upon training programs that provide flexibility to work around participant schedules and present mixed methods of presentation (virtual, in-classroom, on-the-job, etc.) There is a preference for credible, tightly-packaged content that orients global climate issues to a relevant, local context. Finally, there is a desire for continued information transfer beyond structured training opportunities, including webinars, lectures, and online discussion forums.

2015 Climate Change Interpretation Survey

In 2015, the NPS Climate Change Response Program distributed a service-wide needs assessment to interpretive personnel through the regional offices. The brief survey consisted of 21 questions that sought to clarify the degree of climate literacy among interpretive staff, gauge their comfort in addressing climate change topics, and identify the extent to which they are actively engaging visitors on the topic.

Major findings from survey responses (n=254) across these three areas are summarized below.

Personal Engagement and Literacy

A majority of survey respondents (73%) reported being personally engaged on the topic of climate change. Furthermore, 84% of respondents reported having a basic or excellent understanding of climate change effects at their park or program. Half of all respondents (50%) also reported being familiar with interpretive themes relevant to climate change at their work site.

Professional Engagement

Interestingly, a slight majority of respondents (54%) reported feeling ill-prepared for including climate change themes into their interpretive programming. Respondents generally felt unable to identify audience climate change beliefs (61%) or engage audiences on climate change topics (54%). Respondents also generally felt they hadn't received resources (53%) and/or training (59%) sufficient to present or facilitate discussions about climate change topics.

Training and Information Needs

A majority of respondents (59%) reported not having received sufficient training to effectively interpret climate change issues. Furthermore, responses to a series of open-ended survey questions intended to highlight roadblocks to climate change interpretation repeatedly cited two main concerns: a perceived lack of management support, and a lack of training opportunities on climate science, audience identification, and techniques.

Summary of Insights

Both the 2011 Training Needs Assessment and the 2015 Interpretation Survey provide insights that might generally be representative of the larger NPS. Caution should be exercised in extrapolating across the entire bureau, however, as neither survey accounted for non-response bias. Furthermore, some job series were noticeably underrepresented in the 2011 sample. Results of the 2015 effort are also limited in that no demographic information was acquired from which to glean the grade level or occupational category of final respondents in the sample.

With these caveats in mind, the results of the survey suggest that a concerted effort is required to ensure a basic understanding of climate change is enjoyed equitably across all occupational categories. Furthermore, all employees would benefit from understanding the relevance of climate change to mission operations, as well as the policies and response efforts of the NPS. Additionally, opportunities are needed to promote advanced and technical climate change literacy—particularly in occupational categories where such literacy is relevant to official duties.

Where possible, a variety of platforms and media should be utilized in the delivery of training and information. Opportunities to capitalize on these resources should be flexible and designed to meet the needs of the targeted employees. Recognizing the limits of employee schedules, training resources should be developed that provide succinct, relevant content over a varied and scalable range of depth.

Desired Future Effort

In considering the results of earlier assessments, it should be remembered that the NPS has made considerable investments in the development of information resources, training opportunities, and related communication products in recent years. Results from earlier assessments likely do not perfectly reflect the current state of climate change literacy in the NPS. A follow-up effort to sample the larger workforce is merited to obtain a holistic view of current training needs and further inform future strategies. Nonetheless, many insights from these earlier assessments remain relevant and inform the needs assessment that follows.



NPS employees and partners contemplate the effects of climate change on Rodeo Beach by participating in a "Magic Window" environmental education program. NPS Image

Current Needs Assessment

Climate change is an unparalleled challenge to the mission of the NPS that will permeate all of our operations into the foreseeable future. As such, it is important that all employees have a basic understanding of the issue, its implications to the work of the NPS, and how our response can contribute to larger efforts. Furthermore, employees across various disciplines should realize how climate change considerations influence their work, and be familiar with the application of related tools and processes to address climate change.

Statements of Climate Change Literacy and Capabilities

The work of the bureau is supported by a wide variety of occupations, which mandates we provide training that develops advanced climate change capabilities relevant to diverse operational roles. In considering the interdisciplinary nature of our workforce, we have crafted broad statements (Box 1) that endeavor to capture the array of knowledge and skills related to climate change presently required across the workforce to meet the NPS mission.

These statements do not reference current or intended training offerings, per se. Rather they provide a narrative accounting of the types of climate change knowledge and skills that should be conveyed through training and information exchange. Individual training opportunities may address one or more of these statements. Conversely, each statement may be supported by one or more training opportunities and/or venues for information exchange.

Box 1. Statements of Climate Change Literacy and Capabilities

Basic Climate Change Literacy

Employees demonstrate a basic knowledge of the causes, processes, and most conspicuous effects of climate change particularly with respect to NPS resources. Furthermore, employees recognize both the scientific consensus on climate change, and major national and international bodies that contribute to climate science.

Policy Context

Employees demonstrate an awareness of the executive, departmental, and bureau policies that guide climate change response actions. In understanding the evolution from policy to applied climate change response, employees recognize opportunities to contribute meaningfully to bureau climate change adaptation and mitigation efforts.

Supervisory Responsibility

Supervisors understand their responsibility for ensuring that all employees are climate change literate commensurate with their official roles. Supervisors identify opportunities for employee training and actively include climate literacy development in the formulation of appraisal plans, work plans, and Individual Development Plans.

Advanced Climate Change Literacy

Employees understand climate change science, response terminology, and/or best management practices relevant to their specific disciplines. Employees demonstrate this understanding through the consistent use of current, credible, and best-available climate change science and guidance in the course of their work.

Climate-conscious Facilities

Employees understand the long-term implications of climate change for park infrastructure and facilities. Long-term projections are used to inform vulnerability assessments and determine overall risk. Natural hazards and plausible futures are considered in the scoping, creation, and prioritization of projects. Planning, design, and construction/ rehabilitation efforts are informed by an awareness of climate change implications on life cycle and planning horizons.

Climate Science Communications

Employees understand the value of the scientific process, recognize the role of climate science in NPS decision-making, and are aware of relevant knowledge gaps and uncertainties. Employees effectively translate climate science concepts and terminology using plain language, visual media, and organized narrative for the benefit of both internal and external audiences.

Climate Change Interpretation

Employees understand that effective internal and external engagement on climate change issues requires more than the conveyance of climate science. Employees use the power of place to provide historical, scientific, and cultural context for climate change and utilize appropriate techniques and strategies to encourage constructive, value-based dialogue.

Compliance & Climate

Employees recognize the nexus between climate change considerations and reviews under the Endangered Species Act, National Environmental Policy Act, National Historic Preservation Act, and other relevant laws. Planning and compliance personnel routinely evaluate the expected contribution to climate change by proposed projects, and the manner in which climate change may affect the project in turn.

Cultural Resources & Climate

Employees understand the value of cultural resources in chronicling past human experience with environmental change, and the unique challenges current climate change poses to ongoing stewardship of those resources. Cultural resources personnel incorporate climate considerations into current methods to inventory, assess, monitor, and interpret cultural resources, and work to innovate and prioritize adaptation efforts in collaboration with diverse partners.

Disaster Response & Preparation

Employees demonstrate an awareness of how climate change influences the occurrence and impact of large-scale incidents. The potential influence of climate change is routinely considered in disaster planning and preparation efforts. Employees readily recognize disasters as opportunities for adaptation, and integrate climate change considerations into emergency response, communications, post-event assessments, and recovery planning.

Fire & Climate

Employees recognize the nexus between climate and fire occurrence, severity, and impact. Fire management personnel utilize climate change projections and a variety of plausible futures to inform planning and prevention efforts, fire response, treatment implementation, and post-fire activities to adapt to new and uncertain conditions.

Large Landscape Response

Employees recognize landscape-scale planning as a vital component of a coordinated response to climate change. Employees actively participate in cooperative planning and management efforts that address climate change and other conservation concerns across larger landscapes within which the park might only be a small part.

Managing Uncertainty

Because climate change effects are not always fully known, managers recognize the value of tools and methods for making decisions under uncertain futures. Decision-makers are familiar with the use of scenario planning, adaptive management, structured decision-making, vulnerability assessments, and other potential tools for addressing uncertainty in management efforts.

Natural Resources & Climate

Employees understand the most current authorities, policies, and goals for natural resource stewardship under a future of continuous change. Natural resource professionals demonstrate an understanding of the myriad ways climate change influences natural systems, routinely consider a variety of plausible futures, carefully weigh divergent management strategies, implement climate-conscious efforts, and avoid maladaptive actions.

Technical Climate Change Literacy

Employees recognize that they rely upon—and contribute to—a wide variety of technical climate change studies in the course of their duties. Employees demonstrate a nuanced, discipline-specific mastery of literature relevant to their official duties, an understanding of outstanding information needs, and preferred scientific methodologies for acquiring quality climate change data to inform management decisions.

Sustainable Operations

Employees recognize the nexus between design, operations, and climate change and identify opportunities to promote sustainability and reduce greenhouse gas contributions. Employees effectively quantify greenhouse gas emissions using standardized protocols and implement mitigation strategies that reduce our operational carbon footprint.

Visitors & Climate

Employees recognize how climate influences the seasonality, timing, patterns, and forms of visitor use in national park units, and the reciprocal influence of visitor activities on climate change and its effects. Employees consider climaterelated visitor projections and attitudes in planning efforts, and pursue climate-conscious management actions that secure long-term benefits for resource protection, visitor experience, and safety.

Occupational Categories and Relevant Training Objectives

Within the workforce structure of the NPS, several job series often work together in support of operational areas. In assessing the training needs of the NPS, we use broad occupational categories to capture the breadth of the NPS workforce. These occupational categories have been adapted from Garfin et al. (2011) to better include all NPS operations and personnel.

Occupational categories are paired with the earlier Statements of Climate Change Literacy and Capabilities relevant to the primary duties of those employees. Employees within each occupational category are not distinguished by appointment type (paid, volunteer, contractor, permanent, term, etc.) Rather, the desired literacies and capabilities apply to all individuals working on behalf of the NPS. The desired degree of literacy and capability for employees within each occupational category is, however, presumed to be commensurate with employee grade and level of responsibility. The result of this pairing (Table 1) provides a high-level picture of overall bureau needs.

It is important to note that the pairing in Table 1 assumes interdisciplinary collaboration in the execution of essential functions. For example, though an understanding of the interplay between climate change and cultural resources is important to park planning, it is assumed that planners will rely upon consultation with cultural resources professionals in most instances. As such, the pairing in Table 1 represents a basic level of occupational knowledge and skill likely sufficient only if interdisciplinary expertise is available.



Park staff from multiple divisions take part in a Climate Friendly Parks Workshop at Yosemite National Park. Park sites must first complete a greenhouse gas emissions inventory, hold an interdisciplinary workshop, and develop a climate action plan to be designated a Climate Friendly Park. NPS Image

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All Employees	•	•		,						,	,	,	,	,			
All Supervisors	•	•	•														
Concessions Management (Program Management)	•	•					•									•	•
Communications (Education, Exhibit Design, Interpretation, Park Guide, Public Information, Science Communications, Visual Information)	•	•		•	•	•	•		•	•	•			•		•	
Cultural Resources Management (Anthropology, Archeology, Archives, Cultural/ Heritage Landscapes, Historic Architecture, Materials Conservation, Museum Management)	•	•		•		•			•	•			•		•		
Facilities Management (Custodial, Design and Engineering, GIS, Labor, Maintenance, Motor Vehicle Operations, Skilled Trade, Trails, Transportation, Utility Systems)	•	•		•	•				•	•			•			•	•
Wildland Fire Management (Fire Management, Fire Ecology, Fire Public Information, Fuels Specialists, GIS , Monitoring)	•	•		•		•				•	•	•	•		•		
Natural Resources Management Life & Physical Sciences)	•	•		•		•				•	•	•	•	•	•		
Park Planning Planning, Environmental Compliance, Environmental Protection)	•	•		•	•	•		•				•	•			•	•
Senior Park Management (Deputy Superintendent, Division Chiefs, Park Manager, Superintendent)	•	•		•		•		•	•		•	•				•	•
Visitor and Resource Protection (Law Enforcement, Park Police)	•	•								•	•						
Visitor Use and Experience Recreation Planners, Social Scientists, Visitor Jse Specialists)	•	•		•											•		•
Safety (Safety Program Management, Public Health)	•	•		•						•							

Workforce Training Strategy

Service-wide Training Goals

The NPS recognizes the importance of institutionalizing relevant climate change considerations into every facet of our operations. Workforce climate change literacy is a necessary component of responding effectively to climate-related management issues and compounding environmental stressors. Providing a continuum of opportunities for structured learning, information exchange, and collaboration builds capacity to respond effectively to climate change across all occupational categories. In pursuit of this, the NPS aspires to:

Box 2. NPS Service-wide Training Goals

Afford every NPS employee opportunities to acquire basic climate change literacy and understand the relevance of climate change to NPS operations.
Provide "road maps" to incremental coursework and resources relevant to NPS occupations and grade levels.
Collaborate with governmental and nongovernmental climate change leaders to provide quality climate change training that advances mutual goals.
Promote, encourage, facilitate, and reward employee investments in climate change literacy and capacity.

To reach these goals, the following four objectives and related tactics will guide NPS climate change training efforts:

Keep Track

The volume and nature of climate change information changes constantly, as do the structure and abilities of the NPS workforce. Ensuring a continuity of institutional capacity to address climate change mandates that we keep pace with the information needs of the organization. To meet this objective, the NPS will:

- Formulate and administer service-wide needs assessments on a recurring basis to guide future investments in climate change literacy training.
- Inventory the breadth and diversity of occupational categories represented in the NPS workforce to identify appropriate yearly training goals.
- Work with administrative leads for the NPS Common Learning Portal and DOI Learn to identify appropriate metrics for tracking workforce training participation.

Workforce Training Strategy

EOD to COB

Climate change is a dynamic issue that provides perpetual opportunities for learning. From their first day of employment (EOD) through their last (COB), NPS employees will be encouraged to consider the implications of climate change and their professional obligations to respond. To meet this objective, the NPS will:

- Partner with colleagues in Workforce and Inclusion to incorporate basic climate change literacy and policy context into New Employee Orientation and/or Fundamentals courses.
- Work with training leads to develop recommended curricula for occupational categories that align with Office of Personnel Management Leadership Competencies, NPS Universal Competencies, and discipline-specific competencies.
- Identify and utilize appropriate channels to provide notice of climate change training and resources for target segments of the NPS workforce.
- Reward employee investments in climate literacy through scholarships, certification programs, and/or recognition of accomplishments that demonstrate climate change leadership.

Blur the Lines

Because climate change is not the purview of a single occupation or a single geographic area, NPS efforts to enhance climate change literacy must be holistic and interdisciplinary. NPS climate change leads will work alongside colleagues in Workforce and Inclusion to inventory, create, and promote climate change training and resources that support all facets of climate change response at a landscape scale. To meet this objective, the NPS will:

- Coordinate training efforts with other federal agencies through meaningful participation in the DOI Climate Change Training Subgroup, the US Global Change Research Program Education, Training, and Extension Interagency Group, and other multi-organization working groups.
- Predicated on results from periodic needs assessments, work with subject matter experts across multiple disciplines to create, promote, deliver, evaluate, and revise specialized trainings that cater to the needs of diverse occupational categories.
- Identify and facilitate opportunities for NPS employees to participate in non-NPS climate change training that advances climate change literacy and response capacity, and provide reciprocal opportunities to participate in NPS coursework as a means of facilitating climate change response with partners and stakeholders.

Workforce Training Strategy

Facilitate Action

The NPS invests in structured climate change training and information exchange as a means to empower and inspire appropriate response action. As a logical extension of the training continuum, the NPS will cultivate communities of practice that support response efforts through ongoing dialogue and collaboration. To meet this objective, the NPS will:

- Foster the creation of robust professional networks that support ongoing climate change response efforts across various occupational categories.
- Create and promote tools and applications that facilitate the sharing of relevant content across the NPS workforce.
- Utilize a variety of media to foster information exchange broadly across the bureau and between partners.
- Support a bureau-wide climate change training lead to orchestrate workforce literacy efforts and advance the goals of this strategy.



Park staff at Valley Forge National Historical Park discuss effective climate change communication strategies during a Climate Friendly Parks workshop. NPS Image

Inventory of Current Offerings

Inventory of Current NPS Climate Change Literacy Offerings

The NPS presently provides structured training and channels of information exchange that advance some of the workforce literacy and capabilities required to meet the organizational mission. Additional training offerings are intended and in development. A summary of present workforce literacy efforts supported—in whole, or in part—by the NPS is provided in Table 2. Presently, NPS investments in these offerings are intended to serve primarily—though not exclusively—the NPS workforce.



Every summer, the George Melendez Wright Initiative for Young Leaders in Climate Change hosts a cadre of high-caliber students to tackle rigorous climate change response projects in parks. Leadership and intake opportunities present an additional means—beyond training and information exchange—to cultivate needed skills and abilities in the NPS workforce. NPS Image

Inventory of Current Offerings

Table 2. Inventory of Current NPS Climate Change Literacy Offerings

Title	Status	Primary NPS Audience	Description									
Structured Training												
Introduction to Climate Change in National Parks —Career Academy for Natural Resources	Active	All NPS Employees	This is an introductory course. Students learn the basic science of climate change; become familiar with policies, programs and partnerships that guide and support climate change response and science; and explore case studies highlighting ways that the changing climate is impacting NPS park resources. The course also introduces the principles park managers are using to assess, adapt to and plan for changing conditions.									
New Superintendents Academy	Active	Superintendents & Senior Park Managers	Newly-appointed senior park managers are familiarized with climate change response concepts, relevant science, support networks, and tools for planning, adaptation, and decision-making. Three iterations of this course have been offered since 2013.									
Climate Friendly Parks	Active	Park Managers, Planners, Facilities and Communications	Workshop participants measure operational greenhouse gas (GHG) emissions and develop strategies to address sustainability challenges, reduce GHG emissions, and anticipate the impacts of climate change on park resources.									
Interpreting Climate Change Virtual Course	Active	Interpreters, Educators, & Communicators	This course examines and deconstructs barriers to climate change interpretation on public lands. Participants investigate the basis of climate change science, explore the attitudes and perceptions of park audiences, scope ideas and themes for park-specific climate change stories, and learn tools and techniques for visitor engagement.									
Interpreting Climate Change Self-Study Modules	Active	Interpreters, Educators, & Communicators	This course examines and deconstructs barriers to climate change interpretation on public lands. Participants investigate the basis of climate change science, explore the attitudes and perceptions of park audiences, scope ideas and themes for park-specific climate change stories, and learn tools and techniques for visitor engagement.									
Earth to Sky	Active	Interpreters, Educators, & Communicators	This course uses a collaborative approach to interagency professional development, bringing scientists and educators together in collegial learning environments. Training events emphasize development of plans for use of course content in participants' work environment.									
Information Exchange												
Climate Change Response Program Monthly Webinar Series	Active	ALL NPS Employees	Subject matter spans multiple facets of climate change response relevant to the NPS.									
Climate and Culture Group	Active	Cultural Resource Managers	Monthly calls for the growing Climate and Culture community of practice. Calls include brief announcements of upcoming events, updates on major projects, and then a discussion section around a big topic.									
Climate Change Response Program Newsletter	Active	All NPS Employees	Subject matter spans multiple facets of climate change response relevant to the NPS.									

Next Steps

Working through the auspices of the DOI Climate Change Training Subgroup, the NPS will actively review the needs assessments and training strategies submitted by all bureaus. The review will seek to identify commonalities among bureaus regarding desired workforce literacy, and highlight opportunities for collaborative work that better integrates climate change literacy and capabilities across DOI.

The NPS will work with all sister bureaus to compile a full accounting of climate change training offerings currently available or planned. Once complete, the inventory will help identify alignment between current training efforts and desired workforce literacy across bureaus. In concert with the results of the needs assessments, the inventory will also identify outstanding gaps in current training efforts and provide a direction for future development.

Training leads and subject matter experts within the NPS will continue to identify opportunities to advance stated workforce training goals. Both the development of future trainings and the updating of current offerings will be coordinated in consultation with sister bureaus to identify opportunities for collaboration, provide broad utility, and maximize student participation. The NPS will continue to actively participate in the DOI Climate Change Training Subgroup as the primary avenue of collaboration to meet training needs within the department.



In 2013, Sagamore Hill National Historic Site joined the more than 120 NPS units currently designated as Climate Friendly Parks. NPS Image

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A park ranger guides students along a path during an Every Kid in a Park Climate Change Boot Camp at Indiana Dunes National Lakeshore. NPS Image