

# Climate change, management decisions, and the visitor experience: The role of social science research

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**P**ARK PROFESSIONALS ARE CONFRONTED with complex climate change scenarios that require decisions based on the best available science. Professional staffs often use field-based data to inform management decisions, and social scientists have long gathered this information. For example, the NPS Social Science Branch of the Environmental Quality Division oversees the Visitor Services Project that regularly collects basic information about visitors (e.g., visitation characteristics and history, visitor preferences, visitor demographics, and spending patterns) at many park units. As a result, park professionals have used social science information to contribute to decisions, such as facility and service improvements, site-specific visitor regulations, and information dissemination. In the context of climate change, park professionals may need more specific information about visitors' knowledge, beliefs, attitudes, motivations, and behavior to inform approaches to visitor management, messaging, education, and outreach. In this article, we outline current and potential social science research contributions to assist park staffs in effective decision making about climate change.

## Toward effective decision making

The NPS Climate Change Response Program (CCRP) reveals that as conditions shift, "effective decision making will require a flexible approach for incorporating new and relevant science" (CCRP 2010). In 2009 the National Research Council (NRC) identified six principles for effective decision making that are neces-

**Abstract**  
Park professionals often use field-based data to inform management decisions, and social scientists have long gathered this information. As park staffs confront the new challenge of climate change, information developed through social science research will enable them to make more effective management decisions. Using six principles identified by the National Research Council and incorporated by the NPS Climate Change Response Program, we outline current and potential social science research contributions to assist park staffs in effective decision making about climate change. As society's understanding of and responses to climate change evolve, social science will be a crucial tool to assist both young NPS employees and veteran park professionals in effectively making decisions and communicating them in response to climate change in parks.

**Key words**  
climate change, park management, social sciences, visitor experiences

sary for a flexible approach, and recently the National Park Service outlined these principles in its strategy to address climate change (CCRP 2010). In the following sections, we explain how social science applications can facilitate inclusion of these principles for park staff responding to climate change (e.g., reducing a park's carbon footprint, increasing awareness of visitors and staff, climate change scenario planning). Additionally, table 1 (next page) matches principles of effective decision making with social science methods that can provide needed information and insight.

## *Begin with managers' needs*

The first principle recommends *beginning with managers' needs* so the necessary tools (e.g., on-site visitor surveys; see table 1 for examples of additional tools) can be prescriptively developed to provide desired outcomes (e.g., information about visitors' perceptions of site-specific

climate-sensitive resources). Addressing specific management needs is a hallmark of the social science research process. For example, social scientists often first conduct qualitative interviews or focus groups with park staff to inform the development of a quantitative visitor survey (i.e., Instrument Development Approach; Creswell and Plano Clark 2011). This approach has proved effective in helping park professionals manage and understand the visitor experience within a climate change context. For example, researchers (Brownlee and Hallo 2011) used in-depth interviews with professionals at Kenai Fjords National Park (Alaska) to identify their information needs regarding visitors' opinions about climate change. During this process, park staffs were able to express clearly what they wanted to know about visitors' opinions of climate change. Research questions included: What are visitors' levels of perceived awareness about global climate change issues, beliefs about anthropogenic causation, and awareness of climate impacts to sensitive resources at Kenai Fjords?

**Table 1. Typical social science methods that can address principles for effective decision making**

Examples of Social Science Methods	Principles for Effective Decision Making					
	Begin with Managers' Needs	Give Priority to the Process	Link Information Providers and Users	Build Connections Across Disciplines and Organizations	Enhance Institutional Capacity	Design for Learning
Park-specific surveys (telephone, mail, Internet, face-to-face)	X		X			X
Topic-specific interviews and oral histories	X	X	X	X		X
Focus groups and workshops that engage multiple perspectives	X	X	X	X	X	X
Content analysis of existing information, blogs, and public comments	X		X	X	X	X
Evaluating effectiveness of existing education (e.g., citizen science programs) and interpretive programming	X	X			X	X

*Note:* This table is not intended to be inclusive of all principles for effective decision making or social science methods. Instead, the table presents the most direct relationships among decision making principles and social science methods.

Based on these interview results, researchers created a park-specific visitor questionnaire to answer these questions. Questionnaire results indicate visitors generally believe global climate change is occurring and are interested in the topic, but are unaware of the sensitivity of park resources to climate change or the biophysical changes that have occurred recently at the park (such as increased vegetation). Interpretive specialists can now focus limited resources on increasing visitors' awareness in this area. Furthermore, because the results indicate some visitors are uncertain of human influence on climate, interpretive themes may be better designed to include and target this topic as an opportunity to educate and inspire stewardship.

### *Give priority to the process as well as the products*

Second, the NRC recommends giving *priority to the process as well as products*. Specifically, the CCRP (2010) states, "By starting with the engagement process that

brings together relevant stakeholders (e.g., managers, planners, park specialists, scientists, and the public), we can encourage the development of scientific and other products that are relevant to decision making and supportive of a shared vision." Social scientists who investigate public participation emphasize the importance of matching the appropriate process with desired outcome (Chess and Purcell 1999; Leong et al. 2007). Depending on the management context, a suite of approaches can be used to engage not only visitors, but also near-park communities and relevant stakeholders, including individuals potentially most influenced by climate change in or near the park (fig. 1).

In addition to the standard public participation processes (e.g., public comment periods, community meetings) stakeholders may engage directly in climate science in parks. For example, since 2008, park professionals and researchers at Glacier National Park (Montana) have engaged park visitors and community members in climate change issues through participation in the High Country Citizen Science

Program. Specifically, participants (including high school students) help collect observational data about climate-sensitive species such as mountain goats and pikas at Glacier. Park professionals give priority to this process because "engaging the public and youth in data collection instills a strong sense of responsibility and a desire to promote resource conservation on behalf of the park" (Carolin et al. 2011). Social science can add significantly to this process by evaluating program effectiveness, such as increases in participants' awareness, climate change literacy, or changes in their attitudes toward climate change mitigation.

### *Link information providers and users*

The third principle is to *link information providers and users*, and social scientists working on climate change issues (i.e., information providers) can provide critical information for park professionals (i.e., users). This fits well with a fundamental principle of effective park management:

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**Figure 1 (above and right).** Depending on management context, a suite of social science methodologies can be used to engage not only visitors but also near-park communities and relevant stakeholders. These include individuals potentially most influenced by climate change in or near the park.



*As society's understanding of and responses to climate change evolve, social science will be a crucial tool to assist both young NPS employees and veteran park managers in effectively making decisions and communicating them in response to climate change in parks.*

understanding visitors' opinions and perspectives. The uncertainty associated with future climate change scenarios in parks amplifies the importance of this park management principle. Specifically, park professionals may confront unforeseen scenarios caused by climate change (such as flooding or species attrition), and incorporating visitors' opinions about climate change and preferences for related management decisions may assist in effective and efficient decision making. Furthermore, park staffs charged with communicating or interpreting climate change may be more effective when equipped with a comprehensive understanding of visitors' beliefs about climate change, the causes of climate change, or the perceived role of science in their lives. While general polling results about climate change do exist (e.g., the Six Americas study), visitors to a national park are not necessarily representative of the U.S. public. Additionally, a wealth of information from the last 40 years indicates that park professionals and visitors often differ (sometimes substantially) in their opinions about resource conditions and levels of

human-related impacts (Manning 2011). Therefore, park professionals may need specific information about visitors' climate change opinions.

Currently, social science researchers (Thompson 2011) are engaged in a project to provide such information to park professionals. Specifically, researchers are conducting interviews, focus groups, and surveys with park professionals and visitors to "identify potential educational opportunities and knowledge gaps about climate change among target audiences" (CCEP 2011). This study is being conducted in six different areas of the National Park System, including some in Alaska and Florida, which both contain climate-sensitive and human-influenced resources. Park professionals will use results from this study to design specific climate change messaging for general communication planning, outreach and education, and interpretive design and delivery.

### *Build connections across disciplines and organizations*

Social scientists involved in park research often work with multiple agencies and on multidisciplinary teams, which addresses the fourth principle: *building connections across disciplines and organizations*. Often, lands managed by other agencies (e.g., USDA Forest Service) border units of the National Park System, and social scientists can assist in identifying and bridging gaps in regard to climate change that exist across cooperating agencies. For example, cooperating agencies may differ in policy responses and planning frameworks for climate change, and social scientists can use processes such as content analysis and interviews to identify these differences.

Recently, Delach and Matson (2010) compared climate change strategies and plans across the U.S. Fish and Wildlife Service, the National Park Service, and the USDA Forest Service. Specifically, researchers used a content analysis approach of each agency's climate change strategy to



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**Figure 2.** Social science evaluations can provide important and timely information that can help interpretation specialists understand the most effective climate change media and messages for their visiting audiences.

identify differences and similarities in the areas of policy, law, planning, modeling, research, partnerships, and monitoring. Researchers concluded, “Looking at the plans in tandem provides a clearer vision of the types of goals and actions needed to prepare agencies to respond to climate change than any of the three plans offer[s] alone” (Delach and Matson 2010). Such social science outcomes can help park staffs understand differences and similarities among agencies, which can inform collaborative planning processes and improve interagency connections.

### *Enhance institutional capacity*

Building connections across disciplines and agencies can additionally address the fifth principle, *enhancing institutional capacity*, which calls for adding flexibility, network building, and establishing new practices. One area that enhances institutional capacity is effective staff training (Edington et al. 2001). Recently, the NPS Intermountain Region (IMR) and social science researchers (Garfin et al. 2011) collaborated to assess climate change training needs for more than 5,000 IMR employees. Specifically, social science researchers used a structured online survey followed by semistructured interviews with IMR

employees to identify employee preferences for dissemination of training information (e.g., webinars, online resources), as well as training-related challenges to addressing climate change (e.g., cost). Furthermore, the results assisted in assessing existing Internet climate change training resources that could be used for a variety of position categories (e.g., operations, interpretation). As a result, social science researchers were able to identify the potentially most effective training methods and content to address IMR employee needs.

## Design for learning

Finally, the Climate Change Response Program and the National Research Council recommend that park staff *design for learning*, which encourages exploring alternative explanations and approaches. As park staffs learn more about visitors' opinions through social science, they may identify the most effective ways to communicate and interpret climate change to visitors (fig. 2). After park professionals design a climate change interpretation program, researchers using social science approaches such as pre- and post-participation assessments can evaluate the effectiveness of different climate change interpretation techniques. As a result, social science evaluations can provide important and timely information that can help interpretation specialists understand the most effective climate change media and messages for their visiting audience. In turn, park professionals can use relevant social science research to understand the full impact of park experiences on visitors' opinions, attitudes, and perceptions regarding climate change. Such "design for learning" processes may allow park professionals to understand alternative strategies and the efficacy of new approaches.

## Conclusion

Social scientists have increasingly contributed to effective park management over the last few decades. As park professionals confront the new challenge of climate change, data gathered through social science research will enable them to make more effective decisions. As NPS Director Jarvis indicated, "The young employees I have met who are just starting in this wonderful organization will be dealing with climate change their entire career" (CCRP 2010). As society's understanding of and responses to climate change evolve, social

science will be a crucial tool to assist both young NPS employees and veteran park managers in effectively making decisions and communicating them in response to climate change in parks.

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