The State of Human Dimensions Capacity for Natural Resource Management: Needs, Knowledge, and Resources

Natalie R. Sexton, Kirsten M. Leong, Brad J. Milley, Melinda M. Clarke, Tara L. Teel, Mark A. Chase, and Alia M. Dietsch

Introduction

The social sciences have become increasingly important in understanding natural resource management contexts and audiences, and are essential in the design and delivery of effective and durable management strategies. Yet many agencies and organizations do not have the necessary resources and staff to effectively address the human dimensions (HD) of natural resource management. We draw on the textbook definition of HD: how and why people value natural resources, what benefits people seek and derive from those resources, and how people affect and are affected by those resources and their management (Decker, Brown, and Siemer 2001). Clearly articulating how HD information can be used and integrated into natural resource management planning and decision-making is an important challenge faced by the HD field. To address this challenge, we formed a collaborative team to explore the issue of HD capacity-building for natural resource organizations and to advance the HD field. We define HD capacity as activities, efforts, and resources that enhance the ability of HD researchers and practitioners and natural resource managers and decision-makers to understand and address the social aspects of conservation.

Specifically, we sought to examine current barriers to integration of HD into natural resource management, knowledge needed to improve HD capacity, and existing HD tools, resources, and training opportunities. We conducted a needs assessment of HD experts and practitioners, developed a framework for considering HD activities that can contribute both directly and indirectly throughout any phase of an adaptive management cycle, and held a workshop to review preliminary findings and gather additional input through breakout group discussions. This paper provides highlights from our collaborative initiative to help frame and inform future HD capacity-building efforts of natural resource organizations and also provides a list of existing human dimensions tools and resources.[1]

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Human dimensions needs assessment

In September 2012 researchers from the US Geological Survey, Fish and Wildlife Service, and National Park Service collaborated on an HD training and resource needs assessment. The goal was to better understand the HD capacity of the two latter agencies, as well as that of the Bureau of Indian Affairs, Bureau of Land Management, Bureau of Ocean Energy Management, Environmental Protection Agency, National Oceanographic and Atmospheric Administration, US Forest Service, and several state fish and wildlife agencies. The objectives of the assessment were to better understand the following from the perspectives of HD experts and practitioners of the participating agencies:

- overall HD capacity;
- capacity to provide HD tools, resources, and training to their staff;
- currently available HD trainings and resources; and
- prioritization and satisfaction with available training and resources.

For this assessment, the term "social science capacity" was used (as opposed to HD capacity) and was defined as:

- staff who are knowledgeable about social science;
- the availability of social science training and resources;
- support for social science from management; and
- other factors that contribute to the agency's ability to incorporate social science into the decision-making process.

A total of 60 HD experts and practitioners were asked to complete a web-based survey with fixed-response and open-ended questions. Survey participants who could assess the HD capacity of their respective organizations were identified through a network sampling approach in which known HD experts recommended colleagues, and those colleagues in turn recommended others for participation. Thirty-two respondents representing 12 federal and state natural resource agencies completed the survey, for a 53% response rate.

Respondents were asked to rank the overall social science capacity of their agency and how they would like to see that capacity change over time (Figure 1). On average, respondents rated their agencies as having slightly-less-than-moderate capacity overall, and specifically for providing training and resources to their staff. Respondents most often cited a lack of specialized staff as a limitation to their agency's HD capacity. Other reasons included financial constraints, lack of expertise among current staff, and a general lack of awareness of the need for social science on the part of management and scientists from disciplines outside of the social sciences. Respondents indicated they would like to see a moderate to significant increase in HD capacity over time.

Respondents were also asked to rank the relative importance of three different types of social science training courses and the need for external and internal training offerings. A course on interpreting social science data was identified as most important, followed by a course on "What is social science?" and training on how to conduct social science research. Finally, respondents indicated that the greatest need was for internal training and resources (as opposed to those provided by external entities) that are specifically geared toward their

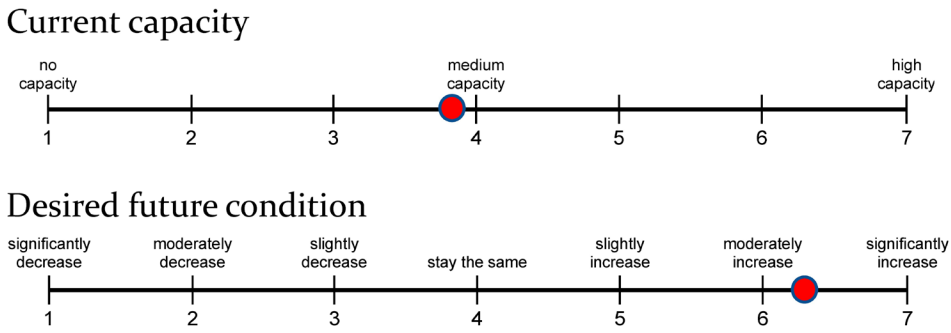

Figure 1. Current social science capacity and desired future conditions.

agency's mission. The results of this needs assessment present a strong case for increasing HD capacity within the surveyed agencies.

Human dimensions framework

In preparation for the workshop, we realized that there is no common framework for talking about the range of disciplines and activities involved in HD practice. HD researchers and practitioners acquire sound information through application of theories and qualitative and quantitative methodologies from various social science disciplines. These include (but are not limited to): sociology, anthropology, psychology, political science, economics, communication, history, ethics, and philosophy. Information can be applied to many aspects of natural resource management, from situation analysis, planning, decision-making, program/intervention implementation, policy development, informative communication, education, audience research, and evaluation. Because natural resource management inherently involves value judgments about desired resource outcomes, HD information can inform all stages of an adaptive management cycle. Stages of most management cycles include identifying issues, planning management actions, implementing actions, and evaluating outcomes (Figure 2).

One of the challenges faced by HD researchers and practitioners is explaining how the variety of social science disciplines can be applied and integrated toward particular management goals. Our framework identifies two main classes of HD activities: (1) foundational information needed to better understand context and audiences; and (2) functional areas in which HD is applied to management issues (Figure 3).

The *foundations* are the social science disciplines that create a basic understanding of the natural resource management context and internal and external audiences. This information aids selection of the appropriate data or tools to address the particular management issue. Foundational information can be applied directly to management; for example, by describing stakeholder preferences for management outcomes or approaches, or by assessing what types of data are needed to evaluate outcomes.

The foundational information also can inform a suite of management actions directed towards people that support the various stages of the management cycle. These *functional applications* are fields of study in and of themselves, with their own theories and communi-

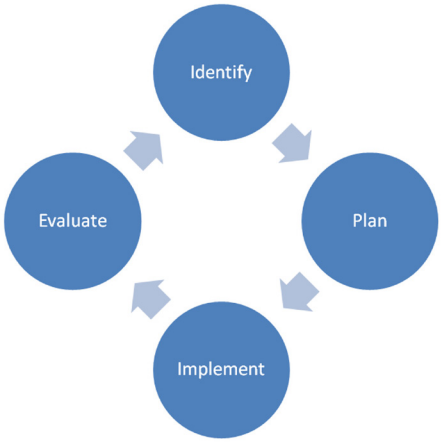

Figure 2. Basic stages in an adaptive management cycle.

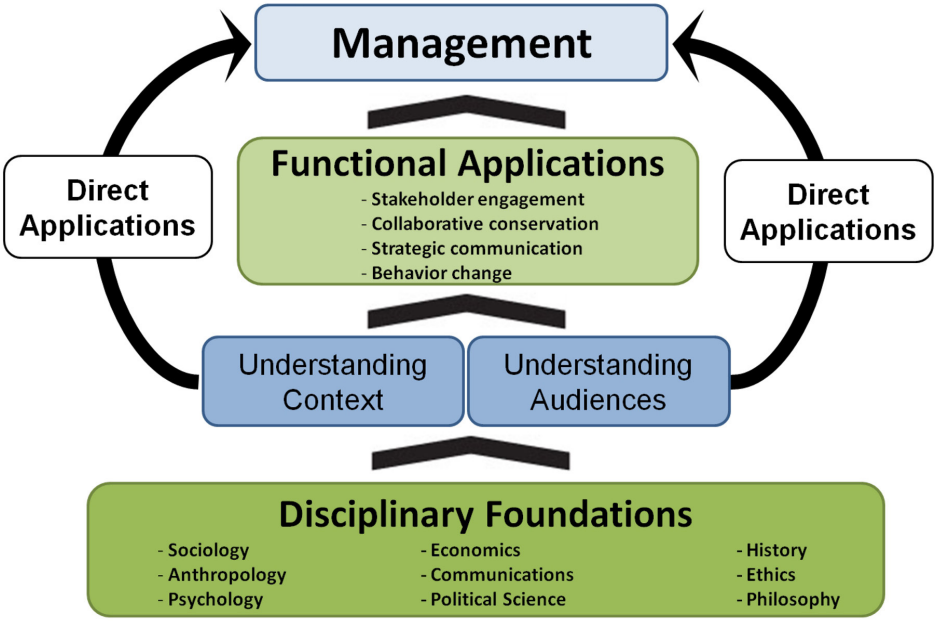

Figure 3. Framework for human dimensions of natural resources.

ties of practice informed by social science information. This framework identifies some of the key functional applications we think are most utilized by managers. There is overlap between the areas, and it is not an exhaustive list, but it offers a starting point from which to consider how functional applications apply to natural resource management.

We believe this framework will improve managers' capacity to identify the social elements of a management issue early in its development and help frame problems broadly

enough to effectively address the human dimensions of the subsequent management activity. Both foundational and functional applications of this HD framework can contribute to each stage of the management cycle, with some functional applications better suited for certain stages than others and some contributing at multiple stages of the management cycle.

Human dimensions capacity workshop overview

In late September 2012, we held a workshop entitled "The State of Human Dimensions Capacity: Current Needs and Training Opportunities" during the conference "Pathways to Success: Integrating Human Dimensions into Fisheries and Wildlife Management." Thirty-six HD researchers and practitioners, as well as natural resource managers from state and federal agencies, nongovernmental organizations, and academic institutions, were in attendance. The objectives of the workshop were to better understand the state of HD capacity among natural resource agencies and professionals, vet the HD framework we developed, and identify important needs, knowledge, and resources to strengthening that capacity within and across agencies.

We provided participants with background information on the HD field and the types of methodologies, information, and insight that HD can bring to natural resource management. We then presented the HD framework. Reactions to the framework were generally positive, with overall agreement that, with refinement, it was a useful schematic to describe the breadth of expertise and disciplines encompassed by the field. Participants expressed a desire to develop a more cohesive identity for the broader field, as well as improve managers' capacity to recognize the need for HD research and practice. Participants noted the need to (1) identify HD needs of a management issue early in the process and (2) frame problems more comprehensively to effectively address the human dimensions of management activities. We also provided an overview of the needs assessment results from our earlier survey work, and highlighted several key HD tools and resources available to managers, planners, and decision-makers.

We then asked participants to identify their three greatest HD-related management challenges and to categorize each challenge under the most closely associated foundational or functional area of the framework. We then framed breakout group discussions around the five areas with the greatest number of management challenges identified: understanding audiences, stakeholder engagement , collaborative conservation, strategic communication/behavior change, and organizational capacity. For each topic, participants were asked to identify: (1) specific needs and constraints; (2) knowledge, skills, and abilities required to address the needs and constraints; and (3) available tools and resources. Outcomes of the breakout groups are summarized below. Resources identified by the groups are included in the human dimensions tools and resources list (see endnote 1).

Breakout group outcomes

Understanding audiences. The more we know about our audiences, the more knowledge we have to contextualize the management issue. Workshop participants broadly acknowledged that an understanding of different audiences is critical to natural resource management success. Increasingly, different stakeholders are engaged in natural resource management con-

versations and decision processes; reaching beyond traditional networks of stakeholders (e.g., hunters and anglers in the case of state fish and wildlife agencies) is vital to effectively representing diverse public opinions. Participants easily identified some key constraints to understanding audiences such as changing constituent bases, changing demographics, diverse and often conflicting interests of stakeholders, and cultural communication challenges.

When asked to identify the knowledge, skills, and abilities necessary to understand audiences, workshop participants noted that communication skills and an ability to build effective relationships with stakeholders were essential. Participants also noted that building relationships with various audiences must be based on trust, and that such relationships can take considerable time and effort to initiate and maintain. The crucial first step in this process of building relationships is an ability to *accurately* identify the stakeholders involved in a given process/issue, ensuring no interest is ignored. Participants articulated that understanding audiences minimizes the likelihood of both excluding key stakeholders and/or making incorrect assumptions about different interest groups. Furthermore, this understanding and inclusion brings greater transparency to decision-making processes, making public involvement more meaningful.

While participants generated a substantial list of needed knowledge, skills and abilities, they recognized the many existing resources to better understand audiences. A suggested reasonable starting point was simple demographic data available from various levels of government (e.g., data supplied by the US Census Bureau). Existing groups that are already involved in an organization's processes were also identified as potential key resources when identifying other stakeholders to bring to the table.

Stakeholder engagement. Engaging individuals or groups of individuals who have an interest or "stake" in the outcome of management actions is an important part of natural resource management. The engagement approach depends on the context and type of decision to be made. Over time, there has been a shift away from the expert model of decision-making, where stakeholder input is accepted but not actively sought, to a more dialogue-based mutual learning approach to public input. These approaches exist on a continuum that has been described by several authors and organizations, including Arnstein (1969), the International Association of Public Participation (2007), and Leong et al. (2009).

Participants in this discussion group focused on ways to engage the public, including "non-traditional" stakeholders, in organization activities and how to integrate HD information more readily into planning and decision-making processes. There was a clear recognition that non-traditional stakeholders matter and that it is important to engage them. Finding the appropriate starting place on the engagement continuum was also an expressed need—how to engage stakeholders in meaningful ways without the organization or managers being perceived as having already made a decision. Participants also expressed the need to bring together opposing stakeholder groups to resolve conflict and develop acceptable policy. Lastly, some participants indicated that they need to be able to more effectively report HD information related to stakeholder engagement to their organization's leadership.

When participants were prompted to list the knowledge, skills, and abilities to address the above-mentioned needs, the following comments emerged: understanding how to appropriately use HD information, effective communication and public engagement skills. and an

ability to use social science methods and tools to identify and better understand the diversity of stakeholder groups (including emerging publics and non-traditional stakeholders). Additionally, several participants alluded to the need for a change in organization "culture" to acknowledge the value of HD and cultivate a more holistic understanding and acceptance of diverse perspectives.

Several information sources, tools, and training opportunities were identified to inform effective stakeholder engagement and conflict management. The Association of Zoos and Aquariums was mentioned as an organization actively involved in working with diverse and non-traditional groups. Several stakeholder engagement tools and resources developed by various federal agencies (including the Forest Service, Environmental Protection Agency, and National Oceanic and Atmospheric Administration) and by the International Union for the Conservation of Nature were identified. Key conflict management and stakeholder engagement training sessions were identified, including those offered by the US Institute for Environmental Conflict Resolution, the Human–Wildlife Conflict Collaboration, and the Institute for Participatory Management and Planning.

Collaborative conservation. Collaborative conservation involves a deliberate and inclusive process of individuals or groups coming together to respond to an important conservation issue. It is one approach to stakeholder engagement, and an outcome of developing conservation partners to maximize efficiency in achieving management objectives. It draws from stakeholders' knowledge of the management context to identify common interests and complementary activities. This approach is becoming increasingly important as natural resource management emphasizes landscape-scale efforts beyond administrative boundaries (e.g., Department of the Interior initiatives such as Landscape Conservation Cooperatives, Joint Ventures, and America's Great Outdoors, or Conservation International's Sustainable Landscapes).

Workshop participants were generally in agreement that collaborative conservation is needed if managers are to be successful in the future given the realities of budgetary constraints and staffing shortfalls, and the myriad 21st-century threats to fish, wildlife, and their habitats (e.g., drought, climate change, invasive species, and large-scale habitat fragmentation and loss). The importance of coordinating resource management across organizational boundaries through effective partnerships was reiterated several times by workshop participants. Participants also identified constraints to building a culture of collaborative conservation, such as difficulty in obtaining support and permission from management to operate collaboratively, resistance within agencies to working with outside entities, the time that collaboration actually takes, and a lack of understanding of the best strategies for collaboration.

The knowledge, skills, and abilities necessary for collaborative conservation identified by participants included an understanding of the mission of other partners and the common goals of those involved with the collaboration. It is also important to identify the benefits to working collaboratively, when this approach makes the most sense, and how to effectively collaborate. Effective communication skills are key to these efforts. It was also noted, however, that capacity to collaborate is sometimes dependent upon the willingness of management to support the idea.

The list of resources generated by workshop participants fell into two broad categories: training and facilitation. Under training, several private firms and public entities were mentioned; one notable example was the National Park Service's facilitator training. Colorado State University's Center for Collaborative Conservation was mentioned several times as an effective agent for facilitating successful partnerships.

Strategic communication/behavior change. Effective communication plays an important role in many aspects of natural resource management. We adopted the term "strategic communication" to emphasize the importance of setting clear communication objectives, recognizing that goals of raising awareness, changing attitudes, or changing behaviors are all best achieved through very different theoretical approaches, types of messages, or other incentives. Because much of the interest in strategic communication among participants centered on behavior change, we combined these areas into one breakout group for discussion.

In the context of strategic communication and behavior change, participants identified the following needs: public meetings that encourage more meaningful involvement from a diverse array of stakeholders, greater organizational openness to social marketing approaches and promotion of resource stewardship through interpretation that focuses on developing emotional bonds with resources, and the need for evaluation of effectiveness of communication activities.

Participants identified methods and integration as the keys to communicating strategically or affecting behavior change. Participants believed that trainings in effective communication were needed for *all* managers. Some of the desired skills included how to segment audiences, identify drivers of behavior, use social science data to craft effective messages, utilize multiple approaches to create behavioral change, and identify appropriate metrics for both front-end and summative evaluation. Participants also discussed the importance of skills to address communication timing, including understanding the potential consequences of poorly timed communication. To integrate strategic communication into management, participants focused on the need for a situation analysis that could determine the appropriate strategic communication approach, based on objectives. They emphasized development of measurable goals and objectives, so that success can be easily evaluated. They also desired a diagnostic tool that relies on available data to better understand an audience or create messages that influence behavior. Participants reiterated that for integration to occur, managers first must recognize the need for audience analysis and assessment, as well as the importance of targeted information and timing of information. To achieve behavior change, managers also must recognize that information alone may not be adequate. Better utilization of marketing, understanding of incentives and motivations, links to policies and enforcement, and creation of alternatives may be as (or more) important as crafting informational messages.

Suggested resources included books such as *Communication Skills for Conservation Professionals* (Jacobson 1999), the National Audubon Society's "Tools of Engagement" planning guide, and a range of university and extension resources for evaluation and environmental education. In addition, a number of social marketing resources were identified, as well as suggestions to learn from other activities targeting specific types of behavior change, such as political campaigns. Other suggestions included communicating messages through broader mainstream media, such as National Public Radio.

Organizational capacity. For any dimension of natural resource management, there are skills, techniques, and resources that help organizations accomplish their mission. Organizational capacity for HD can help facilitate communication with outside partners, define roles in collaboration, and navigate laws and policies, especially those directed towards engaging with the public (e.g., National Environmental Policy Act, Federal Advisory Committee Act, Privacy Act). Social science inquiries can help assess organizational capacity for engaging with stakeholders and applying HD information to management.

Workshop participants revealed several key constraints to investing in the organizational capacity necessary to address HD problems. Many participants indicated they are operating in an institutional culture that is unfamiliar with, and may even be suspicious of, the HD field. They expressed the need to gain more internal support and recognition so that the social sciences are valued and used integrally in conservation work by managers and decision-makers. Participants expressed both the need for more HD expertise in their organizations as well as a broader understanding by decision-makers of the tools and methods that can be applied to natural resource management. Participants additionally felt that HD should be considered early in the process so that more effective integration of HD information into planning and decision making can occur.

Workshop participants identified the following knowledge, skills, and abilities for organizational capacity: more strategic communication to articulate benefits of integrating HD information into management and decision processes, HD training, and a common framework for HD and integration. Comments suggested that HD researchers and practitioners need to better communicate the value of the social sciences and how their application, along with that of the biophysical sciences, can help to inform decisions. Demonstration through case study examples, developing clear messages about the role of HD, and cultivating champions who can help promote HD application were suggested ways to achieve this. Additionally, participants mentioned the importance of HD training for biologists and organization leaders. Incorporating HD curricula into existing biologically oriented training may be one approach. Lastly, a successful social–ecological framework to more effectively describe HD and how it can be used is important to organizational capacity.

Several resources to inform organizational capacity were mentioned by participants, including case studies highlighted on the website HD.gov, publications on sociological–ecological frameworks, blue-ribbon panel reports from the National Oceanic and Atmospheric Administration, and opportunities such as the "Pathways to Success: Integrating Human Dimensions into Fish and Wildlife Management" conference and the annual meeting of the Association of Fish and Wildlife Agencies.

Human dimensions tools and resources

Managers and HD practitioners are often interested in learning more about available HD resources and where to find them. Resources range from journals to websites to working groups; here, we describe some of those key resources. The website HD.gov is intended to serve as a clearinghouse of HD information geared mainly toward federal employees. This website will contain methods, tools, data, publications, and laws and policies related to a host of HD issues. Another opportunity for building HD capacity exists through the Society for

Conservation Biology's Social Science Working Group (SSWG), which was established in recognition of the importance of social factors in conservation. The SSWG is a global network of conservation professionals dedicated to strengthening conservation social science and its application to conservation practice. The group offers training and maintains a website of resources and tools for conservation practitioners wanting to know more about how to integrate the social sciences into their work.[2] The Human Dimensions of Natural Resources Conservation broadcast series is a webinar series covering various aspects of HD with guest speakers from US agencies and academia.[3] The Audubon Society's Tools of Engagement planning guide offers resources on how to best engage people in conservation work, including a downloadable toolkit for assistance in this area.[4] Finally, journals such as *Society and Natural Resources*, *Human Dimensions of Wildlife*, and *Environment and Behavior* have become well-known sources for examining relationships between humans and the environment.

These and many other tools and resources can be found in Colorado State University's human dimensions tools and resources list (see endnote 1). The list is organized by the following themes or topic areas:

- Demographics
- Economics
- Socioeconomics
- Land use, human uses, and the environment
- Attitudes, beliefs, and values
- Stakeholder participation, collaborative planning, and conflict resolution
- Principles, practices, and methods

Within each topic area, resources are organized to provide general guidance, secondary data sources, and selected publications. This resource list, although not exhaustive, provides managers, planners, and decision-makers with useful starting points for understanding and addressing their HD-related issues.

Conclusion

Conservation issues in the 21st century largely involve competing ideas about the importance of natural resources and perceptions of risks and benefits associated with them. Often, sole reliance on biophysical science is not sufficient to understand and resolve these types of conflicts. Natural resource managers typically trained in the biophysical sciences increasingly desire guidance to effectively incorporate social considerations into the management and decision-making process. At the same time, HD practitioners often lack the institutional support, and in some cases the skills, necessary for integrating their research into natural resource management. There is need for a common understanding of HD among researchers and practitioners, and among natural resource managers and decision-makers, in order for HD needs to be met.

Our efforts in developing a framework for HD applications, facilitating discussions about the current state of HD capacity among natural resource organizations, and compiling a set of existing HD-related resources are a first step in informing future directions relative to

HD capacity building. These efforts corroborated the need for (1) a more cohesive identity for the HD field that includes functional applications to which practitioners can relate, and (2) capacity-building efforts to improve managers' skills in identifying the HD elements of a management issue early in its development, and framing problems more broadly to address HD considerations in management activities. Our hope is that these efforts will lead to a dialogue that results in a clearer understanding of HD research and practice, thereby improving systematic consideration of HD information in our conservation decisions. This approach can ultimately aid in maximizing the likelihood of both acceptance and effectiveness of conservation actions in achieving the desired outcomes.

Endnotes

1. See http://warnercnr.colostate.edu/docs/hdnr/hdnru/HDResourceList.pdf.
2. See www.conbio.org/groups/working-groups/social-science.
3. See http://distancelearning.fws.gov/players/human_dimensions.html.
4. See http://web4.audubon.org/educate/toolkit/.

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Natalie R. Sexton, Human Dimensions Branch, Natural Resource Program Center, US Fish and Wildlife Service, Fort Collins, CO 80525; natalie_sexton@fws.gov

Kirsten M. Leong, Human Dimensions of Biological Resource Management, Natural Resource Stewardship and Science, National Park Service, Fort Collins, CO 80525; kirsten_leong@nps.gov

Brad J. Milley, US Geological Survey, Fort Collins Science Center, Fort Collins, CO 80526; bmilley@usgs.gov

Melinda M. Clarke, Human Dimensions of Biological Resource Management, Natural Resource Stewardship and Science, National Park Service, Fort Collins, CO 80525; melinda_m_clarke@nps.gov

Tara L. Teel, Department of Human Dimensions of Natural Resources, Warner College of Natural Resources, Colorado State University, Fort Collins, CO; tteel@colostate.edu

Mark A. Chase, Natural Resource Program Center, US Fish and Wildlife Service, Fort Collins, CO 80525; mark_chase@fws.gov

Alia M. Dietsch, Department of Human Dimensions of Natural Resources, Warner College of Natural Resources, Colorado State University, Fort Collins, CO; and US Geological Survey, Fort Collins Science Center, Fort Collins, CO 80526; dietscha@usgs.gov