National Ecosystem Services Partnership

FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES GUIDEBOOK

Federal Agency Explorations and Applications: Case 1 (U.S. Forest Service)

Application of Ecosystem Services Concepts to Planning and Implementation Processes in the Inyo, Sierra, and Sequoia National Forests

Debra Whitall, Mark Metcalfe, Joe Stringer, and David Saah

FEDERAL AGENCY EXPLORATIONS AND APPLICATIONS: CASE 1

U.S. Forest Service

Application of Ecosystem Services Concepts to Planning and Implementation Processes in the Inyo, Sierra, and Sequoia National Forests

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How to cite:
Whitall, D., M. Metcalfe, J. Stringer, and D. Saah. 2014. "Application of Ecosystem Services Concepts to Planning and Implementation Processes in the Inyo, Sierra, and Sequoia National Forests." In *Federal Resource Management and Ecosystem Services Guidebook.* Durham: National Ecosystem Services Partnership, Duke University, www.nespguidebook.com.

FEDERAL RESOURCE MANAGEMENT AND ECOSYSTEM SERVICES

Institutional Partners

National Oceanic and Atmospheric Administration
U.S Army Corps of Engineers
U.S. Bureau of Land Management
U.S. Department of Agriculture
U.S. Department of the Interior
U.S. Environmental Protection Agency
U.S. Forest Service
U.S. Geological Survey

Clark University
Duke University
The University of Maryland Center for Environmental Science
The University of San Francisco

The National Center for Ecological Synthesis
The National Socio-Environmental Synthesis Center

Defenders of Wildlife
NatureServe
Resources for the Future
The Nature Conservancy

Spatial Informatics Group

Funding Sources

Primary Funding Sources

Gordon and Betty Moore Foundation
Duke University
National Center for Ecological Analysis and Synthesis
National Socio-Environmental Synthesis Center
USDA Office of Environmental Markets
And significant in-kind support from many of the institutional partners listed above

Seed Funding Sources

American Forest Foundation, Defenders of Wildlife, National Oceanic and Atmospheric Administration, Rights and Resources Initiative, Resources for the Future, U.S. Bureau of Land Management, U.S. Department of Agriculture Office of Environmental Markets, U.S. Environmental Protection Agency, U.S. Forest Service, U.S. Geological Survey

About This Document

This case is part of the Federal Resource Management and Ecosystem Services (FRMES) Guidebook created by the National Ecosystem Services Partnership (NESP). NESP, housed at the Nicholas Institute for Environmental Policy Solutions, seeks to enhance collaboration within the ecosystem services community and to strengthen coordination of policy implementation and research at the national level. The FRMES Guidebook represents a collaborative effort by federal agencies and outside experts to develop a credible and feasible approach to incorporating ecosystem services into the decision-making processes of federal agencies.

Cases are written and approved by the author(s)' agency, but they have not been peer reviewed. They describe the decision-making context within which that agency is considering or testing an ecosystem services management framework, and they present approaches or innovations that the agency is using to incorporate ecosystem services into its planning and decision-making processes. Cases informed development of the FRMES Guidebook and could be of value to others embarking on ecosystem services planning and management efforts.

To read other federal agency explorations and applications of an ecosystem services management framework, visit www.nespguidebook.com.

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Motivation

Provision of ecosystem services is a major objective of a new planning rule adopted by the U.S. Department of Agriculture (USDA) Forest Service for the development of National Forest System (NFS) land management plans. The 2012 Planning Rule states:

> The purpose of this part [36 CRF 219.1(c)] is to guide the collaborative and science-based development, amendment, and revision of land management plans that promote the ecological integrity of national forests and grasslands and other administrative units of the NFS. Plans will guide management of NFS lands so that they are ecologically sustainable and contribute to social and economic sustainability; consist of ecosystems and watersheds with ecological integrity and diverse plant and animal communities; and have the capacity to provide people and communities with ecosystem services and multiple uses that provide a range of social, economic, and ecological benefits for the present and into the future. These benefits include clean air and water; habitat for fish, wildlife, and plant communities; and opportunities for recreational, spiritual, educational, and cultural benefits.[1]

Once forest plans are developed consistent with this rule, they will provide direction for all management activities occurring on NFS lands.

Decision Context

The 2012 Planning Rule establishes an iterative planning process for NFS lands. The first step is an assessment of existing trends and conditions in the planning area, followed by an evaluation to determine if current management requires change. This information is used to develop a proposed revised forest plan in conjunction with an environmental impact statement prepared according to National Environmental Policy Act (NEPA) procedures.[2] The information is also used to consider alternative approaches to address management needs and evaluate environmental impacts, including economic and social effects.

Once a revised plan is adopted, the plan is implemented through management activities designed to meet objectives established in the plan and move the project area toward desired conditions. These management activities are developed through site-specific analysis following NEPA procedures. Monitoring plans help determine whether these objectives are satisfied. The monitoring provides information used in evaluating possible adaptive management strategies to better meet plan objectives or in determining to amend the plan.

Location

The Forest Service is applying ecosystem services concepts to planning and implementation processes at three national forests in the Pacific Southwest Region: Inyo, Sierra, and Sequoia.

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[1] http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5362536.pdf. Ecosystem services are defined in the 2012 Planning Rule as "Benefits people obtain from ecosystems, including: (1) *Provisioning services,* such as clean air and fresh water, energy, fuel, forage, fiber, and minerals; (2) *Regulating services,* such as long term storage of carbon; climate regulation; water filtration, purification, and storage; soil stabilization; flood control; and disease regulation; (3) *Supporting services,* such as pollination, seed dispersal, soil formation, and nutrient cycling; and (4) *Cultural services,* such as educational, aesthetic, spiritual and cultural heritage values, recreational experiences and tourism opportunities." 36 CFR 219.19.

[2] http://ceq.hss.doe.gov/.

As part of the region's forest plan revision process, the agency completed several documents to better understand the current conditions and trends relating to forest lands in the southern Sierra Nevada. These documents, released in 2013, are described below.

Bio-regional Assessment: This assessment takes a holistic look at the landscapes in and around 10 Sierra Nevada national forests.[3] It addresses water quality and quantity, fire resilience, sustainable recreation, ecological integrity, and community resilience—services that cross administrative and political boundaries, thus highlighting the importance of interagency, intergovernmental (tribal), and public-private coordination of management goals and actions.

Forest Assessments: These assessments provide an understanding of the existing ecological, economic, and social conditions relating to current land management on a specific national forest. They offer ground-level, forest-specific views of 15 topic areas detailed in the *Living Assessment* at the *Our Forest Place* website.[4]

Science Synthesis: This synthesis is a science-based document that integrates the best current science about social, economic, and ecological resources across the Sierra Nevada. This document is reviewed by scientists and provides a scientific context for land managers making resource decisions about forest uses.

Key Players

To organize for forest plan revision under the 2012 Planning Rule, the region established the following roles:

- **Responsible Official**: Forest supervisors oversee the planning process for their units and are responsible for developing a revised plan and environmental impact statement (EIS) in accordance with the 2012 Planning Rule and NEPA. They utilize their leadership teams as needed to establish forest priorities to meet planning objectives and timelines.
- **Forest Plan Steering Committee**: The committee is composed of supervisors from those forests engaged in forest plan revision and up to three regional directors. It provides for the oversight of the regional revision process, offers strategic guidance for collaboration, and thinks critically and collaboratively to provide direction and to develop strategies for accomplishing plan revision and resolving emerging issues of process, substance, and organization.
- **Regional Planning Director**: This director provides strategic vision and overall leadership and management of the region's revision process. He or she also serves as chair of the Forest Plan Steering Committee.
- **Regional Directors**: These directors are responsible for providing program direction and staff support throughout the plan revision process to ensure that programs are consistent with the direction in the 2012 Planning Rule and directives for the appropriate program area.
- **Collaboration and Communication Leader (Regional Social Scientist)**: This leader ensures development and implementation of collaboration and communication plans.
- **Regional Planning Team Leader**: This leader ensures timely completion of planning process documents in compliance with legal and regulatory requirements; coordinates all phases of work among forest planners, regional program managers, and the regional planning team; and ensures planning documents reflect a scope and scale appropriate to the requirements of the planning rule and directives.
- **Regional Planning Team (RPT)**: This team is composed of a team leader, an ecologist, an economist, a social scientist, a wildlife biologist, a hydrologist, a recreation planner, and a

[3] These forests include the Modoc, Lassen, Plumas, Tahoe, Eldorado, Stanislaus, Sierra, Sequoia, and Inyo national forests as well as the Lake Tahoe Basin Management Unit.
[4] http://ourforestplace.ning.com/.

writer/editor. It serves as the principle interdisciplinary team for forest plan revisions across the region.

- **Forest Planners**: These planners provide forest-level coordination and communication with the forest supervisor, forest leadership team, forest staff, stakeholders, and regional planning team on the forest plan revision.
- **Regional and Forest-level Program Specialists (Extended Interdisciplinary Team)**: These specialists complement the RPT and assist with the development of forest planning work products as necessary.

The region realizes that management of the national forests overlaps with important responsibilities of other state and federal agencies in California. To enhance alignment of forest planning with the roles and responsibilities of other agencies, the region has engaged agencies early and frequently as the plan revision process continues and especially as the environmental impact statement is developed.

The External Agency Coordination Plan describes the framework that is being used to coordinate forest plan revisions for the Sierra, Sequoia, and Inyo national forests with other government agencies. The forest supervisors coordinate with their counterparts in other agencies when the agencies have local offices near the national forests. The regional planning staff has the primary responsibility for coordinating with the headquarters offices that are located in Sacramento or San Francisco.

The plan recognizes two distinct types of relationships with other agencies: those that have direct responsibilities with national forest planning and those with overlapping or parallel responsibilities with forest planning. National forest planning is guided by many federal laws and regulations administered by other federal agencies. The federal Endangered Species Act is administered by the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration Fisheries Service. Compliance with NEPA, including the reviews of environmental impact statements, is the responsibility of the U.S. Environmental Protection Agency. The EPA is also responsible for overseeing states' administration of the Clean Air Act and Clean Water Act.

Some state agencies have additional responsibilities within California government for tracking national forest planning. The California Natural Resources Agency is responsible for overseeing natural resource programs for the entire state. The California Board of Forestry and Fire Protection is responsible for assessing federal forest management for the California Legislature and Office of the Governor. The California Department of Forestry and Fire Protection (Cal Fire) is a partner agency with the Forest Service in overseeing and managing wildland fire protection and forest management programs in California.[5] The California Department of Fish and Wildlife has jurisdiction over the vast majority of plants and animals in the state, and the Department of Water Resources directs water management for California. In addition, the California Air Resources Board and the California Water Quality Control Board are responsible for overseeing implementation of the federal Clean Air Act and Clean Water Act, respectively. The State Historic Preservation Office has responsibility for ensuring compliance with the National Historic Preservation Act.

Many other government agencies manage programs that overlap with or influence national forest management. For example, the National Park Service, the Bureau of Land Management, and the California Department of Parks and Recreation manage public forests and rangelands near the Sierra, Sequoia, and Inyo national forests in the southern Sierra Nevada. The California Department of Transportation manages state highways on national forests, and the Sierra Nevada Conservancy invests considerable state funds on public forests. Many county governments are also affected by the management of national forests in their areas.

[5] http://www.fire.ca.gov/.

Alignment of national forest management with the work of these agencies is desirable. The region also plans to engage the agencies early and often during the forest plan revision work for the Sierra, Sequoia, and Inyo national forests. The primary venue for updating state and federal agencies will be through bimonthly briefings to the California Biodiversity Council's Interagency Alignment Team (IAT). The regional planning staff will be responsible for these briefings. Supervisors of the Sierra, Sequoia, and Inyo national forests will coordinate work with county governments and local offices of state and federal agencies.

In February 2010, the Forest Service and the University of California convened a conference on pre- and post-wildfire forest management for restoration and resiliency. At the close of the conference, participants provided recommendations for additional discussion and work that can be categorized into four broad topic areas: strategic fuels treatments across landscapes with mixed ownerships, adaptive management, increasing public and agency education, and ecosystem services. The Forest Service and stakeholders formed a new collaborative working group in California: the Sierra-Cascades Dialogue Group.[6]

The group considers both public and private lands in an "all lands" approach to planning and conservation (i.e., all land within the Sierra Nevada bio-region, irrespective of jurisdictional or ownership boundaries). It seeks to deepen understanding, build trust, and strengthen relationships among participants with diverse positions to improve the capacity of the Forest Service and its stakeholders to reach supportable decisions. As of June 2014, the group had held 13 dialogues, averaging 140 participants and representing a range of interest groups such as county governments, locally elected officials, environmental organizations, fire safety councils, industry, public land managers, private landowners, recreation groups, rural community governments, scientists, state government, tribes, and water agencies. All dialogues are open to the public. The organizers are committed to achieve age, cultural, geographic, and socio-economic diversity among participants.

The dialogues are based on best practices in the field of public participation (Bohm 1996; Carpenter and Kennedy 1988; Innes and Booher 2010; Straus 2002). Each dialogue includes a professional facilitator who has natural resource planning experience and who also has advanced training in conflict analysis and resolution, a Forest Service social scientist who serves as the convener, and a 20-member steering committee that is responsible for designing the dialogue sessions.

The Sierra-Cascades Dialogue Group is grappling with topics of significance to the Sierra Nevada bio-region, including ecological restoration, improvement of social and economic conditions in rural communities, use of best available scientific information, and access and recreation. Importantly, outcomes from the dialogues lead to development of the bio-regional assessment and the science synthesis, neither of which are required by the 2012 Planning Rule yet were identified by dialogue participants as important in achieving effective forest planning.

Existing Resources

Existing information has been leveraged in several ways:

In a science synthesis report, the Pacific Southwest Research distilled recent peer-reviewed science to promote better understanding of current management challenges. The report focuses on published literature that represents significant advances in thinking about particular challenges, including ecosystem services.

[6] http://www.fs.usda.gov/detail/r5/workingtogether/?cid=stelprdb5349218.

Breaking from traditional public involvement strategies, the Regional Office developed a unique web-based planning tool called "Our Forest Place" and the "Living Assessment" to encourage stakeholders to play an active role in developing bio-regional and forest-level assessments.[7] These online tools allow stakeholders to communicate with one another and effectively assist the agency in writing current condition and trend assessments.

Organizational Capacity

The Forest Service is recognizing the need for improved transitions between outgoing and incoming leaders. Good transition management between the agency leader with whom groups have been working and the new leader is especially important. Capacity to solve natural resource-related problems over the long run depends on the quality of long-term relationships among agencies, other organizations, and the public.

Throughout the revision process, key vacancies and a series of acting assignments have impeded the continuity of plan revision actions. Without this continuity, an aggressive timeline began to dominate the plan revision process. To meet interim milestones, public involvement was curtailed. Because of the reduction in public involvement, stakeholders as well as agency staff felt their input was not heard, leading to a reduced level of trust both internally and externally. Opposition to shortened public involvement and internal tensions eventually led to the extension of the timeline. Interim managers are needed to ensure that leadership is kept abreast of real-time tradeoffs among timelines, public expectations, and employees' work-life balance.

Assessment of Ecosystem Services

Using information from the science synthesis, the Sierra Cascades Dialogue, and the "Living Assessment," the Regional Planning Team wrote a draft assessment of ecosystem services in the bio-region of the Sierra Nevada. This assessment compiled and analyzed existing internal and external information to identify the landscapes across the bioregion that provide key ecosystem services and to ascertain the condition of the services in these locations with respect to wildfire, vegetation disease, and mortality.[8]

The objective of this assessment was to illuminate both the provision (supply) and the use (demand) of the bio-region's ecosystem services, setting the stage for development of transparent land management actions and alternatives to achieve the desired conditions identified in the forest plan revision. For example, identifying the underlying resources important to the provision of a service allows for identification of the appropriate metrics and data to define the resources' current condition and for determination of the resources' health, whether declining, stable, or improving. Management alternatives can then be evaluated in terms of how they affect the provision of ecosystem services and the benefits to people arising from improved conditions.[9]

The assessment focused on ecosystem services (1) most important to people in the broad landscape, (2) most affected by the land management plan, and (3) considered final ecosystem goods or services. *Final ecosystem goods and services* are defined as components of nature directly enjoyed, consumed, or used to yield human wellbeing. Their benefits (e.g., water purification and recreation) result from their direct enjoyment or use by the public. They are not processes, which are more difficult to relate to benefits (e.g.,

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[7] http://ourforestplace.ning.com/; http://livingassessment.wikispaces.com/.

[8] The methodologies and findings of this assessment are detailed in *DRAFT Ecosystem Services for the Bioregion – A Summary for Forest Plan Revision*, an unpublished 2013 report on file with the U.S. Department of Agriculture Forest Service Region 5, Vallejo, California..

[9] The assessment was quickly conducted according to the 2012 Planning Rule and uses only immediately available data. It identified data gaps so that they could be revisited.

pollination and nutrient cycling are critically important to people, but we have little direct connection to these services so it is difficult to directly experience their value). Both of these characteristics make the concept of ecosystem services more understandable and relatable to traditional market goods, which in turn makes it easier to talk about, measure, and communicate the benefits of these services to people (Landers et al. 2012; Boyd and Banzhaf 2007).

The Bio-regional Assessment examined the following ecosystem services:

- Provisioning services (timber, grazing, energy—biomass, geothermal, hydropower, and wind/solar)
- Cultural services (recreation, aesthetics, cultural heritage, sense of place)
- Regulating services (water quality, water regulation, carbon sequestration and regulation, fire resilience)
- Supporting services (biodiversity)

Many other services that provide an important benefit to people (e.g., food, genetic resources, medicines and pharmaceuticals, and air quality) may be added to this analysis.

Analysis

Once the landscapes that are important for the provision of ecosystem services are identified, the current health of the processes and resources that support their provision must be determined. This work highlights those landscapes that are a priority for action to ensure continuation of the benefits provided by ecosystem services. The declining health of an underlying resource that supports a service places provision of the service in jeopardy. For example, decreasing vegetative cover threatens the benefits obtained from carbon sequestration.

Information from the assessment on ecosystem services will be used to

- Develop **roles and contributions** documents that highlight the benefits people obtain from forest ecosystem services;
- Identify the risk of interruption or loss of these benefits and therefore identify the **need to change** forest plans to better ensure sustainability of ecosystem services;
- Identify the **indicators** that can be used to examine the potential environmental consequences of alternate actions to meet the analytical requirements in NEPA; and
- Establish post-plan revision **monitoring programs** on the basis of these ecosystem service metrics.

Tradeoffs

Analysis for environmental consequences entails understanding the effects that management alternatives will have on ecological, social, and economic resources and the resulting implications for forest ecosystem services. That is, management alternatives that effect resources such as vegetation, air, soils, rivers, wildlife, and meadows will affect benefits to people such as forest products, water quality, grazing, biodiversity, energy generation, recreation, and scenery.

Part of the Forest Service's analysis process is developing a means-ends approach to clarify these connections between management alternatives and outcomes to benefits. Such an approach will allow the Forest Service to identify the impacts and tradeoffs of given management alternatives, understand how resulting changes in resource conditions relate to changes in benefits, and identify how those changes to benefits can be measured. Individual resource specialists will conduct their analysis within this

framework to determine environmental consequences of management alternatives. The means-ends approach being developed for this effort has additional benefits for forest plan revision:

- **Integration** of ecological, economic, and social factors as effects on resources (the ecological) are directly connected to benefits to people (the economic and social),
- Establishment of a **transparent analysis process** that highlights the connections between management actions and outcomes and that can be shared during collaboration,
- Identification of **key indicators** that will be important in monitoring and implementing adaptive management strategies, and
- Use of the framework at the programmatic plan revision level to **maintain consistency at the project level** once revised plans are in effect.

Such an approach is not without its challenges, namely, data gaps, decision making in the absence of a common measure of effects (e.g., wildlife habitat may be measured in acres, timber in board feet, recreation in visitor days, and carbon sequestration in tons of carbon), and uncertainty in the face of incomplete information and differing scientific opinion.

Implications

Uncharacteristic wildfires threaten to interrupt or remove altogether the landscape's ability to provide the benefits obtained from ecosystem services. The Forest Service examined this threat to ecosystem services in order to demonstrate how assessment information can be used to inform forest planning and management. Preliminary results indicate that the following lands in the bio-region are at risk for uncharacteristic fire:

- 99% of the important timber-producing land;
- 90% of the important carbon sequestration land;
- 74% of the land with the most valuable assets for protecting water quality;
- 87% of the land with the most valuable assets for supporting water supply;
- 89% of the Forest Service recreation facilities;
- 91% of the locations in the bio-region that provide habitat for important ethno-botanical species for cultural heritage uses;
- 62% of the land important to providing terrestrial biodiversity;
- 86% of the land important to providing aquatic biodiversity;
- 83% of the land with high potential for providing solar energy, 46 percent of the land with high potential for wind energy, and 97 percent of the land with high potential for geothermal energy; and
- 45% of existing hydroelectric facilities and 23 percent of the acres in existing electricity transmission corridors.

Planning and management can utilize this assessment information to determine the need for planning alternatives and management options that reduce the potential interruption and loss of services on these lands. This information can also be used to prioritize management activities to reduce risk on those landscapes that simultaneously provide multiple services as well as to inform the monitoring necessary to ensure the services' sustainability.

Public Participation and Collaboration

The goal of the national forest plan revision process is to develop, consistent with legal mandates, forest plans responsive to those who are affected by or have an interest in the management of the

forests. The 2012 Planning Rule requires each national forest to provide meaningful opportunities for public participation throughout the plan revision process (36 CFR § 219.4).

The most appropriate public participation methods are determined on the basis of the phase of planning, the work product, budget, and staff capacity. These methods are

- Informing—providing participants and the general public with balanced and objective information and assisting them in understanding work products prepared as part of the planning process.
- Consulting—obtaining participants' feedback on draft work products.
- Involving—working directly with participants to ensure that their concerns and aspirations are consistently understood and considered in the development of work products.
- Collaborating—working directly with participants in preparing to make decisions at various points within the planning process, including (but not limited to) development of alternatives and identification of a preferred alternative. The communication and collaboration leader will create opportunities for dialogue to explore different perspectives, balance a variety of needs, and identify areas of common ground that can inform draft work products.

Work products may include information on legal and regulatory requirements and the planning process, lists of available scientific information, summaries of trends in forest conditions and drivers of forest change, and alternatives for analysis.

Independent research has also contributed to the collaborative process. The University of Queensland–Australia and the University of California–Berkeley conducted a public participation geographic information system (PPGIS) study to better understand stakeholder values as they relate to locations in the Sierra, Sequoia, and Inyo national forests (Brown, Kelly, and Whitall 2013). The Sierra Nevada Values Mapping Project discovered, described, and documented the nature and extent of the values that the public finds within the Sierra, Sequoia, and Inyo national forests. It created a website (www.landscapemap2.org/sierra) to allow members of the public to identify the places they value and share their views about what they consider important about the three forests. Users dragged and dropped markers onto a Google® Map of the national forest study area. Each respondent's contribution was combined with other respondents' contributions to ensure that no contribution was individually identifiable. The study was submitted as public input to the Sierra, Sequoia, and Inyo national forests' ongoing forest plan revision efforts.

The Forest Service Pacific Southwest Region has begun working with underserved communities, particularly Latinos, the largest population group in the counties associated with the Sierra, Sequoia and Inyo national forests. In 2013, it entered into a contract with Voces Inc. to develop a Latino engagement guide for forest plan revisions. The guide reflects data collected from Latinos in a small focus group representing the national profile of Latinos as well as in-depth, in-person interviews with nearly 50 Latinos in the San Joaquin Valley. An overwhelming fact emerged: Very few Latinos know what the national forests are or where the nearest one is located. Most have no personal experience with them. Consequently, Latinos will be mostly unable to give meaningful input to national forests plans. To gather meaningful input from Latinos, the Forest Service must first help the Latino community gain awareness of and knowledge about national forests.

Significant trust issues and barriers exist between most parts of the Latino community and governmental entities. To engage the Latino community, the Forest Service is identifying

community leaders and recruiting them to serve as trusted community contacts.

Youth have proven to be excellent trusted community contacts within the Latino, African American, and Hmong communities in the southern Sierras. Initially, youth participated in Forest Service-sponsored workshops designed to identify their core values and the connection of those values with a forested landscape. The exercise begins with an explanation of the concept of Gross National Happiness, used in the country of Bhutan, to define prosperity in healthy terms and to measure actual wellbeing rather than consumption. Participants are able to draw conclusions about their own connections to forested land by answering three questions: What makes you happy? How is that happiness is connected to the land? What rules would everyone have to live by to ensure happiness?

The workshops have demonstrated the strong connection urban youth have to the land and enabled them to share this connection with friends and family. Participants have increased their confidence and are better able to voice their opinions during public workshops on forest plan revision.

More than 100 tribes, both federally recognized and non-federally recognized, exist in California. These tribes are the original land managers of our public lands and provide a wealth of traditional knowledge critical to building resilient communities and forested ecosystems. The Forest Service honors the government-to-government relationship with federally recognized tribes and seeks their involvement as well as that of non-federally recognized tribes throughout the forest plan revision process. A Forest Service tribal liaison coordinates quarterly tribal forums. The success of these forums hinges on attendance by a line officer, a traditional blessing given by one of the tribal elders at the forum opening and closing, written materials, a meeting space organized so that all participants can face one another, encouragement of active listening and storytelling, and follow through on commitments.

References

Bohm, D. 1996. *On Dialogue.* New York: Routeledge.

Boyd, J., and S. Banzhaf. 2007. "What Are Ecosystem Services? The Need for Standardized Environmental Accounting Units." *Ecological Economics* 63: 616–626.

Brown, G., M. Kelly, and D. Whitall. 2013. "Which 'Public'? Sampling Effects in Public Participation GIS (PPGIS) and Volunteered Geographic Information (VGI) Systems for Public Lands Management." *Journal of Environmental Planning and Management*. doi:10.1080/09640568.2012.741045.

Carpenter, S., and W.J.D. Kennedy. 1988. *Managing Public Disputes.* San Francisco: Jossey-Bass.

Innes, J., and D. Booher. 2010. *Planning with Complexity: An Introduction to Collaborative Rationality for Public Policy.* New York: Routeledge.

Landers, D., A. Nahlik, and P. Ringold. 2012. "Ecosystem Services … a Tricky Path Forward to Implementation: Why? How Do We Proceed?" Environmental Protection Agency Western Ecology Division presentation to NSC&NHC, April 24.

Straus, D. 2002. *How to Make Collaboration Work.* San Francisco: Berrett Koehler.

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About the National Ecosystem Services Partnership

The National Ecosystem Services Partnership (NESP) engages both public and private individuals and organizations to enhance collaboration within the ecosystem services community and to strengthen coordination of policy and market implementation and research at the national level. The partnership is an initiative of Duke University's Nicholas Institute for Environmental Policy Solutions and was developed with support from the U.S. Environmental Protection Agency and with donations of expertise and time from many public and private institutions. The partnership is led by Lydia Olander, director of the Ecosystem Services Program at the Nicholas Institute, and draws on the expertise of federal agency staff, academics, NGO leaders, and ecosystem services management practitioners.

About the Nicholas Institute for Environmental Policy Solutions

Established in 2005, the Nicholas Institute for Environmental Policy Solutions at Duke University improves environmental policymaking worldwide through objective, fact-based research in the areas of climate change, the economics of limiting carbon pollution, emerging environmental markets, oceans governance and coastal management, and freshwater management. The Nicholas Institute is part of Duke University and its wider community of world-class scholars. This unique resource allows the Nicholas Institute's team of economists, scientists, lawyers, and policy experts not only to deliver timely, credible analyses to a wide variety of decision makers, but also to convene decision makers to reach a shared understanding of this century's most pressing environmental problems.

For more information about the
Federal Resources Management and Ecosystem Services Guidebook,
visit www.nespguidebook.com.

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