

Sustaining Ecosystem Services across Public and Private Lands: The Cool Soda All Lands Restoration Proposal

Nikola Smith



FEDERAL AGENCY EXPLORATIONS AND APPLICATIONS: CASE 4
National Oceanic and Atmospheric Administration

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Nikola Smith, U.S. Forest Service

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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Cases are written and approved by the author(s)' agency, but they have not been peer reviewed.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

The Willamette National Forest (WNF) is one of two forests in the U.S. Forest Service (USFS) Pacific Northwest Region pioneering an ecosystem services (ES) approach to project-level planning. Following a workshop presenting preliminary work on such an approach at the Deschutes National Forest (DNF) (see Case 7), WNF supervisor Meg Mitchell and WNF staff implemented a project-level case study in the Sweet Home Ranger District. This project focuses on the 10,000-acre Soda Fork Creek drainage in the upper South Santiam River in Linn County, Oregon. The planning area was named “Cool Soda” due to the proximity of Cool Camp, an historic trail shelter and later a logging camp located at the top of the Soda Fork watershed.

The USFS’s application of ES concepts to WNF and DNF project-level planning reflects three objectives: to highlight the goods and services provided by forests to people; to encourage integrated, outcomes-based approaches to resource management; and to support collaborative project visioning, development, and implementation. The USFS is also interested in how national forests can contribute to sustainable economic development, including through recreation, tourism, and diversified forest products. By emphasizing connections between economic resilience and ecological resilience, an ES planning approach can inform decisions about how to sustainably manage lands for public benefit.

Decision Context

The Cool Soda case study takes an “all lands” approach, meaning it addresses management opportunities across all ownerships in the planning area. Under the Forest Service Planning Rule, such an approach engages the public “early and often to build a common understanding of the roles, values and contributions of NFS [National Forest Service] lands within the broader landscape.”¹ This process emphasizes participation by local citizens, subject-matter experts, and stakeholders to share understanding of landscape-scale ecological processes across ownerships and to identify community values in forest restoration.

The Cool Soda case study takes an ES approach to inform planning as well as strengthen communication about the intent and rationale for Forest Service management actions. Cascade Timber Consulting, a manager of privately owned timberlands in a checkerboard pattern with the national forest, is a key collaborator in the study, as is the South Santiam Watershed Council. The opportunity to work across jurisdictions is a strong driver of the project, with dual objectives to improve landscape outcomes and create and sustain jobs in the rural community of Sweet Home, Oregon.

Location

The project area was chosen for its checkerboard ownership pattern, which is 40% national forest and 60% private timberland managed by Cascade Timber Consulting (CTC) for Hill Family Properties. For the past 100 years, CTC and the Forest Service have had a cooperative relationship concerning management of roads, tree genetic research, and noxious weeds. Given this historic positive relationship, CTC, the Sweet Home Ranger District, and the South Santiam Watershed Council initiated the project to apply ES concepts in a collaborative “all lands” approach to forest management. A primary objective of the process was to frame management objectives in terms of ecosystem services provided across jurisdictions.

¹ http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5362536.pdf.

In the Cool Soda planning area, vegetation consists of western hemlock and Pacific silver fir plant associations, with a small mountain hemlock component. The fire regime is a combination of mixed severity and stand replacement. The area includes existing and potential habitat for Upper Willamette River Spring Chinook and Upper Willamette River Winter Steelhead, anadromous fish native to the region that are listed as threatened under the Endangered Species Act. The landscape also includes sites sacred to Native American tribes as well as historic “way trails” that served as important trade routes for the area’s earliest inhabitants.

Through the late 1980s, management of public lands and of private lands was very similar. Many miles of roads across ownerships are under long-term cost share agreements, meaning they are maintained jointly by the WNF and CTC. In 1994, the Northwest Forest Plan (NWFP) was adopted for the federal forests within the range of the Northern Spotted Owl. The plan shifted focus from timber harvest to a combination of ecological restoration and resource protection. Under the NWFP, the lands in the Cool Soda area are predominantly characterized as “matrix,” meaning their management emphasizes timber production outside of stream-side riparian reserves. The mixed public/private ownership of the area offers a unique opportunity to cooperatively develop a restoration plan to sustain ecosystem services across a diverse landscape.

Key Players

The Sweet Home Ranger District designed a series of four workshops to inform the planning process as well as a “Knowledge Transfer Yeeek,” during which experts shared key information regarding physical sciences, vegetation, wildlife, aquatics, and social/cultural components of the landscape. Federal, state, and local agencies were involved as knowledge transfer presenters, workshop participants, or both. They included the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, National Marine Fisheries Service, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Oregon Department of Environmental Quality, Linn County Parks Department, and the Linn County Board of Commissioners. Although federal agencies shared their national perspectives, the process emphasized a local and regional focus.

Involvement was voluntary, though consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service during the National Environmental Policy Act (NEPA) process will be required under the Endangered Species Act to assess the potential impacts of proposed management actions on threatened species, including the Northern Spotted Owl, Upper Willamette River Chinook Salmon, and Upper Willamette River Steelhead.

Non-governmental organizations, businesses, and consultants were involved as presenters, workshop participants, or both and included the Oregon Forest Resources Institute, Forest Service Employees for Environmental Ethics, American Forest Resource Council, Melcher Logging, Sweet Home Economic Development Group, Oregon Wild, Cascadia Wildlands, Rocky Mountain Elk Foundation, University of Oregon, Oregon State University, and Portland State University. Private citizens were also active in the process.

The USFS Pacific Northwest Region’s lead soil scientist and the Sweet Home District Ranger triggered the analysis by their desire to demonstrate the use of a participatory planning process that applied ecosystem services concepts. The Cool Soda Core Team, with representation from key disciplines, was designated to draft the restoration plan in coordination with other staff. The team was co-led by the WNF hydrologist and the Sweet Home Ranger District planner. Additional team members included the district’s wildlife biologist, hydrologist, fisheries biologist, recreation and cultural coordinator, and the Pacific Northwest Region’s ecosystem services specialist. Representatives from Cascade Timber

Consulting and the South Santiam Watershed Council also served as members. The team coordinated the analysis with other Forest Service staff, including representatives from timber, special forest products, botany, silviculture, ecology, geology, soils, cultural resources, fire and fuels, and public affairs. The USFS Pacific Northwest Research Station also prepared presentations for Knowledge Transfer Week and participated in workshops.

Programmatic responsibility was shared by the Cool Soda Core Team as well as staff at the district and regional levels. The team designed workshops to incorporate stakeholder priorities and adjacent land management objectives. Cascade Timber Consulting has jurisdiction over activities on private lands in the planning area and has already begun wildlife habitat improvements. The District Ranger will ultimately select the proposed management actions on national forest lands, which will be implemented by Forest Service staff, with possible support from partners and local citizens. Stream restoration projects and culvert upsizing have been assessed through NEPA as categorical exclusions. Large wood stream restoration was completed in August 2013. Culvert upsizing to allow fish spawning gravel to move downstream is expected to be completed in summer of 2014. The Oregon Watershed Enhancement Board, USFS, and the South Santiam Watershed Council jointly funded a fish habitat improvement project described in a USFS video.² Vegetation management projects will be evaluated through NEPA using an environmental assessment, which is expected to be released for public comment in 2014 and implemented beginning in 2015. Projects included in the assessment are bough and timber harvest, huckleberry planting, wildlife browse enhancement, and fuel reduction treatments.

Existing Resources

The Cool Soda project planning process was designed by the Cool Soda Core Team under the mentorship of the regional soil scientist, who had implemented participatory planning for projects in the Siuslaw National Forest, and with the assistance of the regional ecosystem services specialist, who helped integrate ecosystem services components. The team primarily relied on tools and data sources generated by or readily available to the USFS, including Landtype Association Mapping, which set the stage for understanding the geological and ecological drivers in the area.³ NetMap, a community-based watershed science system developed by Earth Systems Institute, was used to assess potential fish habitat distribution.⁴ This modeling was supplemented by field collection of hydrologic and fish habitat-related data. Potential natural vegetation mapping, which identifies the plant community reflecting the capability of a land area, informed understanding of vegetation types, historical range of variability, and fire regimes.⁵ The team also had access to Gradient Nearest Neighbor (GNN) mapping of existing vegetation to determine the project area's structural condition.⁶ Field-stand exam data informed assessments of timber volume. Field surveys, particularly for the red tree vole, helped the team understand which of the mature forest areas were occupied by threatened and endangered species.

Tools and methodologies developed by the Deschutes National Forest were also consulted in trade-off assessments. To minimize tradeoffs, the team considered specific locations on the landscape where ecological structures, processes, and functions could best support particular land uses or objectives. The team used these ecological attributes to characterize the inherent capacity of a site to provide ecosystem services under properly functioning conditions. Ultimately, the team tied the ES assessment to priorities

² <https://www.youtube.com/watch?v=eEOPVkiulIM>.

³ Land type associations (LTAs) integrate both biotic and abiotic factors at eco-region delineations (1:100,000) and provide information about how landscapes are formed based on geology, geomorphology, soils, and climate. LTAs help managers comprehend the arrangement, patterns, and capacities of various portions of a landscape as well as the main drivers of ecological processes. The USFS Pacific Northwest Region LTAs are being mapped and described. Contact Karen Bennett, regional soil scientist, at kabennet@fs.fed.us for current information.

⁴ <http://www.netmaptools.org>.

⁵ http://ecoshare.info/uploads/gis/swovz120309_metadata.htm.

⁶ <http://www.fsl.orst.edu/lemma/main.php?project=imap&id=home>.

that emerged from collaborative workshops, linked those priorities to the inherent capacity of the planning area or particular features in that area, and recommended projects and outcomes on the basis of that capacity. Overall, this effort, conceived by the team, was conducted “from the ground up.”

Development of the Cool Soda Restoration Proposal was financed directly or in kind by three USFS deputy areas: the Pacific Northwest Research Station, State and Private Forestry, and the National Forest System. The Pacific Northwest Regional Office contributed the staff time of the regional soil scientist and ecosystem services specialist. The WNF hydrologist provided leadership, and the WNF assistant fisheries biologist was a member of the team. The Forest Service also financed publication of the proposal, which has been used to increase exposure for the project and attract outside funding for implementation. The Oregon Department of Fish and Wildlife, the Oregon Watershed Enhancement Board, the South Santiam Watershed Council, and other partners have contributed funds for project implementation on public and private land in the planning area.

The WNF forest supervisor recognized that allowing the Sweet Home Ranger District to experiment with a novel planning process would result in higher up-front costs for NEPA as well as delay production of accomplishment targets. However, the intent of the project is to make a greater initial investment in collaborative planning with the expectation that doing so increases public participation and trust early in project development. This participatory approach has the potential to enhance project implementation by fostering stakeholder confidence in the management proposal and by leveraging the support of partners and stakeholders. Cascade Timber Consulting and the South Santiam Watershed Council also generously contributed employee expertise to Core Team meetings and workshops, and this joint-ownership greatly strengthened the potential of the restoration proposal.

Organizational Capacity

ES programming and case studies are strongly supported by the WNF forest supervisor and Sweet Home District Ranger as well as by the USFS Pacific Northwest Regional Office. Leadership’s interest in the potential of an ES approach to add value to public land management is a primary driver of this work. The Forest Service as a whole is beginning to formalize consideration of ecosystem services in land management policy, including its 2012 planning rule. The agency has convened a national team to develop relevant resources for managers.

As federal budgets and staffing levels decrease, the agency needs to pursue efficient and cost-effective approaches to ES assessment to minimize burdens on employees. Because the cadre of USFS economists is particularly small, the agency can benefit from training in methodologies for valuing ecosystem services in quantitative and qualitative as well as monetary and non-monetary terms as appropriate. Within the National Forest System, it would be most useful to train managers in how to tie their understanding of the ecology of a landscape to the ecosystem services it provides. This understanding would support holistic, sustainable approaches to multiple-use management beyond economic valuation. Federal land managers need to increase their ability to map and understand ecosystem services provided by specific landscape components and to appreciate differences across landscapes and management alternatives.

Training options include (1) development of a mobile team of staff within or across regions to help national forest and district staff conduct ES analysis and (2) training of key staff, particularly in natural resource specialties (hydrology, soils, wildlife, fish, vegetation), at regional and forest levels. Engaging external experts in this information exchange would help the USFS learn from innovation in other organizations and sectors. Training across federal agencies would also reduce duplication and promote consistency.

A significant organizational constraint faced by the Forest Service is a budgetary structure that inadvertently creates siloed approaches to resource management and accomplishment reporting by establishing separate budgets and performance targets for individual resource programs (timber, recreation, aquatics, and so on). An ES approach can support and be supported by integrated, outcomes-based budgeting and performance measures that articulate the goods and services provided by ecological systems as well as by management coordinated across resource program areas.

Options Considered

A primary aim of the Cool Soda all lands approach was to characterize the inherent capacity of the landscape to provide ecosystem services, to compare that capacity to current conditions, to highlight how forest management activities affect ecosystem services, and to design a restoration proposal that sustains those services. Through a collaborative process (see below), management objectives were organized into three thematic areas: streams and wild fish, forests and wildlife, and community and culture. The Forest Service team and workshop participants identified projects to address those objectives and to highlight ecosystem services, or benefits from nature, that would be supported by those projects. Table 1 provides examples of objectives, projects, and benefits from nature that were outlined.

Table 1. Benefits from Nature.

Objectives	Potential Projects	Benefits from Nature
<i>Streams and Wild Fish</i>		
<ul style="list-style-type: none"> • Recover steelhead and Chinook habitat • Minimize road impacts on aquatics • Maintain upland and riparian large wood sources 	<ul style="list-style-type: none"> • In-stream wood placement • Riparian vegetation enhancement • Culvert replacement to improve wood and gravel routing • Culvert replacement to restore aquatic organism passage • Road sidecast pullback 	<ul style="list-style-type: none"> • Wild fish • Clean cold water • Aquatic species diversity and habitat • Traditional and cultural uses • Aesthetics • Recreation
<i>Forests and Wildlife</i>		
<ul style="list-style-type: none"> • Promote tree growth and forest health • Enhance high-quality early seral habitat • Develop wildlife travel corridors • Minimize introduction and spread of invasive species 	<ul style="list-style-type: none"> • Timber harvest • Thinning to enhance forest complexity and diversity • Vegetation treatment to enhance early seral habitat • Planting of high-quality forage • Meadow and wetland restoration • Snag and down wood creation • Invasive species control 	<ul style="list-style-type: none"> • Timber products • Traditional and cultural special forest products • Native plant species diversity • Wildlife species diversity • Clean water • Aesthetics and spiritual values • Climate regulation
<i>Community and Culture</i>		
<ul style="list-style-type: none"> • Foster collaborative approaches to land management • Decrease fire risk • Enhance and protect tribal resources • Maintain administrative and public access • Provide recreation opportunities • Support a sustainable natural resource-based economy 	<ul style="list-style-type: none"> • Partnerships with schools, businesses, and user groups • Land exchange (to protect tribal sacred sites) • Traditional burning • Cooperative road management • Fuel reduction • Harvest special forest products • Interpretive signs • Trail development 	<ul style="list-style-type: none"> • Timber products • Clean water • Wildlife species diversity and habitat • Traditional cultural and special forest products • Recreation • Aesthetics and spiritual values • Environmental education • Public health • Jobs

The Cool Soda all lands approach was structured around several assessments and workshops. At five days of knowledge transfer sessions, referred to as Knowledge Sharing Week, 38 experts from the Forest Service (Research and Development and National Forest System), other federal agencies, academic institutions, and non-governmental organizations shared key information about the planning area with the Cool Soda Core Team on:

- physical sciences (geology, geomorphology, soils)
- vegetation (plant associations, rare and sensitive plant species, forest health)
- wildlife (habitats, threatened and endangered species)
- social/cultural matters (tribal history and current uses, local economic concerns)
- aquatics (hydrology, stream system dynamics, aquatic habitats, water quality issues)

The team built on information communicated during Knowledge Sharing Week and presented key ideas in a stakeholder workshop to explore the inherent capacity of the landscape. The ES concept was communicated in terms of “benefits from nature” that the planning area provides. The core team made connections between the sub-watershed’s structure and intrinsic capacity to provide those benefits. The team also shared a preliminary list of services (Table 1), which workshop participants refined and prioritized.

The existing condition of the landscape was presented at a subsequent workshop. It was characterized in terms of historic land uses, natural disturbances, and field data collection. Core team members prepared information on landscape challenges (e.g., densely stocked vegetation, lack of diversity in early seral habitat, limited recreation opportunities, landslide threats, undersized culverts), compared them to desired conditions, and proposed management activities for moving the landscape toward those conditions. Initial ideas were shared at a collaborative workshop for further refinement and development by constituents. The collectively designed restoration proposal was then presented to stakeholders at a final workshop.

The collaborative process described above shaped planning outcomes in several ways. For example, Cascade Timber Consulting’s concerns about loss of vegetation on plantations due to elk forage contributed to the district’s recommendations for enhancing an elk habitat corridor on public lands. The district also designed fire breaks to protect private timber. For its part, CTC agreed to plant native nutrient shrubs and limit herbicide use to restore the understory on private lands. The district and CTC are pursuing a joint permitting system for special forest products harvesting. Priorities expressed by other stakeholders included development of trail networks, fuel wood gathering, and enhancement of cultural resources, including huckleberry and cedar.

The interdisciplinary and holistic nature of the landscape assessment contributed to integrated project design. Vegetation management projects were not solely driven by timber objectives but were informed by goals for recreation, wildlife habitat, cultural values, and watershed functions. This multi-faceted approach, described in the full restoration proposal,⁷ did not compromise forest product goals but did strengthen social license for implementation by emphasizing how vegetation treatments support a variety of landscape functions.

Analysis

The project workshops identified demand for services and public values. The ecological production of ecological services was characterized in terms of connections among landscape structures, processes, and functions. Core team members drew on the above-described data sources on vegetation characteristics (potential and current), fish distribution (NetMap), and hydrological models (USGS StreamStats and NetMap). They also consulted satellite imagery, field data, and the input of experts who participated in Knowledge Sharing Week. They used this information to identify landscape features and locations that had the potential to provide ecological services, such as flat, open areas for elk habitat or vegetation conducive to special forest products. They designed management actions to build on these services. In addition to proposing management activities, the team characterized the

⁷ Restoration proposal: <http://www.sswc.org/projects/sweet-home-all-lands-approach/>.

potential outcomes of those actions—for example, the percent of a wildlife corridor that would be restored or the total cubic yards of sedimentation that would be avoided. These potential outcomes provided context for each action and highlighted its importance and impact.

Tradeoffs

Many of the ideas to sustain ecosystem services in the Cool Soda planning area emerged from collaborative workshops and information about benefits provided by the sub-watershed. Creating a forum for information exchange increased stakeholders' understanding of the landscape, enhanced their appreciation for diverse perspectives, and highlighted the fact that the USFS is working to sustain multiple ecosystem services across the sub-watershed and to minimize tradeoffs. The core team aimed to maximize beneficial outcomes by proposing management activities in locations that are most conducive to positive results for specific resources or ES objectives. For example, the team recommended a culvert replacement to remove the last remaining human-caused fish habitat blockage in the sub-watershed and to restore the flow of durable gravels, which supply critical spawning substrate to endangered species. In terms of traditional USFS accomplishment reporting, this action would have been described as simply restoring 0.25 mile of stream, omitting its importance for fish or water quality. The team also highlighted activities that will support ecosystem services across resource areas. Fire breaks, for example, reduce fire risk, protect private property, produce commercial timber products, create needed open areas for early seral species and cultural resources like huckleberry, and can be developed into mountain bike trails. Because a primary goal of the project was to sustainably manage the landscape while supporting the Sweet Home community, the restoration proposal also highlighted the potential employment opportunities that would result from management actions. The goal was to serve as many management objectives as possible, but to do so in a site-specific fashion, according to the inherent capacity and current condition of specific locations or landscape features.

Implications

The Cool Soda process emphasized the participatory proposal development phase of NEPA to create restoration recommendations that are strongly informed by stakeholder and expert input. This process creates broad ownership in land management planning. Engaging constituents in workshops throughout the process also increases transparency and improves information sharing about the rationale for Forest Service management objectives and actions.

Forest Service staff began their assessment with an understanding of the inherent capacity of the landscape and aimed to sustain a range of ecosystem services appropriate to that landscape, rather than driving the planning process with single-resource objectives. This interdisciplinary approach highlighted connections among landscape structures, ecological processes and functions, and public benefits, and it informed spatially explicit planning to enhance beneficial outcomes and minimize tradeoffs. The resulting restoration proposal was in plain language, highlighted benefits provided by the Cool Soda area, and demonstrated how stakeholder input was applied. The district plans to use a similarly simple, easily understood style throughout the NEPA process to promote information exchange and public participation in project-level forest management.

The Cool Soda process initiated a larger collaborative land management effort in Linn County, in particular, development of the South Santiam Community Forest Corridor in cooperation with representatives of federal, state, county, and private organizations.⁸ Oregon governor John Kitzhaber designated this venture an Oregon Solutions project, which supports priority community governance endeavors. The USFS Pacific Northwest Regional Office contributed \$10,000 to help with staffing and implementation. The Sweet Home Ranger District also worked with Linn County and other partners to

⁸ <http://orsolutions.org/osproject/SSCFC>.

receive a grant from the Federal Lands Access Program. Funds will be used to assess the livability of Sweet Home as a gateway to public lands. These successes demonstrate how relationships developed in ecosystem services projects can leverage additional resources for restoration and natural resource management across sectors and landscapes.

Cover photo courtesy of Johan Hogervorst.

About the Author

Nikola Smith is an ecologist and ecosystem services specialist with the Pacific Northwest Region of the U.S. Forest Service. She assists national forests with applications of ecosystem services concepts to land management and is involved with development of markets and payment incentive programs for private forest conservation and restoration. She also serves on national U.S. Forest Service teams that are working to advance ecosystem services programming in the agency.

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The restoration proposal was developed through workshops with stakeholders from numerous federal, state, and local agencies, academic institutions, economic development organizations, and non-governmental organizations. The leadership of Meg Mitchell, Willamette National Forest supervisor, and Cindy Glick, Sweet Home district ranger, was instrumental in this innovative approach to forest management.

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.

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For more information, please contact:

Lydia Olander

E-mail: Lydia.olander@duke.edu

Phone: 919-613-9713

Web: <http://nicholasinstitute.duke.edu/initiatives/national-ecosystem-services-partnership/federal-resource-management-and-ecosystem>

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