U.S. Forest Service (USFS) Agency Context Section

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Historical Context
The United States Forest Service (USFS) mission is to “sustain the health, diversity, and productivity of the Nation’s forests and grasslands to meet the needs of present and future generations” (USDA FS 2007). This mission aligns well with the concept of ecosystem services, which highlights connections between natural systems and human wellbeing.1

The ecosystem services approach within the USFS builds on decades of research by resource economists such as Michael Bowes and John Krutilla, who described and evaluated public benefits arising from multiple use management of federal forests (Bowes and Krutilla 1989). The Forest Service was established to protect and manage natural resources—specifically water and timber—because of their importance to national security and for the significant public benefits they provide.2 After World War II, the Forest Service emerged as a primary supplier of natural resource commodities, including timber and rangeland for grazing livestock (USDA FS 2005). Socioeconomic changes, coupled with new legislation passed during the 1960s, 1970s, and 1980s, broadened the range of agency activities and objectives beyond water and timber, including outdoor recreation, range, timber, watershed, and wildlife and fish purposes with “sustained yield of the several products and services obtained therefrom” (Multiple-Use Sustained Yield Act of 1960). These changes also expanded the scope of the agency’s work beyond National Forest management to include work with state forestry agencies and private landowners to protect private forest lands and to support forestry research.

Still more recently, the agency has clarified that the mission set forth by Congress includes healthy functioning forest ecosystems, which are considered critical to maintaining public welfare (USDA FS 2007). Although the Forest Service mission has evolved to broadly serve the public good, the agency’s performance measures and public engagement in planning did not overtly incorporate the values provided by the National Forest System’s regulating, cultural, and supporting services.3 The 2012 Planning Rule (USDA FS 2012) was approved to incorporate these values and to provide resource specialists with new ways to approach planning and decision making.

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1 The historical context section is paraphrased from Smith et al. (2011).
2 The Organic Act of June 4, 1897 (16 U.S.C. 473-475, 477-482, 551) established National Forests “to protect and improve the forests for the purpose of securing a permanent supply of timber for the people and insuring conditions favorable to continuous water flow.”
3 The Millennium Ecosystem Assessment (2005) classified ecosystem services in terms of regulating, cultural, supporting, and provisioning services.
Decision Contexts
In response to growing interest in ecosystem services, the USFS is identifying needs and opportunities for supporting and further developing an agency-wide ecosystem services program. The Forest Service National Ecosystem Services Strategy Team (NESST, chartered in 2013) identifies three opportunities for taking an ecosystem services approach:

- Analysis and decision making (considering a broad suite of ecosystem services in analysis, decision making, and priority setting),
- Measurement and reporting (quantifying and communicating in terms that matter to people), and
- Investing in ecosystem services (connecting providers and beneficiaries of ecosystem services through partnerships, incentives, and markets).

The agency’s work on the latter two opportunities has focused on protocol development for environmental markets and investments in watershed services.

Described below are three USFS analysis and decision-making efforts: (1) forest planning in the context of the 2012 Planning Rule, (2) project-level NEPA decision making, and (3) state-level ecosystem services assessment and valuation.

**Decision Context I: Forest Planning and the 2012 Planning Rule**
The USFS adopted a new planning rule (USDA FS 2012) for the development of land management plans (plans) for National Forest System (NFS) lands that require plans to provide for ecosystem services and multiple uses:

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.4

Plans developed pursuant to the 2012 Planning Rule will provide direction for all management activities occurring in NFS forests following the plans’ adoption. These activities must be consistent with the plans’ components. Forest plans and management activities are subject to the provisions of the National Environment Policy Act (NEPA). See Ecosystem Services and Land Management Plan Revision for more detail.

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4 36 CRF 219.1(c). In the planning rule ecosystem services are defined as “Ecosystem services. 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
Key Players
A handful of agency leaders championed an ecosystem services approach to planning as an opportunity for innovation, integration, and improved public engagement. Much of the work in the FRMERS Guidebook reflects their contributions.

In 2012, seven national forests and national grasslands—early adopters—began revising land management plans in compliance with the 2012 Planning Rule:

- Nez Pearce-Clearwater National Forest, Idaho
- Chugach National Forest, Alaska
- Cibola National Forest, New Mexico
- El Yunque National Forest, Puerto Rico
- Inyo, Sequoia, and Sierra national forests, California
- Francis Marion Forest, South Carolina
- Nantahala and Pisgah national forests, North Carolina

Ecosystem services can be considered at the forest-wide scale, the multiple-forest scale (as in California), and the project scale (see next section). The 2012 Planning Rule recognizes that ecosystem services provide benefits to people beyond national forest boundaries. Consequently, future planning efforts could consider ecosystem benefits at the broad landscape level—what the Forest Service calls the “all lands approach.”

The key players involved in ecosystem services assessments for forest planning have been Forest Service staff. Some early adopters have contracted with Forest Service enterprise teams for assistance. These enterprise teams bring together experts from across the Forest Service to provide capacity where it is needed, functioning as an internal agency “contracting group.” Stakeholders, including outside groups and partners, have been involved in a range of engagement activities, including public meetings and websites that allow Forest Service staff to crowd source information on the value that the public attaches to a forest. Staff at El Yunque and Francis Marion have reached out to local consultants and retired national and state Forest Service employees to help them develop a strategy for incorporating ecosystem services into their planning process. In Region 5 (Pacific Southwest), the regional office convened an ecosystem service assessment team and commissioned members from individual national forest planning specialist teams. In another case (El Yunque), a Forest Service unit collaborated with USFS Research and Development to assess ecosystem services. This work involved substantial engagement with state agencies and research organizations.

Methods, Tools, and Capacity
In accordance with the 2012 Planning Rule, the USFS has proposed directives that offer criteria for identifying and assessing key ecosystem services provided by the plan area. To identify those services that “are most important to people in the broader landscape and those that would be most affected by the land management plan,” the proposed directives call for public participation and use of the best available scientific information. To assess these services, the proposed directives suggest consideration of the following information:

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5 The Forest Service expects to finalize planning directives (both a manual and a handbook) in 2014.
• Key ecosystem services contributions by the plan area,
• Geographic scale at which the plan area contributes to ecosystem services (e.g., watersheds, counties, regional markets, or eco-regions),
• Condition and trend of key ecosystem services,
• Drivers of demand for and availability of the services,
• Stability or resiliency of the ecosystems (or their key characteristics) that maintain the services, and
• Influence of non-NFS lands or conditions beyond the authority of the Forest Service on the plan area’s capacity to provide ecosystem services.

Each national forest and Forest Service region engaged in forest plan revision is using its own approach to identify and assess ecosystem services. In the Pacific Southwest region, Forest Service research station staff used GIS-based tools to characterize the geographic location and extent of ecosystem services, which will serve as indicators or proxies in a larger-scale bioregional assessment (Metcalfe, Kohler, Brough, and Emly in review). The assessments were shared on a wiki website to allow for stakeholder review and feedback.

The 2012 Planning Rule does not require the Forest Service to conduct a monetary valuation of ecosystem services. However, it does require that plan components guide contributions to economic sustainability, where those contributions include ecosystem services. If market and non-market benefits are considered, they may be assessed qualitatively or quantitatively, and they may encompass monetary or non-monetary metrics. Consideration of non-market benefits and integration of public participation throughout the planning process (§ 219.4) are expected to improve the Forest Service’s ability to account for the relative values of market and non-market goods and services.

As management alternatives are developed during the planning process, their effect on the quantity, the quality, or both of the key ecosystem services may be evaluated. Environmental impact statements will document how the provision of those services under each alternative affects social, economic, and cultural conditions, thereby highlighting services tradeoffs among the alternatives. No comparative evaluation of monetary values for the key ecosystem services is required.

Nor is use of a standard set of tools required. The purpose of selecting early-adopter forests is to determine if a standard set of tools would lead to efficiencies and consistent analyses. Field offices do receive national-level advice and support for evaluating ecosystem services. Within the Forest Service, members of the Ecosystem Services Evaluation Framework group and the Ecosystem Services Practitioners Network hold regular calls to connect people doing this work.

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6 The National Environmental Policy Act, National Forest Management Act, and Multiple Use Sustained Yield Act, also do not require monetary valuation.
**Decision Context II: Project-Level NEPA Decision Making**

Attention to ecosystem services in the 2012 Planning Rule is likely to encourage consideration of these services at the project level. Prior to the rule’s release, two national forests in Oregon (Deschutes and Willamette) began exploring project-level applications of ecosystem services approaches to planning and management. The Marsh Project in the Deschutes National Forest and the Cool Soda Project in the Willamette National Forest were motivated by interest in highlighting the goods and services provided by forests to people; encouraging integrated, outcomes-based resource management; and supporting collaborative project development and implementation.

**Legal and Management Context**

Compared to the 2012 Planning Rule, NEPA provides little explicit direction on and regulation of project-level incorporation of ecosystem services. However, NEPA is inherently aligned with an ecosystem services approach because of its requirement that the public participate in environmental analysis and decision making regarding natural resource management to achieve a diverse set of objectives.

The ecosystem services concept supports public involvement by explicitly addressing public values and benefits in project proposals. Early engagement in project visioning can increase transparency and stakeholders’ trust, thereby increasing the potential for successful project implementation. An ecosystem services approach also supports the use of interdisciplinary teams by addressing multiple objectives across resource disciplines.

**Methods, Tools, Capacity**

Project-level applications of the ecosystem services concept in Oregon have been highly collaborative. Non-governmental organizations, other federal, state and local agencies, academic institutions, and local citizens have participated in exploratory methods for addressing nature’s benefits in planning. On the Marsh and Cool Soda projects in the Deschutes and Willamette national forests, ranger districts, the Forest Supervisor’s Office, and the Regional Office worked together to leverage expertise and existing data through workshops, consultations, and field data collection. They used GIS and Microsoft Excel to synthesize information and analyze tradeoffs.

**Decision Context III: State-Level Ecosystem Services Assessment and Valuation**

Several states have expressed interest in state-wide ecosystem services assessments. Reports on the non-market ecosystem services values of their forests have been written for Texas (Simpson, Taylor, Li, and Barber 2013), Georgia (Moore, Williams, Rodriguez, and Hepinstall-Cymmerman 2011), and Virginia (2005). Interest in ecosystem services concepts at the state level extends beyond estimates of the economic and environmental contribution of forests. Southern forest stakeholders appear to have three main motivations for quantifying and valuing ecosystem services at the state level: reporting (measures needed by the state legislatures for appropriations), decision making (understanding of the consequences of converting forests and other land uses and practices), and communication (a narrative to capture public interest) (NCSU).

The majority of state forestry agencies included discussion of ecosystem services benefits and values in their state forest action plans of 2010. An amendment to the Cooperative Forestry Assistance Act (CFAA), as enacted in the 2008 Farm Bill, requires such plans from all states receiving federal forestry funding. The plans determine priority landscapes and outline strategies following national themes and
associated management objectives, one of which is to “enhance public benefits from trees and forests, including air and water quality, soil conservation, biological diversity, carbon storage, and forest products, forestry-related jobs, production of renewable energy, and wildlife.” Although this objective does not specifically refer to ecosystem services, it clearly describes managing forests to provide them.

Because state forestry agencies have had considerable latitude in how they prepare forest action plans, the types of ecosystem services and benefits they have evaluated and the valuation methodologies they have used have varied widely, making cross-state comparisons and compilation of summary statistics difficult.

Key Players
To address the difficulty of making cross-state comparisons of the value of statewide forest-based ecosystem services, nine southern states (Alabama, Georgia, Florida, Kentucky, Mississippi, Oklahoma, South Carolina, Texas, and Virginia) were awarded a regional investment competitive grant from the USDA Forest Service in 2013. The grant has allowed researchers from the Forest Service Southern Research Station and North Carolina State University to partner on a forest ecosystem services valuation project. The project is bringing together stakeholders and experts on ecosystem services and valuation to develop a process and methodology for standardizing the quantification, valuation, and reporting of forest ecosystem services across the southern states (and perhaps the nation). This effort will help the Southern Group of State Foresters and other members of the forestry community to provide accurate estimates of the total economic and environmental contribution of forests as well as to understand the consequences of converting forests to other land uses.

The project objectives include developing guidelines that will improve states’ ability to accurately quantify and value forest ecosystem services in a way that is comparable across states and that supports improved land use planning. Specifically, through stakeholder meetings, literature reviews, and meetings of expert panels, the researchers will

- Identify and prioritize the ecosystem services and benefits produced by southern forests (for valuation efforts),
- Identify methods employed to estimate the value of these services and benefits and assess the methods’ accuracy and cost-effectiveness for state-level valuation of forest ecosystem services, and
- Develop guidelines and standardized methods to enable states to produce reliable, accurate, verifiable, and comparable estimates of the quantity and value of the priority ecosystem services and benefits produced by southern forests. (Mercer, Stills, Cubbage, and Moore 2013)

Methods, Tools, Capacity
At a meeting in Raleigh, North Carolina, in February 2014, approximately 40 southern forests stakeholders discussed standardizing methodologies for quantifying and valuing forest ecosystem services. They represented private industry, non-governmental organizations, academia, and federal and state agencies in 10 of 13 USFS Region 8 states. Some 90% of these stakeholders had more than 10 years’ experience working in the natural resources field.

Panels of ecosystem services valuation experts are in the process of identifying accurate and cost-effective methods for state-level valuation and developing standardized guidelines and methods to
produce reliable, accurate, verifiable and comparable estimates of the quantity and value of the priority ecosystem services and benefits from southern forests. Researchers from the Forest Service Southern Research Station and North Carolina State University are directing this work.

**Institutional Structures**

**Research Community**
USFS Research & Development (FS R&D) is a deputy area within the Forest Service. It provides science, tools, and data that are fundamental to much of the USFS work on ecosystem services. Research is undertaken by five research stations, the Forest Products Laboratory, and the International Institute of Tropical Forestry. Under FS R&D, the Forest Service’s Forest Inventory & Analysis Program projects the condition of forests in 10 to 50 years, allowing the Forest Service to evaluate whether current forest management practices are sustainable and to assess the implications of current policies. FS R&D is actively engaged with other agencies in developing an interagency ecosystem services research strategy.

**Cross-Agency Coordination**
In June 2012, Forest Service staff working on ecosystem services policy, programming, and research held the Ecosystem Services Champions Forum to begin a dialogue on the agency’s strategic direction. In January 2013, the National Ecosystem Services Strategy Team was chartered by the USFS Associate Deputy Chiefs “to collaboratively develop national strategy and policy around ecosystem services and integrate it into Forest Service programs and operations.” This effort is the agency’s first to look across deputy areas and to comprehensively assess opportunities to incorporate ecosystem services approaches into USFS programs and activities. Opportunities fall into three categories: (1) analysis and decision making, (2) measurement and reporting, and (3) investment in ecosystem services.

**Funding Mechanisms, Measures of Project Success**
A significant organizational constraint to incorporation of ecosystem services approaches in USFS programs and activities is the agency’s budgetary structure. This structure inadvertently creates “siloes” 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 ecosystem services approach can support and be supported by integrated, outcomes-based budgeting and performance measures by articulating the goods and services provided by ecological systems and coordinated management across resource program areas.

**Case Examples**
The USFS prepared five case examples for this guidebook.

**The Marsh Project: An Ecosystem Services Approach to Management of a Complex Landscape**
This case example describes a project-level planning pilot in the Deschutes National Forest.

**The Cool Soda All Lands Restoration Proposal: Sustaining Ecosystem Services across Public and Private Lands**
This case example describes a project-level planning pilot in the Willamette National Forest.
Proposal for the Application of an Ecosystem Services Framework in Land Management Planning and Project Implementation for the Pacific Southwest Region

This case example describes a bioregional assessment of ecosystem services in California (USFS region 5) designed to inform forest-level planning.

Integrating Ecosystem Services into Forest Service Programs and Operations

This case describes efforts within the USFS to institutionalize and coordinate ecosystem services activities.

Ecosystem Services and Land Management Plan Revision

This case example describes how the USFS is implementing the ecosystem services requirement in its 2012 Planning Rule.

Works Cited


