Chapter 15: National Forest Planning: Applying New Technologies and Approaches to Improve Public Participation and Decisionmaking

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> Maps are like campfires—everyone gathers around them, because they allow people to understand complex issues at a glance, and find agreement about how to help the land.
>
> —Sonoma Ecology Center

Purpose

This chapter explores how changes in 2012 to the U.S. Forest Service's land and resource management planning rule transformed the orientation of forest planning from being agency driven to becoming more collaborative and offering greater opportunities for public participation. We also highlight new technologies and approaches to reduce conflict among wide-ranging interests in the planning process. In closing, we provide insight on lessons learned from the Nantahala-Pisgah forest plan revision process that might inform how citizens advocate for their values in future forest plans, including sustainable recreation.

Problem Statement

Across the United States, many national forests are in the process of revising their forest plans. Forest planning can be complicated, and there is a learning curve for citizens who are new to the process. Those seasoned in forest planning will notice key differences under the new planning rule, like increased opportunities for public participation. Horelli's (2002: 620) definition of participatory planning elaborated on this process in more depth: "Participatory planning is a social, ethical, and political practice in which individuals or groups, assisted by a set of tools, take part in varying degrees at the overlapping phases of the planning and decisionmaking cycle that may bring forth outcomes congruent with the participants' needs and interests." In the past, the Forest Service has used various methods to drive public participation, such as workshops, charrettes, open houses, and public meetings; however, these methods have not attracted large numbers of participants (Brown et

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al. 2014, Laurian 2004). Although these methods can be valuable, especially during certain phases of the planning process, the downside is that the location and time commitment of these methods reduce the number of participants and highlight the exclusive nature of participation (Kahila-Tani et al. 2016). This observation, in combination with agency staffing and budget constraints, tends to direct the focus on fulfilling the participation requirement in accordance with regulations and neglects the quality and effectiveness that the participation process could provide. Recent studies by Brown and Kytta (2014) suggested that a public participation geographic information system (PPGIS) has the potential to reach a larger spectrum of the public during land use planning processes compared to traditional methods. Although participation opportunities have increased through recent changes in the planning rule, the influence of participation on decisionmaking and actual outcomes remains under-researched, and systematic evaluation is needed to better understand how public participation affects forest planning outcomes.

Dimensions of the Problem: Opportunities for Public Participation

The National Forest Management Act (NFMA) of 1976 requires land and resource management plans to be prepared by each of the 154 national forests (referred to as forest units) in the 193-million-ac (78-million-ha) National Forest System (NFS). NFMA requires promulgation of regulations to govern the planning process, and the NFS Land and Resource Management Planning Rule of 1979 (hereafter, the planning rule) directs the land use planning process for all forest units. Regulations adopted in the 1982 planning rule helped guide many of the forest plans that are currently in use today. Since its inception, suggestions for improving the planning rule were collected and first published by the Forest Service (USDA FS 1990) in its *Synthesis of the Critique of Land Management Planning.* This critique highlighted 232 recommendations and was "designed to focus attention on areas needing adjustment." In the "What We Experienced" section (p. 9) of the critique, the Forest Service noted that interest groups have flourished because of planning. The publication points out that "single-interest advocacy positions were vehemently expressed within the agency as well as outside it. There were relatively few advocates of multiple use in comparison." Surprisingly, a word search within the critique for "collaborate," "collaboration," or "collaborative" (as well as "partner" or "partnership") turned up zero results. The report also concluded that "Relationships are vital. People expect us to involve them, not because we are required to but because we value their contributions, and because better decisions will result." These initial insights proved to be important, and they document the beginnings of a paradigm shift from agency-driven management orientation to becoming open to the idea of

collaborative and co-management styles. The Forest Service worked to incorporate what it learned and attempted to implement new regulations in 1995, 2000, 2005, and 2008, but these regulations were promptly abandoned because of litigation. After 30 years of implementing the initial 1982 planning rule, the Forest Service issued a new planning rule in 2012 that contained many changes; here we focus on new opportunities for public participation.

In contrast to previous regulations, the new planning rule provides more opportunities for public participation, or, as Haber (2015: 6) described it, opportunities to "beef-up the process that occurs prior to NEPA [the National Environmental Policy Act]." Under the 2012 rule, the Forest Service is required to "provide opportunities to the public for participating in the assessment process, developing a plan proposal (including the monitoring program), commenting on the proposal and the disclosure of its environmental impacts in accompanying NEPA documents, and reviewing the results of monitoring information." In addition, the Forest Service is required to "engage the public…using collaborative processes where feasible and appropriate." Collaboration can come in many flavors; we define it here, as authors did in Selin et al. (2020), as the dynamic process by which multiple parties pool resources (e.g., information, money, labor, and time) to solve a problem or create an opportunity that they cannot solve individually (Gray 1989, Selin and Chavez 1995).

The enhanced public participation requirements in the 2012 planning rule create distinct opportunities for valuable engagement on outdoor recreation and specifically identifies the Sustainable Recreation Framework (NFSLMP 2012: 21162 and 21191) to guide management of resources in the NFS. Several themes contained in the planning rule are closely aligned with the guiding principles of the Forest Service *Framework for Sustainable Recreation* (USDA FS 2010). For example, the nexus between the new rule on "collaboration" and the Sustainable Recreation Framework Guiding Principles on "engaging communities" creates a fundamental principle to use in sustainable recreation planning. Under the framework of the 2012 rule, we examine ways in which participation and collaboration in forest planning can be enhanced with geographic information system (GIS) tools, and we draw lessons from an ongoing case study in the Nantahala-Pisgah National Forests.

New Approaches: Public Participation GIS and Collaborative Mapping

Analytical requirements were a core component of the 1982 regulations, and original forest plans were built by formulating reasonable alternatives according to NEPA procedures and "identifying the alternative that comes nearest to maximizing net public benefits" (National Forest System Land Management Planning 1982). The

Forest Service used a computer model called "FORPLAN" to generate recommended land allocations that optimized economic efficiency, but these models were criticized for being too time-consuming, and as Haber (2015: 7) underscored, "the 'black box' approach was a barrier to effective public involvement." Long gone are the days of FORPLAN, and instead, the Forest Service now uses mapping tools and software that the public understands and hosts GIS data that can be readily consumed.

With advances in GIS technology and the advent of Web 2.0 (websites emphasizing ease of use, user-generated content, and interoperability), Web-based mapping tools can be used to "crowdsource policy," and the Forest Service is doing just that. The Talking Points Collaborative Mapping Tool (TPCM) is an interactive online mapping tool used to enhance public involvement in forest planning (Aran and Reed 2015). TPCM was developed by the Forest Service to meet President Obama's Open Government Initiative (2009) to promote transparency, participation, and collaboration, and also satisfies the Forest Service Strategic Plan goal to "develop Internet-based tools to improve internal and external user interaction with the Forest Service and Forest Service data" (USDA FS 2015). TPCM was designed to support public participation through GIS technology by integrating non-expert, place-based knowledge and experience to help address complex land use problems. The application is currently being integrated into several forest plan revisions across the country (e.g., on the Flathead, Lewis and Clark, Manti-La Sal, and Nez Perce-Clearwater National Forests) and is an excellent example of how crowdsourced location intelligence, facilitated by online mapping tools, is enabling collaboration and public participation.

In addition to TPCM, which is primarily focused on collecting place-based knowledge and public comments, online mapping applications can be used to help work through and reduce conflict in the forest planning process. As identified by Cheng and Kruger (2008), conflict can be generated by how actors label areas on a map, such as how management areas are defined and allocated in a forest plan. Management areas emphasize specific uses and values and are often the focus of contention when other values of an area are perceived to be ignored or even threatened. Creating a shared understanding of how multiple values overlap on a landscape and what this means for management area definitions and allocations is central to forest planning. In the following case study, we show how Web-based mapping platforms, like Esri's ArcGIS® Online,[2] can help facilitate discussion and consensus among multiple interests by visualizing complex geospatial relationships at the national forest scale.

[2] The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

Case Study: Nantahala-Pisgah Forest Plan

The Nantahala-Pisgah National Forests are located in western North Carolina, encompassing more than 1 million ac (figs. 15.1 and 15.2). They are a hotspot of biodiversity, an exceedingly popular recreation destination, a place of cultural importance for Cherokee and generational residents, and a source of forest products and clean water. The Nantahala-Pisgah is one of the most visited forests in the country, and growing development in the region is placing greater pressure on this resource. In some high-use areas of the forest, increasing enthusiasm for recreation has not been sustainably matched by capacity to maintain roads and trails. In contrast, communities around other low-use areas desire more recreational visitors. The current forest land management plan, which was approved in 1987 and heavily amended in 1994, does not provide adequate guidance for dealing with emerging

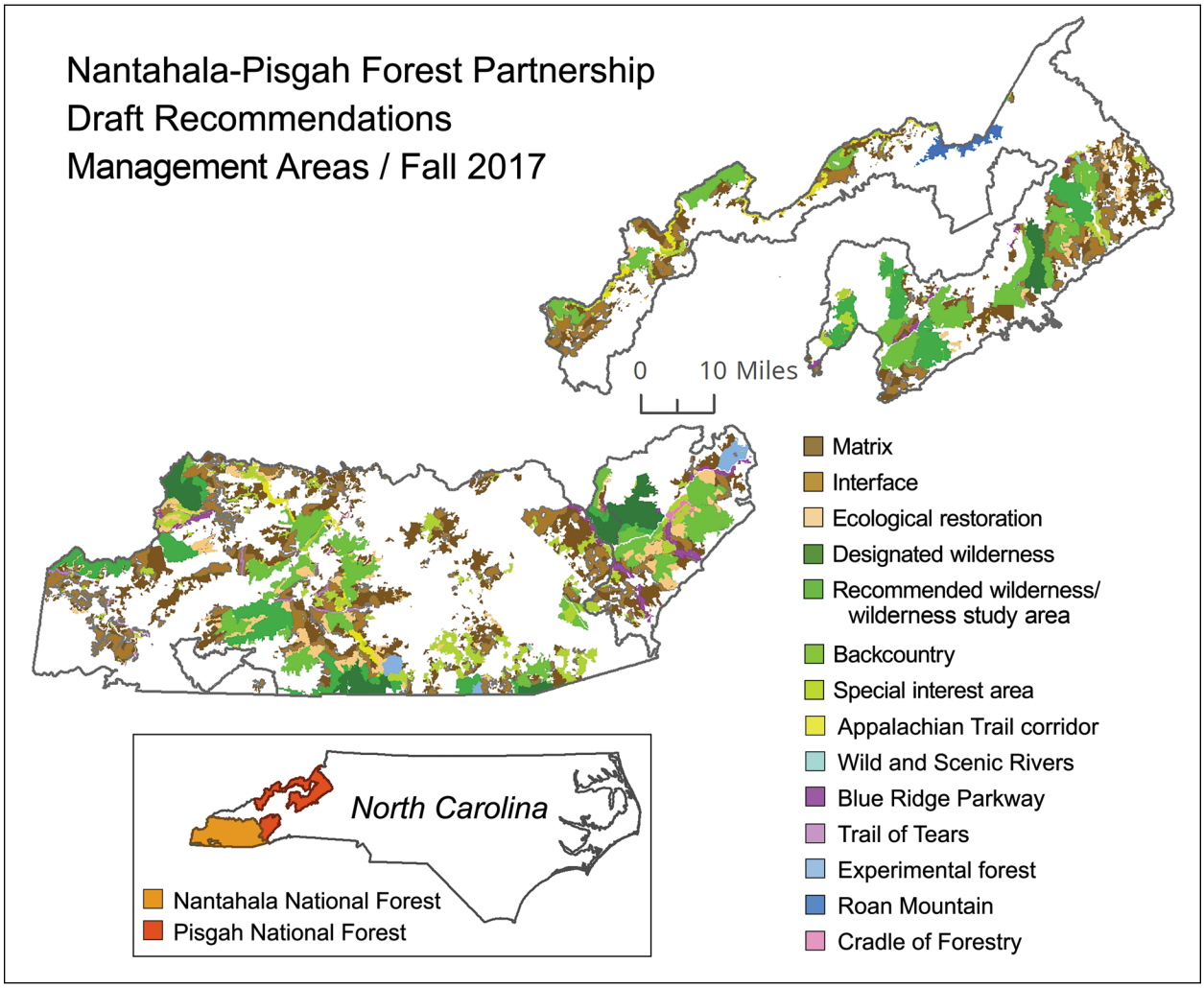

Figure 15.1—Nantahala-Pisgah forest plan revision draft recommendations, Nantahala-Pisgah Forest Partnership, fall 2017.

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Figure 15.2—The Nolichucky River Gorge is located in a remote corner of the Pisgah National Forest in North Carolina near the state's border with Tennessee. The Nolichucky has collaborative support to be managed as eligible for Wild and Scenic River designation.

recreation issues. Addressing questions about how sustainable recreation will be managed in the revised plan (currently in development) is vitally important to ensure the future health of the forest and to accommodate the estimated 3.3 million visitors who recreate in the forest each year (USDA FS 2014).

The Nantahala-Pisgah is an early adopter for plan revision under the 2012 forest planning rule. The Nantahala-Pisgah planning process began in late 2012 and has given rise to multiple collaborative efforts. The Nantahala-Pisgah Forest Partnership is one such effort, formalized in early 2013. The partnership was developed independently from the Forest Service by wide-ranging interest groups seeking to work through complex and historically contentious issues collaboratively. These efforts were encouraged by changes in the planning rule and the opportunity to do forest planning in a different, less antagonistic way than in the past. Participants in the partnership range from volunteers new to the process to career professionals with decades of experience in forest planning. More than 30 active members and affiliates represent a broad cross-section of forest users and stakeholder interests,

organized into seven interest areas: conservation, cultural heritage, economic development and tourism, forest products, recreation, water, and wildlife.

PPGIS has been an important tool for the partnership, and partnership members and interns have used various mapping tools and techniques to help express and negotiate values on the landscape. Tulloch (2008: 353) defined PPGIS as a "field within geographic information science that focuses on ways the public uses various forms of geospatial technologies to participate in public processes, such as mapping and decisionmaking." By digitizing uses and values in the form of GIS data layers, PPGIS facilitates land use planning analyses that account for social values (Sherrouse et al. 2011). Here, we focus on the creation of Web-based mapping technologies and use of an ArcGIS online Web map (Forest Partnership 2016) to support the development of a holistic, integrated set of consensus recommendations for the Nantahala-Pisgah forest plan revision. Recommendations were submitted to the Forest Service in fall 2017 (fig. 15.1). The experience of the partnership in creating these recommendations highlights the challenges and opportunities to collaboratively map values on the landscape, as well as challenges particularly relevant to the role of recreation interests in forest planning.

A broad challenge faced by the partnership was variable access and expertise with GIS data. Early in the process, some stakeholders had access to Forest Service and other GIS data and the ability to make their own GIS layers to express and advocate for their interests, while others did not. This variability translated into imbalances of power and expertise that challenged the ability of partnership members to engage with one another and the Forest Service on an equal footing. To mitigate these issues and organize mapping activities, a mapping committee of partnership members and interns was created. The mapping committee was tasked with collecting and managing GIS data, creating GIS layers for partnership members seeking to express their interests spatially, and developing maps tailored for planned conversations. To further address issues of expertise, time was taken in meetings to explore maps and explain the meaning of map layers, including presentations that went into depth on the attributes, metadata, and values represented in map layers.

Although these early efforts succeeded in visualizing many values on the landscape and facilitating partnership conversations, the tools to explore the intersections of interests during and between meetings remained out of reach for many. The creation of an ArcGIS online Web map helped to further democratize mapping, and was supported by hosting GIS data from interested partnership members and the Forest Service. The Web map was managed by a member of the mapping committee with a subscription to the tool. The Web-based application allowed all group members to explore the map between meetings and identify areas of agree-

ment and tension through their own personal and interest-based lenses, making meeting discussions more productive. The Web map also helped the group work through the challenge created by the unwieldy number of map layers representing the broad array of interests in the partnership. Not all interests could be visualized at any one time in static maps created by the mapping team, and yet absences often led to questions of "what about…?" The Web map allowed for these layers to be present and part of the shared understanding of the landscape, even if some layers were not regularly used in any specific meeting or discussion, or were used only briefly.

A key to the collaborative process was the ability to draw on, experiment with, develop, and, when necessary, discard numerous conceptual tools in attempts to redefine contentious areas in ways that lessened or eliminated tensions. Partnership members perceived at various times that the conceptual tools being used by the Forest Service encouraged definitions of places that sustained disagreement. In response, members experimented with defining these areas in new ways, such as a proposed national recreation area or an ecological restoration management area. Although some experiments were discarded, some were critical for finding compromise. For example, the ecological restoration management area created a category (perceived as missing in the Forest Service framework of the time) of broadly supported active management that was responsive to sensitive contexts, such as rare species, old growth, and the values of recreational visitors. A significant part of contention in overlap areas could be resolved through potential recognition of a spatially explicit ecological restoration management area or through precise language in other parts of the forest plan protecting these sensitive contexts.

Lessons: Nantahala-Pisgah Forest Plan

As demonstrated in the Nantahala-Pisgah case study, Web-based mapping platforms like Esri's ArcGIS Online allowed the Nantahala-Pisgah Forest Partnership to create, gather, share, and publish geographic information through Web-based mapping applications that could be explored by the public. In addition to publishing Web maps, mapping was democratized in several ways including (1) managing and hosting data from partnership members and the Forest Service, (2) providing GIS support to partnership members with little or no GIS expertise, (3) scheduling meetings to explore Web maps and explain the meaning of Web map layers, and (4) sharing Web mapping tools with the public through social media. In brief, the case study highlights how a peer-supported collaborative group leveraged GIS expertise and democratized the mapping process to reduce conflict and achieve consensus among wide-ranging interests.

For further perspective, we revisit a public participation study by McKinney and Johnson (2015) that harvested lessons from early-adopter forests of the 2012 planning rule. This initial study included the Nantahala-Pisgah National Forests with a focus on public participation planning. McKinney and Johnson (2015: 4) offered these thoughts on the planning process:

> One overarching lesson learned is that a national forest's approach to public participation should be thoughtfully tailored to the unique conditions and context of that individual forest. Accordingly, any lesson learned highlighted in this report is just that—a lesson learned from experience on one or more forests based on the unique circumstances facing that forest, including its historical use, local norms and culture, and administrative and management capacity.

We build upon the lessons harvested by McKinney and Johnson (2015) in the Nantahala-Pisgah, focusing on the PPGIS approaches referenced in previous sections. PPGIS satisfies dual purposes under the 2012 planning rule by providing opportunities for engagement and relationship building, and by providing social data. These are often treated as separate functions by land management agencies and are rarely synthesized. It is an innovative tool for its ability to meet both these needs and facilitate the use of social science data to influence decisionmaking.

Lessons Learned From Public Participation GIS

- **Map it if you can**. Mapping technologies, including paper maps, interactive online maps, and offline computerized mapping applications, are important tools to express and negotiate values on the landscape.
- **Democratize mapping**. Provide opportunities for the general public to participate in mapping workshops or surveys. Create Web-based maps that can be viewed and shared with the public. Provide access to spatial data that can be downloaded from the Internet, shared, and readily consumed in popular GIS formats.
- **Use high-quality information to express all interests and values**. The use of high-quality information should be encouraged, including non-Forest Service data. High-quality information has been defined by the White House's Office of Management and Budget as information that is "accurate, reliable, and unbiased" and includes the "best scientific information" (OMB 2002). However, differences in data quality should not prevent interests from being expressed through mapping. Stakeholders should ensure that data are collaboratively vetted, understood, and accepted as accurately representing an interest or value.

- **Get everyone on the same page**. When new data are introduced, structure time in meetings to explore maps and explain the meaning of map layers. This can be invaluable to the collaborative mapping process. Including opportunities to discuss the attributes, metadata, and values represented in map layers provides a foundation that can result in more productive discussions, and it can be helpful to reduce conflict among interests.
- **Identify appropriate scales to frame discussions.** Break the landscape into smaller pieces to help frame discussions. Choose geographic areas that represent a meaningful spatial scale between individual management areas and forest boundaries.
- **Find ways to focus conversations without losing nuance**. Landscape-scale mapping with many interests is challenging. Find balance by simplifying the framework for discussion without losing sight of complex values on the landscape.
- **Don't be afraid to experiment and change the terms of the debate**. Experiment with defining forest areas in new ways, such as a proposed national recreation area or an ecological restoration management area. Although some experiments might be discarded, some might be critical for finding compromise.

Compelling Questions

The PPGIS literature suggests several compelling questions to explore and advance our thinking on public participation and decisionmaking.

1. How can crowdsourced data be used to produce high-quality information that informs the planning process? How can crowdsourcing tools be better designed to effectively reach and engage citizens?
2. How does the information from crowdsourcing tools enhance (or complicate) land management planning outputs or lead to environmental and social outcomes?
3. What are the challenges and barriers during the assessment phase of the forest planning process in gathering information from citizens?
4. What are the best methods to collect participatory mapping data from workshops that scope and identify the range of place-based values at stake in the planning process? How might collected data be used for decision support in the planning process?
5. What are the advantages and disadvantages of information collection technologies (crowdsourcing) like PPGIS and planning support systems?

Conclusions

Although national forests support a range of multiple uses and diverse interests, the public overwhelmingly visits and comes to know these forests through their recreation experiences. It is reasonable to assume that recreational visitors traverse nearly every mile of trail and stream, and visit countless trackless acres, in the NFS every year. These visitors, in sum, possess a wealth of knowledge on the condition of forest infrastructure, species presence and absence, recreation opportunities, and other information important to the forest planning process. Public participation inherently taps the collective information and interests that recreation provides, though it is important to note that recreation experiences may inspire a wide variety of interests from wilderness designations to timber harvest. The combination of new planning rules and advances in Web-based mapping technologies are changing how the public can participate in forest planning in a number of ways: (1) interested stakeholders can share spatially explicit public comments with the Forest Service through Web mapping tools, (2) peer-supported collaborative groups can conduct analyses and create their own proposals in conjunction or coordination with the Forest Service, and (3) the Forest Service is increasingly using Web mapping tools to communicate each step in the forest planning process. With these changes comes a learning curve and the ability of interested stakeholders to keep pace with new rules, planning timelines, and new technologies. However, by harvesting lessons from early-adopter forests, these challenges can be overcome, and the Nantahala-Pisgah National Forests case study demonstrates that peer-supported collaborative mapping can be instrumental in developing higher quality forest plans.

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