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EVALUATING THE ROLE OF STANDARDS AND GUIDELINES
IN NATIONAL FOREST PLANNING

By

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Bachelor of Arts, University of Montana, Missoula, MT, 2011

Thesis

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Evaluating the Role of Standards and Guidelines in National Forest Planning

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There is longstanding conflict related to planning standards and guidelines (S & Gs) used by the U.S. Forest Service to guide and constrain National Forest System land management. The role these prescriptions have played in the past in forest management, and the role they ought to play in the future, is often disputed. However, the National Forest Management Act (NFMA) and the new 2012 NFMA planning regulations require S & Gs, so they must be included in forest plans in the future. The goal of this research was to provide a common understanding of how planning S & Gs were used in the past in order to provide recommendations for how standards, specifically, might be written and applied more effectively in the future. To understand the history and conflicts associated with S & Gs, I analyzed public comment letters from NFMA planning regulations, applicable case law, and background literature. Twenty-five forest plans, strategies and amendments were examined in order to create a typology of common standards and assess their use. This typology found three primary continuums of common standards: mandatory and discretionary, scale of application, and complexity. Several sub-categories are also described, including prioritization, threshold, process-based, management method, and mitigation. Fifteen interviews were conducted with USFS personnel, interest group representatives, and legal experts in order to supplement and validate findings. Findings reveal compelling reasons why the USFS should impose binding, enforceable standards upon itself, including bolstering legal accountability, political credibility, and organizational efficiency. Recommendations for writing standards, incorporating best available science, working within an adaptive management system, supporting recovery efforts for threatened and endangered species, and making use of suitability determinations and management area designations are also provided.

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Evaluating the Role of Standards and Guidelines in National Forest Planning

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I. Introduction

The National Forest Management Act (NFMA) requires the incorporation of planning standards and guidelines (S & Gs) in land and resource management plans (hereafter “forest plans”) (16 U.S.C. § 1604(c)). Standards are mandatory constraints on U.S. Forest Service (USFS) projects and activities. The USFS uses standards to achieve or maintain desired conditions and planning objectives, to avoid or mitigate undesirable environmental impacts, and to meet applicable legal requirements. Guidelines also constrain decision making but allow for some deviation so long as the guideline intent is achieved (36 C.F.R. § 219.7(e)(1)(2012)).

While the description of standards and guidelines as plan components is generally clear, the exact meaning of the congressional requirement is the cause of considerable debate. Many disagree regarding how S & Gs should be implemented on the ground, to which resources and activities they should apply, and at what scale they should guide management. While some interests believe that mandatory S & Gs promote accountability and ensure environmental protection, others view them as too unwieldy, burdensome, and inflexible. Thus, the debate over the appropriate role of standards and guidelines as forest plan components has continued through multiple rounds of forest and national planning. Often missing from this debate are a common understanding of the term “standards and guidelines” in the context of forest planning exercises, and an objective evaluation of the role played by S & Gs since NFMA was passed in 1976. Many questions remain. What are the most common forms of standards and guidelines used by the USFS? How have they constrained and guided agency decision making and management? What are the advantages and disadvantages most typically associated with their use on the National Forests? More important, how will they be used most effectively in the future when considering best available science and the need for adaptive management?

There are two main purposes of this thesis: First, to provide an objective evaluation of the role S & Gs historically played in national forest planning and management. The intent of the evaluation is to reach a common understanding of S & Gs in order to provide a reference point for future dialogs on the topic. Second, the research leads to a more subjective analysis, eventually providing independent

recommendations for future use of standards and how they may be more effectively written and implemented in the context of environmental change, adaptive management, and other “second generation” implementation challenges.

The scope of the research is based on a sample of forest plans, amendments and strategies covering U.S. Forest Service Regions 1, 4, and 10 in Montana, Idaho, Wyoming, Utah, Nevada and Alaska. Therefore, most management and planning examples are from the western United States. The sample was used to generate results and recommendations that can be used by individual national forests in future planning exercises. The results and recommendations are relevant nationally, as forests within the National Forest System are managed consistently under the same set of laws and regulations.

Part II evaluates literature and background materials pertaining to standards and guidelines in the context of the forest planning framework in the United States. The evolution of forest planning under NFMA, including previous exercises in promulgating NFMA planning regulations, is analyzed in relation to S &Gs. Though limited, previous work focused on planning S &Gs is reviewed, thereby revealing the literature gap this project wishes to fill. Part III describes the qualitative methodology used to accomplish study objectives and goals, including analysis and verification. Part IV details the research findings by examining the definition and use of planning standards and guidelines in the context of USFS history and policy. This section describes the process used to write planning S &Gs and broad controversies associated with their use. The review then shifts to focus specifically on standards. Case law associated with the application of standards on National Forest System lands is reviewed in order to provide legal context. Next, a typology of forest planning standards as they are most commonly applied is described. A review of typical arguments and counter-arguments associated with the use of planning standards adds political context to the subject. Part V begins a more subjective analysis by discussing the importance of standards in forest planning. Next described are strategies and recommendations for how planning standards may be written for forest plans revised under the 2012 NFMA regulations, with special attention paid to measuring compliance, maintaining consistency, and compelling actions such as mitigation. Use of other plan components, such as suitability determinations, is explored. The analysis

then shifts to focus on how best available science should be incorporated into the process to develop standards. Recommendations and analysis for linking standards with monitoring in the context of adaptive management and environmental change are also provided.

This research is intended to benefit the USFS and interests who participate in the agency's planning processes. Sixty-eight (out of 127) USFS forest plans are past due for revision, with quickly approaching revision dates (U.S. Forest Service, 2012). As stated previously, the NFMA requires the incorporation of S & Gs in forest plans. Accordingly, the 2012 NFMA planning regulations require the incorporation of S & Gs as plan components. However, the planning regulations do not provide specifics for *how* officials should incorporate S & Gs into forest plans, instead leaving the details to individual national forests. Under the 2012 regulations, the "responsible official" in each forest will be left to wrestle with the issue of how to best use S & Gs in forest planning, as they are charged with informing the development of plan components and content, including S & Gs (36 C.F.R. § 219.7 (2012)).¹ Unless NFMA is rewritten, the issue of how best to use standards and guidelines in forest planning will persist. USFS officials will be tasked with figuring out how to best apply S & Gs in revised plans and this study will provide useful information for how S & Gs have been used in the past and how they might be more effectively used in the future.

II. Policy Background and Review of Literature

In order to understand the role planning standards and guidelines play in the context of the U.S. Forest Service management, some understanding of National Forest System (NFS) planning is necessary. The following section addresses the history and background of planning on National Forest System lands as it applies to this study. From there, the evolution of forest planning under NFMA regulations will be described. Within each "era" of forest planning over the last four decades, planning S & Gs have shifted

¹ See 77 Fed. Reg. 21191 (April 9, 2012), noting, "The responsible official will usually be the forest or grassland supervisor, who is most familiar with the resources, issues, and the people relevant to and interested in the unit." However, higher-level officials, such as the regional forester, may also act as the responsible official for forest plan-level decisions, amendments or revisions. Regardless of level, the responsible official must "develop, amend, or revise plans within the framework" set forth by the 2012 planning regulations.

in definition, utility, and importance. These temporal shifts will be explored in some detail. Finally, previous work focused specifically on planning S & Gs is reviewed in order to reveal the literature gap this project wishes to fill.

a. Forest policy and planning background

Three principal statutes govern the agency's approach to land and resource planning: the 1897 "Organic Act," the Multiple Use Sustained Yield Act of 1960, and the National Forest Management Act of 1976. In passage of the Organic Act, Congress mandated that "forest reserves" be managed to secure favorable water flow conditions and a continuous supply of timber (16 U.S.C. §§ 473-481 (1897)). Any forest practice standards Congress intended to impose with the Organic Act generally failed (Cheever, 1998, p. 632) in what Gifford Pinchot called "another door wide open to the forester" (Cheever, 1998, p. 627). Essentially, the Act gave the USFS latitude to develop its own direction, as Congress provided little more than ambiguous direction of how the forest reserves would be managed once established (Coggins & Evans, 1981, p. 419; Tuholske & Brennan, 1994, p. 57; *West Virginia Division of the Izaak Walton League v. Butz*, 1975; Wilson, 1977, p. 467). Thus, the Forest Service managed national forests for more than sixty years with few congressionally mandated requirements.

The Multiple Use Sustained Yield Act (MUSYA) was passed in 1960, marking "the beginning of a new and unsettled era" of agency planning (Wilkinson & Anderson, 1985, p. 29). MUSYA broadened the National Forest purposes stated in the Organic Act to include management of "various renewable surface resources," to be utilized "in the combination that will best meet the needs of the American people" (16 U.S.C. § 531 (1960)), thus promoting protection of outdoor recreation, range, and wildlife and fish resources (Tuholske & Brennan, 1994, p. 59; Wilkinson & Anderson, 1985, p. 30; Wilson, 1977, p. 469).

Forest planning expanded after the passage of MUSYA. The agency initiated multiple-use planning in 1961 with the first "systematic attempt" to resolve problems associated with conflicting land uses (Wilkinson & Anderson, 1985, p. 31). "Multiple Use Plans" clarified direction for managers by

classifying the appropriate use for every acre of land in each ranger district (Wilson, 1977, p. 469), with narratives and maps delineating intended resource treatments for specific areas (Wilson, 1977, p. 468). However, due to insufficient inventory data for site-specific resources and conditions, managers were often hesitant to establish and enforce management guidelines (Wilkinson & Anderson, 1985, p. 31). The agency also largely failed to properly achieve MUSYA's mandate, often interpreting the statute to mean *all uses* could occur on *every acre* of land (Coggins & Evans, 1981; Wilson, 1977).

Due to these and other problems, the agency started a new round of land management planning in 1973, replacing Multiple Use Plans with "Unit Plans" (Wilkinson & Anderson, 1985, p. 33). Unit Plans were developed according to the first USFS planning hierarchy (Wilkinson & Anderson, 1985, p. 43; Wilson, 1977, p. 470). Regional foresters developed "planning area guides" according to "broad, Servicewide objectives, policy, and direction promulgated by the Chief" (Wilson, 1977, p. 470). Regional planning area guides provided direction for individual forest land use plans. Forest land use plans, in turn, guided preparation of unit plans, which usually encompassed a watershed or drainage (Wilkinson & Anderson, 1985, p. 34). The new round of planning was also heavily influenced by passage of the National Environmental Policy Act (NEPA). Wilkinson and Anderson (1985) explain four primary planning differences that resulted from the advent of NEPA:

First, participation by other government agencies and the public increased substantially. Second, roadless area planning assumed greater significance because an environmental impact statement (EIS) was required before any roadless area could be developed. Third, NEPA's mandate to protect the environment encouraged the Forest Service to apply environmental planning requirements to regulate mining. Fourth, and perhaps most important, NEPA's requirements spurred the Forest Service to develop vastly more complete resource inventories. (Wilkinson & Anderson, 1985, p. 33)

While passage of MUSYA represented increased direction for USFS management (Coggins & Evans, 1981), the planning methods presented problems. National direction was vague. The intention was to encourage the development of various management approaches (Wilson, 1977, p. 472) by granting the

USFS broad discretion to “utilize their professional expertise to accommodate an array of uses consistent with national needs and local conditions” (Keiter, 2005, p. 1161). However, due to the vague direction, the agency had no insulation from multiple interest groups and the pressure to appease competing constituencies (Keiter, 2005, p. 1161). The statute did not provide standards that citizens dissatisfied with USFS decisions could use to challenge the agency in court (Tuholske & Brennan, 1994, p. 60). *Perkins v. Bergland* (1979) recognized that MUSYA “breathe[s] discretion at every pore,” and therefore does little to hold the USFS accountable for management decisions. Thus, the statute largely “failed to quell growing controversy over national forest management” (USDA Forest Service, 2002, p. 11) because criterion to resolve conflicts among public demands were not provided, save the general and unspecified standard of “the best interest of the public” (Wondolleck, 1988, p. 160, citing Hall, 1963, p. 282).

The statutory forest planning framework and degree of Congressional prescription was expanded again with passage of the Rangeland Renewable Resources Planning Act (RPA) (16 U.S.C. §§ 1600-1603). Under the RPA, the USFS must “make periodic assessments of the current and anticipated demand and supply situation for the nation’s forest and rangelands” and prepare a “Renewable Resource Program” to guide USFS development, cooperative work, and research (Teegarden, 1987, p. 396-397). The framework expanded forest planning, but increased accountability measures would not present themselves until the National Forest Management Act (NFMA) of 1976 was passed to amend the RPA.

Cheever (1998) describes the passage of the NFMA as a “train wreck” involving two competing forest management laws. One group, led by conservationists and spurred by recent political upheaval regarding clearcutting practices in the Bitterroot National Forest in Montana and the Monongahela National Forest in West Virginia, wished to constrain “environmentally damaging management practices on the national forests.” West Virginia Senator Jennings Randolph sponsored the reform bill. The other group, led by the timber industry and the USFS and spurred by a recent court decision halting all clearcutting on account of the Organic Act’s substantive measures, took an offensive stance to protect existing forest management discretion. Senator Hubert Humphrey sponsored the second group, and

Humphrey's political influence and agency support arguably resulted in greater influence on the final bill. However, the final legislation contained pieces of both parties' desires (p. 18).

NFMA reformed National Forest management in the United States (Wilkinson & Anderson, 1985, p. 371) with encompassing timber harvest direction and mandates to consider wildlife diversity and other nontimber resources through land management planning (Coggins, 1990, pp. 335-338). The statute preserved much of the discretion the USFS had under multiple use management. However, the NFMA modified the traditional management formula in an "uneasy marriage" of many disciplines and the rule of law (Wilkinson & Anderson, 1985, p. 373), requiring land management plans for all national forests, broad public participation, and an interdisciplinary approach to planning. The NFMA instituted a planning regime with congressionally mandated sideboards to increase accountability and democracy within the existing forest management scheme. As Wilkinson explains, "...policy would be made by the forest plans, with the national forests as functional planning units. These plans would be developed by interdisciplinary teams, with foresters and road engineers...being supplemented by biologists, hydrologists, ecologists, archaeologists, and other appropriate disciplines" (Wilkinson, 1996, p. 667).

Moreover, a committee of scientists (COS) from outside agency was appointed to weigh in on proposed NFMA regulations (16 U.S.C. §1604(h)). Perhaps most important, Congress included mandatory standards and guidelines in the NFMA to guide and constrain the agency's management of national forest lands (16 U.S.C. § 1604). The standards and guidelines, which were to be implemented through regulation, represent the most important difference between the NFMA and the RPA that it amended (Stahl, 1990, p. 30). While planning was the primary feature of the Act, "judicially enforceable standards... were written into NFMA as a way to check the heretofore unquestioned professional judgment" of the agency (Nie, 2006, p. 105, citing Wilkinson & Anderson, 1987, p. 75). Some have described the passage of the NFMA as the "deepest intrusion Congress has ever made into the Service's administration discretion," yet the agency "has only to blame itself for its widely lamented loss of flexibility" (Coggins & Evans, 1981, p. 440). As Wilkinson (1996) explains of the constraints placed on the Agency through the Act's passage,

The Forest Service, because of its tradition of excellence, deserved considerable autonomy. At the same time, serious mistakes had been made and, for the first time, it had become necessary to put sideboards on the agency's discretion. No longer would it be acceptable for the Forest Service to run the national forests as it saw fit, accountable only through gauzy statutes like the Multiple-Use Sustained-Yield Act. (p. 666-667)

Wilson (1977) concurs, explaining that the traditional latitude afforded to agency decisionmakers to interpret and implement statutory direction presented serious problems, as differing management led to inconsistent planning and management in both form and substance (p. 472).

The NFMA's prescriptive nature was consistent with developments in natural resource and environmental policy. As Keiter (2005) explains, implications from statutes passed in the 1960s and 1970s included,

...new environmental protection standards and procedures; a significantly expanded federal commitment to preservation, including biodiversity conservation; more prescriptive organic statutes and new planning requirements along with extensive regulatory regimes; increased judicial involvement and oversight; newly acknowledged public legal rights; and unprecedented levels of citizen involvement in agency decision processes. (p. 1129)

The passage of the NFMA, and the introduction of outside knowledge through the COS, interdisciplinary planning, and additional prescriptive measures, sheds light on a recurring tension between administrative discretion and legal prescription in public lands management.

NFMA's direction, while prescriptive, did not satisfy some interests. Some viewed the "train wreck" formation of the NFMA as "an agreed-upon solution to an unspecified problem," as the clearcutting controversies in West Virginia and Montana were not likely provoked by inadequate planning, nor would they be solved with a better planning system (Behan, 1990, p. 21). Others saw the statute as a congressional move to appease the public in the wake of the clearcutting crises, while still allowing the agency to carry on with business as usual. This argument is supported by previous legislation. Prior to the passage of the Organic Act, through the passage of the NFMA and beyond, the

Agency “fought for a maximum level of administrative discretion, and Congress has largely obliged” (Nie, 2008a, p. 50). Some scholars believe that with the NFMA’s enactment, “Congress moved away from the prescriptive planning model and instead allowed the Forest Service greater discretion and flexibility to implement the Act” (Gippert and DeWitte, 1996, p. 161). After all, the NFMA is “riddled with exceptions and ambiguities that limit the statute’s overall impact” (Keiter, 2005, p. 1141). Or, as Cheever (1998) notes, “The Forest Service won a resounding victory for discretion in Congress in 1976” (p. 49), and “one could argue that the standards...appease[d] critics while imposing the least possible actual limitations on Forest Service activities” (Cheever, 1998, p. 50).

b. NFMA planning regulations and the forest planning hierarchy

There is no better model to illustrate the tension between administrative discretion and legal prescription than the NFMA regulations. The NFMA requires the USFS to promulgate regulations describing the process to develop national forest plans, and the USFS has developed several “planning rules” since the Act’s passage, each subject to the ebb and flow of administrative politics. While the NFMA provides an important framework for promulgation of the regulations, as Nie (2006) explains, each presidential administration still attempts to “stamp its values and philosophy” into the planning regulations. The venue of conflict then “shifts from Congress to the planning process” (p. 100).

NFMA regulations are the vehicle used to interpret the NFMA’s substantive provisions (Cheever 1998, p. 20). The regulations are part of a “rigorously hierarchical” administrative scheme as regulations must conform to the NFMA’s criteria, individual forest plans must conform to standards set by the regulations, and project-level management decisions must conform to plan provisions (Coggins, 1990, pp. 339-340). Since forest plan provisions determine what actions can or cannot be taken at the project level, and therefore act as a gateway to future decisionmaking, plans are often compared to county zoning documents (Cheever, 1998; Gippert and DeWitte, 1996). Forest plans give the agency “broad direction to coordinate multiple uses and sustained yields of outdoor recreation, grazing, timber, fish and wildlife habitat, and watershed and wilderness resources” (Gippert & DeWitte, 1996, p. 167). The requirements in

plans, including standards and guidelines, force the USFS to “confront the questions and conflicts among uses and the optimum combination of uses to be derived” from the forest (Coggins & Evans, 1981, p. 438). However, forest plans are *not* final decision documents, and “they create no legal rights or obligations” (*Ohio Forestry Ass’n, Inc. v. Sierra Club*, 118 S. Ct. 1665 (1998)).

Forest planning regulations must include several specific S & Gs to protect resources such as watersheds,² provide for the diversity of plant and animal communities,³ and insure research will be completed to assess management effects.⁴ Timber harvesting is the undeniable focus of the NFMA, which is “a direct reflection of the fact that the NFMA devotes a disproportionate share of its specific requirements to the timber resource” (47 Fed. Reg. 43026 (Sept. 30, 1982)). Thus, regulations must also include S & Gs that regulate timber harvesting to protect soil quality, natural forest regeneration, watershed conditions, wildlife, recreation, riparian areas, and aesthetic resources. Clearcutting, specifically, is only used if “determined to be the optimum method.”⁵ The regulations must adhere to national direction under NFMA while also allowing for cooperative, site-specific forest management. The first Committee of Scientists (COS, 1979) recognized this tension, explaining,

These regulations are indeed open to the familiar charge of lack of specificity. On the other hand, nothing would be more futile than attempting specific direction for a myriad of physical situations by regulation; and nothing would be more destructive to responsible multiple use planning than imposing a few simple textbook generalizations or rules of thumb as operational requirements.

(44 Fed. Reg. 26626)

² See 16 U.S.C. § 1604(3)(A), specifying, “The U.S. Forest Service regulations must include “specifying guidelines for land management plans developed to achieve the goals of the Program which...insure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish.”

³ See § 1604(3)(B), specifying that regulations must “provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives...”

⁴ See §1604(3)(C), specifying that regulations must “insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land.”

⁵ § 1604(3)(D-F)

This study focuses on the use of S & Gs under NFMA regulations promulgated in 2012. However, in order to best understand how S & Gs may be used in the future, knowledge and understanding of how they have been used in the past is also important. In practice, strategies used by the Forest Service to describe S & Gs in regulation have varied, yet the 1982 National Forest System Land and Resource Management Planning Regulations arguably provided the foundation for all future regulations. By 1995, all national forests and grasslands were covered by management plans guided by direction provided by the 1982 regulations (USDA Forest Service, 2012a). The stated purpose of these plans was to “guide all natural resource management activities and establish management standards and guidelines for the National Forest System” (36 C.F.R. § 219.1 (Sept. 30, 1982)).

Regional and forest planning was based off of principles that included recognition of National Forests as ecosystems, protection and improvement of renewable resources, utilization of a systematic, interdisciplinary approach to planning, and public participation. National Environmental Policy Act (NEPA) procedures were followed. The principles also included “establishment of quantitative and qualitative standards and guidelines for land and resource planning and management” (36 C.F.R. § 219.1(b) (Sept. 30, 1982)). Although “standard” and “guideline” were not defined terms, specific standards were required for appropriate harvest cutting methods; size, dispersal, and size variation of tree openings; harvest management intensities; transportation corridors; and air pollution emissions (36 C.F.R. § 219.9 (Sept. 30 1982)). Certain lands were to be “suitable” for resource uses, and “no timber harvesting shall occur on lands classified as not suited for timber production” (36 C.F.R. § 219.27 (Sept. 30, 1982)).

Notably, plans also had to “provide for adequate fish and wildlife habitat to maintain viable populations of existing native vertebrate species” (36 C.F.R. § 219.27 (Sept. 30, 1982)). The viability mandate signaled the shift of forest planning and policy “toward that of ecology and conservation biology” (Spies and Duncan, 2009, p. 19).

The regulations also included a mandate to “protect streams, streambanks, shorelines, lakes, wetlands, and other bodies of water” and “special attention” was to be given to “land and vegetation for approximately 100 feet from the edge of all perennial streams, lakes, and other bodies of water” (36

C.F.R. § 219.27 (Sept. 30, 1982)). These mandates were often carried out through “Minimum specific management requirements” (MMRs). MMRs were used in individual forest plans to determine the “minimum resource protection standards necessary to comply with NFMA and other laws” (O’Riordan & Horngren, 1987, p. 646). Accordingly, MMRs were developed for “resource protection, vegetative manipulation, silvicultural practices, riparian areas, soil, water, and biological diversity” (O’Riordan & Horngren, 1987, p. 646). The use of MMRs to meet biological diversity mandates was often the most important, as they were used to designate sensitive and management indicator species (Wilkinson & Anderson, 1985, p. 301).

The 1982 regulations have guided management in every national forest and grassland in the United States, and will continue to do so until plans are revised under the direction of the 2012 regulations. But this does not mean the regulations were implemented without controversy. While some understood plans to bolster agency accountability to Congress and the actual planning documents (Coggins & Evans, 1981, p. 440), others regarded the 1982 regulations as cumbersome, inflexible and exorbitantly expensive (Behan, 1990; O’Riordan & Horngren, 1987; Stahl, 1990).

The USFS rewrote its 1982 NFMA regulations in 2000 (65 Fed. Reg. 67514 (Nov. 9, 2000) with an altered regulatory scheme. In an attempt to make the rulemaking process more efficient, the USFS did not complete environmental analysis of the regulations under NEPA, or a biological assessment of the regulations’ impact to threatened and endangered species under the Endangered Species Act (ESA). In addition, the 2000 regulations eliminated the regional guides and many of the MMRs established by the 1982 regulations (*Citizens for Better Forestry v. United States Department of Agriculture*, 2003). Likely because most plans written under the 1982 regulations did not make a consistent distinction between standards and guidelines, the 2000 planning rule did not use the term guideline. A provision labeled as a standard could be mandatory *or* discretionary under the 2000 regulations “depending upon wording and the scope of its requirements” (70 Fed. Reg. 1026 (Jan. 5, 2005)).

The 2000 regulations were deemed unworkable by the Bush Administration due to detailed analytical requirements and lack of flexibility. The agency issued a “transitional rule” allowing National

Forests to follow the provisions of the 1982 planning regulations when amending or revising forest plans, thereby exempting projects from the substantive provisions of the 2000 regulations (69 Fed. Reg. 58055 (Sept. 29, 2004)). As a result, no forest plans were revised according to the 2000 planning regulations (R. Terney, personal communication, June 25, 2012). The 2000 rule was formally removed in 2005 (70 Fed. Reg. 1022 (Jan. 5, 2005)).

The USFS rewrote NFMA planning regulations in 2005 and 2008, and by the U.S. Department of Agriculture's own admission, the regulations represented a "paradigm shift in land management planning" (70 Fed. Reg. 1024 (Jan. 5, 2005)), signifying the movement towards plans that would be "more strategic and less prescriptive in nature" (70 Fed. Reg. 1023 (Jan. 5, 2005)). From that basis, the regulations eliminated species viability requirements and many other standards found in the 1982 regulations, while increasing discretion for local agency officials. In fact, the term "standard" was removed altogether as a plan component. As justified by the 2005 rule,

... in line with and to clarify the strategic nature of plans, this final rule...has removed the term 'standards' as a plan component. The Department decided to employ the term 'guideline' to reflect a more flexible menu of choices consistent with the nature of plans set forth in this rule. (70 Fed. Reg. 1026 (Jan. 5, 2005))

Much controversy resulted from the removal of species viability requirements and other standards, and many found fault with the regulation's provisions (Flourney, Glicksman & Clune, 2005; Nie, 2006; Noon, Parenteau & Trombulak, 2005; Schultz, Sisk, Noon & Nie, 2013). The new rule essentially "delegalized" the planning process to insulate management decisions from legal attack (Keiter, 2005, p. 1187). Some feared that resources once managed with enforceable standards would be subject to adverse effects once the certainty of protection was removed under the 2005/2008 regulations. Old growth forests and the species that depend on them provide one example, as reflected in the following public comment:

Many National Forests are not meeting these numeric old growth requirements, and are thereby continuing to place old growth species at risk. Since the proposed rule would eliminate the 1982

viability requirement, and emphasizes Agency discretion and flexibility over mandatory, numeric standards for individual Forest Plans, the proposed rule may result in attempts to eliminate the mandatory, numeric protection for old growth forests. (Wild West Institute 2007)

Others believed the removal of standards would detrimentally affect national consistency among forests, and that the 2005/2008 regulations weakened “formerly protective regulatory standards that governed each of the 175 forest plans and every site-specific project in the entire National Forest System” (State of California Department of Justice 2007). Still others saw the controversy more simply: failing to include binding, enforceable standards in the regulations and subsequent forest plans violated NFMA. As was commonly argued, the 2005/2008 regulations ignored the congressional intent “to require meaningful, enforceable standards as part of any forest-planning rule” and “explicit mandates requiring the creation of standards” (Defenders of Wildlife et al., 2007).

Due to these and other issues, the 2005 planning rule was enjoined by the U.S. District Court in 2007 for failure to comply with the APA, ESA, and NEPA (*Citizens for Better Forestry v. United States Department of Agriculture*, 2007). The 2008 rule (73 Fed. Reg. 21468 (April 21, 2008)) was found to adhere “to the same basic approach to forest plan development” as the 2005 planning rule. Essentially, the 2005 rule was re-published with the only changes being a draft EIS and additional public comment. As with the 2005 rule, the 2008 rule was challenged and subsequently vacated and remanded to the USFS for failure to comply with legal requirements of NEPA and the ESA (*Citizens for Better Forestry v. United States Department of Agriculture*, 2009).

After years of anticipation, new planning regulations were promulgated under the Obama Administration in 2012 (77 Fed. Reg. 21162 (April 9, 2012)). The 2012 regulations “provide a process for planning that is adaptive and science-based, engages the public, and is designed to be efficient, effective, and within the Agency’s ability to implement,” thus solving many of the problems associated with previous planning rules. The USFS touted the rule as being efficient (saving both time and money), compatible with adaptive management, and emphasizing ecological restoration (Coggins, Wilkinson, Leshy & Fischman, 2012).

The 2012 planning rule requires the use of standards and guidelines in every forest plan along with objectives, desired conditions, and suitability determinations (36 C.F.R. § 219.7(e)(1)). S & Gs are to be applied to a range of resources and uses, including social, economic and ecological sustainability (36 C.F.R. § 219.8). The 2012 rule also leaves some discretion to individual national forests in determining how standards will be defined and applied on the ground. For example, as part of the ecological sustainability requirements, plans “must establish width(s) for riparian management zones” around most water bodies. Though “special attention” must be paid to lands and vegetation within 100 feet from a stream, the forest has discretion to determine the exact width of the required zone (36 C.F.R. § 219.8(a)(3)). Still, the regulations provide a solid framework from which to write meaningful forest plans for the next generation of forest management.

The 2012 regulations went into effect on May 9, 2012, at which time the agency was faced with a massive planning task and over 60 looming revisions (Coggins, Wilkinson, Leshy & Fischman, 2012). Many have optimistic expectations of the 2012 planning rule, and its ability to direct sustainable management of the 155 national forests and 20 national grasslands, covering 193 million acres of the United States. While the impact of the 2012 regulations has yet to be realized, the outlook is encouraging. When industry and extraction groups filed suit to challenge the rule in August of 2012, conservation organizations filed to intervene on behalf of the U.S. Forest Service, in support of the new planning regulations (Environment News Service, 2012).

c. Scholarly Literature

While there is a copious amount of academic literature focused broadly on the political and legal dimensions of National Forest planning (Coggins, 1990; Hoberg, 2004; Nie, 2008a; Tuholske & Brennan, 1994; Wilkinson & Anderson, 1987; Wilson, 1977), very little academic attention has been paid specifically to the role of standards and guidelines in national forest law, management and planning. Some of this literature refers to standards and guidelines and the conflicts and controversies associated with them. For example, Cheever (1998) critically analyzes the passage of the NFMA, and subsequent

implementation of the 1982 planning regulations, in the context of four timber management standards. Morrison and Marcot (1995) broadly assesses NFMA's inventory and monitoring requirements while focusing on wildlife, range and timber resources. Several pieces of scientific literature focus on a particular regional standard, such as soil quality standards or timber harvest-related standards (Page-Dumrose et al., 2000; DeLuca & Archer, 2009).

A large amount of scientific and legal literature focuses on the much-debated NFMA wildlife diversity standard and its subsequent implementation via the 1982, 2000, and 2005 regulations. Noon et al. (2003) assert the need to use a "fine filter approach" to assess wildlife viability in addition to the traditional "proxy-by-proxy" coarse-filter approach that merely assesses species habitat. Noon, Parenteau and Trombulak (2005) lament the lack of measurable, enforceable standards to determine plant and animal diversity under the 2005 NFMA planning regulations. They believed the 2005 approach gave land managers latitude for management that was inconsistent with 'best available science' (Noon, Parenteau, & Trombulak, 2005, p. 1361). Glicksman (2008) critically reviews the use of "models and surrogate techniques" the agency has used to implement the NFMA's wildlife diversity standard.

Schultz, Sisk, Noon, and Nie (2013) critically review wildlife planning under the 2012 NFMA planning regulations. The authors are concerned with the discretion afforded to responsible officials and the absence of direction for how to operationalize the regulations' provisions. While the agency commits, for example, "to maintaining the viability of species of conservation concern," the regulations do not explain how to assess viability (p. 6). The authors believe that the Directives system should be used to "adopt standards and practices for wildlife conservation that are more prescriptive and would help ensure that the rule is implemented in a more robust fashion and informed by best available science" (p. 8). For example, the directives could detail the process for selecting focal species and identifying species of conservation concern (p. 10). The USFS, believe the authors, could leverage the regulations' discretion to "elevate intent and expectations, accept greater responsibility, and provide energetic leadership in the conservation and management of the nation's public lands and wildlife" (Schultz et al., 2013, p. 15).

All of these studies detail various standards in depth. Yet, there is a surprising lack of literature focused specifically on the role played by S & Gs in National Forest planning and management. Discussions of standards found in forest plans are especially absent from the academic and legal conversation. Therefore, this thesis is among the first academic literature focused primarily on the use of planning S & Gs across NFS planning in the U.S.

III. Research Methodology

The broad research objectives of this study were: (1) to analyze how planning standards and guidelines are utilized by the USFS; (2) to assess, organize and create a typology of the most common forms of planning standards used by the USFS; (3) to describe the most common arguments for and against the use of planning standards in forest planning; and (4) to examine how planning standards could be more effectively and efficiently used in the future. A number of more specific questions were asked in order to meet each objective. Accordingly, specific research methods were utilized to answer each question. The objectives, associated questions, and specific research methods are explained in the following table (Table 1).⁶

Table 1: Research Methods Rationale

Objective	Question(s) use to meet objective	Method(s)
Analyze how planning S & Gs are utilized by the USFS	<ul style="list-style-type: none"> • How are planning S & Gs defined in statute, regulation and USFS Manuals? • How are planning S & Gs generally interpreted by the federal courts? • Are S & Gs considered mandatory constraints that are legally enforceable or have the courts afforded some administrative discretion in their implementation? • What resources and values most typically have standards and guidelines associated with them? • How do standards and guidelines typically constrain the management of these resources and values? 	<ul style="list-style-type: none"> • Literature review • Case law review • Public comment analysis • Forest plan and strategy sample • Interviews

⁶ Two primary methods were used to ensure validity of the study framework and results. “Member checking” confirmed the credibility of study methods, the forest plan typology, and the data sources. Member checking is a procedure wherein validation shifts from the researcher to the participant by presenting participants with data so that they can confirm the credibility of the information (Creswell & Miller, 2000, p. 127). Several interviews included a member checking component, where the participant would review typology categories to ensure they were adequate, and confirm that the study trajectory was on the correct path. Also utilized was triangulation, or a procedure wherein researchers “search for convergence among multiple and different sources of information to form themes or categories in a study” (Creswell & Miller, 2000, p. 126). The mixed-methods approach of triangulation related data and results to ensure all findings were consistent with one another.

	<ul style="list-style-type: none"> • What internal processes are typically used to write standards and guidelines on individual National Forests? • How is best available science used or not used in writing S & Gs (from selected sample)? • What role do interdisciplinary planning teams (ID teams) play in the formation of S & Gs? • Is the writing of S & Gs a primary reason why the preparation of National Forest plans take roughly 5-7 years? 	
Assess, organize and create a typology of the most common forms of planning standards used by the USFS	<ul style="list-style-type: none"> • What are the most common types of planning standards used by the USFS? • How are standards used at the USFS regional level, the individual national forest-level, and within designated management areas/zones on a particular National Forest? • What are the advantages and disadvantages applying standards at these various scales of management? 	<ul style="list-style-type: none"> • Forest plan and strategy sample
Describe the most common arguments for and against the use of standards in forest planning	<ul style="list-style-type: none"> • What are the most common arguments made for and against the use of standards in forest planning? • What groups typically make these arguments and why? 	<ul style="list-style-type: none"> • Literature review • Interviews • Public comment analysis
Examine how planning standards could be more effectively and efficiently used in the future	<ul style="list-style-type: none"> • How can planning standards be written and applied in the context of environmental change and adaptive management? • How can planning standards be written and applied in a context using best available science <i>and</i> more collaborative methods of planning and management? • Are there cases of innovation related to using standards in environmental planning, by federal, state, tribal, and/or private interests? 	<ul style="list-style-type: none"> • Literature review • Case law review • Public comment analysis • Forest plan and strategy sample • Interviews

a. Qualitative Methodology & Rationale

1. *Forest Plan, Amendment and Strategy Sample*

A sample of National Forest plans, plan amendments, and strategies were studied to assess how standards and guidelines are written, operationalized, and implemented by the USFS. A total of 25 plans were examined. Within this set, 19 plans are original and revised forest plans, while six are plan amendments and strategies covering multiple national forests (Table 2).

The forest plan, amendment and strategy sample (hereafter “forest plan sample”) was chosen for several specific reasons. First, the majority of plans are from Region 1 of the USFS. Many of the Region 1 National Forests have been legally challenged on the basis of S & Gs implementation. All of the case

law focused on national forests in Region 1 provided depth to my research, allowing me to follow the conflicts associated with particular standards and how they were implemented. The litigation therefore provides a legal record from which to examine varying legal interpretations of S & Gs. There are also many organizations who advocate on behalf of natural resource protection, multiple-use management, and industry within Region 1. Therefore, Region 1 enjoys strong public participation from interest groups during planning processes, which provides a large amount of useful public comment and other interest-based literature. Finally, Region 1 headquarters are located in Missoula, Montana; therefore, access to regional experts and planners for data and references was more readily available.

Table 2: Plans, Amendments and Strategies Included in Sample

	<i>Plan, Amendment or Strategy</i>	<i>Region</i>	<i>Date Written</i>
Forest Plans	Beaverhead Forest Plan	1	1986
	Deerlodge Forest Plan	1	1987
	Beaverhead-Deerlodge Forest Plan	1	2009
	Boise Forest Plan	4	1990, 2003
	Clearwater Forest Plan	1	1987
	Flathead Forest Plan	1	1985
	Gallatin Forest Plan	1	1987
	Helena Forest Plan	1	1986
	Idaho Panhandle Forest Plan	1	1987
	Kootenai Forest Plan	1	1987
	Lolo Forest Plan	1	1986
	Nez Perce Forest Plan	1	1987
	Payette Forest Plan	4	1988, 2003
	Sawtooth Forest Plan	4	1987, 2003
Tongass Forest Plan	10	1979, 1997	
Planning	Final Conservation Strategy for the Grizzly Bear in the Yellowstone Area	1,2,4	2007
	Grizzly Bear Access Amendment (Selkirk/Cabinet-Yaak)	1	2011
	Grizzly Bear Habitat Conservation Amendments (Greater Yellowstone)	1,2,4	2006
	Inland Native Fish Strategy	1,4,6	1995
	Northwest Forest Plan Aquatic Conservation Strategy	5,6	1994
	Northern Rockies Lynx Management Direction	1,2,4	2007
	Region 1 Soil Quality Standards	1	1999

Forest plans were also chosen from Region 4 forests located in Idaho. Three Region 4 national forests were chosen based on two factors: a strong litigation record and the joint revision of forest plans in

2003. Region 4 national forests have “first” generation and revised plans, which was beneficial to analysis, and the three revised plans were consistent since all were jointly developed.

The final forest chosen for inclusion into the sample is the Tongass National Forest in Region 10. The Tongass National Forest was chosen due to extensive planning and litigation history and its historically controversial management situation. The presence of a first generation, second generation and “revised” third generation plan is important. The Tongass National Forest is also exemplary in its use of science-based methods to guide plan revisions in 1997. The Tongass departed from traditional plan revision methods based on “selection by a...decision maker of a preferred alternative from...options developed by an interdisciplinary team” (Shaw, Everest, & Swanston, 2000, p. 378) and instead relied on agency scientists to independently assemble scientific information for plan revision purposes. The scientists participated in the planning process and evaluated how available scientific information was utilized to develop plan components, including S & Gs (Everest et al., 1997). The innovative use of science to develop the Tongass forest plan is noteworthy and an asset to this study.

The purpose of the sample is twofold. First, the sample includes a necessary amount of forest plans from which to provide an accurate typology of the most commonly used standards. Once the first few plans had been analyzed, the typology was drafted using previous inquiry. As each additional plan was analyzed, typology categories were added, refined, or removed. Second, the sample provides in-depth examples of how S & Gs are designed, written, and implemented.

In order to assess each forest plan thoroughly, an initial “check sheet” was created to recognize commonly used forest plan components. Check sheet questions include:

- Original or revised plan?
- Year published?
- Includes “management area” standards and guidelines?
- Includes “forest wide” standards and guidelines?
- Resources and/or activities covered by standards and guidelines?
- Includes standards and guidelines with exceptions?
- Includes discretionary standards and guidelines?
- Includes measurable and quantifiable standards and guidelines?
- Includes guidelines? (If so, how are they defined/utilized?)
- Is covered by INFISH?

The check sheet was beneficial to compare all forest plans within the sample from a common reference point. For example, the check sheet was the first indication that most first generation plans did not contain guidelines. From here, I was then able to more efficiently begin the process of identifying the most common types of standards found in the selected plans. The product of this process was a typology of common standards. According to Glaser and Strauss (1976), the standards typology would be best described under the cyclical grounded theory approach as a “sample of categories” of the most frequently identified standards. Categories increased as plans were analyzed. Therefore, data was collected and analyzed to “obtain examples of and saturate emerging categories” (Moore, 2010, p. 44). This process of categorization is also described as where “researchers could return to...previously collected data to look for examples of categories” (Moore, 2010, p. 45). During formation of the standards typology, data was continuously refined and compared in order to best answer study objectives.

All forest plans were the “final” version. Several of the forests included in the sample published “draft” forest plans; however, plans that had not been implemented were not analyzed. In addition, in cases where forest plans were subject to multiple amendments, only the original or revised forest plan was analyzed. Amendments are not always incorporated into an electronic plan. Therefore, choosing to analyze final or revised plans *and* all of the amendments would have involved extensive work that was impossible for the time frame at hand to ensure all amendments were located and incorporated.

2. *Public Comment Analysis*

Official public comment letters submitted in response to NFMA planning regulation revisions were analyzed in order to get a better sense of the varying perspectives engaged in the forest planning debate. I obtained databases of public comment from the 2008 NFMA planning rule revision process and the 2012 rulemaking process. The 2008 database was obtained from USFS Ecosystem Management Coordination staff. The database was searched for comments containing the phrase “standards and guidelines” in comment text so that all analyzed comments made mention of S & Gs. The 2012 database was obtained from the Bear West Content Analysis Group, which the USFS used to collect all public

comment during the 2012 rulemaking process, and filtered for the phrase “standards and guidelines” in the comment text in order to focus on the 1310 public comments that mentioned S & Gs.

From these two databases, the most common issues, ideas, and arguments specifically relating to standards in planning were identified and organized, yielding a table of the varying perspectives regarding forest planning standards. For example, while many commenters argued in favor of standards for greater consistency in national forest management, an equally large number of commenters argued against standards by citing the need for more local adaptability and flexibility. In sum, the analysis yielded 29 categories based on public comment perspectives.

3. Interviews

Fifteen telephone and in-person interviews, lasting approximately one hour in length, were conducted between October and December of 2012. The purpose of the interviews was to supplement knowledge regarding the role of S & Gs in national forest planning and management, and obtain more specific knowledge of challenges faced when applying standards on the ground. Participants were also asked to explain how they believe implementation of planning S & Gs could be improved in the future in order to inform more subjective analysis and recommendations.

Participants were purposively chosen based on the single criterion that they had extensive professional interactions with S & Gs. Participants were identified from three primary sources: case law, forest planning documents, and in-depth rulemaking public comments on the role played by S & Gs in forest planning. Individuals selected for interviews included interest group representatives, attorneys, and scientists, as well as USFS planners and interdisciplinary team members. In order to objectively evaluate varying perspectives, a comparable number of participants were chosen from the environmental, agency and legal perspectives. Confidentiality was promised to each individual, so their names and specific professional titles are not revealed.

Interview questions were tailored to each individual in order to obtain knowledge specific to a certain forest plan, type of standard, or individual perspective. Interview subjects were not surveyed, and interview responses were not quantified. The research design used to complete the interviews resembled a

“flexible set of guidelines” that connects theory to strategies of inquiry, and then to methods used to collect empirical data (LeCompte & Preissle, 1993, p. 34). For example, a flexible guide was used to conduct interviews, based on the following questions:

- In what capacity have you previously been involved in a forest planning process?
- How do you interact with standards and guidelines on a daily basis?
- In your current position, do you face challenges that relate to standards and guidelines?
- Do you see standards and guidelines as an important component of a forest plan?
- Do you see clear differences between standards, guidelines, and other plan components (goals, desired conditions, etc)?
- Do you have an example of a standard you believe works well, or is innovative?
- What could the Forest Service do to improve the efficiency regarding the application of standards and guidelines to projects?
- How should standards be developed, process-wise?
- How should science be used in the process of writing S&Gs?
- Where do you see standards as best applied? At the national, regional, forest, district level?

However, the interview guide was also refined based on previous findings and inquiry. For example, ID team members were asked to describe the process and challenges associated with application of standards at the project level, conservationists were asked to discuss standards pertaining to their local forest or region, and lawyers were generally probed about legal cases that related to a specific standard. Interview questions were customized based on the individual’s expertise and experience in order to supplement and explain study findings drawn from literature, case law, and forest planning documents. Therefore, while maintaining a “clear focus on the research question [and] the purposes of the study,” inquiry was used to determine which interview questions and topics should be utilized to best support study objectives (LeCompte & Preissle, 1993, p. 30).

4. *Literature Review*

A comprehensive policy, academic, legal, and government literature review was also undertaken to gather background forest planning knowledge. The author first become familiar with general natural resources planning literature, which was followed by a more focused review of the role standards and guidelines have historically played in forest planning. Administrative materials associated with the 1982, 2000, 2005/08, and 2011/12 NFMA planning regulations were analyzed for their relation to S & Gs.

These documents included federal register documents and NEPA documents as they relate to S & Gs. The document analysis resulted in a strong point of reference from which to evaluate S & Gs.

5. *Case Law Review*

Case law focused on the application of S & Gs to forest management projects was reviewed within the jurisdiction of the Ninth Circuit Court of Appeals, an appellate court that hears a disproportionate share of national forest management cases. The case law review timeline begins in the 1990s, because case law focused on S & Gs developed soon after the first forest plans were written (in the late 1980s). Additional federal case law focusing on the application of S & Gs at the project and plan level was also reviewed to provide a backgroup for several specific examples throughout the thesis. The primary purpose of the case law review was to provide requisite legal background and to understand some of the legal challenges associated with the use of standards. I searched Lexis-Nexis, Westlaw, and Google's Case Law databases to find published case law that dealt with the issue of standards in national forest management. Many of the cases I read focused on specific planning standards that were found in my sample of national forest plans.

IV. Research Findings

a. Defining standards and guidelines

To recall, a standard is “a mandatory constraint on project and activity decisionmaking, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements” (36 C.F.R. § 219.7). A guideline is “a constraint on project and activity decisionmaking that allows for departure from its terms, so long as the purpose of the guideline is met” (36 C.F.R. § 219.7). Both components are mandatory, yet guidelines allow for some flexibility. Each definition leaves many details to the discretion of National Forests revising plans under the 2012 regulations. What resources and activities will be managed with S & Gs, at which scale(s) will the components apply, and how will they be written, measured, and implemented?

The evolution of S & Gs begins with the passage of NFMA. Congress used S & Gs to supplement land management *planning* guidance with land management *control*, therefore imposing legally binding plan requirements (Coggins & Evans, 1981, p. 413). While the controlling nature of the components was promulgated with clarity, considerable debate remained over the differences between a standard and a guideline (Gippert & DeWitte, 1996, p. 188, citing *Sierra Club v. Robertson*, 810 F. Supp. (W.D. Ark. 1992)). The NFMA did not provide a definition. The 1982 regulations required the establishment of “quantitative and qualitative standards and guidelines” (36 C.F.R. § 219.1 (Sept. 30, 1982)), and included a section describing “multiple-use prescriptions and associated standards and guidelines” for management areas (36 C.F.R. § 219.11 (Sept. 30, 1982)), which suggests that S & Gs would be more enforceable than “future desired conditions” and other aspirational components.

As one agency planner interviewee explained of the first NFMA planning exercises, very little guidance was provided as to how standards and guidelines should be applied, nor was a distinction made between a standard and a guideline. The first tangible direction for how to use plan components came by way of the judiciary, in early appeals to forest plans on the Flathead National Forest (*Resources Ltd, Inc. v. Robinson*, 1991) and Rio Grande National Forest (*Citizens for Environmental Quality v. US*, 1989). Though the first forest plans were greeted with “the lawsuits and administrative appeals that they were meant to replace” (Wondolleck, 1988, p. 10), the common law that resulted from the lawsuits filled in congressional ambiguity to define the structure and function of a forest plan. In *Citizens for Environmental Quality* (1989), the court explained that “Establishment of forest-wide management requirements (standards and guidelines) to fulfill the requirements of the NFMA relating to future activities...” and “Establishment of management area direction (management area prescriptions)...” are decisions officials must make in a forest planning exercise.

With such limited national guidance, the use of standards and guidelines in “first generation” forest plans was inconsistent. The inconsistency explains much of the present debate regarding the appropriate role for S & Gs. For example, the majority of national forests in the sample chose to forego the use of guidelines and rely on forest planning standards. The purpose of standards varied. The Idaho

Panhandle National Forest broadly developed standards to “resolve public issues and management concerns” and “direct management to meet forest-wide goals” (Idaho Panhandle National Forest, 1987, p. II-24), but many forests left S & Gs unexplained altogether. Other forests took liberties to place importance on standards. For example, the Clearwater National Forest Plan states that the purpose of the Plan is in part to establish “standards...for the administration of...the Forest” (Clearwater National Forest, 1987, p. I-1). Standards are defined as “minimum requirements that must be met” (Clearwater National Forest, 1987, p. II-20); “principles specifying conditions or levels to be achieved” (Boise National Forest, 1990, p. IV-2); design components to “facilitate attainment of Forest goals and objectives” (Beaverhead National Forest, 1986, p. II-25); and “mitigation” applied to management actions (Beaverhead-Deerlodge National Forest, 2009, p. 12). While some standards are linked with objectives, goals, and desired conditions, others are stand-alone requirements.

Revised plans generally incorporate standards *and* guidelines, with distinctions drawn between each component. For example, the Beaverhead-Deerlodge National forest defines a standard as “a particular action, level of performance, or threshold” that is mandatory. Guidelines are generally optional plan components (Beaverhead-Deerlodge National Forest, 2009, p. 304). Another forest explains that agency authority often dictates whether a standard *or* guideline is chosen: The Forest Service “has limited authority to influence certain activities or uses – such as mining or hydropower development – on its administered lands.” In these cases, guidelines are most appropriate, as they establish “reasonable terms, conditions, or measures to minimize or mitigate effects,” in contrast to the enforceable commitment embodied by a standard (Payette National Forest, 2003, p. III-4). The Tongass National Forest (1997) summed up the role of standards in the context of management prescriptions, explaining,

The description of the uses to which land may be put and the activities which may occur there is called a *management prescription*. Each management prescription gives general direction on what may occur within the area...the standards for accomplishing each activity, and the guidelines on how to go about accomplishing the standards... (p. 1-2)

The confusion regarding how to define and apply S & Gs persists. For example, many individuals commenting on the 2012 NFMA regulations felt that guidelines should be optional requirements, and that the distinction between discretionary guidelines and mandatory standards should be clear (77 Fed. Reg. 21205 (April 9, 2012)). These feelings likely originate from the first generation of forest plans and connected case law, which interpreted guidelines as optional requirements. However, as stated previously, the NFMA does not define or provide a distinction between standards and guidelines. The 2012 planning rule's interpretation of each component as mandatory (with flexibility allowed for guidelines, so long as the purpose is still met) (77 Fed. Reg. 21172 (April 9, 2012)) should be permissible.

Interestingly, the 2012 planning rule, while maintaining that S & Gs are mandatory, seems to shift the purpose of the components, especially standards, from protective measures to "design criteria." Proposed agency directives, for example, describe standards as "technical design details" (USDA Forest Service, 2013, p. 24). Even if written in enforceable language, criteria for "technical design" does not seem to adequately describe standards and guidelines as the protective measures Congress envisioned in the NFMA (16 U.S.C. § 1604(g)).

Now that the distinction between a standard and a guideline has been made, the remainder of the thesis will focus primarily on the role of standards in forest planning. Most of the research conducted for this thesis narrowed in on the application of standards, which I view as the most important, legally binding forest planning component. In addition, the role of a guideline has changed considerably over time, and seems to be in flux. Guidelines will be discussed when appropriate, and I will continue to refer to "standards and guidelines," or S & Gs, when warranted.

b. Resources and activities managed with standards

The resources and activities to which standards apply are generally consistent among forest plans. Forest wide standards are typically applied in the following resource categories: recreation, scenic resources, cultural and heritage resources, wildlife and fish management, livestock and range management, timber management, minerals and mining, lands, soils, facilities, transportation, protection

(including fire management and insects and disease management), air and water quality, wilderness, and special designations (e.g., proposed Wild and Scenic waterways, research natural areas, proposed Wilderness areas). Modern plans include categories reflective of contemporary resource issues, including off-road vehicle use and utility corridors. Within each category, certain resources and activities are consistently emphasized, including riparian protection and old growth habitat. In addition, standards are commonly developed to guide and constrain management of management indicator species, big game species, snag species, and threatened or endangered species.

The 2012 NFMA regulations provide a list of values that the responsible official must consider when developing plan components. The list includes traditional resource and activity categories, with notable additions, including ecosystem services, geologic features, habitat connectivity, surface and subsurface water quality, viewsheds, placement and sustainable management of utility corridors, and “system drivers” such as ecological disturbances and climate change (36 C.F.R. § 219.10). While the list of categories is broad, it nonetheless emphasizes consistent application of S & Gs.

c. Procedural methods used to develop standards

Forest plans must be developed, maintained and revised using a “systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences” (16 U.S.C. § 1604(b)). In doing so,

The Secretary shall provide for public participation in the development, review, and revision of land management plans including, but not limited to, making the plans or revisions available to the public...for a period of at least three months before final adoption, during which period the Secretary shall publicize and hold public meetings... that foster public participation in the review of such plans or revisions. (16 U.S.C. § 1604(d))

The 1982 forest planning regulations further clarified this direction, stating that the interdisciplinary (ID) team shall “integrate knowledge of the physical, biological, economic and social sciences, and the environmental design arts in the planning process” (36 C.F.R. § 219.5 (Sept. 30, 1982)).

ID teams were directed to establish “standards and requirements by which planning and management activities will be monitored and required.” The ID teams were also tasked with “obtaining the public’s views about possible decisions” and required to use public participation “early and often throughout the development of plans.” Moreover, public comments were to be analyzed to determine “the variety and intensity of viewpoints about ongoing and proposed planning management standards and guidelines” (36 C.F.R. § 219.6 (Sept. 30, 1982)). As Wondolleck (1988) explains, National Forests apply direction provided in regional S & Gs to development of individual forest plans. Public input is solicited to identify key issues that must be included in the plan, and planners begin forest planning efforts by synthesizing the information (p. 180). For these reasons, the NFMA has been called “an experiment in democratic government” (Steelman, 2001, p. 75, citing Lynn, Kapaldo & Fedkiw, 1990).

The public process to write forest plans, however, often failed to include meaningful public participation (Ackerman, 1990, p. 709). One agency report suggested that both agency officials and interest group members involved in first generation plan development believed that “current procedures promote polarization, distrust, confusion, and delay” (USDA Forest Service Policy Analysis Staff, 1990, p. 36). While public *interests* may be considered in plan development, the public has rarely been involved in developing and writing plan components. According to O’Riordan and Horngren (1987), developing substantive plan components without strong public involvement ignores the congressional intent for participatory forest management. The forest planning process should be based upon statutory and regulatory legal requirements, not desired requirements of a hydrologist, fisheries biologist, or other resource specialists (p. 654). Others dispute these views. For example, one USFS resource specialist interviewee noted the initial work of forest service hydrologists and fisheries biologists to develop standards in his forest’s plan, attributing careful development to increased ownership of – and accountability to – the plan among agency staff.

There is a recurring tension between the role of the public, agency officials, and incorporation of scientific information. O’Riordan and Horngren (1987) critically assessed forest planning under the 1982 regulations. Their research revealed the agency’s tendency to develop forest planning requirements such

as standards based on “the old way of managing forest lands through expert decision” (O’Riordan and Horngren, 1987, p. 644). This type of decisionmaking is based on elite democratic theory; elite theorists view the bureaucracy as worthy of trust and professionally competent. They worry that public involvement may lead to inefficiency and political instability, hence the birth of the “rational decisionmaking model” upon which NEPA and other statutes are heavily based (Steelman, 2001, p. 73). Reliance on USFS technical expertise alone, however, is problematic because many forest planning decisions, including formulation of standards, are not purely technical. Ackerman (1990) explains that technical expertise may decide the best method to protect a riparian area, but it cannot decide whether to allow grazing in the same area. The decisions involve distribution of scarce resources, political choices, and trade-offs (p. 722). Views regarding the role of public involvement and use of science have shifted substantially since the USFS developed first generation forest plans. The importance of fully integrating public participation into every stage of the forest planning process has gained recognition, partly due to public wariness of the bureaucracy’s ability to accurately represent the public’s interests (Steelman, 2001, p. 73). The agency now recognizes the public as knowledgeable and discerning (Steelman, 2001, p. 74), and understands that a lack of trust among stakeholders is a primary impediment to collaborative decisionmaking (Wondolleck & Yaffee 2000). Scientists are increasingly asked to assist in the development of forest plans (Boyce & Szaro, 2005, p. 252). In addition, the importance of a transparent public process has been emphasized (Ananda, 2007, p. 542).

The 2012 regulations continue the trend towards inclusive public process by stating the USFS will “encourage early and meaningful public participation” during forest plan revisions to increase process efficiency and plan effectiveness (77 Fed. Reg. 21249 (April 9, 2012)). The agency makes numerous calls for collaboration and public process throughout the regulations, thereby setting a new standard for co-development of planning components. The new standard is already being attempted. For example, the Clearwater and Nez Perce Forests are in the process of “an intensive two year collaborative process” to “collaborate on input to the Forest Plan revision effort” (Nez Perce-Clearwater National

Forests, 2012). The forests are actively seeking public comment and technical guidance on the writing of all plan components, including standards.

d. Forest planning controversies associated with standards

Literature sources reviewed for this study revealed three primary controversies associated with present and future use of standards. Standards, and disputes over their role and use, often serve as a surrogate for a range of conflicts in national forest management. Therefore, the noted controversies are dominant to forest planning more broadly. The forest planning “process predicament” is the first area of great controversy. Inflexibility to meet changing conditions and high costs are the second and third areas of concern. I describe each controversy in the section below.

1. The Process Predicament

As exemplified through promulgation of the NFMA regulations, the USFS has resisted mandatory requirements. This may be because the agency is already held accountable for following a suite of other regulatory and administrative statutes in addition to NFMA, including NEPA, the ESA, and the Clean Water Act. So, while some see the forest planning approach as “harmoniz[ing] the NFMA’s planning system with many other legal authorities that control or affect land and resource use decisions,” (Gippert & DeWitte, 1996, p. 156), others believe the system forms a “crazy quilt of apparently mutually incompatible statutory directives” (*United States v. Brunskill*, 1984). When mandatory components are placed on top of an already complex planning regime, the agency believes the additional requirements “impede the efficient, effective management of the National Forest System” (USDA Forest Service, 2002, p. 10) and lead to more paperwork instead of on-the-ground management. As one Congressman stated, “The statutory mission of the Forest Service is to ‘care for the land and serve the people.’ Paralyzed by process, shackled by gratuitous bureaucracy, today the Forest Service is incapable of living up to that charge” (Process Gridlock, 2002, p. 11). As has been argued, the requirements put forth in statute and regulation may prevent the agency “from realizing the intent of the law –to protect resources at risk” (USDA Forest Service, 2002, p. 16). In one blunt statement, the agency states they “will ultimately fail to

reverse rapid declines in forest health and increasing wildland fire risks unless the agency is able to more quickly achieve results on the ground” (USDA Forest Service, 2002, p. 8). Descriptions of “analysis paralysis” and “the process predicament” are central to the agency’s case (Nie, 2008a, p. 51, citing 16 U.S.C. § 3313).

Many see the forest planning process as arduous, especially when paired with NEPA’s procedural requirements. A USDA Forest Service report (2002) details the process:

Under NFMA, the Forest Service is required to prepare forest plans for the entire National Forest System. Forest plans are generally 300 pages long. Each forest plan is tied to a programmatic EIS covering an area of about 1 to 3 million acres. Forest plan EISs are about 500 pages long, though CEQ NEPA regulations encourages agencies to limit normal EISs to 150 pages. The entire process of preparing and finalizing a forest plan can take years; for example, it might take five years to prepare a 15-year forest plan. As new information emerges, the Forest Service routinely prepares forest plan amendments and new programmatic EISs. The agency requires review of environmental documentation every three to five years to determine whether it needs to be updated. (USDA Forest Service, 2002, p. 34)

One study concluded that “...the extraordinarily long time required to complete many of the plans” and “complexity of the process” were among the “weak spots” of forest planning under the NFMA (USDA Forest Service Policy Analysis Staff, 1990, p. 47). Behan (1990) referred to this perceived problem as “procedural paralysis” and predicted “...forest plans being challenged on legal technicalities, and redoubled efforts thereafter to make them ‘bombproof,’ legally invincible, at exponentially rising costs” (Behan, 1990, p. 20). The predictions have largely rang true, as environmental litigators interviewed for this study emphasized the agency’s tendency to write vague standards or remove standards altogether. These efforts are best explained as the agency’s desire to defend against future “obstructionism” appeals and litigation (Nie, 2008b, p. 144). As Nie (2006) states, the USFS “seems to believe that previous planning regulations created too many substantive and procedural hooks that could be used against the agency” (Nie, 2006, p. 100).

Due to the mandatory, enforceable nature of standards, they are often blamed for procedural complications. Standards, like other non-discretionary binding obligations, dictate the rules governing timber, minerals, range, recreation, and fish and wildlife management, as well as regulated entities (Nie, 2008, p. 140b). As is commonly argued, the effort to comply with forest planning standards adds an additional layer of procedure to an already complex system. However, we must keep in mind that the process predicament or analysis paralysis “often stems from multiple procedural requirements imposed by Congress and the Executive, and not necessarily from prescriptive laws and their legal enforcement” (Nie, 2008b, p. 140). This research found little evidence to support the argument that standards are a core source of planning inefficiencies. As explained later, use of standards can actually *increase* efficiencies in some instances. Many standards are written in simple terms and do not require additional procedure. Therefore, while the planning system *would* benefit from greater efficiency, “streamlining” exercises should not be used as “a cover for the weakening of environmental laws” and regulations (Nie, 2008b, p. 158). Forest planning must continue to accomplish its statutory purpose of social, economic, and ecological sustainability (Le Master, 2005, p. 1).

2. *Inflexibility*

The second primary controversy associated with forest planning is inflexibility to adapt to changing conditions. This controversy is inherent to problems associated with the “process predicament,” because, as the argument goes, “forest planning requires flexibility to adapt to changing forest conditions, and will not succeed if this flexibility is lost to rote application of rigid procedural rules” (Gippert & DeWitte, 1996, p. 208). As many in the scientific community argue, “Natural systems are so inherently complex that they might never be fully understood in all of their workings” (USDA Forest Service, 2002, p. 20). Therefore, efforts to manage natural systems must be dynamic and flexible. This perspective conflicts with the forest planning process, as “Forest Service rules for public participation and administrative appeals are linear and inflexible” (USDA Forest Service, 2002, p. 24). Forest plans, for example, “are intended to last 10 to 15 years, a period long enough for many changes to occur and much new knowledge to emerge” (USDA Forest Service, 2002, p. 22). Some say the time span of the plans may

“severely limit the forest manager’ ability to deal with empirical controversies and rapidly changing biophysical and social circumstances” (Behan, 1990, p. 23). Indeed, many plans take longer than 10 years to revise; in 2012, of the 127 land management plans being used in the NFS, 68 were past due for revision (USDA Forest Service 2012, p. 21164).

Standards are often a focal point of this controversy. They are generally viewed as mandatory requirements, not subject to flexibility. As was commonly argued during the formation of the 2012 NFMA planning regulations,

Prescriptive elements in land management plans should be minimized. These include but are not limited to such constructs as Management Indicator Species, project level standards, and strict land-use designations. This will allow for maximum flexibility when managing in concert with the uncertainty resulting from rapidly changing ecological (e.g. climate change), social (e.g. demographic changes), and economic (e.g. wood products industry changes) environments. (Council of Western State Foresters, 2011)

The 2012 planning regulations seem to support the public comments in favor of greater flexibility. For example, the regulations did not include mandatory national standards, such as national fixed-width buffer standards, in an effort to provide local flexibility and “to reflect conditions and information on each unit” (77 Fed. Reg. 21206 (April 9, 2012)).

It should also be noted that NFMA grants some flexibility by allowing forest plans to “be amended in any manner whatsoever after final adoption after public notice.” Environmental analysis is only required if “such amendment would result in a significant change in such plan” (16 U.S.C. § 1604(f)(4)). The question of whether an amendment is “significant” is left to the agency’s discretion (*Native Ecosystems Council v. Dombeck*, 2002). Interviews conducted for this research suggested that “non-significant” amendments are commonly used to depart from standards at the project level.

3. *Planning Costs*

The final controversy often highlighted in the literature involves the high cost of forest planning. Similar to previous controversies, many claim that forest planning costs expend dollars that could be

otherwise spent carrying out on-the-ground management. Standards are usually included in this controversy due to their perceived analytical requirements and additional implementation needs. The Forest Service is quick to recognize this issue. For example, the agency has stated that the 1982 forest planning regulations often led to a “drawn-out, difficult, and costly” revision process (77 Fed. Reg. 21163 (April 9, 2012)). The planning process absorbed time and dollars, yet plans were not implemented as envisioned (Spies & Duncan, 2009, p. 191). Cost was one of the primary reasons why the 2000 rule was abandoned by the agency (77 Fed. Reg. 21163 (April 9, 2012)). More light was shed on this topic after a 1999 report estimated that planning and assessment consumes 40 percent of the budgets for NFS work, which represents more than 20 percent of the congressional appropriations for managing the NFS as a whole (NAPA, 1999, p. 18). While the expenditures for forest fire have received more attention in the last decade (Headwaters Economics, 2009; Western Forestry Leadership Coalition, 2010), forest planning costs certainly affect management. Often due to prescriptive requirements, “Line officers often find themselves in a costly procedural quagmire, where a single project can take years to move forward and where planning costs alone can exceed \$1 million” (USDA Forest Service, 2002, p. 12).

USFS budget woes are well documented in the literature (*e.g.*, Blumm & Bosse, 2007, p. 109; Chang, 2006, p. 856; Doremus, 2008). Forest plan development under the 1982 regulations has been estimated to cost between \$2 million per forest (GAO, 1986; Keiter, 2005, p. 1189) to between \$5 and \$7 million (Public Law News, 2007, p. 4). However, the literature does not identify bottlenecks within the forest planning process, or describe the cost of management prescriptions (U.S. Congress, Office of Technology Assessment, 1992, p. 147). Furthermore, the literature review for this research did not produce any evidence that standards specifically are responsible for increased forest planning costs. The U.S. Government Accounting Office (1986), for example, assessed forest planning costs on the Boise and Clearwater National Forests based on “estimated staff-day expenditures and wage rates” (p. 1) and staff judgment of planning costs (p. 2). Forest plan development on the Boise and Clearwater represented 2.3% and 3%, respectively, of the total forest budget (p. 7). Interestingly, NFMA requirements were not disproportionately costly. For example, Boise National Forest staff estimated 41% of the planning costs

were attributed to the NFMA's requirements (with near-equal costs being attributed to NEPA requirements). The cost of the planning process was further broken down into process steps, such as analysis of the management situation and formulation of alternatives, however, development of standards and guidelines or the "management direction" was not identified as an individual cost category (p. 13).

Additional research may help clarify the true cost of developing and implementing standards, and dispel some of the existing controversy. While Congress chose not to accept budget efficiency as the "principle consideration for managing the national forests," economic efficiency is nonetheless important (U.S. Congress, Office of Technology Assessment, 1992, p. 144).

e. Arguments and counter-arguments

Public comment review from the 2005/2008 and 2012 NFMA regulations revealed strong arguments both in favor of, and against, the use of standards in National Forest System planning. At the basic level, these arguments can be divided into two primary camps: proponents and opponents. The following paragraphs detail and explain both arguments while also recognizing the important nuanced arguments that fall somewhere in between.

First, there are those who see standards as important due to their binding, legally enforceable nature. They point out the legal requirements, as stated in the NFMA, to use standards in forest plans. Commenters on the 2005/2008 NFMA regulations repeatedly decried the absence of standards and spoke of the legal obligations to use them. As opposed to other planning components, standards can be used to hold the agency accountable for its actions, and help to manage forest resources consistently. This group often sees standards as the most meaningful components in a forest plan, and important controls for the protection of wildlife species, watershed and riparian health, old growth forests, roadless areas, and other publically contentious resource areas. They generally advocate for a robust monitoring program to measure compliance with standards, and voiced concerns with the 2012 regulations' position that monitoring "does not apply to projects and activities" and "is not a prerequisite for carrying out a project or activity" (16 U.S.C. § 219.12(a)(7)).

This camp also sees a role for standards at the site specific, forest, *and* national level, in order to provide consistency among forests and regions. Many of these comments mentioned cumulative effects and the need to consider resource impacts – and institute protective standards – at a more broad level. Public commenters on the 2012 NFMA regulations, for example, repeatedly stated the importance of a fixed-width riparian stream buffer as a national standard. This type of national standard, the argument goes, would protect watersheds, riparian areas, and wildlife dependent on such ecosystems.

Proponents of standards also view standards as a way to curb what they see as “unfettered” discretion among forest supervisors. As Oregon Wild (2011) summed up the argument in the context of restoration,

The rules are excessively discretionary which will lead to abuse of discretion and more public distrust and gridlock. The proposed rules call for some good things but it does not provide clear standards to ensure that these good things are provided to the degree necessary to ensure that conservation objectives are met. As an analogy, consider a hypothetical rule that simply says the school lunches provide protein. An observer might assume that intent is that each student gets a recommended portion of protein, but since the rule is basically standard less, the letter of the rule could be met by simply providing each student with one peanut. Too many of the requirements in these planning rules are similarly standard less. The rules clearly call for some restoration, but the rules can be significantly improved by ensuring that forest plans provide enough restoration to meet the needs of current and future generations, and provide well-distributed ecological functions and ecosystem services. (Oregon Wild 2011)

On the other side of this debate are those who view standards as cumbersome, burdensome and expensive to implement. Due to their administrative rigidity, standards do not allow managers to adapt to changing conditions or, most importantly, make management decisions based on the localized, site-specific setting of a forest or management area. This group spoke of the need to manage for multiple uses, and of the burden standards may impose on such management. They also frequently mentioned climate change, variable economic conditions, and the need for adaptive management to support their arguments

for increased local control over the forest planning system. Therefore, this camp generally supported the solitary use of guidelines to provide for more flexibility

Opponents of standards also spoke of the expense to implement standards, and the expense and burden of endless appeals and litigation the agency may face by incorporating more standards into forest plans. They wondered why, for example, management decisions should be standardized, when NFMA left so much discretion to the forest official. One group articulated this argument by predicting that by removing “a great portion of the local decision maker’s discretion, the Proposed Rule will have the effect of frustrating the clear intent of Congress and the corresponding provisions of the Rule itself” (Alaska State Department of Natural Resources, 2011). Many in this camp also voiced frustration with the USFS’s apparent abandonment of what they saw as a major victory for agency discretion in *Lands Council v. McNair* (2008), by adopting “many non-discretionary requirements where the responsible official ‘must’ or ‘shall’ adopt a specific management approach” (Troxel, 2011).

While the major arguments and counter arguments are easily categorized, there are more nuanced arguments for the use of standards. Arguments in favor of localized standards to strengthen economic growth related to timber management and other extractive industries were common. Sustainable Northwest (2012), for example, believed that the 2012 NFMA planning regulations needed specific national-level standards “in order to protect the ecological, social, and economic characteristics of each unit, and the surrounding communities...” (Sustainable Northwest, 2011, p. 5). The Wyoming State Division of Forestry voiced a similar opinion, stating that standards should promote management actions, such as “managing sustainable timber lands towards the desired future condition” or “reducing fuels around wildland-urban interface areas” (Wyoming State Division of Forestry, 2011).

Many commenters simply wanted standards to enhance management certainty. As the California Attorney General’s Office (2011) explained, “While discretion can lead to flexibility, it can also lead to uncertainty. Where the restoration and sustainability of one of our nation’s greatest natural resources is at stake, such uncertainty is not acceptable” (California Attorney General’s Office, 2011). Arguments often favored management area standards in order to provide certainty of what activities could occur in specific

areas. One board of county commissioners, for example, concluded, "...the public would be best served if plans have management areas that specify what activities will be emphasized and allowed" (San Miguel Board of County Commissioners, 2011). The Montana Chapter of Backcountry Hunters and Anglers also saw management area standards as essential to provide certainty. They also see "comprehensive use of standards and distinct management units with clear geographic boundaries" as essential to maintaining public trust. As they see it,

The proposed [2012] rules downplay both of these elements. Under the 1982 Rules, the public could anticipate management direction on any given piece of land that had measurable standards to ensure that certain resources would be protected. As far as we can discern, there is no direction in the proposed [2012] rule to establish such clear management lines, nor specific standards or guidelines for each distinct management area. Therefore the public has only trust, not a definitive document with robust and reliable principles and practices. (Montana Chapter of Backcountry Hunters and Anglers, 2011)

There was wide acknowledgement that standards that specify where and how activities will occur enhances the public's ability to understand land management complexity and participate in public processes (The Wilderness Society, 2011).

f. The legal background of standards

To recall, the NFMA and subsequent regulations provided little direction as to how standards should be defined or applied. Therefore, the judiciary was, in many cases, tasked with interpreting the legal meaning of each prescriptive planning component. The following section reviews the application and meaning of standards according to the judiciary.

Standards serve as a sort of gateway through which projects must pass. *Neighbors of Cuddy Mountain v. Alexander* (2002) explains, for example, that compliance with forestwide old growth standards "is relevant to the lawfulness of any individual timber sale." In *Hapner v. Tidwell* (2010) the court makes a similar conclusion regarding compliance with elk cover standards. Standards also "operate

as parameters within which all future development must take place” (*Swan View Coalition v. Turner*, 1992), meaning standards set limits or boundaries that future projects and site-specific activities, whether a project to provide fish passage or a timber sale, must comply with. Forest plan standards and guidelines have historically been the primary mechanism by which individual project proposals are evaluated (Gippert & DeWitte, 1996, p. 186).

Courts tend to make a distinction between standards and guidelines, viewing the former as “mandatory requirements” and the latter as procedural and discretionary (*Greater Yellowstone Coalition v. Servheen*, 2009, citing *Miller v. U.S.*, 1998; *Wilderness Society v. Bosworth*, 2000). This interpretation may change in the future, however. The 2012 regulations view both standards and guidelines as mandatory constraints on projects or activities, yet a guideline “allows for either strict adherence to the terms of the guideline, or deviation from the specific terms of the guideline, so long as the purpose for which the guideline was included in the plan is met” (USDA Forest Service 2012, p. 21206). Though guidelines still allow for some flexibility, they may become, as one agency planning expert hypothesized, connected to a metaphoric “shadow standard” because deviation from the guideline will likely require explanation from the forest.

Several courts emphasize the mandatory nature of standards in the context of the Endangered Species Act (ESA 1976). One of the five factors to be considered by NOAA Fisheries and the U.S Fish and Wildlife Service (USFWS) in making ESA listing decisions is “the inadequacy of existing regulatory mechanism[s]” (16 U.S.C. § 1533). Vague or voluntary measures found in plans are generally viewed as speculative and not enforceable, and thus are not sufficient “regulatory mechanisms” (*Oregon Natural Resources Council v. Daley*, 1998; *Greater Yellowstone Coalition v. Servheen*, 2009). On several occasions, the courts have viewed forest plan standards as constituting an “adequate regulatory mechanism” because of their binding and enforceable nature (*Greater Yellowstone Coalition v. Servheen*, 2009; *Pacific Coast Federation of Fishermen’s Associations v. National Marine Fisheries Service*, 2001; Schultz, Sisk, Noon, & Nie, 2013).

The language used to write forest planning standards is also key. Whether a standard or guideline “is cast in suggestive (i.e., ‘should’ and ‘may’) rather than mandatory (e.g., ‘must’ or ‘only’) terms” is significant to the courts (*The Ecology Center v. Castaneda*, 2009b). For example, guidelines are often written in “aspirational rather than mandatory language,” so the courts generally view guidelines as “advisory” (*Native Ecosystems Council v. Weldon*, 2012). The use of mandatory language, however, “does not eliminate discretion when the broader goals sought to be achieved necessarily involve an element of discretion” (*Blackburn v. U.S.*, 1996). For example, a standard or guideline may be written in mandatory language that requires fire suppression in an area. Still, unless specified in the standard, the agency has discretion to determine methods used to suppress the fire, or the period within which to do so (*Miller v. U.S.*, 1998). For both standards and guidelines, courts assess whether the prescription is defined in mandatory or discretionary terms and whether exceptions and latitude are afforded in implementation. The courts often rely on the language usage to classify the component as a mandatory standard or more discretionary guideline. As Gippert and DeWitte (1996) explain, “The specific language of a Plan will determine how the Plan’s requirements will be applied, and not whether they are classified as standards or guidelines” (p. 189, citing *Sierra Club v. Robinson*, 1994).

The courts have repeatedly recognized the importance of standards for forest-wide consistency with the forest plan, especially when the purpose of the prescription “is to ensure compliance with the substantive mandates of NFMA” (*Ecology Center v. Austin*, 2005). Or, as stated in *Neighbors of Cuddy Mountain* in the context of timber sales,

To hold otherwise would permit the Forest Service to don blinders to the overall condition of a national forest each time it approved a sale, quite literally losing sight of the forest for the trees. This would contravene “one of the fundamental purposes of Congress in enacting [NFMA]: that the National Forest System be managed with a ‘systematic interdisciplinary approach,’ by means of `one integrated plan for each unit of the National Forest System. (*Neighbors of Cuddy Mountain*, citing *Idaho Sporting Cong. v. Rittenhouse*, 2002, and 16 U.S.C. § 1604)

Courts emphasize that “individual site-specific projects must not only comply with NFMA, but must also be consistent with the governing forest plan” (*Helena Hunters and Anglers v. Tidwell*, 2009, citing *Idaho Sporting Congress Inc. v. Rittenhouse*, 2002). Therefore, if standards are written with enforceable language as detailed above, it is important that all site-specific projects and actions be consistent with the forest planning components (*Lands Council v. McNair*, 2008). Moreover, if a forest plan relies on criteria to show how on-the-ground actions are consistent with forest plan standards, compliance with the criteria is mandatory, regardless of how they are labeled in the plan (*Native Ecosystems Council v. Weldon*, 2012; *Ecology Center v. Austin*, 2005). When there is a clear link between a challenged project and an associated standard, the forest must, with “reasonable” proof, demonstrate compliance between the planning standard and project (*Native Ecosystems Council v. USFS*, 2005; *Neighbors of Cuddy Mountain v. Alexander*, 2002; *Wilderness Society v. Bosworth*, 2000). If there is no link between the standard in question and the challenged project, arguments regarding violation of the substantive prescriptions “are unavailing” (*Wild West Institute v. Bull*, 2008).

The mandatory standards and questioned forest planning project must be linked because forest plans, according to the Supreme Court, are generally not ripe for judicial review. Instead of challenging a plan, citizens have to wait until more site-specific projects implementing the plan are initiated by the agency. For example, in *San Juan Citizens Alliance v. Stiles* (2011), plaintiffs’ claims regarding inconsistencies among old growth and wildlife standards were “premature” and “not ripe for review.” Notably, however, *Wilderness Society v. Thomas* (1999) clarifies that claims based on “imminent concrete injuries” caused by a forest plan’s components or a “site specific injury causally related to an alleged defect in the forest plan” may be ripe for review (188 F. 3d 1130, 9th Cir. 1999).

The legal enforceability of standards must also be considered in the context of *Norton v. Southern Utah Wilderness Association (SUWA)*, 2004). In this decision, the Supreme Court ruled that “a land use plan is generally a statement of priorities; it guides and constrains actions, but does not (at least in the usual case) prescribe them.” This decision makes it difficult to enforce some commitments made in a land use plan, like the commitment that an area “will be monitored and closed if warranted” due to motorized

recreational use. This type of ambiguous statement is not a “sufficiently discrete” action warranting judicial review. As a result of this decision, public lands were largely removed from the federal land planning process and agencies were insulated from challenges to planning decisions (Blumm and Bosse 2007, p. 108). Nevertheless, the Court also states in *SUWA* (2004) that “an action called for in a plan may be compelled...when language in the plan itself creates a commitment binding on the agency.” Forest planning standards should fall into this category because they represent a “clear indication of binding commitment in the terms of the plan.”

The case law also reveals the traditional tendency of the judiciary to defer to the USFS in how to best achieve and implement a particular standard. Unless clearly stated with precision and specificity (*Ecology Center v. Austin*, 2005), the courts will usually defer to the agency in determining the methods used to implement a standard (*Lands Council v. McNair*, 2008; *Ecology Center v. Castaneda*, 2009a). The courts are also likely to defer to the USFS for how best to implement a standard if a high level of scientific uncertainty exists.

g. Forest planning standards typology

This study involved a systematic analysis of 25 National Forest plans, amendments and strategies. The review led to the formation of a forest plan “typology,” consisting of the most commonly used standards within each document (Table 2). As with the argument and counter-arguments, this typology focuses specifically on standards in order to simplify analysis. This simplification was necessary because many of the surveyed plans did not include guidelines.

Thirty-one categories of commonly used standards were first identified. The categories were then organized into three broad categories based on general distinctions between standards. The three distinctions are mandatory or discretionary, simple or complex, and scale, with examples within each ranging along a continuum. Six primary subcategories were identified that fall within one or more of the distinction categories.

Table 2: Typology of Common Forest Planning Standards

	Category	Description	Example
Discretionary & Mandatory	<i>Mandatory</i>	Utilize mandatory language such as “must,” “shall,” or “will” and are often specific	“Livestock grazing permits will not be issued. Should livestock drift into the watershed from adjacent private lands, the owners will be required to remove them immediately.” ⁷
	<i>Discretionary</i>	Utilize suggestive language such as “should” or “may” and are often ambiguous and vague	“Tent platforms, toilets, or other constructed facilities should be located approximately one-half mile, or more, from popular beaches, lakes, recreational boat anchorages (both developed and undeveloped), or other special recreation places.” ⁸
	<i>Default with exception(s)</i>	Allow for exceptions to exist, by either recognizing that “exceptions may occur,” or laying out specific terms for allowable exceptions	“Silvicultural examinations and prescriptions will be required prior to timber manipulation or silvicultural treatment. Exceptions are allowed for removal of trees that block vision along roads, removal of hazard trees, clearing of rights-of-way, clearing for mineral development, Christmas tree sales in encroachment areas, and removal of firewood.” ⁹
Complexity	<i>Simple</i>	Impose straightforward rules or requirements	“Chemical herbicides and pesticides will not be used within the Ashley Creek Watershed” ¹⁰
	<i>Complex</i>	Impose complex requirements involving detailed processes, methods, or considerations	“As a minimum, snags are to be retained within the harvest unit at levels sufficient to support species of cavity-nesting birds at 40 percent of potential population levels based on published guidelines and models. The objective is to meet the 40 percent minimum standard throughout the matrix, with per-acre requirements met on average areas no larger than 40 acres. To the extent possible, snag management within harvest units should occur within the areas of green-tree retention. The needs of bats should also be considered in these standards and guidelines as those needs become better known. Snag recruitment trees left to meet an identified, near-term (less than 3 decades) snag deficit do not count toward green-tree retention requirements.” ¹¹
Scale	<i>Forest-wide</i>	Cover all projects and activities within a forest’s boundaries	“Maintain at least 20 percent of the acres within each forested PVG [potential vegetation group] found in a watershed (5th field HU) in large tree size class (medium tree size class for PVG 10, persistent lodgepole pine).” ¹²
	<i>Forest(s)-wide</i>	Cover projects and activities across multiple forests or a region, and are often limited to a zone or area that crosses multiple forest boundaries	“Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Aquatic Conservation Strategy objectives.” ¹³
	<i>Management area</i>	Cover a specific management area and distinguish one management area from another	“Timber management regimes will be based on site-specific analysis of caribou habitat needs. Cost effectiveness and cost efficiency will be included in the analysis. Both even-aged and uneven-aged regeneration systems will be used dependent upon

⁷ Lolo National Forest, 1986, p. III-4

⁸ Tongass National Forest, 1997, p. 3-31

⁹ Beaverhead-Deerlodge National Forest, 2009, p. 44

¹⁰ Lolo National Forest, 1986, p. III-4

¹¹ Northwest Forest Plan, 1994, p. C-42

¹² Payette National Forest, 2003, p. III-26

¹³ Northwest Forest Plan, 1994, p. C-37

			the site specific caribou habitat requirements. Existing all-aged old-growth cedar/hemlock stands are to be retained.” ¹⁴
Additional Sub-categories	<i>Prioritization</i>	Prioritize certain values, resources or actions over others to ensure compatibility or effectiveness	“Occupied bighorn sheep and mountain goat range will be protected during resource activities. Project plans for livestock, timber, or other resource development will include stipulations to avoid or mitigate impacts on their range. Conflicts between livestock and these wildlife species will be resolved in favor of the big game.” ¹⁵
	<i>Threshold</i>	Represent quantitative or qualitative limits that may not be crossed, either as a “ceiling” or “floor”	“In areas where more than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity...” ¹⁶
	<i>Mitigation</i>	Require mitigation of potentially harmful activities in order to reduce resource degradation	“Mitigate the physical impacts of increased dispersed recreation use. Rehabilitation efforts will be based on resource damage to soils, water, and vegetation. Efforts may include closing the site for the short or long term, revegetation by seed or plants, signing, visitor contact, and printed material.” ¹⁷
	<i>Process-based</i>	Specify how decisions must be made, coordination or consultation that must occur, and information or data that must be generated	Easement acquisition shall conform to right-of-way planning and shall include existing Forest Transportation System roads and trails as well as project-related new construction. Coordinate with intermingled and adjacent landowners and local governments in developing roads or road systems that serve the needs of all parties. Obtain rights-of-way utilizing eminent domain only if necessary. ¹⁸
	<i>Management method</i>	Specify tools, strategies, or design components that must be utilized to carry out a management action	“In fisheries streams, design all instream structures to allow for upstream fish passage.” ¹⁹

1. *Mandatory and Discretionary Standards*

I found standards ranging from strict, mandatory requirements to highly discretionary suggestions. For example, a standard may state, “Do not clear debris resulting from fires. Do not undertake fire hazard reduction or reforestation” (Nez Perce National Forest, 1987, p. III-14) or a forest may “prohibit cutting of snags for firewood within 300 feet of any river, lake, or reservoir (Flathead National Forest, 2001, p. II-36). These mandatory requirements embody what one generally thinks a

¹⁴ Idaho Panhandle National Forest, 1987, p. III-35

¹⁵ Helena National Forest, 1986, p. II/19

¹⁶ Region 1 Soil Quality Standards, 1999, p. 2

¹⁷ Nez Perce National Forest, 1987, p. II-16

¹⁸ Sawtooth National Forest, 2003, p. III-53

¹⁹ Beaverhead National Forest, 1986, p. II-29

forest plan standard should look like. Many such requirements were found throughout forest plans included in this study.

However, an equal number of standards range between mandatory requirements and more discretionary ones, and utilize suggestive language such as “may,” “should” or even “avoid.” For example, many standards were found that emphasized or encouraged certain activities. One standard states, “*Generally*, even-age management will be pursued to reduce entries. Uneven-age management is an option when site conditions dictate or the results can be shown to be an enhancement of the riparian area” (Kootenai National Forest, 1987, p. II-32). “ORV use is *not encouraged* but *may be permitted* where it is currently occurring” (Clearwater National Forest, 1987, p. II-37) provides another example. These standards give officials something to consider, but omit any substantive direction. Other standards seem to be entirely voluntary. Consider, for example, “Livestock grazing may be permitted” (Lolo National Forest, 1986, p. III-2) and “Snow roads are *encouraged where possible*” (Idaho Panhandle National Forest, 1987, p. III-35).

The idea of discretionary standards may be surprising. Considering the historical evolution of the planning standard and guideline, however, the distinction makes sense. As explained previously, many first generation plans did not include guidelines per se. Therefore, the category of standards included an array of guidance, with some instances being more mandatory than others. Later, I discuss why discretionary standards should be reclassified as an objective or other component, or removed altogether.

Many default standards that allow for exceptions also exist, falling between mandatory and more discretionary prescriptions. While some of these standards are vague and simply recognize that exceptions may occur, others lay out specific terms for allowable exceptions. Or, they describe specific situations where the default standard may be altered. I refer to these exceptions as “bounded.” One example is to,

Minimize delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following review and recommendation by a resource advisor, when an escape would cause more long-term damage. (Northwest Forest Plan, 1994, C-35)

Standards may also be exempt by defined special activities. For example, “Silvicultural examinations and prescriptions will be required prior to timber manipulation or silvicultural treatment. Exceptions are allowed for removal of trees that block vision along roads, removal of hazard trees, clearing of rights-of-way, clearing for mineral development, Christmas tree sales in encroachment areas, and removal of firewood” (Beaverhead-Deerlodge National Forest, 2009, p. 44). Other standards allow for exceptions based on site-specific analysis. The Inland Native Fish Strategy (USDA Forest Service, INFISH, 1995) requires a default stream buffer width of 300 feet. However, after completion of watershed analysis, “site-specific widths may be increased...to achieve riparian management goals and objectives, or decreased where interim widths are not needed to...avoid adverse effects” (USDA Forest Service, INFISH, 1995, p. A-5). Similarly, the Beaverhead National Forest maintained that “Tractor yarding will not be allowed on slopes exceeding 45 percent” but, “Exceptions may be allowed when soil damage is unlikely to occur if appropriately analyzed and rationale for the exception is documented in the project's environmental analysis” (Beaverhead National Forest, 1986, p. II-36).

2. *Complexity*

Standards also ranged in complexity from simple to highly complex. Examples ranged from the most straightforward, to the most complex standards, which sometimes contained an entire appendix to explain the methods for complying with the standard.

Simple standards provide for easy “rules” to follow or implement. For example, “maintain signs at key junctions” (Sawtooth National Forest, 1987, p. PR134316), or “Logging in sensitive areas requires special considerations and mitigating measures” (Flathead National Forest, 2001, p. II-54). Management area standards provided the most straightforward examples. Consider, for instance, “Commercial harvest of camas is prohibited” (Beaverhead-Deerlodge National Forest, 2009, p. 83) or “livestock grazing permits will not be issued” (Lolo National Forest, 1986, p. III-4). The opportunities that simple, site-specific standards in management areas provide will be discussed later in more detail.

More complex standards usually involved habitat management for particular species. For example, elk management usually involves certain “habitat effectiveness,” with criteria being numerical

standards restricting road density and forest cover in an effort to manage for “elk security.” Prescriptions are often divided into “elk management units,” with variable requirements based on seasonal needs (Payette National Forest, 1988, p. R13811; Gallatin National Forest, 1987, p. II-18; Helena National Forest, 1986, p. II-17 to II-18). Standards managing old growth habitat and snag species also fall into this category in nearly every plan sampled, and often include detailed methods in an appendix (Deerlodge, 1987, p. II-19; Beaverhead-Deerlodge National Forest, 2009, p. 48; Idaho Panhandle National Forest, 1987, Appendix X). Northern Goshawk standards on the Tongass National Forest involve detailed measurements and analysis of foraging habitat in old growth forests, nest sites (both confirmed and probable), and timber harvest requirements (Tongass National Forest, 1997, p. 4-89). A suite of complex lynx management standards have been amended onto many forest plans in the Northern Rockies (USDA Forest Service, 2007). Others categories that usually involve complex standards include achievement of visual quality objectives (VQOs) (Tongass National Forest, 1997, p. 4-90) and forest “openings,” where the forest must measure compliance using watershed, water resource, wildlife, and terrestrial vegetation measurements (Clearwater National Forest, 1987, p. II-27).

3. *Scale*

The distinction between “forest-wide standards and guidelines” and “management area standards and guidelines” exists in nearly every forest plan surveyed. In general, the scale at which standards are applied varies considerably. All forest plans contain “forest-wide” standards that apply programmatically to resources and activities in the entire forest. For example, across the Flathead National Forest, the public is prohibited from cutting snags for firewood within 300 feet of any river, lake, or reservoir (Flathead National Forest, 2001, p. II-36). Management areas are smaller designated areas within the forest that often have more site-specific standards and guidelines that apply *in addition* to the forest-wide requirements. For example, a forest-wide standard on the Lolo National Forest states “The right to prospect, develop, and mine on National Forest System lands open to entry and location will be recognized” (Lolo National Forest, 1986, p. II-16), while a standard in Management Area 18 states that “Mineral materials permits will be considered on a case-by-case basis” subject to management area goals

(Lolo National Forest, 1986, p. III-84). Most forest plans also prescribe management or geographic area standards that only apply within certain zones. The Flathead National Forest, for example, “shall monitor gray wolf and mountain caribou population status” in one management area (Flathead National Forest, 2001, p. II-53). In other forests, timber and range suitability determinations are made on a management area scale. The Lolo National Forest plan uses standards stating that “No scheduled timber harvest will occur” or “Livestock grazing permits will not be issued” in many management areas (Lolo National Forest, 1986). In most plans surveyed, the forests were covered by a suit of forest-wide standards, as well as 20-30 management areas with corresponding standards.

Other standards apply to multiple forests in the context of a watershed, species habitat, or administrative region. For example, several forest plans in this study were amended to manage for grizzly bear habitat, which does not adhere to forest boundaries. Within the grizzly “Primary Conservation Area,” forests must not “create new active commercial livestock grazing allotments” or “increase permitted sheep animal months from the identified 1998 baseline” (USDA Forest Service 2006, p. 5). The Region 1 soil quality standards cover all forests within the region with two thresholds for soil quality (USDA Forest Service 1, 1999). At the largest scale are those, such as the NFMA’s wildlife diversity standard, that apply to all national forests.

Within each of these categories fall six “subcategories” of consistently used standards, including prioritization, threshold, mitigation, process-based, management method, and action-forcing standards.

4. Prioritization Standards

All surveyed forest plans contained standards that set priorities for management. In these standards, certain values, resources or actions were prioritized over others to ensure compatibility or effectiveness. One forest, for example, requires that “Big game requirements for space and forage have priority in the management of winter range used in common by livestock and big game” (Payette National Forest, 2003, p. III-27). In this way, managers are directed to prioritize big game in areas shared with livestock; however, they are not directed to take any specific management actions. To be more specific, the Flathead National Forest states that managers must “Favor wildlife, recreation, and water quality

where conflicts occur between grazing and the other resources” (Flathead National Forest, 2001, p. III-92). This standard provides managers with a starting point for conflict resolution.

Other standards in this category use prioritization as a way to order management decisions. For example, “Meet increased skiing demand through the expansion of the existing Discovery Basin Ski Area... before giving consideration to other new area proposals” is one more process-based prioritization standard (Deerlodge National Forest, 1987, p. II-13). Many forests included explicit work schedule standards that also fall within this category. Consider the Helena National Forest, which states that “Generally, trail maintenance work priorities will be established as follows: Priority 1, Activities to correct unsafe conditions relative to management objectives; Priority 2, Activities to minimize unacceptable resource and trail damage; Priority 3, Activities that restore the trail to planned design standards” (Helena National Forest, 1986, p. II-32). This type of explicit standard is an easy way to convey the forest’s priorities to the public. Finally, some standards simply ensure compatibility. “Livestock grazing will be allowed where use is compatible with administrative functions” is one such example (Lolo National Forest, 1986, p. III-8).

5. *Threshold Standards*

The next major category of standards is those providing a threshold. Thresholds represent limits that may not be crossed, and can be written in several different ways. For example, the Region 1 Soil Quality standards contain two quantitative thresholds that cannot be crossed. The standards instruct forests to “Design new activities that do not create detrimental soil conditions on more than 15 percent of an activity area,” and “In areas where less than 15 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effect of the current activity following project implementation and restoration must not exceed 15 percent” (USDA Forest Service Region 1, 1999, p. 2). In this way, the thresholds protect soils against future disturbance while attempting to maintain existing quality. Lynx standards in the Northern Rockies provide several similar quantitative thresholds that act as both gateway and prohibitions for future activities. One such standard, for example, requires that “timber management projects shall not regenerate more than 15 percent of lynx habitat on the National Forest System lands

within a Lynx Analysis Unit in a ten-year period” (USDA Forest Service, 2007, p. 3). Quantitative stream sediment thresholds were also found. For instance, one forest instituted a maximum sediment loading based on stream channel type (Clearwater National Forest, 1987, Appendix K).

Other standards within this category are written so that certain activities are contingent upon thresholds. These standards are both quantitative and qualitative. “Roads will be closed to motorized vehicles December 1 to May 15 if motorized use has the potential of adversely affecting wintering white-tailed deer populations” is one such example; road closures are based on the threshold of adverse affects to white-tailed deer populations (Flathead National Forest, 2001, p. III-37).

Finally, thresholds can also set a “floor” for resource management instead of a limit. Consider the standard that “elk summer range will be maintained at 35 percent or greater hiding cover and areas of winter range will be maintained at 25 percent or greater thermal cover...” (Helena National Forest, 1986, p. II-17). This standard represents a threshold because hiding or thermal cover cannot fall below the stated percentage. Many other standards were found to use thresholds to maintain a certain resource condition. “Maintain at least 10 percent of the forested portion of the IPNF as old growth” provides one example (Idaho Panhandle National Forest, 1987, p. II-29).

6. *Mitigation Standards*

Mitigation standards require forest managers to mitigate potentially harmful activities in order to prevent degradation of resources. The Beaverhead-Deerlodge National Forest, for example, must “Mitigate, through avoidance or minimization, management actions around known active nest sites of threatened, endangered, proposed candidate, and sensitive bird species...” (Beaverhead-Deerlodge, 2009, p. 49). In this example and others, specific mitigation actions are left to the discretion of the forest manager. Other standards prescribe more specific action. The Nez Perce National Forest must “[m]itigate the physical impacts of increased dispersed recreation use.” Mitigation measures “may include closing the site for the short or long term, revegetation by seed or plants, signing, visitor contact, and printed material” (Nez Perce National Forest, 1987, p. II-16).

Mitigation standards can also be used in conjunction with threshold standards. The Payette National Forest prescribes mitigation measures where soil quality standards are exceeded. In this example, the forest must use mitigation to restore soil quality levels following completion of an activity that degrades soil quality (Payette National Forest, 2003, p. III-21). This type of joint mitigation-and-threshold requirement allows management flexibility while ensuring resource quality will not deteriorate.

Finally, other standards use mitigation in more of a planning sense, requiring that “mitigation measures be included in plans of operation for all mining activities, mineral related access roads and processing facilities” (Clearwater National Forest, 1987, p. II-30). In this example, choosing mitigation measures and a timeline for action is left to the discretion of the official in charge.

7. Process-based standards

Many of the standards found in the study sample prescribed a certain process for how decisions must or should be made on the forest. These types of procedural standards range from requiring environmental effects analysis prior to oil and gas leases (Lolo National Forest, 1986, p. II-16) to implementation stipulations for timber sale contracts (Sawtooth National Forest, 2003, p. III-36).

Others within this category call for coordination and cooperation among national forests, the public, state agencies, tribal interests, or other entities. For example, the Nez Perce National Forest must “Coordinate the scheduling of land-disturbing activities with adjacent Districts to address cumulative effects over large areas in key wolf habitats” (Nez Perce National Forest, 1987, p. II-19). On another forest, the agency must “Coordinate all Forest Service management activities to meet the requirements of the State Implementation Plan, State Smoke Management Plan, and Federal air quality standards” (Flathead National Forest, 2001, p. II-64).

Other standards require consultation with certain experts, agencies, or interest groups prior to proceeding with certain activities. The Boise National Forest must conduct cultural resource inventories in consultation with the appropriate tribal and state historic preservation offices (Boise National Forest, 2003, p. III-70). A Certified Mineral Examiner “shall review all proposed Plan of Operations in

Inventoried Roadless Areas to determine if unnecessary or unreasonable resource damage will occur” on the Sawtooth National Forest (Sawtooth National Forest, 2003, III-49).

These standards may also encourage the forest to generate certain types of information such as a watershed analysis (USDA and USDI, 1994, p. C-7), cultural resources inventory (Kootenai National Forest, 1987, p. II-25), or a guide for recreational opportunities (Helena National Forest, 1986, p. II-14). In addition, standards in this category may require the forest to *update* the collected information. The Tongass National Forest must maintain a channel type and stream class based inventory, to be maintained and updated during site-specific project planning and analysis (Tongass National Forest, 1997, p. 4-8).

Last, several standards called for education, either for agency personnel or the public. For example, managers should be educated and trained for wilderness management (Nez Perce, 1987, p. II-17) or to “better acquaint the public with the positive use of fire and the beneficial role of natural fire...” (Beaverhead National Forest, 1986, p. II-42).

8. *Management methods standards*

Common among surveyed forest plans were standards instituting specific tools, strategies, or design components that should or shall be utilized to develop or carry out a management action. Consider, for example, this Sawtooth National Forest mandate: “When taking water from fish-bearing streams for road and facility construction and maintenance activities, intake hoses shall be screened with the appropriate mesh size” (Sawtooth National Forest, 2003, p. III-59). Other examples of specific requirements include increasing the height of fencing wire that allows for antelope passage (Sawtooth National Forest, 1988, p. PR134348) or designing structures within streams to allow for fish passage (Gallatin National Forest, 1987, p. II-19). More vague management method requirements include such direction as to “Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Aquatic Conservation Strategy objectives” (Northwest Forest Plan, 1994, p. C-37).

V. Analysis and Recommendations

The development and writing of standards under the 2012 NFMA planning regulations will be integral to the success, effectiveness, and sustainability of forest plans generated under the planning rule’s guidance. Several key factors, including language choices, physical and temporal measurements, consistency, use of science, and monitoring, influenced the effectiveness of standards in the past, and will continue to be important in the future. In the next section, I subjectively analyze each of the factors more completely, leading to recommendations to consider when writing standards for the next generation of forest plans (summarized in *Table 3*).

Table 3: Recommendations for Writing Standards in the Future

1. Standards should be used to meet legal obligations under NFMA and the ESA, increase political credibility, improve efficiency, and enhance species recovery efforts.
2. When writing standards, discretionary terms must be avoided and specific, concise language should be utilized.
3. Forests should consider using suitability determinations and management area designations to determine suitable uses of an area in lieu of standards.
4. Specifying when, how, and where a standard should be carried out is important. Special attention must be paid to how standards are measured, temporally and spatially.
5. National and regional guidance is important to assure uniformity of information between planning levels and consistent implementation across landscapes.
6. In certain situations, such as species recovery efforts, standards that compel mitigation, maintenance, or other pro-active actions should be considered.
7. The USFS should explain the science, and factors going beyond science, that were considered when developing standards in order to be fully transparent.
8. Forests should practice more precautionary decisionmaking in situations where scientific uncertainty exists in order to reduce the impact of existing ecological stressors and mitigate effects from future climatic effects and disturbances.
9. Standards should have a traceable scientific lineage with clearly documented methods and assumptions in order to increase plan credibility, ease future conflict, and provide a solid starting point when revising or updating science-based standards.
10. A robust monitoring program is essential to determine compliance with forest plan standards and gather data to determine whether standards should be relaxed or strengthened to meet planning objectives.
11. Standards can add credibility and accountability to an adaptive management approach by providing protective “boundaries” for implementation and experimentation.
12. Forests can make standards more adaptable by writing pre-specified exceptions or contingency measures and regularly amending standards to address best available science or changed management conditions.

a. *The importance of standards*

Findings covered so far illustrate the uses, controversies, and political and legal context associated with standards. Ultimately, however, the USFS will determine how and where to use the

planning component in forest plans. Public comment analysis and interviews conducted for this research reveal compelling reasons why the agency should incorporate meaningful standards in forest plans. While the agency could view standards as a negative burden to comply with, my hope is that it may see the use of standards as an opportunity for legal compliance, political credibility, increased efficiency, and improved species recovery efforts. The reasoning that may compel the USFS to use planning standards in the future is central to this research and is discussed below.

As many public commenters emphasized during promulgation of the 2005 and 2008 forest planning rules, the agency has a legal mandate, under NFMA, to include standards in forest plans. Unless NFMA is rewritten in the future, standards will be required to “insure” protection of wildlife diversity, watershed conditions, bodies of water, and productivity of the land (16 U.S.C. § 1604(g)). NFMA refers to “standards *and* guidelines,” thereby allowing forests to choose the most appropriate component. However, many of NFMA’s requirements were written using strong terms such as “must provide,” “assure,” and “insure,” and NFMA regulations should treat the substantive provisions as such (Cheever, 1998, p. 30). Merriam Webster defines the term “insure” as “to make certain especially by taking necessary measures and precautions” (Insure, n.d.). Standards are the only component with enough binding certainty to meet the requirement, for example, to “insure that timber will be harvested from National Forest System lands only where soil, slope, or other watershed conditions will not be irreversibly damaged” (16 U.S.C. § 1604(E)-(E)(i)). Under the 2012 regulations, standards are the only plan component that can provide adequate certainty and binding protections to achieve NFMA’s substantive mandates. Conversely, guidelines, objectives, goals, and desired future conditions are discretionary and flexible, and do not provide certainty of protection. The 1982 NFMA regulations reinforced this view by limiting the scope of the EIS to standards and guidelines “because those are the only elements...that could significantly affect the environment.” In response to questions asked of the decision, the agency responded in the preamble, “[a]ny other planning guidance not reflected in standards and guidelines would have no predictable effect on the environment, but would simply add additional procedural direction” (36 C.F.R. § 219 (Sept 30, 1982)). Guidelines have since been defined as more flexible.

The 2012 NFMA planning regulations augment the mandate to include meaningful standards in forest plans and apply the component to an array of resources and activities. Section 219.7 states that “every plan must include the following plan components,” and proceeds to list objectives, *standards*, guidelines, and suitability of land (36 C.F.R. § 219.7). Moreover, the said components must “ensure” the protection of certain resources and activities. For example,

Plan components must ensure that no management practices causing detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect water conditions or fish habitat shall be permitted within the riparian management zone... (36 C.F.R. § 219.8(3)(B))

As with the NFMA mandates, standards are the only plan component that can legally “ensure” detrimental changes to the riparian management zone will not occur.

The second compelling reason to write meaningful standards is for improved planning efficiency. Research findings, particularly interviews with ID team members, uncovered ways in which planning standards can lead to increased efficiency at the project, or site-specific planning level. One agency resource specialist, for example, compared standards to “the rules on the playground.” Without standards, designing and implementing a project may take much longer due to the lack of guidance. Standards provide clear rules to abide by, and provide a template from which ID team members can design projects. The USFS Policy Analysis Staff (1990) confirmed this theory. After surveying agency planners and supervisors, the Staff identified certain elements as being particularly useful to the forest planning process, including “management standards and guidelines” and “management prescriptions” (p. 29).

My interviews found that while resource specialists may find standards useful, line officers prefer more flexibility for implementation and approval. It was also suggested that perceived inefficiencies at the project planning level often result when ID teams struggle to negotiate ways to complete a proposed project that may violate standards, often at the line officer’s command. The important point here is that the ID team members hold the primary responsibility to design projects and assess environmental impacts, so if standards increase project planning efficiency, they should be utilized.

Standards can also improve planning efficiency by complimenting existing laws and regulations and eliminating the need for additional planning processes. For example, many travel management plans prepared under the 2005 USFS motorized travel regulations were litigated (*Idaho Conservation League v. Guzman*, 2011; *Montana Wilderness Association v. McAllister*, 2011; *Russell Country Sportsman v. USFS*, 2011). Most national forests reluctantly started travel management planning to comply with the rule. However, the Lolo National Forest was exempt because the forest plan included planning standards that restricted motorized use (Lolo National Forest 2009). The motorized use standards, applied at the management area level, have also been used to successfully shield the forest against motorized travel-related lawsuits (*Montana Snowmobile Ass'n v. Wildes*, 2000). Aligned with this idea is the argument that standards, and other similar voluntary safeguards imposed on itself by the USFS, can complement and enhance existing laws and regulations without actually replacing them (Hunter et al., 2010, p. 1054).

Politics provides the third compelling reason to include meaningful standards in a forest plan. Research for this study found that use of standards and other substantive forest plan components may increase the USFS's credibility to the public. To start, many of the most specific, enforceable standards from first generation plans have also been the most litigated (e.g., road density standards for elk, old growth standards, and others). After "learning" from this trend, the agency tended to gravitate towards vague, less meaningful standards in an effort to avoid future litigation. But the idea that standards are simply a tool used by environmentalists for litigation purposes is ill-founded. Cheever (1998) explains, "Despite indications to the contrary, lawyers...require more from the law than an instrument with which we can bludgeon our opponents. We require a story we can understand" (p. 55). Conservation and environmental interest groups simply want the agency to follow clearly articulated rules in a rational manner, and apply reasonable levels of discretion. They desire greater certainty that resources and values will be protected. Writing clear, meaningful standards and adhering to them can help National Forests overcome past credibility challenges to restore public trust.

Local interests and communities have similar desires, as forest plans are often thought of as a "social contract" between the agency and communities, where livelihoods often depend on how certain

resources are to be managed (Spies and Duncan, 2009, p. 89). Industry and forest products interest groups value management certainty, for standards represent assurances that these groups can depend on when planning for the future or investing in new activities such as restoration projects. These groups expect a forest plan to be upheld as stated; they do not wish to deal with varying implementation in the future, especially if it will mean increased costs. As Wilkinson (1996) describes the importance of meaningful, enforceable standards often sought by interest groups,

...Congress intended that NFMA planning would have exactly the same effect as local land-use planning—the plans would be binding on future agency actions and enforceable in court—and it is in the enlightened self-interest of the Forest Service not only to accept that fact, but to advocate it. (Wilkinson, 1996, p. 675)

Nie (2011) documented the desire for certainty and predictability in forest management as a “defining characteristic” of local, place-based National Forest initiatives. Interest groups grew weary of frustrating planning processes that often yielded increased future uncertainty and instead chose other venues, such as Congress, to achieve greater predictability. For example, the proposed Forest Jobs and Recreation Act, sponsored by Senator Jon Tester, provides certainty of Wilderness designations, timber harvest, and motorized vehicle use (p. 10233) and the Northeast Washington Forestry Coalition Blueprint designates restoration and active management areas within the Colville National Forest to create a more predictable timber supply (p. 10234). Many of these initiatives seek “more certainty and predictability than ‘strategic and aspirational’ forest plans,” or those without standards and management area prescriptions, can offer (p. 10240).

The last compelling reason to write meaningful standards is to fulfill ESA requirements. According to Gippert and DeWitte (1996), forest planning can be utilized to “harmonize” NFMA and the ESA in three primary ways: “(1) by stressing the importance of conserving species and the ecosystems that they inhabit before the point of crisis; (2) by considering federally designated critical habitat and recovery planning efforts; and (3) by complying with the ESA conservation and consultation requirements” (Gippert and DeWitte, 1996, p. 172).

This study found several specific ways that standards and guidelines can be used to harmonize the two statutes. First, the components may serve as “adequate regulatory mechanisms” to protect species habitat and prevent harm in order to avoid species listing or facilitate delisting under the ESA. Some forest planning standards help to facilitate candidate conservation agreements (CCAs), Habitat Conservation Plans (HCPs), and other cooperative agreements between the USFS, U.S. Fish and Wildlife Service (USFWS), and partners with the intent to prevent listing candidate species under the ESA. In other cases, mandatory standards may help preclude the listing of a species or support a species delisting due to the certainty of protection. As Schultz, Sisk, Noon & Nie (2013) explain, “the use of binding standards in forest plans would likely service to decrease the number of species listed as threatened and endangered and promote delisting decisions in the future” (p. 14).

The Christ’s Indian Paintbrush (*Castilleja christii*) provides one example of how forest planning S&Gs can be incorporated into cooperative agreements in order to facilitate recovery of the species. After *Castilleja christii* was designed as a “candidate species” for listing under the ESA, the Sawtooth National Forest developed a Candidate Conservation Agreement with the U.S. Fish and Wildlife Service. The agreement tiers from a forest plan management area standard directing managers to “maintain habitat and populations of Christ’s Indian paintbrush consistent with the conservation strategy” (Sawtooth National Forest 2003, p. III-300). As a result of the Sawtooth National Forest’s successful implementation of “numerous conservation actions” that ameliorated threats to the species and the establishment of a “long-term monitoring program to document their effectiveness” the plant was removed from the list of ESA candidate species (USDI 2012, p. 7000).

The 2012 planning regulations support this reasoning by requiring the responsible official to use plan components, including standards or guidelines, to “provide the ecological conditions necessary to: contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area” (36 C.F.R. § 219.9).

Discretionary standards are not effective in these situations. Consider the USFS attempts to prevent listing of the Mexican spotted owl as a threatened species. The agency's attempts to revise forest management guidelines "by means of non-binding directives" was futile; the owl was listed in 1993 (*Center for Biological Diversity v. Norton*, 2003). Conversely, the Tongass National Forest included mandatory standards in the 1997 Tongass forest plan to "manage risk to goshawks and other species through a conservation strategy that protects approximately 1.4 ha of productive old forest..." (USFWS Alaska Region, 2007). Mandatory standards, for example, "Preserve nesting habitat around all confirmed and probable goshawk nests whether or not they are currently occupied" (Tongass National Forest, 1997, p. 4-89). Partly as a result of the standards, the USFWS chose not to list the Alaska Distinct Population Segment (DPS) under the ESA (72 Fed. Reg. 63123 (Nov. 8, 2007)).

Planning standards can play an integral role in decisions to delist species under the ESA. For example, in a recent decision to delist the West Virginia Northern Flying Squirrel, the USFWS relied on a 2004 amendment to the Monongahela National Forest Plan that used standards to limit vegetation management, development of recreational facilities, and oil and gas leasing in flying squirrel-suitable habitat (Monongahela National Forest, 2006, p. II-27). The forest plan amendment was used by the USFWS to argue, "the former primary cause of habitat loss (detrimental logging practices) has been abated on the Monongahela, and proactive conservation throughout much of the flying squirrels' range has and will continue to eliminate impacts from past logging practices..." (71 Fed. Reg. 50242 (Aug. 26 2008); *Friends of Blackwater v. Salazar*, 2012).

A recent grizzly bear (*Ursus arctos horribilis*) court ruling provides a second example of why forest planning standards are important in delisting decisions. On appeal, the Ninth Circuit Court concluded that incorporation of established post-delisting strategies from the "Final Conservation Strategy" for the Greater Yellowstone Area of grizzly bears into Yellowstone and Grand Teton National Parks, National Forest lands, and Wilderness Areas outside of grizzly bear Primary Conservation Areas are binding regulatory mechanisms with the force of law. They also recognized that the protections

offered after a species is delisted will not be as strong as those provided by the ESA, as the ESA aims to recover species to the point where its own measures are “no longer necessary” (16 U.S.C. § 1523(3)), ...thus contemplating that something less can be enough to maintain a recovered species. It is therefore reasonable to conceive of ‘adequate’ regulatory mechanisms as offering a recovered species something less than the stalwart protections of the ESA, but considerably more than no special protection at all. (*Greater Yellowstone Coalition, Inc. v. Servheen*, 2011)

However, it is undeniable that binding standards are the most appropriate, best-matched strategy to use as adequate regulatory mechanisms for protection of recovered species.

Standards may also preclude the need for Section 7 consultation under the ESA if the USFS is willing to develop planning standards that adhere to recovery planning criteria (Schultz, Sisk, Noon, & Nie, 2013, p. 13). As Rohlf (2004) explains, “Though federal agencies may be somewhat reluctant to restrict their activities to allow for species recovery, the prospect of avoiding the time-consuming and procedurally draining section 7 consultation process provides tremendous appeal to most federal agencies” (Rohlf, 2004, p. 548). The Environmental Protection Agency (EPA) took this approach at the national level by signing a memorandum of agreement with the USWFS and National Marines Fisheries Service to coordinate Clean Water Act water quality standards with species recovery criteria (66 Fed. Reg. 11201 (Feb. 22, 2001)). The goal is “...to ensure protection for listed species, provide greater regulatory predictability, and make ESA consultations more timely and efficient” (EPA, 2001).

The Northern Rockies Lynx Management Direction provides one site-specific example. The Direction was amended into 13 national forest plans as a series of habitat protection S & Gs, and the USFWS issued a “no jeopardy” biological opinion regarding the Direction’s implementation in 2007 (USDA Forest Service, 2007). Therefore, forests need not undergo consultation for projects within the lynx habitat area so long as they comply with the Direction’s requirements (Schultz, Sisk, Noon, & Nie, 2013, p. 13; USFWS, 2008, p. 177).

Management of the Mexican spotted owl (*Strix occidentalis lucida*) further supports the importance of standards in light of consultation requirements. National Forests within the range of the

Mexican spotted owl modified their forest plans in 1995 to adopt management direction, including standards, as specified in the owl's recovery plan (USDA Forest Service Southwestern Region, 1995). Due in part to sideboards instituted by planning standards, the agency was able to determine that certain projects would have "no effect" on the Mexican Spotted Owl's habitat that may harm the species, therefore obviating the need for formal consultation under the ESA (*Southwest Center v. U.S. Forest Service*, 1996). Similar conclusions have been drawn regarding salmonid management within jurisdiction of the Northwest Forest Plan. So long as projects are consistent with management direction in the Plan's Aquatic Conservation Strategy, an ESA Section 7 finding of "no jeopardy" to the species is legitimate (*Pacific Coast Federation of Fishermen's Associations v. National Marine Fisheries Service*, 2001).

b. Writing meaningful standards

Standards should be written in mandatory terms. The discretionary standards found in first generation plans likely resulted in part from lack of guidance provided by the 1982 regulations. However, a cursory review of draft forest plans developed in the past five years, as well as empirical information collected through the interviews, leads me to believe that discretionary standards continue to be written. This is a problem. In addition to provoking confusion as to the role standards should play, discretionary standards conflict with the 2012 forest planning rule. To reiterate, a standard must be written as "a mandatory constraint on project and activity decisionmaking" (36 C.F.R. 219.7(e)(1)(iii)). Writing a standard in anything but meaningful, mandatory terms utilizing auxiliary verbs such as "will," "shall," or "must" is incorrect. Using language such as "can," "may," or "should" would be better suited for the writing of objectives or desired conditions, which are not mandatory.

The National Wildlife Refuge system went through a similar planning process as the National Forest System when they began the process to write "Comprehensive Conservation Plans" (CCPs) for every refuge in the United States (USFWS, 2000). As part of the effort, the Service published a "handbook" for writing effective objectives (USFWS National Wildlife Refuge System, 2004). According to the handbook guidance, "SMART" objectives should be specific, measurable, achievable, results-

oriented, and time-fixed (USFWS National Wildlife Refuge System, 2004, p. 8-9). The guidance can be easily adapted to the writing of standards under the 2012 NFMA regulations. Officials could use the SMART guidance, or a similar framework, to explain how and why certain standards were chosen. Particularly important to the writing of standards are the smart, measurable, and achievable criteria.

Standards should also avoid ambiguous language subject to different interpretations. Clear, simplistic standards (e.g., “Do not clear debris resulting from fires” (Nez Perce National Forest, 1987, p. III-14)) can be effective in this regard. I found many examples where ambiguous terms such as “large trees,” “detrimental soil conditions,” or “sensitive areas” were not defined or explained.

The British Columbia Ministry of Forests (1998) provides additional guidance for writing land management standards (and other prescriptive plan components). The guidance advises officials to “look up, look down, and look within” when developing prescriptions. In other words, consider the need for standards to “reflect or consider relevant laws, government policies and resource use plans (look up)...be informed by existing local and...operational plans (look down)...and be internally consistent within the plan itself (look within)” (British Columbia Ministry of Forests, 1998, p. 10-12). This advice can be especially useful when officials are considering, for example, Clean Water Act requirements, state Best Management Practices (BMPs), and standards to maintain water quality at the management area *and* forest-wide level.

Standards are not appropriate to use in all situations. For example, the measurement of a “desired rate of progress toward a desired condition or conditions” should be managed with an objective according to the 2012 regulations (36 C.F.R. 219.7(e)(1)(2)). Based on uncertain budgets and resource conditions, standards should not be written to mandate scheduled activities or events. Unlike a standard, an objective allows managers the flexibility to change the schedule of activities or projects. Several public commenters on the 2012 NFMA regulations suggested, for example, utilizing standards to prescribe certain timber outputs. This type of mandatory, scheduled output is a slippery slope towards future litigation should projects veer off schedule, and is more appropriately addressed via Allowable Sale Quantity (ASQ) levels, planning goals, or objectives.

Other planning components should also be used to provide general advice for project planning. For example, the discretionary standard that “Snow roads are encouraged where possible” (Idaho Panhandle National Forest, 1987, p. III-35), is not an effective standard. However, this advice may be useful to ID teams or project contractors performing work on the ground. I believe this type of voluntary guidance, similar to a BMP, should be categorized as a “potential management approach,” which is described as an “optional plan component” (36 C.F.R. § 219.7(f)(2)).

Use of suitability determinations connected to management area designations is another valuable tool to use lieu of standards in some situations. Suitability determinations can be written as stand-alone components or as a standard. The NFMA requires that forest plans identify areas that are not suited for timber production (16 U.S.C. § 1604(k)). Under the 1982 NFMA regulations, timber suitability determinations effectively closed unsuitable areas to timber harvest for the life of the plan if timber harvest would lead to “irreversible damage to soil or watershed and lands which could not be adequately restocked within five years” (36 C.F.R. § 219.12(b)(1)). However, the NFMA also requires that forest plans identify whether or not lands are suited for “resource management” more generally (16 U.S.C. § 1604(g)). The 2012 planning regulations address this requirement by using suitability as a tool to identify lands “as suitable for various uses or activities based on the desired conditions applicable to those lands” (36 C.F.R. § 219.7(e)(1)(v)).

Determining the suitability of lands for uses such as potential wilderness, motorized recreation, grazing, wildlife habitat, or active restoration could eliminate the need for standards. Management areas can, for example, state that motorized access is “not permitted,” (Lolo National Forest, 1986, p. III-32), thus eliminating the need for a suite of standards managing motorized use based on season, temporal location, or other variables (*e.g.*, Beaverhead-Deerlodge National Forest, 2009, p. 32). Determining suitability is a simple way to manage a specific area in a more binary fashion. One recent draft forest plan includes a standard stating that certain areas are “unsuitable for designation of new utility corridors, utility rights-of-way, communication sties, or wind energy development” (George Washington National Forest, 2011, p. 4-38). In this case, determining suitability simplified planning by eliminating the need for a

variety of S & Gs to constrain new utility corridors and other developments. Direction under the new regulations seems to support this type of determination. The agency's proposed directives system suggests identifying the types of roads suitable for management areas (USDA Forest Service, 2013, p. 104) and using determinations for "administrative or commercial communicate sites, commercial use of non-timber products, cross country over-snow vehicle use...motorized travel...range structures, recreational trails...utility corridors," and several other uses (USDA Forest Service, 2013, p. 28).

Suitability determinations are often made at the management or geographic areas scale; if uses will be unsuitable in one area, they will likely be suitable in another. Designation of management or geographic areas is required by the 2012 regulations (36 C.F.R. § 219.7(d)). These designations are a "standard tool to communicate resource management objectives and strategies" that should be consistent with the general intent of the plan, and can serve as a framework to identify even smaller geographic areas, such as a botanical research area (British Columbia Ministry of Forests, 1998, p. 13).

Management areas can also be flexible. As Pressey et al (2007) explains, these types of conservation areas can be temporally fixed, yet moved or removed spatially as features of interest shift between parts of a planning region. For example, a habitat-focused management area could move spatially based on a species range at that time of year. Areas could also be temporally flexible, yet spatially fixed. In these areas, restrictions may take affect for a hunting season or other defined period (p. 584). The Wyoming gray wolf management plan employs this type of movable conservation area strategy; a certain habitat area will increase temporally to facilitate seasonal migration of wolves between Wyoming and Idaho (Wyoming Game and Fish Commission, 2011).

Strategic use of management areas and suitability determinations can help managers achieve site-specific goals when undertaking large-scale planning efforts across multiple forests. The Northwest Forest Plan, Southern Appalachian Assessment, and Sierra Nevada Ecosystem Assessment were all exercises aimed to examine and understand large ecoregions and "make recommendations for smaller, site-specific areas, usually watersheds" (Wilkinson, 1996, p. 680). This type of large landscape planning will be important in the future. As Littell et al (2012) explains of the Tahoe National Forest,

Management units are often <50 ha because of logistical and financial considerations. Increasing the size of management units to hundreds or thousands of hectares across watersheds will decrease ‘administrative fragmentation’ (i.e., different management actions applied to different portions of a landscape within a single forest) and improve the likelihood of accomplishing adaptation objectives. Ecosystem-based management at large spatial scales and for multiple species and resource values will favor adaptability to climate-related challenges. (p. 282)

Therefore, while forest(s)-wide standards will always be essential in order to ensure management consistency and protection of resources across a landscape, use of suitability determinations and prescriptions at other scales will be an important mechanism for providing more specific protections.

c. Measuring compliance with standards

How standards are to be measured, spatially and temporally, and the methodology used to do so, provides the second factor to be seriously considered with writing prescriptive measures. The case law shows the USFS has struggled with measuring compliance with standards in the past, but this could be improved upon in the future.

The first issue involves temporal measurements. Clarity as to whether a standard should apply before or after an action is often absent. One recent case, *Rocky Mountain Wild v. Vilsack* (2012), helps to explain this issue. When a standard required the forest to limit the sum of “detrimentally compacted land” to no more than 15 percent on a unit, there was confusion as to whether the standard should have been applied prior to, or following, the Handkerchief Mesa timber project. The plaintiff argued that a project should not go forward if the standard is exceeded prior to the project. The court sided with the agency, who argued that units exceeding the standard prior to the project will be reclaimed afterwards to bring compaction levels below 15 percent. Interestingly, though the court sided with the agency on *when* reclamation should occur, the court disagreed with the agency’s methodology to measure compliance with the standard. The agency surveyed a sample of units to measure soil compaction, yet there was no indication of soil compaction levels in unsurveyed areas. The court was looking for more reliable methods

used to measure estimated compliance with the standard (*Rocky Mountain Wild v. Vilsack*, 2012). The ambiguity of the standard was at fault. In the future, forests must explicitly state when a standard should be met in sequence with the project or activity it constrains. The methods used to reach compliance should also meet the burden of “reliability.”

Standards used to measure elk security explain why spatial or physical measurements are so important. In *Hapner v. Tidwell* (2010), the Gallatin National Forest was challenged for their compliance with a standard requiring the agency to “maintain at least two thirds of hiding cover associated with key habitat components over time.” Through the plan defines the measurement of cover as “capable of hiding 90 percent of an elk seen from a distance of 200 feet or less,” the agency chose to measure compliance with elk hiding cover using two different measurements, one based on “current prevalence of various tree classifications in the project area,” and another based on “a canopy cover definition.” Neither measurement was consistent with the Gallatin plan; therefore, the agency was found to be in noncompliance with the plan’s standards (*Hapner v. Tidwell*, 2010).

In *Helena Hunters & Anglers v. Tidwell* (2009), whether or not the agency complied with elk security road density standards was the question before the court. The agency defined an elk herd unit as the “total area used” by an elk herd as they move from summer to winter range over the course of a year, yet chose to exclude private lands from their analysis. Open road density in areas outside of USFS lands were not figured into compliance calculations. The court therefore ruled that the agency’s methodology to measure compliance was unreliable (*Helena Hunters & Anglers v. Tidwell*, 2009).

A pileated woodpecker case provides a similar example of incorrect measurement denominators. In *Neighbors of Cuddy Mountain* (1998), the agency was questioned for compliance with a standard requiring five percent of old growth be maintained within the woodpecker’s “home range.” Since the percentage was calculated using the proposed timber sale area, instead of the woodpecker’s more extensive range, the USFS was not in compliance (*Neighbors of Cuddy Mountain v. USFS*, 1998).

The three examples above illustrate why care must be taken when writing standards that apply at a specific scale. Those tasked with implementing the standards must have a clear understanding of the

required scale, analysis unit, and methods for measuring compliance. The scale should be clearly articulated in the forest plan standard. Moreover, terms such as a “home range” or “elk analysis unit” should be defined explicitly and accessibly in the forest plan’s text. In addition, scientific jargon that may take on different meanings based on the discipline should be avoided.

d. Consistency in standards

The NFMA instituted a systematic planning framework to manage National Forests consistently after decades of inconsistent national direction and application (Wilson, 1977, p. 467). However, a consistent planning *framework* has not always resulted in consistent *management*. Maintaining consistency among national forests was cited repeatedly as an issue of concern among those commenting on the 2012 regulations. Many commenters felt standards could be used to manage certain resources and activities more consistently across the system. One environmental interest group, for example, compared national standards to automobile safety belts in the United States; while cars are different, national regulations exist to ensure uniform seatbelt design (Biodiversity Conservation Alliance, 2011). Many others advocated on behalf of national riparian and stream fixed-width buffer standards. As was commonly argued,

The Forest Service needs a consistent process for assessing and managing the health of watersheds under its care. The proposed rule must be amended to include such a process as well as firmer direction, including minimum buffers, special protection for exceptional watersheds, and restoration of degraded watersheds, prohibitions on logging in erodible soils and landslide hazard areas, road density standards, and prohibitions against activities in riparian areas that are not proven to improve watershed health. (Southern Environmental Law Center, 2011)

Concerns regarding national and regional consistency are not new. The 1982 NFMA regulations recognized consistency by stating that ID teams “will use common data definitions and standards...to assure uniformity of information between all planning levels” (36 C.F.R. § 219.12 (Sept. 30, 1982)). The 1982 regulations also called for the establishment of “regional guides,” which would use regional

standards and guidelines to “address major issues and management concerns” (36 C.F.R. § 219 (Sept. 30, 1982)). In the Committee of Scientist’s (COS) evaluation of the “scientific and technical adequacy” of the first draft NFMA regulations, they noted, “although regional plans are not called for in NFMA, we thoroughly agree...that they are critical to the whole...planning process” (44 Fed. Reg. 53971 (Sept. 17, 1979)). The COS also emphasized that “many controversial management practices such as size of clearcuts, standards for biological growth potential, and silvicultural systems” would be best governed by regional standards (44 Fed. Reg. 26600 (May 4, 1979)).

Nonetheless, regional plans were mostly phased out in the 1990s, with vestiges such as the Region 1 soil quality standards remaining. Although regional guides were originally endorsed by the COS, the agency found them to be inflexible (Gippert & DeWitte, 1996, p. 162). Many within the forest management community support this change, citing the need for management to focus on site-specific conditions. Many reject, for example, plans that are “homogenized, cookie-cutter copies of each other” and instead believe plans should reflect the land’s character, cover manageable tracts of land, and scale to watersheds and other topographic features (Stahl, 1990, p. 30). Since watershed and other ecological boundaries rarely match administrative boundaries, maintaining regional consistency with regional standards can be very inefficient (Gippert & DeWitte, 1996, p. 163).

Still, regional standards do not have to impede effective forest planning. Regional standards could serve as a framework, and then be tailored to meet local conditions or existing forest standards. For example, the relatively homogenous forests in Eastern Washington and Oregon follow a set of regional standards, referred to as the “Eastside Screens,” that establish protective riparian, ecosystem and wildlife standards for timber sales. The Eastside Screens standards are set at a “minimum level” for compliance. I did not assess whether or not it is common practice to establish standards with greater protection than the minimum level. However, if the prescription of existing forest plan standards exceeds that provided in the Eastside Screens, they will continued to be followed (USDA Forest Service, Region 6, p. 9).

Consistency across national forests can provide multiple benefits. First, when planners in the same region create and use consistent planning components, plan content will be easier for the public to

understand. “Readability and a concise presentation style” of conservation plans is important to “busy decision and policy makers and others who have a stake in conservation” (Brooks & Massengale, 2011, p. 207). Second, certain resources, such as the bull trout, will always be affected on scales larger than that of a forest plan. The agency’s “all lands” approach recognizes the ecological interactions that take place beyond forest boundaries and requires officials to “coordinate with and encourage participation of other relevant land or resource managers” (77 Fed. Reg. 21185 (April 9, 2012)). For this reason, regional planning teams should provide guidance on writing standards consistently across multiple forests. Region 2 national forests, for example, maintain consistency by following a regional guide with a “streamlined menu of regional standards and guidelines.” The guide includes regionally vetted standards that apply to all resource areas, and is continually updated to reflect new science and conditions (USDA Forest Service Region 2, 2003).

Writing national implementation guidance beyond that provided in the Directives system or agency manual would also be helpful. For example, national guidelines establishing a consistent methodology used to meet road density standards, or methods used to correctly classify a decommissioned road, may be particularly useful yet also provide local flexibility.

e. Standards and the ability to constrain or compel

The 2012 planning regulations preamble clarifies that standards will not compel an action. Standards “set out design criteria,” and do not “result in specific management actions taking place” (77 Fed. Reg. 21206 (April 9, 2012)). The proposed directives take this one step further, specifying that standards “should not direct or compel processes such as analysis, assessment, inventory, or monitoring” (USDA Forest Service, 2013, p. 25). But the line between standards that compel and constrain action is not straightforward. There are numerous examples of first generation planning standards that compel an action. Standards may require the forest to “locate new structures” (Sawtooth National Forest, 2003, p. III-49), “fertilize to maintain vegetative ground cover” (Flathead National Forest, 2001, p. II-53), “obliterate temporary roads” (Clearwater National Forest, 1987, p. II-33), or “mitigate management

actions” (Boise National Forest, 2003, p. III-27). Moreover, certain standards inherently require analysis, assessment, inventory, or monitoring to confirm compliance.

The 2012 regulations bolster the idea that standards *should* compel action in some cases by requiring standards or guidelines to “maintain or restore” a suite of resources and values, including ecological integrity of terrestrial and aquatic ecosystems and watersheds (36 C.F.R. § 219.8), the “diversity of ecosystems and habitat types throughout the plan area” (36 C.F.R. § 219.9), and “air quality, soils and soil productivity” (36 C.F.R. § 219.8). Arguably, a standard written to “maintain or restore” certain functions must compel some sort of action. In addition, the 2012 regulations seem to require proactive wildlife conservation standards. The rule makes clear that plan components, including standards or guidelines, must “provide the ecological conditions necessary to: contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area” (36 C.F.R. § 219.9).

In some cases, standards could help achieve these action-based goals without compelling action. Standards could be written to constrain activities in support of desired conditions that aim for species recovery, restoration, or other goals. For example, USDA Forest Service INFISH standards (1995) constrain timber harvest in “Riparian Habitat Conservation Areas” in support of broader goals to “maintain or restore” water quality, stream channels, instream flows, timing and variability of the water table, and diversity and productivity of riparian plant communities (p. A1). However, there are situations where mitigation should be required, and therefore compelled by a standard. For example, a Sawtooth forest plan standard requires mitigation of “the adverse effects of livestock access or activities” that may disturb fish listed under the ESA (Sawtooth National Forest, 2003, p. III-13). In this case, mitigation allows the forest to permit limited livestock use while still meeting legal ESA requirements.

Uncertain budgets are the most obvious source of USFS resistance to action-compelling standards. If an agency is required to complete certain actions by way of mandatory standards, not having an adequate budget to do so could lead to noncompliance, and tax agency resources (Squillace, 2011). However, Congressional budget control requires resource trade-offs in decision-making (Teeguarden,

1987, p. 404). The problem is therefore that *all* management activities are contingent upon uncertain budgets, meaning the agency is forced to prioritize competing actions on an essentially static land base (Wilson, 1977, p. 461).

Instead of viewing standards that compel action as a risk, the agency could see this as an opportunity to use standards as part of a creative, proactive conservation strategy. For example, under the agency's "Watershed Condition Framework," forests are required to prioritize watersheds for restoration, and implement restoration work through targeted improvement projects (USDA, 2011). However, once a forest restores a set of priority watersheds, there are no safeguards in place to ensure the watershed quality does not deteriorate once more. Planners could employ standards to maintain the condition of restored watersheds, a use that arguably compels action, yet seems to comply with both the 2012 regulations and the Watershed Condition Framework. Action-compelling standards could be used in this way to manage processes (like watershed restoration) by "buffer[ing] streams, promot[ing] adjustment to climate change, or facilitat[ing] management" (Pressey et al, 2007, p. 585).

f. Best available science and the role of standards

Historically, little guidance was provided in how to use science in forest planning. NFMA provided little guidance other than the mandate to use an "interdisciplinary approach" when planning. The 1982 regulations ambiguously called for integration of science into the planning process. As a result, many planning standards examined in this study have a questionable scientific basis. Consider old growth standards. Several forests have a requirement to maintain a certain percentage of old growth on the forest. On the Idaho Panhandle National Forest (1987), "10 percent of the forested portion" must remain as old growth (p. II-29). The Helena National Forest (1986) calls for "[f]ive percent of each third order drainage [to] be managed for old growth" (p. II-20). These quantitative requirements have resulted in numerous appeals and litigation (e.g., *Neighbors of Cuddy Mountain v. U.S. Forest Service*, 1998; *Idaho Sporting Congress v. Rittenhouse*, 2002; *Ecology Center v. Austin*, 2005), yet the thresholds seem to have little scientific justification. The agency struggles to meet the minimum requirements, yet conservation groups

argue standards should require *greater* protections for old growth. Additionally, each forest's definition and description of managing "old growth" varies, based on qualitative descriptors such as "decadence" (see, e.g., Kootenai National Forest, 1987, p. A17-1; Helena National Forest, 1986, p. II-20; Boise National Forest, 2003, p. GL-26). In sum, "there is no agreement as to what old growth is, how much exists, or how much existed in the past" (Spies and Duncan, 2009, p. 159). This sort of complexity can make writing science-based standards very difficult.

Drawing from the old growth example and others, the next section analyzes how best available science may be used, procedurally, to write standards. I explain why the USFS should transparently explain the science, and factors going beyond science, that were considered in developing a standards. I also recommend that planners practice more precautionary decisionmaking in situations where scientific uncertainty exists. Finally, I explain why standards should have a traceable scientific lineage with clearly documented methods and assumptions.

1. *Transparency in explaining science and factors going beyond science*

The old growth case illustrates issues associated with target-based conservation planning, or using explicit goals to "quantify the minimum amount of a particular biodiversity feature we would like to conserve through one or several conservation actions" (Carwardine et al., 2009, p. 3). In forest planning, old growth standards and other targets are used to protect forest resources. Yet there are concerns that targets may be set arbitrarily, result in unachievable conservation plans, and are unable to address complex ecological processes, disturbances, and socioeconomic issues (Carwardine et al., 2009). Many targets are political decisions. Svancara et al. (2005) find some conservation targets have "gained considerable popularity...without evidence of biological substance or conservation merit" (p. 989). For example, a 10% species habitat protection target to preserve biodiversity often "falls far below the mark" of adequate protection (p. 992). The longer a target is in place, the stronger inertia behind it may grow (Hunter et al., 2010, p. 1054). This may be why, for example, the 1982 regulations' emphasis on the "land and vegetation...approximately 100 feet" from water body edges was reintroduced during the 2012 planning rule public comment period. Many interest groups strongly advocated for a 100-foot default

fixed-width stream buffer standard, even though findings have concluded that a fixed-width may be insufficient in some cases based on locality, stream conditions, and surrounding vegetation (Belt, O’Laughlin, & Merrill, 1992; Richardson, Naiman, & Bisson, 2012).

The 2012 regulations require officials to “use the best available scientific information to *inform* the planning process” (77 Fed. Reg. 21261 (April 9, 2012)), but political and normative judgments will undeniably affect the development and writing of standards. Some standards may be *based* on these types of judgments. A standard that restricts OHV use in a popular hiking area, for example, represents prioritization of public interests and not necessarily scientific conclusions. The new forest planning mandate for best available science will not be easy to implement. Things are more complex, because science alone can rarely answer all of the value and risk-laded questions posed by policy and decision-makers (Doremus, 2004; Hoberg, 2004; Ruhl, 2004; Schultz, 2008).

The problem with science-based standards is not necessarily the inclusion of political and normative judgments, but the way in which the USFS manages science and intertwined judgments. The agency must openly acknowledge the limits of science, by recognizing normative and political questions and decisions. Decisions to use or not use standards should be made and discussed publicly through the planning process, with a full explanation of the science, and factors going beyond science, that were considered. As Doremus (2004) helps to explain, the USFS could also be more transparent about the “level of uncertainty in the information supporting their actions...” (p. 397), in order to increase public trust (p. 447).

As the National Wildlife Refuge System advocates for their own planning system, transparency will increase a conservation plan’s merit, assist in management continuity as staff turnover, and improve plan reevaluation and revisions (USFWS National Wildlife Refuge System, 2004, p. 9). The Northern Rockies Lynx Management Direction (USDA Forest Service, 2007) and Tongass National Forest plan (Tongass National Forest, 1997) disclose the scientific basis for standards in detail. However, describing how normative and political judgments affected standards, or were incorporated into scientific decisionmaking, would also be helpful. For example, the Lynx Management Direction (2007) explains

that public “issues,” including winter recreation opportunities and wildland fire risk, helped develop management direction and analyze effects (p. 5). However, it would have been beneficial to explain with more specificity how each “issue” affected the development of standards.

2. *Incorporating scientific uncertainty into the process to develop standards*

The 2012 planning rule introduces a science-based planning framework (36 C.F.R. § 219.3) that adapts to changing conditions, including climate change (36 C.F.R. § 219.5), and acknowledges conservation biology, ecology, and other sciences that inform forest planning (77 Fed. Reg. 21163 (April 9, 2012)). In light of this framework, forests will have to collect and synthesize scientific information to guide plan revisions. Two USFS research stations recently released one such synthesis to guide forthcoming plan revisions on the Inyo, Sequoia and Sierra National Forests. In addition to compiling relevant scientific literature, the synthesis recognizes research gaps and information needs. For example, planning to manage for the California Spotted Owl will require “[i]mproved information on vegetation status, structure, and condition...” because “widely-available vegetation data are not consistent across the Sierra Nevada and vary among forests” (USDA Forest Service, Pacific Southwest Research Station, 2013, Ch. 7.2, p. 16). The collection of scientific information for other revision processes will likely reveal similar information gaps, as will consideration of climate change and disturbance (Joyce et. al., 2009).

In the face of scientific uncertainty, however, ID teams should not shy away from writing standards for the next generation of forest plans. On the contrary, uncertainty and the prospect of severe environmental disturbances from climate change should support the writing of protective, precautionary standards. Standards could be part of an effort to reduce the impact of existing stressors and mitigate future climatic effects as part of a “no regrets” strategy for climate change preparedness (Joyce et. al., 2009, p. 1026). Planners and officials should continue to write standards, with more attention paid to identifying realistic bounds to predictions, making precautionary decisions, and regularly revising predictions (Pressey et. al., 2007, p. 589). Some level of uncertainty will accompany *all* planning decisions (Noss, O’Connell, & Murphy, 1997, p. 80), so “a pragmatic view of conservation planning accepts these facts and seeks to minimize the risks to species and ecosystems” (Noss, O’Connell, &

Murphy, 1997, p. 81). Moreover, collecting more scientific data and information will rarely lead to “one correct answer to any policy problem or question posed” (Nylen, 2011, p. 281). Science is “a process carefully designed to illuminate the extent and reliability of knowledge about studied systems, and to increase the reliability and extent of that knowledge over the course of time” (Doremus, 2005, p. 297), so managers should understand that science will never completely answer most political questions.

Officials should also recognize when there *is* enough scientific certainty to write standards. As one agency resource specialist interviewee explained, scientific knowledge may exist on a continuum, but there are certain axioms of fundamental knowledge that can be used as the basis for developing standards. As Noss, O’Connel and Murphy (1997) describe,

Admitting our ignorance about many aspects of Nature and being properly humble and cautious is one thing. But failing to move forward with planning and management because we don’t know all we would like to know is quite another...Ecosystems, while complex, can be understood well enough to predict their trajectories reasonably well... (p. 77)

For example, road density standards could be written using scientific axioms such as “forest roads increase stream sedimentation” (Goode et al., 2012, citing Megahan, 1974; Reid & Dunne, 1984; Ziegler & Giambelluca, 1997; Luce & Black, 1999; Croke & Mockler, 2001; MacDonald et al., 2001; Wemple et al., 2001; Arnáez et al, 2004) and “road density increases elk vulnerability” (Christensen, Lyon & Unsworth, 1993; Leptich & Zager, 1990; Lyon, 1983; Rowland, Wisdom, Johnson & Penniger, 2005; Unsworth & Kuck, 1991; Youmans, 1990).

Generally, gathering empirical data from multiple sources, utilizing credible references, and attempting to validate predictive models will support planning decisions and reduce uncertainty. Sound professional judgment should be complemented by scientific corroboration when available (USFWS National Wildlife Refuge System, 2004, p. 9). The USFS should “make every effort” to locate information from federal, state, and local agencies, academic institutions, and research stations, consult with experts, and seek help when interpreting information (USFWS National Wildlife Refuge System, 2004, p. 9). Officials must also strategically obtain and utilize information, and then correctly match

information to problems; “more information” is not always the strategic answer to scientific information gaps (Doremus, 2009, p. 413).

3. Providing a traceable lineage for science-based standards

Science will rarely be the sole variable in the writing of standards, but it should be used in every stage of the planning process. Understanding how dynamic forest ecosystems function requires multiple disciplinary perspectives (Doremus, 2009, p. 433), so outside scientific consultation should be incorporated into the planning process from the beginning (Noss, O’Connell, & Murphy, 1997, p. 156). When revising forest plans, officials should not think of science as a “competing interest” in the forest planning “negotiation” (Noss, O’Connell, & Murphy, 1997, p. 124). Instead, science should inform, rather than validate, the process to develop standards. Most important, the scientific lineage should be fully documented for the public and managers to assess. Documenting the full scientific background, rationale, and risk of a standard in planning documents could increase plan credibility and ease future conflict. A defensible scientific lineage would also provide a solid starting point when revising or updating science-based standards.

This type of approach was used by the Tongass National Forest to revise the Tongass forest plan and develop plan components, including standards. Unlike traditional forest planning processes, the Tongass process asked scientists from the agency’s Pacific Northwest Research Station to join the planning team with “separate and distinct roles from the National Forest System members” and assure that credible scientific information was developed (Shaw, Everest, & Swanson, 2000 p. 379).

The scientists audited the consistency of final management decisions with best science using an “adaptive decisionmaking process” (Everest et al., 1997; Shaw, Everest & Swanson, 2000; Szaro et al., 2005). A management decision was “consistent” with scientific information if the following criteria were met: (1) All relevant scientific information made available to managers was considered in the decision, (2) Scientific information was understood and correctly interpreted, and (3) Resource risks associated with decisions were acknowledged and documented (Everest et al., 1997, Summary). The scientists also described risk levels, based on different decision options, to specified wildlife species, ecosystems, and

society (Szaro et al., 2005, p. 7). However, policy decisions regarding the appropriate level of risk to accept were made by resource managers (Shaw, Everest, & Swanston, 2000, p. 378). Finally, the scientists' evaluations were subject to peer review (Shaw, Everest, & Swanston, 2000, p. 382). When using the adaptive decisionmaking process to write standards, the science audit panel determined if managers considered relevant information, developed standards that demonstrated an understanding of the information, and documented risk that might occur as a result of the standard (Everest et. al., 1997, p. 4).

Officials must also carefully consider the public's role in developing science-based standards. The 2012 regulations place "greater emphasis on public participation and collaboration early and throughout the planning process" (77 Fed. Reg. 21255 (April 9, 2012)). However, technical expertise and knowledge will be significant factors in the process to develop standards. Strong values and interests can help set goals and priorities, but greater knowledge will be needed of participants to assist in development of standards. Science-based input will be most useful to ID teams (Steelman, 2001, p. 83). While interest-based input can, for example, help write a standard banning chemical herbicides and pesticides within a watershed (Lolo National Forest, 1986, p. III-4), more specific input will be necessary to address habitat linkages, restoration objectives, and other complex issues with standards. The Monongahela National Forest planning process helps to explain this issue. As Steelman (2001) explains of making final, substantive changes to the Monongahela National Forest plan,

...participation was somewhat restricted by the participants' ability to discuss the technical details of the plan (Godwin, 1985). Briefing papers were sent out to the attendees of these working meetings to promote constructive, educated dialogue on the specific issue areas (United States Forest Service, 1986)...Only those participants that understood the implications of the changes in the standards and guidelines affecting the resources in question could take part in this phase of the decisionmaking process (Steelman, 2001, p. 84).

If forests commit to collaboratively developing standards, the public's ability to influence a plan may hinge on technical expertise. Scholars have advocated for various public process responses to situations where technical expertise will be necessary. Cheng (2006) advocates for a "systems thinking"

approach. With this type of approach, forest ID teams and public process participants would work together to develop and write technical components such as standards (p. 855). Steelman (2001) believes that knowledge from the forest's resource specialists could help inform citizen participants, while the citizen participants also help inform the "technical elite" (p. 86). Based on the resource or activity being regulated, the balance between agency and public knowledge would shift, producing greater plan credibility and ownership among stakeholders. This "learning organization" version of collaborative planning will hinge on the USFS's "organizational ability, resources, and will to implement the new policy..." (Manring, 2005, p. 65), as moving past interest-based public input to co-production of technical plan components will require more of the agency *and* the public than previous planning exercises.

g. Monitoring and adaptive standards

Climate change and environmental disturbance will test the resilience of forests in the future. Most experts agree that a systems approach to national forest planning will be necessary to deal with the changing climate and preserve biodiversity (Camacho, Doremus, LcLachlan & Minter, 2010, p. 21; Pressey et al., 2007, p. 583). Approaches may include restoration of aquatic systems, active management of terrestrial systems, and treating invasive species (Littell et al., 2012, p. 278). There will be mounting pressure on forests to recognize the dynamic, changing nature of forests, incorporate new findings and scientific literature, and adapt management strategies accordingly. In some of these situations, forest managers will have to experiment and adapt to changing conditions (Noss, O'Connell, & Murphy, 1997, p. 133, citing Holling 1978; Walters 1986; Walters & Holling 1990). The USFS says the forthcoming era will have opportunities for "more flexible approaches to public land management" because "scientific insights are paving the way for adaptive management on an ecosystem basis..." (USDA Forest Service, 2002, p. 12). Managers will need to design adaptive process to maximize learning associated with implementation by experimenting with alternative management practices (Duncan & Spies, 2009, p. 203).

Of course, implementation of forest planning standards is *not* experimental. How, then, are forest plans to embrace adaptive management while also recognizing the protection provided by forest planning

standards? How will forests deal with the “tremendous challenge” to traditional legal enforcement models posed by adaptive management (Nie, 2008b, p. 147), when there is “good reason to doubt whether regulation by adaptive management is possible” (Ruhl, 2006, p. 31)?

Developing a robust monitoring program is the first step to addressing these questions. The section below analyzes the importance of monitoring to measure compliance with forest planning standards. The importance of linkages between standards, monitoring, and the decisionmaking process is discussed. Monitoring is also key to facilitate adaptive management within the protective “boundaries” provided by standards. Following the monitoring discussion, I analyze how standards may be more adaptive and supportive of resilient systems in the future.

1. Monitoring

Monitoring is essential to a forest’s ability to make sure standards are being implemented correctly, in a manner consistent with the forest plan (Loose, 1990, p. 6). In fact, using standards effectively *depends* on compliance monitoring, or monitoring done to ensure enforcement of standards (Russell, 2001, p. 74). For example, failure to enforce water and fish habitat standards was cited as one “fatal flaw” in the Clearwater National Forest’s ability to protect anadromous and resident salmonid species from decline (Espinosa, Rhodes & McCullough, 1997, p. 211). Monitoring data can also be used to validate the assumptions underlying standards, and gather data to assess whether standards should be relaxed or strengthened to meet planning objectives (Biber, 2011, p. 15). As Noss, O’Connell and Murphy (1997) explain, “a long-term obligation to ecological monitoring and to adjusting plans on the basis of new information” will be essential to future attempts in adaptive planning (p. 133).

There are, of course, many issues associated with monitoring. Funds for monitoring are usually limited (Biber, 2011, p. 39; Cole & McCool, 1997, p. 67), and the USFS “could face legal challenges if it makes enforceable monitoring commitments that it does not have the funding to implement” (Schultz, Sisk, Noon, & Nie 2013, p. 4). The Northwest Forest Plan’s adaptive management areas, which inherently rely on monitoring and adjustments, were largely unsuccessful due in part to budgetary issues (Doremus, 2008, p. 419; Stankey et al. 2003, p. 44). The judicial review system provides other disincentives for the

USFS to monitor compliance with standards (Biber, 2011). The courts generally award a high degree of deference to the agency when considering technical decisions (Biber, 2011, p. 42), therefore providing little reason to collect information to validate standards. For example, when the agency was challenged on its methods to monitor trout populations as required by one forest plan, the courts deferred to the agency's "expertise in interpreting its [plan]" because the "issue at stake is one of scientific methodology, i.e., how to best track trout populations..." (*Idaho Sporting Congress v. Thomas*, 1998). If the courts *do* probe into the agency's decisionmaking process, collection of monitoring data could be used to point out inadequacies in meeting standards (Biber, 2011, p. 41).

Possibly as a result of these disincentives, the USFS has been "specifically criticized for not following NFMA inventory and monitoring requirements and for generating sparse, poor quality, and out-of-date information" (U.S. Congress, Office of Technology Assessment, 1992, p. 6). "Monitoring of forest management activities is inadequate" was one of four findings described in a 1992 U.S. Congress report on NFMA planning issues (U.S. Congress, Office of Technology Assessment, 1992, p. 10).

Solutions to improve implementation monitoring of standards should be explored. Under the guidance of the 2012 regulations, forests must develop a monitoring program to collect data at the forest and broader scales. Biennial monitoring reports will be used to assess whether management changes are warranted (36 C.F.R. § 219.5). Yet the 2012 regulations specify that monitoring requirements "are not a prerequisite for making a decision to carry out a project or activity" (36 C.F.R. § 219.12), which falls short of the 1982 regulatory requirement to link standards and monitoring by developing "standards and requirements by which...*activities will be monitored and evaluated*" (36 C.F.R. § 219.5 (Sept. 30, 1982)).

Under the 2012 regulations, officials will have to take judicious steps to link standards with monitoring. Since a lack of funding may determine the realistic level of monitoring, the agency will be required to "revise its monitoring plans to reflect more accurately what is possible and what is most important to accomplish under staff and budget constraints and according to public interest" (U.S. Congress, Office of Technology Assessment, 1992, p. 6). Russell (2001) asks, "Does our ability to monitor match the requirements or restrictions of the chosen instrument?" (p. 74). In the case of USFS

monitoring, standards are mandatory requirements or restrictions, and the policy instrument chosen by Congress to guide and constrain national forest management. Therefore, standards should be matched with mandatory, enforceable monitoring protocols to determine compliance.

Straightforward examples of compliance monitoring requirements exist. The Kootenai National Forest employs a wildlife management standard to “monitor the application of these [primarily grizzly bear] standards and guidelines to assure they are properly and effectively used” (Kootenai National Forest, 1987, p. A 8-9). However, more compelling examples monitor the *effectiveness* of standards in order to inform the decisionmaking process. The Sawtooth National Forest linked monitoring with standards as part of an endangered species management strategy for Christ’s Indian paintbrush (*Castilleja christii*), which resulted in removal of the plant from the list of ESA candidate species. The Sawtooth established a “long-term monitoring program to document [the] effectiveness” of conservation actions designed to ameliorate threats to the species (USDI 2012, p. 7000). The conservation actions were described in a Candidate Conservation Agreement, which linked to a forest plan management area standard directing managers to “maintain habitat and populations of Christ’s Indian paintbrush consistent with the conservation strategy” (Sawtooth National Forest 2003, p. III-300). All conservation actions address a specific threat, and align with discrete tasks, performance metrics, and a trigger that results in a management response if “pulled.” The trigger works as a warning mechanism that prevents an ecological threshold from being crossed. For example, in order to address threats from livestock use, the forest must annually monitor the condition of fences and barriers to prevent unauthorized livestock use within the Christ Indian paintbrush’s habitat area. If fences or barriers have not been maintained, a trigger is pulled and the forest must work with permittees to ensure maintenance occurs, or modify operating instructions to prevent future unauthorized livestock use (USDA Forest Service and USFWS 2005, p. 52).

Although standards sometimes require monitoring, *Norton v. Southern Utah Wilderness Alliance* (SUWA, 2004) makes it difficult to enforce monitoring requirements in forest plans. SUWA held that forest plan challenges are only valid if the challenger asserts the agency “failed to take a *discrete* agency action that it is *required* to take” under the Administrative Procedures Act (5 U.S.C. § 706(1)). According

to the court, BLM plan requirements stating a motorized use area “will be monitored and closed if warranted” lack a “clear indication of binding commitment in the terms of the plan.” This is because “a land use plan is generally a statement of priorities; it guides and constrains actions, but does not (*at least in the usual case*) prescribe them.” The court broadly concluded that monitoring commitments in federal land and resource management plans are generally not binding or reviewable in court.

However, monitoring to measure compliance with standards represents an *unusual case* compared to the “general statement of priorities” typically found in land management plans. *SUWA* noted that plan monitoring requirements may be compelled under 5 U.S.C. § 706 “...when language in the plan itself creates a commitment binding on the agency.” Therefore, if written in mandatory language that describes a discrete requirement, standards that require monitoring may be used to hold the USFS accountable for its commitments (Blumm & Bosse, 2007, p. 133; Schultz et al., 2013, p. 10). Greater likelihood of enforcement exists if the standard pre-specifies “details and timelines of the monitoring and mitigation,” identifying “what will be monitored and when, how and when monitoring information will trigger a change in management action, and what activities can continue while monitoring or mitigation decisions are ongoing” (Nie & Schultz, 2012b, p. 1142). Consider an objective to “Monitor [recreational facility] use and reconstruct sites as needed” (Beaverhead-Deerlodge National Forest, 2009, p. 24). This objective is not highly prescriptive, and would likely fall into the “not reviewable” category under *SUWA*. However, a standard requiring mitigation or recalculation to make certain that no more than 15 percent soil compaction occurs within a project area (*Rocky Mountain Wild v. Vilsack*, 2012) compels a more prescriptive, measurable monitoring mandate that could seemingly be enforced.

Nie and Schultz (2012b) explain that monitoring commitments may also be enforceable if they are written in way that requires the agency to complete monitoring before an action can take place (p. 1142). The Northwest Forest Plan (1994), for example, uses a “survey and manage” approach, which requires that federal agencies collect data on species in the project area *before* a “ground-disturbing activity” can proceed within the plan area. The rigorous requirement specifies when surveys should be completed, and the scale at which monitoring should occur (p. C-5). The Tongass National Forest (1997)

provides a second example. Prior to implementing springtime management activities in wolf den areas, managers must “check each known inactive den site to see if it has become active” (p. 4-114). Espinosa, Rhodes and McCullough (1995) also explored this strategy; in order to better protect anadromous and resident salmonid species on the Clearwater National Forest, the authors recommend that “projects scheduled in ‘below standard’ watersheds should not proceed until it can be displayed that watershed and habitat conditions have recovered to optimum levels...” (p. 228).

2. Adaptive management in the context of forest plan standards

Beyond compliance and enforcement of standards, monitoring will be essential to any management strategy seeking to accomplish adaptive management goals with adaptable standards. Monitoring has been referred to as “the lynchpin” of adaptive management in a natural resource context (Joyce et al., 2009, p. 1030), yet it will be essential if the USFS is going to pre-specify how standards may adjust in the future to reflect contemporary science or changed management situations.

An adaptive management strategy is a “systematic, iterative, incremental approach that requires continuous monitoring, evaluation, and adjustment of management actions” (Nie & Schultz, 2012b, p. 1138, citing Holling 1978). An effective adaptive management strategy involves “monitoring-adjustment frameworks that allow incremental policy and decision adjustments at the ‘back end,’ where performance results can be evaluated and new information can be fed back into the ongoing regulatory process” (Ruhl, 2006, p. 30). Monitoring of the management process and results informs future decisions and enables “midcourse corrections” so that unexpected trends do not become “policy fiascos” (Spies & Duncan, 2009, p. 324). In the section below, I first explain how the 2012 NFMA planning regulations can facilitate the use of more adaptive standards. Next, I provide examples and analysis of how standards could be used to support, and not inhibit, an adaptive management strategy.

The USFS attempts to set forth a framework for adaptive management with the 2012 regulations, which describes a “three-part planning cycle of assessments, planning, and monitoring...to identify changing conditions and respond with adaptive management” (77 Fed. Reg. 21201 (April 9, 2012)). The agency will assess resources and generate new data based on a forest-specific set of monitoring questions

and indicators. Based on findings, the agency should be able to proceed with data-supported management changes and plan components. The 2012 regulations therefore adopt “a multi-scaled approach for monitoring that codifies the intent, although not the process, for implementing a transparent and data-drive approach to adaptive management” (Schultz, Sisk, Noon, & Nie, 2013, p. 6). Under the framework provided by the 2012 regulations, standards could be used, in some situations, to facilitate adaptive management at different scales. As explained previously, standards could also prescribe monitoring.

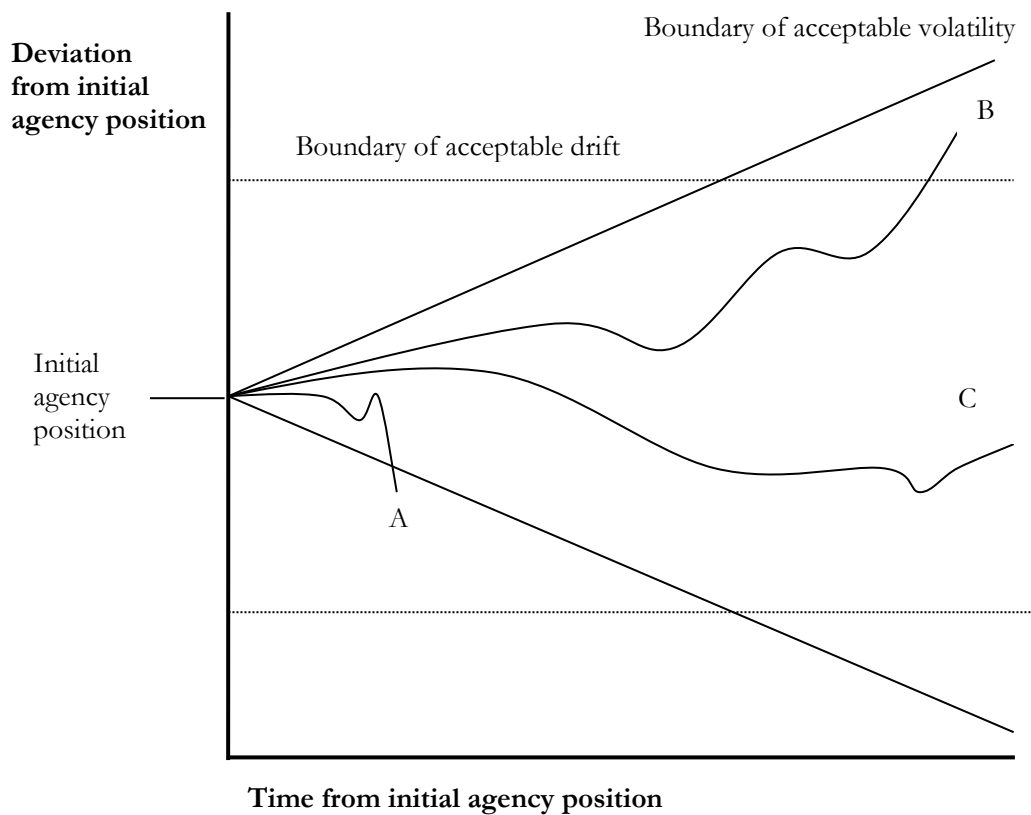
The most effective use of standards in an adaptive structure is to provide boundaries and direction. Ruhl (2006) suggests the use of prescriptive legal measures, such as standards, to guide adaptive management. Prescriptive law defines boundaries to prevent volatility (altering decisions too substantially, too soon) and drift (too many small adjustments over time that send agencies far off the original course of action) within adaptive systems (Figure 1). Such standards, or “objective boundaries,” allow decisionmakers to adjust decisions in a transparent and accountable manner, which allows the adaptive management strategy to be monitored by the public and policed by the courts (p. 55).

The importance of standards as boundaries for an adaptive system cannot be understated. Laws and regulations define the purpose and goals of an experimental process in natural resource management (Nie, 2008b, p. 156; Wiersema, 2008, p. 1297). In a forest management situation, standards should serve the same function. Standards provide sideboards and legal direction for forests working on adaptive management (Nie, 2010, p. 3). Wiersema (2008) points out that “a set of goals that will constrain decisionmakers at the lower-level scales of governance and the higher-level scales of governance,” are usually absent from adaptive systems. These constraints are essential to insure that long-term ecosystem protection will be taken into account (p. 1295). Moreover, “procedural rules without the substantive legal standards are ineffective because they have no goal to guide and trigger protective responses” (p. 1297).

Standards that serve as “objective boundaries” for adaptive management can be simple and straightforward. Many existing forest planning standards could serve in this role. For example, the Nez Perce National Forest (1987) employs a standard stating, “projects that will not meet State water quality standards shall be redesigned, rescheduled, or dropped” (p. II-21). In this case, the forest relies on Idaho

water quality standards to provide boundaries for project design and experimentation. Alternatively, consider the Idaho Panhandle National Forest standard that ensures proposed land management activities on the fisheries resource do not result in “greater than 20 percent reduction in fry emergence.” In this case, projected resource impacts must be “evaluated and quantified” during the environmental assessment process, and if the project is projected to result in more than a 20 percent reduction, a “more detailed fishery/watershed analysis” is triggered (Idaho Panhandle National Forest, 1987, Appendix I). Again, the 20 percent threshold provides a boundary within which projects must be designed, while still allowing flexibility for “in bounds” experimentation.

Figure 1: The role played by substantive legal boundaries in an adaptive management system (Ruhl, 2006, p. 55)



Defining Boundaries for Volatility and Drift: The institutional structure of adaptive management must clearly define instances of volatility, in which the agency has deviated from its initial position too dramatically over the short-term (decision path line A), and instances of drift, in which the agency has slowly over time moved substantially away from its initial position (decision path line B), while still protecting the agency from obtrusive public participation and judicial review when it has neither acted with too much volatility nor drifted too far off course (decision path line C).

There are also more complex examples of standards that serve as boundaries within an adaptive management system. The Final Conservation Strategy to recover Yellowstone grizzly bears provides one example. The strategy is designed so that managers can “monitor both population and habitat parameters closely and respond when necessary with adaptive management addressing the problems of the population in a dynamic way” (Interagency Conservation Strategy Team, 2007, p. 20). Standards that facilitate this strategy allow, for example, “temporary changes to secure habitat” so long as the changes stay within the following boundaries: “only one project is active per grizzly subunit at any one time” and “total acreage of active projects within a given Bear Management Unit will not exceed 1% of the acreage in the largest subunit within that BMU” (U.S. Fish and Wildlife Service, 2007, p. 3).

Based on forest resources and funding, use of standards within an adaptive management system will not be realistic for all activities. In these cases, a guideline might be the more appropriate tool. The 2012 rule’s approach to guidelines allows for “flexibility as circumstances warrant, for example, when there is more than one way to achieve the intended purpose, or new information provides a better way to meet the purpose, without lessening protections” (77 Fed. Reg. 21206 (April 9, 2012)). However, in situations such as management of endangered species, where great scientific uncertainty is coupled with high risk to the resource, or there is risk of crossing an irreversible ecological threshold, guidelines would not be appropriate tools due to the room for error and flexibility.

Aside from setting the boundaries in an adaptive strategy, there are methods to write and implement more adaptable standards. Standards can be written with pre-specified exceptions and contingency measures. Standards can also be amended via a plan or site-specific amendment in order to address best available science, situations where standards conflict, or when a standard no longer addresses the current management condition.

Standards can be made more adaptable with pre-specified exceptions (what are termed “bounded exceptions” in the typology) and other built-in strategies. “Simultaneous openings resulting from timber harvest on both sides of a stream area not permitted, unless the results can be shown to be an enhancement for the riparian area” provides one example (Kootenai National Forest, 1987, p. II-31).

Instead of outright restricting simultaneous openings from timber harvest, the forest chose to provide an opportunity for flexibility based on site-specific assessment. In another example, marbled murrelet nest buffer protections may be removed on the Tongass National Forest if monitoring shows that the nest site has been inactive for two or more nesting seasons (Tongass National Forest, 1997, p. 4-114). This example shows how standards could be relaxed or removed based on changed conditions. These types of standards are most effective when exceptions to the default are detailed as specific scenarios in which exceptions would be warranted. While these standards may be more time-intensive to develop, the flexible nature could result in time savings and increased credibility should exceptions be warranted.

Completing plan and site-specific amendments is the final mechanism that can be used to modify and adapt standards. As articulated by the courts in *Native Ecosystems Council v. USFS* (2005), if the agency thinks a plan is no longer relevant, “the agency should propose amendments...altering its standards, in a process complying with NEPA and NFMA.” Plan amendments allow forests to update plan components in the time between full revisions, as the NFMA only requires the agency to “develop, maintain, amend or revise Forest Plans at least every *fifteen years*, or when conditions have significantly changed” (16 U.S.C. § 1604(f)(4)). Several environmental interest group interviewees spoke of their preference for forest plan amendments, which involve a transparent process. Comparatively, my interviews suggested that site-specific amendments to standards happen more frequently, yet involve much less public transparency and analysis. Though “significant” amendments require “public involvement comparable to that required for the initial development of a plan, including the preparation of an EIS” (Gippert & DeWitte, 1996, p. 177; 16 U.S.C. § 1604(f)(4)), forest plan amendments are still more efficient than entire plan revisions. Amending standards to reflect new information can also lower the cost of plan revisions later on (USDA Forest Service, IMI, 2002, p. 42).

Several national forest plans in Montana are currently working to amend elk security standards. The USFS has explicitly recognized that criteria provided in the “Hill paradigm” (Hillis et al., 1991) represents “best science” for measuring compliance with elk security standards in Region 1 (*Native Ecosystems Council v. Weldon*, 2012; *Hapner v. Tidwell*, 2010). Elk security standards, which are defined

by blocks of canopy cover and road management designed to give elk a “secure” area while under stress, are usually managed with a combination of road density and canopy cover standards (Christenson et al., 1993, p. 5). Now, new science is beginning to reveal that forest structure has changed due to a decline in logging compared with when standards were written in the 1980s. Therefore, hiding cover may not be as important as it once was. Instead, summer grazing lands could be higher priority for elk management in the future, as Montana faces a warming climate and less available forage (Chaney, 2013). For this reason, the agency has an opportunity, through the amendment process, to account for the best available science.

As an example from the Idaho Panhandle National Forest illustrates, the importance of updating and modifying standards through the amendment process should not be overlooked. In *Lands Council v. Powell* (2005), the courts found that the agency violated NFMA because it did not comply with a standard requiring the forest to maintain an eighty percent success rate for fry emergence. The forest chose instead to comply with the newer INFISH standards, believing that the two standards conflicted, and the fry emergence standard did not offer the best protection. The court held, however, that the standards did *not* conflict, and should have both been followed. As Kester (2005) explained of the situation, “if, in its expertise, the Forest Service found fault with the methods in the Forest Plan, the Forest Service could have revised the forest plan rather than disregarding clear requirements” (Kester, 2005, p. 227).

VI. Conclusion

As articulated by the court in *Resources Ltd., Inc. vs. Robinson*, “the Forest Service is faced with a nearly impossible task of serving many different interests.” Not only must the Forest Service serve a range of interests, but citizens have a strong right to influence management of the National Forest System. The question then, is not whether management standards are best or most effective, but whether or not “substantive...management standards are the best way to provide the protection their champions seek” (Cheever, 1998, p. 54). I hope this thesis has provided thorough background on S & Gs, and compelling arguments to support the use of standards to provide the protections sought by NFMA. While recognizing that standards inherently involve prioritizing some values over others, I hope I have convinced the reader

that standards can be used in a variety of strategic ways. Standards are fundamental to an effective forest plan, and the importance of standards has been confirmed by strong public support and legal enforcement.

The development of standards is a critical process that must not be overlooked when revising forest plans. Forests should leverage the process to develop technical standards as an opportunity for co-production of information and learning with forest stakeholders. The writing of standards, including language and phrasing, will be critical. The legal background, and examples of mandatory and discretionary standards, should help to guide users through the topic of writing standards.

One of the biggest contributions made by this research is the standards typology. I encourage forests, and those participating in forest planning revisions, to explore several types of standards detailed in the typology. Threshold and bounded exceptions standards may be particularly useful to consider, as they seemingly provide latitude and accountability. Measurements and methods used to determine compliance will continue to grow in importance, so paying close attention to how compliance will be measured early in the development process will be beneficial in the end. Other tools, including suitability determinations and management areas, should be utilized in conjunction with standards. Connections between forest planning and the ESA should also be explored, with intersections being used to proactively promote the recovery, or avert listing, of threatened or endangered species. Forests must remember the benefits of consistency, and regional offices should consider providing regional guidance to forests.

Science must be taken into account throughout the entire process to develop and amend standards. The rationale and scientific (or non-scientific) lineage of a standard, as well as information gaps and uncertainty, should be fully disclosed. Agencies should expect to arrive at uncertain conclusions, yet should be prepared to move forward. The *process* of using science to inform the development of standards is most important, as it will build credibility with the public and the of the plan itself.

Monitoring will be essential to determining the effectiveness, validity, and lifespan of certain standards, not to mention the fact that monitoring is the primary way to determine on-the-ground compliance with standards. In the future, forests should write prescriptive, discrete monitoring commitments that clarify how, when, where, and by whom monitoring should occur. Monitoring can also

be incredibly useful to a forest's ability to modify, relax, or increase the protections prescribed by standards, so forests should take advantage of the power of information.

Standards should not impede adaptive management under the 2012 NFMA planning regulations. In fact, standards should be a key component to transparent, publicly and scientifically supported adaptive management strategies. Standards that serve as boundaries will provide essential sideboards and direction to the experimental process. These types of standards will require more of an up-front planning commitment, but I believe the improved accountability and guidance will build a more sustainable adaptive system. As Ruhl (2006) concedes, "regulation by adaptive management is possible, even inevitable, but hard work lies ahead to make it so" (p. 57).

In conclusion, the agency has a lot of work ahead. Aside from the need to revise over 68 of 127 forest plans, changing social, environmental and ecological contexts will influence planning like never before. Undoubtedly, this will be a "herculean job" (Coggins and Evans, 1981, p. 445). Nonetheless, efforts to develop effective, efficient planning standards should proceed. As Cole & McCool explain, "although it is important to set standards that will not cause more problems than they solve, it is also important to be *courageous* and *bold* in setting standards" (Cole & McCool, 1997, p. 66, emphasis added). In using standards, the agency has an opportunity to be courageous and bold, to protect invaluable natural resources, and to gain valuable experience, technical sophistication, and public trust.

VII. References

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