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US Forest Service Implementation of the National Environmental Policy Act: Fast, Variable, Rarely Litigated, and Declining

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Abstract

This paper draws on systematic data from the US Forest Service's (USFS) Planning, Appeals and Litigation System to analyze how the agency conducts environmental impact assessments under the National Environmental Policy Act (NEPA). We find that only 1.9 percent of the 33,976 USFS decisions between 2005 and 2018 were processed as Environmental Impact Statements, the most rigorous and time-consuming level of analysis, whereas 82.3 percent of projects fit categorical exclusions. The median time to complete a NEPA analysis was 131 days. The number of new projects has declined dramatically in this period, with the USFS now initiating less than half as many projects per year as it did prior to 2010. We find substantial variation between USFS units in the number of projects completed and time to completion, with some units completing projects in half the time of others. These findings point toward avenues for improving the agency's NEPA processes.

Keywords: National Environmental Policy Act (NEPA), US Forest Service (USFS), Environmental Impact Assessment, National Forests

Over the last several decades, the US Forest Service (USFS) has embraced a multiple-use mandate that requires an interdisciplinary workforce, high levels of public debate over decisionmaking, and balancing extractive and non-extractive uses (Koontz 2007, Schultz et al. 2016, Fleischman 2017). At the same time, the agency faces declining budgets and longer and more intense fire seasons that consume an increasing portion of the agency's budget (Reiners 2012, Fleming, McCartha, and Steelman 2015, National Interagency Fire Center 2019). Recent policy proposals aim to address these interacting problems by decreasing the agency's regulatory burden under the National Environmental Policy Act (NEPA) (US Forest Service 2019), as well as by reforming NEPA processes throughout the government (Council on Environmental Quality 2020). However, there is limited public information about the role of NEPA in the agency's activities.

This paper aims to fill this gap by conducting a systematic analysis of the USFS's NEPA activities since 2005. Under NEPA, the USFS is required to analyze, document, and disclose the likely environmental effects of its actions. Since 2005, the USFS has used its Planning, Appeals, and Litigation System (PALS) database to track and record NEPA decisions. Although PALS is not publicly accessible, the USFS granted us permission to download PALS metadata in April 2019. These metadata, termed the Multi-Year Trend Report

Management and Policy Implications

There has been much public debate on how the US Forest Service (USFS) can better fulfill its National Environmental Policy Act (NEPA) obligations, including currently proposed rule-making by the agency and the Council on Environmental Quality; however, this debate has not been informed by systematic data on the agency's NEPA processes. In contrast to recently publicized concerns about indeterminable delays caused by NEPA, our research finds that the vast majority of NEPA projects are processed quickly using existing legal authorities (i.e., Categorical Exclusions and Environmental Assessments) and that the USFS processes environmental impact statements faster than any other agency with a significant NEPA workload. However, wide variations between management units within the agency suggest that lessons could be learned through more careful study of how individual units manage their NEPA workload more or less successfully, as well as through exchanges among managers to communicate best practices. Of much greater concern is the dramatic decline in the number of NEPA analyses conducted by the agency, a decline that has continued through three presidential administrations and is not clearly related to any change in NEPA policy. This may suggest that USFS no longer has the resources to conduct routine land-management activities.

(MYTR), record information about completed and ongoing land-management projects planned by USFS over fiscal years 2005–18.

Our findings raise questions about common understandings of USFS's environmental analysis and decisionmaking processes and highlight significant problems the agency is facing that need more attention. Although public debate focuses on delays caused by NEPA, we find that the great majority of NEPA analyses are processed through less rigorous and time-consuming categorical exclusions (CEs) and environmental assessments (EAs) rather than environmental impact statements (EISs), and that the USFS completes EISs faster than peer agencies. Furthermore, our data suggest that the substantial variation between management units in the time it takes to process NEPA documents may highlight EIS preparation strategies that help balance timeliness with NEPA's mandates for public engagement and scientific rigor. Identifying and sharing these strategies could be a more effective and less controversial way of improving environmental analysis and decisionmaking processes than the new NEPA regulations proposed by The Council on Environmental Quality (CEQ) and USFS (US Forest Service 2019, Council on Environmental Quality 2020).

We further show that there has been a dramatic decline in the number of NEPA analyses initiated and completed annually that should be of great concern to all who care about public lands in the United States. This decline is likely related to the combination of flat or declining real budget allocations, retirement of experienced staff without adequate replacements, and increasing fire impacts that divert agency resources away from routine land management (National Interagency Fire Center 2019). We conclude by suggesting that greater disclosure of information about the NEPA process could improve decisionmaking by improving performance measurement, heightening public awareness of the benefits and costs of the NEPA process, providing the agency with better information about public expectations and preferences, and raising public awareness of problems facing the USFS.

The USFS and NEPA

Forest Service Organization

Most of the USFS's staff and budget are devoted to managing the lands of the National Forest System. This system comprises 193 million acres of federally owned land concentrated in the Western states. The National Forest system is organized into nine regions, each headed by a regional forester. Nested within regions are 154 named National Forest units, as well as 20 named National Grasslands and several other management units with unconventional names (in this paper, all are referenced as national forests), led by forest supervisors. Some named units have been administratively combined, so that, for example, the forest supervisor for National Forests and Grasslands in Texas is in charge of the Angelina, Davy Crockett, Sabine, and Sam Houston National Forests, as well as the Caddo and Lyndon B. Johnson National Grasslands. The lowest level of organization in the National Forest System is the Ranger District, overseen by a district ranger. There are over 600 Ranger Districts. Officials at each level have broad autonomy in project design and implementation, including NEPA compliance, within their unit (Kaufman 1960, Fleischman 2017).

The USFS's multiple-use mandate represents the outcome of decades of contestation over the agency's mission (Wilkinson and Anderson 1985, Hirt 1994, Clarke and McCool 1996). Balancing the competing demands of multiple uses, including resource conservation, resource extraction, and recreation, is a continuing source of tension for the agency. Although much scholarly and public attention focuses on high-profile management controversies facing the USFS, a lack of systematic research on USFS's land-management activities means it is unclear how much of the agency's activities are controversial and how these controversies affect environmental analysis and decisionmaking processes.

NEPA

NEPA is the stage for competition among multiple uses because it obligates all federal agencies, including the USFS, to incorporate stakeholder and scientific perspectives into project decisions. NEPA requires an assessment of the potential environmental impacts of any major federal action (Mandelker et al. 2016). Specifically, NEPA mandates that every major federal action be accompanied by "a detailed statement by the responsible official on (i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action …" (42 USC § 4332C). Further, agencies are expected to "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decisionmaking …" (42 USC § 4332A). Finally, the notice and comment requirements of NEPA, the National Forest Management Act, and the Administrative Procedure Act require that public input is sought and responded to at each step of the NEPA process. Because the USFS is tasked with land management, many of its activities have potential environmental impacts. Consequently, the agency conducts more NEPA analyses than any other federal agency (Broussard and Whitaker 2009, Trnka and Ellis 2014, Council on Environmental Quality 2018), and the NEPA process is a key USFS decisionmaking tool (US Forest Service 2019).

NEPA and implementing regulations from the Council on Environmental Quality (40 CFR § 1500–1508) and the USFS (36 CFR § 220) lay out the procedure for preparing scientific assessments. Figure 1 illustrates the major steps in this process. Federal agencies preparing new projects or programs that may have environmental impacts must prepare an EA, which examines potential environmental impacts (40 CFR §1501.3). If none are found or if impacts can be mitigated, the agency issues a Finding of No Significant Impact and a decision notice (36 CFR § 220.7). If significant impacts are found, the agency prepares a more detailed EIS. It is not mandatory to prepare an EA prior to an EIS; if an agency knows that an activity will generate significant environmental effects, it can directly prepare an EIS (40 CFR § 1501.4).

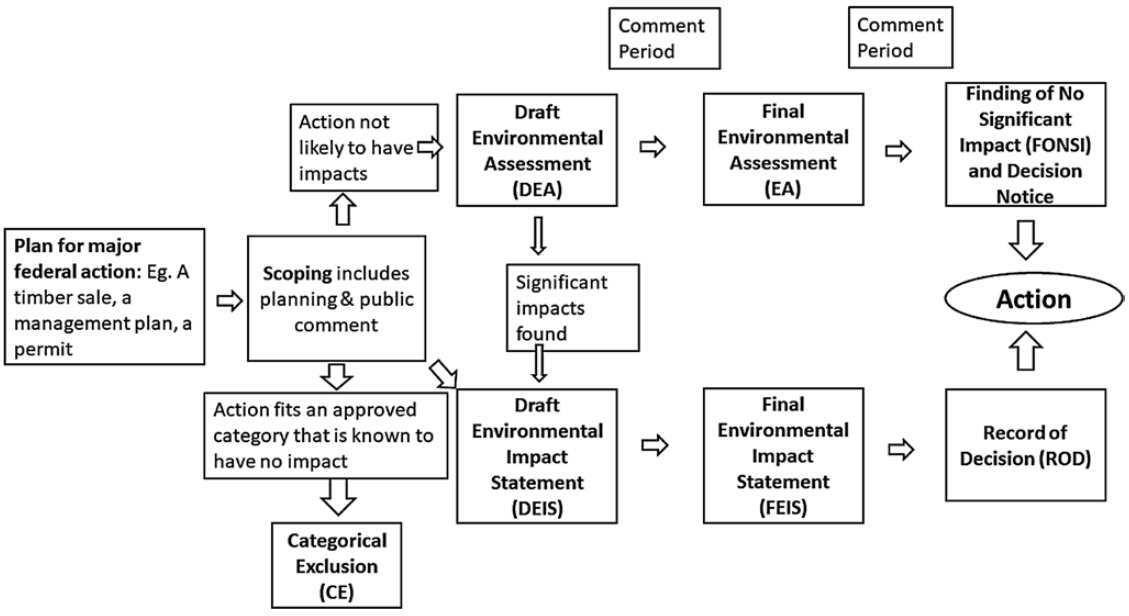

Figure 1. National Environmental Policy Act Process (see also Council on Environmental Quality 2007).

EISs examine several alternative courses of action, including a "no action" alternative (40 CFR § 1502.14). The final decision about which alternative is to be adopted is recorded in a Record of Decision (ROD) (36 CFR § 220.5). NEPA does not require that a less environmentally impactful alternative be chosen; rather, it requires disclosure of impacts of proposed actions. Development of either an EA or an EIS begins with a formal scoping period that includes outreach to other government agencies, tribes, and the general public to determine the issues to be addressed (40 CFR § 1501.7). After this, the agency prepares a draft EA or EIS, responding to issues raised during scoping. After soliciting comments on the draft (40 CFR § 1503), the agency prepares a final EA or EIS and then makes a decision. Agencies may also choose to issue CEs for certain actions predetermined to have no environmental impacts (40 CFR § 1508.4). Early CEs were for activities such as routine maintenance of facilities. In recent decades, agencies have issued CEs for many kinds of projects, typically justifying them with evidence that many past EAs for a certain kind of project have found no significant impacts, so future projects that are similar are likewise expected to have no impact (current USFS CEs are listed at 36 CFR § 220.6).

A central component of the NEPA process is public participation, which aims both to include the public in decisionmaking and to ensure that the agency is aware of relevant scientific and technical information. Each stage of a NEPA analysis generates requirements for notice and comment regulated by the National Forest Management Act and Administrative Procedure Act. Agencies are required to publish in the Federal Register a notice of intent to prepare EIS as early as possible, and EAs and most CEs require public scoping. The notice of intent outlines the proposed action and invites comments from affected parties, including other federal, state, or local government agencies, tribal governments, and other stakeholders (40 CFR §1501.7). Agencies often make significant efforts to consult with relevant agencies and stakeholders early in the process, holding public scoping meetings in affected communities and/or performing targeted outreach. Public comment is again sought when the agency prepares and circulates a draft EA or EIS. The final EIS must include a response to the comments received from the public (40 CFR §1503), along with the ROD, and some final EAs also include this, although it is not required. Prior to 2013, final decisions were subject to administrative appeal (Brown 2015). The agency now primarily uses an objection process that occurs between the publication of the final EA or EIS and the signing of the decision notice or ROD (36 CFR § 218–219). Final decisions may be challenged in court for being arbitrary, capricious, or not in accordance with the law.

Past Research Examining NEPA's Role in USFS Decisionmaking

Critics of NEPA complain that NEPA analysis is a costly and time-consuming obstacle toward completing needed work on the ground—hence recent proposals aiming to streamline NEPA processes in a variety of ways (Trnka and Ellis 2014), including the USFS's recent proposal to increase the number of projects covered by CEs (US Forest Service 2019). However, past studies are limited by the lack of availability of quantitative data on NEPA processes and procedures.

NEPA's advocates see the NEPA process as a fundamental tool for ensuring that decisions are based on sound scientific information, reflect public values and concerns, contribute to organizational learning, and are viewed as legitimate by the public (Nie 2008, Nie and Metcalf 2016, Emerson and Baldwin 2019). NEPA can serve as a "fire alarm" (McCubbins and Schwartz 1984, McCubbins 1999), enabling concerned citizens to object to Congress and the courts when the agency oversteps its authority or makes decisions out of line with public values. It also serves as a process for the agency itself to examine how individual projects impact the multiple resources it manages, consistent with the agency's legal mandate (16 USC 531). Historically, NEPA provided a platform that facilitated the transformation of the USFS from a clientelistic agency that primarily served extractive industries to an agency that attempts to balance diverse public values (Fleischman 2017).

Two aspects of NEPA facilitated this historical transformation. First, NEPA required the USFS to diversify from an agency that primarily employed foresters (Kaufman 1960) to one that employed specialists in the wide variety of disciplines needed to conduct NEPA analyses, who in turn brought new knowledge and perspectives to the agency (Tipple and Wellman 1991, G. Brown and Harris 2001, Koontz 2002, 2007, O'Leary 2009). These new voices improved project planning as well as the agency's ability to meet its multiple-use mandate, and contributed to the development of new management philosophies, such as ecosystem management (Hirt 1994, Yaffee 1994, Hoberg 2001).

Second, NEPA's public participation requirements inserted new stakeholders into agency decisionmaking

and increased public visibility of agency operations (Glucker et al. 2013). Broad stakeholder participation has increased the agency's ability to meet a multiple-use mandate because politically active citizens advocate for a variety of public forest values, and NEPA's procedural requirements ensure that some consideration is given to these values. For example, citizen-led lawsuits, based in part on NEPA-related claims, halted agency timber operations in the 1980s in the Pacific Northwest, leading directly to the adoption of the ecosystem management paradigm (Yaffee 1994). Citizen participation in NEPA remains a major way that the agency obtains information about public concerns and incorporates them into management (Bixler et al. 2016, Emerson and Baldwin 2019). Evidence suggests that citizen engagement enabled by NEPA leads to decisions that are better at both managing public resources and aligning with public values (Young et al. 2010, Bevington 2012, 2018, Trnka and Ellis 2014, Nie and Metcalf 2016).

Increased public involvement, scientific analysis, and interdisciplinary engagement is expensive, and much scholarship on NEPA focuses on these costs. NEPA's costs are substantial: Stern et al. (2014) find that NEPA planners alter plans to make them less ambitious and conduct detailed analyses as a way to prevent lawsuits. Many studies examine NEPA litigation, finding that it is expensive and time-consuming, and that the agency frequently loses cases (Alden and Ellefson 1997, Austin et al. 2004, Keele et al. 2006, Broussard and Whitaker 2009, Miner et al. 2010, Mortimer et al. 2011, Miner et al. 2014, Trnka and Ellis 2014, Keele and Malmsheimer 2018). Mortimer et al. (2011) surveyed NEPA team leaders and found that decisions about the level of analysis to pursue (i.e., EA versus EIS) were primarily decided not based on a project's potential impacts but rather based on the risk of public controversy and litigation. Deciding in favor of an EIS was seen as a signal to the public that the agency was concerned with the issue and believed its analysis would stand up in court.

Although NEPA's costs in terms of project delays may appear obvious, there has been little systematic study of the drivers of these costs. No agency provides systematic data on the costs of its NEPA analyses, and it is not clear if the costs of NEPA analysis can even be separated from broader aspects of project preparation—for example, preparing a timber sale will require a timber cruise, a silvicultural prescription, and a survey for rare and threatened species, regardless of whether those are required by NEPA analysis or simply by the practice of sustainable forestry. Furthermore, some studies suggest that many delays blamed on NEPA are driven not by NEPA but by lack of funds or difficulty coordinating with other agencies (Trnka and Ellis 2014), or by tensions within USFS offices and interdisciplinary teams (Stern et al. 2010a, b).

Project timelines can be studied as a proxy for cost. The median USFS EIS completed between 2010 and 2017 was started 2.92 years prior to the completion date (CEQ 2018). This number compares favorably to analogous agencies such as the Bureau of Land Management (3.83 years), the Fish and Wildlife Service (4.23 years), and the National Park Service (6.35 years). In 2012, the USFS completed EISs faster than any other agency with a large NEPA workload (Trnka and Ellis 2014). No published data are available on the percentage of USFS projects that are EISs, and there is no published information on EA and CE timelines for any agency, although Trnka and Ellis (2014) report that these timelines are highly variable. Without these data, it is difficult to assess what kinds of costs NEPA imposes or what kinds of strategies are likely to be effective at decreasing workload while responding to the need for scientific consideration, careful analysis, and public involvement. In particular, whereas the USFS's proposed rule proposes increased use of CEs to speed analysis, the USFS has not released data that show that CEs in fact take less time.

Concerns about costs largely fall into two categories. First, many scholars and administrators explore ways to conduct analysis and solicit public engagement with greater cost-efficacy using techniques such as increasing public engagement in the early planning stages or increasing the use of CEs (Bixler et al. 2016). Second, many worry that NEPA's costs prevent the agency from undertaking needed work. Some work may be time-sensitive, such as responding to fires or disease outbreaks, whereas other work may simply not happen or be delayed because the agency conducts analysis rather than doing work on the ground. Concern that fire-risk-reduction work is being delayed by NEPA is a major driver of recent proposed revisions to the agency's NEPA regulations (US Forest Service 2019). Since NEPA has contributed to an agency-wide reorientation away from extractive activities, people who favor higher levels of extractive activity are particularly concerned about NEPA's costs, mirroring the enthusiasm that environmentalists continue to have for a law that has helped them achieve policy goals. In practice, many critics combine a general concern with NEPA leading to "analysis paralysis" with a specific

concern about NEPA preventing certain kinds of activities (e.g., Bosworth 2002).

Analytical Approach

We analyze USFS projects and related NEPA processes across space and time, first investigating the types of activities the USFS carried out over the last 14 years, then examining whether the frequency of NEPA analyses changed over time and whether NEPA time frames varied across regional and forest offices. Finally, we analyze litigation patterns, since lawsuits are widely perceived to be a driver of costs.

The analysis relies on MYTR data generated from the USFS's PALS database, which the USFS has used to track all land-management planning activities and projects with NEPA decisions (completed and ongoing) since 2005[1]. These data are generated primarily from NEPA practitioners who enter information as projects proceed. The MYTR data reveal the location of the project (including region, forest, and district); the level of the decisionmaker; whether the project was designated as requiring a CE, EA, or EIS; the time period in which the project went through the NEPA process; and the projects' purposes and activities[2]. A complete replication dataset for this paper is posted in the Data Repository for the University of Minnesota at https://doi.org/10.13020/3xfe-2m18.

Results

Diversity in Management

The USFS documented 33,976 unique decisions in the 14 years covered by our dataset. Of these, 27,961 (82.3 percent) were processed as CEs, 5,377 (15.8 percent) as EAs, and 638 (1.9 percent) as EISs[3]. On average, only 46 EISs were conducted annually, across nearly 800 FS offices. These results suggest the USFS already makes extensive use of its authority to reduce administrative burden. As can be seen in Table 1, the most common project purpose (38.4 percent of all projects) was special-use management. Special-use permits are a catch-all category for permits that are not governed by other statutes and include activities as diverse as siting communication towers, permitting private cabins and guiding and outfitting services, expanding and maintaining ski areas, and allowing special events on USFS land (USDA Office of Inspector General 2011). Ninety five percent of special-use permits fit existing CEs, leaving the agency little room for increasing the number of special-use permits qualifying for CEs. The most common purposes for EAs and EISs are vegetation management, including forest products and fuels management. This suggests that NEPA is functioning as expected, since these activities have more potential for environmental impacts than other activities, and tend to be controversial.

Other kinds of projects are less common, yet still constitute a significant portion of USFS activities. Recreation management is the second-largest category. Combined with the large percent of special-use permits related to recreation management (for example, permitting cabins, ski areas, and outfitters/guides), recreation may in fact be the activity most frequently subject to NEPA review. Other major project categories include management of wildlife, fish, rare plants, roads, minerals & geology, and grazing. Although land-management planning is scarce in the data overall (just over 1 percent of all projects), it is particularly likely to result in EISs (10.5 percent of all EISs), because all forest plans and major plan amendments require EISs (Brown and Nie 2019).

The way the NEPA process plays out across USFS units varies dramatically. Figures 2 and 3 show clear regional dimensions to these differences. Although Region 8 (Southern) produced the most CEs and EAs (and thus the most decisions) in the time period studied, it produced the fewest EISs (less than 20 total). Region 5 (Pacific Southwest) produced the most EISs, followed by Region 6 (Pacific Northwest).

Individual National Forest management units have dramatically different workloads. Figure 4 shows the distribution of NEPA decisions across forest units. Five forests (Six Rivers National Forest, Columbia River Gorge National Scenic Area, Land Between the Lakes National Recreation Area, El Yunque National Forest, and Midewin National Tallgrass Prairie) produced fewer than 100 analyses across the entire time period, whereas nearly half of units quadrupled that figure, and the Ouachita National Forest conducted 769. Figure 5 shows the location of the forests producing the most and fewest NEPA analyses. The sources of variation are not clear. For example, whereas some forests that produce few analyses are small—Midewin, the unit with the fewest decisions, is a scant 18,500 acres—others, such as the Six Rivers and Kaibab National Forests, are large units that face complex management challenges yet produce few decisions.

Heterogeneity in production of EISs is equally dramatic. Although one unit (Black Hills National Forest) produced 24 EISs, 14 units produced no EIS from 2005 to 2018. Figure 6 shows forests producing the most and least EISs. Unlike the scatter in Figure 5, the

Table 1. Purposes of US Forest Service decisions, 2005–18.[5]

Purpose	Total	Percentage of total	Categorical exclusions	Percentage of categorical exclusions	Environmental assessments	Percentage of environmental assessments	Environmental impact statements	Percentage of environmental impact statements
Special-use management	13,030	38.4	12,401	44.4	1,465	27.2	205	32.1
Recreation management	5,242	15.4	4,178	14.9	1,391	25.9	177	27.7
Vegetation management	4,823	14.2	3,505	12.5	1,360	25.3	175	27.4
Wildlife, fish, rare plants	4,755	14.0	3,183	11.4	1,158	21.5	100	15.7
Fuels management	3,686	10.8	2,149	7.7	989	18.4	92	14.4
Forest products	3,489	10.3	1,893	6.8	977	18.2	83	13.0
Water management	2,836	8.3	1,869	6.7	884	16.4	78	12.2
Road management	2,579	7.6	1,868	6.7	617	11.5	75	11.8
Minerals & geology	2,452	7.2	1,502	5.4	551	10.2	67	10.5
Grazing management	1,802	5.3	1,154	4.1	524	9.7	60	9.4
Facility management	1,136	3.3	848	3.0	270	5.0	31	4.9
Special area management	625	1.8	431	1.5	192	3.6	27	4.2
Land-ownership management	536	1.6	388	1.4	170	3.2	24	3.8
Land-management planning	430	1.3	318	1.1	150	2.8	18	2.8
Research	403	1.2	171	0.6	138	2.6	18	2.8
Heritage-resource management	285	0.8	130	0.5	116	2.2	16	2.5
Land acquisition	246	0.7	103	0.4	69	1.3	10	1.6
Regulations, directives, orders	120	0.4	71	0.3	31	0.6	5	0.8

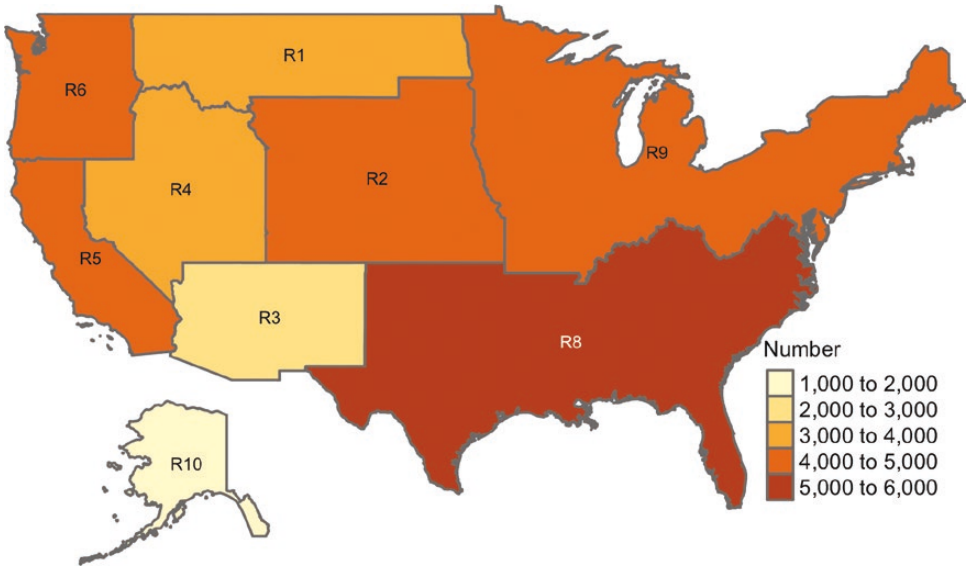

Figure 2. Number of analyses by region.

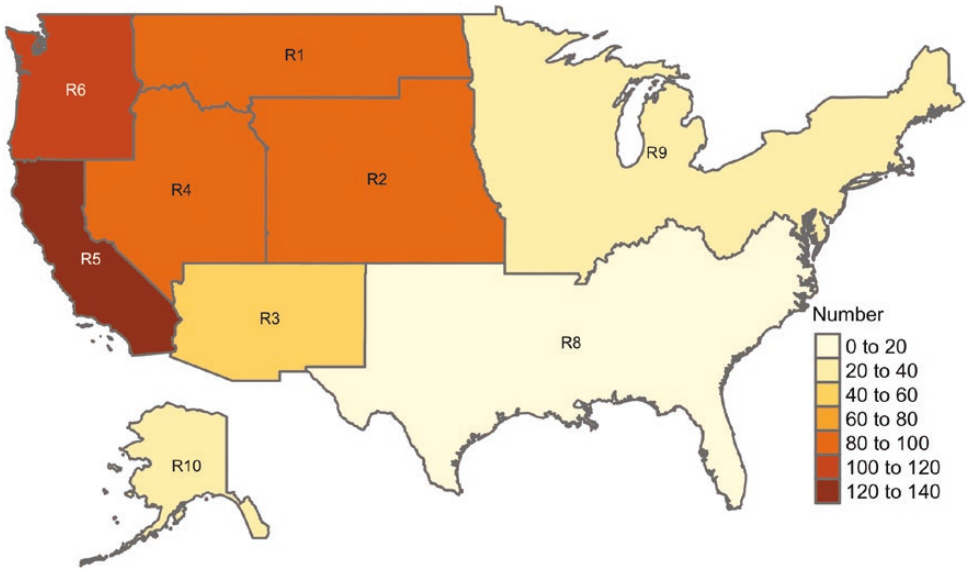

Figure 3. Number of environmental impact statements by region.

distribution of EISs is more suggestive of a regional pattern. Most national forests producing no EISs are located in Region 8, whereas three of the highest producers are in Region 5, and three are in Region 2. On the other hand, the Ottawa National Forest in the upper peninsula of Michigan produces no EISs, whereas its immediate neighbor, the slightly larger Chequamegon-Nicolet National Forest in Wisconsin, is one of the largest producers of EISs. Better understanding the processes that drive variation in project workloads across the National Forest system would help the agency allocate resources where they are needed and design administrative processes to ensure that projects needs are being met.

Trends over Time

The most striking pattern in the PALS data is the decline in NEPA analyses initiated annually. Figure 7 displays the number of projects initiated per year. More than 60 projects requiring EISs were initiated annually, 2005–9, but the number declines after this, with only 19 initiated per year in 2017 and 2018. Similarly, the number of EAs initiated dropped from a high of 614 in 2009 to a low of 153 in 2018, and the number of

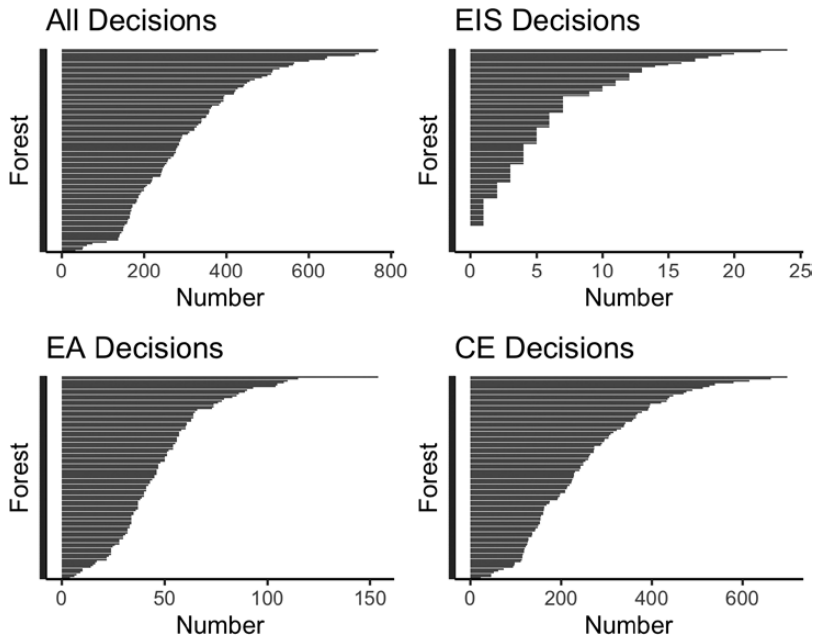

Figure 4. Number of National Environmental Policy Act projects per National Forest, 2005–18.

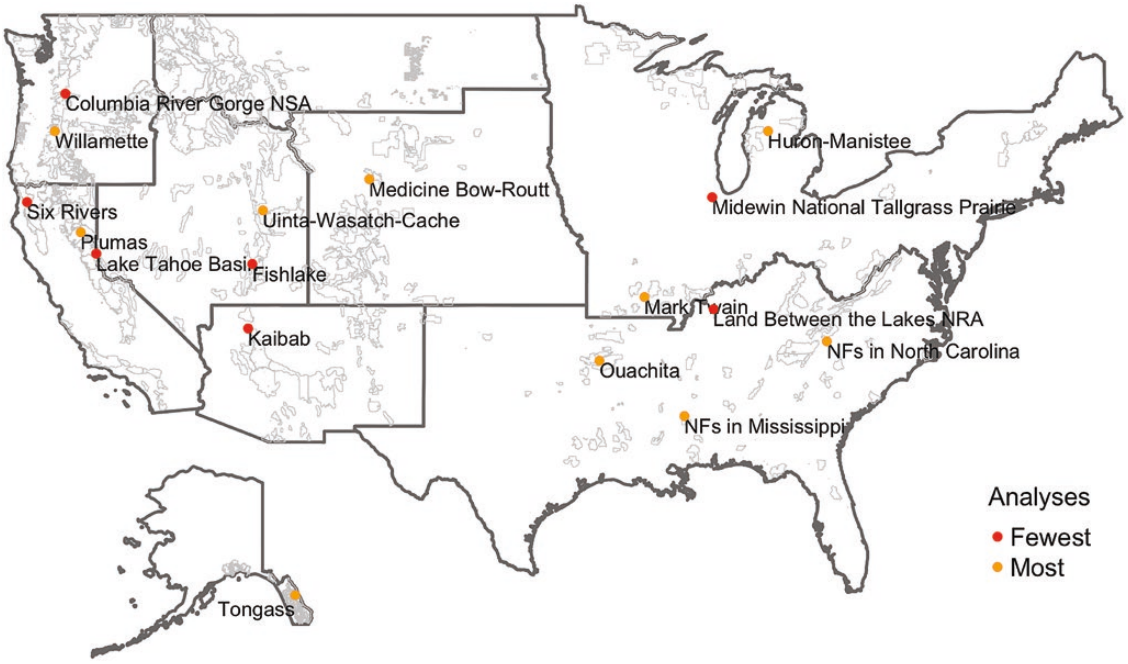

Figure 5. Forests producing the least and most total National Environmental Policy Act analyses, 2005–18.

CEs initiated dropped by more than half (2,716 initiated in 2005 and 1,218 initiated in 2018). The number of NEPA analyses signed each year also decreases over time following a similar trend.

Several potential causes of the declines in Figure 7 can be easily eliminated. The trends are fairly consistent over the last 14 years, suggesting that no one administration or Congress is responsible for lower levels of activity, although the sharp drop in CEs from 2007 to 2008 may be due to court cases lost by the Bush Administration that year that invalidated some CEs. Similarly, the decline appears similar across regions and activities. There are no major changes in NEPA regulations during this time that can account for

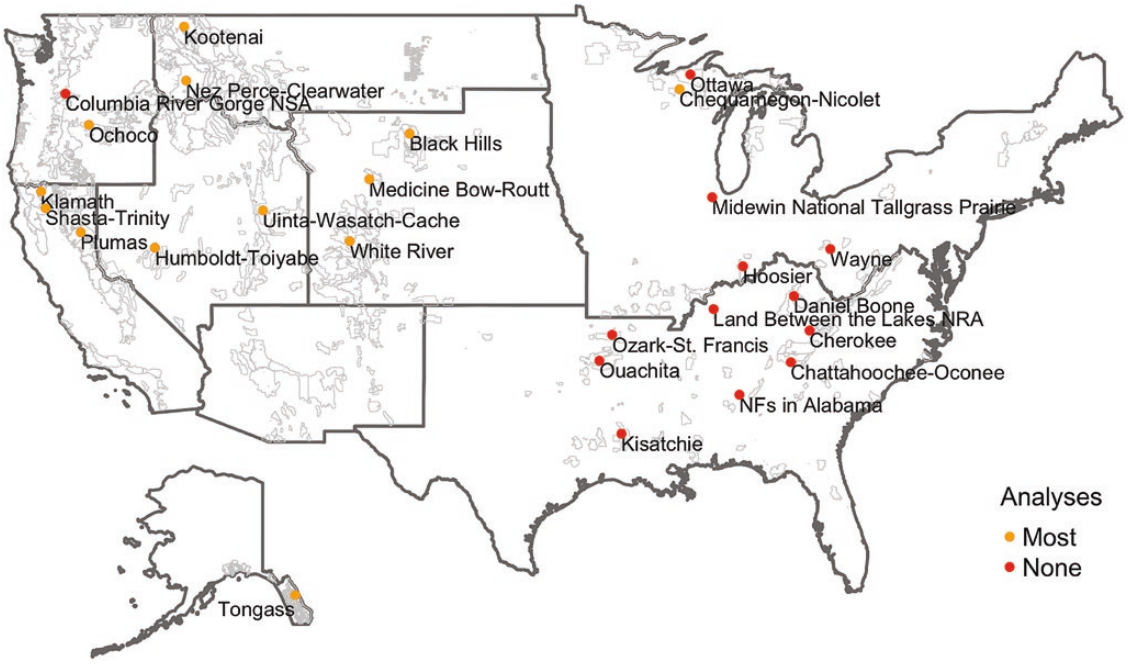

Figure 6. Forests producing the least and most environmental impact statements, 2005–18.

this large shift in the number of projects. Yet whereas the number of projects signed by district rangers has declined by approximately 40 percent since the early years of our study, the decline in projects signed by higher level officials (e.g., forest supervisors, regional foresters) is only about 15 percent. This could indicate that the decline in number of projects is partly a result of consolidation of NEPA analyses into a smaller number of larger, landscape-scale programmatic EISs (Council on Environmental Quality 2014), although if this were the case, we would also expect an increase in the number of EAs and CEs that implement the programmatic EIS, but instead we observe a decrease. On the other hand, it could also indicate that higher-level officials have more access to resources and/or pursue projects that are less likely to be cancelled in times of fiscal stress.

A second temporal consideration is the time it takes to complete a NEPA analysis. On average, any single NEPA analysis takes less than a year to complete: the median time to complete a NEPA project is 131 days[4]. The median time to complete a CE is 105 days, an EA is slightly more than 1 year (392 days), and an EIS is less than 2.5 years (882 days). This is substantially faster than mean times reported in prior studies, both for the USFS and for other federal agencies (Trnka and Ellis 2014, Council on Environmental Quality 2018). The difference between our analysis using medians and prior studies using means is consequential: medians are better reflections of central tendencies than means for data that are skewed (i.e., a small number of projects take a long time, whereas most projects are completed quickly). The standard deviation among preparation times for EISs is large, suggesting that factors within projects that qualify for an EIS play an important role in determining preparation time.

As in our earlier analyses, there is substantial variation between regions, forests, and individuals in terms of the length of time it takes to complete a NEPA analysis. In Region 10, the median EA took less than 1 year to complete, whereas in Region 6 it took 1.4. Variation in time to completion across units is less dramatic for CEs and EAs than for EISs. Figure 8 shows the heterogeneity in time to completion for EISs across regions. The median EIS in Region 9 took less than 2 years, whereas the median EIS in Region 3 took over 4 years.

There is also variation between forests. The Ozark-St Francis National Forest took less than 3 months to complete an average CE, whereas the Lake Tahoe Basin Management Unit took more than 1 year—longer than 10 national forests took to complete their average (median) EA. The fastest EA completers included the Chugach, Chequamegon-Nicolet, and Ozark-St. Francis National Forests, all of whom completed their average EA in 10 months or less. By

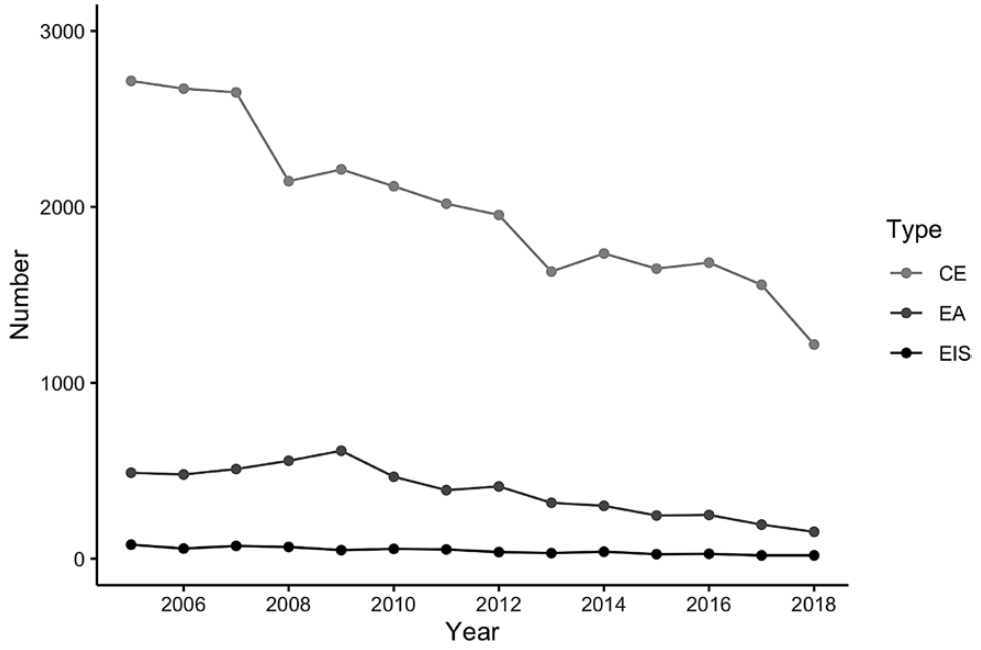

Figure 7. Downward trends in the number of projects initiated per year.

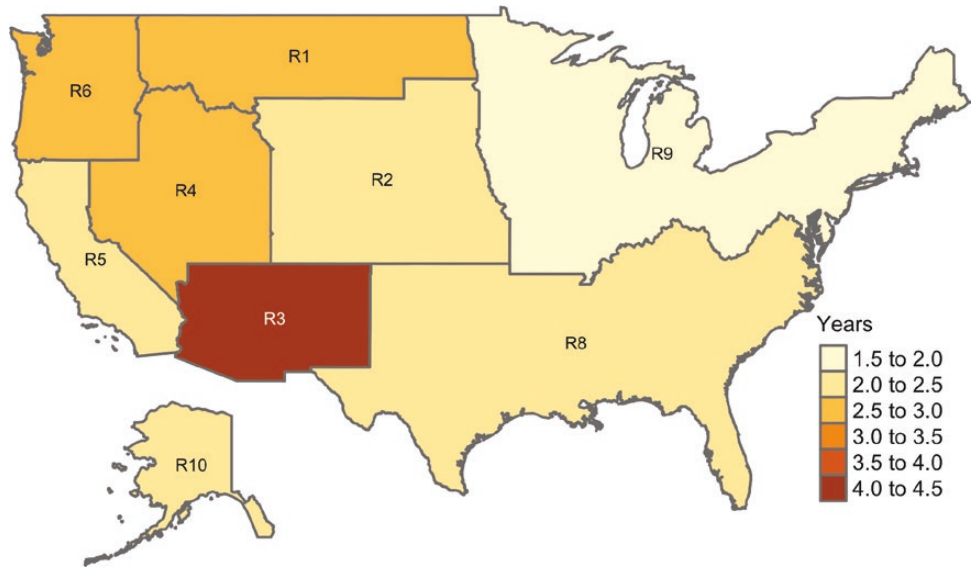

Figure 8. Time from initiation to decision signed for environmental impact statements, 2005–18.

contrast, nine national forests took longer than 2 years to complete an average EA, with the slowest, Daniel Boone and Helena-Lewis and Clark, both taking more than 2.3 years.

Figure 9 shows the average number of years national forests took to complete EISs. The variation among forests is striking. Fifteen national forests took less than 2 years to complete an average EIS. Although some of these simply completed very few EISs, the forest that wrote the most EISs (24), the Black Hills, averaged only 1.6 years per EIS. Other forests completing a large number of EISs in less than 2 years on average include the Plumas, Ochoco, Chequamegon-Nicolet, and Inyo. Six national forests, all of which completed few EISs, took more than 6 years to complete an average EIS. Faster processes might represent more efficient decisionmaking and/or simpler resource management challenges, but could also signify insufficient engagement with science and stakeholders.

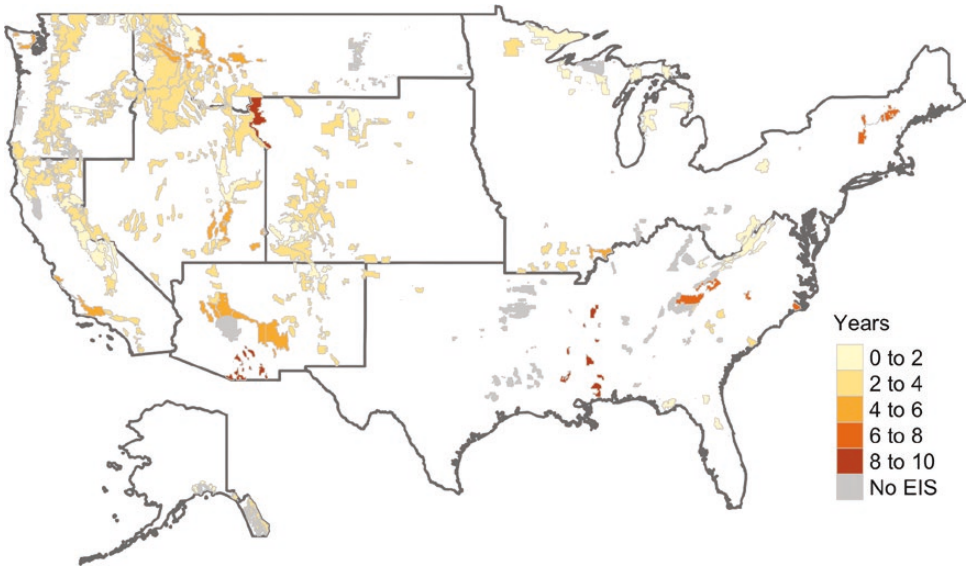

Figure 9. Time from initiation to decision signed for environmental impact statements, 2005–18.

In addition to regional and forest-level effects, certain officials may be more likely to complete projects quickly, and/or spend more time carefully engaging stakeholders and applying scientific information. As noted above, the decline in the number of projects is much sharper at the district than at the forest/region levels. Among responsible officials, 11 have signed 100 or more decisions in our database; for example, the current forest supervisor of the White River National Forest in Colorado has signed 203 decisions. By contrast, 443 individuals have signed a decision for a single project. This suggests there is a wide range of expertise and institutional knowledge about the NEPA process across units.

Litigation

There is a widespread perception that NEPA analyses are frequently litigated. Our data show this is not the case. Less than 1 percent of all completed NEPA analyses in our dataset led to litigation (292 cases), including less than 1 percent of CEs, 2 percent of EAs, and 12 percent of EISs. That EISs are more likely to lead to litigation is expected: EISs are for larger projects with more potential for significant environmental effects. NEPA planners may opt for an EIS when they believe a project is more likely to be litigated because they believe that an EIS is more likely than an EA to hold up in court (Mortimer et al. 2011). The MYTR does not provide information on the nature of the litigation, but an earlier analysis of USFS litigation indicated that 71.5 percent of cases between 1989 and 2008 involved NEPA (Keele and Malmsheimer 2018).

The quantity of litigation remained relatively constant throughout our study period, with a peak in 2007, when 48 CEs were challenged in court, most likely a result of the introduction of new CEs by the Bush administration a few years earlier (Vaughn and Cortner 2005). Of the 241 resolved cases (the others are still outstanding), the USFS won 67 percent, lost 21 percent, and settled 12 percent. This win rate appears to reflect an improvement: an earlier analysis over 1989–2008 found that the USFS won 53.8 percent of cases, lost 23.3 percent, and settled 22.9 percent (Miner et al. 2014). Another study focusing on fuel-reduction activities between 2006 and 2008 found only 2 percent resulted in litigation, and the Forest Service won 48 percent, lost 38 percent, and settled 14 percent (United States Government Accountability Office 2010).

Discussion and Conclusion

Our findings have several important implications for National Forest management and policy, as well as for NEPA more broadly. First, in contrast to common public discourse, we find that the median NEPA project took less than 5 months to complete, and the vast majority of NEPA analyses are completed in less than 3 years, that less than 2 percent of these analyses are EISs, and that few analyses are litigated. This contradicts the widespread narrative that NEPA is a major source of delay for the USFS. Instead, the USFS is making extensive use of existing authorities to speed the vast majority of projects through NEPA analysis.

Only a small number of the most complicated and/or controversial NEPA projects require years of analysis.

Second, there appears to be substantial heterogeneity within the USFS concerning how NEPA processes are handled, in terms of both level of analysis (i.e., some offices perform many EISs, others many EAs or CEs) and time spent on analysis. Our data do not allow us to understand why these differences exist; they may be driven by the external political environment or the resources being managed. It is worth investigating whether differences exist because of different NEPA practices across these offices; if so, the practices of successful offices could be studied and shared in order to improve NEPA practices across the agency. Overall, these results show an agency that is effective at handling its NEPA obligations, particularly given the complexity of its multiple use charge, and which can learn more from its field managers and partners about how to improve NEPA practices.

Finally, we find a very significant decline in the number of NEPA projects being initiated and completed that cannot be explained by any changes in NEPA law. If anything, recent acts of Congress and Executive Orders should have decreased the costs and increased the speed of NEPA compliance by introducing new CEs and establishing new processes aimed at increasing the efficiency of environmental reviews (Hoover et al. 2019, Council on Environmental Quality 2020). A great slowdown in USFS activity could mean that needed work is not being done on the landscape. Agency critics have argued that many USFS activities are destructive to the values the agency is supposed to be promoting (Bevington 2018). If this is the case, then fewer projects could mean fewer destructive activities on public lands, and therefore better management. Since the PALs data have few details about actual project content, and since there is substantial controversy over the best way to manage public lands, we cannot evaluate the extent to which these changes are good or bad. Nonetheless, this decline should be notable to all who care about public lands.

There are two possible causes of the decline. First, USFS may be relying increasingly on larger, programmatic EISs that cover a large number of projects across a landscape, rather than many smaller projects; this practice has long been officially encouraged and is consistent with the pattern of a higher percentage of projects being approved by higher-level officials. Increasing programmatic EISs are inconsistent with two elements of our data: it seems unlikely to explain the decline in CEs, many of which deal with different kinds of projects than those covered in programmatic EISs. Furthermore, programmatic EISs are supposed to lead to EAs that are tiered to the programmatic EIS, but EAs have also been declining.

The second reason for declining project numbers is the well-documented combination of a flat or declining annual appropriation and dramatically rising fire suppression costs. In 2014, 51 percent of USFS funding went to fire-fighting, compared to only 17 percent in 1995 (US Forest Service 2015). This has likely affected the availability of staff NEPA experts as well as experts in other fields needed to compose interdisciplinary teams. For example, in 2011, the USFS had only one employee with the expertise to inspect and manage 967 communication tower leases scattered across the country (USDA Office of Inspector General 2011).

In 2018, Congress approved a new package of funding for the USFS, which provides, for the first time in FY2020, a large separate spending authority for fire-fighting (USDA 2018), which is expected to free the existing agency budget to focus on traditional management activities. Yet, in recent years, the agency has requested budget cuts—the president's 2021 budget proposes to decrease the agency's budget by 3 percent, even after accounting for the increased authority for fire-fighting. It is difficult to imagine improving USFS's ability to address challenges such as climate change and increasing fire risk without substantial investment in hiring and retaining staff with relevant expertise in both science and public engagement.

Our data do not provide support for the current proposal to expand the number of projects eligible for CEs (US Forest Service 2019) and do not support a significant justification for CEQ's proposed rule-making (Council on Environmental Quality 2020) and associated executive action surrounding NEPA. In contrast to the justification for the proposed rule changes, the vast majority of USFS projects are completed quickly, use existing authority to decrease paperwork, and are not litigated. The average NEPA project takes the USFS less than 5 months to complete—this is largely due to the existing CEs, which cover the vast majority of the agency's activities. We have presented evidence that suggests that project processing delays are likely due not to NEPA, and suggest, based on the USFS's own analysis of its situation, that lack of available budget and staff is the main barrier to efficient project processing. There does not appear to be a general problem with projects being delayed by NEPA, and past studies have found little improvement from efforts to alter rules to speed NEPA timelines (DeWitt and Dewitt 2008). Instead, we

find that a very small number of projects take a long time to get through the NEPA pipeline, as should be expected given the highly heterogeneous nature of the USFS's multiple use mission and the need for careful analysis of complex and/or highly controversial projects. There is substantial variation between units that might be leveraged to improve project management. More efficient use of the National Forest Management Act Planning process to make clear high-level decisions would likely contribute to more efficient project-level NEPA decisionmaking (Brown and Nie 2019).

Furthermore, we show that increasing the number of CEs in the manner recently proposed by USFS is not likely to substantially alter NEPA timelines. In many situations, EAs can be completed as rapidly as CEs, and the new proposed CEs would apply to a very small number of projects. For example, the USFS's justification for the proposed rule mentions a backlog of 5,000 special-use permit applications, but with 95 percent of special-use permits already processed through existing CEs, the new CEs are likely to apply to fewer than 250 of the 5,000 backlog. At the same time, CEs lose some of the benefits NEPA brings in terms of scientific analysis and public engagement, and run the risk of undermining public trust in the agency if applied too broadly (Stern and Mortimer 2009, US Forest Service 2017, DiBari 2018). Finally, the dramatic decline in the number of projects completed by the USFS over the last decade while there have been no changes in NEPA implies that the agency has more important problems that need to be addressed.

The insights we have gained from the PALS data, and others that could be derived from systematic data about USFS decisionmaking, are valuable in helping the public understand USFS decisionmaking. An easy step the agency can take to improve public understanding of its operations is to make the entire database, including not only the MYTR that we analyze here, but also the linked individual project documents present in the full PALS database, publicly available on the web. Yet more value could be added by including data on other key project components such as spatial scale, physical location, and intensity of activity; number and nature of public comments received; cost outlay spent preparing the documents; and the benefits of the proposed projects. Making data on NEPA processes public would improve transparency; would help the public understand the constraints, costs, and opportunities created by NEPA; and may reduce the controversy over rule changes by closing the information gap among stakeholders. More attention to effective and accurate disclosure of NEPA analyses and related projects would help both the agency and its stakeholders better engage the NEPA process and meet its multiple use mandate.

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Endnotes

1. Cancelled projects are not included in analyses. It is also worth noting that before we had access to the MYTR, we web scraped the project web pages of all National Forest units. We could not match around 2,000 projects (5 percent of all projects in this period) we found on the web to projects documented in PALS (including cancelled projects). We speculate that these unmatched projects are, in essence, lost in translation—either cancelled but not updated as such in the PALS database or posted to the web during the scoping period but not pursued thereafter.
2. NEPA planners can associate with their project purposes and activities listed on a drop-down menu; these descriptors are based on the USFS Handbook's natural-resource-management codes.
3. We drop any observation from the MYTR that is not a unique project; dropped data are primarily duplicated rows because of entries from multiple forest supervisors working on the same project.
4. Note that percentages add up to more than 100 because approximately 25 percent of projects have multiple purposes.
5. This descriptive analysis does not include ongoing projects (1,269), which means the data are right censored. If these projects take particularly long to complete, the average rates of completion we describe here are biased (underestimated). Because there are so few ongoing projects relative to those completed, however, we feel confident that any potential bias would have small impacts on averages.

Literature Cited

Alden, A.-M., and P.V. Ellefson. 1997. *Natural resource and environmental litigation in the federal courts: A review of parties, statutes and circuits involved*. Available online at https://conservancy.umn.edu/bitstream/handle/11299/36842/1/Staffpaper125.pdf; last accessed December 20, 2019.

Austin, J., J.M. Carter, B.D. Klein, and S.E. Schang. 2004. *Judging NEPA: A "Hard Look" at judicial decision making under the national environmental policy act*. Environmental Law Institute, Washington, DC.

Bevington, D. 2012. *The rebirth of environmentalism: Grassroots activism from the spotted owl to the polar bear.* Island Press, Washington, DC.

Bevington, D. 2018. Lessons from groups that litigate logging. P. 471–85 in *193 million acres: Toward a healthier and more resilient US Forest Service*, Wilent, S. (ed.). Society of American Foresters, Washington, DC.

Bixler, A., R. Patrick Bixler, A. Ellison, and C. Moseley. 2016. *Administrative and judicial review of NEPA decisions: Risk factors and risk minimizing strategies for the Forest Service*. Ecosystem Workforce Program Working Paper Number 66. Northwest Fire Science Consortium, Corvallis, OR. Available online at https://ewp.uoregon.edu/sites/ewp.uoregon.edu/files/WP_66.pdf; last accessed December 20, 2019.

Bosworth, D. 2002. *Statement Dale Bosworth Chief, USDA Forest Service. June 12, 2002*. Subcommittee on Forests and Forest Health Committee on Resources US House of Representatives, Washington, DC. Available online at https://www.fs.fed.us/sites/default/files/legacy_files/media/types/testimony/1_HNRC_06-06-2002_Testimony.pdf; last accessed December 20, 2019.

Broussard, S.R., and B.D. Whitaker. 2009. The magna charta of environmental legislation: A historical look at 30 years of NEPA-forest service litigation. *Forest Policy Econ.* 11(2):134–140.

Brown, G., and C.C. Harris. 2001. A longitudinal study of environmental attitudes of women and gender diversification in the US Forest Service 1990–1996. *For. Sci.* 47(2):246–257.

Brown, S.J. 2015. *Administrative and legal review opportunities for collaborative groups: ERI white paper—issues in forest restoration*. Northern Arizona University and the Western Environmental Law Center. Available online at https://www.nationalforests.org/assets/files/Admin_Legal-Review-Opportunities-for-Collabs_SJ-Brown-and-ERI-2015.pdf; last accessed December 20, 2019.

Brown, S.J., and M. Nie. 2019. Making forest planning great again? Early implementation of the Forest Service's 2012 national forest planning rule. *Nat. Resour. Environ.* 33(3):3–7.

Clarke, J.N., and D. McCool. 1996. *Staking out the terrain: Power and performance among natural resource agencies*. SUNY series in Environmental Politics and Policy. State University of New York Press, Albany.

Council on Environmental Quality. 2007. *A citizen's guide to the NEPA: Having your voice heard*. Council on Environmental Quality, Executive Office of the President, Washington, DC.

Council on Environmental Quality. 2014. Final guidance for effective use of programmatic NEPA reviews. *Fed. Reg.* 79(2014–30034):76986–76990.

Council on Environmental Quality. 2018. *Environmental impact statement timelines (2010–2017)*. Council on Environmental Quality, Washington, DC. Available online at https://ceq.doe.gov/docs/nepa-practice/CEQ_EIS_Timelines_Report_2018-12–14.pdf; last accessed December 20, 2019.

Council on Environmental Quality. 2020. Update to the regulations implementing the procedural provisions of the National Environmental Policy Act. *Fed. Reg.* 85(2019–28106):1684–1730.

DeWitt, P., and C.A. Dewitt. 2008. How long does it take to prepare an environmental impact statement? *Environ. Pract.* 10(4):164–174.

DiBari, K.J.A.R. 2018. *EADM: Environmental analysis and decision making regional partner roundtables: National findings and leverage points: May 2018*. National Forest Foundation, Missoula, MT. Available online at https://www.nationalforests.org/assets/pdfs/National-EADM-Report.pdf; last accessed December 20, 2019.

Emerson, K., and E. Baldwin. 2019. Effectiveness in NEPA decision making: In search of evidence and theory. *J. Environ. Pol. Plan.* 21(4):427–443.

Fleischman, F. 2017. Questioning Kaufman: How cross-level political coalitions interact with organizational structure. *Public Admin. Rev.* 77(5):743–751.

Fleming, C.J., E.B. McCartha, and T.A. Steelman. 2015. Conflict and collaboration in wildfire management: The role of mission alignment. *Public Admin. Rev.* 75(3):445–454.

Glucker, A.N., P.P.J. Driessen, A. Kolhoff, and H.A.C. Runhaar. 2013. Public participation in environmental impact assessment: Why, who and how? *Environ. Impact. Assess. Rev.* 43(November):104–111.

Hirt, P.W. 1994. *A conspiracy of optimism: Management of the national forests since World War Two*. University of Nebraska Press, Lincoln, NE.

Hoberg, G. 2001. The emerging triumph of ecosystem management: The transformation of federal forest policy. P. 55–85 in *Western public lands and environmental politics*, Charles Davis (ed.). Westview Press, Boulder, CO.

Hoover, K., L. Luther, A.A. Riddle, and P.A. Sheikh. 2019. *Forest management provisions enacted in the 115th congress*. Congressional Research Service, Washington, DC.

Kaufman, H. 1960. *The forest ranger: A study in administrative behavior.* Resources for the Future, Washington, DC.

Keele, D.M., and R.W. Malmsheimer. 2018. Time spent in Federal Court: US forest service land management litigation 1989–2008. *For. Sci.* 64(2):170–190.

Keele, D.M., R.W. Malmsheimer, D.W. Floyd, and J.E. Perez. 2006. Forest service land management litigation 1989–2002. *J. For.* 104(4):196–202.

Koontz, T.M. 2007. Federal and state public forest administration in the new millennium: Revisiting Herbert Kaufman's the forest ranger. *Public Admin. Rev.* 67(1):152–164.

Koontz, T.M. 2002. *Federalism in the forest: National versus state natural resource policy.* Georgetown University Press, Washington, DC.

Mandelker, D.R., R.L. Glicksman, A.M. Aughey, D. McGillivray, and M. Doelle. 2016. *NEPA law and litigation*. Thomson Reuters, Eagan, MN.

McCubbins, M.D. 1999. Abdication or delegation-congress, the bureaucracy, and the delegation dilemma. *Regulation* 22:30.

McCubbins, M.D., and T. Schwartz. 1984. Congressional oversight overlooked: Police patrols versus fire alarms. *Am. J. Polit. Sci.* 28(1):165–179.

Miner, A.M.A., R.W. Malmsheimer, and D.M. Keele. 2014. Twenty years of forest service land management litigation. *J. For.* 112(1):32–40.

Miner, A.M.A., R.W. Malmsheimer, D.M. Keele, and M.J. Mortimer. 2010. Research article: Twenty years of forest service national environmental policy act litigation. *Environ. Pract.* 12(02):116–126.

Mortimer, M.J., M.J. Stern, R.W. Malmsheimer, D.J. Blahna, L.K. Cerveny, and D.N. Seesholtz. 2011. Environmental and social risks: Defensive national environmental policy act in the US Forest Service. *J. For.* 109(1):27–33.

National Interagency Fire Center. 2019. *Federal firefighting costs (Suppression Only)*. Available online at https://www.nifc.gov/fireInfo/fireInfo_documents/SuppCosts.pdf; last accessed December 20, 2019.

Nie, M. 2008. The underappreciated role of regulatory enforcement in natural resource conservation. *Policy Sci.* 41(2):139–164.

Nie, M., and P. Metcalf. 2016. National forest management: The contested use of collaboration and litigation. *ELR.* 46(30):10208–10221.

O'Leary, R. 2009. When a career public servant sues the agency he loves: Claude Ferguson, the Forest Service, and off-road vehicles in the Hoosier National Forest. *Public Admin. Rev.* 69(6):1068–1076.

Reiners, D. 2012. Institutional effects on decision making on public lands: An interagency examination of wildfire management. *Public Admin. Rev.* 72(2):177–186.

Schultz, C.A., K.M. Mattor, and C. Moseley. 2016. Aligning policies to support forest restoration and promote organizational change. *Forest Policy Econ.* 73(December):195–203.

Stern, M.J., C.A. Martin, S.A. Predmore, and W.C. Morse. 2014. Risk tradeoffs in adaptive ecosystem management: The case of the US Forest Service. *Environ. Manag.* 53(6):1095–1108.

Stern, M.J., and M.J. Mortimer. 2009. *Exploring national environmental policy act processes across federal land management agencies*. USDA Forest Service Gen. Tech. Rep. PNW-GTR-799. Pacific Northwest Research Station, Portland, OR. Available online at https://www.treesearch.fs.fed.us/pubs/33918; last accessed December 20, 2019.

Stern, M.J., S.A. Predmore, M.J. Mortimer, and D.N. Seesholtz. 2010a. From the office to the field: Areas of tension and consensus in the implementation of the National Environmental Policy Act within the US Forest Service. *J. Environ. Manag.* 91(6):1350–1356.

Stern, M.J., S.A. Predmore, M.J. Mortimer, and D.N. Seesholtz. 2010b. The meaning of the National Environmental Policy Act within the US Forest Service. *J. Environ. Manag.* 91(6):1371–1379.

Tipple, T.J., and J.D. Wellman. 1991. Herbert Kaufman's forest ranger thirty years later: From simplicity and homogeneity to complexity and diversity. *Public Admin. Rev.* 51(5):421–428.

Trnka, J., and E. Ellis. 2014. Environmental reviews and case studies: Streamlining the national environmental policy act process. *Environ. Pract.* 16(4):302–308.

USDA. 2018. *Secretary Perdue applauds fire funding fix in Omnibus, March 23, 2018*. Available online at https://www.usda.gov/media/press-releases/2018/03/23/secretary-perdue-applauds-fire-funding-fix-omnibus; last accessed December 20, 2019.

USDA Office of Inspector General. 2011. *Forest service administration of special use program*. Available online at https://www.usda.gov/oig/webdocs/08601-55-SF.pdf; last accessed December 20, 2019.

United States Government Accountability Office. 2010. *Forest service: Information on appeals, objections, and litigation involving fuel reduction activities, fiscal years 2006 through 2008*. United States Government Accountability Office, Washington DC.

US Forest Service. 2015. *The rising cost of wildfire operations: Effects on the forest service's non-fire work*. USDA, Washington, DC. Available online at https://www.fs.fed.us/sites/default/files/2015-Fire-Budget-Report.pdf; last accessed December 20, 2019.

US Forest Service. 2017. *The environmental analysis and decision making (EADM): Workshop overview*. US Forest Service, Phoenix, AZ. Available online at http://amforest.org/wp-content/uploads/2017/11/Phoenix-Workshop-Materials-Combined-October-2017.pdf; last accessed December 20, 2019.

US Forest Service. 2019. National Environmental Policy Act (NEPA) compliance: Proposed rule. *Fed. Reg.* 84(114):27544–27559.

Vaughn, J., and H. Cortner. 2005. *George W. Bush's Healthy Forests: Reframing the Environmental Debate*. University Press of Colorado, Louisville, CO.

Wilkinson, C.F., and H.M. Anderson. 1985. Land and resource planning in the national forests. *Oregon Law Rev.* 64(1–2):1–373.

Yaffee, S.L. 1994. *The wisdom of the spotted owl: Policy lessons for a new century*. Island Press, Washington, DC.

Young, S., M. O'Brien, and J. McElfish. 2010. *NEPA success stories: Celebrating 40 years of transparency and open government*. Environmental Law Institute, Washington, DC. Available online at https://ceq.doe.gov/docs/get-involved/NEPA_Success_Stories.pdf; last accessed December 20, 2019.