Forest Management in Plumas County: Exploring Stakeholder Collaboration

Tate Paige Luoma

ABSTRACT

This research delves into the interaction between forest management stakeholders in addressing wildfire mitigation and post-wildfire restoration. These facets of forest management have taken precedence given the current landscape: wildfires of unprecedented severity and size. Plumas County has long been the focus of private and public forest management stakeholders, as communities nestled in a forested landscape have been hit by multiple major fires. Through identification and analysis of stakeholders' experiences, solutions can be formulated and implemented for forest management improvement. Interviews with stakeholder leadership and employees were conducted, as well as a review of environmental policy. Results found that although many stakeholders shared similar goals, there is a clear need for enhanced partnerships. Collaborative meetings among stakeholders must be initiated and continued for collective impact. The United States Forest Service (USFS), suffering from understaffing and employee turnover, is one of the biggest impediments to effective forest management, both with internal USFS projects and in instances of joint ventures. The National Environmental Policy Act and California Environmental Quality Act were both described in interviews as having necessary and important environmental review processes, but the environmental assessment timelines of these policies directly conflict with post-fire restoration windows. Categorical exclusion can be expanded to address this issue. Local agencies have significantly more and swifter success in implementing forest management projects compared to larger agencies. More monetary and workforce investments should be made to propel local agencies further. To best elevate forest management, changes must be made at the local, state, and federal levels.

KEYWORDS

wildfire mitigation, post-wildfire restoration, categorical exclusion, local agency investment, United States Forest Service

INTRODUCTION

This paper seeks to understand the relationship between stakeholders involved in forest management; if conflict among stakeholders and issues experienced are better identified and understood, management improvements can be made. When multiple stakeholders own or manage forested land, discrepancies between these groups can create barriers to streamlined and collaborative forest management and wildfire mitigation. Each stakeholder in this study was selected for its direct involvement in forest management in Plumas County. Additionally, each of these stakeholders has been greatly impacted by the wildfires in Plumas County since 2020. A list of the stakeholders interviewed can be found in Table 1.

Existing literature delves into several other topics and issues related to Plumas County/Plumas National Forest: Maidu land restoration (Stephens et al. 2023), fuels reduction (Stephens et al. 2021), forest regeneration (Stephens et al. 2020), and more. Numerous papers have been published concerning biology and ecology in the Plumas National Forest. These studies provide integral background information for understanding the study site and the intricacies of forest management. That said, these studies do not address the issue of stakeholder relations and inner workings, and how these relations affect Plumas County. Informed by these studies, my interviews aim to understand what is happening in forest management specifically in Plumas County. Forest management is facing an extremely dire situation because prevention and restoration are struggling to keep up with wildfires; a case study of the stakeholders involved will provide insight into the unique problems being faced. Interviewing the people directly affected by wildfires and directly involved in pre and post-wildfire management will provide an in-depth understanding of the advancements that forest management needs.

In order to identify how interactions among stakeholders may hinder or help productive forest management, I ask the central research question: How does the interaction between stakeholders influence effective forest management and wildfire mitigation practices in Plumas National Forest? To research further, I ask three sub-questions: (1) What are the current goals, objectives, and management strategies of each stakeholder? (2) How does major environmental policy affect forest management strategies and projects? (3) What short and long term improvements can be made to address forest management issues? I believe that looking to local agencies as successful examples in forest management, as well as improving collaboration among

stakeholders, are two solutions that could significantly improve forest management. These solutions could decrease project planning time, improve employee treatment, and allow projects to be implemented more quickly, among many other benefits. I think that although the United States Forest Service often manages with the right intentions, the organization is severely inhibited by bureaucracy, low morale, poor employee treatment, and policy barriers.

EXTENDED INTRODUCTION

California Wildfires

These catastrophic consequences from wildfires make forest management one of the most important sectors of natural resource management today. Forest management agencies are increasingly facing devastation; more research must be done in order to understand the ways that forest management can be elevated. In 2021 alone, 2,569,386 acres burned from a total of 7,396 wildfires in California (CalFire Incidents 2021). The repercussions of these fires, especially when they burn at high severity, are vast. High severity wildfires lead to total ecosystem type conversions, with previously forested areas becoming shrub lands (J. Pangburn, personal communication, 10/10/23). After wildfires, mills are inundated with dead logs, and salvage logging can overwhelm harvesting operations, leaving living, viable timber standing (Prestemon et al. 2006). Additionally, high severity wildfires lead to loss of life, property, and other infrastructure, ultimately costing millions of dollars in damages.

Current Forest Management

Current forest management is falling behind the pace necessary to preserve our forests, as wildfires grow larger each year. If multiple stakeholders are prioritizing and implementing management strategies that are aligned, can stakeholder interaction be improved to create a more efficient and effective forest management network? Before and in response to wildfires, stakeholders may focus on one management objective over another. Ideally, a combination of management tactics is needed to better manage wildfire risk (Busenberg 2004). Collaboration and

consistent communication among stakeholders is one way to combine management tactics and ideas.

To reduce fire likelihood and severity, forests can be controlled for wildfire mitigation and restoration. Forest restoration can be defined as "reducing tree densities and surface fuels while also shifting species composition and spatial patterns to more closely resemble the historical range of variation" (Stephens et al. 2021). The "historical range of variation" refers to pre-colonial times, before fire suppression and timber extraction became a common practice. Fuels management includes, but is not limited to, prescribed burning and commercial thinning operations, which are key processes for decreasing the severity of potential wildfires in the future (Hartsough et al. 2008). Wildfire mitigation and forest restoration work spans broad landscapes, but is especially critical around mountain communities. Plumas County is a prime example of towns nestled in the forest, and when wildfires burn, homes and lives are threatened.

After a wildfire, a critical window must be observed in order to maximize response to the post-fire landscape. When high severity fires burn most or all trees to the ground, an empty landscape is left to be dominated by shrubs and grasses. These shrubs and grasses grow back far more quickly than tree saplings, oftentimes outcompeting new tree growth; a once forested landscape can experience ecosystem type conversion into a shrubland within only a couple years. Additionally, burned timber is only commercially viable for approximately two years before it starts to decompose. Salvage logging needs to take place immediately after a wildfire; leaving burned trees on the land only provides more fuel to be burned in future fires.

Plumas County

Plumas County has long been the focus of myriad groups, both private and public, working in forest management. The county has recently received even more attention due to the frequency of large wildfires in the area (Figure 1). A history of fire suppression throughout California has led to uniquely imbalanced forests; overpopulation of shade tolerant trees, overly dense forests, and dangerous fuel buildup has afflicted forests for decades (L. Hall, personal communication, 2/14/24). The open, patchy, and uneven-aged structure of forests before European settlement made forests resilient to fire (Chang 1996), but these historic forest structures are no longer common in

Plumas County. These issues diminish forest health, threaten biodiversity, and increase wildfire likelihood and severity.

Plumas County experienced two major fires in the past 4 years: the North Complex Fire in 2020 and the Dixie Fire in 2021. The North Complex fire burned at such high intensity that 100% mortality was reported for conifer trees in 2022 (Stephens et al. 2023). The Dixie Fire burned 963,309 acres, remaining an active fire for 104 days (CALFIRE Incidents 2021). The repercussions of these wildfires are felt years later; mills continue to process salvage logs years after the wildfires (anonymous forest industry professional, personal communication, 10/10/23), many agencies are still in the planning stages of restoration treatments (B. Bledsoe, personal communication, 10/25/23), and towns are in the process of rebuilding. If proper forest management is not accomplished, the risk of high severity wildfires in the future remains high (former USFS employee, personal communication, 10/24/23).

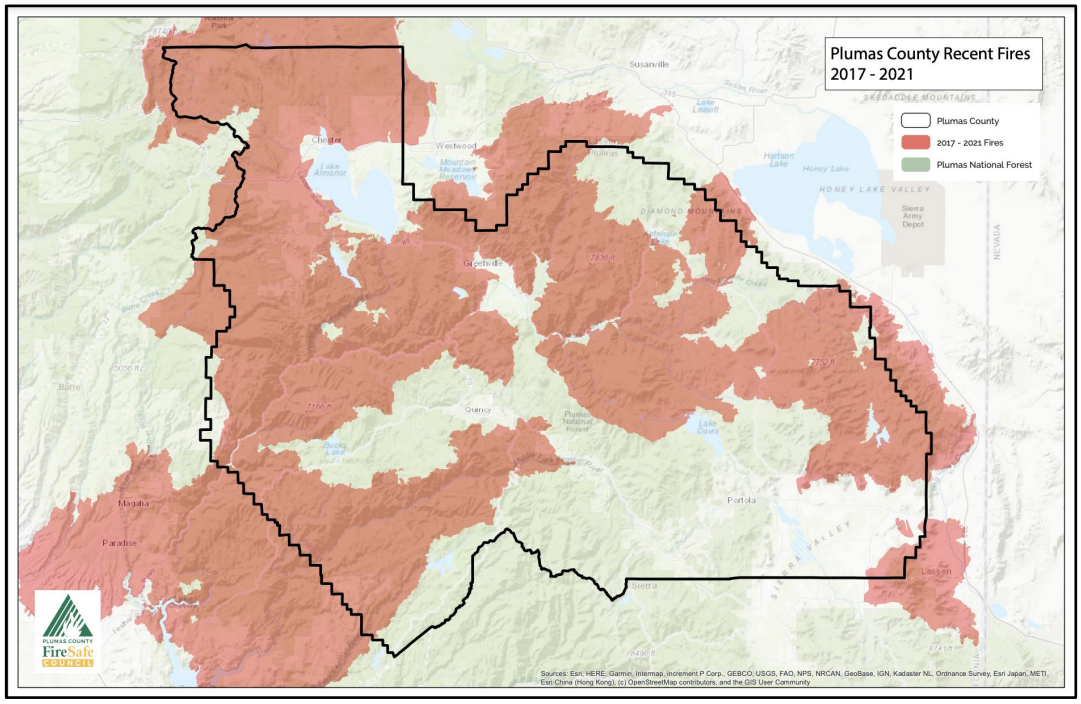

Figure 1. Plumas County Recent Fires. Map from Plumas Fire Safe Council. Roughly half of Plumas County has burned since 2017. Tens of thousands of forested acres have been decimated.

Policy in Plumas

California forests are afforded more legal protection than most other forests in the world (Dicus and Delfino 2003). Plumas County forest and resource management is bound by many policies and regulations, some of which require extensive environmental review processes. An important piece of legislation affecting forest management is the National Environmental Policy Act (NEPA), signed into law in 1970. NEPA requires that organizations act carefully in forest management, addressing the environmental impact of their actions (Owen 2002). Through NEPA, federal agencies must release statements detailing any proposed actions on federal land, allowing the public to comment and submit alternatives to the proposal (Sax 1973). Thus, forest management projects can move quite slowly.

Another act requiring environmental review is the California Environmental Quality Act (CEQA), also signed into law in 1970. Similar to NEPA, CEQA requires state and local agencies to publicize the environmental impacts of proposed projects (Environmental Protection Agency DATE). CEQA also has a public comment period, allowing citizens to share their opinions on proposed projects. Public comment has the potential to change or even stop projects from being implemented. The slow-moving, multi-year timelines of NEPA and CEQA conflict with the post-fire restoration window (salvage logging, replanting, etc.), creating a huge impediment to efficient and timely forest management.

Of note is a significant amount of other policy that requires an environmental review/compliance/survey period. The National Historic Preservation Act (NHPA) and the Endangered Species Act (ESA), among several other policies, both require environmental review processes. The NHPA requires that federal agencies consult with the Advisory Council on Historic Prevention before implementing a project on a historic or tribal site (Advisory Council on Historic Prevention 2023) and the ESA protects endangered species, regulating projects (US Fish & Wildlife Service 2023). For the purpose of my research, NEPA and CEQA will be the two policies discussed, as they were the most frequently mentioned across all interviews.

Past Collaborative Attempts

Plumas County and its surrounding areas have long been at the heart of collaboration efforts. In the early 1990s, the Quincy Library Group (QLG) was formed. Timber industry representatives, local and federal officials, and environmentalists began to meet regularly, with

their meetings culminating in the creation of the Herger- Feinstein Quincy Library Group Forest Recovery Act, signed into law by President Clinton in 1998. The act emphasizes the importance of timber, calling for an increase in logging operations, with some clear-cutting permitted (Owen 2002). This act was vehemently opposed by multiple environmental groups.

METHODS

Study Site

Plumas County is located in northeastern California, including portions of the Sierra and Cascade mountain ranges. With a population of about 19,131 people as of 2023 and only 7.8 people per square mile (US Census 2023), Plumas County is not densely populated, and many of its towns are quite spread out. Citizens live in and around heavily forested areas, making forest management one of the most important matters in the county. There are over 100 million acres of national forest in the area (Plumas County 2024). Plumas County hosts many stakeholders and agencies active in natural resource and forest management. The United States Forest Service manages the national forest land in the area. Private timber companies actively log and replant their lands. Nonprofits work with community members, educating them about wildfire safety and teaching residents how to conduct prescribed burns. The Mountain Maidu, indigenous to the area, have been stewards of the land for hundreds of years, and have recently reclaimed some of their land back (L. Hall, personal communication, 2/14/24). The forest in Plumas County is mixed-conifer, with shade tolerant white fir and incense-cedar dominating the landscape. A history of fire suppression has caused the forest to become extremely dense, increasing the risk of wildfire and many other ecosystem issues. Overgrown forests create myriad problems: an imbalance of shade tolerant trees, increased occurrence of invasive species, increased fuel loads, a general landscape that is much more difficult to manage, and more.

Data Collection

In order to answer my research questions, I separated my research approach into two methods: policy analysis and interviews. I looked at change in policy over time, identifying and

understanding paradigm shifts and why they occurred. In my interviews, I asked interviewees about the context in which the original policies were written, and if policy improvements have been made or need to be made. I also analyzed discourse in policy, looking into the values and norms that motivated and informed such policies, and finding whether these values and norms still remain true. I chose to focus on the National Environmental Policy Act of 1970 (NEPA) and the California Environmental Quality Act of 1970 (CEQA). NEPA and CEQA were two of the most common pieces of legislation that surfaced throughout my background research, both when reading previous papers and when conducting introductory interviews. NEPA and CEQA both require an environmental review process and a public comment period; these policies influence the speed at which forest management projects can be planned and implemented. The collection of policy information helped inform the questions I asked during interviews. I asked questions about the timeline of the environmental review process, the importance (or unimportance) of the public comment period, and if alterations to these policies can and should be made.

I conducted interviews with stakeholder leadership and employees to gather the most current and relevant information pertaining to stakeholder beliefs, goals, and current projects (Table 1). Stakeholder officials were asked to examine and elaborate on their interactions with other stakeholders, identify policy barriers they experience, and discuss short and long term improvements to forest management. Leadership from the California Department of Forestry and Fire Protection (CALFIRE), the United States Forest Service (USFS), and several other management agencies were contacted for interviews, as these individuals are highly informed about the inner workings of their respective agencies. Additionally, various types of employees were interviewed in order to better understand specific projects, day-to-day activities, and the overall experience of working with or for a stakeholder. Interviewees were current and former employees, new to their positions and seasoned veterans, and in both leadership and junior positions. Interviewing a variety of employees and people involved with stakeholders allowed for a more extensive information base.

Table 1. Stakeholders and affiliated interviewees. 11 total interviews were conducted across 9 stakeholder groups.

Stakeholder	Number of Interviewees
United States Forest Service (USFS)	3
California Department of Forestry and Fire Protection (CALFIRE)	1
Feather River Resource Conservation District	1
Sierra Institute	1
Private Industry	1
Plumas Underburn Cooperative	1
Plumas Fire Safe Council	1
Feather River College	1
Mountain Maidu	1

The general questions asked were the same across all interviews (Appendix A1). Participants were first asked to state their agency's or affiliated stakeholder's main purpose and belief system. This was asked to better understand why the stakeholders are involved in forest management and how they approach their management. Next, interviewees were asked about the current projects they are involved in, especially if these projects pertain to the Dixie and/or North Complex Fire. Participants were then asked if any current or former projects involved collaboration with other agencies, and if so, how these collaborations were managed. Finally, participants were asked to share any ideas for improving forest management in Plumas County. It is important to note that although all interviews followed this list of standardized questions, each individual interview included follow-up questions related to answers in real time.

Data Analysis

Data analysis began by transcribing each interview. Each transcription was coded into three main sections: Stakeholder Functions, Policy, and Collaboration. In this way, interviews could be sorted by overarching themes, project types, stakeholders collaborating with others, and policy that might help or hurt a project. These sorted codes were helpful in identifying the frequency of similar answers. This highlighted the importance of specific factors in forest management; more common answers indicated greater importance. Once sorted, answers were synthesized into figures and tables to better demonstrate the results of this study. I synthesized information from interviews

to inform background information, identify problems in forest management, and to explore solutions to these problems. Additionally, reading interview transcriptions allowed me to identify powerful and important quotations that I wanted to highlight throughout my writing.

RESULTS & DISCUSSION

Overlapping Goals

Having numerous shared goals across stakeholders creates a strong platform for potential collaboration. All stakeholders I interviewed are concerned with wildfire mitigation. "[Wildfires] certainly don't adhere to administrative boundaries," comments an anonymous private industry professional. The majority of stakeholders also cite community protection as a priority. These concerns necessitated heightened response after the 2021 Dixie Fire, a wildfire that affected every stakeholder in Plumas County. Another common theme was the desire for forest restoration. It was apparent that many stakeholders are concerned and interested in improving the forest, through replanting, thinning, and various other restoration tactics (Table 2). Furthermore, every single interviewee made it extremely clear how deeply they care about Plumas County. Each person expressed strong desires to improve their forest and community, frequently mentioning the need to protect the county from further catastrophe.

Table 2. Common projects and stakeholders involved. Most stakeholders are involved in the same types of forest management projects, creating significant opportunities for increased collaboration.

Code	Definition	Notes
Restoration	Management focused on improving some undesirable conditions, restoring landscape, etc.	USFS Resource Conservation District Sierra Institute Private Industry Feather River College Mountain Maidu
Fire	Projects related to recent wildfires, Dixie and North Complex	USFS Resource Conservation District Sierra Institute
WUI	Management focused on the communities in the Wildland Urban Interface of Plumas County	USFS Resource Conservation District Sierra Institute Plumas Fire Safe Council Plumas Underburn Cooperative CALFIRE
Fuels management	Actively managing fuels, prepping fuels management projects	USFS Resource Conservation District Sierra Institute Plumas Fire Safe Council Plumas Underburn Cooperative Feather River College
Thinning	Actively thinning, planning thinning	USFS Resource Conservation District Sierra Institute
Rx burning	Actively burning, promoting burning, teaching about burning, preparing for burning	USFS Resource Conservation District Plumas Underburn Cooperative CALFIRE
Community engagement	Any mention of community learning, community assistance, public comments, etc.	Sierra Institute Plumas Fire Safe Council Plumas Underburn Cooperative Feather River College Resource Conservation District USFS Mountain Maidu

Although many stakeholders share similar goals, I found across interviews that there is significant room for improvement when it comes to collaboration among these stakeholders. Many interviewees described the same issue: there is not enough visibility of goals or consistent communication between stakeholders, despite the fact that many of the stakeholders are involved in similar projects. This lack of communication is a barrier to stakeholders working together; there are numerous missed opportunities to collaborate on reaching collective forest management goals. Additionally, 7 out of 11 participants said that the USFS bureaucracy played a significant role in hindering collaboration or stalling project implementation. Many stakeholders have attempted to collaborate with the USFS on multiple occasions, only to be significantly slowed by the agency or never receive contact from the agency at all.

USFS: The Stakeholder Affecting Them All

I found that the United States Forest Service was one of the biggest common denominators influencing forest management issues in Plumas County, with both internal USFS projects and in instances of collaboration with outside stakeholders. The USFS is suffering from many underlying internal problems, namely understaffing and employee turnover. Historically, it was common for USFS employees to work in the same area for decades, making the forest their life's work (anonymous former USFS employee, personal communication, 10/24/23). Now, salaries that are not commensurate with the cost of living force employees to look elsewhere for jobs. "[A former USFS employee] was living in the barracks because he couldn't afford anything in town and the housing he could find was outrageously expensive. So he's moving … to another district. That's another person and another project gone," comments interviewee Mikayla Blair of the Forest Service.

Additionally, employees will spend years on a project, only to watch it collapse when a wildfire burns the entire landscape. Low pay and low morale make it exceedingly difficult for employees to commit to the USFS for more than a few years. "The Forest Service needs to change some things and pay is one of them. Students aren't going to work for $15 an hour and break their backs, right. It's just not worth it," says Jon Dvorak, Director of Forest Health and Fuels at Feather River College. With a shortage of staff, new employees are being prematurely placed in leadership positions on projects where they have no experience. Delegating a project to an inexperienced employee is inefficient; this transition is time consuming and delays the advancement of forest management projects. "[The former USFS employee] could have done this much quicker than me. What takes him a day takes me weeks," adds Blair, in reference to a first-time timber sale. These types of problems within the USFS are not specific to Plumas County alone. A 2019 study published by the National Association of Forest Service Retirees (NAFSR) analyzing the Forest Service workforce came to similar conclusions: in order to increase the pace and scale of forest restoration, the Forest Service must improve its hiring process and receive substantially more funding. The NAFSR report also cites partnerships as an important way to facilitate forest restoration.

Employee turnover and inexperience is especially damaging when it comes to projects in post fire landscapes. "Landscapes are very, very dynamic in the first 10 years after a fire. Timing is important both ecologically and economically," comments a former USFS employee. As

previously mentioned, salvage logs are only viable for sale (approximately) within the first two years after a fire. And, if replanting does not occur quickly, forests can experience total ecosystem type conversions, with managers missing the window to control brush that grows back in place of trees. It is important to note that although the USFS was frequently mentioned as a hindrance to collaboration in forest management, many of these issues are not unique to only the federal agency. Many stakeholders suffer from a lack of funding and manpower, policy barriers, and slow timelines. The frequency of these issues can be seen in Figure 2.

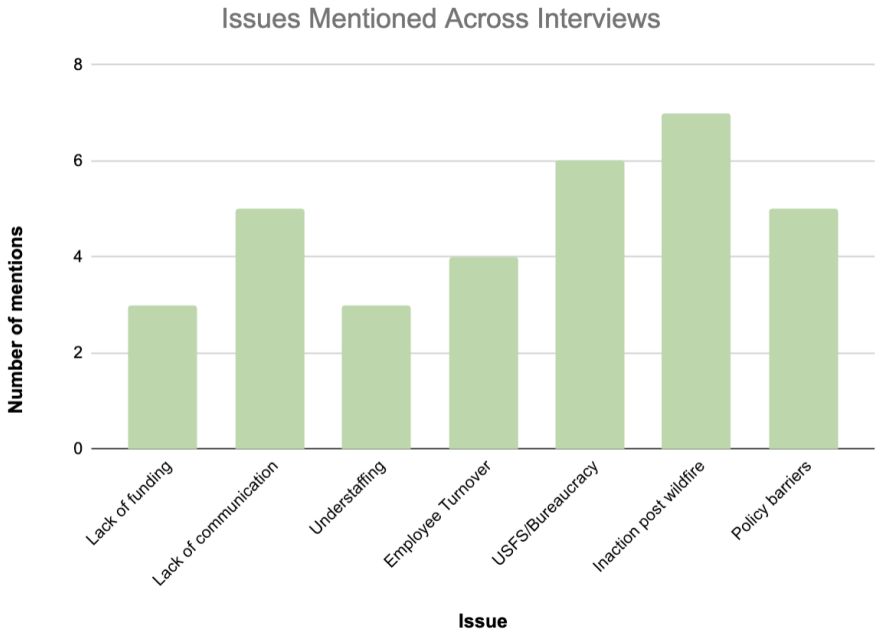

Figure 2. Frequency of issues mentioned in interviews. Many stakeholders experience the same types of issues; issues are experienced across all of forest management.

Consistent Engagement Improves Collaboration

Asking stakeholders about their goals in forest management revealed an interesting fact: many stakeholders have objectives that are acutely aligned, but fail to communicate these objectives to one another. When stakeholders lack collaboration, they miss out on many opportunities. Collaborating stakeholders can share manpower, join forces around funding, and can combine other available resources. When asked why there are limited partnerships proportionate to shared goals, many interviewees had a simple answer: stakeholders in Plumas

County need to meet more often. "Collaboration is pretty much the word of life at this time, we need to be able to create collaborative efforts with all of these other agencies that have passion for what is taking place," says Les Hall, a member of the Mountain Maidu, Plumas Underburn Cooperative, and Meadow Valley Fire Department. Similar to my research findings, Carter (2005) found that collaboration is a widely accepted method of improving the efficiency and of forest management, often leading to rapid change. If stakeholders were to meet bi-monthly, for example, there would be a platform to consistently discuss and potentially align current and future projects, and offer resources and aid to other stakeholders. In a study of 671 stakeholders involved in collaborative projects with the Forest Service, participants routinely cited continued interaction and ease of contact as necessities for successful collaboration (Schuett 2001).

Meetings may seem like an obvious solution in theory; stakeholders just need to gather together more frequently. "For that collaboration to work you have to have that passion and you've got to be willing to work those extra hours and go to those extra meetings," says Dvorak. An effective problem-solver and collaborator must know how to forge genuine partnerships with others and be prepared to invest considerable effort in making these partnerships work. It is ambitious to expect stakeholder engagement to increase in the midst of a myriad of problems: pay that does not reflect the cost of living, unprecedented high-severity wildfires, high employee turnover, and more. It is unrealistic for employees to "work those extra hours and go to those extra meetings" when they are taking on the workload of multiple people, worried about paying rent next month, and lacking important experience. This can be a big ask, especially for USFS employees. Asking employees to go the extra mile and attend collaborative stakeholder meetings, especially when meetings may happen outside normal work hours, is asking a lot of underpaid and overworked employees.

There have been attempts at collaborative forest management meetings and programs in the past, and although mostly successful, these attempts have highlighted areas of management still in great need of change. The Collaborative Forest Landscape Restoration Program (CFLRP) was established by the USFS in 2009 "to encourage collaborative, science-based ecosystem restoration of priority forest landscapes" (United States Forest Service 2023). The CFLRP has been successful in many ways, providing an example of collaboration that should be motivation to continue the sharing of goals and projects among stakeholders. The CFLRP increased the ability to complete work and improved trust between stakeholders, as well as decreased conflict and legal

action against stakeholders. However, the CFLRP is still affected by many of the same issues currently experienced in Plumas County: employee turnover, understaffing, and the extra hours of effort required to facilitate collaboration (McIntyre and Schultz 2020). These underlying problems must be addressed in order to successfully facilitate stakeholder meetings. Additionally, the CLFRP does not have any projects specific to Plumas County or its surrounding forest. Although the CLFRP may be impactful in other areas of the country, it has no direct impact in Plumas County. The stakeholders in Plumas County must take collective action into their own hands.

Another collaborative group, specific to Plumas County, is the Quincy Library Group (QLG). The QLG was highly concerned with timber practices and protection of the spotted owl, among other forestry related issues. Environmentalists and timber officials were frequently opposed, and the QLG is remembered by many as a controversial group (personal observation). Though the controversy of the QLG may be a reason for current stakeholder reluctance, the group was formed before California was ravaged by wildfires hundreds of thousands of acres in size, on a near yearly basis. That is not to say that wildfire mitigation was not taken into consideration, only that the extensive wildfires that we see today had not yet been experienced. Collaboration can and should be further attempted as a solution to forest management now, as today's stakeholders are facing new issues that unite them towards common goals. The context in which the QLG was formed is vastly different from the context of forest management today. The worst case scenario – wildfires hundreds of thousands of acres in size – had not yet been realized. The binding issue of wildfire is now at the level needed for stakeholders of different affiliations and values to unite.

Influence of Policy on Projects

The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) were both described in interviews as having necessary and important environmental review processes. Both of these acts require the publicization of the environmental impacts of proposed projects. Following this is a public comment period. Public comments have the potential to alter or halt a proposed project. The fastest environmental assessment usually takes about two years (M. Hall, personal communication, 1/23/24). Both NEPA and CEQA were passed in 1970 and developed in a very different context than current resource management. An antiquated policy does not require elimination, but does necessitate constant updates. The general consensus among

interviewees is that although environmental review should take place, there are new scenarios in forest management that necessitate a change in these policies. If forest managers only have a matter of 1 to 2 years to restore a post-fire landscape, their projects will not be implemented in a timely manner if that 1 to 2 years is spent on an extensive environmental review. Four interviewees explicitly said that there need to be new exceptions made to NEPA and CEQA, specifically when completing projects with wildfire mitigation or restoration in mind. NEPA and CEQA have not been updated recently enough to reflect the current state of forest management.

Policy Modifications Provide Mitigation

NEPA and CEQA were the two most commonly mentioned policies from all stakeholders. An anonymous USFS silviculturist in Plumas County describes the public comment period as a "double-edged sword". Citizens have the right to share their opinions, but they often have very different ideas of how the land should be managed. If enough people object to a project, it must be revised, and sometimes even stopped. In a study of 16 Forest Service employees, Hoover and Stern (2014) found that employees "cringe" when they have to do an environmental impact statement or environmental assessment. Understaffing and an unmanageable workload were two of these reasons why these assessments were viewed so negatively, and many employees dreaded the time consuming public comment process. Environmental review is extremely important, as all projects should be evaluated to produce the least detrimental environmental impact possible.

Environmental review quickly becomes a barrier in instances of post-wildfire restoration, when stakeholders only have a year or two to implement a project. More specifically, after a high-severity wildfire, there are only 1 to 2 years to complete work before the forest is effectively lost forever (J. Pangburn, personal communication, 10/10/23). Standing dead trees provide fuel for another high-severity fire, and shrubs and grasses grow so quickly after fires that tree saplings may never have a chance to return. If NEPA and CEQA take an average 2 years to complete (Hoover and Stern 2014), the critical 1 to 2 year window for implementing forest restoration is lost. Environmental compliance processes can jeopardize projects that would overall benefit an environment (Carlin and Farabee 2011).

One solution to this problem is the expansion of categorical exclusion. Categorical exclusions are categories of projects that do not require a standard environmental review process.

If a project meets the designated design features of categorical exclusion, there is no objection process typical of a standard environmental assessment. There is still public comment, but the project can only be stopped if the agency conducting the project gets sued (anonymous USFS employee, personal communication, 1/24/24). Categorical exclusions can expedite environmental reviews, making the process easier on employees and allowing projects to be implemented more quickly. Scott (1991) argued that many cases of categorical exclusion undermine NEPA and stifle public comment. This argument makes sense in many cases, especially in instances of forest management unrelated to wildfire restoration. It is still important that the NEPA process be followed, but this process needs to be swifter for projects in a burned landscape. If more post-fire restoration projects were to fall under categorical exclusion, landscapes that have burned at high-severity can be treated before it is too late. The current categorical exclusions related to wildfire treatments do not sufficiently reflect the state of forest management today, both with small project size and limited project types (Table 2).

Table 2. Categorical exclusions related to post-wildfire projects and restoration. Although recently amended, these categorical exclusions would be more effective if activity size (acreage) was increased and more activity types fell under each exclusion category.

Categorical Exclusions, Title 7, § 220.6(e)	Year Amended
(11) **Post-fire rehabilitation** activities, not to exceed **4,200 acres** (such as tree planting, fence replacement, habitat restoration, heritage site restoration, repair of roads and trails, and repair of damage to minor facilities such as campgrounds), to repair or improve lands unlikely to recover to a management approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire.	2024
(13) **Salvage** of dead and/or dying trees not to exceed **250 acres**, requiring no more than 1/2 mile of temporary road construction. The proposed action may include incidental removal of live or dead trees for landings, skid trails, and road clearing.	2024
(25) Forest and grassland management activities with a primary purpose of meeting **restoration** objectives or increasing **resilience**. Activities to improve ecosystem health, resilience, and other watershed and habitat conditions may not exceed **2,800 acres**.	2024

Expanding categorical exclusion to encompass all restoration projects under 20,000 acres, for example, would allow the Forest Service (and other stakeholders) to treat more significantly sized landscapes without having to complete a slow environmental review process for every project in every instance. This would allow for more timber to be salvaged before another fire, for more saplings to be replanted before grasses and shrubs dominate, and more stands to be quickly thinned to protect nearby communities. These types of projects under do have the potential to cause some amount of environmental impact, but compared to wildfires like Dixie and North Complex, these impacts are necessary and worthy of categorical exclusions in order to prevent another destructive wildfire from occurring.

Expanding or revising categorical exclusions does require an extensive process to be undertaken by the USFS. After drafting a proposed categorical exclusion, federal agencies must (1) consult with the Council on Environmental Quality (CEQ), (2) coordinate with other federal agencies conducting similar projects, (3) publish the proposed exclusions for public comment, (4) obtain the CEQ's written determination of conformity with NEPA, and (5) publish the new categorical exclusion(s) to be available to the public (NEPA CE Guidance 2010). This process

would likely take years; a daunting endeavor for agencies already suffering from other problems, but the years spent expanding categorical exclusions would ultimately be worth it.

Mixed Use Management

Throughout stakeholder interviews, short-term and long-term solutions to forest management issues became apparent. One short-term solution with potential for large-scale impact is partitioning off certain landscape projects with one or two management purposes; it is exceedingly difficult to manage landscapes for mixed use. "NEPA encourages us to do multiple use, and multiple use is extremely challenging. How do you manage potentially conflicting uses in the same project?" asks an anonymous employee of the United States Forest Service. The same employee provides a more specific example: managing fuels and soils in the same project. Managing fuels would mean reducing the fuel load in a landscape to decrease the likelihood of a high severity wildfire. This would require removing underbrush, fallen branches and needles, and any other natural material on the forest floor. In contrast, managing soils would require these biomaterials to be left where they are, allowing them to decompose and replenish nutrients in the soil. These two management goals are both valid and "correct" from a forest health perspective, but they perfectly conflict with one another. To manage for both of these uses concurrently means that neither use would get the full treatment that it deserves (anonymous USFS employee, personal communication, 1/24/24).

Streamlining Mixed Use

Subsequently, if stakeholders (especially the Forest Service as arguably the biggest actor in Plumas County) were to manage more landscapes for only one or two uses, especially uses that overlap, the efficiency and efficacy of management projects would greatly improve. For example, managing for fuel reduction and forest restoration is often successful, as both promote forests that are less dense and more variable in vegetation types (Stephens et al. 2021). If stakeholders were to designate a hierarchy of management objectives, projects would be streamlined. This is not to say that all forest management projects should be simplified, only that if more projects, especially wildfire mitigation and post-wildfire restoration projects, were consolidated to one or two uses,

the speed and efficiency of such projects would improve. More acres need to be treated at a much faster rate to properly address wildfires and a changing climate.

Local Stakeholder Success

I found that local agencies and private timber companies succeeded in implementing forest management projects more rapidly than larger agencies, especially when compared to the USFS. Local agencies are often able to plan and begin projects on a significantly shorter timeline, one of the biggest reasons being that they do not suffer from the same bureaucracy as the USFS. Each local agency interviewed was involved with at least several management projects at once, many of which included collaboration with another stakeholder. Every local agency was also especially concerned with community protection, engagement, and improvement. Local agency success is also partially due to the fact that these agencies are able to complete NEPA and CEQA more quickly. The average NEPA environmental assessment takes approximately 2 years, a timeline consistently achieved by local agencies, but more infrequently achieved by the USFS. Additionally, private timber companies do not have to conduct standard environmental review processes that other stakeholders complete, allowing them to start and finish projects more quickly than other stakeholders. After a wildfire, this is extremely advantageous, as these companies can begin salvage logging and replanting days after a fire has burned through an area.

Investment in Local Stakeholders

A long-term, ongoing solution, requiring reorganization at the local and federal level, is to facilitate more collaboration with local stakeholders. One way to initiate this collaboration is increasing the contracting ability of the United States Forest Service. As the largest forest management entity in Plumas County, increasing the contracting ability of the USFS would allow the agency to work on more projects with other stakeholders, and complete those projects in a timely manner. Many local agencies, like the Feather River Resource Conservation District (FRRCD), can act as lead agencies when completing an environmental review. The FRRCD can take on the bulk of the environmental review process, allowing Forest Service employees to work comfortably on other projects at the same time. Local agencies would also be involved in more

large-scale projects, benefiting the forest and surrounding communities, giving employees invaluable experience, and continuing to boost the quality and efficacy of the stakeholders themselves. In order for this collaborative investment to happen, the USFS would need to hire more employees. The USFS simply does not have the capacity to increase its contracting ability without major changes to incentivize its employee base. My findings are in opposition to Robson and Kant 2007, who found that local stakeholder collaboration with a government agency had time and energy investments that might not be worth the effort. That said, the interviewees in Plumas County described the time and energy of collaborative investments to be necessary and worthwhile.

Another local stakeholders investment to be made surrounds the funding of projects. Large funds of forest management money needs to be allocated consistently; the disaster cycle must not be the only way to receive substantial funding. There is a significant lack of financial support for wildfire prevention, far less than the amount being used to fight the fires (L. Hall., personal communication, 2/14/24). The Dixie and North Complex Fires ultimately cost hundreds of millions of dollars to fight, far more than any amount of money spent on wildfire mitigation and forest restoration projects. "Post Dixie [wildfire] there was such a need [for funding] that we took quite a bit of state money without needing to do anything competitive," says Michael Hall of the Feather River Resource Conservation District. Although the large influx of funding after a devastating wildfire is extremely helpful to restoration projects, money needs to be invested into the landscape before these fires strip the land of life. "In other cases, we go through the standard competitive process, with more regular competitive grants than direct awards," Hall adds. Making funding more accessible in general, rather than after an extreme wildfire allows stakeholders to implement preventative measures (via forest management projects) before a wildfire occurs, rather than after an entire landscape has been reduced to ash.

As a state agency, CALFIRE provides many forest management and wildfire mitigation grants. Several local agencies in Plumas County are currently using funding from CALFIRE or have received funding from the agency in the past. Boosting CALFIRE presence in Plumas County could not only increase the likelihood of funding opportunities for local agencies, but would also provide more manpower for various forest management projects, especially prescribed burning. "We want fire stations here to be able to serve the public and have more fuel reduction presence," comments Jonathan Pangburn of CALFIRE. "But until there's a public push, to force the legislature

to deal with this, it's not a high priority. Having said all of that, there are some proposals within my department to try to make it happen."

Strength of Plumas County

It is of the utmost importance to highlight the passion and commitment of the stakeholders in Plumas County. Hope and determination to enact change resonated throughout each interview. It was extremely apparent that the interviewees care deeply about Plumas County and are motivated to save the forest and the community. Change is possible!

Limitations and Future Directions

It is important to note that some opinions and viewpoints are absent from this research; my study population did not include a representative from every forest management stakeholder in Plumas County. A notable stakeholder missing from my research is Sierra Pacific Industries (SPI). SPI is the largest private landowner in California (San Francisco Chronicle 2023), and controls a significant portion of the timber market in Plumas County and California. Being unable to include the views of the largest wood-processing entity in the county creates a gap in my research. Interestingly, contacting SPI and receiving no response is a common experience among stakeholders, not just an experience unique to my own research.

If I were to take this research further, I would interview more, if not all, of the stakeholders in Plumas County. I would also want to include the views and opinions of local community members, as forest management projects are often happening in their backyards. Additionally, my research could be strengthened by a more in-depth policy review. My current review of policy focuses on NEPA and CEQA, as these policies were the most frequently mentioned during interviews. Other relevant policies, like the Endangered Species Act, National Historic Preservation Act, and the 2012 Forest Planning Rule could also be examined.

Broader Implications

This study provides insight into the complicated world of land use and resource management. Forest management is a particularly challenging facet of resource management, as stakeholders are in an ever growing race against wildfires to fortify the land before it burns. Although my research focuses on one specific county, it highlights implications for forest management as a whole. As a federal agency, the United States Forest Service is responsible for the efficiency and efficacy of forest management on the most amount of land. The majority of problems discussed throughout my thesis have USFS shortcomings as a common theme. Mitigating issues surrounding the USFS requires major change at the federal level. Although there are improvements to be made to the USFS specifically in Plumas County, many of the solutions discussed would require federal support, such as the expansion of categorical exclusion and an increase in the contracting ability of the Forest Service. Investing more in local management agencies and stakeholders would require reorganization at the local, state, and federal levels. The level of reorganization required would depend on what tactics are used for systems' change. Hosting more collaborative meetings would require reorganization at a local level, while investing more money into local agencies would be boosted by support from the State of California. In practice, many of the solutions that my research identified may be difficult to implement; degree of difficulty should not diminish their potential impact.

ACKNOWLEDGEMENTS

I would first like to thank all of the interviewees that agreed to take part in my research. Without them, none of this work could have happened. A huge thank you to Brandon Collins, my thesis advisor, who provided invaluable guidance and advice for the past year. I would also like to thank Jessica Craigg and Patina Mendez for their support throughout my thesis classes. Another big thank you to my mom, Amy Duganne, for her tireless editing of my writing. Finally, I would like to thank Jim and Roxie Esterle, Gillian Balk, Nate Alisago, and Xavier Banson, the family and friends that listened to me talk about this research for hours on end.

REFERENCES

About Plumas County | Plumas County, CA - Official Website. 2024. https://www.plumascounty.us/186/About-Plumas-County.

Antuma, J., B. Esch, B. Hall, E. Munn, and F. Sturges. 2014. Restoring Forests and Communities.

Borhani, M. T. 2011. Land Reclamation, Culture, and Language Revitalization in Mountain Maidu Country.

Busenberg, G. 2004. Wildfire Management in the United States: The Evolution of a Policy Failure. Review of Policy Research 21:145–156.

Cal. Pub. Resources Code § 4513.

CALFIRE. 2021. 2021 Fire Season Incident Archive | CAL FIRE. https://www.fire.ca.gov/incidents/2021.

Carlin, N., and D. Farabee. 2011. CEQA Streamlining Legislation: Some Small Steps Forward, but No Giant Leap. Natural Resources.

Carter, J. 2005. Recent experience in collaborative forest management: a review paper.

Chang, C. 1996. Ecosystem Responses to Fire and Variations in Fire Regimes

Dicus, C., and K. Delfino. 2003. A Comparison of California Forest Practice Rules and Two Forest Certification Systems.

Dixie Fire | CAL FIRE. . https://www.fire.ca.gov/incidents/2021/7/13/dixie-fire/.

Endangered Species Act | U.S. Fish & Wildlife Service. 1973, December 28.

Executive Office of the President Council on Environmental Quality. 2010. Establishing, Applying, and Revising Categorical Exclusions under the National Environmental Policy Act

Forest Practice | CAL FIRE. https://www.fire.ca.gov/what-we-do/natural-resource-management/forest-practice.

Hartsough, B. R., S. Abrams, R. J. Barbour, E. S. Drews, J. D. McIver, J. J. Moghaddas, D. W. Schwilk, and S. L. Stephens. 2008. The economics of alternative fuel reduction treatments in western United States dry forests: Financial and policy implications from the National Fire and Fire Surrogate Study. Forest Policy and Economics 10:344–354.

Hoover, K., and M. Stern. 2014. Constraints to public influence in US Forest Service NEPA processes. Journal of Environmental Planning and Management 57.

Huynh, M. United States Forest Service. Personal communication. 2024, January 24.

Juska, A. Collins Pine. Personal communication. 2023, October 10.

Leonard, C., and E. Stiefel. 2023, November 2. California's biggest private landowner is also the largest in the U.S. Here's what it controls.

Leverkus, A. B., B. Buma, J. Wagenbrenner, P. J. Burton, E. Lingua, R. Marzano, and S. Thorn. 2021. Tamm review: Does salvage logging mitigate subsequent forest disturbances? Forest Ecology and Management 481:118721.

McIntyre, K. B., and C. A. Schultz. 2020. Facilitating collaboration in forest management: Assessing the benefits of collaborative policy innovations. Land Use Policy 96:104683.

Meet the Forest Service | US Forest Service. 2023. https://www.fs.usda.gov/about-agency/meet-forest-service.

National Association of Forest Service Retirees. 2019. Increasing Workforce Capacity to increase the pace and scale of restoration on national forest system lands.

National Historic Preservation Act | Advisory Council on Historic Preservation.
Our Organization | CAL FIRE. https://www.fire.ca.gov/about/our-organization.

Owen, D. 2002. Prescriptive Laws, Uncertain Science, and Political Stories: Forest Management in the Sierra Nevada.

Prestemon, J. P., D. N. Wear, F. J. Stewart, and T. P. Holmes. 2006. Wildfire, timber salvage, and the economics of expediency. Forest Policy and Economics 8:312–322.

Robson, M., and S. Kant. 2007. The development of government agency and stakeholder cooperation: A comparative study of two Local Citizens Committees' (LCCs) participation in forest management in Ontario, Canada. Forest Policy and Economics 9:1113–1133.

Sax, J. L. 1973. The (Unhappy) Truth about NEPA Enrichment Series. Oklahoma Law Review 26:239–248.

Schuett, M. 2001, January 1. Making it work: Collaboration in natural resource management. https://www.researchgate.net/publication/260969805_Making_it_work_Collaboration_in_natural_resource_management.

Scott, M. L. 1991. Defining NEPA out of Existence: Reflections on the Forest Service Experiment with Case-By-Case Categorical Exclusion The Endangered Species Act: The Northwest Power Act: Forest Service Planning. Environmental Law 21:807–838.

Stephens, C. W., B. M. Collins, and J. Rogan. 2020. Land ownership impacts post-wildfire forest regeneration in Sierra Nevada mixed-conifer forests. Forest Ecology and Management 468:118161.

Stephens, S. L., M. A. Battaglia, D. J. Churchill, B. M. Collins, M. Coppoletta, C. M. Hoffman, J. M. Lydersen, M. P. North, R. A. Parsons, S. M. Ritter, and J. T. Stevens. 2021. Forest Restoration and Fuels Reduction: Convergent or Divergent? BioScience 71:85–101.

Stephens, S. L., L. Hall, C. W. Stephens, A. A. Bernal, and B. M. Collins. 2023. Degradation and restoration of Indigenous California black oak (Quercus kelloggii) stands in the northern Sierra Nevada. Fire Ecology 19:12.

U.S. Census Bureau QuickFacts: Plumas County, California. 2023. https://www.census.gov/quickfacts/fact/table/plumascountycalifornia/PST045223.

APPENDIX A: Interview Questions

Standardized Questions	Example Follow-Up Questions
What is your name, position, and how long have you been involved with [your stakeholder group]?	Do you have any personal goals or beliefs you would like to share?
What is [your stakeholder group's] main purpose, mission statement, goals, and/or belief system?	
Please list some current projects you are involved with, especially (if applicable) related to Dixie and North Complex fires.	Can you elaborate on the timelines of these projects? How have environmental review processes affected these projects?
Have you collaborated with other agencies/organizations/stakeholders in the past or currently? What worked? What didn't?	Are there any stakeholders you are trying to start working with?
Do you have any recommendations for improving stakeholder collaboration?	
Do you think agency collaboration is a solution to more effective forest management? If not, what do you think it is?	
Is there anything else you would like to add? Any other information that you think is valuable to this study? This does not have to be something previously discussed.	

Figure A1: Standardized interview questions with example follow-up questions. Each interviewee was asked to answer 7 standardized questions. As these questions were answered, follow-up questions unique to each conversation were asked.