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Forests on the Edge: Forest Restoration and Concepts of Nature in Northern New Mexico

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FORESTS ON THE EDGE:
FOREST RESTORATION AND CONCEPTS OF NATURE IN
NORTHERN NEW MEXICO

BY

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B.A., RELIGIOUS STUDIES, POMONA COLLEGE, 2007
M.S., GEOGRAPHY, UNIVERSITY OF NEW MEXICO, 2017

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ABSTRACT

Dozens of catastrophic forest fires have impacted New Mexican communities over the last two decades, threatening humans, property, and livelihoods. Ecologically, forest systems are stressed by historically unprecedented tree density, drought, increased temperature, and dwindling ecological diversity, further increasing fire danger. An increasingly common response to these threats is to actively manage New Mexico's forests using mechanical tree thinning and prescribed fire, with a goal of "restoring" forests to a healthier ecological state. Restoring forests is both a scientific and cultural act. While the science is well studied, land managers often struggle to understand how human values impact forest restoration decisions, and how those values differ from one community to the next. This paper examines a restoration project in La Cueva, New Mexico, a community that is debating whether and how to restore forests near their homes. Qualitative interviews with La Cueva residents and forestry professionals reveal that conflicting concepts of "nature" influence how individuals define successful forest restoration and beliefs about what (if anything) should be done to manage nearby forests.

Table of Contents

List of Figures

List of Tables

FORESTS ON THE EDGE:
FOREST RESTORATION AND CONCEPTS OF NATURE IN NORTHERN NEW MEXICO

1) Introduction

Over the last two decades, dozens of New Mexican communities have been impacted by wildfire, which threatens human lives, property, and economic systems that rely on forests. Water, already a scarce resource in the arid Southwest, is also under threat: when large tracts of forest burn, watersheds retain less water, and flooding becomes more common (Cannon & DeGraff 2009; Mueller et al. 2013). Fires endanger cultural systems as well. Many New Mexicans live in or near forests, and their cultural identities and economic livelihoods are often tied to the trees (Correia 2005; Egan 2012).

An increasingly common response to these threats is to actively "restore" New Mexico's forests (Allen et al. 2002). In New Mexico's forests, restoration usually takes two forms, mechanically thinning trees and prescribed burning. Specific strategies vary from project to project, but the restoration goal is generally the same: to increase forests' resilience to wildfire, drought, disease, and climate change, and in turn to increase the resilience of the social systems connected to those forests.

In practice, forest restoration is rarely as simple as cutting select trees and burning the understory on a cool autumn morning. Some biologists and environmental ethicists debate whether we should try to restore forests at all (Katz 2003; Elliott 2003; Ring 2009). Moreover, there is a persistent, lingering question at the heart of each restoration project: *restore to what*? In some cases, restoring a forest to what it looked like 100 or 200 years ago is impossible or prohibitively expensive. In others, climate change makes

future conditions difficult to predict. In all cases, cultural values play a role, often outweighing ecological issues. People are concerned about job opportunities, tourism, recreation, water security, hunting, agriculture, aesthetics, and property values. The choice to restore a forest, while ostensibly rooted in the physical sciences, cannot help but reflect human values.

This research examines a restoration project in La Cueva, New Mexico, a community that is debating whether and how to restore forests near their homes. Qualitative interviews with La Cueva residents and forestry professionals reveal conflicting concepts of "nature" that influence how individuals define successful forest restoration, and their beliefs about what (if anything) should be done to manage nearby forests. By building on the work of Marcus Hall and others, this research seeks to explain how different conceptions of "nature" can have a tangible impact on forest restoration projects in a community like La Cueva (Hall 2005).

Background: Forest Restoration in New Mexico

For decades, scientists have conducted restoration ecology research on forests in the American Southwest. As a result, there is a sound and growing understanding of forest ecology and the effects of restoration on individual species (Horncastle et al. 2013; Okin 2015; Jacobs 2015; Ouzts et al. 2015). From this research, we understand that forests are essential for the health of water supplies, timber supplies, food supplies, and tourist economies. We also know that many of our forests are struggling after decades of over-logging, overgrazing, and fire suppression (Friederici 2003).

Scientists have identified millions of acres in need of restoration to prevent disastrous forest fires and sustain local economies (Allen et al. 2002). There are multiple

forest restoration projects underway in New Mexico, funded by both public and private organizations, including the U.S. Forest Service, the Santa Fe Fireshed Coalition and The Nature Conservancy's Rio Grande Water Fund (Bradley 2009; Egan 2014; The Nature Conservancy 2016).

Several authors have studied the social-ecological complexities of Southwestern forests, though not necessarily from a restoration perspective (Roybal & Benson 2012; Daniels & Wright 2015). Kosek (2006) examined the complex relationship between the federal government, which manages large swaths of National Forest land in New Mexico, and Native and Hispanic communities. In one chapter of his book, *Understories,* Kosek highlights local anger at the government for promoting, through Smokey Bear, a narrow and racist symbol of what it means to be an American.

Other researchers have studied New Mexicans' attitudes toward fire and whether those attitudes are malleable (Franklin et al. 2014; Gottfried 2009; Ryan 2008; Goldstein 2012). Others have argued that ecological restoration can jumpstart a flagging forestry sector in New Mexico, especially with the assistance of the federal government's Collaborative Forest Restoration Programs (Egan 2012; Egan 2014). Several journalists have reported on landscape-scale restoration projects with a critical eye (Ring 2009; LaMonaco 2014).

Relatively little research, however, has been conducted on the social components of ecological restoration in New Mexico, and it is unclear whether practitioners' goals match the goals of residents that stand to benefit from large-scale restoration projects. For example, in collaborative meetings of the Santa Fe Fireshed Coalition, forestry professionals expressed frustration at not being able to communicate with landowners about forest health (personal observation, March-April 2016). My research helps to

identify and explain these gaps in understanding through a case study of the small New Mexican community of La Cueva.

This thesis is divided into four sections: a summary of the case study location, a literature review, a methods section, and a manuscript. The manuscript contains the results of the research project and a discussion that ties those results to the literature review. The manuscript is designed for submission to an academic journal, in which case it will include condensed versions of the literature review and methods sections.

La Cueva, New Mexico: A Case Study

The communication is going to be slow. It takes time to build relationships, it takes time to build trust with those communities, with those individuals and understanding them, and really learning the, what I like to call the personality of the community. (Forestry professional, Santa Fe County)

This research project aims to understand the personality of La Cueva, a small community in northern New Mexico, and the forestry professionals working in and near that community. Specifically, I investigated to what extent the restoration goals of forestry professionals match the restoration goals of La Cueva residents. While La Cueva is not representative of all semi-rural New Mexico communities—most people in this study are white, over 50 years of age, and have moved to La Cueva in the last 20 years— understanding residents' attitude toward restoration is likely to inform management decisions in similar communities around the country.

La Cueva is in Santa Fe County, about 15 miles southeast of the city of Santa Fe (figures 1 & 2). There are approximately 60 households in the community, sitting on lots between five and forty acres in size.

Figure 1: La Cueva detail map

Figure 2: Central New Mexico map

La Cueva is a wildland-urban interface (WUI) community, and using Paveglio's WUI community archetypes, could be categorized as a "high amenity, high resource WUI community" (figure 3). The Santa Fe National Forest sits to the north and west of La Cueva, and there is a 133-acre satellite section of National Forest land on the southern end of the community known as Block E. There is only one road, Forest Road 375/63A, into La Cueva, and it passes through Block E. Block E is primarily ponderosa and piñon-juniper woodland. According to local residents, it was thinned about 50 years ago. The USFS has proposed a thinning project on Block E to improve forest health and reduce wildfire risk along the road.
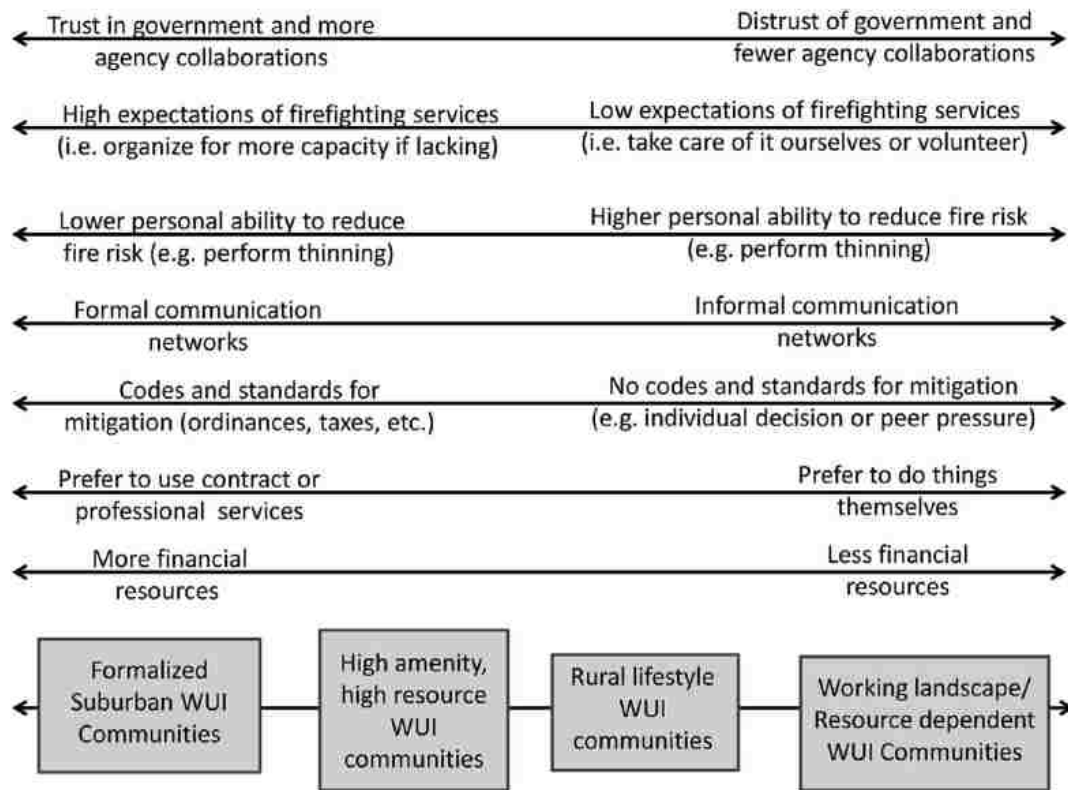
Figure 3: Continuums characterizing different characteristics among WUI archetypes. La Cueva is best characterized as a "High amenity, high resource WUI community" (from Paveglio et al. 2015)

This thinning proposal is part of Collaborative Forest Restoration Program (CFRP) proposal 21-14, sponsored by Santa Fe County Fire, with a primary goal of reducing wildfire risk for La Cueva residents (CFRP 2014). Several organizations have been involved in the planning, recommendations, and potential implementation of this thinning project, including the U.S. Forest Service, Santa Fe County Fire, Forest Stewards Guild, New Mexico State Forestry, and the Santa Fe Fireshed Coalition.

The proposal has triggered heated debate within the La Cueva community about whether and how the thinning project should be implemented. While many residents are in favor of the Block E plan, there is strong resistance to the proposal, so much that a

group of residents created a website (www.lacuevaguardians.org) and submitted a petition to the Forest Service outlining their concerns (see Appendix B).

The Forest Service argues that Block E needs additional thinning to reduce tree density from approximately 520 trees per acre to 30-60 trees per acre (Appendix A). A vocal minority of La Cueva residents have publicly lobbied against the proposal, calling it too drastic and claiming it will harm forest health. Other La Cueva residents and forestry professionals are in favor of the proposal because it would reduce wildfire risk and, they argue, improve forest health. Interviews revealed several differences in how these two groups, those in favor of the Block E plan and those opposed to it, approached the idea of forest restoration. Each group expressed distinct underlying ideas of what "nature" is, or what it means for a forest to be "natural," and those ideas influenced their answers to questions like "*restore to what*?"

2) Literature Review

This research overlaps with the ecological literature on forest restoration, but focuses instead on the human and cultural side of ecological restoration in New Mexico. Climate change and the risk of catastrophic fires pose a substantial threat to forest ecosystems and the thousands of New Mexicans who rely on those forests for water, wood, and income. This research is heavily informed by the **nature and society** literature in geography, which draws on several academic fields to critique the act of restoration and highlight the role of cultural factors in restoration decisions. Within the study of restoration, the **political ecology** literature demonstrates how restoration is *performed* in order to accomplish tasks, often at the expense of certain groups of people. **Restoration ecology** scholars focus on the human side of restoration projects, and how human values overlap with the ecological goals of restoration projects. The **environmental psychology** literature adds to the discussion of how restoration is performed, and what motivates people to do restoration in the first place.

2.1 Nature and Society

Geographers have a long history of studying the relationship between the natural world and the human world, or between nature and society. Defining the terms "nature" and "society," however, has proven a difficult task. Some argue there is no such thing as nature, or that nature means so many different things to different people that it lacks any coherent definition, and instead exists in the world of metaphors and icons. Scholars in this field strive to understand the meanings behind words like "nature" and "society," challenge dualistic attitudes that separate humans and the non-human world, and question

the authority of science (Harvey 1974; Cronon 1995; Castree 2014).

Until about fifty years ago, the word "nature" was squarely in the realm of the natural sciences. This changed, at least in the U.S., coincident with the environmental movement in the 1960s and 1970s, which highlighted the social costs of unfettered economic growth (Meadows et al. 1972). Around the same time, arguments against biological determinism warned of the social and moral consequences of suggesting that individual differences are "natural" and therefore inevitable and unchangeable (Sahlins 1976; Lewontin et al. 1984). Scholars questioned the often *unquestioned* authority of scientific data. Still today, nature-society scholars challenge the authority of the natural sciences while maintaining a healthy respect for work done in those fields (Higgs 2005; Aberg 2013).

In many cases, the idea that "nature" exists separate from "culture" fosters a dualistic mindset. Nature-society scholars question that dualism, pointing to humans' tendency to spatialize nature as something "out there," external to society. Humans also temporalize nature, thinking of it as something of the past: if there are more people on the planet today who own more things and use more technology, there is therefore less nature now than there used to be (Castree 2014).

This dualistic mindset can have negative consequences both ecologically and socially. For example, fire suppression, supported in part by the idea that fire was usually "unnatural" and damaging to forests, was the official policy of the U.S. Forest Service for many decades. Scientists know now that this practice increased forest density, which in turn increased the likelihood of "unnaturally" (as in, historically rare) large fires (Friederici 2003). Socially, scholars have challenged the idea that the Americas existed in a "wilderness state," pristine and untouched by humans, prior to European arrival, an

example of the tendency to temporalize the concepts of nature and wilderness (Denevan 1992; Mann 2005).

Americans have used the concept of "wilderness" to signify different things and accomplish different tasks. In his seminal 1967 book, Robert Nash traced the evolution of Americans' attitudes toward wilderness, including early settlers who viewed wild places as evil and in need of domination, Thoreau's Romantic philosophy, Theodore Roosevelt's "Wilderness Warrior" image, and 20th century environmentalism (Nash 1967). In the 1990s, William Cronon and others confronted the idea that wilderness—nature at its purest and healthiest state—can reinforce the dualism between nature and society, leaving little room for humans and nature to coexist (Cronon 1995; Nelson & Callicott 1998).

Nature and society scholars, in short, ask fundamental questions like "what is nature?" The answer, of course, varies across space and between cultures. However, much of the nature-society scholarship is theoretical, ignoring how concepts like "nature" and "society" impact local issues and local populations. The anthologies that address the human side of restoration are heavy on theory but light on practice. Rarely do they incorporate case studies, and when they do, there is little work addressing the American Southwest (Throop 2000; France 2008; Egan, Hjerpe, & Abrams 2011).

2.2 Political Ecology

Nature and society scholars destabilize the dualism between the natural and the cultural. They also show how conceptions of nature can *perform* differently. Because of this, their work overlaps with political ecologists by asking how people use the *idea* of restoration to perform various tasks, such as how ecological restoration can reinforce

ideas that benefit one community or social group at the expense of another.

Political ecologists have coined the phrase "Conserve and Control" to explain how conservation is sometimes used to seize control of natural resources, often from a particular class, gender, or ethnicity, ostensibly in order to preserve a valuable "natural" environment (Robbins 2012). For example, government officials in New England have controlled the movements of local fishers through conservation measures that, in practice, wrest control of fisheries away from local residents (and, ironically, exacerbate levels of overfishing) (St Martin, 2001). Similarly, government foresters in Southeast Asia have controlled timber harvests, selling contracts to large companies with little or no benefit to local populations (Cruz et al. 1992; Kummer 1992). On a more positive note, people on the island of Cyprus are using conservation to allay decades-long tensions between Greek Cypriot and Turkish Cypriot communities (Grichting 2014).

Relatively few political ecologists have examined ecological *restoration* to the same extent as ecological *conservation*. Even so, by probing the terms "nature," "wilderness," and "conservation," political ecologists help us understand how "restoration" is performed to promote an agenda. Bliss and Fischer, in a case study about the role of Camas in Oregon, argue that the act of choosing a restoration "target" inevitably reflects and privileges certain patterns of human activity over others (2011). Salmon habitat restoration in the Pacific Northwest reveals the conflicting goals of environmentalists, farmers, and Native Americans (Breslow 2014).

In southern Ontario, environmentalists and First Nations people face similar questions about what it means to restore a landscape, a debate rooted in questions of scientific authority and centuries of xenophobia (Foster, 2009; Nayak 2011). In post-apartheid South Africa, the expansion of wildlife-based tourism has created tensions

between landowners and non-landowning farmers. Landowners have been accused of using restoration for their own economic gain at the expense of local farm dwellers (Brooks et al., 2011). Restoration can reinforce an economic system, such as Paul Rosgen's popular but controversial stream restoration work, which has been accused of promoting both pseudo-science and a neoliberal economic agenda (Lave 2012).

These examples show that ecological restoration is a malleable term, a concept that can be defined in myriad ways to perform myriad tasks. People in privileged positions can use restoration to promote a particular aesthetic, a certain lifestyle, or a convenient law, often at the expense of populations with less political power. Similarly, political ecologists question the authority of science to answer questions about when, where, and how we should restore a landscape. Rarely do they argue that science should be cast aside, but that ecological restoration should not be reduced to a purely biological science (Bliss & Fischer 2011). The social aspects of restoration matter greatly, and when they are ignored under the guise of an amoral scientific agenda, restorationists may fail in their attempt to restore degraded environments (Egan, Hjerpe, & Abrams 2011).

While some political ecologists have examined restoration issues, restoration is still a relatively new area of inquiry (Higgs 2003). Forest restoration is rarely studied using a political ecology lens, and there is very little research on the social aspects of New Mexico's forest restoration projects. It is unclear, for example, if restoration is politicized to perform various tasks, or if there are instances in which restoration projects are used to benefit certain people at the expense of others. There is little research that explains how the goals of restorationists in New Mexico, even well-intentioned ones, may obscure larger systems that privilege one conception of nature over another.

2.3 The Cultural Side of Ecological Restoration

Ecological restorationists actively engineer the world. Because of that, they are forced to wrestle with the idea that humans are intrinsically part of nature, inseparable from the environment in which they live. In this way, ecological restoration is both a human process and a scientific one. Ecological restorationists, in step with nature-and-society scholars, strive to break down the widely held dualism between humans and nature.

It is useful to distinguish between ecological restoration and restoration ecology (Higgs 2005). Restoration ecology is the biological science of understanding how ecosystems function and how we might go about restoring them or making them more resilient. Biological science helps to determine if an ecosystem is healthy and resilient. If an ecosystem is degraded, the science helps to explain how one might go about restoring it. Restoration ecology is a relatively new subfield of ecology, tracing its roots to the late nineteenth and early twentieth centuries in the Midwest U.S., where scientists and landscape architects worked to restore prairie ecosystems (Leopold 1949; Throop 2000). By the 1980s there was enough interest and research to found two journals in the field, *Restoration and Management Notes*, and *Restoration Ecology*.

However, restoration ecology does not explain what cultural factors are at play, whose conception of nature will be prioritized, where a group should focus their restoration efforts, or why anyone should bother to restore anything in the first place. Conversely, ecological restoration encourages biological research, but it also incorporates cultural, political, economic, and ethical concerns into restoration practice (Higgs 2005). Ecological restoration is, in a sense, a zoomed-out version of restoration ecology— scientific knowledge is still important, but cultural aspects also play a major role. For

example, Sarr and Puettmann (2008) advocate a three-part approach to forest management that incorporates social, economic, and ecological considerations. Similarly, some scholars visualize restoration as a Venn diagram that weighs three or more components to create multi-faceted restoration plans (Higgs 2003).

A design-oriented approach provides humans with a positive role in nature-society interactions, and presents an alternative to dualistic human-nature relationships (Weng 2015). Put differently, by advocating for human involvement in healing natural systems, some scholars in the ecological restoration movement are questioning ideas long held by the mainstream environmental movement (Tomblin 2009).

The meaning of the word "restoration," like the words "nature" and "wilderness," has changed over time. Historical geographers have uncovered how "restoration myths" vary across geography and across cultures by examining a critical component of restoration practice: restoration almost always relies on landscapes of the past. Scholars acknowledge that choosing a historical reference point is often arbitrary and reveals a culture's "restoration myth" or "nature myth" that guides restoration practice (Brown et al. 2004; Hall 2005).

For example, the Walden Woods site in Massachusetts has at times emphasized recreation opportunities for visitors, at times deemphasized recreation and focused instead on healthy ecosystem function, and at times focused on restoring Walden Woods to the landscape experienced by Thoreau and Emerson (Smith 2014). In England in the 1990s, an uproar over a proposed road near Twyford Down led residents to interpret "restoration" in different ways depending on their opinion of the road project (Eden 2002). In some cases, ecological restoration is used explicitly to accomplish social or personal goals. For example, residents living around coal ash disposal sites in Bosnia and

Herzegovina organized groups to clean up the waste in order to rekindle their bond to the landscape and each other. Their activism also created new economic opportunities for their community (Broto 2010).

These multi-faceted restoration models provide an alternative to simplistic human/nature approaches. They also serve to question the authority of science, especially when science is presented as a purely objective, amoral argument that boils down to "the science says this is what we should do." Ecological restorationists argue that science is not always amoral; it can contain and obscure economic or political motivations. For example, environmental managers might privilege scientific and engineering knowledge with the goal of exploiting natural resources for economic gain (Lave 2012; Aberg 2013). The goal of ecological restoration research is not to disparage science, but to cast healthy doubt on the objectivity and authority that comes with scientific data, and to make room in restoration practice for cultural considerations.

There are downsides and challenges to incorporating social factors into restoration. For example, prioritizing human values may lead restorationists to disregard scientific knowledge in places where it should be held in high regard. In some cases, volunteers focus on tangible results and see humans as an active part of the ecosystem who contribute to environmental health, while academic restoration ecologists focus on longer-term goals and invisible processes (Weng 2015). In studies of river restoration, many projects are labeled "successful" if they create positive public opinion around the work, regardless of any measurable ecological improvements (Bernhardt et al. 2007).

Similarly, practitioners working on landscape-scale, government-funded restoration projects in the American West have been frustrated with the "paradox of public involvement and equity of knowledge": as restoration projects become increasingly

16

complex, public opinion becomes problematic because few citizens have the scientific expertise to give pertinent criticism (Egan 2014). Allowing anyone to comment on and practice science can allow individuals without scientific training to shape and influence how science is practiced (Lave 2012).

In other words, there is often a gap between the goals of professional scientists and non-professional citizens, and there is little insight about how large that gap is or how to address it. Restoration is an ecological practice and a social practice, and while there are several well-established models for conducting ecological restoration, there are many fewer models to address the social outcomes of restoration projects (Bernhardt et al. 2007; Egan 2013; Lave 2013). Because of this gap, restorationists may not know if their own goals match those of local residents. This problem is particularly acute in New Mexico where there is little research addressing the role of human values in restoration projects, despite a long and contentious history over forest management decisions (Kosek 2006; Correia 2007).

2.4 Doing Restoration: Motivations and Impacts

To address the question of why humans do restoration, it is useful to look at our underlying motivations. In some cases, those motivations can be described in individual psychological terms. In others, those motivations reflect larger political or ethical systems; political ecology scholars provide a framework for this study. Sometimes psychologists and political ecologists end up asking the same questions: why humans are motivated to do restoration work, and how the practice of restoration impacts humans.

Clewell and Aronson (2006) offer a psychological framework for why humans are motivated (or not) to restore degraded ecosystems, divided into five categories:

a) Technocratic: undertaken by government or large institution. Can more easily manage large and complex endeavors, but runs the risk of being too authoritarian and losing public support

b) Biotic: often driven by biodiversity or endangered species concerns

c) Heuristic: trial-and-error, looking for previously unseen connections

d) Idealistic: emotional attachment to certain areas or species. Provides lasting intrinsic motivation, but often limited to small, uncomplicated projects

e) Pragmatic: ecosystem services, climate change impacts, economic impacts

As motivating tools, any of these approaches is inadequate by itself, and most restoration projects strive to incorporate multiple goals. Even so, this model helps scholars understand the motivations of people who practice restoration.

In the field of water management, restoration decisions often begin with well-engineered systems that maximize economic profit (Aberg 2013). Advocates for restoring eroded rangelands and burnt forests commonly focus on models that maximize stocking rates and board feet (Torell et al. 2014; Egan 2012; Wu 2011). These projects quantify, in dollars, the ecosystem services that would be improved through restoration (Mueller 2013). Their motivations are primarily pragmatic, aimed at improving the economic potential of waterways, rangelands, and forests. They are also technocratic, relying on large institutions to secure funding.

Others take an idealistic approach. In some cases, feelings of guilt motivate people to atone or seek redemption for environmental damage (Smith 2014). Jordan (1992) has suggested that people raised in Christian cultures are more likely to feel a need for environmental atonement. Emotional geographers have studied emotional connection to place, which can encourage restoration if that place becomes degraded (Urry 2005; Kerny & Bradley 2009).

The work of restoration ecologists is primarily a biotic and heuristic approach. As practicing scientists, they ask questions about ecosystem function, health, and resilience, and conduct heuristic experiments to answer those questions. From an ethical standpoint, improving ecosystem health—by restoring biodiversity or endangered species, for example—is sometimes considered an end in itself, regardless of its impact on humans (Bowles & Whelan 1994; Lirman & Miller 2003; Brown et al. 2004; Weng 2015). The question of when and where to actively restore ecosystems is assessed primarily through a scientific lens (Holl & Aide 2011).

Individuals motivated to do ecological restoration can usually identify multiple underlying motivations. For example, someone may be motivated to remove exotic species and restore native species for biotic reasons (to improve biodiversity and resilience) and idealistic ones (because of an emotional attachment to the way a place used to look) (Throop 2000). Others might study the effects of forest restoration to gain scientific insight (heuristic) and to jumpstart a local economy (pragmatic) (Egan 2012). While Clewell and Aronson's model is useful, in practice our motivations are rarely so neatly categorized.

One reason for doing restoration is rarely mentioned in the restoration literature: the psychological benefits of living in or near a restored landscape, as opposed to a degraded one. Scholars have studied the psychological benefits of *doing* restoration (Grese et al. 2000; Miles et al 2000). Other than this, however, the connection between the environmental restoration literature and the psychology literature is weak. This is despite an abundance of research showing individual benefits of spending time in a healthy "natural" environment, as opposed to a predominantly urban environment or a degraded "natural" environment (Pretty et al. 2005; Chawla 2014; McMahan & Estes 2015). Much

of this research extends from Wilson's idea of "Biophilia," and has led to well-developed

psychological theories such as attention restoration theory and stress-reduction theory

(Wilson 1984; Ulrich et al. 1991; Kaplan & Kaplan 2011). Scholars of ecological

restoration could do more to draw on this psychology literature to strengthen arguments

about our motivations to restore degraded ecosystems.

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3) **Methods**

3.1 Data Collection

I conducted qualitative, semi-structured interviews with people directly involved in forest restoration in and around La Cueva. Interviews consisted of standardized, open-ended questions, allowing for consistency across interviews and making responses easy to compare (Patton 2015). While a set of questions was consistent in each interview, I also used an "interview guide" approach that allowed me to create a conversational atmosphere and explore topics in greater depth as they arose (McCracken 1988). The interview guide approach was useful in probing certain subjects such as "restoration" or "wilderness," while maintaining a consistent list of questions and topics in each interview.

People fell into two main groups: natural resource professionals and residents of La Cueva who are not natural-resource professionals. I interviewed thirteen (13) professionals and ten (10) La Cueva residents. As I began interviewing La Cueva residents, it became clear that they fell into two distinct categories: those in favor of the Block E thinning proposal, and those opposed to it. Six (6) of the La Cueva residents were supporters of the Block E proposal, and four (4) were opposed to it. Most of the professionals lived in or near Santa Fe, and all were familiar with La Cueva and the forested area surrounding the community. All La Cueva residents in the study owned property in the community, and all but two lived there full-time.

Semi-structured interviews were a good fit for this project. This method allowed me to frame the discussion with a small set of predetermined questions, but also allowed the conversation to move in any number of directions. This was important when asking

about a topic like "forest restoration," a complex concept that means different things to different people. Giving interviewees the opportunity to speak freely enabled them to raise the issues most important to them.

To locate natural resource professionals, I used existing relationships with individuals from professional organizations such as The Nature Conservancy (TNC), Forest Stewards Guild, U.S. Forest Service, Santa Fe County Fire, and New Mexico State Forestry. Those professionals helped put me in touch with a small number of La Cueva residents. From there I used a snowball sampling method to find other La Cueva residents willing to speak with me (Patton 2015).

Additionally, I consulted textual sources to gain a deeper understanding of the debate. These sources were all publicly available, such as letters to the editor of the local newspaper, the *Santa Fe New Mexican*, and documents published by TNC about the Rio Grande Water Fund project. These documents were published between 2012 and the end of 2016. I analyzed a website, www.lacuevaguardians.com, created by La Cueva residents opposed to the Block E plan. The USFS has made available meeting notes about the Block E proposal and letters they have received from La Cueva residents, some in support of the proposal and some opposed to it.

3.2 Conducting Qualitative Interviews

All interviewees were over 18 and not part of a vulnerable population. I obtained consent both verbally and in writing (see Appendix C). Initially, I contacted interviewees via phone or email and asked if they were willing to participate in this study, gave them an opportunity to ask me questions about the research project, explained that their

responses will be anonymous, and made it clear that their participation is completely voluntary and there would be no repercussions for not participating. I conducted all interviews in person, and provided a written consent form, signed by all interviewees. Before beginning the interview, I again explained my research and how their answers may be used in my final manuscript, reminded them that their consent is voluntary and that they may refuse to answer any of my questions or end the interview at any time. Interviews lasted 30-60 minutes. All interviewees agreed to being recorded, and I later transcribed each interview. In the final text, the identity of each interviewee has been protected, aside from designating them "natural resource professionals" or "La Cueva residents," and I avoided using any quotations that might reveal their identity.

In conducting interviews, I was aware that I came to this project with my own assumptions and biases about restoration. I aimed to minimize those biases by using a scripted set of questions, divided into three categories (figure 4).

While these questions were consistent in each interview, I allowed the conversations to go in any number of directions depending on what the interviewee felt was worth discussing. I avoided follow-up questions unless I needed clarification or wished them to elaborate on a point (McCracken 1988). The goal was to understand how respondents think about forest restoration without much prompting, and to uncover the "indigenous categories" that people use to understand restoration as a concept (Patton 2015). I sought to uncover what restoration means to each person, what they value about the restoration process, and decipher how their values compare to each other.

To accomplish this, I took a relationship-focused approach and aimed to establish, as Patton puts it, "rapport through neutrality" (Patton 2015: 457). For example, I began each interview with a full disclosure of who I was, what I had already heard from both

sides of the Block E debate, and that I had no agenda other than to learn about the
interviewee's experience. While I aimed for a conversational tone, I kept to the scripted
questions unless I was asking simple follow-up or clarification questions (see Appendix
D for full list of interview questions).

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1) **Personal background and involvement with forest restoration**
    a. How long have you lived here? How long as your family been here?
    b. What do you do for a living? What background do you have in forestry, ecology, or environmental studies?
    c. Have you done any forest restoration work on your land? If so, how did those projects come to be? What were the steps you took to make restoration happen?

2) **Defining forest restoration**
    a. How do you define forest restoration?
    b. Do you think it is important to conduct forest restoration in La Cueva? Why or why not?
    c. What makes a restoration project successful? What makes it unsuccessful?
    d. How do you want the forests in this area to look in 5 years? In 50 years?

3) **Relationships with agencies doing restoration**
    a. What is your relationship with organizations doing forest restoration?
    b. What are they (or you) doing that's working well? What would you like to be done differently?

Figure 4: Scripted interview questions

3.3 Analysis Methods

I used data from the interviews and written texts to create a narrative about forest restoration values in New Mexico. The narrative highlights the values that guide people's attitudes toward forest restoration, whether we should bother to restore forests, and what constitutes a "successful" restoration project. It also highlights notable similarities and differences between forestry professionals and residents of La Cueva, and between residents.

After transcribing interviews, I coded the data by finding consistent themes, such as fire, as well as sensitizing concepts, defined as "terms, phrases, labels, and constructs that invite inquiry into what they mean to people in the setting(s) being studied" (Patton 2015). The goal was to be sensitive to how people use certain concepts, in this case in the context of forest management (Blumer 1954; Schwandt 2002). The interviews prompted discussion of sensitizing concepts like "wilderness," "restoration," and "natural cycles."

Data analysis was partly inductive and partly deductive (Strauss & Corbin 1998). I structured interview questions to deductively analyze sensitizing concepts like "forest restoration" and "nature." Simultaneously, inductive analysis of the data revealed unexpected themes, such as wilderness and Santa Fe County Fire. Once I identified these themes and sensitizing concepts, I grouped them in categories such as aesthetics/beauty/looks, wild/wilderness, animals/wildlife, soil, water, fire/burn/wildfire, natural cycles/natural balance, agriculture/grazing/cattle/farming/food, economics/money/jobs, climate change, local and federal agencies and non-profits (searched by name), and restoration/restore. As concepts and themes became apparent, I conducted keyword analysis on each of those terms, and pulled out relevant quotations to

analyze by concept (Patton 2015). I also recorded the frequency at which each theme was

discussed, especially in the context of defining a successful forest restoration project.

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4) Manuscript

4.4 Results

Interviews with natural resource professionals and La Cueva residents revealed several areas of agreement and disagreement. From the data, there emerged four main themes: defining successful restoration, attitudes toward fire, views on government agencies, and concepts of nature.

4.4.1 Defining "Successful" Restoration: Restore to What?

Even when all parties agreed that some level of restoration is a good idea, turning that idea into practice proved exceedingly difficult. To begin, the concept of restoration was difficult to define. Most people had no issue with the term "restoration," though some preferred not to use the word at all. Their objections centered on the problematic idea that forests could and should be restored to an arbitrary past state—1900, before humans actively started suppressing fires? 1800, before railroads and grazing? 1500, before Europeans arrived? 20,000 BCE, before any humans arrived?

Nonetheless, all interviewees agreed that human intervention around La Cueva could have a positive effect on the forest. When asked what a "successful" outcome would be, however, their answers differed and revealed a complex set of values around restoring a forest.

> *"I think [my neighbor's] goal of 100-150 trees per acre is too much. It's too intense. I'd be comfortable with 50% of the trees being removed."* (La Cueva resident)

"I'm comfortable with it being thinned. I can't say that everybody is. So I would say that of the 33 people who signed that petition … probably 80 percent of them would agree with me that if it was thinned to 100 or 150 trees per acre, that would be comfortable." (La Cueva resident)

Interviewees also agreed that a successful restoration project should improve wildlife habitat, create a healthier watershed, and improve ecological function. Seventy percent of interviewees cited water as a major concern, arguing that thinning Block E would improve water retention in the long run, primarily by reducing the risk of a large fire. Only one person believed that thinning would have a negative effect on water retention, due to increased sun exposure and evaporation. Notably absent from most interviews was talk of agriculture; only two people—one La Cueva resident and one professional—mentioned agriculture as a component of successful forest restoration. Seventy percent of interviewees also spoke of wildlife habitat as a top restoration priority (Table 1).

Despite these areas of agreement, residents in both camps said that dialogue has ceased and compromise seems unlikely. As will be discussed below, residents were far more likely to emphasize differences than areas of agreement.

	La Cueva Residents, total	La Cueva, pro-Block E plan	La Cueva, anti-Block E plan	Natural Resource Professionals	Total
Animals/wildlife	80.0%	83.3%	75.0%	61.5%	69.6%
Aesthetics/beauty	90.0%	83.3%	100.0%	23.1%	52.2%
Thinning; Active management by humans is needed	100.0%	100.0%	100.0%	100.0%	100%
Fire prevention	70.0%	100.0%	25.0%	100.0%	87.0%
Improve/maintain wilderness, wildness	30.0%	0.0%	75.0%	7.7%	17.4%
Improved watershed health	60.0%	66.7%	50.0%	76.9%	69.6%
Restore natural cycles/natural balance	40.0%	66.7%	0.0%	100.0%	73.9%
Agriculture	10.0%	16.7%	0.0%	7.7%	8.7%
Money/economic opportunities/jobs	20.0%	0.0%	50.0%	61.5%	43.5%
Mitigate effects of climate change	30.0%	16.7%	50.0%	61.5%	47.8%
Positive comments about Santa Fe Fire Department	90.0%	100.0%	75.0%	n/a	n/a

Table 1: interviewees were asked "What makes a forest restoration project successful?" Percentages reflect interviewees who brought up each issue while answering that question.

4.4.1.1 Differences within the La Cueva community: fire prevention and wildness

The most prominent disagreement within La Cueva had to do with fire prevention. Every resident in favor of the Block E plan was deeply concerned about wildfire risk, and cited reduced fire risk as an essential component of a successful restoration plan. For residents opposed to the Block E plan, fire risk was not a motivating factor, but rather a risk they were willing to accept. This difference is discussed at length in the "Attitudes Toward Fire" section below.

Those opposed to the Block E plan were far more likely to use words like "wilderness," "wildness," and "wild" than those in favor of the plan. For anti-Block E residents, the idea of living in a wild area, or the feeling that one's home is situated within or adjacent to wilderness, was an important part of defining successful restoration work:

"I hear the coyotes come by every night, and I get my kitties in, you know I'm very careful about that, but I love it. To be in the wild, to have some aspect of the wild in this day and age is such a gift."

"It's a real sense of wilderness. It has a very special convergence of different ecological zones … The trees are beautiful, the views. It's just a very gorgeous, special piece of land. Um, it's had its workout from human beings though."

4.4.1.2 The curious case of aesthetics

The most striking difference between La Cueva residents (no matter their opinion on Block E) and natural resource professionals was their emphasis on forest aesthetics, *i.e.* how the forest should look after a restoration project. The "look and feel" of the forest around La Cueva was very important to La Cueva residents: 90% of them spoke about aesthetics as a critical component of a successful restoration project, compared to 23% of professionals.

For La Cueva residents in favor of the Block E plan, aesthetics were a motivating factor in wanting to heavily thin the forest, especially if thinning reduced the risk of a beauty-shattering fire:

"We could see that the growth of trees was dangerously dense and close to the house, and that was an imminent danger to the house surviving any kind of fire situation ... if you would have looked out from this porch 20 years ago, you would have seen nothing but a wall of unhealthy junipers and piñons obstruct, you couldn't see very far, it was just this wall of unhealthy, unhappy, crowded trees."

"I came here because the land is as beautiful as it is, but as I became acquainted with being here I realized that the forests were not healthy, there was just way too much growth. A lot of sick and spindly trees that were limiting the capacity of the whole system to be healthy and viable. That also limited the ability of other living creatures to live, insects and birds and lizards and snakes and deer and hawks and you name it."

"Yeah and I've asked people why they're against [the Block E proposal], and my neighbor next door said well we live in a forest and if we cut down the trees it won't look like a forest. And I say, so it's all about how it looks to you, not any reality about what's going on in the ecosystem or anything? So that's, with a lot of people it's just the way it's going to look."

Those opposed to the Block E project were equally concerned with aesthetics, but worried that a thinning project would make the land less beautiful, discourage wildlife, and compromise the "natural" feeling of the landscape:

"Thirty to forty trees per acre, that to me is a clear cut. I mean you can call it what you want, but you look at thirty to forty trees per acre… I have a neighbor who did a thinning project … maybe eighty trees per acre, maybe even 100 trees per acre. And it looks horrible."

"When the stream runs through the Galisteo formation, there's a canyon, a really narrow canyon, and the bottom of the canyon is all exposed rocks, it's just beautiful. The trees are beautiful, the views. It's just a very gorgeous, special piece of land … So if you want to preserve the land and allow people to enjoy it, you have to find the balance that will not damage the beauty that was there. So stewardship means making a decision on how you can share it and people can use it or preserve it."

"You should see animals. You should see insects, snakes, I see snakes [laughter]. You should see growth and death … I think the soil, everything is important. But you should see in a healthy forest you should see all kinds of animals, and in their natural habitat, not in land that's been plowed over. I haven't been up past the forest gate in a long time but I know it doesn't look as pretty as it used to [prior to a Forest Service-led thinning project north of La Cueva]."

4.4.1.3 Natural Resource Professionals

In defining successful restoration projects, there were few disagreements among natural resource professionals. Where disagreements did exist, they were of scale and

approach. Some wanted to thin as many acres as possible, as quickly as possible, and were frustrated by perceived political hurdles that slowed their progress:

> *"So we're back up against [the Forest Service's] national problem with doing EA's, environmental assessments, and how anybody can just say 'I don't want you to do that' and then they have to review it."*

Others were happy to take things slowly and engage local communities:

> *"So it's really just taking the time to … and making a commitment that you know you're going to be in the community for a very long time, and that you want to build solid relationships, and maybe burning a bridge over one project isn't worth getting the larger goal overall done."*

Natural resource professionals, while less likely to discuss aesthetics, unanimously spoke about restoring natural cycles or improving ecological function as a primary concern in forest restoration. For example, they generally agreed, ecologically speaking, that it is a good idea to thin overgrown ponderosa and piñon-juniper forests like Block E. With a current density of 520 trees per acre, thinning would reduce the risk of a massive wildfire, reduce the risk of a disease outbreak, increase ecological diversity, and increase forest resiliency in a warming climate.

> *"A successful forest restoration project is one that helps promote or restore the complex functionality of the ecosystem. And then there's different values we can*

draw out, but to me that's an overarching piece that needs to be considered at all

times."

"So, in general, function and process, that's how I would judge restoration."

"The overall goals are to have resilient landscapes and fire-adapted

communities."

"So thinking holistically about what makes a forest, it's not just the species

composition, it's not just the risk of crown fire, it's this ability for the forest to go,

to respond in a more natural way and the forest is linked in a healthier way I

would guess to climate, to climate changes, to fire, and it can respond more

gradually, more gracefully, to the continued pressures."

"I don't know if restoration is the right word, necessarily. But to me it just seems

like forest management of that system, and it depends on, you know there's a wide

array of objectives and goals and filtering out through what seems to be the most

important for that system."

Many professionals acknowledged that there are researchers who have a different view on forest health and wildfire patterns, such as William Baker, but they maintain that Baker and others are in the clear minority about how to improve forest health (Baker et al. 2001).

Professionals were also more likely to tout the economic benefits of forest restoration. Sixty-two percent spoke of economic issues, such as creating jobs, as an important factor in defining successful restoration projects; only 20% of La Cueva residents mentioned economic benefits or costs to restoration. This disparity likely reflects the socioeconomic status of La Cueva residents compared to New Mexico generally, but it also highlights a potential disconnect between how the two groups approach the design and implementation of a restoration project.

4.4.2 Attitudes Toward Fire

Any discussion of forest health in New Mexico includes questions about the role of fire. In this study, while none of the scripted interview questions used the word "fire," everyone—both professional and non-professional—raised the issue. Their concerns (or lack thereof) were distinct and telling. In discussing fire, forestry professionals used terms like landscape resilience, fire-adapted communities, and ecological function. Forestry professionals, unsurprisingly, spoke more often of fire's role in ponderosa and piñon-juniper forest ecosystems. Fire, as one professional put it, is nature's "vacuum cleaner":

> *"From the forest's point of view ... will [thinning] allow natural fire to come back and not nuke it, but allow the fire to come back and do its thing and be its little vacuum-cleaner self and clean things up? ... Yeah, that's how I look at it, nature's vacuum cleaner. And it's necessary."*

Frequent, low-intensity "vacuum cleaner" fires reduce tree density, and therefore reduce the risk of a large, catastrophic wildfire. Professionals repeatedly drew connections between low-intensity fire and a host of good outcomes: watershed health, improved wildlife habitat, improved soil health and structure, and forest resilience in the face of climate change. These outcomes, in turn, improve public health and safety.

Professionals acknowledged the threats posed by large fires, but did not linger on those threats. Some spoke of trying to avoid the topic of fire altogether, especially when engaging the public:

"I'll go into meetings now when we're talking about fire and I won't even say fire until it's brought up by the audience. Because if you can't sell forestry on the habitat, on the timber, on the other resource values, maybe fire isn't as important. But a lot of people have been using that, going into communities saying, 'if you don't do this then your house is gonna burn down.' And then they posture and they say, well that's fine because I'd rather have my house burn down than cut these trees. You're just setting up a posture by using fire as a scare tactic."

La Cueva residents in favor of the Block E plan cited wildfire threat as their primary motivation for supporting the thinning proposal. Their comments were filled with concern, even anxiety, about their safety and the safety of their neighbors. They were quick to point out that there is only one road in and out of the community, and they worried that if a fire began near the south end of La Cueva, everyone could be trapped. This worry inspired a sense of duty to do everything in their power to prevent such a catastrophe.

La Cueva residents opposed to the Block E plan were more accepting of wildfire risk, and they were more likely to point out fire's positive role in the forest ecosystem. They saw fire as a natural occurrence, arguing that anyone living in a forest should be aware of that risk and willing to accept it. This group was more likely than pro-Block E residents to express respect for fire and point out fire's positive role in forest ecosystems. They were also more likely to emphasize the beauty of the landscape as it stands now (table 2).

Sampling of Attitudes Toward Fire	
La Cueva Residents in Favor of Block E plan	**La Cueva residents opposed to Block E plan**
"I'm very concerned about Block E, because it's right at the mouth of the valley. I've walked through that area, it's full of diseased trees. And some decent amount of thinning would restore the health of the trees that remain, and would seriously diminish the opportunity for a really major hot hot fire to begin there and engulf the valley."	*"I am very well aware of the risks of living near the forest. I would never live near the ocean. Never. You couldn't pay me to live near the ocean ... So the people who live by the ocean, that's their choice. If a tsunami or whatever comes, they chose to live there. If a fire comes, I chose to live there."*
"Sure, [concern about fire] is almost a level of paranoia. I see people fling a lit cigarette out the car, what do you do with that? I see it from people who drive up and down this road."	*"I think fire is a cleansing, beautiful thing. I love fire... I think fire can bring back life. If you do a controlled burn appropriately ... cause you see whenever there is a fire you see new growth coming. The seeds that floated around, it's cleansing. That's why I want to be cremated. It's a cleansing thing. I truly believe that. And if I ever had a fire at my home or on my property, it would make me very sad and it would take a long time to bring it back ... But when it comes down to it, if there's a fire, and they can't get to me, then they just can't get to me... if you don't want to live there, then don't live in La Cueva."*

"Down here where this road connects with the Pecos Highway, basically going east-west, if a fire were to start there and go across the road, everyone would be trapped up here. So it's a vital concern ... It would be hard to live with yourself if you had prevented people from being able to retreat in case of fire and you got out, and they didn't, it would be hard to wake up in the middle of the night and look at yourself in the mirror."	*"Yeah, [fire] is a concern anywhere you live in the forest, I think. Because most of the forests don't have roads, don't have loops going around taking you out. So you know that when you're moving here. It's very clear, there's one way in and one way out."*
"We actually would look out here and see the smoke. It was like billowing clouds of smoke that looked just like regular clouds in the sky, but it was smoke ... So we've seen that two or three times, just right out the back door here ... after a while you get skittish about fires."	*"I have read enough, though, to realize that if you have a really serious fire, not a lot of anything we can do now is going to be preventative or save the day."*
"It's huge for me, I have three horses, and two alpacas, and three dogs ... So the safer I can make this property the better it is for them ... You know it's pretty simple because we have just that one way in and out ... So it's like, OK, having a fire break at the end of the road, no brainer."	*"I respect anybody's right to be in a fire-free zone. But, if you choose to live in a place like La Cueva, which has these magnificent ponderosas, some of them a couple hundred, three hundred years old, you assume certain risks or you don't live there, you live in town, you live in El Dorado, you live in Lamy, where you're not going to run the risk of having your, having a forest fire burn your house, and maybe kill your family. These are risks you take if you choose to live in a magnificent forest."*

Table 2: Sampling of attitudes toward fire among La Cueva residents.

4.4.3 Role of Government Agencies and the Unique Role of the Santa Fe County Fire Department

La Cueva residents opposed to the Block E plan frequently expressed mistrust of the federal government. One interviewee was concerned the Forest Service wanted to thin forests *"because they get bags of money to do it."* Another was disappointed with prior

USFS thinning projects, claiming they look "*horrible*" and that the Forest Service *"didn't live up to their commitments"* about which trees they would cut. Those in support of the Block E plan were more likely to have a positive view of the federal government and to speak positively about individual Forest Service employees.

Non-USFS professionals acknowledged room for improvement in the Forest Service, but also expressed sympathy. For example:

"[The Forest Service comes] in with an attitude, sometimes, around communities. And in some cases I understand why, they're getting beat down constantly, they're getting harassed, and just you know people are calling them out a lot. And instead of working with that they tend to get hostile."

None of this is unique to La Cueva—the Forest Service frequently gets mixed reviews among the American public (Correia 2007; Egan 2012; Dvorak & Brooks 2013; LaMonaco 2014). More interesting is how La Cueva residents view the Santa Fe County Fire department (SFCF). SFCF has a wildland division, formed in 2004 with funds from a Collaborative Forest Restoration Program grant. The wildland division performs outreach in the Santa Fe area, helps communities develop a "Wildfire Protection Plan," and conducts forest thinning and prescribed burns. La Cueva residents, no matter their stance on Block E, have an exceedingly positive view of SFCF. Ninety percent of La Cueva residents spoke positively about SFCF. Seven residents mentioned firefighters by name and told stories of forestry projects they'd completed with the help of SFCF. One resident told a story of a firefighter who advised her to remove diseased trees to maximize forest

health. Another made it clear that while she distrusted the Forest Service, SFCF employees were caring, thoughtful, and reasonable. For example:

"We really, just, umm, for the record and for just, umm, good PR, we really, really appreciate the involvement of the fire department of Santa Fe …. They're just, they're great."

"Right now it's like the restoration people, some of them not all, but some of them are just bulldog ahead, not [SFCF employees], but some of the others are just like "we don't care, we're just going ahead with it.""

"I love them."

4.4.4 Competing Concepts of "Nature"

Interviewees frequently used the words "natural" and "nature." They also, no matter their opinion on Block E, held the belief that humans have damaged nature, in this case the forests around La Cueva, and around New Mexico generally.

In talking about nature, professionals and residents in favor of the Block E plan were more likely than anti-Block E residents to stress human knowledge and action as the solution to New Mexico's forest problems. As one professional put it: "*We see people as being central to the answer.*" They expressed faith in scientists' ability to assess forest condition and prescribe treatments that would increase forest resilience to drought and wildfire: "*[We know] that thinning increases the understory diversity, it increases the*

diversity of things that we think will be more resilient to climate change in the future."

This group spoke of humans as *part* of nature, rather than separate from it: *"Human activity is also an expression of nature."*

Professionals frequently lamented humans' role in damaging forests in the first place. Many told the same story about logging, grazing, and fire suppression that pushed New Mexico's forests into their current overgrown, fire-prone conditions. They spoke of restoration as righting a past wrong, and felt a strong sense of responsibility to apply their knowledge for the benefit of both forest and human communities.

Conversely, La Cueva residents opposed to the Block E plan saw humans as the cause, but not the solution, to forest problems. In their minds, human intervention is likely to make things worse. They spoke of nature as the solution, a force that would prevail regardless of any actions humans might take in the short run. They trusted nature, left to its own devices, to solve problems better than humans could. As one interviewee succinctly put it: *"We've f**ked up interfering with nature enough that trying to repair the damage we've done will only make it worse."* They also worried that thinning would make the forest look "*less natural*," even "*ugly*." They associated an abundance of trees with a more "natural" look, conveying the idea that more trees results in more nature.

They also frequently used words like "wild" and "wilderness," and held up those ideas as something to aspire toward, even on small tracts of private property. They wanted to be secluded and hidden from their neighbors, underscoring the perception that they live in a wild place, far from human activity (table 3).

Sampling of Concepts of "Nature" and "Natural"

Professionals and La Cueva residents in favor of Block E plan	La Cueva residents opposed to Block E plan
"Human activity is also an expression of nature. But it's also, you know ... This is a particular kind of environment, it's a mountain topography, semi-arid, certain climactic conditions, historically certain kinds of beings have been here for a long time. That has been rudely interrupted and disturbed by the intrusion of human activity which has changed the ecology, the climate, the viability of certain species to live here, the relative health of the environment has been strongly affected by human activity." (La Cueva resident)	*"Nature will take its course and the weakest ones will die. And then they will go back into the earth like compost, or bugs kill them. But I am in favor of some thinning for the attractive purpose."*
"[Current forest problems] reflect things that we've done in the past that have not been helpful to our forests. We talk about fire suppression as being something that was not useful ... you could write a whole book—in fact many books have been written about the history of the Forest Service and how fire suppression became number one, you know, and people thought that was the right thing to do to save the trees. But it turns out in the Southwest, basically taking that pulse of disturbance out of the system is very detrimental to our forests." (Forestry professional)	*"First, man is so temporary there. We have a long-term responsibility that pre-dates and goes beyond our lifetimes."*
"We see people as being central to the answer ... we have a lot of haves and have-notes in this state. And so our view is that we need to benefit those local communities, those smaller communities, as well as say the downstream users. The thinning that we do, the prescribed fire that we do, those are jobs for people, too. And we think that's important to provide. And that's the long-term solution to the vitality of our culture and our state." (Forestry professional)	*"And I don't know much about fire prevention, I have read enough though to realize that if you have a really serious fire, not a lot of anything we can do now is going to be preventative or save the day"*

"When we take chainsaws into the woods anymore in the Southwest we're doing one of two things. We're either reducing fuels to protect life and property in some way, or we're doing some sort of ecological restoration. In the Southwest, in the ponderosa pine and the dry-mixed conifer forest, and even some of the PJ … those two things overlap really, really well." (Forestry professional)	*"I thought [a thinning project on a neighbor's land] made the trees look unattractive and not natural… I like it to look a certain way, natural though. I've seen some homes in the Pecos area that do shrubs like squares and I think that's just so ugly. I want it to look like nature, stones everywhere, you know… It's not going to be a forest if there's only two or three trees left. Sorry I get really emotional."*
"The biggest thing is a lot of people in and around Santa Fe—and it's not just Santa Fe—move there and think those trees are natural to be that thick and the whole nine yards, and trying to convince them otherwise is like beating your head against the wall." (Forestry professional)	*"I wouldn't have wanted so much of my house to be seen by everyone that passes by… now you can see everything, and on a county road I wouldn't want people passing by and seeing my stuff all the time. I love where I live because people can't see me."*
"Those of us who are in favor of healthy forests go up [to a previously thinned area] and say look there are new trees coming up, look how bright green the growth is, look at how beautiful this expanse is, you can see vistas, you can see rocks, and wildlife, wildlife has come back." (La Cueva resident)	*"The community would probably support a project that is done in a natural way, and not similar to the manner that has already been done… so that means not thirty or forty trees per acre, which is the prescription that they've, the Forest Service has come up with because they want to do a fuel break."*
"I spent a lot of time out on the land, and uh, kind of learned experientially you know what the land needs, how to take care of it, how certain uses of the land degrade the land, and that it needs a caring relationship to do well. That was a very healing and important part of my life experience." (La Cueva resident)	*"Thirty to forty trees per acre, that to me is a clear cut. I mean you can call it what you want, but I have a neighbor who did a thinning project … his thinning is maybe eighty trees per acre, maybe even 100 trees per acre… that gives us an idea of what 80 to 100 trees per acre looks like, and to me, it's ugly."*
"And then there's this skewed vision of natural, that if you leave it alone, that's natural. I sort of equate owning land with owning a kid, because it takes about the same amount of work to raise a kid as it does to maintain a piece of property. And these people buy whatever it is, 10, 20, 50, 500 acres, and they're not prepared to take care of it." (Forestry professional)	*"We've f**ked up interfering with nature enough that trying to repair the damage we've done will only make it worse."*

Table 3: Sampling of Concepts of "nature" and "natural"

4.5 Discussion

4.5.1 Bridging Nature Myths

Scholars have long noted a difference in how communities think about the natural world and humans' role within it (Nash 1967; Sahlins 1976; Katz 2003; Light 2003). Put differently, communities have their own "nature myths" that sometimes contrast with myths elsewhere in the world. For example, as Hall argues, Italy and the western United States have embodied two very different approaches to restoration. Since the 1850s, large numbers of Italians have migrated from the Alps to cities. Abandoned areas in the Alps were commonly viewed as "unkempt gardens," and when large storms caused flooding in downstream communities, Italians were likely to blame nature, not people, for the ensuing destruction. In their eyes a normal, healthy landscape was settled. In contrast, white settlers in Utah saw accelerated logging and livestock grazing after the 1850s that rapidly changed the landscape. In their eyes, a healthy landscape was unsettled, and when floods and wildfire occurred, Utahans were more likely to blame humans for the damage. In their respective homes, Italians sought to reintroduce humans to restore the landscape's health, while Utahans sought to remove humans to accomplish the same thing (Hall 2005). Everyone in the La Cueva study, no matter their opinion on Block E, agreed with the basic premise that humans have damaged the forest around their community, and around New Mexico generally. But their opinion of how to fix the problem reveals different nature myths at play.

La Cueva residents opposed to the Block E plan expressed a "wilderness" nature myth in line with Hall's Utahans: the best way to restore the forest is to minimize human involvement and trust "nature" to fix what needs fixing. By emphasizing wilderness and

"natural" aesthetics, those opposed to the Block E plan are expressing a nature myth, long-held by American wilderness advocates, that minimizes human impact and excludes humans wherever possible (Cronon 1995). In their minds, the forest is most beautiful when humans tread lightly on the land, and signs of human intervention, such as a thinning project, are considered unattractive, even ugly. A "natural look" implies an abundance of trees and wildlife, and minimal evidence of humans.

Using words like "wilderness" and "wild" in defining successful restoration projects underscores the idea that human intervention, if needed at all, should be swift and minimal. Excessive intervention would have a significant and negative impact on the nature-filled place they call home: "*Block E directly abuts private property and the proposed drastic thinning will radically change the world we live in*" ("Petition to Save La Cueva").

This "wilderness" nature myth also influences how La Cueva residents think about fire. Compared to their pro-Block E neighbors, those opposed to the thinning plan are much less worried about forest fires, and more accepting of fire's destructive potential, partly because they see nature itself as the best healer. This group is not entirely opposed to human intervention, but wherever possible they would rather see humans step back and let natural forces take their course.

This myth tends to be dualistic and, like Hall's Utahans and many white American environmentalists, conceives of "nature" and "culture" as antagonistic realms (Bertolas 2010). The myth has a friend in the Wilderness Act: both imply that wilderness—nature its purest and healthiest state—is somehow separate from society, leaving little room for humans and nature to coexist (Cronon 1995; Nelson & Callicott 1998). Moreover, this dualistic mindset tends to spatialize nature as something "out there," external to society,

and to temporalize nature by relegating it to the past, implying that there is less nature today because there are more people on the planet who own more things and use more technology (Castree 2014).

For natural resource professionals and La Cueva residents in favor of the Block E plan, their *design-oriented* nature myth is in line with Hall's Italians: to restore New Mexico's forests, human intervention is essential, and it must happen quickly and abundantly. Like the Alps in Hall's story, these groups see New Mexico's forests as unkempt gardens, large tracts of overgrown vegetation that for decades have been mismanaged by humans, and need repair. It represents a design-oriented approach, in line with an ecological restoration movement that grants humans a non-dualistic and symbiotic role in the nature-society relationship, and in some ways at odds with preservation-focused American environmentalists (Higgs 2003; Tomblin 2009; Weng 2015). If humans were to step away, "nature" would respond with devastating fires and floods, and parts of New Mexico would become denuded and inhospitable. In this myth, nature frequently requires not only immediate restoration, but continual human intervention as the climate changes in unpredictable ways.

Conversely, natural resource professionals highlighted the positive economic impacts of forest restoration: it creates jobs and sustains ecosystem services. The Nature Conservancy makes economics an explicit part of their Rio Grande Water Fund promotion, and many of the professionals I spoke with at TNC and elsewhere were eager to tout the economic benefits of restoration (The Nature Conservancy 2016). This emphasis on economics reinforces a design-oriented nature myth that readily *includes* humans, a myth that sees humans as the solution to environmental problems, and a myth that is optimistic about a future in which human needs and environmental health are

pleasantly aligned, much like a well-kept garden. An approach like TNC's that includes

economics is in line with the scholars who are calling for restoration practice that

includes human values in addition to ecological health (Throop 2000; Higgs 2005; Sarr &

Puettman 2008; Havlick & Doyle 2009; Egan, Hjerpe, & Abrams 2011; Egan & Estrada

2013).

The design-oriented myth has undertones of guilt and redemption. Many people I

spoke with, especially natural resource professionals, told the story of how their job is to

clean up the mess made by humans over the last century. Restoration is popular partly

because it allows humans to redeem themselves for past wrongs, a powerful story that

provides meaning to people working in New Mexico's forests. At best, this story can be a

powerful catalyst that reconnects society to the surrounding environment, but at worst it

could rationalize restorationists' efforts to do *something*, even when a restoration plan is

poorly conceived or likely to cause social hostility (Jordan 2000; Smith 2014).

Drawing on the psychology literature, Clewell and Aronson (2006) provide another

framework for assessing different approaches to restoration. While everyone in La Cueva

is driven by "biotic" motivations (concerns about wildlife and forest health), those

opposed to the Block E project draw on "idealistic" motivations, such as an emotional

attachment to the land or aesthetics. Those in favor of the Block E project take a

primarily "pragmatic" approach, focusing on wildfire-risk reduction. Those two

approaches are not necessarily at odds, but they demonstrate that when two groups look

at a problem with different underlying motivations, the process is likely to be

contentious, even when the end goals are similar.

Unlike public debates that pit environmentalists against some business or industry,

the discord in La Cueva is between environmentalists who think of nature in one way

against environmentalists who think of nature in another way. It would be inaccurate to label one group as more environmentally conscious than the other—they are all conceivably environmentalists, but with contrasting ideas of nature.

In other words, the disagreement over the Block E project is a small example of a larger challenge facing restoration projects. These projects mirror our cultural values, but those values are shifting. Two decades ago there was little momentum behind restoration activities like the Water Fund and the Santa Fe Fireshed Coalition (Bradley 2009). Today there are multiple agencies and individuals working collaboratively to improve the conditions for all living things in New Mexico. It is possible this new momentum represents a shift in values from a conservation-focused "wilderness" mindset to an active-management, design-oriented mindset, a shift brought on in part by climate change, drought, and an increased risk of catastrophic fire. La Cueva is a single example of these clashing values, but given the consensus of forestry professionals in this study and the recent prevalence of large fires, environmentally-conscious New Mexicans may be increasingly likely to support a design-oriented approach to forest management in the future. Such an approach would be in line with scholars who are calling for land managers to ignore "reference conditions" and instead focus on human benefits and ecosystem resilience (Allen et al. 2002; Dufour and Piegay 2009).

The design-oriented approach also clashes with humans' tendency to temporalize and spatialize nature, and places great faith in human judgment and wisdom to, as Higgs puts it, "design" landscapes (Higgs 2005; Castree 2014). In a community like La Cueva, embracing a design-oriented approach may prove fruitful. Higgs invites restorationists to *"not bury the idea that restoration involves design, but celebrate that fact, and enlarge our skills and wisdom around how we design restoration projects"* (Higgs 2003: 205). A

well-designed restoration plan for La Cueva could incorporate aesthetics and ideas of "wildness" while still reducing fire risk and improving ecological function. In Southwestern ponderosa and piñon-juniper forests, those design concepts align nicely. A design approach would also provide a structure for dealing with global warming.

Moreover, frameworks exist for assessing both social and ecological impacts of a restoration project, and a place like La Cueva could be an excellent place to test those models (Egan 2013). Whether that happens or not, the ability to understand how our nature myths differ from our neighbor's is an essential component in moving those collaboratives forward.

Through a certain lens, the La Cueva project could be interpreted as an argument *against* large-scale public involvement in land management projects. The "paradox of public involvement and equity of knowledge" contends that complex restoration projects can be hampered by outspoken individuals who do not have the scientific expertise to critique a scientific proposal (Higgs 2005; Egan 2014; Weng 2015). However, this idea implies that cultural and emotional factors can be entirely removed from scientific data collection, and that there is some ideal "nature" that land managers should strive for. The La Cueva debate shows that "nature" is not so easily defined (Castree 2014). Even though forestry professionals are generally in agreement over what constitutes a healthy forest, their land management decisions are still influenced by social factors like wildfire prevention around houses, the question of wilderness, and the possibility of providing jobs to people that need them.

Moreover, the social sciences provide insight about what might constitute a healthy, natural forest. For example, there is an abundance of research showing the psychological benefits of spending time in a place perceived to be healthy and natural, and the negative

effects of spending time in an environment that is degraded or lacks natural components (Pretty et al. 2005; Chawla 2014; McMahan & Estes 2015). When residents on both sides of the Block E plan stress aesthetics, they are not being trite—how they feel about the "naturalness" of a place has an appreciable psychological effect. That said, land managers should be wary of privileging the aesthetic preferences of a vocal minority over the threat of catastrophic wildfire.

Poor communication between community members has contributed to the stalemate over Block E. As one incensed resident put it: *"[My neighbor] acted unilaterally, he doesn't speak for the whole community, but he acted like he does. He said everyone was in favor of thinning, wanted to essentially clear cut that Block E, but he didn't ask anyone! He just made the decision himself."* One way to overcome communication barriers, at least in a place like La Cueva, is to be intentional about who is delivering the message. All of us have what might be called "Agency Myths," biases about government agencies and NGOs that are well fortified and hard to change. The Forest Service, for example, gets mixed reviews in northern New Mexico, and is especially unpopular in many Hispanic and Native communities (Kosek 2006; Correia 2007). Similar things could be said about the Park Service, NM State Forestry, BLM, NRCS, and the non-profits Wildearth Guardians and The Nature Conservancy (Kosek 2006; Ring 2009; Dvorak 2013; LaMonaco 2014; Brooks 2015).

However, in La Cueva there was one "Agency Myth" that persisted: a positive view of the Santa Fe County Fire department. Ninety percent of La Cueva residents, unprompted, brought up SFCF and expressed a high level of trust and respect for that agency. This may be due to the extensive outreach efforts conducted by SFCF's Wildland Division, the fact that they don't own any land themselves, or the personalities of its

firefighters. Whatever the reason, engaging SFCF could bridge the gap between federal agencies and some rural New Mexican communities.

The results of this study can inform land managers seeking to understand rural communities with nature myths different than their own. When approaching a community like La Cueva, for example, land managers need to understand the importance of aesthetics. Aesthetics was largely absent from the conversations I had with professionals, but it was at the forefront of conversations with La Cueva residents on both sides of the Block E plan. Professionals need not always adopt the residents' aesthetic preferences, but the "look and feel" of the forest could be a legitimate point of discussion (see, for example, McMahan & Estes 2015). Similarly, the idea of living in a "wild" place is important to many La Cueva residents, and could be part of the discussion without necessarily compromising restoration goals (see, for example, Foster 2009; Nayak 2011). By seeking ways to bridge these myths, land managers could build coalitions more easily and complete urgent projects more quickly.

Collaboratives like the Santa Fe Fireshed Coalition and the Water Fund are making explicit efforts to include cultural components in their restoration plans. The name "Water Fund" is a good example of leveraging a symbol—water—that is universally valued, no matter the underlying nature myth. However, these collaboratives' emphasis on reducing wildfire risk and creating jobs is not reaching certain residents in the WUI, like those opposed to the Block E plan. This does not mean the collaboratives should change their overall approach—their goals are worthy—but understanding the varied nature myths of their audiences, and shifting rhetoric and design appropriately, could further strengthen their effectiveness. In the case of La Cueva, that means having conversations about wildlife, wilderness, healthy and robust trees, aesthetics, and water.

Another way to actively engage residents could be a citizen science program. This method would not be appropriate in all New Mexico communities, but in La Cueva, where many residents are retired and eager to engage in land management decisions, citizen science could open doors to collaboration and compromise, and encourage environmental stewardship (Smith 2014b). It could also provide cost-effective and valuable data that would inform adaptive management plans (Cooper et al. 2007). However, a citizen program comes with its own potential pitfalls, even when everyone agrees on the stated goals (Weng 2015).

4.6 Limitations and suggestions for future research

Given the scale and location of this study, there are a number of limitations worth noting. The professionals I spoke with are all actively engaged in restoration planning and implementation. Therefore, their "nature myth" is perhaps different than other natural resource professionals. I did not interview employees from the National Park Service or the various wilderness-focused non-profits in New Mexico, who may advocate for a more preservationist approach to forest management.

Lessons from the La Cueva case study will inform management decisions in similar communities, but La Cueva is not fully representative of all WUI communities, or even other small, rural northern New Mexico communities. La Cueva could be described as having a "high amenity, high resource WUI community" archetype; communities that are more rural and agriculture, or those that are more formally suburban, are likely to require different forest management approaches (Paveglio et al. 2009). Future research could focus on New Mexican communities that fit a different profile than La Cueva to see how

their conceptions of nature and restoration differ. Specifically, La Cueva is not an agricultural community, nor is it a poor community. Future research could address a perceived disconnect between natural resource professionals and agriculturalists, or between natural resource professionals and poorer communities in New Mexico, and study how each community approaches ecological restoration.

This research suggests that some ideas of restoration/nature may be benefiting a relatively wealthy WUI community like La Cueva more than others. Those in favor of the Block E plan are calling for resource-intensive mechanical thinning that will reduce wildfire risk. It is unclear whether these resources are being deployed as readily in poorer communities. Additionally, by looking only at La Cueva, this paper does not address conceptions of "nature" in other communities, and how those conceptions might encourage residents to leverage resources to "restore" the forest. Political ecologists could investigate if resource distribution around fire prevention and forest health looks different in other New Mexican communities.

Much of the debate around La Cueva is driven by emotion and psychology, rather than strict adherence to scientific facts. Emotional geography scholars could investigate the emotional ties that bind people to a piece of land and influence their decision to restore a forest, or not. Further research could overlap with psychology, and the study of emotion generally, to inform natural resource professionals on how to best approach a community like La Cueva.

List of Appendices

Appendix A: Block E Prescription Summary

Appendix B: "Petition to Save La Cueva"
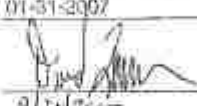
Appendix C: Consent Form for Interviews

Appendix D: Full list of interview questions

Appendix A: Block E Prescription Summary

USDA - Forest Service   R3-FS-2400-115 (10/86)

DETAILED PRESCRIPTION SUMMARY
(Reference FSH 2409.26d)

Data Base: 10 05		Prepared by:	Ken Reese
Compartment(s): 5142		Date:	01-31-2007
Stand(s): 5142-0200(16), 5142-0400(2), 5142-0500(3)			
5142-0600(69), 5142-0700(7), 5142-0800(35)			
5142-0900(1) (ACRES)		Certified By:	
Acreage: 133		Date:	9/24/2007

Project Name: La Cueva Fuelbreak - Block E

Stand Objectives: Flame length is < 4ft.; and torching index is >35 mph
(If Changed from Stand structure and density will not support crown fire.
Diagnosis)

Silvicultural Treatments & Timing (This Entry):

Activity	Type	FY	Fund	Wk. Force	Method	Card Type Prepared
1180	fuel break construction	06	WFHF	FA	200	
1253	piling	06	WFHF	FA	100	
1230	Burn of activity fuels piles	08	WFHF	FA	300	

Narrative:

Existing Conditions
The treatment area is a pinyon/juniper stand with scattered individuals, small pockets and stringers of ponderosa pine throughout the stand. Douglas fir is rare. Stand data collected indicates about 520 trees per acre and the average basal area is 64 sqft/ac. Ninety percent of these trees are less than 9 inches dbh/drc. The average tree is less than 20 feet tall. The vegetative structure is a young forest to mid-aged forest. Oak brush is heavy at over 2400 stems per acre and averages 2-3 feet in height. There is some pinon ips mortality but no recent attacks were found. In the northwest corner, dwarf mistletoe is common in ponderosa pine. Dwarf mistletoe is present in juniper. Site productivity is low to moderate. Surface boulders and rock outcrops are dominate physical features, especially in the northern portion of the treatment area. The slopes are generally gentle to moderate. The aspect is mostly south to southeast.

Desired Conditions:
In the portions of the stands that will be included in the fuelbreak the stand basal area will be 20-30 sq ft/ac or 30 to 35 trees per acre. Five percent of the treatment area will be in denser leave tree clumps.

This open stand will have trees represented in all diameter classes. The mid size diameter classes will have the most cohorts. This will increase the average stand diameter. Fuels generated by treatment will be reduced. The areas treated will have improvements in forest health through the removal of mistletoe infected trees and reduced basal area. There will be an increase in the amounts of oak and herbaceous plants. The remainder of these stands not in the treatment area will be untreated.

Treatment:
Construct a shaded fuel break along County Road 63-A (see map). The treatment will be a thinning across all diameters. There is 24" diameter limit. Leave 5% of the area in denser clumps. Slash will be lopped and scattered and/or piled. Slash will be kept away from residual trees. Broadcast burning and/or pile-burning will follow after the needles have fallen.

Appendix B: "Petition to Save La Cueva"

This letter is available online www.lacuevaguardians.org/petition

SAVING LA CUEVA CANYON

We, the residents of La Cueva Canyon and Glorieta, are vehemently opposed to the Forest Service's proposal to create a fuel break on the 133 acres labeled as "Block E" between our community and Highway 50.   The USFS prescription is, in reality, a clear cut, which will leave just 30 to 40 trees per acre.

The USFS's own studies indicate that this area currently supports between 500 and 600 trees per acre. The wholesale removal of 560 trees per acre - 93% of the existing trees – is a lumbering project that will produce irreversible ecological damage that will negatively impact every aspect of this once healthy forest.

Two years ago more than 60% of La Cueva Canyon's residents and neighbors voiced their strong opposition to any thinning project in Block E that didn't use the best available science based on consideration of how such thinning would negatively impact local wildlife and our watershed, and would result in soil erosion and degradation.   The denial of funding for this project by the Collaborative Forest Restoration Program (CFRP) is a further indication that this plan is seriously flawed.   However, despite continued opposition from the community, the Santa Fe National Forest has now funded this project, which is slated for the Fall of 2016.

In our opinion the 2004 NEPA for this project in Block E was inadequate, is outdated and did not present the project details accurately.

It is also our opinion, after reviewing the documentation that discusses and defines the current proposal, that this is a waste of money and will cause substantial harm to our area for no benefit**.**

We are being asked to allow a major logging operation to take place in the forest near our homes. The damage to the soil and the forest floor from the equipment and trucks will remain for decades. The amount of "slash" from 74,000 trees will cause catastrophic fire hazard to our homes. The impact on wildlife habitat will be devastating and lasting. Block E directly abuts private property and the proposed drastic thinning will radically change the world we live in.

We urge you, in the strongest terms possible, to intercede and to place this plan on hold until a truly science-based alternative is put forth.

Lyra Barron, Glorieta, NM
Stephanie Garcia, Glorieta, NM
Carol Johnson, Glorieta, NM

Carol Parker, Glorieta, NM
Rick and Marleen Horsey, Glorieta, NM
Daniel Smith, Glorieta, NM
Robert Schrei, Glorieta, NM
Steve and Kristen Flance, Santa Fe, NM, and on behalf of three generations of the Flance family:
> Rachael Flance, Kai Flance, Hannah Steerman, Greg Steerman, Isaiah Steerman, Acacia Reeder, Adam Warner, Stephanie Warner, Sadie Anne Warner, Jack Warner

Donna Thomson, Glorieta NM
Frank Hadley Murphy, Glorieta, NM
David Levin, Santa Fe, NM
Marsha Dalton, Glorieta, NM
Melissa Dalton, Glorieta, NM
William Gooch, Glorieta, NM
Dean Mitchell, Glorieta, NM
Doug Booth, Glorieta, NM
Richard Mietz, Glorieta, NM
Keith and Karen Simons, Glorieta, NM
Celeste Yacoboni, Glorieta, NM
Buck Gayer, Glorieta, NM
Natasha Ryan, Glorieta, NM
Kendra & Michael Henington, Glorieta, NM
Linda & Gary Storm, Glorieta, NM
Brigid Curran, Glorieta, NM
Natalie Owings, Heart & Soul Animal Sanctuary, Glorieta, NM
Jon Asher, Glorieta, NM
Karyn Rose, Glorieta, NM
Jaum Barron, Glorieta, NM
Mary Powell, Glorieta, NM

Appendix C: Consent Form for Interviews

THE UNIVERSITY *of*
NEW MEXICO

Firesheds: the Many Sides of Forest Restoration in New Mexico
Informed Consent for Interviews
6-16-16

Introduction

I, Jordan Stone, from the department of geography and environmental studies at the University of New Mexico, am conducting a research study. The purpose of the research is to better understand how people think about forest restoration in Santa Fe County, and what people value in a restoration project. You are being asked to participate in this study because you are either a natural resources professional who has worked on forest restoration projects in Santa Fe County, or a citizen of Santa Fe County who has some interest in forest restoration projects.

What does participation mean?

If you agree to participate, the following will occur: An interview will be arranged at your convenience, in a place of your choosing. The interview will take about 45 minutes. If you agree, it will be recorded and transcribed to aid the analysis process later on. The interview will involve answering a small number of questions about forest restoration. You will have an opportunity to share your opinions on the subject in addition to the questions I ask. You will be asked questions such as:

- How do you define forest restoration?
- Do you think it is important to conduct forest restoration in Santa Fe County? Why or why not?
- What makes a restoration project successful? What makes it unsuccessful?

You can refuse to answer any of the questions at any time. In my final manuscript, your name will not be used to identify you. However, you may choose one of the following levels of consent:

1) *Level one: no attribution except professional/non-professional designation*

   This level will ensure that all information will be kept completely confidential with no identifying descriptions or other indicators that would allow information to be attributed to the participant. However, since the crux of my research is the difference between professionals and non-professionals, I will ask that you be identified in one of those two categories.

2) *Level two: use of descriptive identifiers*

   The second level will allow for confidentiality but will allow me to use descriptive identifiers (e.g. "an employee of the Nature Conservancy" or "a landowner in the town of La Cueva"). There will be space on the consent form for you to list identifiers he/she would be comfortable with. We will work together to make sure the descriptive identifier is suitably broad to maintain your anonymity.

Your involvement in the study is voluntary, and you may choose not to participate. You may also choose to withdraw information or consent at any time. The risks of this project are minimal. You may experience discomfort or loss of privacy when answering questions. However, I will go to great lengths to ensure that your answers remain anonymous. I will store all data on password-protected devices and use a unique identification code in place of your name. Once I am done transcribing the interviews, the audio recording will be deleted.

Number: 11238
Version: 6/21/2016
Approved: 6/27/2016
Expires: EXEMPT
Institutional Review Board

THE UNIVERSITY of
NEW MEXICO

The findings from this project will provide information on how individuals think about forest restoration in Santa Fe County, and what they value in a restoration project. If published, results will be presented in summary form only, with appropriate anonymous identifiers for any quotations.

If you have any questions about this research project, please feel free to call me, Jordan Stone, at 828-606-2597. You may also email me at jordanstone5@gmail.com. If you have questions regarding your rights as a research subject, or about what you should do in case of any harm to you, you may call the UNM Office of the IRB (OIRB) at (505) 277-2644 or irb.unm.edu.

Potential Benefits of Participating in this Study
We hope that participating in this study will help both forestry professionals and local citizens understand the values surrounding forest restoration in New Mexico, and where those values coincide or differ with other citizens. Participants will have an opportunity to express their opinions about forest restoration, and the results of this study will be made available to all who participate.

Consent to participate

Please choose one of the following regarding the level of confidentiality (**Initial next to chosen level**):

_____ *Level one: no attribution except professional/non-professional designation.* This level will ensure that all information will be kept completely confidential with no identifying descriptions or other indicators, except a designation as a natural resource professional or a non-professional.

_____ *Level two: use of descriptive identifiers.* The second level will allow for confidentiality but will allow me to use descriptive identifiers (e.g. "an employee of the Nature Conservancy" or "a landowner in the town of La Cueva"). There will be space on the consent form for you to list identifiers he/she would be comfortable with. We will work together to make sure the descriptive identifier is suitably broad to maintain your anonymity.

(reminder: if you change your mind during or after the interview, you may switch from one level of confidentiality to the other.)

Please initial one of the following regarding the use of an audio recording:

_____ I consent to the use of an audio recording device during the interview

_____ I do not consent to the use of an audio recording device during the interview

By signing below, I agree to participate in the above described research study. I have had an opportunity to ask questions and all questions have been answered to my satisfaction.

_____   _____   _____
Name of Adult Participant   Signature of Adult Participant   Date

_____   _____   _____
Name of Research Team Member   Signature of Research Team Member   Date

Appendix D: Full list of interview questions

1) **personal background and involvement with forest restoration**
   a. Where do you live, and how long have you been living there?
   b. (if applicable) How long as your family been here?
   c. What do you do for a living? What background do you have in forestry, ecology, or environmental studies?
   d. Have you done any forest restoration work on your land? If so, how did those projects come to be? What were the steps you took to make restoration happen?
   e. Do you know of other people doing restoration work in the area?
2) **their connection to the local area and what they value, both socially and ecologically**
   a. What are your general thoughts about the Santa Fe community?
   b. What are your favorite places?
   c. What do you value most about living in Santa Fe County? What do you value most about this land? This community? Why?
   d. What do you want to see changed in Santa Fe County? Will forest restoration help?
3) **how they define and think about restoration;**
   a. How do you define forest restoration?
   b. Do you think it is important to conduct forest restoration in Santa Fe County? Why or why not?
   c. What makes a restoration project successful? What makes it unsuccessful?
   d. How do you want the forests in Santa Fe County to look in 5 years? In 50 years?
4) **their relationship to the agencies doing restoration**
   a. What is your relationship with organizations doing forest restoration?
   b. What are they doing that's working well? What would you like to be done differently?
   c. What do your neighbors think about restoration work?

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