

**Burning to Learn, Learning to Burn:
Transforming Organizations and Professionals through the
US Fire Learning Network**

by
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ABSTRACT

Since the 1970s, the institution of fire management has been in a frustrated transition from fire suppression and control to ecologically informed fire management. Administrative boundaries, professional specializations and organizational incentives and funding mechanisms have stalled the adoption of landscape scale ecological fire restoration as a guiding paradigm. Using a case study approach, this dissertation examines the potential of a multi-scalar collaborative network, the US Fire Learning Network (FLN), to catalyze the changes necessary to overcome the frustrated transition. Established in 2002 in an agreement between the USDA Forest Service, The Nature Conservancy, and the US Department of Interior, the FLN operates at landscape, regional and national scales. In this multi-scalar context, the network utilizes planning technologies, communication modalities, and interpersonal interaction to link participants at each scale and motivate them to enhance their collaborative ecological restoration planning capacities. The network directly addresses the challenges of the frustrated transition by enabling practitioners to collaborate across administrative and disciplinary boundaries, develop expertise in ecological fire restoration planning and management, and to inform policy changes at the federal level that can create new incentives and funding mechanisms that support landscape scale ecological restoration. While institutional transformation has yet to occur, the FLN sets the stage to address the core challenges that fire management practitioners and organizations face as they engage in landscape scale ecological fire restoration. This work provides theoretical and practical insights to collaborative planning research by introducing new forms of collaborative practice, describing how collaborative planning can be conducted across multiple scales simultaneously, and establishing how multi-scalar collaborative networks may be able to catalyze institutional change necessary to respond to complex cross scalar environmental problems.

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Chapter 1

Introduction

Through the power of collaborative networks and partnerships, federal agencies, state governments, and the industrial and scientific communities can come together to achieve the goal of sustainability for people, prosperity, and the planet.

~Mike Leavitt, Former Administrator, US Environmental Protection Agency

Collaboration is transforming in the sense that you don't leave the same way you came in. There's some sort of change. You give up part of yourself. Something new has to be created. Something happens differently because of the process.

~Public agency director (cited in Thomson & Perry, 2006)

The Fire Crisis and the Need for Change

Fire is a mesmerizing and frightening phenomenon. It gathers people when contained and sends us packing when unleashed. Human interaction with fire has always been dichotomous: on one hand, humans have harnessed the power of fire as a tool for human purposes including heat, energy, light, and landscape alteration; and, on the other, humans have attempted to fight against the power of fire as it destroyed the environments they either created or wished to protect for their uses. This relationship between humans and fire separates us from all other species of the Earth, for we are the only species that can kindle, sustain, and spread fire across the landscape (Pyne, 2001a, p. 52) as well as the only species that can work systematically to extinguish it.

Fire cycles are a natural part of many ecosystems as cataclysmic disturbance is an essential part of ecological progression in many regions throughout the world (Rossotti, 1993). Despite the fact that fire is a natural phenomenon, in the modern context of industrial societies, “fire history reflects the political economy of ranching and forestry as much as it does the spasms” of global climatic phenomena (Pyne, 2001a, p. 23). With humans at the center of the story of fire on the landscape, fire, society and nature are intertwined in a biocultural dance. Debates about the role of fire on the undeveloped landscapes of the United States have taken

shape alongside the emergence of land management agencies charged with multipurpose missions for guiding land use on public lands. As the missions and institutional cultures of these agencies developed throughout the 20th century, a dominant narrative about fire and its management became deeply embedded into the organizational cultures of fire management agencies. The United States Department of Agriculture Forest Service (USFS) sat at the pinnacle of the fire management institution and systematized fire control and suppression.

Since the 1970s, fire management institutions have been in a state of frustrated transition. Disturbance ecology taught that the role of fire on many ecological systems was not only natural, but necessary for the renewal and sustainability of certain ecological functions. The long standing practice of suppression was blamed for increasing risks of disease, pest infestations, and conflagrations. Fire management organizations became over-stretched in terms of resources and capacity to respond to an ever-worsening crisis caused at least in part by an overzealous effort to eliminate fire. As ecosystems deteriorated and fires burned hotter and bigger, fire management organizations, especially the USFS, responded by making incremental changes to the procedures and protocols that guided their work. But, through the end of the 20th century, despite a widely legitimized recognition of the sources and preferred responses, the crisis persisted and fire suppression continued to dominate fire management expenditures and practice on the ground.

The fire management crisis is indicative of emergent challenges in environmental planning and policy in the 21st century. These challenges are characterized by great complexity, dynamism and uncertainty which require adaptive responses from land managers. The crisis of how to manage fire while balancing multiple competing management goals and other complex environmental challenges such as climate change, peak-oil and energy, and diffuse sources of fresh water contamination suggest that the next wave of environmental management will have to

respond to dynamic, complex, cross-scalar problems that defy existing institutions of governance including existing approaches to cooperation and coordination. These problems cross jurisdictional and administrative boundaries at all levels of government and even traverse national boundaries. Management of specific environmental media such as water, air, or toxic waste separately fails to integrate the complexity and connectivity of ecological systems and functions. Responding to these challenges will require a transformation of existing professional practices and ways of knowing, organizational systems and institutional structures. The need to change social-ecological system functions and relations requires a corresponding change in social and political institutions. Examining how to catalyze these needed changes is the core focus of this dissertation.

This study focuses on the challenges and opportunities for social change that have emerged from a multi-scalar collaborative planning effort. I use the US Fire Learning Network (FLN) as an example of a multi-scalar collaborative endeavor to gain insights into how to expand the reach and scope of collaborative environmental management. A multi-scalar collaborative is an interconnected system of two or more distinct groups operating at different organizational and spatial scales. For example, Margerum and Whitall (2004) describe a multi-scalar collaborative in the Rogue River Basin in which several watershed groups were linked to a regional entity, the Rogue Basin Coordinating Council, that aimed to provide technical assistance and advice to each participating group. The council operated at a regional or river basin scale while each watershed group operated on a local level.

The FLN links multiple place-based collaboratives together into a larger network at regional and national scales. Landscape collaboratives consist of multiple diverse stakeholders from across agencies and organizations that have an interest in fire management in a particular

landscape. Their broadly shared aim is collaboratively to develop ecological restoration plans for fire adapted ecosystems. Collaborating groups are connected at regional scales that usually span multiple states. These regional networks bring leading participants of landscape level collaboratives together to enhance their capacities to engage in collaborative processes effectively and develop robust ecological restoration plans for fire adapted ecosystems. The national network links regions together, provides a framework for planning, and fosters communication and sharing of lessons learned across the entire network.

The FLN has the potential to inform various questions related to how to structure multi-scalar initiatives, what kinds of collaborative processes promote learning within and across scales, and what results may emerge from such endeavors. Of particular interest to me is how the network can foster changes in fire manager and organization practices. Specifically, I seek to examine how the FLN can lead to the integration of landscape scale ecological fire restoration tenets and practices in the plans, policies, and practices of public land management agencies. Can the FLN help overcome the barriers that have led to the frustrated transition in fire management?

US Fire Management: A Frustrated Transition

In Chapter 2, I clarify the context of fire management by providing an overview of the history of fire management in the 20th century. The dominant paradigm of wildland fire management in the United States has been grounded in the rhetoric and action of fire suppression. That approach focuses on the security and safety of human communities as well as the protection of valuable property and natural resources.

Since the 1970s, the fire management institution has been in a frustrated transition. Disturbance ecology clarified that fire played a valuable role in many ecosystems. By the end of the 20th century, fire management officials widely recognized that a new approach to fire management was needed. Though many within the fire management institution recognized and articulated the need to engage in more ecologically informed fire management practice, practice on the ground was slow to change. Fire suppression remained embedded in the institutional structures, organizational incentives, budget setting approaches, and professional practices of agency land managers.

The barriers to engaging in landscape scale ecological fire restoration were many though three barriers stand out as particularly important. Administrative boundaries for management limited the extent to which fire professionals were willing and able to enact management strategies across entire ecosystems or landscapes. Funding streams and wildfire management policies privileged hazardous fuels reduction and property protection over ecological restoration action. Agency land managers were also constrained by a series of accountability measures that hindered integrated management and created incentives to burn acres, but not necessarily for ecological purposes. These factors, along with deeply embedded professional ways of knowing and practices of resource management professionals, stalled progress toward undertaking ecological restoration of fire adapted ecosystems at landscape scales.

Methods and Analytical Framework

The purpose of this dissertation is to respond to the question: How and to what extent can multi-scalar collaborative networks catalyze institutional change? I have chosen to respond to this question through a detailed case study of the US Fire Learning Network, a multi-scalar

collaborative network designed to accelerate the implementation of ecological fire restoration across the United States. A case study is useful for developing theoretical insights that illuminate core aspects of a particular social problem or phenomenon (Stake, 1995; Yin, 2003). In order to examine the potential of collaborative networks to lead to institutional change, I develop an analytical framework for examining the sources, nature and scale of change evident within the case under study.

The analysis of change animates debates in social theory about how change occurs and under what conditions. I draw on this theoretical foundation for my analysis of the FLN as a catalyst of change. In particular, I utilize the work of Anthony Giddens (1986) and his theory of structuration to understand how social structures can be influenced by the acts and practices of individual social agents. Structure and agency are in dialectical tension in this conceptualization, enabling change through individual or collective acts within a social system.

Building a context for the potential to foster change in the fire management institution, I draw on the work of Ann Swidler (1986) to articulate how social change can emerge in unsettled social-cultural periods when a previously dominant worldview comes under scrutiny. In these times, new worldviews and social practices become tried and tested. As these cultural models are enacted in specific locations and situations, they either obtain legitimacy and “take root and thrive” or fail to capture widespread support and “wither and die” (Swidler, 1986, p. 280). Social change emerges as new worldviews are considered, new strategies of action are tried, and institutional structures slowly change to enable practices that are consistent with new cultural constructs.

I further situate my research in the context of theories of organizational and institutional learning and change. The work of Argyris and Schon (1978, 1996) provides a foundation for

understanding how organizational learning can be detected and what kinds of acts can facilitate change at this level. Scholars studying institutional learning and change are much more theoretically than empirically grounded. However, the work of neo-institutional theorists informs my analysis of the potential for multi-scalar networks to catalyze broader social change (Nielson, 1993; North, 1990; Scott, 2003).

Given this theoretical foundation, I analytically seek to identify the nature of change, the scale or scope of change, and the sources of change that emerge from the FLN and influence the broader fire management institution. I focus my analysis of the FLN on its design, processes, and outcomes, and trace external impacts on organizational plans, policies, and practices. Specifically, I examine how the design, functions, and outcomes of the FLN lay the foundation for a network of collaboratives to generate the principles and practices of landscape scale ecological fire restoration. I characterize the nature of change as reflecting these principles and practices in the broader fire management institution. In terms of external impacts, I identify how the network fosters changes in organizational plans, policies, protocols, and practices at multiple levels in the fire management institution. In tracing these external impacts, I identify the nature of change, that is, the specific practices associated with landscape scale ecological fire restoration that were adopted by individuals or organizations in the fire management institution. I clarify the sources of the change, that is, the individuals, mechanisms, and forums through which the change was enacted. Finally, I characterize the scale of change, noting the level of organizational and institutional systems that landscape scale ecological restoration practices were adopted and enacted or codified. This analysis provides an opportunity to respond to the core question of the dissertation as well as address several key themes that arise within the collaborative planning literature.

Collaborating for Change

Chapter 4 examines the evolution of collaborative processes and how collaboration has been associated with learning and change. Over the last two decades, planning and policy researchers have exhibited growing interest in structures that facilitate learning across agencies and organizations to generate more nimble, adaptive, and relevant responses in the face of dynamic and complex problems (Hajer & Wagenaar, 2003; Innes, Connick, & Booher, 2007; Weber & Khademian, 2008). Building on theories of social learning, planners have advocated collaborative and communicative planning, public administrators have suggested inter-organizational networks, and management consultants have designed communities of practice to generate various types of learning and decision making forums to respond to these challenges.

While each of these fields provides useful rubrics for designing and managing collaborative processes with particular purposes, processes, and outcomes, they only recently have begun to reveal the specific challenges that collaborative processes face when operating at multiple scales. Multi-scalar collaborative processes are proliferating. These emergent multi-scalar collaborative endeavors may generate the potential for cross-scalar and cross-boundary learning and change.

There are several aspects of this research that promise to inform the study of collaborative planning and multi-scalar collaborative networks. First, this research provides a model for how collaborative planning can operate across multiple scales simultaneously. Within the multi-scalar context, this study introduces new kinds of collaborative approaches at each scale that extend the possibilities available to collaborative planners beyond traditional models of collaboration in the planning literature. Moreover, it introduces the potential of linking

collaborative processes across scales in a broader network, enhancing the development of certain kinds of capacities in collaborative planning by connecting distinct collaborative practice models.

Second, this research offers insights into how a multi-scalar collaborative network can navigate a core tension in the field: balancing the need for coherence across the system without undermining the need for creativity at each collaborative node. Operating across scales in which many participants in a network rarely if ever meet face to face, developing coherence in practice can be challenging. Yet, over-prescribing network activity can undermine creativity or lead to an exodus of members who cannot apply the network approach to their respective contexts. This study provides a theoretical framework through which to understand how network action can strike a productive balance between coherence and creativity.

Finally, this research explores the potential of learning and change to reach beyond the network to catalyze institutional change. Collaborative planning has been associated with individual learning and change, and to some extent to organizational learning. In this research, I suggest that by operating across multiple scales simultaneously, there is the potential to extend learning and change from individuals, to organizations, and even to institutions. While lightly theorized, this potential has been largely unexamined in collaborative planning literature.

US Fire Learning Network

I examine the question of how and to what extent multi-scalar collaborative endeavors can catalyze institutional change through a detailed qualitative case study of the US Fire Learning Network (FLN), a collaborative project between The Nature Conservancy (TNC), US Department of Agriculture Forest Service (USFS), and the land management agencies of the US

Department of the Interior (DOI). The FLN is the most active of the several conservation learning networks that TNC has initiated in recent years to expand its impact beyond the boundaries of the lands it owns and manage. Through these networks, TNC is sharing knowledge to influence how others manage landscapes that the Conservancy deems ecologically important for biodiversity preservation. In the case of the FLN, the objective is to shape how fire is managed on wildlands in the United States to encourage landscape scale ecological restoration of fire adapted ecosystems.

Chapter 5 provides a detailed overview of the creation, purpose, design, processes, and outcomes of the FLN. Over time, the FLN evolved into a multi-scalar collaborative planning effort that aimed to generate and disseminate innovative approaches to integrate ecological fire restoration into fire management practice. It operated at three distinct but interconnected levels: national, regional and landscape.

FLN landscapes generally function as multistakeholder collaborative planning efforts. They draw together representatives from organizations with an interest in fire management to develop ecological restoration plans for fire adapted ecosystems. Guided by specific planning protocols and utilizing specific technologies, these collaboratives work over a two year period to shape a plan that articulates a common vision, set of objectives, and specific strategies for achieving ecological restoration goals across organizational and jurisdictional boundaries.

The FLN regions gather leading participants from a group of landscapes in geographic proximity to review planning products and processes among their peers. In these forums, landscape representatives present elements of their plans and describe their collaborative efforts to each other and then receive feedback and generate creative responses to specific challenges that hinder progress on each landscape. As they engage in regional forums, participants clarify

techniques to enhance both their capacities to develop ecological restoration plans and guide or participate in collaborative planning processes at the landscape level.

Finally, the national network provides a framework for engagement, publications to disseminate success stories and lessons learned, and a professional staff to mentor network leaders and nurture relationships. The national staff also aims to build legitimacy and support for the network with participating organizations. The network has been able to generate a variety of outcomes including increasing restoration on the ground, increasing funding for restoration for specific projects, expanding collaborative capacity, promoting innovation in ecological fire restoration practice, and enhancing landscape scale ecological restoration planning.

FLN and the Network Imaginary

In Chapter 6, I focus my analysis on how the FLN guided participants to generate fire management plans and practices that were coherent with landscape scale ecological fire restoration tenets. I describe how the use and circulation of specific technologies, planning guidelines, and media fosters the creation and dissemination of common narratives, assumptions, expectations, and practices for fire management throughout the FLN. As they develop plans or modeling systems, network participants reinforce the guiding purpose of the network, namely to engender a collaborative approach to engage in the restoration of fire-adapted ecosystems. Common understandings and practices are communicated throughout the network via a variety of media outlets including newsletters, websites, publications, a listserv, presentations and field excursions. In short, they create a what Goldstein and I (Forthcoming 2009a) have labeled a “network imaginary”.

The network imaginary aids in navigating one of the core tensions of multi-scalar networks. Namely, it provides necessary coherence and comprehensibility across the entire

network while not undermining the creativity and flexibility that are the hallmark of collaboration. The coherent understandings and practices that permeate the network do not impose a disabling control over the landscape collaboratives. Though their plans and products are coherent and comprehensible across the network, each landscape team maintains flexibility and creativity to respond to conditions and challenges specific to its respective contexts. Still, the network imaginary allows participants autonomously to speak with one voice, aligning their assumptions, expectations, and practices with landscape scale ecological fire restoration.

Fostering and Motivating Change beyond the Network

Next, I focus on the influence of FLN participants and products beyond network boundaries. Chapter 7 describes how FLN practices are becoming increasingly evident in the functions, policies, processes, or outputs of organizations. I provide examples that demonstrate where changes in plans, protocols, and actions at various organizational levels can be linked to FLN participants and products. Following the work of key individuals and planning products produced within the FLN, I describe how network practices and products were introduced outside the network and what changes resulted over time.

I focus on how the FLN is generating practices that address the central barriers of the frustrated transition. Specifically, I examine how FLN participants and products are able to foster greater focus on ecological restoration in planning and implementation practices of the USFS. I describe how the FLN has facilitated greater collaboration across organizational boundaries and within organizations, enabling landscape scale and integrated ecological management. Finally, I outline ways in which the FLN has been able to inform incremental changes to funding streams and policy mandates that soften the barriers to landscape scale ecological fire restoration action.

Taken together, these examples point to the potential that FLN can catalyze change toward the integration of landscape scale ecological fire restoration as a primary practice within the fire management institution.

Multi-scalar Networks and Institutional Change

In Chapter 8, I revisit the key themes that emerged in this study to synthesize how multi-scalar collaborative networks such as the FLN have the potential to catalyze institutional change, particularly in unsettled institutional environments. I focus on two aspects of the network. First, I focus on the internal workings of the network and describe how it generated a coherent imaginary that permeated all levels of the network, and in so doing, fostered coherence without undermining creativity. I show how through the linkages across scales within the network, the practices associated with landscape scale ecological fire restoration were generated, refined, and distributed. In particular, the network was effective in fostering and enhancing the capacities of fire management practitioners to engage in ecological restoration planning through collaborative planning processes. The effectiveness of the network model in generating and refining these practices rests on its use of specific kinds of collaborative practice models at each scale to achieve particular objectives and linking these models through various mechanisms of circulation.

Second, I clarify how the FLN was able to extend these approaches and practices beyond the network. The network creates the arena within which individuals are motivated to go back to their home organizations and push for the changes needed to accomplish their common goals. They formulate and refine their specific goals through the FLN process generating plans of action that are at once coherent with a larger vision of landscape scale ecological restoration and particularly applicable to the ecosystems and organizational structures within which practitioners

work. Because the network is effective at generating a network imaginary to tie everyone together, the consistency with which people communicate the practices of landscape scale ecological fire restoration reinforces the impact of the network on participating professionals and organizations. Using planning products, success stories from the network, and scientifically defensible arguments for ecological restoration, practitioners in specific landscapes were able to influence organizational plans and practices to incorporate landscape scale ecological restoration approaches. Built into the multi-scalar model is a capacity to generate change at multiple levels at once. Emergent effects can be witnessed at local levels, regional levels, and national levels as the network becomes increasingly prominent and integrated into the programs and policies of the USFS and associated agencies and organizations that comprise the institution of fire management.

Building on these reflections, I describe the potential of the FLN or similar multi-scalar collaborative networks to foster broader institutional change. The FLN was able to serve as an incubator of new kinds of fire management purposes and practices from within the fire management institution. It specifically addressed aspects of fire management policy and practice that had stalled the transition to ecologically informed fire management. Thus, the FLN does not serve as a mechanism to redefine or replace the entire fire management institution. Indeed, it does little to threaten the existing authority and legitimacy of fire management professionals and organizations. Rather, it provides a constructive approach to respond to a widely recognized need for change in fire management practice. In this way, while its approach may not be revolutionary, the FLN does indeed have the potential to facilitate an institutional transformation in fire management that has been stymied for nearly four decades.

While my analysis of the FLN is favorable, I do not mean to suggest that this particular model is applicable to all policy problems or planning efforts. Nor do I wish to imply that the FLN is an ideal type. There are numerous limitations to this collaborative approach and its implementation is, of course, uneven across scales and locations. However, recognizing that scaling up collaboration will be necessary to respond to complex cross-scalar environmental problems, finding ways to link collaborative processes together across multiple scales will be essential to generate relevant responses to these emergent challenges. By linking multiple collaborative practice models and aiming to engender learning through practice across organizational and spatial scales, I suggest that the potential exists for this type of collaborative planning network to foster institutional or system-wide learning and change in ways that can more effectively respond to complex cross scalar environmental problems. The purpose of this dissertation is to articulate how this might occur and what it implies for collaborative planning theory and practice.

Chapter 2

Fire Management Discourse and Practice: A frustrated transition from suppression to restoration

Policy is enunciated in rhetoric; it is realized in action.

Herbert Kaufman, The Forest Ranger, 1960

Fire historian Stephen Pyne (2004) writes that three dominant narratives can be told about fire on the natural landscape. First, fire's narrative is one of birth through natural combustion scattered unevenly across the globe, growth as humans harnessed and spread fire into places previously unburned, and decline as humans have both altered the land to be incompatible with fire and have worked to suppress it on fire adapted landscapes. This is the story of flames, their rise in the natural world and fall at the hands of humans.

The Imperial Narrative intersects fire's narrative as a story of control of public lands for conservation purposes. Colonial powers in Europe began reserving land in the colonies to ensure that parochial interests would not undermine the orderly growth of colonial (and by association metropolitan) economies. Government institutions were created to manage these landscapes and protect the commonwealth, extirpating local citizenry and their irresponsible and flagrant burning from the land.

America's Narrative, Pyne suggests, arises amidst the imperial narrative applying a militaristic approach to organize armies of firefighters for the broader war against fire. The emergence of public lands and government agencies to manage them at the beginning of the 20th century centralized control of millions of acres across the United States in the hands of public administrators, particularly experts trained in professional forestry. The profession taught foresters how to maximize the economic outputs of forests through timber production and how to

avoid damage by eliminating fire from the landscape. Throughout much of the 20th century, this dominant narrative about fire and its management underpinned to policies, rules, funding streams, and professional practices that supported this approach, overseen by the nation's leading forestry agency, the US Department of Agriculture Forest Service (USFS) (Langston 1995; Nelson 2000; Arno and Allison-Bunnell 2002).

Over the last four decades, the fire management institution has been in a period of frustrated transition. With the rise of disturbance ecology in the 1970s and ecosystem management in the 1990s, rhetoric and policy began to reflect alternative perspectives which emphasized to varying degrees fire's natural role ("let it burn"), the need to restore ecological fire regimes, a desire to reduce hazardous fuels, and the will to protect personal property values and human safety. While the rhetoric of policy, plans, and officials for nearly four decades has embraced alternative perspectives including ecologically informed fire management, action on the ground has been slow to change. Into the first decade of the 21st, institutional barriers to transforming fire management from suppression focused to ecologically oriented approaches remained high. Organizational incentives, protocols, budgets, and cultures reinforced engaging in an ongoing war against fire. Prescribed burning and ecological restoration of fire adapted ecosystems were marginalized in practice.

In order to set the stage to understand the transition underway in fire management, I first outline the historical foundations of the fire management profession and its connection to the mission and policies of the USFS. I characterize the dominant fire management discourse as grounded in the language of war—fire is an enemy that must be conquered in order to maintain stability and economic production outputs associated with forests. Second, I describe alternative and counter narratives that emerged as ecology and ecosystem based thinking entered the fore

and focus on how these emerging narratives have influenced fire management strategies and understandings within land management agencies. To conclude, I characterize the frustrated transition of fire management organizations, in particular, the USFS.

‘Fire as Enemy’: The Forest Service at War

The emergence of a fire management paradigm in the United States, paralleled the development of the nation’s forestry profession and public land management organizations. Professional forestry practice is a relatively recent import to the United States, arriving in the late 19th century. European standards of scientific forestry animated the American approach. Scientific forestry sought to manage natural systems to maximize productive output (Hays, 1999; Pyne, 2004). This model did not permit disturbance, and therefore, called for the removal of fire. At the same time, government agencies created to manage public lands were staffed by trained forestry professionals. By the time the nation’s forest program came under the purview of the USDA Forest Service (USFS) in 1905 with Chief Gifford Pinchot, the agency’s mission had narrowed to the preservation and protection the forest reserves. Though the mission of the USFS included watershed protection and recreational goals, these were secondary to the economic production of timber (Alverson, Kuhlmann, & Waller, 1994; McQuillan, 1993). In this way, these organizations, in particular the USFS, became the core of the institution of fire management and defined a path toward the total control of fire on the American landscape.

To Pinchot and others of the conservation movement, management of the nation’s forest reserves involved “the development of a trained forestry force to control fires, tackle disease problems, and supervise cutting and sales” of timber to secure a sustainable yield (Hays, 1999, p. 36). With foresters acting like gardeners of the woods (McQuillan, 1993), the economic resource

of timber was central and fire was understood as a threat. As Langston (1995) has argued in her study of the decline of the ponderosa pine forests in the Blue Mountains, “Two major things seemed to endanger the pine forests: loggers and fire. Fire killed young trees, and since young trees were the future of the forest, fire was clearly the enemy. Loggers threatened pine forests by cutting them down” (pp. 27-28). Rapacious and unchecked logging followed by slash fires often ignited by errant sparks from steam locomotives had caused foresters to question the ability of forests to recover from such devastation and supply the nation with its timber needs (Langston, 1995; Pyne, 2004). This chaos inspired forestry to engage in “the conversion of the continent’s vast expanses of old-growth, ‘mixed up messes’ of inherited forest canopy, into regulated, regimented, uniform stands of ‘thrifty’ young trees, vigorous producers of wood fiber in perpetuity” (McQuillan, 1993, p. 192). In this context, fire contributed to the chaos and destroyed the purposefully designed forest “gardens.” Indeed, foresters understood that “nothing could be done about honest forestry until fires were controlled” (Pyne, 2004, p. 35). With an understanding that fire was constituted a chief threat to timber production, the USFS became the primary agency charged with the management and control of fires on America’s public lands (Pyne, 1997a).

By the first decade of the 20th century, the Forest Service quickly took institutional and intellectual control of fire management. Institutional control was obtained through cooperative programs with other agencies, private firms, and the states while intellectual control emerged as the Forest Service spread European forestry methods and fire control techniques to collaborators, especially state forest agencies. In short order, the Forest Service developed the foundation for a “national *system* of fire management” (Pyne, Andrews, & Laven, 1996, p. 247), an institutional web of relationships and knowledge practices dedicated to controlling fire.

This focus on fire suppression was solidified by early challenges to control fire by the fledgling agency. A key testing ground for the Forest Service flared up in the Great Fires of 1910. The Service's fire suppression abilities were pushed to the limit when extreme winds and heavy lightning led to extensive wildfires that cut through Idaho and Montana killing 85 people, destroying many communities, and burning through 3 million acres of land (Pyne, 2001b). This conflagration put pressure on the new agency to define its goals relative to fire and, in many ways, shaped the agency's approach to fire for the next several decades. Fire had become an enemy to be subdued as it threatened human lives and valuable property. In response, the Forest Service, under the direction of Henry Graves who succeeded Pinchot as Chief of the Forest Service in 1910, established a policy of fire exclusion. Graves, who had fought on the front lines of the Great Fires, noted that 90 percent of the work of American forestry was fire protection, that forestry "would succeed or fail most simply according to its capacity to subdue free-burning fire" (Pyne, 2004, p. 36).

While some foresters and timberland owners promoted the idea of light burning for timber management, the Forest Service instead argued that fire was destructive and unnecessary (Arno & Allison-Bunnell, 2002; Carle, 2002). Some individual biologists suggested that allowing fire to burn under certain conditions might be necessary for proper management of some species. Professional loggers experimented with "light burning" on their own lands. Nevertheless, the Forest Service promoted the image of fire as an enemy to be conquered. Leading foresters in the agency resisted proposals for "light burning" and characterized them as "Paiute forestry" an indigenous fire practice that had given way to total fire suppression, the product of scientific reason and western civilization (Pyne 1982). For the next several decades, this understanding of fire would dominate discourse and action on the nation's wildlands. Fire

suppression entailed an enormous investment of resources, expertise, and personnel at the agency (Langston, 1995; Pyne, 2004; Schiff, 1962).

In some cases, capacity to respond to fires on the wildlands simply did not exist. Following the Great Fires of 1910, the Forest Service struggled to realize its own fire exclusion policy and, in an effort to save money and lacking resources of technology, allowed fires in some unsettled areas to burn (Devine, 2004). Thus, accessible landscapes and those near human settlements became the primary targets of fire control. Nonetheless, with the rise of Franklin Roosevelt's New Deal, the Civilian Conservation Corps, and continued fervor within the agency to fight fires, the Forest Service became more and more efficient at fire suppression efforts. Starting in 1935, the agency gathered its resources "in a paramilitary campaign against fire under the Forest Service's 10 A.M. Policy" which stated that a fire was "to be controlled by 10 A.M. the day after it was reported" (Arno & Allison-Bunnell, 2002, p. 20).

In its dominant national narrative about fire on wildlands, the Forest Service, began to adopt the organization and language of military operations in times of war (Arno & Allison-Bunnell, 2002; Lowe, 2000; Martell, 2001; Pyne, 1997a, 2003; Rossotti, 1993). Metaphors of war abounded in the agency's depictions of its work. Preparing the "weapons of combat" (Rossotti, 1993) to engage in the "moral equivalent of war" (Pyne, 1997a) on the "battlefield" of the firefight (Pyne, 2003) placed fire in the role of an 'enemy' both to humans and to trees, an enemy that had to be defeated through suppression and exclusion.

The Forest Service directed public sentiment toward support of fire suppression as metaphors of war and destruction conjured up images of the battlefields of World War II (Pyne, 1997a, 2004). Firefighting became more deeply connected to national defense. Surplus military equipment from World War II and Korea strengthened the Forest Service's arsenal against fire.

Metaphorically, the Forest Service's war on fire became a tangible, but elusive struggle of the Cold War era (Pyne, 2004). Mechanization of firefighting teams led to greater effectiveness and the number of acres burned dropped dramatically in the post-war era (Arno & Allison-Bunnell, 2002; Pyne, 1997a).

Fire professionals examined the means, not the ends, of fire management. They worked on "imagining new concepts to guide fire protection planning, inventing better tools for firefighting, devising better techniques to detect and hit fires quickly" (Pyne, 2004, p. 93). Although the counter-narrative of "light burning" existed at the turn of the twentieth century, foresters were steeped in the fire exclusion approach which argued that keeping the flames out of the forests led to greater timber production and less risk of losses (Pyne, 2004). Their training as professionals and their role "as disinterested civil servants" meant that they were set apart and above the counter-narrative advocates who were either naïve, technically incompetent, or politically motivated (Pyne, 2004, p. 95). A sense of superiority suffused agency personnel who touted their science against the folk wisdom of the locals. The professional foresters "argued for systematic regulation of burning that would support, not confront, professional forestry...they conjured up a vision of conservation, the rational industrially efficient exploitation of natural resources... Fire fighting was the pragmatic merger of idealism with reality by means of applied science" (Pyne, 1997b, p. 187). The Forest Service largely functioned "as though it were actually possible to manage and control nature through scientific processes" (Nelson, 2000, p. 32), and fire control became one of the primary activities and sources of expenditures of the agency. The guiding narrative held that "forestry professionals would put expert management techniques to work to suppress forest fire, bringing wild nature under human control and preserving the timber inventories of the forests for future human use" (Nelson, 2000, p. 38).

The Forest Service's organizational priorities regarding fire took shape in the hills of Idaho and Montana in 1910 and the lines were deeply drawn. The 10 A.M. policy remained in effect through the 1960s. The social and political focus on economic production through the maximization of forest output was widely accepted in USFS. Control of the rural frontier fire gave way to focused efforts to control fire on the backcountry and wildlands. Exclusion and suppression of a mortal enemy would dominate both the discourse and action of fire management for more than 60 years.

'Fire as Natural': The Counter-Narrative to Suppression

Alternative narratives existed alongside the dominant one throughout the 20th century. A principal counter-narrative described how 'light burning' was healthy for forests and would flush away combustibles that otherwise would pile up under suppression leaving a tinder box for conflagrations (Pyne, 2004). As early as the turn of the 20th century, a few biologists, professional foresters, and private timbermen advocated for the use of fire to enhance the productivity of timber. Their experiences and observations regarding light burning suggested that fire was not uniformly an 'enemy' to all types of forests. In particular, the pine forests of the Southeast US depended upon fire for the health and reproduction of certain species of pine trees. Thus, fire was allowed on these landscapes by the end of the 1940s for the purpose of maintaining timber yields. This exception was granted because the role of fire in those particular forests enhanced the economic production of timber, the primary goal of the Service. However, it was not widely publicized as the focus on fire suppression remained paramount (Schiff, 1962).

In the social upheaval of the 1960s and 1970s, new public values began emerging and the purpose of national wildlands was redefined. A discursive shift in fire management emerged

alongside the social and environmental movements of the period. Public values began to gravitate toward a focus on preservation of nature, recreational opportunities and wilderness for its own sake more than economic resource production of range and timber. The passage of the Wilderness Act in 1964 “posed fire policy conundrums that were difficult to answer within the existing fire-fighting paradigm” as it required letting nature take its course in the wilderness (Nelson, 2000, p. 25). The wild and the natural gained favor in the eyes of an increasingly urban populace.

Meanwhile, the role of fire in ecosystems became a focus of scientific study and efforts to reestablish more ‘natural’ fire regimes gained ground (Franklin & Agee, 2003). With the emergence of ecological sciences attuned to disturbance dynamics (Worster 1994), fire began to be seen not simply as a destructive force, but a necessary force of change and renewal. Within this scientific paradigm, fire suppression became anathema to responsible ecological management as it altered ecological conditions in fire-adapted ecosystems, causing outbreaks of pests, disease, and uncharacteristically large wildfires.

Thus, the discourse about fire began shifting toward a focus on its value as a natural part of many ecosystems, a stance that was supported by the emergent environmental movement. While the Forest Service had previously extinguished all fires, even on wilderness areas, this policy was challenged by new scientific understanding and shifts in public values. Simultaneously, the recognition that fire exclusion was draining resources and potentially causing more ecological harm than good weakened the suppression discourse within land management agencies (Pyne, 2004). Fire slowly reemerged on America’s wildlands. The National Park Service began introducing ‘natural prescribed burns’ into its most remote landscapes in 1968 and the USFS “formally announced its switch from ‘fire control’ to ‘fire

management' at the 1974 Tall Timbers Fire Ecology Conference" (Carle, 2002, p. 180). By 1978, the Forest Service began allowing controlled burning in select areas (Nelson, 2000). Fires in the wilderness lands of the nation became not only acceptable but desirable. Experimentation in prescription burning and letting natural fires burn became integrated into agency tactics and practices in fire management. The experiment was tentative as prescription and letting natural fires burn were tightly controlled activities, used in limited fashion, difficult to predict, and when the flames got away, the resulting burns became highly publicized failures.

'Fire as Contextual': Ecosystem Management

In the 1990s, a more diverse range of narratives began to emerge. The opposite ends of the spectrum, total exclusion or let-it-burn, began to give way to more complex models of fire management. Greater complexity characterized political debate as well as the fire community as a whole. Fire managers began to choose among a suite of options to manage fire in the context of each particular landscape. A focus on community-based solutions underlay what some have labeled *new forestry* (Franklin, 1989). The Forest Service embraced the ideas of this emerging paradigm in the 1990s and developed 'New Perspectives,' a policy initiative aimed at integrating new forestry concepts based on ecosystem management techniques into the agency (Kraft, 2004; McQuillan, 1993).

Simultaneously, institutional arrangements compatible with this reorientation were proposed within the rubric of "ecosystem management," officially adopted by the USFS in the early 1990's (USDA Forest Service, 1992). Ecosystem management emphasized scientific evaluation of management alternatives, collaboration across jurisdictions, and enhanced citizen engagement (Cortner & Moote, 1999; Randolph, 2003). Forestry practice focused on ecosystem

and landscape scales, sought to incorporate a range of social values and uses, and was more connected to community level economic and political systems (Kennedy, Thomas, & Glueck, 2001).

Instead of one simple guiding narrative, fire management was now informed by complexity, information sharing, adaptive management, and collaboration. The focus was on forest health and ecosystem management rather than simply economic output, although efforts aimed at defining economic valuations of ecosystem services have developed and are being explored widely (DeBano, Neary, & Ffolliott, 1998; Martell, 2001). As one observer has noted, “the main job of the New Forester is to maintain the forest ecosystem, not just produce wood. You might say that traditional foresters couldn't see the forest for the trees. For the New Foresters, the catchword would be—the forest comes before the trees” (Franklin, 1989). In this view, ecological health became a guiding objective of forest planning and management. As a result, fire management practices, particularly prescribed burning, would aim to achieve ecological goals.

Safety First: Reinvigorating Suppression

The focus on ecosystems in fire management was soon tested by a new conflict on the ground: the clash of urban development and wildlands. In no small measure, the ‘fire as enemy’ narrative was reinvigorated by the expansion of urban development into the rural fringe. The encroachment of human communities into forests and prairies led to media produced images of flames licking the sidewalks of suburbia, kindling public fears of wildfire. In sprawling metropolitan America, where the urban meets the rural or even the wild, “flame makes little

distinction between dried wood bunched together into a thicket and cellulose hammered into a cabin” (Pyne, 2004, p. 27).

The so-called intermix fire or fire in the wildland urban interface (WUI) has occupied (and perhaps sidetracked) the fire community for the last two decades. With an increased focus on private property protection, the focus on suppression has been reinforced in recent years (Dombeck, Williams, & Wood, 2004; Franklin & Agee, 2003). As exurban homes burn, there is little or no political or social choice besides gallant efforts to snuff out the offending flames. Personal responsibility and local land use planning are discussed in the abstract, but the immediate response is generally swift and thorough, as brigades of firefighters go to work (Dombeck, et al., 2004; Goldstein, 2007; Goldstein & Hull, 2008).

The intermix fire presented a significant challenge to the USFS’s effort to reintroduce fire on the landscape as it drew resources away from restoration initiatives to address fire concerns on forests that bordered urban areas. The focus on property protection and human safety proved potent in reinvigorating the narrative of fire suppression. In his extensive treatment of fire, fire management, and fire culture, Stephen Pyne notes that this metaphor continues to have an impact on fire management approaches and field tactics.

Even as fire management strives to expand beyond paramilitary suppression, no compelling metaphors exist to describe those tasks. Everything is reduced to the same tired, hackneyed phrases of firefight-as-battlefield. The effect is to discard or devalorize everything save suppression. Our metaphors do with language what firefighting has done to fire protection overall: they have distorted it to a single, unbalanced purpose (Pyne, 2003, p. 115).

Nonetheless, ecosystem management and the increasing costs of suppression activities continued to pre-occupy officials within the USFS. Jack Ward Thomas, Chief of the Forest Service from 1993 to 1996, observed during the particularly taxing fire season of 1996, that the

toll on both ecosystems and the institutions of fire management had reached a crisis level. In his journal, he observed

We must collectively begin to deal with the conditions that contribute to large, hot, and uncontrollable wildfire. ...it is clear that current conditions caused by a combination of fire exclusion, insect and disease control, insect and disease outbreaks, and drought (perhaps due to changes in weather regimes) are producing more and more fires. In spite of ever-increasing success in initial attacks on fires, more and more acres are burning on public lands (Thomas, 2004, p. 364).

He argued repeatedly in the agency and before Congressional committees that “presuppression” activity must be increased in order to enhance forest health and stem the relentless growth of costs linked to wildfire and its suppression in human life, property, and administrative engagement. As the end of the 20th century approached, officials in the Forest Service had largely accepted the idea that fire suppression and exclusion had contributed to the degradation of ecosystems and the intensification of wildfires across the United States, particularly in the West. In this context, they aimed “to shift their emphasis from fire suppression to prescribed fire and to redefine the national agenda from an obsession with the intermix fire to a program of restoration burning” (Pyne, 1997a, pp. 40-41).

Ecological Fire Restoration: a frustrated transition

High-profile wildfires in the early 2000's focused national attention on the normally insular world of fire management (Davis 2006). The continued infringement of development into the wildlands and the degradation of historic fire regimes which was blamed for exacerbating the intensity of fires collided. With private property, in particular people's homes, ever more threatened by increasingly damaging wildfires, the public was able to put a face on the devastation caused by rampant wildfire.

The fire seasons of 2000 and 2002 in particular raised public awareness and concern about fire policy. More than 90,000 fires burned in 2000, scorching nearly 7.4 million acres of land and costing federal agencies \$1.36 billion in fire suppression expenditures. In 2002, another 7.1 million acres burned setting records in Oregon, Arizona, and Colorado. Previous fire seasons since 1960 had rarely burned more than 5 million acres and only once before more than 6 million (National Interagency Fire Center, 2009). Images of thousands of homes burning, mourning the lives of fallen fire fighters, and the devastation wrought on the landscape and valuable forest resources were imprinted on the minds of the American public through the media (Vaughn & Cortner, 2005).

With public awareness heightened, fire fighter safety compromised, and agency budgets stretched, the Clinton administration, George W. Bush administration and Congress acted to address concerns about protecting communities, ensuring safety, minimizing resource loss, and restoring fire regimes to return fires to within a “natural range of variability.” Official wildland fire policy came to embrace multiple goals including ecosystem restoration, fuels reduction and community protection (Steelman & Burke, 2007). Both the National Fire Plan (USDA Forest Service & US Department of Interior, 2001) and the Healthy Forests Restoration Act (US House of Representatives, 2003) charted a course toward integrating greater consideration of ecological integrity and sustainability in fire management action.

While the ecological value of these policies have been debated (Vaughn & Cortner, 2005), they mandated that the public fire management agencies engage in collaborative planning and decision making in fire management and rank restoration projects based on the protection of human communities and criteria of ecological health. The National Fire Plan outlined four goals of fire management: improve prevention and suppression, reduce hazardous fuels, restore fire

adapted ecosystems and promote community assistance. Protecting human communities and municipal watershed is prioritized in the plan while there is a long term emphasis on restoring ecosystems (USDA Forest Service & US Department of Interior, 2001).

The Healthy Forest Restoration Act built on the goals of the National Fire Plan and maintained its focus on protecting human communities while outlining specific measures for ranking landscapes in need of ecosystem restoration. In Title I, Section 102 the act describes how to prioritize hazardous fuels reduction projects primarily based on Fire Regime Condition Class (FRCC). FRCC measures are based on a scale of one to three. A landscape score of FRCC 1 suggests that the ecological conditions on the landscape are slightly altered from historic conditions, FRCC 2 characterizes a landscape that is moderately altered and FRCC 3 a significantly altered one. Specifically, the Act states that fuels reduction projects should be ranked on wildland-urban interface lands in FRCC 3, wildlands that were in FRCC 3 or 2, and lands that served as endangered species habitat that required fuels reductions to improve that habitat. The emphasis on FRCC 2 and 3 as targets for hazardous fuels reduction projects predisposes management action on landscapes that are most departed from historic fire regime conditions. This brings an ecological focus into the decision making about hazardous fuels reduction projects.

Despite these changes in policies and management guidance, a full-scale transition to ecological restoration in fire management practice remains elusive. Instead, at the turn of the 21st century, the legacy of fire suppression persisted, in terms of acres, budgets, organizational incentives, professional practice and other aspects of institutional culture (Arno & Allison-Bunnell, 2002; Dombeck, et al., 2004; Pyne, 2004; Steelman & Burke, 2007). Rather than a lack of understanding about the need for ecological restoration, Pyne (2004, p. 52) suggests that “the

issue is not that we have failed to cross the divide, but that we have so little to show for having breached it decades ago.” As Arno and Allison-Bunnell (2002) clarify, while ecological science, agency rhetoric and even policy supports a change toward prescribed fire and other fire restoration treatments,

Actually making the change in emphasis from fire control to fire management has been elusive. Over the decades, professional and institutional rewards and incentives have been linked to fire suppression... The policy revision to integrate preventive management of fuels and use of prescribed fire with fire suppression did not include changes in rewards and incentives (Arno & Allison-Bunnell, 2002, p. 25).

By the end of the 20th century, “fully 98 percent of forest fires...were rapidly and effectively controlled” (Nelson, 2000, p. 22). Though the agencies recognized the need to apply controlled fires to millions of acres across the nation, in 2001, “US federal agencies treated less than 1% of the total acreage necessary” (G. F. I. TNC, 2004) due to myriad organizational constraints.

With the National Fire Plan (2001) and the Healthy Forests Restoration Act (2003), public land management agencies were charged by Congress to engage in more active ecological fire restoration, empowering agency leaders to try new approaches to fire management based on ecological principles. Officials in the Forest Service have highlighted the difficulty of reorienting fire management professionals acculturated to the narrative and in the practice of fire suppression as well as the organizational incentives that can create barriers to change (Jim Hubbard, personal communication, 4-27-07; Sarah Robertson, personal communication, 3-13-07). Barriers to engaging in landscape scale ecological fire restoration practices include the lack of fit between administrative boundaries and ecological boundaries, wildland fire management policies and funding that reinforce suppression practices, and organizational incentives and accountability mechanisms that continue to hinder more integrated management approaches that

would support ecological restoration. The following sections describe each of these factors in greater detail.

Policy barriers

Suppression oriented objectives continue to dominate wildland fire management policies and directives across all fire management agencies. While wildland fire use and prescribed fire are mentioned in interagency policy directives, particularly the 1995 Federal Wildland Fire Management Policy, suppression continues to be the central focus of and default response when fires are not caused by natural sources or prescription even if resource benefits could be procured from the fire (Wildland Fire Leadership Council, 2003).

In the case of natural ignitions, when valuable natural resource benefits can be achieved from allowing a fire to burn, managers can opt to designate an ignition appropriate for wildland fire use (WFU). Fire management plans have to be in place and define specific areas where ignitions can burn before such a designation can be applied. As of 1998, 88 of the 596 designated wilderness areas in the continental US had completed fire management plans and even in those areas many ignitions were still suppressed (Arno & Allison-Bunnell, 2002). An audit by the Inspector General of the USDA in November 2006 revealed that of the nearly “80,000 natural ignitions that occurred on Forest Service land from 1998 to 2005, only about 1,500, or 2 percent were allowed to burn as WFU” (USDA Office of the Inspector General, 2006, p. iii). Its audit found that current fire policies and the lack of qualified personnel trained in WFU limit the ability of USFS managers from making the choice to implement this strategy. Although Federal Wildland Fire Management Policy specifies that WFU and suppression should be equally considered in any fire event, the auditors argued that the Forest Service “bears considerable

pressure to begin fire operations as suppression” and once designated for suppression a fire event cannot be recategorized as WFU (USDA Office of the Inspector General, 2006).

Meanwhile, Forest Service managers continue to rank other social values over natural resource or ecological benefit. The persistent focus on WUI or intermix fire fighting has forced this issue. In 87% of wildfires responded to in 2003 and 2004, managers referred to protecting private property as one of the key reasons for employing fire suppression tactics (USDA Office of the Inspector General, 2006). The report suggested that this focus on protecting private property was perhaps overused in the context of fire management as it was more easily legitimized than other benefits of fire management practice.

Budgets disproportionately support suppression

Not only reinforced in wildland fire policy, federal budgets maintain a disproportionate focus on fire suppression activities. As described above, the increasing incidence of WUI fire has led to fervent support for suppression activities by the public and its elected officials. Moreover, it has generated a cycle of increasing budget allocations for suppression which has created pressure on USFS budget lines for other purposes, including fuels management and other ‘pre-suppression’ activities.

For decades, the budgeting process for fire-fighting relied on shifting funding from other line items or using surplus funds generated by timber extraction fees, so called KV funds. When firefighting costs exceeded the allotment in the budget, surplus funds from timber extraction fees generally covered the any overage. However, as timber extraction on public lands declined through the 1980s and 1990s, these funds became increasingly scarce.

Meanwhile, the wildland fire fighting budget is set at a 10 year average rate. Thus, while fire suppression costs incrementally increased over time and the budget allotment for wildland fire fighting likewise increased, the source of excess funds from timber activities slowly dried up. As a result, other line items within the USFS budget were tapped to address emergency needs when suppression costs exceeded the allotment within the overall agency budget. In this context, the overall appropriation to the USFS remained relatively steady. While wildland fire management (nearly all suppression) activities accounted for 13% of the Forest Service budget in 1991, that figure had grown to nearly 43% of the budget by 2006 (USDA Forest Service, 2009).

Increases in fire suppression expenditures translated into reduced spending in other areas. From 2005 to 2007, budgets for restoration on USFS lands declined from nearly \$13 million to less than \$2 million (Steelman & Burke, 2007). Suppression and hazardous fuels treatments comprise an ever increasing proportion of the federal wildfire budget at the expense of other activities such as restoring fire adapted ecosystems. The federal budget proposed by President Bush in February 2007 included a 23% increase in spending for fighting wildfires to \$911 million. Based on the 10 year average, the budget accounted for the fact that for four of the previous seven years, fire fighting costs had topped \$1 billion. Yet, in Congressional committee hearings, some lawmakers noted that while the increase in firefighting expenditures was necessary, the budget irresponsibly cut funding for “work done to thin overcrowded forest to reduce the risk of fire” (Daly, 2007) and restore ecological integrity. In practice, the fact that the USFS must borrow from other line items for suppression puts further pressure on these aspects of fire management (Steelman & Burke, 2007).

The budget challenge has been recognized by Forest Service Chiefs for several decades. In a joint statement to Congress, the Chiefs from 1979 to 2007 admonished lawmakers for not

adjusting the budgeting process, saying that “we wish to express in the strongest way that the Forest Service has been put into an untenable financial situation due to the way fire suppression funding is being handled in the federal budget” (Backus, 2007). Despite the fact that many in the USFS and beyond had recognized that the long term sustainability of forests and the fire program depended on pre-suppression treatments and ecological restoration action, the ongoing mission to live up to property and community protection alongside the growing costs associated with snuffing out increasingly catastrophic blazes each year limits the ability of the agency to make significant progress in restoring fire and reducing fuel loads.

Organizational incentives and directives hinder ecological restoration at a landscape scale

The organizational culture of the USFS has been long studied. Since Herbert Kauffmann published his seminal work, *The Forest Ranger*, in 1960, the agency has been recognized as a model of administrative efficiency and effectiveness. Though he characterized decision making in the USFS as decentralized, Kaufman (1960) observed a remarkably consistent “zone of acceptance” in which district level rangers and field officers would make decisions that their superiors would direct them to if they were standing over their shoulders (Tipple & Wellman, 1991). Through the first sixty years of the 20th century, the Forest Service was able to create a culture of “voluntary conformity” by moving personnel to connect them to the Service, not to place; by staffing from a single professional practice (90% trained foresters); maintaining consistent reporting and training requirements; and using symbols and rhetoric that would keep forestry professionals aligned with a consistent message and practice (Kaufman, 1960).

The next several decades tested the organizational culture of the Forest Service as a more complex mission emerged in the 1970s driven by changes in science, rhetoric and policy

wrought by the environmental movement and as a more diverse array of professionals populated the agency's ranks (Tipple & Wellman, 1991). The concept of ecosystem management heralded a new resource management paradigm, emphasizing environmental protection over commodity production, and less intensive management practices guided not only by experts and professionals, but involving greater input from a diverse array of stakeholders (G. Brown & Harris, 2000).

Despite the promise of change heralded by this shifting rhetoric and national policies that supported it, organizational change in the Forest Service came slowly. Values, norms, and beliefs that underlie a dominant paradigm in resource management “are often slow to change because they become interwoven in the fabric of organizational culture, professionalism, and bureaucracy” (G. Brown & Harris, 2000, p. 2). Indeed, bureaucracies resist integrating new knowledge and information as well as cultural shifts as they often are hierarchical, fragmented into isolated units, and steeped in a particular dominant paradigm that is difficult to unseat (G. Brown & Harris, 2000; Danter, Griest, Mullins, & Norland, 2000).

In the realm of fire management, the same organizational incentives and directives that have stalled broader change in resource management paradigms (G. Brown & Harris, 2000; Kennedy & Quigley, 1998) stall the change from a focus on fire suppression to landscape scale ecological fire restoration. While line officers and recruits in the early 1990s believed that the incentive structures of the USFS *should* reward professional competence, healthy ecosystems, and concern for future generations, they felt that values reflecting organizational bureaucracy were those *actually* rewarded: organizational loyalty, meeting targets, promoting the image of the Service, following agency rules and regulations, and working well with teams (Kennedy & Quigley, 1998). In many respects, these values continue to inform agency incentive structures.

In the case of fire management practice, specific incentives translate to certain opportunities and limitations to action on the ground. For example, targets for burning on Forest Service lands are measured in “acres black”. According to USFS personnel who participated in this study, the acres black target can translate to more acres being burned that are less valuable for ecological purposes than other acres (Jim Hubbard, personal communication, 4-27-07; Sarah Robertson, personal communication, 3-13-07; John Andre, personal communication, 6-14-06; John Omer, personal communication, 7-10-08; Leslie Weldon, personal communication, 11-20-07; Lauri Turner, personal communication, 11-8-07; among others). When approaching the end of burn season, agency personnel are faced with a dilemma. In order to maintain their budget lines they have to demonstrate the ability to perform certain tasks. Often, to achieve their target for acres black, they engage in burning the “easy acres” rather than the acres that matter most to achieve ecological restoration goals. As a wildlife biologist working on the Daniel Boone National Forest characterizes it, “We’re burning ... acres, but to get the acres, we’re picking the low fruit as they say—we’re taking the easy ones, the cheap ones...” but not always the best acres in terms of ecological objectives (John Omer, personal communication, 7-10-09).

Similarly, the ability to categorize a blaze for “wildland fire use” depends upon a district or forest having developed a fire management plan. Where they do not have a fire management plan, natural ignitions must be suppressed. In some cases, fire professionals in this study complained that even though they had plans to engage in prescribed fire activities on a particular landscape where a natural ignition occurred, without the fire management plan, they were unable to manage the blaze to achieve the desired ecological benefits and had to return later to conduct their prescribed burn after spending their resources on a suppression effort first (John Andre, personal communication, 6-12-06; Steve Osborne, personal communication, 6-13-06).

Another challenge to Forest Service staff interested in landscape scale ecological restoration is that agency rules require that prescribed fire ignitions must be concluded 2 hours before nightfall. The aim is to limit the use of resources on prescribed burning beyond a single day so that if needed, resources can be quickly diverted to emergency response (John Andre, personal communication, 3-12-09). Landscape scale restoration in some cases may require more extensive burning across larger areas than can be accomplished within relatively tight burn windows. For now, these areas cannot be burned (Sam Lindblom and Steve Croy, personal communication, 7-9-08).

Exacerbating this situation, the primary directive of many state forestry agencies is to suppress all fires in the most efficient way possible. Indeed, most state forestry agencies maintain the fire suppression mandate they inherited from the professional foresters of the early 20th century. In many cases, this translates to a suppression oriented response when state forestry professionals are the first on the scene of a fire. The tactics they use to extinguish fires are often damaging to ecologically valuable resources and, according to some observers, overzealous responses using heavy machinery even when blazes are relatively contained are frequent (John Andre, personal communication, 6-14-06; Margit Bucher, personal communication, 11-8-07; Josh Smith, personal communication, 12-9-08; McRee Anderson, personal communication, 12-9-08; among others).

Conclusion

The fire management institution is at a crossroads. Where the wild and urban meet or other human purposes are threatened, fire is fought back with the fervor of the post-WWII era and the rhetoric and action of suppression thrives. Yet, in the wildlands, fire is being reapplied to the landscape. It burns as a prescriptive tool aimed at ecosystem health, as a natural phenomenon

which has been allowed to reemerge, and as a management effort seeking to right past mistakes by reducing fuels while reinvigorating soils and certain plant species.

The call to expand the role of prescribed fire, not only as a tool of fuels reduction and fire prevention but as a tool of ecological renewal is resonating at the highest levels of the fire management community, regardless of the political orientation of federal administrations. From Jack Thomas through Dale Bosworth, Forest Service Chiefs around the turn of the 21st century became more and more focused on the fire crisis and more and more aware of the ecological necessity to restore fire to certain landscapes. Bosworth (2004) has highlighted the fire problem as one of the four major threats to ecosystem integrity in the nation's forests and grasslands.

Even so, the transition to landscape scale ecological fire restoration as a central practice in fire management has struggled to gain traction. The organizational and bureaucratic systems, policies, rules, and norms continued to stall such change. As Kennedy and Quigley (1998, p. 120) observed,

Attempting to achieve and reward...ecosystem management goals with agency...planning systems, traditional organizational structures, highly targeted budgeting, or the existing employee reward system is likely destined for frustration and failure. Overnight, revolutionary change cannot be expected in the organizational culture of such a large bureaucracy as the USFS.

Shifting the paradigm of fire management from suppression and prevention to landscape scale ecological fire restoration lagged as well. Though science and agency rhetoric supported the shift as early as the mid-1970s, widespread implementation of landscape scale ecological fire restoration practices remained elusive into the early 21st century.

Chapter 3

Methods and Analytical Framework

Purpose of the Research and Choice of Methods

The purpose of this research was to examine how and the extent to which multi-scalar collaborative planning networks can catalyze organizational and institutional change. In particular, the question that guided this research was how the Fire Learning Network can facilitate overcoming the frustrated transition in fire management toward more ecologically informed practice. As such, my research was designed to inform collaborative planning theory and practice rather than enumerate the characteristics of a population. For this purpose, I determined that an in depth qualitative research approach would be an appropriate mechanism to enable the nuanced analysis necessary to generate substantive theory about the dynamics of multi-scalar collaborative planning networks.

When the goal is theoretical or analytical generalizations, the in-depth case study is a useful methodological approach. Stake (1995, 85) asserts that “single cases are not as strong a base for generalizing to a population of cases as other research designs. But people can learn much that is general from single cases.” Yin (2003, 10) also suggests that “in doing a case study, your goal will be to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization).” Flyvbjerg (2004) takes this idea a step further claiming that generating context-dependent knowledge is perhaps the most essential role of social science research in producing opportunities for learning. He contends that

One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods. But formal generalization is overvalued as a source of scientific development, whereas ‘the force of example’ is underestimated (Flyvbjerg, 2004, 425).

Thus, as I sought to examine the potential for multi-scalar collaborative networks to foster institutional change, I chose to utilize an in depth case study of one case exemplar to attempt to develop meaningful theoretical insights to offer to the fields of planning, collaborative governance, and collaborative environmental management.

Case Selection

The US Fire Learning Network is one of the largest and most active conservation learning networks led by TNC. Although other conservation learning networks have been identified by some scholars (M. Brown & Salafsky, 2004; Creech & Willard, 2001), the FLN is one of the most extensive conservation learning networks active today. Since its inception in 2001, the FLN has gone through two cycles of funding and network design. The first phase of the network from 2001-2003 was at a national level connecting 25 project sites through formal workshops and guided planning processes. The second phase initiated a process of regionalization which continues today. Regional networks were organized under the national network and brought together landscape level representatives from five to 13 landscape groups associated with the region. The network operates across these three scales, national, regional and landscape levels, and facilitates interaction across scales through a variety of mechanisms (see Chapters 5 and 6).

The primary activity of the network is to generate ecological fire restoration plans on the participating landscapes through collaborative interactions among multiple stakeholders. Regional networks bring leading participants from each landscape together to describe progress, share lessons learned, and generate innovative responses to specific challenges in each landscape. At the national level, professional staff help guide network activities, provide

communications systems to connect the network at all levels, and build support for network activities among the signatory organizations. Because of these characteristics, the FLN serves as a useful case for examining multi-scalar collaborative networks and provides the opportunity to examine how principal organizations within the fire management institution might change through their participation in the network.

Analytical Framework: The Question of Change

To address the core question of how the FLN may serve as a catalyst of broader social change, I build an analytical framework through which to view the question of learning and change. For this analysis, I draw on practice based theories of social change, in particular the ideas of Anthony Giddens (1986). Giddens' structuration theory emphasizes the false dichotomy of individual actions and social structures. Individual social actors operate in dialectical tension with social systems or structures. Social structures at once guide social practices and are informed by those practices. It is a view of social change that relies on the creativity and actions of individuals within a social system but is not overconfident in their ability to affect system-wide change on their own.

Ann Swidler (1986) extends this line of thinking by suggesting that there are periods of time in social life when there is greater or lesser potential for social change to occur. She distinguishes between "settled" and "unsettled" times. In the former, dominant worldviews, ways of knowing, and strategies of action or social practices are persistent, relatively unquestioned, and coherent. In the latter, dominant ways of viewing the world and doing things become questioned and new ideas, perspectives, ideologies, and actions emerge in social-cultural spaces.

As these new ideas and practices become tested in particular places among particular people in a social world, the potential exists for new alternatives to become adopted and enacted.

In this research, I aim to discover where individual or collective social agents are enacting new kinds of practices that can overcome the frustrated transition in fire management. In this context, the scale of change is an important part of the analysis. Theories of organizational and institutional learning provide a way to think about how change can reverberate beyond individual practices into various levels of social systems. Linking these insights with the core question of this dissertation about how and the extent to which multi-scalar networks have the potential to catalyze institutional change, I ask: how are new practices generated within a network, disseminated beyond it, at what scale, and from what sources? I further develop the foundation for this analytical framework below.

Sources of Change: The Interplay of Structure and Agency, Culture and Action

A central debate in social theory is the relationship between “structure” and “agency.” Structuralists aim to describe an objective reality in which social structures determine and constrain social actors. In the work of theorists such as Claude Levi-Strauss (1958), structuralists emphasize the importance of rules, both seen and unseen, in governing social relations and interactions. The subjectivists, led by Jean Paul Sartre, emphasize the role of individuals to choose their own paths in life and society (Calhoun, Gerteis, Moody, Pfaff, & Virk, 2002). As Ebrahim (2003, p. 14) summarizes the debate, “the oppositions between these two perspectives, with one favoring the influence of certain objective rules as determining human behavior and the other placing importance on individual action and freedom, is known as the structure-agency debate.”

Within this debate, there are those who do not affiliate with either side, but rather suggest that both structure and agency shape social worlds and action through dialectical tension (Bourdieu, 1977, 1990; Giddens, 1986). Giddens (1986) offers a theory of structuration which links structure and action. He describes the “duality of structure” in which social actors make society while being constrained or empowered by its social and cultural constructs creating a “mutual dependence of structure and agency” (Giddens, 2002, p. 238). As Calhoun et al. (2002, p. 223) summarize Giddens’ theory, structure and agency are two sides of the same coin: “On the one side, agency is given meaningful form through the ‘generative schemes’ of structure. On the other side, ...structures are maintained and changed through action.”

Social actors engage in practices, that is, ongoing streams of actions that are either consciously motivated or routine and undertaken without conscious thought. These “continuous flows of conduct” constitute the action, practices, or agency of individuals within a social world (Giddens, 2002, p. 233). The structure that informs such actions consists of “‘rules and resources’ that act as common interpretive schemes in a particular social system” (Calhoun, et al., 2002, p. 223). In this way, structures are not only constraining but enable certain practices as well by providing a common set of understandings and meanings upon which to draw.

Although Giddens assumes a level of stability in social structure, the possibility for change exists through structuration. The rules and resources of structure organize social systems which consist of “reproduced relations between actors or collectivities, organized as regular social practices” (Giddens, 2002, p. 237). As the generative rules and resources of structure are applied to social systems they come in contact with social practices which have the potential to transform the structural properties, in particular through unintended consequences of certain

actions. Through this interplay between structure and agency, “conditions governing the continuity or transformation of structures” are created and enacted.

These insights suggest that individuals play a fundamentally important role in fostering social change. The structures within which they operate are equally important as they both constrain and enable certain kinds of behavior. Within this context, individuals engaging in certain kinds of practices have the potential to alter structural elements, albeit largely at the margins. The likelihood that any isolated individual act will have profound effects on the broader social structure is slim according to Giddens (1986). Thus, collective action becomes important in fostering broader social change. As an increasing number of individuals engage in common practices, the potential to create change in the broader social system likewise increases.

The widely cited work of Ann Swidler (1986) provides a theory of culture and action that animates these dynamics more thoroughly by distinguishing between settled and unsettled periods in social life. Swidler (1986, p. 273) suggests that culture consists of a “‘tool kit’ of symbols, stories, rituals, and world-views which people may use in varying configurations to solve different kinds of problems.” Actors within a particular cultural milieu develop “strategies of action” which become persistent over time and are not determined as much by the achievement of particular ends as they are by various aspects of cultural constructs or tool kits. Like Giddens (1986), Swidler (1986, p. 277) contends that social structures do not consist of a “unified system that pushes action in a consistent direction.” Rather individuals and groups act within a particular social context through actively choosing among diverse and sometimes conflicting symbols as they develop strategies of action.

However, there is a distinction between how actors within a cultural context engage during times of relative stability and times of instability, what Swidler (1986) calls “settled” or “unsettled” periods. During settled periods, individuals function within social systems using familiar norms, patterns, and strategies of action that become almost habitual and unquestioned. However, in times when fundamental questions arise and new ideologies begin to be considered legitimate, an unsettled period sets in. Broader social change has a greater potential to emerge in this latter context in which “Individuals in certain phases of their lives, and groups or entire societies in certain historical periods, are involved in constructing new strategies of action... learning new ways of organizing individual and collective action, practicing unfamiliar habits until they become familiar” (Swidler, 1986, p. 278). In essence, social change emerges as new worldviews become considered, new strategies of action become tried, and institutional structures slowly change to enable social practices that are consistent with the new cultural construct. This process of social change may be intentionally initiated by social actors or may arise more organically as individuals experiment with new possibilities.

Swidler’s (1986) description of social change is particularly applicable to this research. For more than 70 years the fire management institution was in a settled period. Although alternative or competing stories, symbols and worldviews existed, the institutional structure or system for managing fire on the nation’s wildlands was built on a consistent and dominant cultural construct based on the need to suppress and control fire. The settled period “does not impose a single, unified pattern on action, in the sense of imposing norms, styles, values, or ends on individual actors. Rather, settled cultures constrain action by providing a limited set of resources out of which individuals and groups construct strategies of action” (Swidler, 1986, p.

282). Institutional structures were constructed to support the endeavor and led to strategies of action on landscapes that cohered with the overarching worldview. Symbols and narratives reinforced the dominant paradigm and helped shape the perspectives and actions of fire managers on the ground. In this context, fire management professionals “naturally [‘knew’] how to act” without having to think about their actions in relation to the structures that enabled certain strategies of action and inhibited others (Swidler, 1986, p. 280).

Since 1970, this cultural construct has become increasingly challenged and practitioners in the world of fire management have likewise become unsettled. New worldviews have gained prominence and new ways of organizing action have contended for dominance (Swidler, 1986). As described in Chapter 2, worldviews that highlighted the natural role of fire led to strategies of action to let natural fires burn. Others that focused on the importance of safety and property protection gave new life to fire suppression action at least on the wildland urban interface and hazardous fuels reduction across all landscapes in the name of reducing cataclysmic fire events. Still others highlighted the importance of fire as a tool to maintain ecological health and biodiversity and pushed strategies to restore ecological fire regimes. In this period of instability, new strategies for action could be constructed and new social entities developed, creating opportunities for new cultural models to be defined and widely adopted at least within certain social groups. However, as these cultural models are enacted in specific locations and situations, they are tested and either obtain legitimacy and “take root and thrive” or fail to capture widespread support and “wither and die” (Swidler, 1986, p. 280).

This approach to understanding the interplay of structure and agency, in particular during settled and unsettled periods of social systems, provides a useful conceptual framework for understanding how change has emerged within the fire management institution to date and why

the transition to landscape scale ecological fire restoration remains frustrated. This discussion clarifies that constraining aspects of the fire management institution inhibit the practices of individuals operating within that system to align with a new worldview associated with landscape scale ecological fire restoration.

The question for analysis in this dissertation is how and to what extent a multi-scalar collaborative network can generate the potential to change those inhibiting structural elements and enable new forms of practice or strategies of action. In order to respond to this question, it is important to trace the sources of change. Based on the theory of structuration, I seek to identify individual or collective acts by social agents from the FLN that have an impact on individuals or organizations beyond the network. In particular, I aim to examine how landscape scale ecological fire restoration practices are adopted beyond the network and where network actors play a role in introducing those practices into the broader institutional context.

The Nature of Change: Adopting New Practices

In the above review of practice based theories of social and cultural change, change results as new social practices are enacted and adopted leading to the alteration of the rules and resources of structures, or the narratives, symbols, and artifacts of social-cultural systems. In this research, I seek to discover where new sorts of practices are being enacted beyond the network under study. Thus, my examination of the nature of change requires me to trace practices that are coherent with the landscape scale ecological fire restoration worldview promulgated by the FLN.

As described in Chapter 2, numerous factors continue to inhibit the widespread practice of landscape scale ecological fire restoration. Administrative boundaries limit working at landscape scales as ecological systems and functions do not adhere to political and ownership

boundaries. Funding streams and wildfire management policies focus on hazardous fuels, safety, and property protection limiting the capacity for fire management practitioners to emphasize other purposes and mechanisms in fire management. Finally, the accountability mechanisms of public land management agencies emphasize achieving resource and discipline specific targets, hindering more holistic and integrative management approaches required by ecosystem management and landscape scale ecological restoration. In short, the institutional structures of fire management, at least to a certain degree, inhibit the ability of resource managers to engage in ecological restoration of fire adapted ecosystems at a landscape scale.

Thus, the analysis of the nature of change begins with an examination of the landscape scale ecological fire restoration practices developed within the network. I seek to determine the content or characteristics of landscape scale ecological fire restoration assumptions, expectations, and practices. To characterize the extent to which the network defines and refines such practices, I examine the extent to which coherent and comprehensible practices are adopted across the entire network. Then, I aim to examine how those practices emanate from the network and become integrated into the broader fire management institution. The evidence of the nature of change resides in how the FLN defines landscape scale ecological fire restoration practice and, in particular, how those practices align with the barriers that inhibit the transition from fire suppression to ecologically informed fire management.

The Scale of Change: From Organizations to Institutions

The final aspect of the analytical framework is the scale of change that can be observed in the fire management institution. Institutional change is required to overcome the frustrated transition in fire management. Change at this scale is rarely associated with collaborative

processes. Yet, individuals and organizations are nested within the institutional context. This section reviews key ideas in theories of organizational learning and institutional change to provide a framework for my analysis of how to detect either instances of change at these levels or events and occurrences that point to the potential for such change. Thus, my analysis aims to identify various levels of the fire management institution at which landscape scale ecological fire restoration practices are evidenced.

Within the organizational context, Argyris and Schon (1978, 1996) suggest that there are two levels of learning that can take place: single loop and double loop learning. Single loop learning occurs when members of an organization detect outcomes of certain actions that are inadequate in some way and attempt to modify them to ensure that organizational performance remains within the range set by the organizational norms. In single loop learning, the ‘detection of error’ leads to adjustments in strategies and assumptions to improve performance, that is, organizational actions are altered while governing values remain constant (Nielson, 1993). Organizational norms remain unchanged—organizational effectiveness is improved within existing norms as the organization shifts certain strategies and assumptions to achieve desired outcomes.

Double loop learning occurs at a deeper level in the organization and involves inquiry that leads to changes in the norms themselves or leads to the setting of new priorities and weightings within the existing norms. Like single loop learning, double loop learning usually begins with a ‘detection of error’ or a need for improvement in the organization. In double loop learning, the inquiry into strategies and assumptions leads to a further questioning of organizational norms which requires a shift in the overall organizational map to achieve the needed correction. Thus, there is a second feed back loop that leads to the organizational change

in norms or governing values alongside a change in action to reflect these new values (Nielsen, 1993).

Extending Argyris and Schon's analysis, Nielsen (1993) has suggested that *triple loop learning* occurs as an "embedded tradition system within the governing values of a behavior can be nested" becomes questioned and potentially transformed through the process. This sets the stage for enabling broader institutional change. I use the term institution in the tradition of neo-institutional theorists who suggest that institutions underlie social structures and are manifest in routines, rules, norms, and behaviors to be followed (Bryson and Crosby 1992, DiMaggio and Powell 1983, Healey 1997). As North (1990, p. 3) articulates it, institutional structures determine "the rules of the game in the society—the humanly devised constraints—that shape human interaction." As Scott (2003) contends, institutions are composed of cultural-cognitive, normative, and regulative elements. Rules, laws and sanctions comprise the regulative components of the system, certification and accreditation provide normative standardization of legitimacy, and common beliefs and a shared logic of action shape a culturally supported, recognizable, and comprehensible construct to guide certain behaviors and practices. In concert, these institutional elements "promote and sustain orderly behavior" (Scott, 2003, p. 135). These systems comprise the unseen webs of power that underlie every facet of society. As Foucault has theorized it, "every element of an institution—its formal routines, its informal practices, its physical structures, its discourses—'carried' social meaning and the power relations of social order" (Healey, 1997, p. 36).

Change at the institutional level implies individual and organizational change. North (1990, p. 5) contends that organizations "in the course of attempts to accomplish their objectives are major agents of institutional change." Watts et al. (2003, p. 4) suggest that "ultimately,

institutional change can only occur through changes in behavior, attitudes, relationships and activities, all of which depend on individual insights and decisions.” Without organizations and individuals changing their guiding thoughts, discourses, and practices, the underlying elements of social order cannot change. As Watts et al. (2003) propose, institutional change requires developing and enhancing individuals’ awareness, knowledge and skills (single loop, individual learning); reorienting management systems (double loop, organizational learning); and fostering a culture of innovation, learning and change (triple loop, organizational and institutional learning).

Thus, institutional change can emerge in a variety of ways and on a variety of fronts. There is no one model for institutional change. What is widely recognized is that individuals have the capacity to catalyze learning and change at various levels but that transformative change will not occur without resulting changes in the institutional rules, norms, and structures that provide the boundaries within which individual and organizational action occurs, the choice set for determining strategies of action.

Analytical approach

With this analytical framework, I aim to describe the sources, nature and scale of change occurring both within and beyond the FLN. In my analysis, I seek both individual and collective acts of social agents who influence others in the adoption of landscape scale ecological fire restoration practices. The nature of change that particularly interests me is the adoption of a particular set of practices that facilitate overcoming the frustrated transition in fire management. Thus, I specifically aim to discover where collaboration within and across organizational boundaries and the tenets of landscape scale ecological fire restoration are reflected in actions,

protocols or practices of others within the fire management institution. Finally, there are numerous levels within a social system, from individuals to organizations, to institutions, to entire societies. As I observe the adoption of certain kinds of social practices, I seek to understand the level at which change is occurring. In this dissertation, I am particularly interested in exploring the extent to which new kinds of practices are adopted and enacted across institutional space. Together, these three aspects of change, its source, nature, and scale provide a framework for my analysis of the FLN and its impact on the fire management institution.

In my analysis of the FLN, I focus on two aspects of network action to clarify the extent to which it can catalyze change. First, I develop an understanding of the internal workings of the network, how it is designed, what processes operate within it, and what it generates internally. Analytically, my focus is on how the network fosters coherence within the network to link participants to each other and a common collective practice. This approach helps define the kinds of practices that may emanate from the network into the broader institutional context of fire management, providing a foundation for understanding the sources and nature of change catalyzed by the network. Tangentially, this exploration also provides insights into how to design and manage multi-scalar collaborative networks, contributing to the broader conversation about the emergent potential of multi-scalar collaboration in collaborative planning literature. I undertake this analysis in Chapter 5 where I provide a detailed case study of the network design and processes and Chapter 6 in which I describe how the network generated coherence across the system without undermining creativity at each collaborative node.

Secondly, I focus on network action in the external environment. Specifically, I seek to characterize how the network fosters changes in organizational plans, policies, protocols, and practices at multiple levels in the fire management institution. In particular, I aim to determine

how and to what extent the network might be instrumental in overcoming the frustrated transition toward landscape scale ecological fire restoration. I examine this question in Chapter 7 where I describe evidence of landscape scale ecological fire restoration practices extending beyond the FLN to be enacted by individuals, incorporated into organizational plans and practices, and linked to guiding policies in fire management. This approach allows me to characterize the characteristics or nature of the change being catalyzed by the FLN, identify the individuals, planning products and forums from the FLN that inspire the change, and the scales where the new practices are adopted and enacted in the fire management institution.

Data Collection

Using the case study approach and guided by the analytical framework I have described above, I utilized a variety of data collection and analysis strategies. Case study methodologists suggest that researchers collect data through interviews with key actors, analysis of documents and other written communications applicable to the case, and, when possible, observations of the interactions among the actors within the case (Creswell, 1998; Merriam, 1998; Stake, 1995; Yin, 2003). In this research, I conducted all of these data collection strategies.

As part of a larger funded project, I was charged with writing the primary case history of the National FLN and several regional networks. I worked extensively on gathering and analyzing documents and interviewing key actors to develop these larger case stories of the FLN and regional networks. In particular, I delved into interactions, products, and processes that demonstrate how the network was designed, how it operated, what the outcomes were and how FLN products and participants introduced landscape scale ecological restoration of fire adapted ecosystems principles and practices into their organizational units. My primary data sources

consisted of documents, interviews and observations. I drew on documents created across the eight years of the FLN including funding proposals, ecological restoration plans produced by FLN landscapes, workshop agendas and summaries and personal communications and memos between FLN staff. I also traced documents that were influenced by FLN participants and products such as NEPA planning documents, land and resource management plans, public policies related to fire management. I engaged in direct observation of formal network meetings and workshops, attended field excursions, and informally interviewed FLN participants in the field. Finally, I conducted formal interviews with key participants in the FLN and associated organizations either in person or over the phone. I used participant lists from FLN workshops and snowballing to facilitate the identification of interview subjects (Stake, 1995).

The interviews of the participants and observations of network workshops and meetings served as the primary sources for examining the core questions of how the network was able to extend landscape scale ecological fire restoration principles and practices beyond the network boundaries. In total, we conducted more than 140 interviews for the project and I personally or with another member of the research team conducted 76 interviews. As a research project team, we attended 16 workshops or network meetings, seven of which I attended either on my own or with another member of the team.

Interview instruments for each interview were unique to the subject as I sought to draw out specific examples rather than generic generalizations. In each interview, I asked questions related to the subject's position in his/her organization, the subject's professional history in fire management, how the subject was affiliated with FLN, what they had gained from their participation, what some of the challenges were associated with network participation, how subjects collaborated with others, how they approached gathering support among their

organizational colleagues for their fire restoration efforts, and what knowledge and information that have gleaned from the process that is novel or reinforcing that they hope to utilize in their management work. The interview instruments were semi-structured to ensure that the key points of analysis were covered with each respondent while allowing for deeper exploration of key narratives that arose during the interview. Each of the interviews and recorded workshops, meetings, and telephone conversations were transcribed.

Data Analysis

As Robert Stake (1995, 71) observes, “There is no particular moment when data analysis begins. Analysis is a matter of giving meaning to first impression as well as final compilations. Analysis essentially means taking something apart.” In the analysis of case study data, we take apart the components that are of interest to us, not simply the linear chronological components, but the components that relate to the impressions, perspectives, and questions that most interest us (Stake 1995).

To begin this process, I developed a rich description of the case (Creswell, 1998). This description served as the initial stage of the analysis as I brought the data together to tell a coherent story. As part of the larger research project, I was specifically charged with developing case studies of the National FLN and the South Central FLN, and case summaries for the Northwest FLN and Southeast FLN. I used these case studies to facilitate my exploration of the questions that guide this dissertation as well as other related questions that were part of the larger research project.

For the first year of the project, my colleagues and I attended regional workshops and national meetings and conducted numerous interviews on site and over the phone to ground our

understanding of the context and history of the case as well as to begin to formulate initial theoretical propositions to test through further examination. As I developed the rich description of the case, I engaged in a variety of techniques to make sense of the data and draw out themes to simplify the story into key lessons learned and key theoretical implications. Following each visit to the field and each interview, my colleagues and I would develop short research memos and hold regular group meetings to debrief and begin to collectively posit and test emerging interpretations of the data.

Stake (1995) suggests that the analytical process involves two strategic activities. The first is to interpret individual instances. The second is to aggregate those instances “until something can be said about them as a class” (Stake, 1995, 74). These aggregate themes focus the analysis on the key points of interest and allow for the development of broader claims about key characteristics of the case. Using memo, coding, and theme development techniques outlined by multiple methodologists, I aggregated particular instances to develop theoretical claims about how the principles and practices of landscape scale ecological fire restoration were defined and refined through network participants and products. These techniques of aggregation included categorizing codes to build themes by noting repeating patterns in the data, relating categories to each other, comparing data across cases, re-examining the literature to clarify and refine codes and themes, using metaphors and analogies to connect the data to other similar relations and trying visualization techniques such as drawing flowcharts that connect codes and themes in relational patterns (Creswell, 1998; Merriam, 1998; Miles & Huberman, 1994; Morse & Richards, 2002; Yin, 2003).

While utilizing these various techniques, I co-authored multiple articles that I have drawn on directly in this dissertation. In particular, I conducted an analysis of FLN planning products

and technological tools produced by landscapes participating in regional FLNs as well as the media publications and presentations developed at the national level of the network. I used a grounded theory approach (Strauss & Corbin, 1990) employing NVIVO™ qualitative analysis software to assist in the analysis of the data. I entered text files of the planning products as well as interview transcripts into the database and analyzed the data using the inductive process of formulating theory by developing a series of codes to explain the conditions, context, strategies, and consequences related to the phenomenon of interest (Charmaz, 2006; Strauss & Corbin, 1990).

Due to my own inability to overcome some technical limitations of using the NVIVO™ software, I resorted to more traditional qualitative analysis methods to develop codes and categories of some of the planning products, technological tools, and representations of the network. For example, I developed a table to chart emergent codes as I analyzed each of the FLN newsletters. Once I had developed a set of tentative categories based on thematic similarities of phrases, sentences, and depictions in the newsletters, Goldstein and I (Forthcoming 2009a) further refined the codes and began to develop a framework for the analysis. Then, I revisited the newsletters and recalibrated the coding scheme, combining initial codes into categories and sub-categories as the analysis unfolded. Along with Goldstein, I conducted similar types of analysis of modeling/mapping technology outputs and planning products produced in different regional networks. We conducted new interviews and analyzed existing transcripts to ground our analysis in the interpretations and insights of FLN participants.

Goldstein and I (Forthcoming 2009a, Forthcoming 2009b) began to assign category names based on thematic similarities of ideas, actions, or representations evident in the data. Then, we refined the categories by identifying specific dimensions or properties of the initial categories and then linking categories into core and subsidiary relationships. As we developed the analysis, our

categories began to converge around the concept of a guiding narrative or network imaginary that animated the network ideas, actions, and planning products. We continually reinterpreted and refined these initial constructs by feeding data into the analysis as we sought to ensure that the emergent theory was built on the evidence from the field, completing the “grounding” of the theory (Charmaz, 2006; Goldstein & Butler, Forthcoming 2009b; Strauss & Corbin, 1990).

These analyses focused primarily on internal aspects of the network. Using these analytical methods, I was able to articulate more clearly the constitutive components of landscape scale ecological fire restoration and its associated practices. I linked these aspects to factors that contribute to the frustrated transition in fire management to determine the extent to which the practices being generated within the FLN had the potential to directly address some of the barriers that continued to frustrate the transition.

Upon this foundation of the inner workings of the network, I began to develop my broader thesis about the potential for multi-scalar networks to foster institutional change. Building on organizational and institutional learning theory, I began to identify ways in which the principles and practices of landscape scale ecological fire restoration being developed in the FLN might become influential across the fire management institution. For this phase of the analysis, I extended my data collection beyond the network, consulting plans, products, protocols, rules, regulations, and policies that network participants had potentially influenced. Using a cyclical process of inductive and deductive analysis, I consulted the literature on institutional learning and change and then re-entered the field to collect data and conduct interviews to check my initial interpretations. From the literature to my existing data, to the field and back to the literature, I immersed myself within the analytical process of making sense out of the mountains of data that filled my databases. I coded and re-coded interview transcripts,

planning products, organizational rules and regulations, and policies and then conducted new interviews, gathered new documents, and altered my codes again as I sought to explain the ways in which the network had been able to influence plans, policies, and practices of organizations and professionals in the fire management institution.

During this process, I focused on two core FLN practices that had the potential to overcome some of the barriers that are associated with the frustrated transition, namely the practices of ecological restoration planning and collaboration. As I sifted through my documents and transcripts, I began to identify a suite of storylines that demonstrated that these practices were being adopted beyond the network in various ways. In the analysis, I aimed to identify three aspects of change. First, I sought to identify the sources of the influence, the social agent(s), their associated material objects, and the social networks that informed their perspectives and actions. Second, I aimed to clarify the nature of change, the specific kinds of practices and ways they were exhibited in documents or actions beyond the network. Third, I aimed to identify the scale of the shift, from individuals to various levels within organizations to federal policies. Reflecting on these three aspects of the analysis allowed me to directly respond to the core question of the dissertation.

Research Quality

Using what seems to be a very “intuitive, soft, and relativistic” method (Creswell 1998, 141), how can I ensure that others will take my work seriously? As Stake (1995, 107) asks, “Do we have it right?” Qualitative methodologists suggest that the quality of research can be

enhanced through several useful techniques including triangulation; rich, thick descriptions of the case; and an ‘audit trail’ (Creswell, 1998; Lincoln & Guba, 1985; Maxwell, 1996; Merriam, 1998; Morse & Richards, 2002; Stake, 1995; Yin, 2003).

Triangulation involves the use of multiple data sources, researchers, and/or methods to confirm the reliability of the data (Stake 1995; Creswell 1998). I gathered data from multiple sources and used several methods in the analysis as outlined above. Given that this research is part of a funded project involving other researchers, I had the benefit of working with a team to confirm the reliability of the data and of my interpretations of it. Moreover, on several occasions I engaged in data collection in the field alongside colleagues on my research team. Having another researcher in the field with me offered the opportunity to use colleagues as sounding boards and another set of eyes through which to view the interactions of network participants. Finally, I utilized my contact with FLN participants to not only gather new data, but to test my analytical interpretations with those who were closest to network action.

To further enhance the credibility of my findings, I used peer review, committee review, and debriefing opportunities (Creswell 1998) through both structured interactions such as in committee meetings, academic and professional conferences, and project team meetings as well as unstructured interactions such as reading and editing by peer research group members. Portions of this research have already been vetted by formal double blind peer review and accepted for publication in respected academic journals, a further testament to the overall quality of the research (Goldstein & Butler, Forthcoming 2009a, Forthcoming 2009b; Goldstein, Butler, & Hull, Forthcoming 2009).

In the end, Stake (1995, p. 73) asserts that even with numerous instrumental techniques of analysis at our disposal, “Where thoughts come from, whence meaning, remains a mystery.

The page does not write itself, but by finding, for analysis, the right ambiance, the right moment, by reading and rereading the accounts, by deep thinking, then understanding creeps forward and your page is printed.” Thus, even with all the systematic tools I utilized to facilitate sense-making of thousands of pages of qualitative data, I am left with my intuition as a researcher, my experiences in the field, and my personal interactions with FLN participants to guide my analysis. As Stake puts it (1995, p. 77), as a qualitative case study researcher “I seek to make sense of certain observations of the case by watching closely...and by thinking about it as deeply as I can. It is greatly subjective. I defend it because I know no better way to make sense of the complexities of my case.”

Ethical Considerations

This research involved human subjects as primary sources of data. Balancing the values of quality research with the ethics of noninterference in others’ lives is a delicate consideration in qualitative case studies. To ensure that individuals involved in this study were not adversely affected, I used informed consent for voluntary participation and offered the possibility of confidentiality (Merriam 1998). I gained approval from the Virginia Tech Institutional Review Board (IRB) to conduct this work as one of the researchers on the larger funded research project.

Chapter 4

Literature Review

Collaborative Planning, Multi-scalar Networks, and Change

Network structures [are] integrated systems in which members see themselves as interdependent—working toward systemic change—and see that, although they represent individual organizations, their perspective is a holistic one.

(Keast, Mandell, Brown, & Woolcock, 2004).

The fire management crisis is indicative of emergent challenges in environmental planning and policy in the 21st century. These kinds of problems have been called wicked (Rittel & Webber, 1973) or messy problems (Ackoff, 1974). They are characterized by great complexity, dynamism and uncertainty. They consist of multiple related problems and sub-problems operating across multiple scales and multiple policy domains (Weber & Khademian, 2008). As Keast et al. (2004, p. 363) contend, these types of problems are elusive to traditional models of governance and decision making “because they defy precise definition, cut across policy and service areas, and resist solutions offered by the single-agency or ‘silo’ approach.”

The fire management crisis and other complex environmental challenges such as climate change, peak-oil and energy, and diffuse sources of fresh water contamination suggest that the next wave of environmental management will have to respond to dynamic, complex, cross-scalar problems that defy existing institutions of governance. These challenges require a retooling of the practices of individual professionals, organizations, and institutions to address them. As Innes and Booher (2008, p. 3) point out, “The problems facing policy governance in the 21st century sometimes seem to be overwhelming the organizations society depends upon to address them” and “require new spaces for decision making.” Simply put, the need to change social-ecological system functions and relations requires a corresponding change in social and political

institutions. Change of this magnitude requires transformation of existing structures, relationships, and practices.

Over the last two decades, planning and policy researchers have exhibited a growing interest in collaborative processes that facilitate working across agencies and organizations and involve the public in decision making processes that are at once more democratic as well as more nimble, adaptive, and relevant in the face of dynamic and complex problems (Hajer & Wagenaar, 2003; Innes, et al., 2007; Weber & Khademian, 2008). Building on theories of social learning, planners have advocated collaborative and communicative planning, public administrators have suggested networks, and management consultants have designed communities of practice to generate various types of learning and decision making forums to respond to these challenges. Each of these fields offers insights to how collaborative processes can generate opportunities to learn, foster new practices, or catalyze broader social change.

While each of these fields provides useful rubrics for designing and managing collaborative processes with particular purposes, processes, and outcomes, they only recently have begun to reveal the specific challenges that collaborative processes face when operating at multiple scales. This marks a new era in environmental policy and planning. Having applied the responses of the regulatory era of the 1970s, the market-based policy mechanisms generated during the 1980s and early 1990s, and the place-based collaboration and decentralized decision making that burgeoned in the 1990s through the turn of the century (Kraft, 2004), policy makers and public administrators continue to be bedeviled by the challenges that cut across spatial and organizational scale. New efforts to respond to these challenges are occupying environmental planning and policy arenas and multi-scalar collaborative processes are beginning to emerge. These multi-scalar collaborative endeavors may generate the potential for cross-scalar and cross-

boundary learning differently than more isolated or place based collaborative efforts. In isolation, each of the collaborative practice models described in the first part of this literature review has its limitations, but together they reveal a more robust view of how collaborative processes can generate new kinds of practices and new ways of viewing the world.

A multi-scalar network system poses several opportunities and challenges across various aspects of network design and action. First, designing a multi-scalar collaborative poses the conundrum of how to match the purpose, processes, and desired outcomes of the endeavor to appropriate collaborative practice models. With different kinds of outcomes needed at each level of the network, a uniform approach to collaborative design may not be effective at achieving the broader goals of the network. Second, a particularly thorny challenge in the case of multi-scalar networks is how to build coherence and comprehensibility across the system without undermining the potential for creativity and innovation in each collaborative node. Without a certain level of coherence across the system, there is the potential that collaboratives will operate in ways that generate an incomprehensible cacophony rather than a unified voice of change. Yet, the need for coherence and comprehensibility across a network has the potential to stifle the flexibility and creativity of the collaborative process by over-prescribing the boundaries of acceptable action. This is a core challenge of the collaborative planning field as well as other fields that seek to expand collaborative endeavors across multiple scales. Third, a multi-scalar collaborative may have the potential to catalyze broader social change than narrowly bound collaborative efforts. This dissertation addresses each of these challenges and opportunities through the study of the US Fire Learning Network.

Social Learning and Collaboration

Learning and change has long been recognized as a central outcome of collaborative processes. As Margerum (2008) contends, the purpose of all collaborative groups is change of some sort at some level; thus, change is implied in collaborative practice. References to learning and change are common within the collaboration literature from communicative planning (Forester, 1996b; Healey, 1997; Innes, 1998) to communities of practice (J. S. Brown & Duguid, 1991; Cook & Brown, 1999; Wenger, 1998) and more broadly defined public sector networks (Agranoff & McGuire, 2003; Bottrup, 2005; Inkpen & Tsang, 2005). Each of these informs certain aspects of learning and change as well as provides distinct models of collaborative practice. This section reviews these three areas of study relating collaboration to learning and change. The review begins with a brief synopsis of social learning.

Social Learning and Planning

In his seminal work *Planning in the Public Domain*, John Freidmann (1987) categorizes four major traditions that arise in the theory and practice of planning, including the social learning tradition. Grounded in the philosophy of American pragmatists, the social learning tradition questions the underlying epistemological assumptions of scientific and technical reason by suggesting that the knowledge of experience should be validated through practice and therefore understood through action. It is an adaptive approach, one that refines existing theory through experiential lessons or learning, as Dewey put it, “learning by doing.” Friedmann (1987, p. 182) summarizes the tradition,

It is the essential wisdom of the social learning tradition that practice and learning are construed as correlative processes, so that one process necessarily implies the other. In this scheme, decisions appear as a fleeting moment in the course of an

ongoing practice. They are embedded in a learning process that flows from the attempt to change reality through practice.

The questions that guide social learning tend to be pragmatic, focusing on such issues as how to deal with the inherent habitual nature of human beings, how to blend technical and experiential knowledge types, how to engage in dialogic relations between planners and actors, and how democratic theory informs the paradigm which is founded on non-hierarchical relations and an openness to communication (Friedmann, 1987; Healey, 2009).

The social learning tradition rose to prominence in the latter three decades of the 20th century as the neo-pragmatists began to theorize about the relevance of learning to solve complex social problems (Healey, 2009) and complexity, uncertainty, and a thirst for relevant knowledge motivated public and private sector actors to generate learning opportunities through collaborative networks (Weber & Khademian, 2008). A pre-cursor to communicative or collaborative planning, Friedmann (1973) proposed “transactive planning” which emphasized small group processes and informal interpersonal relationships operating within and across organizations in the public sphere. Recognizing the need to change traditional organizational and institutional functions and relationships in the public domain, theories of social learning influenced public managers from city and regional planning to natural resource management in the latter decades of the 20th century (Agranoff, 2006; Agranoff & McGuire, 2003; S. E. Daniels & Walker, 2001; Keen & Mahanty, 2006; Schusler, Decker, & Pfeffer, 2003). In business management, practice based theories of learning spawned a field of study and professional consulting in “communities of practice” (Lave & Wenger, 1991; Osterlund & Carlile, 2005). With the rise of the “network society” (Castells, 1996) and increasing proliferation and diversification of collaborative processes that cut across organizational, social, administrative and political boundaries, social learning became not only necessary to solve complex problems

but in many respects inevitable given the rapidity with which people were being connected and mobilized.

Collaborative and Communicative Planning

Since the mid-1980s, researchers have attempted to characterize planning practice by focusing on the importance of knowledge, information, and communication as primary tools of planners (Forester, 1989, 1993, 1999; Innes, 1998; Lauria & Wagner, 2006; Neufville, 1983). Drawing on neo-pragmatist philosophy, planning is understood as a “practically situated, social learning activity... to promote the ability for critical, transformative...work in the public sphere” (Healey, 2009, p. 277). Much of this work has given rise to the ‘communicative turn’ (Fisher & Forester, 1993; Healey, 1993, 1996) in planning theory leading planning and policy researchers to herald a paradigm shift (Dryzek, 1990; Innes, 1995). Argumentation, deliberation, communicative action and discursive politics were central themes as planning practice opened to more participatory forms to enhance public participation and democratic legitimacy.

Collaboration in the public sector emerged as a complement to traditional modes of governing, a way to fill in where legislative decision making, administrative implementation and judicial enforcement failed to resolve complex social problems. Gray (1989) describes how the rise of collaboration can be connected to various shifts in political and social realities of the late 20th century including increased global interdependence, declining productivity, shrinking federal revenues, dissatisfaction with judicial interventions, blurred boundaries between organizations, and broad economic and technological changes. In these cases, collaboration was seen as an innovative alternative that can be effective in breaking through the limitations of ‘normal’ modes of governing and decision making (Fung & Wright, 2003).

Scholars observing collaborative planning practice built a normative basis for evaluating collaboration, constructing communicative planning theory particularly through observations of consensus building practice (Innes 2004). Analyzing collaboration through this lens ties evaluators to a framework that is built on a specific type of collaborative process (multistakeholder collaboration) with specific purposes (conflict resolution and negotiated settlements), certain norms (transparency and broad representation), normative procedures (facilitation processes, consensus building), and desired outcomes (binding agreements) (Innes, 1996; Innes & Booher, 1999a; Karl, Susskind, & Wallace, 2007; Margerum, 2002; Susskind & Cruikshank, 1987; Susskind, McKearnan, & Thomas-Larmer, 1999). Collaborative processes, then, become judged on how well the collaboration under analysis approximates these normative conditions, processes, and outcomes based on an ideal type. Studies describe how specific conditions are needed to enter into collaborative forums, evaluate specific processes against the normative theory, or offer suggestions on how barriers to collaboration can be overcome creating the ideal conditions under which collaboration can thrive (see for example, Koontz, et al., 2004; Margerum, 2007; McGuirk, 2001; Randolph & Bauer, 1999; Schuett, Selin, & Carr, 2001; Weber, 1998, 2003; Wondolleck & Yaffee, 2000).

In these contexts, scholars specify that collaborative forums should be broadly representative of diverse participants who have an interest in a shared problem or common issue. Participants should engage in non violent communication and engender “authentic dialogue” that incorporates multiple ways of knowing to legitimize diverse perspectives and voices (Ansell & Gash, 2007; Booher & Innes, 2002; Innes & Booher, 1999a; Innes, et al., 2007). Procedurally, collaborative planning theory depends largely upon consensus building and relies on facilitated processes, often using outside professionals to guide interaction among participants. Face to face

communication is essential and clear process guidelines ensure respectful and ideally ‘authentic’ dialogue among participants (Innes, 1996; Innes & Booher, 1999a, 1999c). The collaborative planning approach often is used to develop agreements or plans to guide collective action to address a common problem and end stalemate (Innes & Booher, 1999a; Weber, 1998; Wondolleck & Yaffee, 2000). While it has the potential to “set in motion cascades of changes in attitudes, behaviors, actions, practices, and institutions” (Innes, et al., 2007), these changes were considered secondary or tertiary effects of most collaborative planning forums (Innes & Booher, 1999a).

Communities of Practice

Communities of Practice (CoP) offers an alternative explanatory and evaluative framework of collaboration. Originating in the business management field, CoP has been making its way into the public management realm and recently has begun to interest planning and policy scholars (Goldstein, 2008; Snyder & Briggs, 2003; Snyder, Wenger, & Briggs, 2004). In public management contexts, CoP has been touted as a knowledge management strategy suggesting that it can facilitate collaborative learning among public managers and stakeholders aiming to understand and define a common problem.

Introduced by Lave and Wenger (1991), a community of practice describes how people engaged in a particular professional practice communicate regularly with each other about their activities and through doing so individually and collectively improve their practice. Oriented toward individual improvement, these communities are more about enhancing individual competency through learning rather than solving a particular policy problem, making decisions, developing plans, or engaging in broader organizational enhancement (Dyer & Nobeoka, 2000;

Osterlund & Carlile, 2005). Individual improvement emerges as communities jointly construct, exchange, and share a common set of resources, knowledge, and practices (Wenger, 1998), but consensus building is neither the aim nor the process. CoPs tend to be self-organizing and fully voluntary, thus, autonomy and identity are essential to the functioning of such communities (Wenger, 1998). The community and individual become mutually reinforcing. A community's member infuses his/her experience and, in turn, relies on the knowledge capitalized by the community to engage in his/her practice. Through 'war stories' that members tell when they gather, tacit knowledge, know-how, and experiential knowledge are all brought to bear on the community's understanding of their practice (J. S. Brown & Duguid, 2001).

There are three core structural elements of a CoP: domain, community, and practice. The domain is the core issue or set of issues that the community focuses on as well as the members' sense of identity related to the topic of concern. The community is made up of the members of the CoP and is characterized by the set of relationships among members, the levels of trust they share with one another, the interactive spaces used to communicate among members, and the sense of belonging and reciprocity they build. Finally, the practice of the community is the set of skills, methods, and techniques that emerge as participants share knowledge and promote learning and innovation through their interactions (Snyder & Briggs, 2003; Wenger, 2000).

Recently, public administrators have begun to use communities of practice to respond to complex public management challenges particularly if they operate across agencies or sectors (Snyder & Briggs, 2003; Snyder, et al., 2004). The application of CoP theory to public management reflects the need to engage in collaboration to resolve complex public problems in forums that emphasize learning and adaptive management among public managers. The design of such collaborative processes can be distinguished from multistakeholder collaboration that has

dominated the planning field. CoPs aim to improve capacities to solve complex problems rather than agree on and implement solutions. They provide open forums for discussion and learning rather than achieving consensus. And, they cross boundaries of organizations and sectors in public management rather than ensure fully inclusive participation of multiple and diverse stakeholders.

Inter-organizational and Learning Networks

While collaborative planning and communities of practice tend to describe relatively small scale or community based collaboration, observers in the field of public administration have adopted the broader concept of networks. Social networks, relationships between two or more individuals, span pre-history. The rising interest in network forms of organization, however, has been a relatively recent phenomenon. The work of Manuel Castells (1996) and his declaration that we have entered an era characterized by ubiquitous network forms and live in a “network society” opened numerous scholars to ideas associated with networks and the various impacts that networks have on social relationships, governance, policy processes, planning, and more.

Network forms of organization can be broadly defined, but most scholars agree that they rest between the traditional notions of hierarchy and market (Powell, 1990). Networks have generally been analyzed within the private sector as means for creating competitive advantage among firms that work together for mutual gains or mutual ends (Brass, Galaskiewicz, Greve, & Tsai, 2004; Powell, 1990). This analysis has been extended to public sector networks as scholars examine how planning and implementation networks are designed and function within the public sector or through public-private partnerships (Agranoff & McGuire, 2003; Mandell, 2001;

Provan & Milward, 2001). Networks in both the public and private sectors function within and alongside existing organizations and provide the potential for crossing boundaries and creating interorganizational relationships and mediums for exchange (Podolny & Page, 1998; Powell, 1998).

In the public administration literature, the concept of networks has gained significant traction (Agranoff & McGuire, 2003; Kickert, Klijn, & Kopenjan, 1997; Mandell, 2001; Sorensen & Torfing, 2005). The field continues to wrestle with core questions of what forms these networks take, the role of public managers within networks and the practices that should be undertaken to ensure the proper management of public goods (Agranoff, 2006; Bryson, Crosby, & Stone, 2006; Feldman, Khademian, Ingram, & Schneider, 2006; McGuire, 2006; Weber & Khademian, 2008). This literature has significant links to collaborative planning scholarship as it works in similar fashion to theorize about the practices of public managers within an increasingly interconnected world. Unlike collaborative planning and communities of practice, network scholarship has not settled on a widely agreed upon set of norms, processes, and designs.

In recent years, networks designed explicitly for learning is a growing phenomenon. As Cummings and Zee (2005, p. 17) note, “Learning-oriented networks represent civil society’s answer to the challenges of the emerging knowledge society.” Although given a variety of names such as ‘learning networks,’ ‘knowledge networks,’ ‘thematic networks,’ and ‘virtual teams’, the primary intent of such networks is to share knowledge and information among members in an effort to ‘learn’ (Beeby & Booth, 2000; Bottrup, 2005; M. Brown & Salafsky, 2004; Creech & Willard, 2001). In this sense, learning networks encompass communities of practice as they “focus on augmenting the personal capacity of an individual or a group in a particular area of skill, expertise, vocation, avocation, or knowledge” (Anklam, 2007, p. 36).

There is no one model for learning networks. They range from web portals and information clearinghouses, to large scale communities of practice, to nested units of collaborative networks engaged in different kinds of work at each scale but linked for the purposes of sharing information, knowledge, and generating innovation across all scales. They can support a variety of services and create numerous and varied forums for exchange sponsoring such activities as field projects, planning exercises, exchange visits, field excursions, information databases, publications, contact list generation, and even virtual social networking sites for members (Goldstein, et al., Forthcoming 2009).

In learning networks, the mode of exchange is through network interactions and the product of the exchange is knowledge, information, and expertise. Learning networks promote learning both from and by practicing professionals, fostering the spread of best practices and emerging concepts within and throughout the field (S. E. Daniels & Walker, 2001). They emphasize generating practical knowledge, drawing lessons from experience, instilling sound decision-making processes, and identifying barriers that impede effective practice and how to overcome them.

The Scope of Learning and Change through Collaboration

Learning and change is associated with all of these models of collaboration. In the field of collaborative planning, Booher and Innes (Booher & Innes, 2002; Innes & Booher, 1999a) suggest that of the many intangible outcomes of consensus building and collaboration, learning and change can be among the most powerful. While specific agreements and plans may be the products of collaborative processes, developing those products enables participants to engage in social learning. Thus, from generating local changes in individual practices to systems of

governance designed for the purpose of learning and change, collaborative forums are widely recognized for their propensity to create dialogic interactions that foster social learning.

Scholars studying collaboration often examine learning at the scale of individuals (Booher & Innes, 2002; Forester, 1996b; Poncelet, 2001; Wenger, 1998). Some scholars argue that engaging in collaboration can provide an opportunity for individuals to align themselves around new and potentially common notions of how they view themselves and their social worlds around them (Booher & Innes, 2002; Hardy, Lawrance, & Grant, 2005; Inkpen & Tsang, 2005). Participants can come to see themselves as interconnected in new ways and can change fundamentally held views on how participants view themselves in relationship to each other and the natural environment (Bryan, 2004; Poncelet, 2004; Roling & Maarleveld, 1999). Beyond simply learning about and employing existing information and knowledge and using that knowledge to change strategic action, participants may experience fundamental changes in discourse, practices, and group interaction that become part of individual and collective transformation.

In the planning literature, Booher and Innes (2002, p. 231) develop this notion suggesting that “a central outcome [of collaboration] is that participants in dialogue build a sense of shared identity as part of a system or community.” They suggest that through collaborative dialogue “people try out various ways of thinking about themselves and ways of making sense of their experience and the world in which they live” (Booher & Innes, 2002, p. 231). It is within such deliberative contexts that individual identities can be constructed and can coalesce around common or collective identity (Hardy, et al., 2005; Healey, 1999).

Extending this line of reasoning, collaboration may be a way to motivate individuals to serve as agents of learning and change at the organizational level (J. S. Brown & Duguid, 1991;

Innes & Booher, 1999a). Through their reviews of network scholarship, Podolny and Page (1998) and Brass et al. (2004) suggest that organizations in networks have the potential to improve through learning, that is, interorganizational networks may catalyze organizational change. Yet, while scholars in various fields have suggested that organizational learning occurs through networked relationships (Beeby & Booth, 2000; Bottrup, 2005; Powell, 1998), there is less evidence suggesting *how* the organization learns and changes through network participation.¹

Going beyond this organizational level, Innes and Booher (1999a) posit that new institutions, norms, heuristics, and discourses may arise from collaborative interactions, even at small scales. Healey (1997) articulates how this might occur. Drawing on Giddens' theory of structuration, she offers this theory of change:

We live through culturally-bound structures of rules and resource flows, yet human agency, in our continually inventive ways, remakes them in each instance, and in remaking the systems, the structuring forces, we also change ourselves and our cultures. Structures are 'shaped' by agency, just as they in turn 'shape' agency (Healey, 1997, p. 47).

This offers the possibility that social change can emerge from the interplay of individuals with the institutional realities within which they operate.

Collaboration focuses this interplay as it draws together a web of networks, creating nodes of intersection "where systems of meaning, ways of acting and ways of valuing are learned, transmitted and sometimes transformed" (Healey, 1997, p. 58). Through collaborative interactions, institutional capacity can be built as impacts extend into the networks of relationships outside the group connected to the participants, increasing the institutional capacities of governance to resolve complex policy challenges (Healey, 1998). In this way,

¹ Bottrup (2005) begins to tackle this question with some acumen. However, his work is in an arena outside of the planning realm and fails to fully examine how network interactions and activities led to the organizational change he observed in his work.

Healey proposes that certain collaborative infrastructures can engender greater flexibility, creativity, and innovation within urban governance regimes, that is, the capacity for learning and change of entire governing systems can be enhanced through collaborative processes. She suggests that the goal is to develop “a mode of governance... which focuses on learning new approaches and new practices,” that is, to shape a new governance regime focused on learning, adaptability, and collaborative interaction (Healey, 2004).

Scaling Up Collaboration

In environmental management contexts, the fact that collaborative processes can foster social learning and change has made collaboration the *de facto* governance approach in adaptive management (Gooch & Warburton, 2009; Pahl-Wostl, et al., 2007) and a mechanism to navigate decision making in the midst of high levels of uncertainty. Until recently, the scale of the collaborative endeavors in environmental management tended to be focused on addressing problems in specific locations or policy domains, without linkages to other similar forums or arenas (Healey, 1997; Koontz, et al., 2004; Randolph & Bauer, 1999; Shutkin, 2000; Weber, 1998, 2003; Wondolleck & Yaffee, 2000). Increasingly, however, scholars recognize that the management of complex systems requires cross-scale linkages at both horizontal and vertical levels among institutions and ecological systems (Berkes, 2004; Berkes & Folke, 1998; Ostrom, et al., 2002). Rather than simply allowing “a thousand flowers to bloom” (Weber & Hayward, 2009) through collaboration in isolated units, these multi-scalar approaches provide a collaborative superstructure to link multiple units at multiple scales. As Berkes (2002, p. 293) observes “Cross scale institutional linkages means something more than management at several

scales, isolated from one another. Issues need to be considered simultaneously at several scales when there is coupling or interaction between scales.”

In the last decade, scholars and practitioners have been experimenting with linking collaborative processes across multiple scales as they seek to engender broader systemic change. In environmental planning and management arenas, multi-scalar collaborative endeavors have emerged across expansive ecological systems such as the Everglades (John, 1994), the Great Lakes (Keuhl, 2001), and the Chesapeake Bay (T. Daniels, Daniels, & Leslie, 2002); multi-jurisdictional watersheds such as river basins in Oregon (Margerum & Whitall, 2004) and Australia (Margerum, 1999); complex water supply systems in Florida (Scholz & Stiftel, 2005), California (Innes, et al., 2007), and New York (McCreary, 1999); and regional or national environmental planning and management endeavors such as Habitat Conservation Planning under the Endangered Species Act (Fung & Wright, 2003), Land and Resource Management Planning in British Columbia (Frame, Gunton, & Day, 2004), and community forestry efforts across the US (Brunner, et al., 2005). This period of intensive experimentation and innovation creates opportunities to draw lessons from multi-scalar collaborative models.

Scaling Up Collaborative Planning

In the 2000s, the scope of collaborative planning endeavors began expanding, operating both at larger scales (Innes, et al., 2007; Margerum, 2008; Scholz & Stiftel, 2005) and across multiple scales (Fung & Wright, 2003; Margerum & Whitall, 2004; Ostrom, et al., 2002). Some scholars began examining the extent to which a broader understanding of collaborative planning could be associated with and informed by the concept of the Network Society², a global shift in

² The call for papers for the Third Joint Congress of the Association of Collegiate Schools in Planning and the Association of European Schools of Planning in 2003 specifically asked scholars to examine whether the notion of a

social and political relations through heightened interconnectedness and interdependence of firms, groups, populations, governments, and nations. In the Network Society, hierarchical institutions that were once the center of governing “must now increasingly compete with open-ended, often unusual, ad hoc arrangements that demonstrate remarkable problem-solving capacity and open up opportunities for learning and change in exactly those circumstances where classical-modernist institutions have failed to deliver” (Hajer & Wagenaar, 2003, p. 3).

Some researchers aim to clarify the field by developing typologies of collaboratives that operate at different scales and with different purposes (Ansell & Gash, 2007; Bidwell & Ryan, 2006; Margerum, 2008; Moore & Koontz, 2003). These efforts fall short. For example, Margerum (2008) proposes a typology of collaboration in environmental management and uses institutional analysis to suggest that collaboration takes place at distinct levels with specific purposes: 1) at the policy level to change legislation, policies, or rules, 2) at the organizational level to engender changes in organizational policies and programs, and 3) at the action or operational level to implement strategies including education, restoration, and planning (Margerum, 2008, p. 488). He suggests that collaboratives at different scales involve different types of stakeholders, have different management arrangements, focus on distinct types of problems, and use distinct approaches to implement the change they desire. While this typology is quite useful for examining collaboratives that operate at distinct scales, how to link collaboratives operating across scales simultaneously is left unexamined.

Others suggest that collaborative governance is more encompassing than site, sector, or problem specific collaboratives. As the summary to a 2005 workshop bringing deliberative

“network society” had implications for planning. In this forum, it became clear that the implications of the network society are both far reaching and quite variable as the term can be applied to physical infrastructure networks, social connections (both virtual and face to face), information flows (particularly via communication technologies), and governance forms (Albrechts and Mandelbaum, 2005).

democracy, collaborative planning and alternative dispute resolution scholars and practitioners together concluded, the objective has become to "...think about the system that produces each conflict and try to fold what we learn from one occasion into the long-term development of new institutional capacity" (Ashcraft & Susskind, 2005). Workshop participants contended that multistakeholder collaboratives could be part of an "ad-hocracy" (Menkel-Meadow, 2005) that is constantly made and remade through ongoing practice rather than the exemplar of collaborative governance in total. These scholars sought to examine collaborative approaches to address problems that extend beyond the scale and reach of classical-modernist political institutions as well as beyond traditional place-based multistakeholder collaboratives in a time of heightened interconnectedness and interdependence of firms, communities, and governments (Hajer & Versteeg, 2005; Hajer & Wagenaar, 2003). Yet, how to develop and link collaborative structures that operate across scales more effectively remains unexamined and lightly theorized.

Scaling Up in Communities of Practice

In a similar vein, business management consultants have begun to team up with public administrators to bring the concept communities of practice to the public sector to address problems at multiple scales simultaneously (Snyder & Briggs, 2003; Snyder, et al., 2004). They have argued that the public domain faces dynamic and complex problems that cross organizational, disciplinary, and spatial boundaries. There is a need for knowledge and capacity that transcends compartmentalized and rigid public agencies. Developing and sharing expertise among business, governments, and civil society, and across disciplines and jurisdictions is a necessary step in addressing these problems (Snyder & Wenger, 2004; Snyder, et al., 2004). Recognizing that elusive public sector problems cut across organizational and spatial scales,

public sector communities of practice must also operate at multiple scales. These scholars advocate nested communities of practice to generate the needed capacity and expertise.

This fractal model simply changes who is involved at different levels rather than how they are involved (Wenger, 2000). Taking this model to its logical extreme, some envision national ‘community of communities’ based on a federalist model of nested communities of practice operating in particular policy domains (Snyder & Briggs, 2003). The fractal model assumes that the self-same design, processes and outcomes achieved at each level of the network will provide the necessary structures and opportunities for learning and exchange to generate expertise that cuts across multiple sites and levels. The “fractal scaling approach” has the potential to augment the influence of both the overall network at various scales and to augment the impact of local level communities if they can draw on the larger “network of networks” to inform their practice (Snyder & Briggs, 2003). However, these concepts, while well theorized, have not been extensively evaluated in applied settings. Questions about this approach remain. How does the “practice” change at each level of the federalist model? Can the community be sustained across all levels and scales? Is it possible to maintain a focus on a particular domain across all levels?

Scaling Up Learning Networks

Learning networks are being designed to address complex and dynamic cross scalar problems, operate at multiple scales and involve multiple organizations and models of collaboration (Anklam, 2007; M. Brown & Salafsky, 2004; Creech & Willard, 2001; Keast, et al., 2004; Keen & Mahanty, 2006; Knight, 2002; The Heinz Center, 2004). Although technically speaking, learning networks can be a narrowly defined and small community of practice, they

generally have been applied in arenas that reach across organizational and spatial scale. Indeed, learning networks in the conservation and international development fields emerged as organizations sought to expand their impact beyond their own boundaries. As Engel (1993) suggests, the purpose of linking across organizations in learning networks is to “upgrade” performance by enhancing knowledge and capacity, to engage in analysis and activities “upstream” reaching across spatial scales in understanding, and to “upshift” their impact to a higher policy level. Yet, how to design effective multi-scalar learning networks continues to challenge practitioners and scholars alike. Moreover, the extent to which and how these networks generate learning and change that extends beyond network boundaries remains only lightly examined.

Conclusion

There are several aspects of this research that promise to inform the study of collaborative planning. First, this research provides a model for how collaborative planning can operate across multiple scales simultaneously. Within the multi-scalar context, this study introduces new kinds of collaborative approaches at each scale that extend the possibilities available to collaborative planners beyond traditional models of collaboration in the planning literature. Moreover, it introduces the potential of linking collaborative processes across scales in a broader network, enhancing the development of certain kinds of capacities in collaborative planning by connecting distinct practice models.

Second, this research offers insights into how a multi-scalar collaborative network can navigate a core tension in the field: balancing the need for coherence across the system without undermining the need for creativity at each collaborative node. Operating across scales in which

many participants in a network rarely if ever meet face to face, developing coherence in practice can be challenging. Yet, over-prescribing network activity can undermine creativity or lead to an exodus of members who cannot apply the network approach to their respective contexts. This study provides a theoretical framework through which to understand how network action can strike a productive balance between coherence and creativity.

Finally, this research extends the potential scope of learning and change that can be achieved in collaborative contexts. Collaborative planning has been associated with individual learning and change, and to some extent to organizational learning. In this research, I suggest that by operating across multiple scales simultaneously, there is the potential to extend learning and change from individuals, to organizations, and even to institutions. While lightly theorized, this potential has been largely unexamined in collaborative planning literature.

Chapter 5

The Fire Learning Network: A catalyst of change

While changes in rhetoric and policy associated with fire management were emerging in federal fire management agencies, one of the world's largest and most respected conservation organizations, The Nature Conservancy (TNC), began envisioning a new approach to achieving a bold global mission. On December 5, 2003, the TNC Board established what has become known as the 2015 Goal: "By 2015, The Nature Conservancy will work with others to ensure the effective conservation of places that represent at least 10% of every Major Habitat Type on Earth" (TNC, 2004b). TNC has long been regarded as one of the most effective conservation organizations in the world; however, by the early 2000s its model of buying and managing its own lands was no longer sufficient to achieve such a bold objective. Their new endeavor would rely on conservation practitioners operating at ecological scales around the world to address threats to biodiversity that transcend organizational and jurisdictional boundaries. TNC leaders determined that the organization had the opportunity to shape how biodiversity conservation was achieved on a global scale by leveraging knowledge and practices that TNC could enable or create through its collaborative partnerships. Many of these strategic thinkers were leaders in establishing TNC-guided conservation learning networks for that very purpose. One of the largest, most active, and by many accounts, most successful of these networks is the US Fire Learning Network (FLN). This chapter examines the rise of learning networks in TNC and provides a case study of the FLN.

Strategic Transformation in TNC

As one of the largest and most venerable conservation organizations in the world, The Nature Conservancy (TNC), officially formed in 1951, started out with a goal to protect open

space and wildlife preserves (Brichard, 2005; Luke, 1997). Since that time, TNC has brought nearly 15 million acres in the United States under its influence through acquisition, easements, and other techniques (TNC, 2006d). In the 1970s, TNC's mission shifted from aiming to preserve distinct pieces of Nature to a scientifically driven approach to identify landscapes with high ecological values based on the concept of biodiversity (Luke, 1997, p. 67; Marine, 1990). The new mission serves as the banner of every site in TNC's webpage system: "The mission of the Nature Conservancy is **to preserve** the plants, animals, and natural communities that represent **the diversity of life on Earth** by protecting the lands and waters they need to survive" (TNC, 2006c, bold in original). TNC is on a global quest to protect habitat (lands and waters) necessary to support biodiversity as manifest through individual plants and animals as well as entire natural communities or ecosystems.

While the land acquisition and direct management approach is still a major conservation strategy of TNC, the limitations of this mechanism became all too clear in 2000. TNC along with the Association for Biodiversity Information (the TNC spin-off of the Natural Heritage Network later renamed NatureServe) published a coarse scale inventory of biodiversity in the United States. *Precious Heritage: The Status of Biodiversity in the United States* warned that fully one-third of species in the United States were imperiled (TNC, 2006d). The TNC identified about 100 million acres in need of preservation based on the mission of protecting this biodiversity (Doug Zollner, personal communication, 6-13-06). TNC's direct management of only 15 million acres throughout the United States fell far short.

In some respects, this dilemma caught the TNC off guard. After 5 decades of "quietly preserving nature" (Grove, 1988), the TNC was tens of millions of acres short of reaching its goal. Yet, in other respects, the organization was prepared as the Conservancy had become one

of the most influential conservation science and planning organizations in the world. TNC had formally adopted a new agenda for conservation in 1996 known as “Conservation by Design.” Conservation by Design was informed by the “5S” planning process developed by Gregory Low³ which established a planning discipline for Conservancy staff systematically to identify key threats to biodiversity conservation and mitigate them appropriately (Brichard, 2005). The *Precious Heritage* report was the outcome of 5 years of diligence on the part of TNC scientists to develop a blueprint for conservation that would guide TNC managers toward key targets that fit the Conservation by Design and 5S frameworks.

Meanwhile, then TNC President John Sawhill, developed two task forces in 1997 to chart a course for the future. These groups concluded that TNC should focus on applied science, expand community-based conservation programs, and apply “the community-based conservation lessons on much bigger landscapes by influencing the practices of government and corporations” (Brichard, 2005). This focus would push TNC to look beyond its organizational and land ownership boundaries to advocate its conservation message and management approach to others. A new strategic vision was emerging in both the discourse and practice of the TNC alongside the direct land management approach. This new strategy aimed to shape the conservation practices of land managers within and outside the Conservancy. As outlined in a draft of a strategic planning document developed by the Global Conservation Strategies Team (GCST),

Our objective is to transform the practice of biodiversity conservation on Earth, with others, to make it truly effective and effectively distributed. Specifically, our aim in enhancing connections and sharing know-how is worldwide adoption, and

³ The 5-S planning process refers to a rational adaptive management planning process developed by Greg Low that TNC applied as an approach to implement Conservation by Design through proactive site level planning. The 5-S methods include analyzing:

- Systems (conservation targets and natural processes that maintain them),
- Stresses (threats to conservation targets),
- Sources (where a particular threat is coming from),
- Strategies (identify threat abatement and restoration techniques), and
- Successes (monitor effects of strategies in achieving conservation goals).

effective implementation, of the Conservation Approach that TNC is developing with partners (Global Conservation Strategies Team, 2006).

Conservation Learning Networks

One of the manifestations of TNC's approach to distribute a model of conservation planning and practice is the proliferation of Conservation Learning Networks. The concept of learning networks in TNC was initiated in the Freshwater Initiative in the late 1990s. The Freshwater Initiative established networks of TNC projects working on freshwater issues and engaged in information exchange and planning exercises in groups organized around particular themes. Jeff Hardesty, Director of Ecological Management and Restoration at the time, characterizes these early networks as internally focused: "They were Nature Conservancy staffed, Nature Conservancy projects, and it was more of a [way]...to deliver information and materials and products to projects in an efficient way so that our experts didn't have to travel from individual project to individual project" (Jeff Hardesty, personal communication, 11-2-06). While the network architects understood that some projects were innovators in practice and therefore could be sources of lessons that could be passed to others in the network, the principal focus was on information delivery within TNC rather than generating conservation practice innovation (Jeff Hardesty, personal communication, 11-2-06; Wendy Fulks, personal communication, 1-15-07).

Noting the utility of the networks in the Freshwater Initiative, Hardesty and his team began evaluating land based conservation work across TNC to determine the extent to which the organization was advancing "large-scale on the ground projects and at-scale threat abatement strategies...that didn't have to do with land conversion and land acquisition" (Jeff Hardesty, personal communication, 11-2-06). They began to build networks of practitioners for land based conservation work, but expanded the application of networks to include partners from other

organizations. The team developed a series of Landscape Conservation Networks. They started with a wetlands management network, then moved into forest management, grazing and grasslands management issues, invasive species, and finally fire regimes (Wendy Fulks, personal communication, 1-15-07; Jeff Hardesty, personal communication, 11-2-06).

The architects of the networks hoped they could enhance organizational and professional capacities to manage conservation lands across jurisdictional and organizational divides.

Hardesty (personal communication, 11-2-06) clarifies that

the idea was to bring practitioners together with partners, to share lessons learned, and to challenge the organization at the site level to be thinking at scales that were appropriate to the threat, not that were convenient to us, or how we worked... the idea was to develop these thematically-based, threat-based, strategy-based, partner-based networks.

Thus, through Landscape Conservation Networks, TNC sought to accomplish three key goals. First, the networks aimed to scale up conservation action appropriately to respond to key threats. Scaling up in this context means that instead of managing within ownership, administrative or jurisdictional boundaries, TNC leaders sought to enable what they called landscape scale management based on principles of landscape ecology. This approach extended the boundaries of land management planning and implementation across interconnected ecological systems up to eco-regional scales. Second, the networks were designed to extend beyond TNC organizationally through inter-organizational partnerships. Given that TNC could never purchase or manage all of the lands that were important for conservation of biodiversity, they had to rely on partners to implement biodiversity conservation techniques. And, third, the networks sought to build capacities and knowledge through information exchange and learning. With high levels of uncertainty and complexity, TNC leaders recognized that an adaptive management approach was necessary to respond to the challenges that confronted conservation land managers.

Within TNC, the learning network model became more refined over time. A structure and set of expected practices accompanies the TNC learning network approach. Learning networks aim to “bring together Conservancy staff, agency partners, and scientific experts in a series of facilitated, progressive workshops” guiding the participants through a carefully designed sequence of planning exercises (TNC, 2006b). At the workshops, participants are exposed to tools and techniques associated with conservation strategies related to the network’s purpose and have the opportunity to receive peer-review comments on the documents they prepared for the session.

Fire Learning Network

One of the most active of these networks is the US Fire Learning Network (FLN). The FLN was formed in 2001 as a cooperative partnership between TNC and the public land management agencies of the US Department of Interior (DOI) and US Department of Agriculture Forest Service (USFS). The FLN has gone through two distinct phases since its initiation. Operating at a national level from 2002-2003, the FLN connected 25 initial landscape teams together. The landscapes covered around 40 million acres, about half of which were located in Western states. Over a period of two years, participants engaged in four formal workshops to develop planning documents and implementation strategies for fire restoration. This phase caught the eye of the well respected fire historian, Stephen Pyne (2004) who touted the FLN as a potentially innovative governance approach to natural resources management in an era when government agencies struggle to maintain legitimacy in an arena they once dominated.

The second phase was marked by greater flexibility and decentralization. The FLN adopted a regional approach in 2004 and created multiple regional hubs instead of a single

national hub. From 2004-2006 the network expanded to include 80 project sites in 10 regional networks covering well over 100 million acres of fire-adapted landscapes. The formal planning process continued to guide most regions, but some also aimed to develop comprehensive planning tools such as ecological mapping and modeling systems. A 2007 cooperative agreement extended the partnership through 2011. The regionalized structure continues to dominate the network, but greater flexibility of design and purpose of each region or landscape project has been woven into the network as the network coordinators and leaders continue to adapt their approach to incorporate new ideas and feedback from FLN member landscapes and participants. Each regional network is at a different phase in its development and has a slightly different approach to engage in network action. This chapter provides an overview of the history of the Fire Learning Network and a review of the inter-organizational relationships, social interactions, and outcomes that have been associated with FLN activities.

Generating an Idea, Designing a Network

In the *Precious Heritage* report, TNC identified 100 million acres to be included in ‘portfolio sites,’ areas that represented essential links in achieving the organization’s biodiversity conservation mission (TNC, 2006d). Across the portfolio landscapes, 45% were identified as having altered fire regimes (TNC Conservation Science Division, 2001). In order to accomplish their organizational mission, TNC had to address the challenge to biodiversity conservation posed by these altered fire regimes. Given that public land management agencies managed nearly 70% of the lands in the portfolio sites (Jeff Hardesty, personal communication, 11-2-06), TNC had little choice but to work with federal partners who managed the lands in hopes that biodiversity and ecological restoration of fire-adapted ecosystems goals could be implemented

on federal lands. As one of the first coordinators of FLN recalls, “out of that thinking the concept of the FLN was born” (Doug Zollner, personal communication, 6-13-06).

The notion of a learning network focused on fire issues had been a topic of discussion among the leadership of TNC’s Conservation Science Division as they conceptualized a variety of landscape based networks (Wendy Fulks, personal communication, 1-15-07). However, the idea gained significant traction with the unveiling of the first iteration of what has become known as the National Fire Plan (USDA Forest Service & US Department of Interior, 2001). The National Fire Plan supported the restoration of fire adapted ecosystems particularly where restoring altered fire regimes and reducing hazardous fuels could be accomplished simultaneously. With Congressional appropriations of \$1.8 billion in the 2001 budget supporting the plan (Shlisky, 2001), public land management agencies had a new mandate for fire management with a strong ecological focus coinciding with a continued focus on security, community protection, and risk management.

With this new plan, leaders within TNC recognized that the agency mandates for restoration were highly compatible with the TNC goals of biodiversity protection and restoration. TNC organized and hosted a National Fire Roundtable March 13-15, 2001 in Flagstaff, Arizona. Sixty-two people attended the roundtable and came from a wide array of organizations including TNC, US Forest Service, Bureau of Land Management, National Park Service, US Fish and Wildlife Service, state forestry or wildlife agencies, and universities (Shlisky, 2001). The meeting sought to determine how TNC could partner with government agencies to facilitate the implementation of National Fire Plan projects.

The National Fire Roundtable laid the foundation for creating the FLN. As Doug Zollner (personal communication, 6-13-06) recalls, the network was conceived on a bar napkin in

Flagstaff. Some of the TNC staff attending the roundtable sat down for a beer after one of the meetings and began to brainstorm how to deal with the fire management challenges and barriers that seemed overwhelming to many of the attendees of the roundtable. Introducing fire and restoring fire adapted ecosystems on a landscape scale seemed a daunting path to follow. Yet, it was one the attendees felt needed to be pursued in order to restore forest and grassland ecosystem health in most regions throughout the United States and it was work that the agencies had been asking Congress to fund. As TNC leaders talked that evening, they sketched a model for a network approach to identifying common ground, sharing information, creating collaborative partnerships, and shaping common sets of practices to restore fire adapted ecosystems. Although the concept of a Fire Learning Network had been bubbling up to the surface within TNC leadership, the network idea took shape and was vetted on a bar napkin that night. The idea was unveiled to the attendees of the National Fire Roundtable the next day.

The idea of the network resonated with the other attendees. As reported in the summary of the roundtable, one of the six emergent strategies to achieve their common goals was to “Develop a network of community-based restoration projects as a means of quickly disseminating lessons-learned, making a case for ecologically compatible fuel reduction, and demonstrating success” (Shlisky, 2001, p. E2). At the meeting, participants identified over 130 sites that were potential locations of community-based fire restoration projects where fuels management issues were central, public agencies were major stakeholders, and biodiversity values were at risk (TNC Conservation Science Division, 2001). These sites were targeted as potential projects to participate in a network focusing on ecological fire restoration.

TNC staff developed a comprehensive funding proposal to obtain National Fire Plan money to implement a strategy for achieving the broad objective of transferring knowledge and

fostering innovation in fire management for ecological restoration. The proposal for funding became a cooperative agreement between the TNC, DOI, and USFS entitled *Proposal to Promote Restoration of Fire-Adapted Ecosystems through Education and Community-Based Partnerships* (RFAE). It was signed by the President of TNC, the Director of Fire and Aviation Management of the USFS and ratified by an internal agreement between the USFS and DOI (Ayn Shlisky, personal communication, 9-27-06).

The agreement created a three pronged approach designed to expand opportunities for training in fire management techniques for ecological restoration, to realign how agencies portray fire to the public in their education campaigns, and to work cooperatively with the agencies and other stakeholders through learning networks to reinforce restoration thinking and action on the ground. At its core, “The goal of the RFAE project is to work at local to national levels to overcome barriers to implementing ecologically appropriate fuels reduction and restoration projects” (TNC, 2004a). The proposal was funded by the federal agencies for nearly \$1.8 million with nearly \$300,000 a year supporting Fire Learning Network landscape projects. TNC provided staff and other in-kind resources to support the effort and specifically hired two network coordinators to manage the FLN.

FLN's Purpose: Collaboration for Organizational Change

As envisioned by leaders within TNC, the FLN would bring together partners in restoration who would build on common ground to identify ecological priorities and implement fire restoration strategies at landscape scales. The network would serve as a central point of exchange of technologies and knowledge to help participating project sites learn from each other and build successful fire management programs in a variety of regions throughout the United

States. As stated in one of the FLN newsletters, “The FLN supports and accelerates collaborative, innovative community-based, landscape scale fire management planning in multi-partner landscapes” (Fire Learning Network, 2002). From its inception, the FLN was designed to engage partners in developing fire restoration plans at landscape scales that crossed multiple jurisdictional and organizational boundaries and to share knowledge, information, and technologies among fire management practitioners.

This approach called for inter-organizational collaboration in order to operate at the scale of management necessary to achieve the goals of ecological fire restoration. This perspective greatly influenced how the organization clarified the purpose and hope of the networks. As identified in the first grant proposal outlining the Fire Learning Network, “Despite owning and managing more than 1,500 nature preserves of our own, we recognize that conserving biodiversity will largely be the result of decisions made and actions taken by our partners—public land managers, corporations, communities and private citizens—and not us” (TNC Conservation Science Division, 2001, p. 1). In the second proposal, the importance of working with government agencies was stated even more plainly: “As a non-profit organization with limited resources and a small land base, the Conservancy realizes that the success of our mission is highly dependent on the success of our federal and state partners” (The Nature Conservancy Global Fire Initiative, 2003). Working cooperatively with partners had become an organizational imperative rather than a luxury.

Central to this approach is the idea that learning networks can foster change in the organizations and agencies that operate within the institution of fire management. Though organizational or institutional change is not explicitly stated as a goal of the network on the FLN website, it is widely understood among network organizers and participants. At an FLN leaders

training hosted by Virginia Tech in 2007, one of the network leaders stated simply that the goal of the FLN was to change how federal agencies approached fire management. National FLN leaders presenting at regional network workshops have specifically stated that part of the purpose of the network is to initiate “viral spread” of FLN ideas and get network participants to take the tenets of ecological fire restoration back to their home units to influence others. As one TNC leader shared,

For the Nature Conservancy it was far more the decisions and actions of our partners that would make a difference and less so ours... Through collaboration, we could have some influence and perhaps change the way that our partners think about integrating, or think about managing their own lands and waters, bringing in a biodiversity perspective (Confidential personal communication, 2006)⁴.

Despite the fact that this bold goal is usually only shared in confidential settings, TNC actively promotes the FLN as a way to accomplish their biodiversity goals with the support and willing participation of partners. The cooperative agreement establishing FLN clearly articulated the purpose of the network to promote ecological fire restoration among organizations that would partner with TNC, a goal that is at least rhetorically supported by the signatory government agencies. Key leaders within the agencies recognized this potential of learning networks and participated in the network for precisely that purpose. The most recent version of the cooperative agreement, written with the active participation of agency representatives from the USFS and BLM (Linda Mazzu, personal communication, 3-9-07; Sarah Robertson, personal communication, 3-13-07), specifies that the desired outcomes of the partnership include to “build an institutional philosophy/culture that supports the implementation of the full range of fire use management strategies” and to strengthen “understanding and support for an integrated approach to the restoration and maintenance of fire adapted and fire sensitive ecosystems...among Senior-

⁴ Given the sensitive nature of some of the comments made by research participants and their requests for confidentiality, I have chosen to protect their identity by listing some comments as confidential personal communications.

level fire and resource staff from all partner organizations” (TNC Global Fire Initiative, 2007). In essence, this is a call for specific actions that can facilitate overcoming the frustrated transition in fire management.

Jim Hubbard, the Director of State and Private Forestry for the USFS, articulates similar reasons for supporting the FLN. His hope is that the FLN can generate learning among federal and state agency land managers to incorporate landscape scale ecological fire restoration knowledge and practice into USFS work. He argues that although the agencies understood eco-regions and landscape scale restoration, “that did not translate through to the land managers making priority decisions...where the landscape context was being considered as it should be.” In the late 1990s, he recognized that TNC was modeling and planning at eco-regional scales and wanted to bring this knowledge to government land managers and help incorporate that kind of thinking in their decision processes. According to Hubbard, what the FLN offered to land management professionals and organizations was the opportunity to work through a planning process that would “make them stop and sit down and think through this...and apply it to the processes that they work with” in their own organizational and ecological contexts. Hubbard’s hope was that doing so would lead to “changing behavior, changing thinking, and changing approaches over time” (personal communication, 4-27-07).

Meanwhile, network leaders also aimed to improve TNC’s capacities in conservation management through learning and exchange. Advocates of learning networks in TNC sought “fundamentally to change the Nature Conservancy and the way we think about our work... it was as much about...changing the way the Nature Conservancy worked and thought about its work, as changing or influencing our partners” (Confidential, personal communication, 2006). While TNC had been engaged in the practice of using prescribed fire for the purpose of habitat

improvement since the 1960s, some TNC leaders contended that many of the state chapters in the nation, particularly in the west, were not placing fire high on their list of conservation threats or tools for achieving ecosystem restoration goals. Thus, the FLN organizers hoped that fire would be placed higher on the list of priorities of the state chapters of TNC. Moreover, some leaders observed that state chapters were not always willing to cooperate with federal partners, especially those located in areas where long adversarial relationships had ensued between environmental activists and resource agencies. However, the situation called for collaboration as 70% of the fire altered landscapes that needed restoration to meet TNC's conservation goals were on federal property. Many TNC leaders began to suggest that working against federal agencies was a lost opportunity when collaboration had the potential to foster conservation practice on federal lands.

These sentiments were echoed at a 2008 Fire Learning Network leaders meeting in which many of the attendees lamented the fact that they were unable to garner the level of organizational support for their work from within TNC that they needed to accomplish the goals of the FLN. In strategic planning sessions at the meeting, leaders identified specific action steps they could take and contacts they could make to build greater support for their work and instill an understanding of the importance of ecological fire restoration as an organizational goal within their respective TNC state chapters. The work of fire restoration, inter-organizational collaboration, and cross boundary coordination is unevenly supported across the various organizational units of TNC.

Thus, learning networks are seen as catalysts for organizational change of all participating organizations. Key leaders within TNC sought to transform the agencies by bringing a stronger biodiversity perspective and landscape scale ecological restoration

approaches into agency management paradigms while also transforming TNC by engendering greater collaborative approaches to scale up management responses to key threats to the biodiversity conservation effort. The impetus for the entire initiative was grounded in an understanding that effectively responding to major conservation threats could only be accomplished by transforming how conservation managers thought about their work and how conservation organizations were structured to engage in threat abatement. In this case, the threat was fire or the lack of fire in ecosystems that depend on the cleansing power of flames. The response was inter-organizational and cross-jurisdictional collaboration to engage in ecological fire restoration planning and management.

Membership and Site Selection

The organizers of the original network conceived of it as a collection of projects participating voluntarily to forward their restoration agendas. Membership in this first phase was tightly controlled. An Advisory Team that included representatives⁵ from six national agencies, TNC, and a state forestry agency was established to help determine which projects to involve in the FLN. The Advisory Team worked with FLN staff to develop criteria for participation. The team reviewed the 130 sites identified at the National Fire Roundtable and chose 50 priority sites based on their geographic location, ecological importance, and level of stakeholder commitment.

⁵ The original Advisory Council included the following representatives:

Allen Carter, US Fish and Wildlife Service, DOI

Derek Halberg, National Guard

Merrill Kaufmann, USFS, Research

Paige Lewis, Colorado State Forest Service

Don Motanic, Bureau of Indian Affairs, Intertribal Timber Council

Bruce Runnels, The Nature Conservancy

Wini Sorensen, Bureau of Land Management, DOI

Lindon Wiebe, USFS, Management

Tom Zimmerman, National Park Service, DOI

Then, the FLN coordinators developed a Request for Proposals (RFP) which they sent to lead contacts at each of the 50 sites (Ayn Shlisky, personal communication, 9-27-06).

The Advisory Team reviewed 27 applications and ranked the projects, choosing 25 sites to include in the network (Ayn Shlisky, personal communication, 9-27-06). Of the 25 sites, 5 were designated as demonstration landscapes, 4 were contributing landscapes, and the remaining 16 were participating landscapes. Demonstration landscapes obtained a higher allocation of funding and were required to do all of the homework planning exercises and present at the workshops. Participating landscapes could attend workshops and could choose one homework planning exercise to complete and present at the workshop. Contributing sites could participate at whatever level they wished and were not required to complete any homework assignments. Funding allocated to each team ranged between \$5,000 and \$25,000 depending on the quality of the proposal and the demonstrated need of funding for planning purposes. The five demonstration sites were located in the Bighorn Mountains, WY; Jemez Mountains, NM; Upper Deschutes Watershed, OR; Long Island Pine Barrens, NY; and the Middle Niobrara Valley-Sandhills Prairie, NE (Fire Learning Network, 2002, see also Figure 5-1).

The funding could not go directly to government agencies, therefore TNC staff served as lead contacts in each landscape team. The landscape leaders brought partners together to work through planning exercises and served as the primary liaisons between the site level partners and the larger national network. The network principally involved fire managers and conservation professionals most of whom had government credentials in fire management techniques, had experience implementing prescribed burns, and had some level of fire management responsibility on conservation lands within the larger target landscapes. The network also involved ecologists, biologists, modelers, GIS technicians and other professionals trained in the sciences or who had

technical expertise needed to inform fire management planning efforts. Many of these professionals had fire management responsibilities on network landscapes as well.

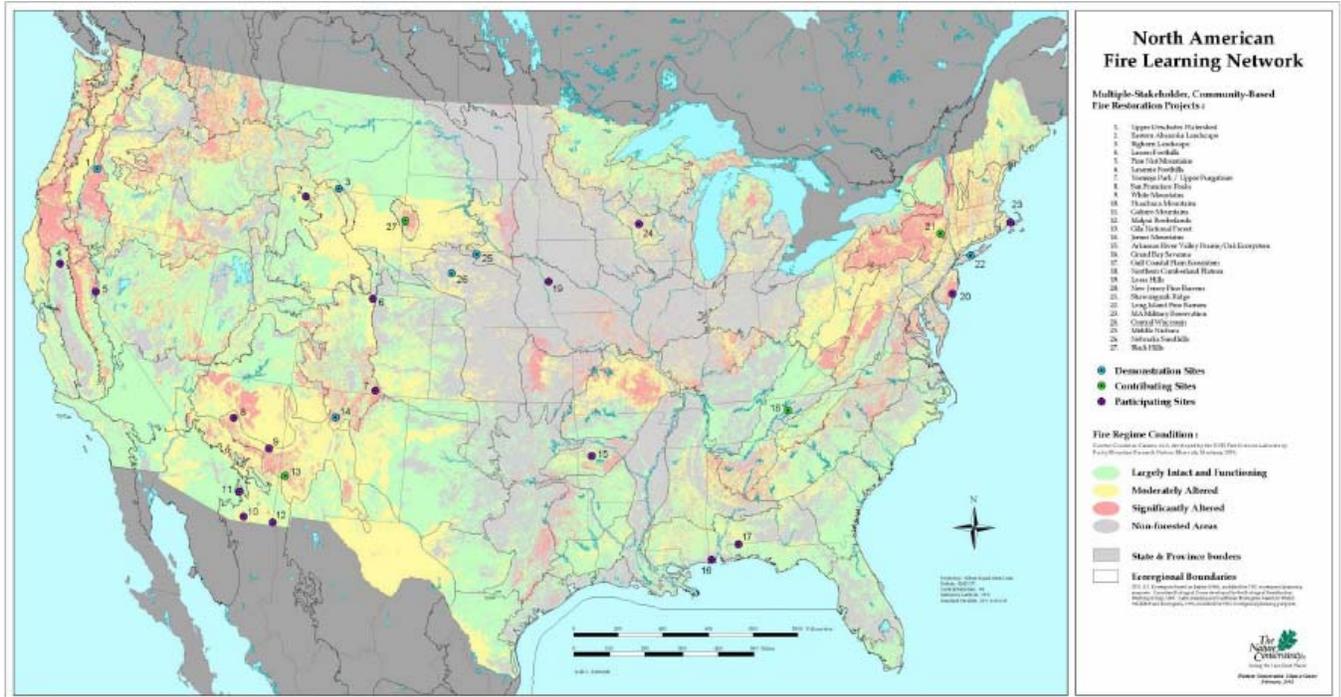


Figure 5-1: Map of FLN landscapes, 2002. Courtesy of FLN Director, 2009.

FLN Structured Planning Process

FLN coordinators developed a 4-step planning process and workshop series to guide participants through developing components of a landscape scale ecological restoration plan over the two year phase. The first proposal which led to the cooperative agreement stated that the workshops would be tied to TNC processes from the outset: “Roundtables are structured according to the particular needs of participants, but are guided by the basic principles of the...Conservation Planning process developed by TNC over the past 15 years” (TNC Conservation Science Division, 2001). The process mirrors TNC’s “Conservation by Design approach which is a four step process of setting goals and priorities, developing strategies, taking action and measuring results” (Ayn Shlisky, personal communication, 9-27-06). The leaders

adapted this traditional TNC planning process to focus on fire management issues and to be applicable to the planning processes of agency partners. In particular, the process was designed to transfer easily to National Environmental Policy Act (NEPA) planning procedures that needed to be followed by all federal agencies (Doug Zollner, personal communication, 6-14-06).

The first homework guided participants to develop ecological models of historic landscape conditions, current conditions and a collaborative vision statement to clarify restoration goals. The second assignment involved comparing current conditions and to maps of desired future conditions to identify the need for change and to prioritize specific areas in need of restoration action. The third homework required participants to develop an implementation plan to take action toward achieving their desired future conditions. The final homework had partners construct a monitoring plan to measure results and outline adaptive management strategies to feed new information into ongoing restoration planning (Figure 5-2). At the workshops, participants engaged in peer review of each others' work on the national stage.

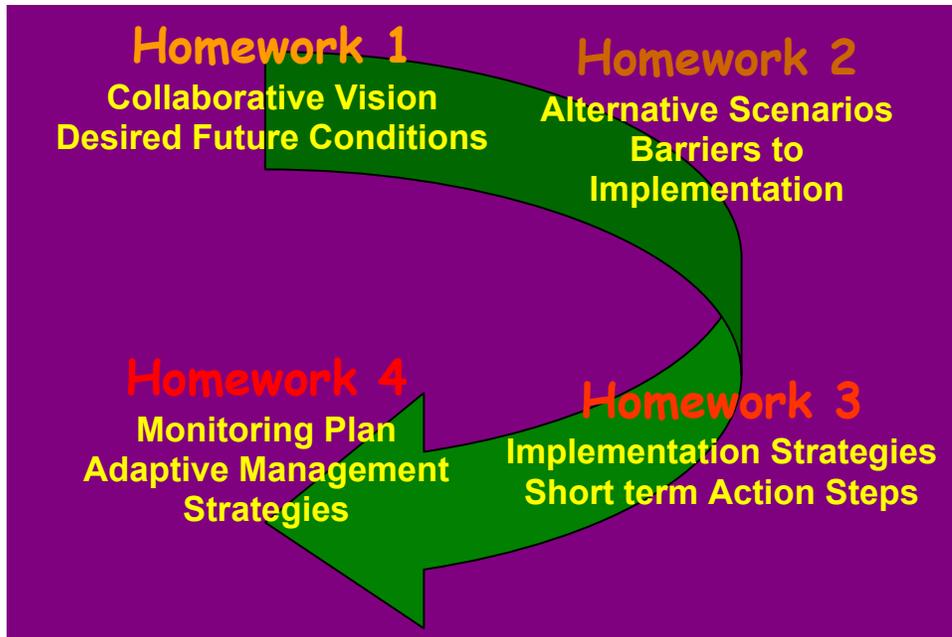


Figure 5-2: The four-step planning process, called “homework” as each exercise was to be completed prior to the FLN workshops

Landscape teams completed and prepared to present one of the “homework” exercises at each of the four workshops. During the national phase, the five demonstration sites completed all four of the planning exercises and presented the resulting planning products at the network workshops. The concept was that by completing the planning exercises outlined in the four pre-workshop assignments, the demonstration sites would serve as examples for all of the other teams on how to develop an ecological fire restoration plan. They would also generate knowledge and technology that could be passed through the network to other sites (Doug Zollner, personal communication, 6-14-06). While the participating landscapes were required to complete only one of the planning exercises, many teams completed more than one as they sought feedback about their planning efforts from other network participants.

Interactive Forums: Network Workshops

Biannual workshops served as the primary venue for network interaction. From 2002-2003, the FLN coordinators organized four workshops held in Santa Fe, NM; Sunriver, OR; Little Rock, AR; and Pensacola Beach, FL. The National FLN workshops consisted of approximately 3 days of meetings with lectures and presentations in the morning of the first day, project presentations and peer review in the afternoon, a field excursion to one of the sites on the second day and wrap up of presentations, peer review, and lectures on the final day. The national workshops were designed to allow leading participants from each landscape project team to gather and review their landscape level work, learn about recent scientific and policy developments related to fire management, and attend concurrent and plenary sessions on particular topics of interest to fire management professionals.

Each workshop included significant time for peer review using the planning guidelines as the common framework. Landscape teams presented their work, often using PowerPoint, and then attendees would comment, question, critique and discuss the landscape level work. At the national level, the network coordinators facilitated these peer review sessions. Following presentations by landscape teams, the coordinators asked a series of clarifying questions to start the session. Then, they opened the discussion to the broader audience (Doug Zollner, personal communication, 6-14-06).

With the planning guidelines as a point of departure, the FLN coordinators set agendas that built on the exercises that landscape teams had undertaken prior to the workshop. The coordinators organized the workshops around the themes of preparing, interpreting and using ecological models; the role of science and technology in informing fire management practice; effective collaboration to overcome barriers to fire restoration; and monitoring for adaptive

management. The core themes of each workshop determined who the coordinators invited as guest speakers, what concurrent sessions they would offer, and the focus of the field excursion. For example, for the third workshop focusing on effective collaboration, the FLN coordinators invited Gregg Walker, a collaborative natural resource management scholar at Oregon State University, to provide a three-hour training in effective collaborative techniques. Presentations by TNC, USFS, and BLM staff provided case studies of effective collaborative efforts in distinct ecological and political contexts highlighting the fact that different approaches to collaboration may be needed in different situations. On the field excursion to the Bayou Ecosystem Restoration Project in Arkansas, Scott Simon, the Director of Conservation for TNC-Arkansas pointed to two key aspects of collaboration that made that project successful: “it is not only the long-term relationships between partners and a willingness to share resources when needed, but also the consistent and mutual focus on desired future conditions that gets the job done” (Fire Learning Network, March 2003, p. 1). An oft repeated phrase among FLN members, “good partnerships make good projects,” originated at this workshop in Simon’s pre-excursion presentation.

FLN landscape teams hosted the workshops and guided participants on a field excursion to showcase restoration sites and fire restoration program efforts. The extent to which a host site could offer an informative and interesting field excursion was one of the primary criteria FLN coordinators used to choose a particular location. The field excursions allowed attendees to tour exemplary project sites and review restoration work on the ground. It was a tactile space for peer review as partners described their work and showed other participants landscapes where ecological restoration has been implemented or was being planned. Each landscape highlighted a different set of ecological and social conditions that influenced the performance of restoration

efforts. For example, in the visit to Arkansas, the field excursion demonstrated successful restoration techniques to respond to disease and pest outbreaks in oak ecosystems, highlighted educational and outreach efforts to build support in the public and among lawmakers, and pointed out the importance of creating partnerships to develop strong plans and engage in restoration treatments (Fire Learning Network, March 2003).

FLN Regionalization

Following the first two years of the FLN, TNC developed a new proposal in December 2003 outlining a three-year strategy to continue the learning network, education and training programs of the original RFAE proposal. The major change in the proposal was to initiate regionally based networks to serve as the primary hubs for landscape level planning, peer review, and learning. FLN coordinators had conducted a survey at the end of phase one in which participants expressed a desire to work in regional networks both to reduce travel costs, and more substantively, to engage in learning and exchange with those working in landscapes that had similar ecological conditions and institutional challenges (Fire Learning Network, 2003; Pohl, 2003). The FLN leaders responded by formally proposing that regional networks to enable more intimate interactions focused on regionally relevant learning objectives. The national network would host annual meetings on policy, funding and related topics rather than the biannual workshops.

The formation of regional FLN projects around focal landscapes mimicked phase one of the national FLN although it was a more open process. An RFP was sent to a broader array of agency and TNC contacts. The RFP outlined the regional strategy of the FLN and conditions for participation. Regional FLNs would involve a focal landscape and include participating

landscapes within geographic proximity. In many cases, one of the landscapes that participated in the first two years of the process would become a focal landscape in a regional network. Regions were not delineated ahead of time, but were allowed to emerge organically, defined by partners and their proposals. The FLN funded six regions involving 50 landscapes in 2004. The first six regional networks were located in the Great Plains, South Central states (mainly Arkansas), Northeast, Southwest, Northwest, and Laurentian Mixed Forest around the Great Lakes. Regional networks and landscapes were added over the three year period until they numbered 10 networks and 72 landscapes by the end of 2006 (TNC, 2006a). Over the three years of the second RFAE agreement, new networks were started in the Southeast, Trinity Basin in California, Intermountain West, and Centennial Valley in Montana (Figure 5-3). Each region identified at least one demonstration landscape team to serve as guides and mentors to other participating landscape teams.

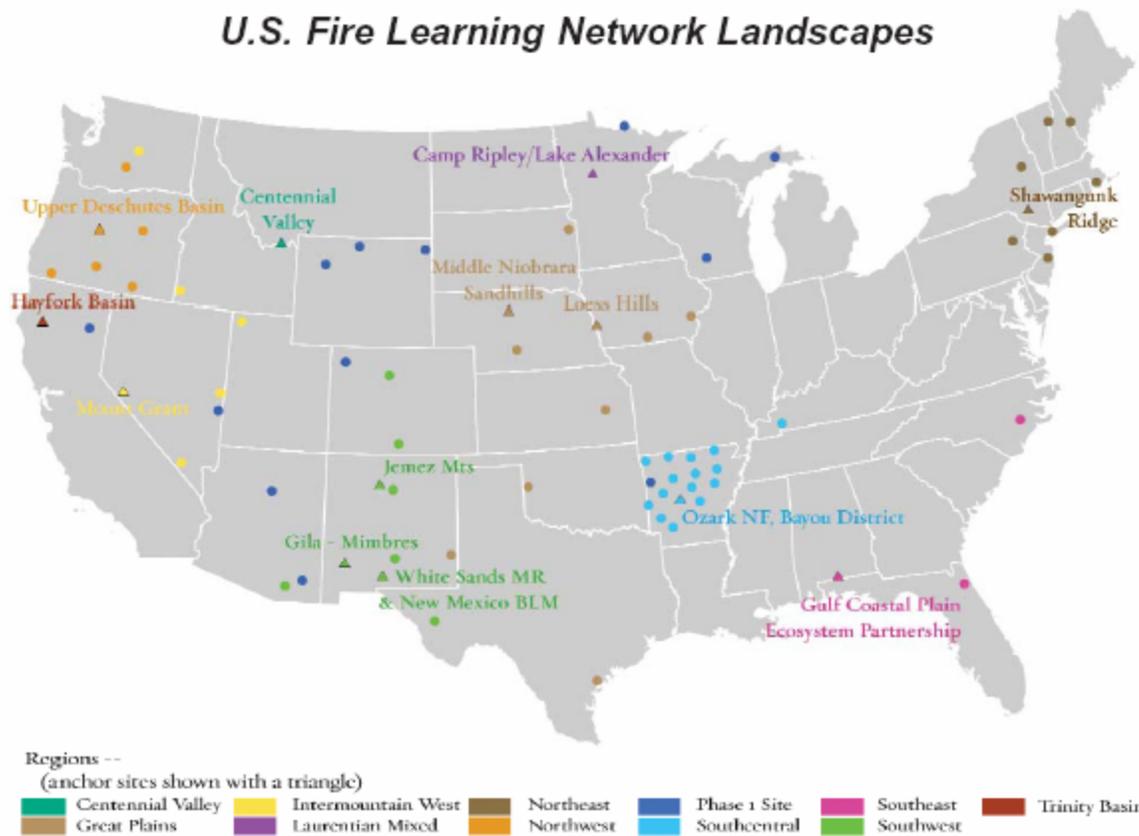


Figure 5-3: Map of US Fire Learning Network landscapes and regions at the end of 2006. Courtesy of FLN Director, 2009.

In 2007, USFS, DOI, and TNC signed a new cooperative agreement that is to run through 2011. *Fire, Lands, and People* or FLaP, continues the original three pronged approach of training, education, and the network with ongoing feedback informing the adaptation of the design and processes of each aspect of the strategy. Under this new agreement, by the end of 2008, the network had contracted to include 65 landscape teams operating in nine regional networks or as independent landscapes serving as footholds for new regions. The Southwest and Laurentian Mixed Forest regional networks completed their work and chose not to establish new regional networks while the Northeast disbanded due to lack of capacity. The Southeast regional

network proposed to continue under the new agreement, but their proposal was rejected due to incompatibilities between the regional proposal and broader network approaches.

Continuing and new networks spread the network to new participants and new locations. The Southcentral network completed one planning cycle with their original suite of landscapes and then enlisted new participants for two more regional networks, one focusing on state wildlife management lands and the other focused on federal lands. The Great Plains network continued meeting with their original landscape teams to focus on implementing the plans they had developed together while enlisting new partners and landscapes to join the process. New networks were established in the Central Appalachians (early 2007), Southern Blue Ridge (early 2008) and the Colorado Central Rockies (late 2008). By the end of 2008, US FLN leaders had also teamed up with Latin American FLN and Invasive Species networks to establish the first international Invasives and Fire Learning Network in south Florida and the Caribbean. Along with these regional efforts, national FLN staff chose to fund several independent landscapes in 2009 in an attempt to expand the network into new areas (Figure 5-4). The South Puget Sound in Washington, the Mimbres Watershed in New Mexico, and a site on the Sierra Nevada in the Intermountain West have been established as independent demonstration landscapes.

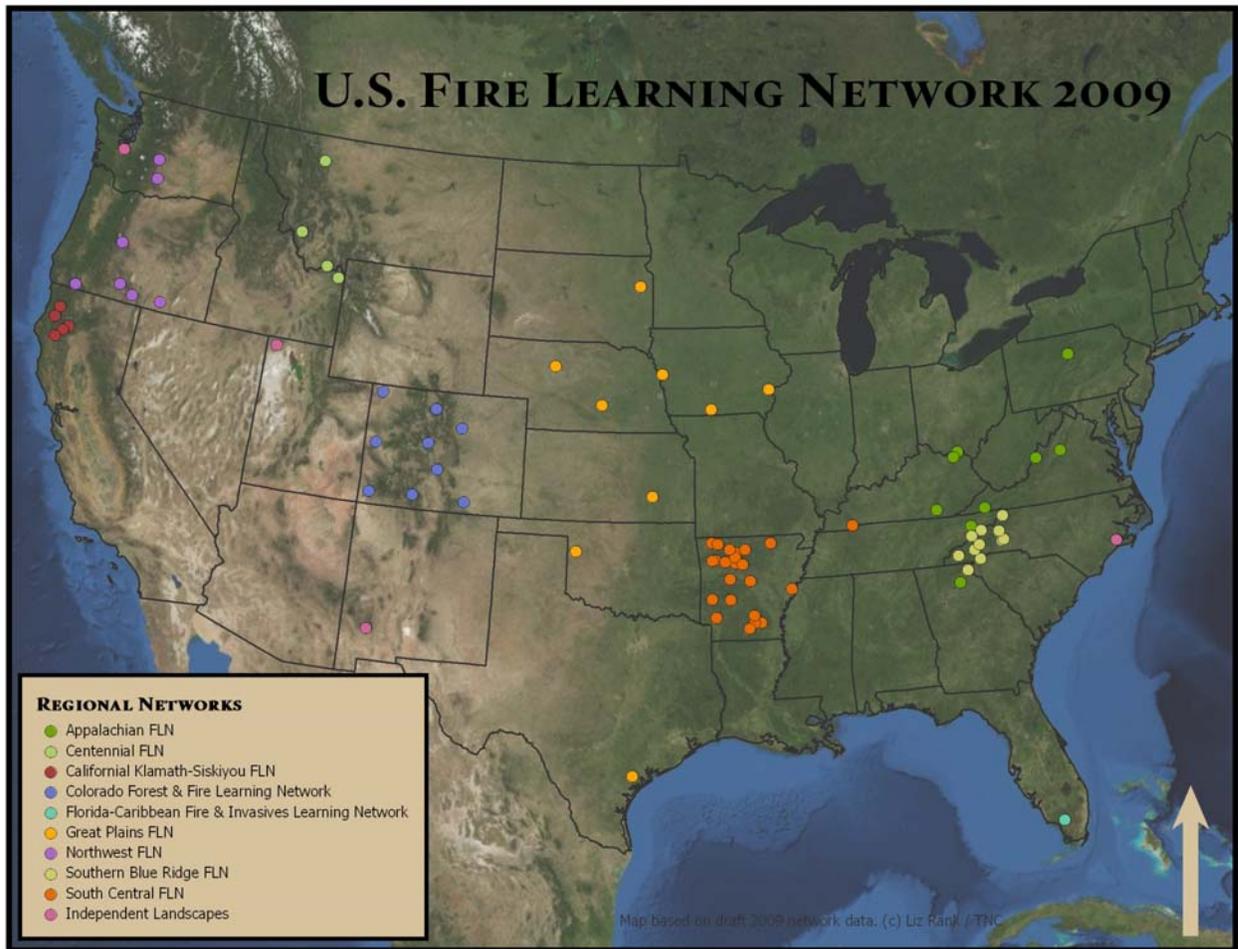


Figure 5-4: Map of the US FLN landscapes and regions in early 2009.
 Courtesy of FLN Director, 2009.

Multi-scalar Network Processes

From 2004 to 2009, the network has operated on three scales: landscape, regional, and national. As in the national phase, landscape boundaries are determined by ecological characteristics rather than organizational or administrative boundaries. The landscapes tend to be extensive as they cover ecologically interconnected systems. At the end of 2008, the average landscape covered 1.3 million acres while the median landscape covered 500,000 acres.

Although some landscapes measured only a few thousand acres, most were significantly more extensive.

Each landscape brings conservation lands held by public, private and nonprofit actors under the joint planning efforts of representatives from participating organizations. Landscape collaboratives tend to attract a variety of stakeholders who have an interest in conservation of species and habitat in the landscape area. Most consist primarily of representatives from agencies, organizations and citizens who own or manage land within the landscape boundaries. These stakeholders collaboratively develop restoration plans to be implemented at landscape scales, cutting across organizational and jurisdictional boundaries to achieve a common vision across the entire landscape. The aim is to generate landscape scale restoration objectives for implementation rather than engage in piecemeal planning and management efforts within administrative boundaries.

Each regional network is assigned at least one network leader. Regional network leaders are almost all TNC affiliated. Most of the leaders have numerous other responsibilities to their respective state chapters besides coordinating a regional network. Network leaders engage in a variety of activities depending on their time, energy, and particular set of capacities. In general, they set workshop agendas, make site visits, facilitate collaborative efforts at the landscape scale, guide network meetings and workshops, and develop regional level reports and records to share with partner organizations at various levels.

Regional networks consist of anywhere from five to 13 landscape groups. Participants at the regional level tend to be fire management professionals from each landscape collaborative. Participation in the regional collaboratives is open to anyone in landscape groups or those interested in regional fire management issues. With their inherent bias toward addressing

landscape level fire restoration planning issues, the regional forums tend to be spaces where professionals can gather to work on similar planning exercises while bringing a variety of professional capacities and knowledge to the table as they seek to develop ways to approach the challenges of fire restoration planning. As a result, the regional groups are relatively homogenous in their membership. As the leader of the South Central Regional Fire Learning Network (SCFLN) describes it, the regional network “is an open forum for [participants] to discuss issues with their peers...[who] are all in the same boat [so] it’s a non-threatening group.” (McRee Anderson, personal communication, 8-11-06).

Each region holds biannual workshops hosted by one of the participating landscapes. At the workshops, landscape representatives gather to present and review landscape level work, share lessons learned, obtain updated information on policy or relevant science, and engage in collaborative exercises to build and test new ideas such as problem solving sessions, group discussions, and field excursions. Regional workshops involve from 20 to 50 participants depending on the size of the region and the number of representatives from each landscape that choose to attend. Participants at this level aim to enhance their capacities to engage in collaborative ecological fire restoration planning through sharing knowledge, information, and practice with each other as they develop strategies to solve landscape based problems.

Prior to the workshops, each landscape team is asked to complete planning exercises following network guidelines. Landscape representatives formally present work to other professionals who ask questions, provide critiques, and develop recommendations for how to improve plans or processes for a particular landscape collaborative. These sessions provide opportunities for landscape representatives to receive feedback, pose conundrums to their peers, refine restoration strategies, and, in general, make sure they are on the right track. As the leader

of the Central Appalachians FLN clarifies, “the heart of the learning network is all about group learning. Here at these peer review workshops is when...we get together to show off what we’ve been thinking and receive input on the work we’ve been doing...” (Judy Dunscomb, personal communication, 7-9-08).

Beyond this peer review work, regional workshops incorporate various other forums to allow participants to share information, brainstorm new ideas, and build knowledge and capacity for ecological fire restoration planning. Regional leaders organize panel discussions, schedule small group work sessions, invite guest speakers, and facilitate open discussion forums. Most workshops include a field excursion to restoration sites on the host landscape. Often network participants tell stories about techniques they have tried on similar landscapes, point out problems they had when trying a particular set of approaches, or suggest alternative restoration techniques based on their experiences in the field.

At the national level, the FLN employs a national Network Director, two coordinators who work to support eastern and western based networks respectively, and a communications professional. With the help of other staff working in the TNC Global Fire Initiative, FLN staff provide support and guidance to the regions and landscapes in their respective fire planning work. The professional staff offers planning and process guidance to regional leaders by reviewing workshop agendas, participating in regional network workshops, and distributing resources and information to share lessons learned and particular innovations that might be applicable to other regions and landscapes. They promote a series of guidelines to provide a framework for planning that can be adapted to specific conditions and needs of each landscape collaborative (Goldstein & Butler, 2009). The national staff maintains a website and listserv,

produces a monthly newsletter and facilitates communications through direct contact with regional and landscape leaders.

Unlike the first two years when a formal advisory council oversaw network management, the current approach in the FLN is to utilize agency points of contact from the USFS and DOI for primary oversight and collaboration. These points of contact and the national FLN staff meet frequently with each other to review network activities to ensure coherence with partner interests. FLN leaders have sought to widen the level of participation of federal agencies by providing regular reports to the National Inter-Agency Fuels Coordination Group (NIFCG) which was created shortly after the unveiling of the National Fire Plan. NIFCG works to coordinate fuels management aspects of the fire management programs of all of the federal land management agencies.

The national FLN staff and agency points of contact coordinate annual national meetings. These conference like meetings provide a forum for participants from regional and landscape levels to share lessons learned, develop policy strategies, review ongoing regional and landscape level work, and participate in discussions, field excursions, and collaborative activities to explore a variety of specific topics. These annual meetings replaced the biannual workshops of the first two years. The national FLN staff also hosts regional network leaders meetings to develop strategies for network management, engage in peer review of regional proposals, and foster communications across regional networks.

The FLN's Collaborative Practice Models

Each level of the FLN has functions that are familiar to collaboration scholars (Figure 5-5). At the landscape level, most networks function similarly to multistakeholder collaboratives

involving many and diverse locally based stakeholders who work together toward consensus as they develop place based ecological restoration plans focused on ways to manage fire in target ecosystems. As Wendy Fulks, the acting Director of the Global Fire Initiative at the time, put it in a presentation at the first Southern Blue Ridge FLN meeting, the landscape groups are where partners identify stakeholder, engage in collaboration, and develop and implement fire restoration plans.

Regional networks involve a much narrower set of stakeholders, generally management professionals from agencies and stakeholder groups who have some level of responsibility for fire management decisions on landscape sites. Most of the regions function as communities of practice, that is, groups of practitioners who aim to increase their knowledge and expertise in a specific area by interacting with others who practice in that domain (Lave & Wenger, 1991; Wenger, 1998). Their purpose is not consensus oriented decision making to resolve problems; rather it is to share knowledge, experiences, practices, and ideas as they collectively develop a sense of how to perform the practice of ecological fire restoration. As Fulks described it in her synopsis, they aim to understand barriers, adapt processes to fit the situation and goals, and enhance their practice of guiding landscape level planning. The regions draw on the lessons learned through landscape practice and regional interaction to formulate the techniques, tools, and knowledge of a new professional practice.

Finally, the national level operates as an interorganizational public private partnership using professional staff to facilitate the overarching goals of the network, enable communication across the network, and ensure effective operations at all levels while consulting with high level officials who serve in advisory capacities representing the interests of the partner agencies and

organizations (Keast, et al., 2004; Kickert, et al., 1997; Mandell, 2001). Again, in Fulks' description, the national level captures and disseminates

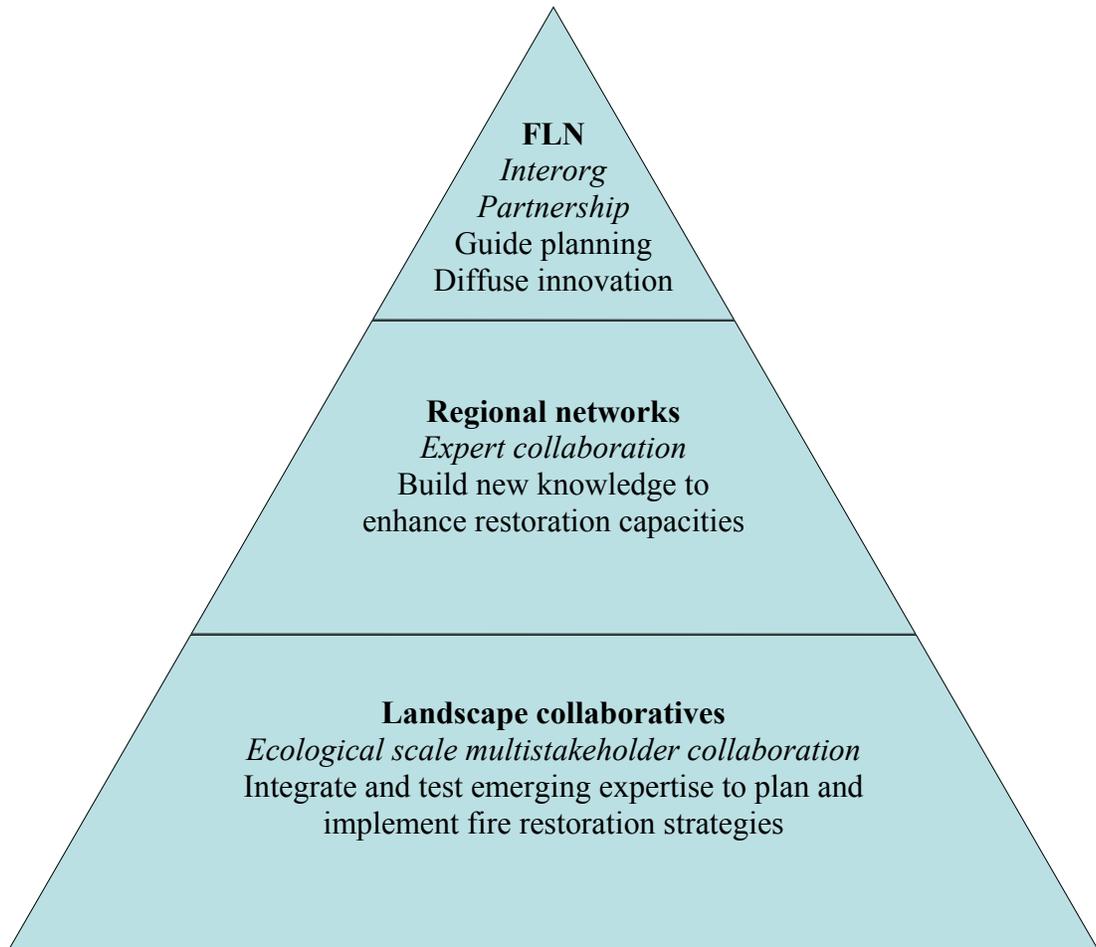


Figure 5-5: FLN's multi-scalar organization with three distinct but interconnected collaborative practice models

information and lessons learned from the regional and landscape levels, makes connections among existing networks, helps initiate new networks, and provides funding for workshops. By making connections among the networks, the national staff ensures that the network does not operate as three distinct collaborative practice models. Instead, landscapes, regions, and the

national level are inexorably linked through co-mingled participation and open lines of communication designed to enable diffusion of knowledge and innovation.

Regional Networks

Despite broad similarities described above, each regional network has its own personality, like the participants who comprise each network. Some regional networks completed a two year cycle and dissolved, others continued past the first two years, bringing on new landscape teams or spawning spin-off networks. Each regional network engaged in its own approach to achieve the goals of the FLN. Some networks used the same four step planning process developed in the national phase of FLN. Others adopted a scientific modeling approach and aimed to develop comprehensive ecological modeling and mapping systems to inform landscape scale planning efforts. A few chose to build a community-based collaborative effort among partners which would expand over time to cover a larger landscape area. Broadly speaking, I have categorized the regional networks into three distinct types: fire manager networks, ecological modeling networks, and emergent community-based networks. In this section, I describe these three types of regional networks, the processes they use to forward fire restoration planning and their ongoing evolution to provide a sense of distinctive characteristics. I focus most extensively on the modeling networks as the fire manager networks largely mimic the processes used during phase one which have been thoroughly outlined above.

Fire manager networks

From 2004-2006, the Great Plains, South Central, and Laurentian Mixed Forest networks essentially replicated the National FLN planning processes used in phase one.⁶ They utilized the same planning guidelines and four homework exercises to guide landscape teams through developing elements of ecological fire restoration plans. Regional leaders convened biannual workshops where landscape team participants presented progress on each homework and other attendees reviewed and critiqued their work. Using the homework and peer review process, these networks served as catalysts for landscape teams to outline long term goals and short term action steps, identify barriers to restoration and strategies to overcome them, and begin the process of engaging in implementation on the ground. These networks tended to attract fire professionals whose primary goal was to get restoration strategies implemented on the ground. In most cases, managers who had responsibility for a fire management program in their respective organizations attended. Often, these professionals were trained in wildlife biology, ecology, or other related sciences, but their experience and on the ground responsibilities included fire management. In the parlance of the participants in these networks, they are “boots on the ground” professionals.

With the renewal of the cooperative agreement in 2007, the Laurentian Mixed Forest network chose not to continue while the Central Appalachians network was added to the FLN. This network tended to attract fire managers whose aim is to get fire restoration action on the ground through strong planning and management processes. However, it departed from the original fire manager networks in its approach. The Central Appalachians network promotes the use of Conservation Action Planning (CAP). CAP is the next generation of TNC’s 5S planning approach. It guides planners through a series of protocols to input data into an Excel

⁶ Given the similarity between these networks and the national level processes, I will not delve into great detail about these networks here.

Spreadsheet. From the inputs, the spreadsheet generates reports that allow teams to easily identify the priority species and natural communities under threat, the most significant threats to biodiversity conservation, the key strategies to reduce the threats, and the most important barriers to restoration action. Some FLN leaders have referred to the four-step FLN planning guidelines as a mini-CAP, suggesting that CAP offers the same kinds of results but in a more robust planning tool (Lynn Decker, personal communication, 1-22-07; Judy Dunscomb, personal communication, 9-3-08).

Ecological modeler networks

Ecological modeler networks tend to involve professionals who engage in scientific ecological modeling and mapping to develop comprehensive tools for analysis and prioritization of restoration action. Over the course of the FLN, multiple regions have focused on this modeling approach. The Southwest FLN sought to model fire behavior on piñon-juniper systems and to complete a multi-million acre rangeland ecological assessment. The Northwest and Intermountain West aimed to create prioritization tools based on Fire Regime Condition Class. The Southeast integrated the development of LANDFIRE models, another TNC-USFS partnership program, with FLN activities. The Southern Blue Ridge sought to generate scientific research on fire effects in the diverse ecosystems of the region and develop prioritization tools as well.

This type of network was legitimized in the 2004 cooperative agreement which stated that “All projects in the Network will participate in regional workshops focused on one of two topics: achieving tangible progress and transferring lessons learned in adaptive fire management, or building technical capacity in application of the best available fire science tools.” These

networks were of the latter type, aiming to develop scientifically informed technical tools that would inform planning activities and be disseminated to other landscapes throughout the network.

Rather than engage in the four-step planning process to develop an ecological fire restoration plan, these networks tend to focus on one aspect of that process, developing ecological models and mapping tools. In most cases, these teams develop GIS-based tools to prioritize landscape treatment locations or modeling ecological change over time. Often, these models and tools are based on Fire Regime Condition Class (FRCC) protocols. In FRCC protocols, current ecological conditions are depicted on a three-part scale that denote the level of departure from a reference or historic ecological condition. Modelers gather data on soils, tree-ring dating studies, vegetation cover, historic accounts from sources such as the Government Land Office records and other sources to establish a model of ecological conditions at some point in the past, usually pre-European settlement. Then, they model existing vegetation cover based on satellite data, aerial photography, and landscape walks. They compare the existing to the historic model and establish a measurement of difference between the two by assigning an FRCC score. FRCC 1 covers a range of departure of less than 33%, FRCC 2 denotes a level of departure between 34-66% and FRCC 3 is the highest level of departure, 67% and above.

FLN landscapes in both ecological modeling and fire manager networks utilize models to assist in their decision making processes about where to implement restoration projects.

Although FRCC was not intended to be used as a default measure of desired future conditions (Jim Smith, personal communication, 3-7-07), FLN landscapes frequently use FRCC in this way by monitoring how closely existing conditions reflect historic conditions depicted in their FRCC models. The underlying assumption is that future ecological conditions should mimic pre-

European settlement conditions. This approach is further legitimized in fire management policy. As written into the Healthy Forest Restoration Act of 2003, priority for funding fuels treatment will be given to sites that, among other things, can demonstrate they are FRCC 2 or 3 and aim to achieve a condition of FRCC 1 through their restoration action.

A variety of FLN mapping and modeling products use FRCC as a way to prioritize restoration locations. In the Southeast, multiple project teams have developed prioritization tools to set a timeline for treating plots across a landscape to restore long-leaf pine habitat for the endangered red-cockaded woodpecker. In the Northwest, landscape teams have developed FRCC maps for most of the region and use these maps to check restoration treatment plans of federal agencies. Wherever treatments are to be conducted on lands in FRCC 2 or 3 designations, the FLN landscape participants give agency personnel a thumbs up. In ongoing work, Northwest partners are developing a suite of tools to assist the agencies in not only identifying *locations* that need restoration action, but what *actions* might be most effective to achieve ecological restoration goals (Amy Waltz, personal communication, 4-29-09). In the Intermountain West, partners combined FRCC and LANDFIRE data with a streamlined version of TNC's Conservation Action Planning approach to prioritize restoration treatments based not only on ecological importance, but also incorporating organizational efficiency, economic and social values into the mix. In one example, they developed a scientifically defensible suite of 15-17 projects to be vetted through NEPA processes and subsequently implemented on the Ely Ranger District of the Humbolt-Toiyabe National Forest (Fulks, 2007).

Extending beyond this focus on developing landscape or regional specific models, some of the FLN landscapes are also involved in the LANDFIRE project. LANDFIRE is a TNC-led project sponsored by numerous federal agencies to develop models and tools to assist fire

managers in their planning and implementation efforts. Although FRCC protocols are integrated into LANDFIRE, this complex modeling system includes a list of possible map and model outputs that extends far beyond the tools that most regional networks develop on their own. In some cases, landscapes that participated in the LANDFIRE project tended to attract ecological modelers to their FLN workshops. This was particularly the case in the Southeast where LANDFIRE and FLN meetings were held over the same two-day period. FLN coordinators are seeking to integrate LANDFIRE into FLN regions and landscapes more broadly as expressed in the 2007 cooperative agreement (TNC Global Fire Initiative, 2007) and as evidenced by the joint meeting of regional leaders and LANDFIRE staff in December 2008. But their hope is more that LANDFIRE can be brought to bear as a tool for fire managers rather than as an input into ever more complex ecological modeling systems (Lynn Decker and Jim Smith, personal communication, 12-9-08).

Emergent community-based networks

Finally, the FLN includes some collaborative groups at the landscape level that are not affiliated with a larger regional network and are focused on fostering community-based collaboration. In most cases, the FLN coordinators have included such landscapes under the designation of ‘demonstration landscapes’ in hopes that they would serve to catalyze greater interest in a particular geographic location which could be expanded into a regional network over time. For example, the Trinity Basin and Centennial Valley networks were added in 2006 and the South Puget Sound network was added in 2008. Each of these networks was established as a foothold within a particular region to attract other potential participants to the FLN.

In most cases, these networks start out more tentatively than their regionally affiliated counterparts. Relationship building dominates a lot of their early efforts (Nathan Korb and Mason McKinley, personal communication, 12-9-08). Rarely do they engage in complex modeling or work through the 4-step FLN planning process in the early phases. Instead, they develop partnerships, identify common ground, and begin to build a common vision among participants. Over time, they begin to chart pathways to achieve the common vision which may include scientific research and information sharing (Centennial Valley), developing restoration plans at landscape scales across organizations (Trinity) and implementing demonstration projects to generate greater interest (Puget).

The Trinity Basin serves as an interesting example of this type of collaborative. When established, it was the first network to be led by an organization other than TNC. FLN leaders sought to establish a network in California, but they were unable to find enough interest within the CA state chapter of TNC to participate in the network. Eventually, they contacted Lynn Jungwirth of the Watershed Research and Training Center (WRTC) to see if she would be interested in participating. The WRTC had a long standing interest in collaborative ecosystem management in the Trinity Basin in northern CA. Jungwirth agreed to join FLN and continue to build on the collaborative endeavors the WRTC had already established in the region to incorporate ecological fire restoration into their planning and management efforts. Since then, the network expanded, adding two new landscapes to include the Klamath Siskiyou watershed in 2008 and established connections in northern CA and southern OR to add more sites to the network (Lynn Decker, personal communication, 8-12-08; 12-10-08). Recognizing its expansion to a regional network, the Trinity was renamed the Klamath Siskiyou network in 2008.

Outcomes

Over the last seven years, the FLN has involved more than 650 partner organizations in collaborative ecological fire restoration planning. Nearly 100 million acres have been brought into the network planning effort and dozens of plans have been completed. Over 100 landscape teams have been involved through 12 different regional networks. With a goal to accelerate the restoration of fire adapted ecosystems, these numbers do not reflect how FLN is achieving that larger objective. This final section of the case provides an overview of outcomes generated by the FLN either directly or indirectly as reported by FLN participants and documentation.

On-the-ground Action

The traditional measure of success in applying restoration treatments to the landscape is “acres treated” or in the prescribed fire lingo, “acres black”. FLN staff currently estimate that landscape teams are treating over 500,000 acres a year. As reported in a 2007 FLN participant survey, 43% of respondents stated that they had applied fire restoration treatments on the ground as a result of their work in FLN. In some cases, resource managers already engaged in restoration work were able to leverage their efforts in FLN to expand restoration action. For example, land managers on the Bayou Ranger District in Arkansas were able to increase the application of prescribed burning from 2,000 acres per year to 20,000 acres per year over the first two years they participated in the FLN. Since then, they have continued to treat around 20,000 acres a year, but more importantly, the ecologist overseeing the effort states that the landscape has reached the desired future condition of a restored oak woodland ecosystem on nearly all of the 60,000 acres that comprised the original project (John Andre, personal communication, 3-13-09). Thus, not

only are FLN landscapes increasing the number of “acres black,” over time, they are demonstrating that they can achieve the more substantive result of a restored ecosystem.

Implementation Money Generated

Another measure of success is the amount of funds generated by FLN teams to engage in implementation of planned fire restoration activities. Since inception, FLN leaders estimate that landscapes have generated more than \$14 million in funding for project implementation. In one example, the Southcentral regional network used FLN planning products to develop a proposal for funding of restoration treatments on multiple districts in the Ozark-Saint Francis National Forest. They received \$2 million to conduct prescribed burning and mechanical thinning on five ranger districts. The landscape scale view of the FLN provided the framework for a joint proposal to be developed from all of the districts simultaneously (McRee Anderson, personal communication, 8-11-06). Later, FLN teams brought other partners together in an effort to extend restoration action to other sites, even those not included in FLN. They obtained a Doris Duke Foundation grant in 2006 to include treatments to restore oak woodlands on state lands, USFS lands, and Fish and Wildlife preserves (Steve Osborne, personal communication, 3-9-09).

Promoting learning and innovation

Transferring techniques and technologies among network participants is one of the basic functions of a learning network. The Southeast Regional FLN (SEFLN) offers an example where a specific type of technology has been developed, refined, and distributed across FLN to other landscapes. Partners on the Eglin Air Force Base in Florida developed an ecological fire restoration prioritization tool to use in GIS software to locate and map where restoration

strategies should be implemented. They presented the tool at a SEFLN regional workshop in 2004. The landscape team leader from Onslow Bight in North Carolina described the system at one of her landscape meetings and piqued the interest of her partners. With input from consultants from Eglin, Onslow Bight partners representing numerous federal and state agencies and nonprofit conservation organizations began developing the tool for the entire landscape which covers over 1 million acres. Since that time, the tool has also been introduced to the Southern Blue Ridge regional network where landscape teams are considering adopting a similar technology. These types of technological transfers have taken place in the Northwest and Intermountain West FLNs as well.

Fire manager networks also promote the transfer of information and techniques among network participants. For example, in the South Central regional FLN, the ecologist for the Bayou Ranger District established a rough estimate of a desired future condition for oak woodlands using a traditional forestry measure of tree density. He clarifies that “given that we know the historical density of trees at each location [based on Government Land Office (GLO) records], [our estimate] brings us close to that.” The target density is imperfect and may be as much as 10% greater than densities reflected in the GLO records. But Andre admits that there is some controversy over the use of GLO records for the purpose of establishing a desired future condition, so the Bayou team erred on the high side. Determining the calculation for the desired tree density was more about using a “good common make sense approach” rather than grounded in scientific data (John Andre, personal communication, 7-19-06). Despite this relatively unsophisticated approach to quantifying the desired future condition, other sites in the South Central region reported at their fourth workshop that they had adopted the same measurement to establish a baseline desired future condition based on an equivalent tree density measure in their

own landscapes. This practice was developed at the Bayou and repeated at sites throughout the SC FLN and even beyond⁷ as they drew on the Bayou model for management practices that were applicable to similar ecological systems and social-political contexts.

Beyond the distribution of technologies and techniques, the FLN promotes innovation and creativity. FLN workshops offer both formal and informal opportunities for interaction among fire professionals. Through pooling their collective insights in these various forums, fire professionals can generate novel approaches to respond to complex fire management challenges. For example, on a field excursion in the Alleghany Highlands of VA, participants in the Central Appalachians FLN were led to an overlook of a 5,000 acre forest of rolling hills with rural development nearby. Landscape team members noted a lack of fire breaks and suggested that a prescribed burn might take multiple days or even weeks to implement. Their usual approach was to start and extinguish a prescribed fire within a day or two following USFS protocols. After some discussion, one participant suggested mimicking lightning ignitions by dropping igniters from a helicopter and managing the ensuing blaze as if it were a natural ignition. The group brainstormed how that approach might be accomplished, what policy or organizational barriers existed to such an approach, and what staffing or mechanical resources would be needed to implement the endeavor. Numerous participants noted this exchange as one of the most productive moments of the meeting as it offered a new way to think about implementing fire restoration techniques on the ground. As one said at the end of the workshop, “I thought that the idea of mimicking a natural lightning event was a really cool idea. That’s the kind of thinking we need to generate here in the FLN that questions our assumptions about what we do and how we

⁷ Some of the SCFLN participants have partnered with the Latin America Fire Learning Network. Through sharing their practices from the Arkansas sites, resource managers in Chiapas, Mexico have utilized the same “site index minus 10 basal units” measurement to approximate desired future conditions for their forests (Doug Zollner, personal communication, 6-14-06).

do it.” Though it has yet to be attempted on the ground, this creative approach to implementing a prescribed burn on an otherwise inaccessible landscape serves as an example of the types of innovative ideas that can be generated in FLN forums.

Expanding collaborative capacity

In order to work across boundaries, fire managers have to engage in developing strong collaborative partnerships. The FLN was designed both to encourage collaboration and to build the capacities for collaborating effectively among network participants. For example, instructions for each step of the team projects usually begins with the charge to work “collaboratively” as in “Collaboratively draft a three-year implementation plan” or “Collaboratively begin drafting a monitoring plan.” Regional workshops included sessions explicitly aimed at improving collaborative capacity by offering trainings and panel discussions on how to build collaborative partnerships and engage in collaborative planning and management effectively.

Building in an expectation for collaboration and providing participants with the tools to improve their capacity to collaborate effectively translated into enhanced collaborative action among FLN participants. On the 2007 survey, more than 70% of landscape participants reported significant improvements in both the number and quality of partnerships they had been able to establish through their participation in the FLN. 43% of respondents reported that they had formalized collaborative partnerships through development of Memorandums of Understanding or other formal agreements through the relationships they had developed in FLN.

Not only did FLN partnerships strengthen through this process, but collaborative capacity was transferred to participating organizations. In one example, the landscape lead for the Land between the Lakes (LBL) restoration project, Jim McCoy, reported that one of the most valuable

outcomes of participating in the FLN had been improved collaboration among his colleagues in his unit (Fire Learning Network, July 2006). He used the capacities he developed by completing the FLN planning guidelines as well as participating in regional workshops to more effectively engage in collaborative work. LBL's Forest Supervisor, Bill Lisowsky (personal communication, 11-28-07), reflects on McCoy's work,

Jim was able to facilitate discussions and include other members of the team in those discussions. He did a lot of cross pollinating and did a lot of the information sharing and acted as a facilitator, a conduit for learning and working together... I think that the Fire Learning Network has allowed us to formulate projects in a more integrative way and it has helped each part of the team... work better together.

Improved Planning

The FLN four-step planning process was meant to generate products that were applicable to other planning and management efforts within the participating organizations, particularly in completing National Environmental Policy Act (NEPA) planning requirements (Doug Zollner, personal communication, 6-14-06; Ayn Shlisky, personal communication, 9-27-06). Meanwhile, the technologies and tools being developed in ecological modeling networks are meant to directly inform landscape scale fire management planning efforts. Through the FLN, participants in both fire manager and ecological modeling networks were able to develop planning products that could be used to inform other types of plans that would guide implementation in their respective partner organizations. The elements of fire restoration plans produced through the FLN processes are many. As one of the FLN publications clarifies in a rather cumbersome but not exhaustive listing,

Structured workshops result in tangible products such as multiscale ecological models, fire regime descriptions, spatial and quantitative descriptions of desired future conditions, collaborative goals for fire-adapted landscapes incorporating multi-partner objectives, input for NEPA planning, cumulative effects analyses,

cooperative agreements, small diameter biomass utilization strategies, multiscale monitoring and adaptive management plans, and innovative technology transfer strategies (Fire Learning Network, 2002).

This diverse array of planning outputs provided opportunities for landscape team participants to adopt and adapt FLN products to their own planning and management requirements in their respective organizations.

In a 2007 survey, FLN participants reported on the extent to which the planning products developed in the network were used to inform other planning or implementation efforts (Fire Learning Network, March 2007). Nearly 30% of respondents reported that NEPA documents were easier to prepare because of the FLN products they were able to reference. 45% of respondents reported that the FLN planning products had informed prescribed burn plans on their landscapes while 37% had used FLN planning products to inform more generalized fire management plans. Forest plan revisions were informed by FLN products for 16% of respondents while around 12% of respondents had used FLN products to develop Community Wildfire Protection Plans or resource management plans for private lands. FLN products were also used in Bureau of Land Management Plan revisions, Endangered Species Recovery Plans, Fish and Wildlife Resource Management Plans, National Park Service Management Plans, State Forest or Park management plans, tribal resource management plans, and local government resource management plans.

It is not only the number of plans influenced by FLN products that matters, but the substance as well. In one example, the project leader of the Bayou Ecosystem Restoration Project clarifies that the FLN led to a fundamental change in the Forest Land Management Plan.

Because of the success we had through the Fire Learning Network, we served as a model for the land management plan when it was revised. Under the new plan, it's formally recognized that we have restoration areas. A lot of credit goes to the partnerships that we developed through the Fire Learning Network and what we

learned about how to come up with a scientifically sound and defensible proposal.” (John Andre, personal communication, 6-13-06).

These changes were significant according to Andre. Previously the forest plan had one management area and all management decisions were driven by timber targets, a condition Andre refers to as “chasing timber”. The revised plan has multiple management areas designated for multiple purposes including large areas identified as restoration areas. Andre points out that “Under the new plan it’s formally recognized that we have ...restoration areas...[which] have gone way beyond the 60,000 acres that we started with.” Any treatments in these areas including the removal of timber must conform to ecosystem restoration goals. Drawing on FLN work, the revision of the forest plan established a new focus on ecological restoration and integrated management goals rather than having everything driven by timber interests.

Recognition

Although not a direct output of the FLN, the receipt of awards and recognition suggests the relative effectiveness of the network model in generating the support of key organizations and evaluators. It is clear that the FLN and other RFAE components are regarded as an effective way to engage in moving toward the mutual goals of TNC and the National Fire Plan. The effectiveness of the RFAE in achieving shared goals between TNC and the National Fire Plan was reflected when TNCs Fire Initiative received the first ever group award for *Excellence in Implementing the National Fire Plan* for the collective achievements of the FLN and other components of the RFAE cooperative agreement. Secretary of Interior Gale Norton presented the award in 2003 at the annual National Fire Plan meeting. The joint project also received recognition from the National Academy of Public Administration in its report *Wildfire Suppression Strategies for Containing Costs*. The report described the FLN and other approaches

that focus on reducing fuel loads as an effective strategy for reducing wildfire suppression costs (The Nature Conservancy Global Fire Initiative, 2003). Fire historian Stephen Pyne has recognized the FLN as an innovative governance mechanism in an era when “forestry’s institutional collapse [has left] a political vacuum” (Pyne 2004 p. 41).

Recognition among partner agencies points to the fact that the signatories of the cooperative agreement see value in the network. The continued renewal of the cooperative agreement and ongoing funding commitments from the USFS suggest that the federal partners recognize the FLN as an important strategy in their efforts. In the most recent budget request for 2009, the FLN received an unsolicited 10% increase in federal funding during a period of contracting federal budgets. In early 2009, in an effort to bring economic stimulus package money to TNC projects in partnership with the USFS, TNC government relations staff met with USFS Chief Abigail Kimbell. In the meeting, Kimbell repeatedly stated that the USFS was working with FLN projects to target fuels reduction projects to propose for stimulus money (Lynn Decker, personal communication, 3-18-09). This recognition is indicative of the reputation that FLN and the RFAE program as a whole have gained at the highest level of the agencies as well as among professionals and scholars assessing wildfire management strategies.

FLN as a Multi-scalar Collaborative Network

Using a multi-scalar collaborative network structure, the FLN case provides an opportunity to examine fundamental questions in collaborative planning and governance literatures. The next chapters delve more deeply into specific aspects of the FLN to address the tensions and challenges of multi-scalar collaboration outlined in the literature review. Specifically, the Chapter 6 describes how by creating a network imaginary, the FLN navigates

the core tension between coherence across network nodes and creativity in each node. Chapter 7 addresses the extent this networked approach has generated learning and change beyond network participants and led to the adoption of the network imaginary in other organizational contexts. Finally, I conclude in Chapter 8 by assessing how and the extent to which the FLN has served as a catalyst for fundamental change in the fire management institution.

Chapter 6

Narrative Frameworks and Network Imaginaries: Balancing Coherence and Creativity to Inspire Institutional Change

[The FLN] is a tool to get people where we want to go, which is about conservation outcomes. Think of it as a Swiss army knife in that not everybody needs to use the same piece of the knife, but we provide this tool where they take what might work, and they use that to get to the big picture.

~Lynn Decker, FLN Director, 6-14-06

Any fire practice—any policy, any research program, every fire regime—is a cultural artifact. It reflects a negotiation between what a society wants and what its land will accept...ultimately, the discussion concerns a moral universe of values, beliefs, judgments, and identities, about who we are and how we should behave.

~Stephen Pyne, 2003. p. 35

As described in Chapter 3, multi-scalar collaborative endeavors such as the FLN are faced with fundamentally different challenges than site or place-based collaboratives. Working across scales in disparate locations necessitates some level of connectivity between and among sites. For information and innovation to be generated and shared across scales, mechanisms of communication and circulation are needed to link the different scales of action. Without such linkages, the effort has the potential to devolve into a disconnected cacophony of voices, scattered and diffuse. While change in planning and management practices may independently emerge in specific locations, the potential for broader and more fundamental change across organizations and institutions dissipates.

Thus, an elemental tension awaits those operating in such a multi-scalar collaborative context. At issue is how to engage practitioners in a common purpose in ways that are comprehensible and coherent across the entire network while not undermining the potential for creativity and innovation that is the hallmark of collaboration. It is analogous to a central challenge to environmental planning and policy in general: how to strike the right balance

between central coordination and control and local planning and action. This chapter describes how the FLN has navigated this core tension and in so doing created greater potential for fostering institutional change.

The first part of this chapter describes how the use of planning guidelines and GIS based technologies and mapping systems shape a common set of understandings and practices across the entire FLN. I first examine the planning guidelines used in the first two years of the national network and describe how they provided a narrative framework for participants. As FLN participants developed their restoration plans, the framework guided them through articulating a socially explicit fire regime (Goldstein & Hull, 2008) that was coherent with an overarching narrative about fire and landscapes, placing professional fire managers in a redemptive role of restorationists. Next, I describe how with greater diversity of processes offered to FLN regions, a variety of technologies and guidelines continued to frame common understandings, expectations, and assumptions that tied network participants and their practices to a coherent and shared “network imaginary” (Goldstein & Butler, Forthcoming 2009a). These common understandings and practices become communicated throughout the network via a variety of media outlets including newsletters, websites, publications, listserv, presentations and field excursions. As they develop plans or modeling systems, network participants reinforce the guiding purpose of the network itself, namely to engender a collaborative approach to engage in the restoration of ecological systems that are fire-adapted or fire-dependent.

However, the coherent understandings and practices that permeate the network do not impose a disabling control over the landscape collaboratives. Though their plans and products are coherent with a ‘network imaginary’ (Goldstein & Butler, Forthcoming 2009a), each landscape team maintains a high level of flexibility and creativity to respond to conditions and

challenges specific to their respective contexts. As they engage in developing and enacting ecological restoration plans in the field, FLN participants embody and refine the emergent imaginary through their practices. Technologies and planning guidelines create boundaries around the kinds of understandings and practices that can be accommodated in the network while enabling practitioners to be innovative in the pursuit of a common shared vision. This balancing act facilitates the generation of fire management practices that chart the way toward overcoming the frustrated transition and engaging in landscape scale ecological fire restoration.

Of Narratives and Imaginaries

Narratives

Planning researchers have been attuned to the power of storytelling since the communicative or discursive turn in the early 1990's (Fischer & Forester, 1993). Drawing ideas from literary theory and discourse analysis, researchers have explored how plans are future and action-oriented stories, directing attention toward what must be done in order to achieve a desirable future (Sandercock, 2003; Throgmorton, 2003). Planning stories focus on a central inciting event or circumstance and provide a narrative arc of conflict, crisis, and resolution in a way that can be acted upon. While technical models may describe possible outcomes and distinguish between their likelihoods, planning stories can describe what is most desirable, and caution how least desirable outcomes may occur if certain actors do not behave as they should.

Narratives structure reality within a timeline, range of space, and level of detail that influences what is made visible and what remains hidden or untold (Mathews, 2003; Sandercock, 2003). These parameters establish the setting in which a character's fate is determined or perspective altered, drawing on a culture's catalog of generic plot conventions, such as the

archetypal tale of a golden age lost often told in environmental planning and resource management. These plotlines create moral tension, encouraging audiences to position themselves within the tale, envisioning and desiring change and becoming inspired to be involved (Sandercock, 2003).

Through this process, planning stories may be more than merely motivating – they can disrupt assumptions and old habits, and enlist readers to occupy new roles and embrace different values and beliefs. As Throgmorton (2003, p. 130) writes:

Future-oriented storytelling is not simply persuasive. It is also constitutive. The way in which planners and others involved in the process of planning write and talk shapes community, character and culture. How planners (as authors) choose to characterize (name and describe) the people who inhabit and activate their stories shapes how those characters are expected to act and relate to one another. And how planners write and talk shapes who we are and can become.

Planning research has begun to consider how storytelling functions amidst the intimacy and intensity of collaborative processes. Examining collaborative negotiation, Forester (1996a) suggested that stories provide stakeholders with insight into each other's perspectives and values, and Innes and Booher (1999b) concluded that storytelling is a way for stakeholders to grapple with complexity and uncertainty and develop a clearer sense of their own stakeholder identity. They suggested that collective storytelling is a kind of "bricolage" through which stakeholders play with familiar ideas, methods, and strategies, trying different combinations until they assemble a new story that seems workable and mutually acceptable.

Social Imaginaries

Extending this line of thought, social theorists have sought to articulate ways in which the unspoken and unseen aspects of social organization can shape or be shaped by common social constructs such as narratives. For this analysis, I draw on Charles Taylor's (2002, 2004) notion

of a social imaginary. To explicate his idea, Taylor describes how the ideas and practices of modernity became embedded into social systems and institutions of modern Western societies. He points to the emergence of modernity in the theories of the political philosophies of Enlightenment thinkers who outlined a new moral order for society based on mutual benefit of individuals and the defense of their rights. As their philosophies began to influence how certain people thought and acted in the world, the spread of the ideas and practices of modernity began. Over the period of a few centuries, these ideas and practices (built on such foundations as logical positivism and an ethos of equality) became the basis upon which social systems from the market economy to the public sphere were created and ordered in the Western world (Taylor, 2002, 2004).

While a social imaginary is widely shared by large groups of people if not whole societies, it has an intimate expression, influencing the ways that “ordinary people ‘imagine’ their social surroundings.” What gives the imaginary its power is that it migrates from theoretical abstraction to permeate all aspects of social life from institutional to individual conceptualizations and practices. As Taylor (2001a, p. 22) clarifies, the imaginary “begins to define the contours of [a participant’s] world, and can eventually come to count as the taken-for-granted shape of things, too obvious to mention.” It becomes central to how individuals define who they are and determine how to act as they navigate their social worlds and yet remains largely implicit in their lives. The imaginary “enables, through making sense of, the practices of a society”, providing “the kind of common understanding which enables us to carry out the collective practices which make up our social life” (Taylor, 2001a, p. 18).

A social imaginary is reproduced through action and interaction in a social world from representations (à la Anderson) to common narratives or stories told through social interaction

and embodied in the daily practices that come to define social life. Anderson (1983) suggests that widespread adoption of modern national imaginaries, shaping what he called “imagined communities,” was tied to such daily rituals as reading the national newspaper. Reading the same stories individuals became part of a nation that shared common values, interests, and experiences. Symbols such as flags and monuments and administrative acts such as census taking, map making, and museum establishment further articulated and reinforced national imaginaries (Anderson, 1983).

Taylor (2001b, p. 189) extends this line of reasoning and suggests that the social imaginary is “nourished in embodied habitus, is given expression on the symbolic level.” Thus, while Benedict Anderson’s representations are central to the formation and transmission of an imaginary, social practices which cohere with and define the imaginary more deeply root it in society. In this way, Taylor incorporates a practice based vision of what constitutes an imaginary and what effect it has on individuals and groups who embody the imaginary through their actions.

The idea of the social imaginary offers a practice based theoretical construct of what inspires, guides, and animates relationships, behaviors, practices, and social order (Taylor, 2004). Charles Taylor’s (2004) conceptualization of an imaginary operates at a social scale that spans nations and beyond. I draw on his construct to describe how a social imaginary silently articulates the assumptions and expectations of people operating in certain social spheres, shaping who they are, what practices they engage in and how they judge the actions of others. Specifically, I develop the notion that an imaginary can animate the actions and interactions of individuals within a multi-scalar collaborative network.

Building the FLN Narrative

For the first two years of the FLN, the network operated at a national level utilizing a standardized planning process. This period provided the opportunity for fire managers to confront a central challenge of their profession and foster innovative responses as they engaged in developing ecological fire restoration plans on their respective landscapes. As they developed their restoration plans, FLN participants developed stories of the landscape and fire management practitioners within a narrative framework that bound them to each other, their landscapes, and particular practices that redefined their professions. With specific planning guidelines, the FLN ensured that landscape plans were coherent and comprehensible across the entire network. In association with their landscape collaboratives, ecological settings, and the larger network, FLN participants articulated elements of a socially explicit fire regime (Goldstein & Hull, 2008) that defined certain relationships between the natural world, institutional order, ways of knowing, and professional identity (Goldstein & Butler, Forthcoming 2009b).

Homework as a Narrative Framework

As FLN participants went through the planning process of the first two years, Goldstein and I (Goldstein & Butler, Forthcoming 2009b) contend that they developed the elements of a coherent story that had the potential to inspire action in alignment with an overarching narrative of redemption, not only of landscapes, but of professionals themselves. The FLN homework helped align network participants to a new discursive frame associated with fire as it led them through the construction of a shared but locally applicable narrative. The narrative animated a new socially-explicit fire regime⁸ by providing a timeline, protagonists, settings, social agency,

⁸ For an explanation of socially explicit fire regimes, I reference my work with Goldstein (Goldstein & Butler, Forthcoming 2009b). We write, “We use the term ‘socially explicit’ fire regime to

and narrative arc. The narrative was brought to life through the FLN homework, which facilitated narrative construction by requiring network participants to complete a structured series of tasks. Each task guided network partners in identifying key characters, settings, and points along the plotline within their specific landscape. Within this context, partners developed a locally derived and applicable narrative within a framework that ensured a level of comparability and consistency across project sites.

In shaping the narrative of the FLN, all 25 of the original FLN sites were required to complete the foundational elements of the story: setting, context, and at least portions of the dramatic structure which identifies key protagonists. Then, the five demonstration sites completed the remaining homework assignments which further clarified the protagonists and timeline as well as the temporal and spatial units within which this fire restoration narrative unfolds. The narrative was further reinforced at national workshops during which the demonstration sites took center stage during plenary sessions to present their work (Doug Zollner, personal communication, 3-7-07).

To ensure consistency across the narrative, homework assignments were highly prescriptive in terms of providing a format for framing the outputs. As one of the leaders of the first phase of the FLN recalls, consistency was achieved through the homework by establishing a framework to guide landscape level planning (Doug Zollner, personal communication, 6-13-06). There are a series of steps to be followed and very explicit instructions on how to accomplish each of these steps in every homework assignment. The statements guiding participants through

suggest that ecological fire regimes always have had an unarticulated social component. The work practices and social relationships of fire managers and others sustain ecological fire regimes as meaningful truths, a process that emphasizes the social dimensions of cognitive commitments while at the same time underscoring the epistemic and material correlates of social life. As this implies, socially explicit fire regimes are contingent on both the ecological and cultural variety. In any one place many... alternatives may co-exist, as agencies and activists struggle to understand one another and cooperate within a specific ecological context.”

the exercise are connected through detailed instructions and a reporting format that all projects have to follow when they turn in the assignment. Given this highly prescriptive format, the comparability of the homework output across project sites is exceptionally high. While the content differs in its particulars, readers of the homework can easily reference characteristics of each project site such as the land area covered, ownership patterns, the current and natural/historic fire regimes, land cover vegetation and habitats, conservation targets and threats, desired future conditions, a collaborative goal statement, etc. Each of these elements is fundamental to the narrative that FLN participants are able to tell about their respective landscapes.

The Narrative Elements

Characters and Setting. The principal characters in the narrative were conservation partners on each landscape project team and the ecosystems in which they worked. Partners included federal, state, and private land managers depending on ownership patterns, prior relationships, and available expertise in the region. By identifying conservation targets, threats and viability rankings, partners documented ecosystem processes or species whose status could be improved by fire restoration.

Each of these characters were placed in the landscape setting, a physical space also characterized by land ownership and administration, management priorities, natural resource and amenity relationships, and other issues relevant to fire restoration. Participating landscapes operated in diverse circumstances. Landownership ranged from 83% federal ownership in the Jemez Mountains of New Mexico to 95% private ownership in the Middle Niobrara Sandhills of Nebraska. Human communities played a central role in the Long Island Pine Barrens but were

marginal in the sparsely populated Bighorns Range of Wyoming. Resource uses ranged from extensive timber operations and recreation in the Deschutes Basin of Oregon to grazing in the Bighorns and the Niobrara to groundwater recharge zones on Long Island.

The Idyllic Past. Homework guided partners along a narrative arc. Participants first identified the historical fire regime on their respective landscapes. The idea of an ecological fire regime that existed before Europeans arrived established the normative landscape condition in which fire burned at frequencies and intensities that maintained preferred ecological conditions. These varied considerably across the different landscapes, ranging from low intensity fires every 4-10 years on the plains ecosystems of the Niobrara to as much as 200 - 400 years between stand replacement fires in Spruce-Fir forests in Wyoming's Bighorns landscape. This historical fire regime became the basis for establishing desired future conditions (DFCs). Network partners used a variety of sources to describe this relationship including maps of historic vegetation condition represented by Fire Regime Condition Class (FRCC), which depicted current ecological conditions on a three-part scale denoting the level of departure from historic ecological conditions. A pre-settlement past was established as the baseline against which to measure future improvement.

The Disastrous Present. Having established historic conditions, network participants in each landscape characterized current conditions and described the risks to ecological systems particularly as a result of fire suppression. While risks to human communities were included in the analysis, homework guidelines focused attention on ecological communities by requiring determination of threats to conservation targets and assessment of their viability. This focus on conservation targets privileged a natural order while emphasizing that humans had placed this order in disarray. Partners ranked each target to identify its potential viability under existing

conditions. This activity introduced the notion that landscape partners must act to address threats and restore ecosystem viability.

Continuing this push toward thinking about how fire suppression led to current threats to conservation targets, partners compared current to historical conditions and focused on necessary changes to the fire regime. Participants from nearly all of the landscapes concluded that a primary threat to ecological health was fire suppression. For instance, partners in the Jemez Mountains contended that “fire suppression, overgrazing and fragmentation” led to less frequent fires than in the past. Because of this change, they noted that today's fires burn with an intensity that has “obliterated forest stands,” reduced the quality of fragile soils, and endangered natural communities. A landscape altered by years of fire suppression was the central challenge that fire managers had to address in order to protect conservation targets.

The Restorative Future. Partners focused significant effort on how to restructure the landscape to recover ecological health while protecting human communities. They described the preferred future condition on their landscape in a "collaborative vision statement". They were directed to think about social changes necessary to achieve desired ecological conditions. The vision statements focused on restoring ecological health while recognizing human needs, principally through the reduction of hazardous fuels for community safety and through support for logging and other natural resource uses.

Network partners then quantified and mapped desired future conditions based on their vision statements and descriptions of historic fire conditions. Partners identified the percentage of the landscape that should be covered with each ecosystem type identified in their conservation targets. By comparing these estimates to current vegetative cover, they developed a prescription for the ecological changes necessary to achieve their goals.

Positioning themselves at a low point in the narrative, fire managers were asked to lay out two scenarios. One sustained the institutional status quo, while the other identified changes in management practices that would “maintain currently healthy fire regime conditions while restoring those 'out of whack.'” Maintaining the status quo was linked to continued departure from desired future conditions. Reversing this decline was linked to prescribed burning and other treatments such as chemical spray and mechanical thinning. The scenarios legitimized the fire manager as restorative agent.

For example, in the Bighorns landscape the current management scenario involved the continuation of limited prescribed fire activity and total wildfire suppression. Within this scenario, partners described the Bighorns ecosystems as “decadent,” “susceptible to disease and pests,” and in “decline due to grazing pressure and fire suppression.” In contrast, the management change scenario invoked a complex series of landscape treatments including prescribed fire, herbicides and thinning. Under this scenario, desired future conditions were achieved across the entire landscape.

Problem Solving Dimension. FLN partners then developed an implementation plan for this management change scenario. Partners were directed to identify barriers to implementation, which included the absence of coordination and cooperation across jurisdictions and ownerships, funding shortfalls, cultural resistance to fire, and poorly framed fire messages. Partners then identified strategies to overcome barriers and achieve desired future conditions. For example, partners in the Jemez Mountains and Deschutes Basin wrote that a consistent mapping system would improve coordination, while the Long Island team proposed to complete an interagency fire management plan. Identification of barriers and strategies reinforced the fire manager's role as principal agent to achieving desired future conditions.

A Continual Role for the Land Manager. Finally, partners developed monitoring and adaptive management plans to link their proposed strategies to the ecological and social conditions required for restoration. The monitoring plan focused partners on restoring “fire regimes within the natural range of variation”. The adaptive management plan established how fire managers would integrate monitoring into changing strategies given incomplete knowledge of ecosystem functions and processes. First acting as principal agent of ecological restoration, fire managers were then cast as caretakers to maintain the desired future conditions into perpetuity.

The Narrative Arc

The FLN homework guided each landscape in the creation of a narrative that began before European colonization. It followed the “golden age lost” narrative archetype at first. Each narrative opened with healthy ecosystems and “natural” fire regimes before European colonization. This state of grace was undone as fire exclusion through the 20th century changed the composition and structure of ecosystems and raised the risk of catastrophic fire. The heroes of the 20th century, battalions of firefighters on the front lines of wildfire, fall from grace when viewed through this ecological lens.

In the narrative, the future is uncertain. If the status quo continues, fire risks increase as ecological conditions deteriorate. Ecosystems have been altered beyond their capacity to recover without help. If fire managers implement restoration plans that restore ecological health and protect human communities, then they can change the narrative archetype to “golden age regained.” In the process, fire managers can reclaim the heroic identity denied to them within the ecological account of a century of fire suppression. Reaching this desired future will require

changes in organizational culture so that fire managers can implement ecological restoration plans. Institutional barriers to fire restoration are the principal obstacles on this path to improved ecological conditions and fire managers are cast as the key agents of change.

Enabling a New Socially Explicit Fire Regime

This narrative structure provided a way for FLN participants and landscapes to develop plans and practices that would be coherent with a new socially explicit fire regime (Goldstein & Hull, 2008). Eminent fire historian Stephen Pyne (2003, 2004) writes of narratives that inform fire regimes that combine both social and ecological dimensions. As described in Chapter 2, the imperial narrative dominated both the role of fire on the landscape and the human relationship to fire for more than a century. In the mid-19th century, colonial powers created government institutions to manage colonial land and resources and protect the economic interests of the commonwealth, extirpating local citizenry and their irresponsible and flagrant burning from the land. Architects of America's public land agencies looked to colonial models for inspiration. America's Narrative, Pyne suggests, arises amidst the imperial narrative applying a militaristic approach efficiently to organize armies of firefighters for the broader war against fire. The emergence of public lands and government agencies to manage them at the beginning of the 20th century centralized control of millions of acres across the United States in the hands of public administrators, particularly experts trained in professional forestry.

As described in Chapter 2, competing narratives have co-existed alongside this imperial narrative, a narrative that pits human firefighters against a formidable but tamable foe. These other narratives which have emphasized other aspects of human-nature-fire relationships have had trouble gaining traction over time. Part of the challenge is that the organizations and

professionals involved in fire management and their associated practices are deeply ensconced in the imperial narrative that emphasizes control. If counter-narratives threaten professional status or organizational legitimacy, they are unlikely to be adopted or overcome existing dominant narratives.

Goldstein (2007) has described how incommensurable narratives can undermine the potential to change dominant socially explicit fire regimes. In their study of the aftermath of the 2003 Cedar Fire in San Diego, CA, Goldstein and Hull (2008) noted how two competing fire regimes were vetted by what became adversarial advocates of different approaches to fire policy, management, and practice. Established government agencies operated under a “management” fire regime and an emergent community organizing group pushed a “restoration” fire regime. The fact that they were incommensurable led to the dissolution of the community group and the application of the “management” regime in the aftermath of the disaster. In our work, Goldstein and I (Forthcoming 2009b) suggest that the FLN navigated this challenge by enabling the production of a narrative that was simultaneously not threatening to the ways of knowing and professional identities of professional fire managers while charting a course to the future that repositioned the fire manager in a place of redemption within an institutional order that was cooperative and collaborative.

The FLN narrative enlisted partners in adopting this new socially explicit fire regime as a framework for planning and management. It did so by inviting and legitimizing their input rather than challenging their professional identities, ways of knowing and organizational affiliations. In this way, Goldstein and I (Forthcoming 2009b) contend that the FLN engendered a collaborative process in which new organizational relationships could be fostered, various ways of knowing could be legitimized and made legible, and fire management professionals could embark on a

heroic journey of simultaneously restoring fire adapted ecosystems and protecting communities. These three aspects of the socially explicit fire regime, institutional order, ways of knowing and professional identity, are summarized below.

- **Institutional Order:** The role of fire management agencies was preserved but performatively adapted to become more collaborative;
- **Ways of Knowing:** Different ways of knowing were legitimized, creating space for tacit professional knowledge as well as scientific knowledge, and;
- **Professional Identity:** The narrative framework ensured the heroic status of fire professionals as both protectors of human communities and restorers of ecological health.

Through these means, FLN homework set the stage for fire management reform. It invited fire management professionals to create a narrative that was commensurable with existing organizational practices, epistemic frameworks, and professional identities while pushing them to develop new relationships, integrate various forms of knowledge, and become ecological restorationists along the way (Goldstein & Butler, Forthcoming 2009b).

Network Imaginary

Following the first two years, the FLN has both diversified and refined the approaches, technologies, and communications systems of the network. A broad array of technologies, planning guidelines, and media shape, transmit, and reinforce certain assumptions and expectations for engaging in collaborative ecological fire restoration planning and management. This extensive infrastructure enlists FLN participants in articulating and applying discourse and practice that coheres with and expresses what Goldstein and I termed a “network imaginary” (Goldstein & Butler, Forthcoming 2009a). With a guiding imaginary shaping network action, the

FLN risks undermining collaborative creativity and innovation by prescribing interaction. Rather than dictate specific practices and outcomes, however, the assumptions and expectations of the imaginary coordinate site-based collaboratives without hierarchal authority or mutually supporting social relationships.

From its inception, FLN organizers relied on action at a distance (Latour, 1995), allowing technologies, systems and protocols to guide disparate landscape teams through a common collaborative planning process. With regionalization, FLN participants were more widely dispersed and less frequently and tightly connected by annual meetings or leadership. The FLN risked devolution into an uninterpretable cacophony of disparate and disconnected activities scattered across the country. Nonetheless, most regional networks adopted the four-step planning process of phase one (fire manager networks) or began developing FRCC-based modeling and prioritization systems (ecological modeler networks). Moreover, the national staff developed a multi-faceted approach to communicating activities, ideas and innovations in practice throughout the network. The principle technologies (planning guidelines and FRCC) and media articulated and sustained a network imaginary.

In the regions, partners in each landscape developed elements of fire restoration plans by following FLN planning guidelines or employing modeling technologies and protocols based on FRCC principles. These guidelines and technologies reinforced the common imaginary among FLN participants by engaging them in practices that foster specific assumptions and expectations about their worldview, the underlying problems they aimed to address, the types of challenges they would face, appropriate actions they should take on the landscape, and a mode of engagement that included collaboration with legitimate and credible partners. Table 6-1 summarizes the assumptions and expectations that animate the imaginary and the elements of the

planning guidelines or FRCC based technologies that established or reinforced these aspects of the imaginary.

Table 6-1: FLN Imaginary assumptions and expectations are reinforced through FLN technologies

Components of the Imaginary	Assumptions/Expectations	Planning Guidelines	FRCC
Worldview	Ecological restoration of fire adapted ecosystems	Requirement to map ecological features, identify ecological targets, threats, construction ecological models, and monitor ecological processes	Represents ecological conditions and fire regimes over time
Problem definition	Pre-European fire regimes were disrupted by agency fire suppression, degrading ecosystems and increasing fire risk	Specify pre-European fire regime and define effects of fire suppression on ecosystems, plant and animal communities	Reconstructs historical vegetation type, coverage and fire regime, determines degree of departure from current conditions
Appropriate action	Strategic planning done inter-organizationally at landscape scale over long time periods / Tactical fire treatments done by individual management units over shorter time periods.	Landscape mapping required/ Landscape description sets scale beyond organizational boundaries, but ownership/mgmt/admin responsibilities legitimated	Analyze flammability conditions over landscapes, ignoring jurisdictional boundaries/ Prioritization tools inform management within organizational boundaries
Challenges	Barriers to fire restoration are primarily organizational	Define barriers related to organizational structure, priorities, regulation and policy	
Collaborate with credible and legitimate actors and organizations	Resource management professionals are legitimate collaborative actors	Collaboration between ownerships and jurisdictions requires knowledge of ecological science, fire planning and management techniques	Collaborative synthesis of data across ownership and management boundaries requires knowledge of ecological sciences, ability to operate GIS

Imaginary Assumptions and Expectations Reinforced in Technologies

Ecological worldview

FLN planning guidelines and FRCC protocols guided network participants through a landscape assessment that oriented partners toward ecological restoration rather than other goals such as property protection or fuels reduction. Using the planning guidelines, partners identified how

altered fire regimes threatened species, natural communities, and ecosystems. The Deschutes landscape team described how fire suppression stressed Ponderosa pine and Lodgepole pine, the Bayou landscape in the South Central FLN focused on loss of oak woodlands due to lack of fire, and the Onslow Bight landscape in the Southeast region noted declines in red-cockaded woodpecker due to fire exclusion from Long-leaf Pine. Based on these ecological targets, partners identified the type and location of natural communities with the greatest need of restoration. Then, they developed at least two scenarios, one projecting the ecological consequences of continuing current management practices and the other suggesting how target species, natural communities, and ecosystems could improve with restoration of natural fire regimes. The Land between the Lakes (LBL) landscape team in the Southcentral FLN described how current management practices would continue ecological degradation, leading to dominance of closed oak-hickory forests on a landscape that was historically open woodland and grassland. They developed an alternative scenario in which prescribed burning and thinning would restore the historical balance of oak woodlands and grasslands and open oak-hickory forest.

FRCC reinforced this ecological focus. As landscape team members modeled divergence of current vegetation cover from historic conditions, they sought to integrate soil, topographic, and vegetation data with historical records such as Government Land Office archives and tree-ring dating. Using this data, the Deschutes team depicted historical conditions and mapped the existing distribution of vegetation cover. On their map entitled “Biophysical Setting” (Figure 6-1), they coded human land uses, such as urbanized and agricultural areas, with a grey color along with rock, glacier, and lava – signifying areas that had no particular relevance to ecological restoration—reinforcing the primary importance of ecological characteristics over other factors.

BioPhysical Setting

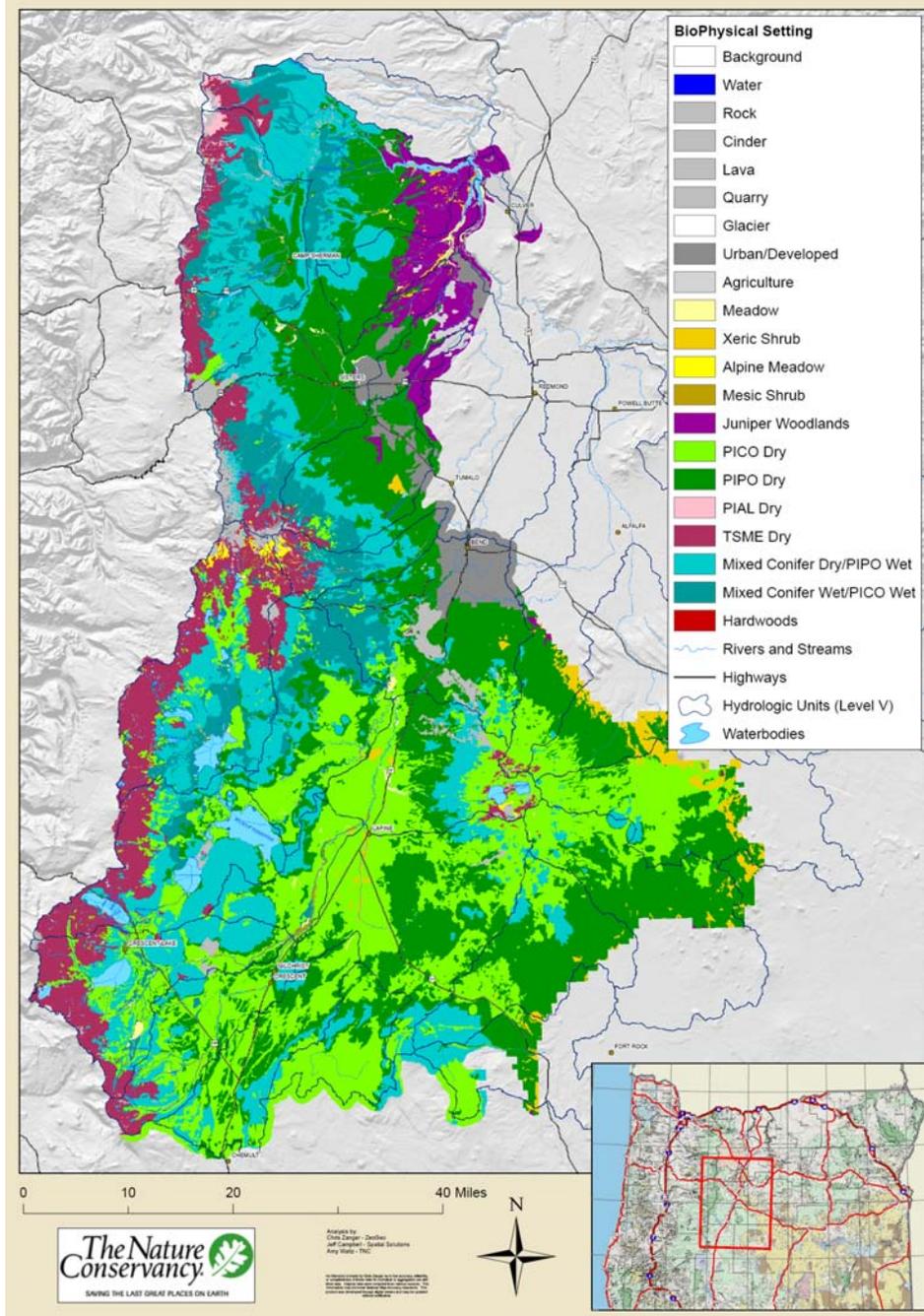


Figure 6-1: Biophysical setting map developed by Deschutes landscape November 2007. Courtesy of Amy Waltz, NWFLN coordinator, 2009.

Problem definition

TNC and public land management agencies initiated FLN as a response to a common problem frame that fire suppression had altered historical fire regimes. As stated in the summary report of the National Fire Roundtable, “Decades of active fire exclusion...has resulted in unsupportable fuel loads and vegetation changes that pose a serious threat to both biodiversity health and public safety” (Shlisky, 2001, p. 1). FRCC protocols and planning guidelines reinforced this understanding, grounded in the pre-European past as an original reference condition, impaired through short-sighted agency fire suppression.

The planning guidelines directed landscape teams to describe the ecological role of fire before European settlement, assembling their account of the "natural or historical fire frequencies, intensities, and extents" from tree-ring dating, historic records and eyewitness accounts. Each landscape account began with a description of pre-European conditions, described as natural, healthy, and unimpeded by human intervention except for aboriginal burning. This was generally not considered a departure from the historical fire regime. For example, in the Blacklands landscape of the Southcentral FLN, team members wrote in their first planning exercise that “Fire is the most important ecological process maintaining the distribution, composition, and diversity of blackland prairie, woodland, and forest communities.” Drawing on detailed scientific studies, the team described the frequency, intensity and seasonality of fires due to lightning strikes as well as aboriginal burning patterns. Their assessment concluded that fire burned annually through the Blacklands, maintaining the health of grassland, prairie, and savanna systems by preventing fast-growing red cedar trees from encroaching on the landscape.

Planning guidelines also directed partners to identify conservation targets and threats specific to their own ecosystems, linking agency-led fire suppression and increasingly catastrophic wildfire to measures of ecosystem health such as biodiversity decline. The Jemez Mountains landscape team in the Southwest FLN identified six ecosystems as important conservation targets including mixed conifer forests, ponderosa pine forests and woodlands, piñon-juniper woodlands, grasslands and savannas. All of the systems are threatened by altered fire regimes associated with fire suppression and four of the pine or juniper target systems suffer from “intense fire from surrounding fire prone systems” which can lead to catastrophic changes to target ecosystems. Emphasizing problems resulting from suppression, Jemez partners wrote that “Prior to the 20th century, extensive crown fires in ponderosa pine were extremely rare, if they happened at all.”

Supporting this approach, FLN coordinators recommended using FRCC to model landscape conditions, reconstructing vegetation type and coverage as well as fire frequency and intensity in unaltered, pre-European times. By comparing historic conditions to today, FRCC yielded an estimate of how altered landscape fire regimes were. In the Northwest FLN, team members modeled past and existing conditions of the 2 million acre Deschutes landscape in central Oregon focusing on two ecosystems, Ponderosa Pine and Mixed Conifer. The FRCC based model highlights the extent to which fire regimes were altered and what vegetative cover types were most affected. The Deschutes team concluded that these two ecosystems suffered from moderately to severely altered fire regimes due to fire suppression.

Appropriate action

FLN planning guidelines and technologies align with a common understanding of two key priorities that constituted appropriate action, each at distinct temporal, spatial and organizational scales. One priority was strategic planning, conducted inter-organizationally, at landscape scales, and with long time horizons. The other was a tactical emphasis on determining precisely where and how burning should be performed, hands-on fire restoration that was conducted principally within individual ownerships and jurisdictions, at the smaller scale of forest stand, and over the time span of a few days. These two priorities, one strategic and the other tactical, were closely integrated and mutually supportive.

Supporting strategic action, planning guidelines required each site to develop integrated descriptions such as landscape-scale maps and ecological models that subsumed smaller-scale features such as forest stands. FLN coordinators selected landscapes that crossed administrative or organizational boundaries and often covered millions of acres, aligning themselves with the agreement at the National Fire Roundtable that, “The appropriate scales of restoration are landscapes and ecoregions” . For example, the Onslow Bight in the Southeast FLN covers more than 1.3 million acres and incorporates conservation lands managed by the Department of Defense, USFS, TNC, North Carolina State Parks, North Carolina Department of Wildlife Resources, and US Fish and Wildlife Service. While public lands dominate most landscapes, some had significant private landholdings, such as the Niobrara in Nebraska, with over 10 million acres of privately held lands including large and small scale ranching operators as well as TNC. Temporally, planning guidelines encourage partners to plan over the interval required for full ecological restoration. All FLN landscapes projected at least 10 years into the future, and

some extended the timeline much further, such as the 500 year horizon projected by the Long Island Pine Barrens FLN.

FRCC mapping supported this strategic emphasis, aggregating vegetation types in different successional states to yield landscape-scale measures. FRCC analysis produced estimates of "natural range of variability", the appropriate fire frequency and intensity within a particular ecosystem, ranging from a few years for low intensity fires to centuries for severe, stand-replacing fires (Jim Smith, personal communication, March 7, 2007). In turn, FLN landscape teams could use these estimates calculate where and how much burning was required. The Deschutes landscape used FRCC to compare the historic distribution of key ecosystems to the current distribution to determine "percent departed" (Figure 6-2), which was used to identify shortfalls in the current level of effort and establish long-term restoration priorities (Amy Waltz, personal communication, 21 Nov 2007).

Fire Regime Condition Class (FRCC) HUC 5 Level

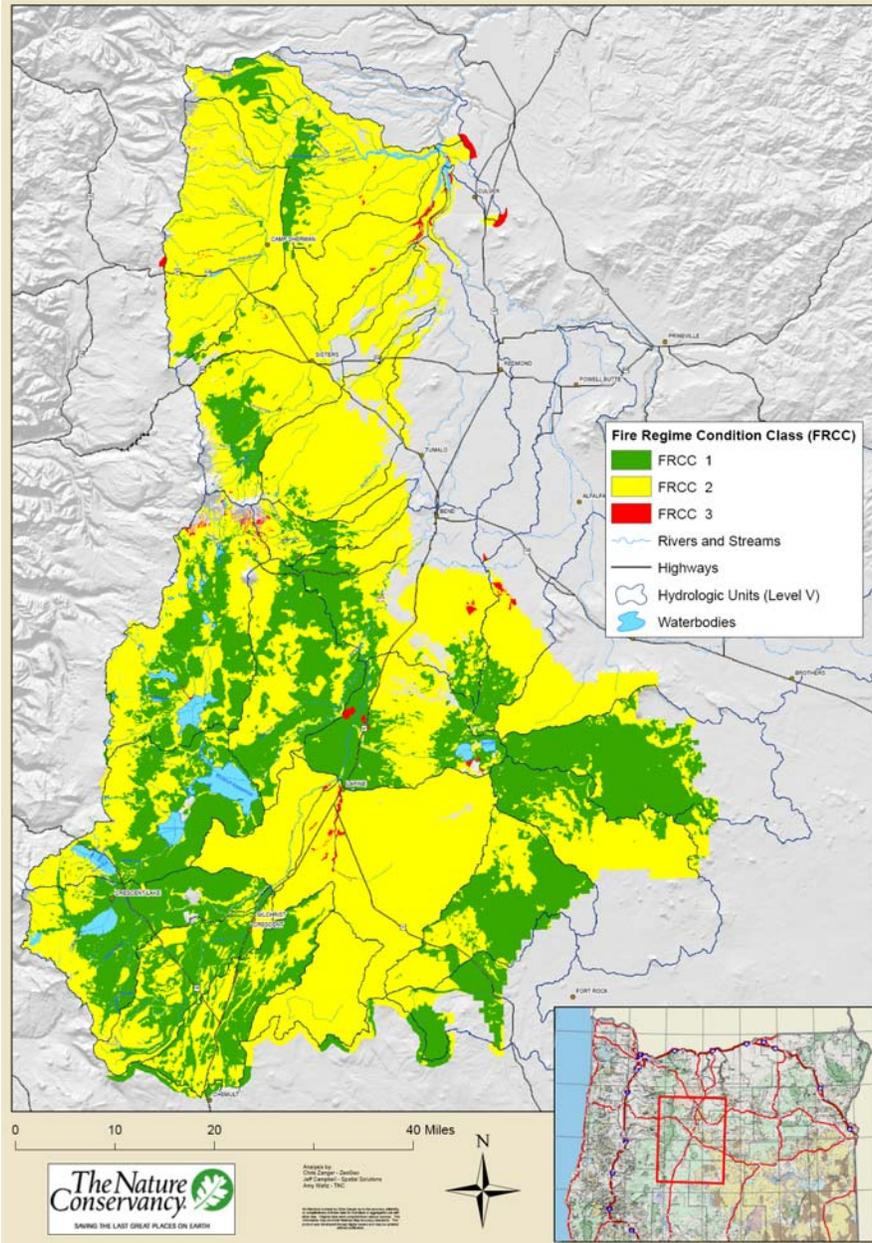


Figure 6-2. FRCC map of Deschutes landscape November 2007.
Courtesy of Amy Waltz, NWFLN Coordinator, 2009.

Complementing this strategic emphasis, planning guidelines directed landscape teams to develop three year fire restoration strategies within individual ownerships and administrative

boundaries, or partnering on a small scale across shared boundaries. The Alleghany Highlands landscape of the Central Appalachians FLN developed a "burn plan" on 1200 acres of Warm Springs Mountain, where TNC and the USFS share a boundary. This cross-boundary project could be implemented quickly and was a familiar scope of operation for field staff from both organizations. Participants are also drawn to a more intimate scale of operation when applying FRCC to establish landscape treatment priorities. The Deschutes team used FRCC to map and model smaller scale restoration projects on their landscape, such as on the Sunriver Healthy Forest Restoration Project and South Bend Healthy Forest Restoration Project, both within the Deschutes National Forest. They also have developed a series of maps that are meant to aid in identifying priority areas for treatments with a focus on generating stand level priorities for treatments. Figure 6-3 is an example of one map showing treatable stands.

Developing an Action Map for the Upper Deschutes Basin Step 1d - Treatable Stands

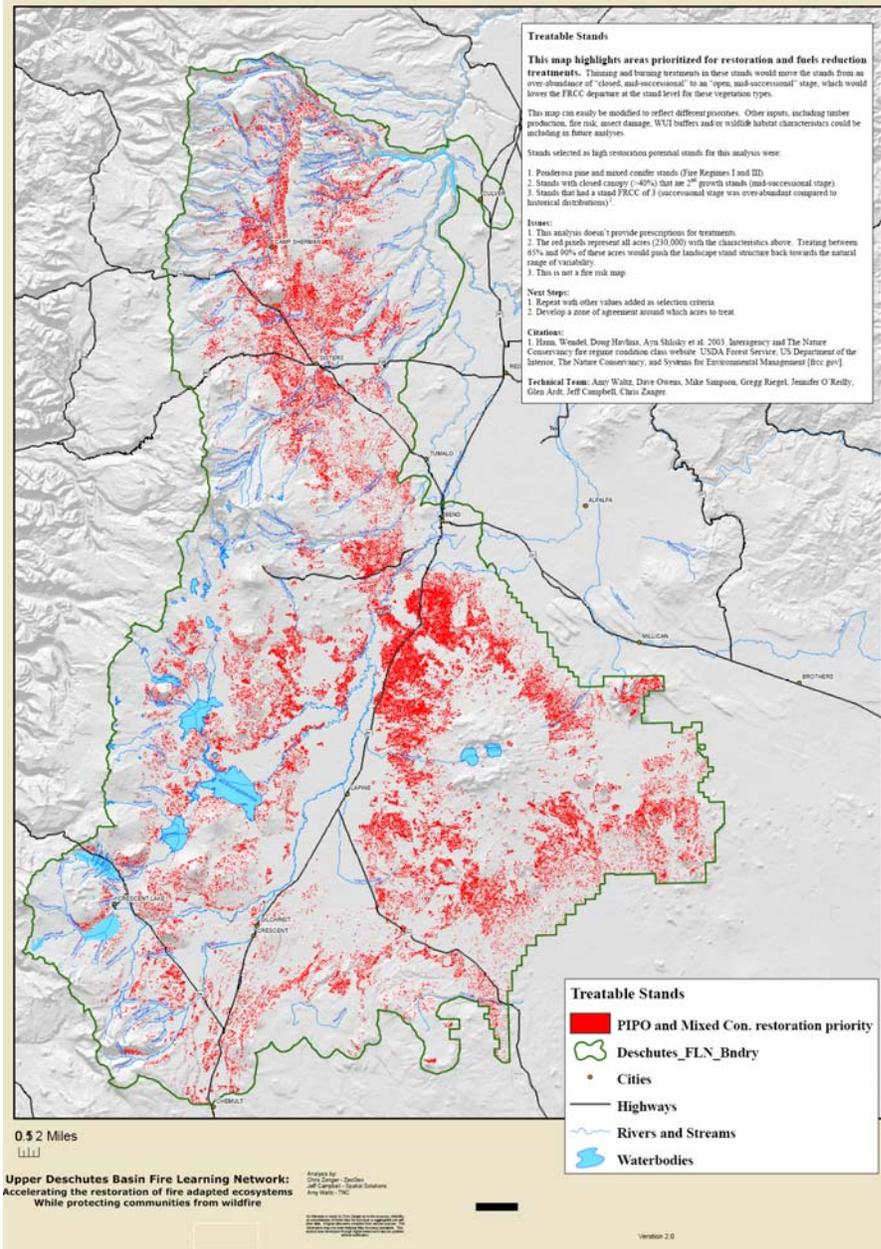


Figure 6-3: Deschutes landscape map of treatable stands, identifying those individual forest stands that have at least moderately altered fire regimes, are of significant ecological value, and can be restored using ecological fire restoration techniques.
Courtesy of Amy Waltz, NWFLN coordinator, 2009.

Challenges

In accord with the emphasis on organizational reform in the cooperative agreement, FLN planning guidelines directed partners to identify obstacles to connecting across ownerships and management boundaries in order to increase controlled burning and fuels reduction. Responding to this guidance, individual landscapes emphasized barriers related to organizational structure, priorities, regulation and policy. Participants rarely mentioned barriers such as a lack of understanding of fire regimes or technical obstacles to implementation. Of the nearly 50 active landscapes in 2003, the top barriers consisted of an inability to coordinate with partners, lack of funding, cultural resistance to fire reflected by the lack of a coherent message in support of ecological fire restoration, lack of staff capacity to engage in restoration work, and regulatory procedures (Figure 6-4).

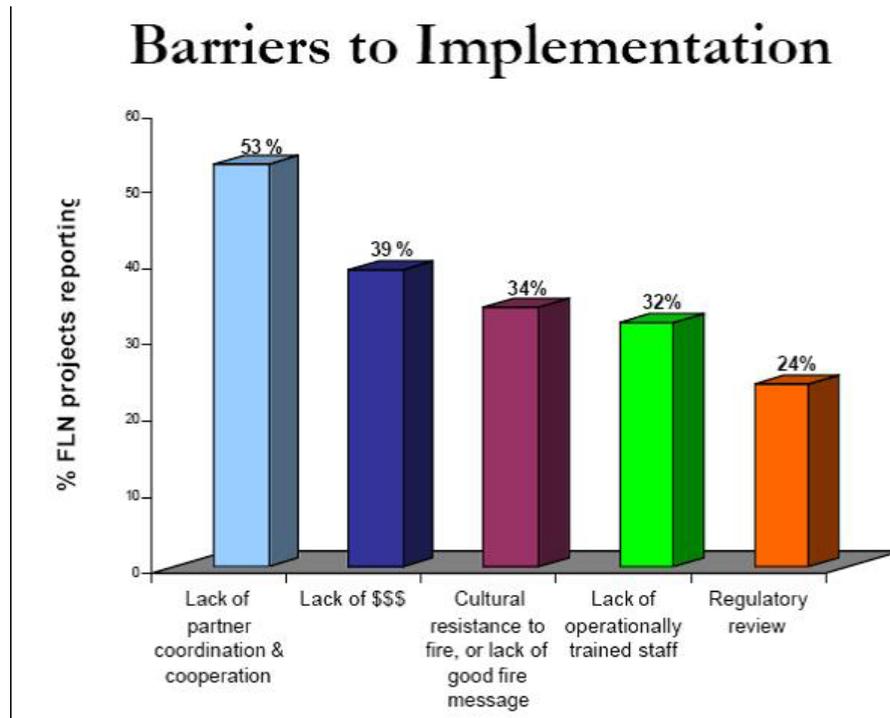


Figure 6-4. Barriers to implementation reported in 2003 FLN newsletter (March 2003).
Courtesy FLN Director, 2009.

The 2007 FLN policy survey revealed similar results .With responses from nearly 100 FLN participants, the top barriers (ranked as important) to implementation of ecological restoration were a limited availability of a trained workforce (61%), an inability to procure funding (53%), competing priorities across agencies and organizations impeding coordinated action (41%), and a misunderstanding of wildland fire use by the public (41%). While regulatory review pressures seem to have lessened over time, the survey revealed an emerging challenge associated with air quality regulations at both state and federal levels and a lingering concern about NEPA review with nearly 60% of respondents ranking each of these as important (~20%) or somewhat important (~40%) barriers. Across the FLN, partners emphasized the importance of organizational and institutional challenges as barriers to ecological restoration of fire adapted ecosystems rather than a lack of knowledge or scientific understanding.

Collaborating with credible and legitimate partners

While FLN was designed to foster inter-organizational and cross-boundary cooperation, planning guidelines and FRCC had implicit expectations of who would legitimately participate in the collaborative. The FLN cooperative agreement included the public as potential cooperators, but in practice only those with training and experience in natural resource management had requisite skills to participate in FLN. This approach to collaboration enhanced the ability of fire professionals to share resources and knowledge and engage in cooperative activities to restore fire-adapted ecosystems across organizational and administrative boundaries.

Partners worked together across organizational or jurisdictional boundaries to develop plans at the landscape scale. Each FLN landscape was directed to recruit partners from key organizations, and planning guidelines emphasized collaboration as an underlying expectation,

including instructions such as “Collaboratively draft a three-year implementation plan” and “Collaboratively begin drafting a monitoring plan.” FRCC analysis supported this effort by requiring partners to gather ecological data across jurisdictional boundaries and collaborate to develop ecological models and prioritize restoration tasks. The Deschutes team's efforts to develop a landscape-wide FRCC model included participants from nearly all the organizations with management and advocacy interest in the area, including two National Forests, a Bureau of Land Management district, the Central Oregon Intergovernmental Council, state agencies such as the Department of Forestry and Department of Fish and Wildlife, TNC, Sierra Club and Audubon Society.

While encouraging collaboration, planning guidelines and technologies also circumscribed who could collaborate. This was not done by explicitly defining legitimate partners or intentionally excluding anyone, but by assigning tasks that only could be conducted by those who understood fire dynamics, ecological science, and a wide range of environmental planning and management techniques. For example, the first activity of the planning guidelines is to identify conservation targets and threats. These terms are not defined and no further direction is given other than to prioritize the list related to altered fire regimes. Then, partners are asked “what is the natural or historical fire frequencies, intensities and extents for matrix fire-adapted systems?” These are the earliest and in many regards the simplest components of the guidelines, but for the uninitiated, what is required to define targets and threats or describe fire regimes for “matrix fire-adapted systems” is not likely self-evident. FRCC protocols go further, requiring an ability to collect, analyze and map data related to vegetation cover, soil types, tree-ring dating, and geologic features, to model ecological system characteristics, and to operate in a

technological environment that requires spatial modeling, database management and mapping capabilities.

This complexity stymied attempts to open the network to a broader array of participants. In the Southcentral FLN, the LBL landscape team leader noted that the range of collaborators was limited because many partners supported FLN work but were not interested in developing complex ecological fire restoration plans (personal communication, 3-14-07). Motivated by a similar concern, the leader of the Bayou landscape informally consulted with partners since few were willing to participate in data gathering, analysis, and synthesis required to complete planning guidelines (personal communication, 6-14-06). In the Deschutes example above, though there are many agencies and organizations represented, the participants themselves were resource management professionals. Thus, while the FLN set the stage for greater cooperation and coordination among professionals working in different disciplines and under different organizational mandates, the tools and techniques used in the FLN did not invite the participation of the uninitiated.

FLN Media Reinforce Assumptions and Expectations

At the national level, FLN leaders maintain a variety of ways to communicate throughout the network by publishing newsletters, field guides, and briefing documents and by conducting presentations and interactive landscape tours at national and regional meetings. Regional leaders also conduct presentations, host field excursions, publish workshop summaries and tout success stories among their members. In this way, both print and performative media serve the function of what Anderson (1983) would call “representations,” conveying and reinforcing the network imaginary. Reading about or listening to other successful professionals or serving as exemplars

themselves, FLN partners were enabled to imagine their own place in the network, and to act in concert with the FLN imaginary as they re-oriented their practice in distinct landscapes.

The FLN Dispatch

In the FLN, the correlate to Anderson's (1983) national newspapers is the FLN Dispatch, a monthly newsletter distributed to network members in print form and posted to the FLN website electronically. The Dispatch is a one page story told from landscape or regional levels, from field perspectives, and filtered through national staff who write and edit the final copy. These stories have become exemplars, success stories used both within the network to legitimize action that is compatible with the network imaginary and outside the network to construct an externally legible imaginary of what FLN is about. Dispatches legitimize certain knowledge practices, processes, and actions within the network. Reporting on regional and landscape level activities to other regions and landscapes, the dispatches depict those activities that cohere with or embody the imaginary.

The FLN published 36 dispatches from June 2004 to October 2008.⁹ The content of each dispatch reinforced the knowledge practices associated with the network imaginary. The Dispatches were always about successful efforts to put fire on the ground, share knowledge about fire restoration, develop valuable data models, or engage in collaborative work at ecologically meaningful scales. The Dispatches also cut across all scales of the network sharing stories that emerged from successful landscape, regional and national activities. As stated by the communications staff of the FLN in an internal summary report, "Each regional Network and

⁹ The Dispatch was published monthly until December 2006. It has since been replaced by a regular e-newsletter called "The Networker" which continues to distribute success stories and lessons learned among network members and other interested parties in digital form on a bi-weekly basis. The Dispatch continues to be used to provide more complete descriptions of FLN successes and activities but on a more sporadic basis.

most Network landscapes shared unique lessons learned via the *Dispatch*.” These stories were widely distributed within and beyond the network. FLN staff report that annual downloads of the Dispatch from the FLN website (which does not include distribution of print copies) numbered in the thousands with a high of 3,370 downloads in 2006.

My analysis of each Dispatch story revealed that the newsletters consistently reinforced the assumptions and expectations of the imaginary, particularly those associated with professional practices. FLN exemplary practice includes planning and implementation at appropriate temporal and spatial scales, collaborating to develop plans and coordinate restoration action, and engaging in action to overcome barriers to ecological restoration. Table 6-2 provides a synopsis of the aspects of FLN exemplary practice that were highlighted and communicated through the Dispatches.

Table 6-2: Fire management practices associated with FLN imaginary as evidenced in the network newsletter, the *FLN Dispatch*

Exemplary Practice	Number of FLN Dispatch Stories Referencing the Practice
Appropriate Action	
<i>Long Range Ecoregional Planning</i>	17
<i>Managerial implementation of treatments</i>	22
Addressing Barriers to Implementation	
<i>Organizational Barriers</i>	21
<i>Knowledge or Practice Barriers</i>	10
Collaboration with partners	
<i>Partnerships for Coordinated Action</i>	26
<i>Collaborative Planning Results</i>	17

Appropriate Action

A central practice of the FLN is developing elements of fire restoration plans. Using technologies and guidelines that lead to restoration planning products are evident in nearly every Dispatch. Some of the newsletters highlight both long range eco-regional planning and

managerial action. Primarily, FLN participants use technologies and guidelines to develop long term planning products to inform restoration action in the field. On the ground, they implement more narrowly focused restoration treatments based on the strategies that emerge in the large scale planning process.

The FLN Dispatches feature stories of landscape scale planning efforts using both modeling and prioritization tools and planning processes based on the FLN guidelines. For example, the November 2006 Dispatch heralds the work of the Intermountain West FLN where partners are developing a land use decision making modeling tool that incorporates fire restoration prioritization models to facilitate scientifically supported restoration treatments on the landscape. One specific landscape, a 1.3 million acre area in Utah's Grouse Creek and Raft River Mountain Ranges, is bringing together multiple agency partners and private landowners to utilize some of the innovative modeling tools developed by the Intermountain West regional network. Through workshops involving all of the participants in review and analysis of the inputs and specifications of the model, the landscape collaborative is compiling local historical land use data and ecological data for analysis so that they can forecast past and future scenarios involving changes to grazing practices, weed control approaches, prescribed fire applications, and other restoration techniques. Using this tool developed at the regional level and applying it to local landscape conditions, the landscape collaborative aims to enhance their capacity to develop strategies for restoration of the entire ecosystem.

The August 2005 Dispatch highlights "an outstanding example of a public-private collaboration" in the Lassen Foothills of California that produced a fire management plan through engagement in the FLN. Local fire planning efforts that cut across the half-million acre area are being coalesced into a region-wide Community Wildfire Protection Plan. This plan will

incorporate the core vision of landscape scale fire management, gaps in fuel treatments that the partners have identified through the dispersed planning processes, and recommend new treatment projects. This multi-scaled regional planning effort is touted as a key success story in various FLN publications.

The key to these planning efforts is that they result in on the ground fire restoration action. Twenty-two Dispatch stories refer to on the ground implementation action that resulted from specific planning efforts and planning products. John Andre, the landscape lead for the Bayou Ecosystem Restoration Project in the South Central Regional FLN, describes in the November 2004 *Dispatch* how the planning processes of the FLN provided his landscape with scientifically defensible restoration projects that were able to be quickly routed through National Environmental Policy Act (NEPA) processes and implemented on the ground. Since engaging in the planning process with participants in the South Central FLN, the Bayou landscape has gone from prescribed burning of 1,000 acres a year to applying prescribed fire on over 18,000 acres and mechanical thinning on 2,600 acres in 2004.

Addressing Barriers

The Dispatch stories frequently identify the barriers that landscapes and regions are attempting to overcome through their collaborative work. While building a scientific basis for restoration and deeper understanding of the ecological role of fire in target ecosystems is outlined as a key purpose of the network, the importance of organizational barriers to ecological fire restoration is reinforced in the media as nearly two-thirds (21 of 36) of the newsletters described how the FLN regions and landscapes were addressing challenges such as regulatory processes, the inability to work across management boundaries, and a lack of resources or staff

to put fire on the ground. For example, the September 2005 Dispatch described how the Northeast FLN created opportunities for sharing resources and building capacity in the establishment of the Maine Fire Crew, a team of trained fire professionals who travel among multiple states in the northeast to assist on prescribed fire teams. As the Dispatch claims, “The additional equipment and trained personnel are essential for helping maintain or restore ecosystems at project sites that in some cases have limited or even no capacity to burn on their own.” In another example, the February 2006 newsletter describes how the Tieton landscape in the Northwest FLN has been able to develop an interagency vision and plan using the Conservation Action Planning approach to overcome the patchwork approach to planning and implementation. Peter Forbes, one of the participants on the landscape stated that “This is going to make it so much easier for us to do ecosystem restoration when we don’t need to worry about political boundaries.”

This focus on organizational barriers is complemented by the ten of the newsletters that clarify how the network would enable participants to overcome knowledge barriers, building stronger understanding for ecological conditions and restoration needs to restore functional fire adapted ecosystems. For example, the March 2006 describes how the Centennial Valley network will develop a better understanding of ecological functions of their systems, particularly the Douglas-fir system that is being infested by bark beetles. As Nathan Korb, the network leader, contends, “We have a lot to learn even about the simplest system that we know most about.” As described in the February 2008 Dispatch, a central goal of the Central Appalachians network, is to build a better understanding of how fire functions in the region. According to the network leader, Judy Dunscomb “Appalachian eco-regions contain both fire adapted and fire-dependent

species, yet the complexity of these diverse oak-hickory and pine dominated systems has hamstrung our ability to articulate ecological management objectives.”

Collaboration

The practice of collaboration is perhaps the most deeply shared practice that permeates the entire network. As stated in the July 2005 edition of the Dispatch, “Effective collaboration resulting in on-the-ground fire regime restoration is the hallmark of the FLN.” The purpose and form of collaborative practice varies depending on the needs of landscapes and regions engaging in fire restoration work. One of the key forms is to develop strategic partnerships or coalitions for improving coordinated planning and restoration work. Among the Dispatch stories, 19 referenced using collaborative relationships in strategic ways to improve coordination. For example, on the Croatan National Forest in the Southeast Regional FLN, officials cite having “dependable, influential partners who willingly share resources and expertise” as one of the key elements of success in engaging in fire restoration work. Their partners facilitate a variety of coordinated outcomes, not least of which is to engage in collaborative fire management through sharing resources in the field. Another approach legitimized in the network is to engage in more open collaborative forums involving stakeholders in processes that lead to plans or other products that encompass a common vision and strategize restoration activities at ecologically meaningful scales. As reported in the October 2005 Dispatch, the Huachuaca Area Fire Partners working in Arizona includes a wide array of stakeholders from public agencies at federal and state levels, non-profit conservation organizations such as TNC and the Audobon Society, private landowners, and interested citizens. This group developed a comprehensive multi-jurisdictional fire management plan that cut across over 500,000 acres in the region. According

the one of the participants, the stakeholders, who were working in a conflict laden environment, “didn’t let the differences in priorities and procedures across the various parties keep us from putting this plan together.” Fourteen of the Dispatch stories relate to this theme of engaging in inclusive planning processes to develop fire restoration planning products.

Performative Media

Playing a similar role as the network newsletter, dramatic re-enactments provide performative exemplars. For example, field excursions led by host sites at regional and national meetings are one form of ‘performative media’. These excursions create opportunities to demonstrate exemplary practice in line with the FLN imaginary as well as to share insights and develop new ideas for ways to respond to complex restoration challenges. For example, in July 2008, Central Appalachians FLN partners toured a 1200 acre site where the Allegheny landscape team had performed prescribed burning. The team described how TNC and USFS burned their lands in a coordinated effort. Standing on a rock outcropping overlooking the site, the team leader discussed how collaborative relationships with key management professionals enabled them to overcome organizational barriers to prescribed burning on a complex landscape with multiple ownerships. Team representatives fielded questions from the network participants as they walked around the site, still blackened from the burn. Network participants reviewed the restoration goals with the team and conducted on the spot assessments of fire effects on vegetation. The group brainstormed ideas about what next actions would enhance the restoration process. This tour reinforced assumptions and expectations about the operational scale of action, collaborating with fire professionals, focusing on ecological impacts of restoration activities, and overcoming organizational barriers through collaboration.

In another example, the national FLN meeting in March 2007 included a “landscape walk”. Beforehand, the FLN Director asked landscape teams to prepare posters describing historical and current ecological conditions and organizational barriers, outlining their collaborative vision statement and long-term landscape-scale ecological objectives, and describing their collaborative planning work and project-oriented training and fieldwork. At the meeting, representatives from each landscape displayed their poster and spread supporting materials on tables. Half of the landscapes stationed their tables, while the other half roamed among the posters. Roamers read and asked questions of landscape representatives at each table. The Director gave each roamer evaluation forms and fake checks and instructed them to distribute 50,000 “landscape dollars” to projects they judged as having great potential writing down specific reasons why on the back of the check. Roamers and those at the tables then switched, allowing everyone to play both roles.

Acting both as landscape representatives and external evaluators, participants aligned each landscape with the assumptions and expectations of the FLN imaginary. On their fake checks, participants responded to the question, “What about this project’s history says “success!” to you?” Analysis of the responses reveals that the partners reinforced key FLN themes including collaborating and integrating resource management actions at a regional-scale among agencies and landholders, protecting priority ecological features particularly those that are sensitive or rare, engaging in on-the-ground fire restoration projects preferably with partners, and developing planning tools such as burn prioritization models to enable greater coherence of implementation actions across a landscape.

Landscape walks and field visits were a kind of participatory media, either describing or performing exemplary FLN practice. Acting at different times as both audience and performer,

FLN partners worked in ways that were coherent with shared assumptions and expectations while remaining improvisational and responsive to local culture, conditions, and circumstances. This process is mutually reinforcing, as exemplary action elicits positive responses from other participants. Published media reinforced these landscape performances through efforts such as the posters that accompanied the landscape walk, or the compilation of information about individual landscape's planning, modeling, restoration action, and collaborative partnerships, which they published in an FLN field guide of 37 exemplary landscapes (The Nature Conservancy, 2007a) and later updated to highlight exemplary practice on all FLN landscapes.

Legitimizing Various Forms of Knowledge

As in the narrative framework, the FLN imaginary created space for flexibility and creativity necessary to innovate by legitimizing various forms of knowledge. One of the core goals of the FLN is to promote learning and sharing of ecological fire restoration knowledge and information through network interactions. From the beginning of the FLN, organizers set the expectation that the network would be science driven. As stated in the request for proposals for the first year of the network, “The ultimate products delivered by each landscape team will differ depending on the needs and status of specific projects, within the context of a minimum acceptable standard for ecologically- and scientifically based collaborative fire management planning.” Yet, what constitutes valid ecological knowledge is widely interpreted in the FLN. Not only is the published work of experimental science informative in this realm, the FLN explicitly promotes the idea that field based expertise should not be underestimated. The instructions in FLN planning guidelines for how to define desired future conditions suggest that participants should “use any and all available information... including historical information,

expert opinion, key species requirements, feasibility, natural disturbance regimes, spatial characteristics, intuition and gut feeling.”

The Dispatch stories reinforce this concern with ensuring high quality planning for fire restoration through the application of both scientific and field based knowledge and expertise. Among the stories that highlighted knowledge seeking and knowledge sharing, they were evenly split across these two domains of ecological knowledge practice. Eight of the articles referenced examples of networks that were seeking, sharing, and utilizing the best available scientific knowledge to inform ecological planning processes for implementation of restoration action. For example, the September 2004 *Dispatch* describes how a team of scientists from TNC and the Bureau of Land Management in New Mexico engaged in a 3 year ecological assessment of 13 million acres of rangelands. The team used ecological modeling systems developed by state and federal agencies to map the ecological conditions and the extent to which areas of the landscape were departed from an historical fire regime. This team worked through the Southwest Regional FLN to obtain peer review of their methods and results as well as to share their processes and outcomes with others from the region.

Another eight referred to instances when field based knowledge and expertise was shared to improve the capacities of fire managers implementing restoration action. In one such example, a prescribed fire team working in the Great Plains brought their field knowledge to regional FLN workshops to share and garner new ideas about how to improve restoration of grassland ecosystems. The prescribed fire group was able to provide other network participants with examples for how they built flexibility into their operations, planning processes and work plans to be able to take advantage of unexpected opportunities in the field. Meanwhile, the team received feedback on planning products they were developing at a landscape level and

particularly were able to improve how they generated new partnerships with private landowners on their landscape. As the June 2005 *Dispatch* summarizes, “A key tenet of learning networks is that project teams learn from each other, with groups both contributing to, and benefiting from, an open exchange of ideas and information.” Whether from sharing field knowledge or scientific expertise, these two aspects of ecological restoration knowledge are promoted and legitimized in the FLN.

Locally specific and field based knowledge informed by ongoing monitoring protocols developed through FLN planning processes is of central importance in the network. Because of underlying uncertainty and complexity of ecosystem functions, an ecosystem based approach to planning that is central in the common vision of the FLN requires a high degree of contextually relevant data and expertise. While the guiding processes of the FLN articulate that there is a nation-wide problem with the degradation of ecological health in fire adapted ecosystems, identifying specific sources of the problem, defining the extent of the problem, and determining how best to address the problem are tasks left to regional and landscape level collaboratives. This field-based expertise is fundamentally important to the adaptive management process engendered by the FLN planning guidelines. It is also an aspect of learning and innovation that emerges from landscapes and can be transmitted to other sites. In this way, the FLN facilitates the communication of and potential integration of field-based innovations into other landscape collaboratives through national and regional level interactive forums and media.

Coherence and Innovation

There is a danger inherent in linking multiple place-based collaboratives together in such a way that they cohere to a common vision or imaginary. Some scholars have argued that

collaborative forums can be arenas for co-optation as powerful interests manipulate or over-ride the interests and perspective of the less powerful (Flyvbjerg & Richardson, 2002; Kothari, 2001; McGuirk, 2001; Tewdwr-Jones & Allmendinger, 1998). Advocates of collaboration have countered that this view of power is unidimensional and fails to recognize emergent properties that can lead to collective forms of power that empower and enable both the powerful (in instrumental terms) and less powerful who participate in collaborative processes (Booher & Innes, 2002).

In principle, I agree that excessively binding conditions of coherence have the potential to co-opt a diversity of interests and perspectives by channeling the focus of collaborative interactions too narrowly. Of equal importance, is the notion that such constraints on collaborative processes can reduce the effectiveness of collaboration by inhibiting the application of local knowledge and limiting the creative capacity that is at times emergent through collaborative dialogue. Such actions may cast a “shadow of hierarchy” (Scharpf, 1994) over network action, limiting the productivities for which a network is suited to generate.

However, a delicate balance between coherence across multiple place-based collaboratives and enabling creativity through open and flexible collaborative processes can be struck by linking collaboratives into larger networks operating under a common collective vision. That vision, which can have characteristics of social imaginaries, can emerge through the collaborative process and be transmitted and reinforced in a variety of ways. FLN planning guidelines, technologies like FRCC, and the various kinds of FLN media reinforce common assumptions and expectations among network participants. Their assumptions and expectations constitute more than a common story about landscape-scale fire restoration, or a shared set of ecological goals shared by the FLN founders and sponsors. They include an understanding of the

historical basis of the problem and the appropriate strategic and tactical response. In addition, they are collectively oriented toward overcoming organizational barriers and share tacit agreement that fire managers possess the credibility and legitimacy to participate in FLN collaborative efforts. Taken as a whole these assumptions and expectations support an imaginary among network participants, a common understanding which enables partners to carry out the collective practices of the FLN.

In the case of the FLN, I argue that the common vision and mechanisms of circulation motivate coherent practices throughout the network. Yet, the imaginary and practices associated with or imbued by it, can be guiding, but must not be dominating. The mechanisms through which the imaginary circulates must not be overly prescriptive but rather inspire creativity and enable the incorporation of local knowledge into the planning process. As FLN participants engage in practices coherent with the imaginary, landscape collaboratives maintain the flexibility and indeed are encouraged to incorporate local knowledge and develop plans and processes that are applicable to the ecological, social, and political contexts within which they operate.

The imaginary was “nourished in embodied habitus” through practices that were engendered by FLN guidelines and technologies (Taylor, 2001b, p. 189). While the FLN was founded on the premise that the degradation of fire-adapted ecosystems was a nation-wide problem (The Nature Conservancy, 2001), planning guidelines and technologies enabled each landscape to situate the FLN imaginary in participants’ own experience and context, through their own actions, collective reasoning, and choices. Practices are possible and make sense within the imaginary's assumptions and expectations of one another, while carrying and legitimating the imaginary. As Taylor (2002, pp. 106-107) notes, "These understandings are both factual and normative; that is, we have a sense of how things usually go, but this is interwoven

with an idea of how they ought to go, of what missteps would invalidate the practice." If FLN tasks were defined too narrowly, this would squelch the energy and initiative characteristic of collaboration. Instead, while the goals and strategies of each site-based collaborative was coherent and consistent with the FLN imaginary, their analysis and plan of action was grounded in the specific attributes of their region, a process that required creative interaction in each landscape.

Conclusion

A shared imaginary can allow networks such as the FLN to coherently operate across disparate place-based collaboratives without undermining the potential for creativity and innovation. The network infrastructure of planning guidelines, technologies and media fosters this solidarity without the need for pervasive authority. Combined action can be coherent without central coordination, with partners acting independently in similar ways and autonomously speaking with a unified voice. This offers an alternative to what Fung and Wright (2003) call the unworkable models of democratic central control or strict decentralization. Instead, the imaginary provides parameters within which common practice can be defined and enacted. It ensures both a level of coherence of action and a level of freedom to explore the boundaries of existing practice to generate new kinds of practices. It does so without strict control from the top and without the complete dissolution of central authority or mechanisms to link actors and organizations together across disparate locations.

In this case, the imaginary animates an alternative worldview to the dominant paradigm in fire management, namely, landscape scale ecological fire restoration rather than all out suppression. It inspires the generation of new kinds of fire management practices coherent with

that worldview, specifically addressing the barriers to overcoming the frustrated transition from suppression to ecologically informed fire management. In this way, the FLN fosters perspectives, strategies, and techniques that are tested in the field to support changing fire management practices on the ground to align with landscape scale ecological fire restoration.

A network of collaboratives with a common imaginary can diffuse innovation throughout organizations and institutions, operating both at place-based sites and through the influence of partners on their own organizations. As FLN participants embody the imaginary through their fire management practices, they can have impacts beyond the network, generating the potential for more fundamental change. Moreover, as exemplary practices become represented and distributed throughout the network and beyond, new kinds of practice can be introduced into the broader fire management world. I take up this question in the next chapter in which I examine how the practices of the FLN imaginary have the potential to extend beyond the network to inspire change in the organizations and institution of fire management.

Chapter 7

Generating Change beyond the Network: FLN practices in the fire management institution

If you are a status quo person, you are going to be very uncomfortable in the Fire Learning Network.

~John Andre, USFS Ecologist, Bayou Ecosystem Restoration Project

Introduction

The idea of a learning network is to create an interactive forum through which participants can generate and share lessons learned with each other. The Fire Learning Network was designed with the intent to inspire learning at multiple scales across organizational and disciplinary boundaries. Explicitly and implicitly throughout its existence, the network and its advocates have depended on the idea that through network interactions individual practitioners would learn, their practices might become more innovative and the organizations in which they worked might, over time, change.

For multi-scalar collaborative networks to generate institutional or system-wide change, network participants must enlist others within their organizations to adopt network understandings and practices. This chapter describes how practices associated with the FLN imaginary are becoming evident in the functions, policies, processes, or outputs of fire management organizations. Specifically, I aim to sketch where these changes can be traced to the FLN, either participants themselves or planning products that they produced.

However, organizational systems as well as individual beliefs, ways of knowing, and worldviews are not always conducive to the change sought by FLN participants. In this chapter, I also provide examples where organizational barriers slow or halt efforts to engender

organizational change and where individuals resist change to their deeply held beliefs about fire and fire management. The fact that in certain instances FLN participants are unable to overcome these barriers provides a cautionary note that power relationships outside a network and embedded belief systems and practices will influence how multi-scalar collaboratives interface with organizations and institutions that they aim to affect.

There are numerous factors that enable or inhibit the adoption of practices, policies and procedures that are coherent with the worldview of ecological restoration of fire adapted ecosystems. Indeed, the FLN is one factor among many building momentum toward transformative change in fire management. Nonetheless, FLN participants frequently identify specific actions or changes in plans, policies, and practices that were inspired by the people and products of the FLN. On a 2007 FLN survey, when responding to the question “what kinds of results do you believe have been achieved through the FLN process,” 34% of respondents reported that fire management practices had changed, 43% responded that fire had been restored to a forest or grassland habitat, 71% reported that collaboration had improved through their group processes, 41% claimed that the public’s acceptance of fire and restoration had improved, and 13% tied specific policy changes at the local, state or regional level to the FLN.

Using two of the core practices associated with the FLN imaginary as an organizing framework (see Chapter 6), I describe examples of these changes and their linkages to FLN participants and products. These two practices are essential to engaging in landscape scale ecological fire restoration and directly address barriers to overcoming the frustrated transition in fire management from a focus on suppression to a focus on landscape scale restoration of fire adapted ecosystem. The first practice I describe is the integration of the ecological restoration approach into management plans as well as action on the ground. These practices highlight how

FLN participants and products are able to bring long range planning and managerial level implementation into alignment with the tenets of landscape scale ecological fire restoration. Next, I describe how the practice of collaboration is being integrated into organizations associated with the FLN. These collaborative relationships are changing how organizations are addressing a variety of resource concerns, not just fire. Although the rhetoric of collaboration has been strong among resource management agencies, the practice of collaboration has been unevenly applied. The FLN has been able to build collaborative capacity among associated practitioners and organizations.

For the most part, these changes can be characterized as bottom up or middle out. Practitioners involved in FLN take FLN plans and products, ideas and rhetoric, data and techniques back to their organizational units. In many cases, the intersection leads to the adoption of practices associated with the FLN imaginary in areas beyond the projects specifically designated as part of the FLN. They promote the FLN and the imaginary with their peers and colleagues (middle out) as well as with their supervisors and beyond (bottom up).

The FLN does not rely on a bottom up model of inspiring change in organizations through individual practitioners. It has also inspired change from the top down. I follow the adoption of FLN imaginary practices with a description of several ways in which FLN products and participants have led to the integration of the FLN imaginary worldview at the highest organizational levels of the USFS and even among policy makers. These changes have the potential to inspire far reaching organizational shifts as the priorities for funding and directives for action within a hierarchical agency increasingly promote undertaking landscape scale ecological restoration of fire adapted ecosystems.

Ecological Restoration Approach

The FLN imaginary guides adherents to develop long range plans and short term strategies that promote and enact the landscape scale ecological restoration of fire adapted ecosystems. The ecological restoration approach of the FLN is not monolithic. Fire adapted ecosystems vary significantly and the social-ecological systems that encompass them likewise vary. The ecosystems have distinct fire regimes, numerous natural community types, and are in differing states of ecological health requiring discrete techniques and combinations of treatments to achieve a restoration goal. Settlement patterns also influence how practitioners define “landscape scale.” For example, in the Long Island Pine Barrens, landscape scale restoration within the confines of high human population density translates into tens of thousands of acres. On the grasslands of the Great Plains where vast expanses of land have little to no human settlement, landscape scale can mean millions of acres.

In these varied social-ecological systems, FLN participants aim to develop ecological restoration plans at landscape scales that can be implemented by land managers in specific locations across the ecosystem. When these planning products or FLN participants can inspire ecological restoration planning and management in the actions, plans, and protocols of other resource management agencies, the practices of the FLN imaginary spread beyond the network. As one of the early supporters of the FLN points out that with the participation of state and federal agency representatives “the [principles and practices of the FLN] through sharing of lessons learned and practices and tools, will be incorporated in the land management plans” of the agencies on each landscape (Jeff Hardesty, personal communication, 11-2-06).

Planning for Restoration

Engaging in planning and producing plans are core exercises of the FLN. Within the FLN, the great majority of participants either develop ecological restoration plans (through the four-step planning process or CAP) or they develop ecological modeling and restoration prioritization tools that can inform ecological restoration plans. In some ways, these activities are what I would call shadow planning. What I mean by shadow planning is that the development of the plan is not directly associated with planning and management protocols of agencies and organizations authorized to manage the land. The plans capture visions and strategies of a collaborative group, but there is no authority in the plans to guide management nor in the collaborative groups to implement them. Seen in this light, the FLN planning exercises are little more than focusing activities for network participants as they try to generate learning opportunities by responding to complex ecological fire restoration problems on their respective landscapes.

However, the landscape scale ecological restoration principles that animate the plans and products of the FLN have been integrated into the long range and short term planning products of land management agencies. The four-step planning process was specifically designed to inform such plans. As Doug Zollner, one of the original network coordinators recalls, “we designed these [homeworks] so the products would roll into one of their NEPA documents or one of their management plans seamlessly. And so we set this up as, this isn’t anything you don’t already have to do, you’re just going to be doing it with your partners” (personal communication, 6-12-06).

Many of the FLN regions and landscapes specifically identify the importance of influencing Land and Resource Management Plans within forest service units. In the cases where

network landscapes include significant percentages of federal lands, which is true for most landscapes in the FLN, partners work to provide input into federal land management planning processes. As Jeff Hardesty (personal communication, 11-2-06) observed, “anytime we have an opportunity to actively influence land management plans... if not strategy number one, that’s strategy number two.” In the 2006 proposal for the Northwest FLN, network leaders wrote that “network objectives at each landscape are tied directly to forest plan revisions, which are occurring at each of the sites over the next five years. The network is therefore at a critical time to influence ecological goals and objectives in the forest plans.”

FLN planning products have been used to inform long term fire management and resource management plans in numerous cases. In the 2007 FLN survey, 37% of respondents claimed that they introduced FLN products into more generalized fire management plans FLN products informed USFS Forest Plan revisions for 16% of respondents and Community Wildfire Protection Plans for 12% of respondents. FLN planning products were also occasionally (less than 10% of respondents) used as inputs or to influence revisions of Bureau of Land Management Plans, Endangered Species Recovery Plans, Fish and Wildlife Resource Management Plans, National Park Service Management Plans, State Forest or Park management plans, tribal resource management plans, and local government resource management plans. Through introducing FLN planning products into these various types of plans, the tenets and practices of ecological restoration of fire adapted ecosystems have the potential to become integrated into these plans and reflecting in the goals, objectives, and strategies of the plans themselves. Building these principles into plans that do have the power to guide management actions has the potential long term effect of leading to more ecological restoration action on the ground.

Planning for Restoration on the Ozarks. In the case of the South Central FLN, the planning products and network participants were able to exercise considerable influence over plan revisions, integrating ecological restoration components into new Land and Resource Management Plans (LRMP). The Ozark-Saint Francis National Forest Land and Resource Management Plan revisions were finalized in September 2005. The forest covers more than 1.2 million acres and manages public land through six ranger districts (USDA Forest Service, 2005). Two of the districts were participating in the SCFLN at the time of the revisions process, the Bayou Ranger District and the Pleasant Hill Ranger District.

According to FLN participants, the planning process used during the LRMP revisions was modeled on the FLN approach. As Doug Zollner claims, “[the FLN] affected the whole Ozark Forest plan...because they just used information and methodology from the [FLN] workshops for the forest plan. So the whole restoration component of the forest plan at the forest level came right out of the FLN” (Doug Zollner, personal communication, 6-14-06). John Andre further clarifies,

Our project was used as a model of successful woodland restoration when the Land Management Plan was revised. We were out in front of the Land Management Plan revision,...and all the planning team held this up as a demonstration area that we could successfully restore short leaf pine and oak woodlands. The impact of that is, we have dedicated management areas devoted to just developing those [restored ecological] conditions. Our old plan had essentially one management area, and it was timber driven (John Andre, personal communication, 6-14-06).

The plan itself specifies a vision that includes the restoration of ecological systems that were the target ecosystems of the homework products of both the Bayou and the Pleasant Hill teams. As stated in the ten year vision of the plan,

Progress is made toward restoring open, fire-maintained, dry oak and pine woodland ecosystems based on the ecological potential and capability of the land.

Natural processes are mimicked to create landscape patterns that resemble historic reference conditions (USDA Forest Service, 2005, p. 1.16).

The plan itself mirrors the FLN planning process, identifying ecological systems and existing conditions, defining desired future conditions, specifying target or indicator species, strategies to achieve desired conditions, and a monitoring plan to track results (USDA Forest Service, 2005).

In the previous version of the plan written in 1987, all management areas were designated timber management areas. Essentially, the analysis focused on how to identify the appropriate mix of species and ages of trees to maximize the output of wood fiber or “board feet”. In contrast, the plan revisions borrow heavily from the landscape scale ecological restoration approach modeled by the Bayou Ecosystem Restoration Project through the FLN. In the 2005 revisions, two management areas were specifically devoted to ecological restoration, a pine woodland management area and oak woodland management area. The language of the plan is drawn directly from the planning products developed on the Bayou and Pleasant Hill districts. As stated in the plan, under each of these areas, “The primary emphasis in this management area is to restore and maintain a landscape mosaic of open pine/oak woodland that approximates historical conditions” (USDA Forest Service, 2005). Timber management is not excluded from these areas, but all timber activities are to be in alignment with the overarching ecological restoration objective.

Under objectives for ecological restoration, the plan specifies an objective of restoring and maintaining at least 22,000 acres of oak woodland and 20,000 acres of pine woodland by 2015 with a longer term objective of restoring 110,000 acres of oak woodland and 100,000 acres of pine woodland. As Andre points out, “we’ve gone way beyond the 60,000 acres we started with” (personal communication, 6-12-06). The importance of fire was emphasized in the plan’s descriptions of each of these systems charting a course for restoration using prescribed fire

among other techniques. The plan establishes a prescribed burn objective that was informed by the work of the Bayou and Pleasant Hill teams in the FLN, stating that annual burning should cover an average of 120,000 acres across all community types in the forest and that one-third should be burned during the growing season (USDA Forest Service, 2005). The extent of the burning area and the importance of growing season burning were both described in the FLN products produced by the Bayou and Pleasant Hill teams and vetted in SCFLN workshops.

The role of the FLN participants and planning products was central in the emphasis of ecological restoration in the plan revisions. As Andre contends, “A lot of credit goes to the partnerships that were developed through the Fire Learning Network and the entire process of how to come up with that scientifically sound and defensible proposal” (John Andre, personal communication, 6-12-06). The plans that Andre had developed with partners in the FLN informed the forest plan revisions directly and provided the justification and scientific foundation for establishing the two landscape scale restoration management areas in the plan. Meanwhile, FLN partners, in particular TNC affiliated staff including McRee Anderson, Doug Zollner, and Scott Simon, the Director of the Arkansas Chapter of TNC, participated extensively, providing input into the planning process, writing letters of support, and generating data and scientific evidence to support the restoration argument whenever Andre and his staff requested it (John Andre, personal communication, 6-12-06; McRee Anderson, personal communication, 8-11-06; Doug Zollner, personal communication, 6-14-06).

Since the plan revisions, the prescribed burning and restoration program has grown considerably. By 2006, on the Bayou Ranger District alone, the USFS was burning more than 20,000 acres a year using prescribed fire techniques. Of the 60,000 acres of oak woodlands enrolled in the FLN under the Bayou project, all were either restored or nearly restored by 2009

(John Andre, personal communication, 3-13-09). Meanwhile, other ranger districts have joined the South Central FLN. By the end of 2008, every ranger district in the Ozark Saint-Francis National Forest had had a project enrolled in the FLN (McRee Anderson, personal communication, 12-8-08). Each one was developing ecological restoration planning products that would become inputs into their implementation plans for their prescribed fire and ecological restoration programs.

Land Between the Lakes. In other cases, FLN participants and planning products play similar roles. For example, Jim McCoy arrived on the Land between the Lakes National Recreation Area (LBL) in the midst of the Land and Resource Management Plan revisions. As he (personal communication, 3-14-07) remembers his involvement in the plan revision,

I transferred to Land Between The Lakes, and was able to bring FLN information and technology into the process with me at the most appropriate time possible. We were beginning to revise our land and resource management plan... I was able to infuse that document with the tenets of landscape scale prescribed fire ecosystem-based management. And so basically our land and resources management plan as it relates to fire management relates to FLN tenets.

His supervisor, Bill Lisowsky agrees with this assessment. Although the actual ecological restoration project that LBL enrolled in the SCFLN was not initiated until after the LRMP was complete, Lisowsky recalls that McCoy played a fundamentally important role in the plan revisions, bringing “a new source of energy” and a level of fire expertise to the process infusing the plan with “ecological restoration and fire restoration principles” (Bill Lisowsky, personal communication, 11-28-07).

Ely Ranger District. In the Intermountain West (IMW) FLN, some of the modeling products being developed in the network have shaped fire management plans in the region. In particular, Pat Irwin, the former District Ranger of the Ely Ranger District in the Humboldt-Toiyabe National Forest, the largest national forest in the lower 48 states, visited a regional FLN

meeting in 2006. In the process, she became excited about the modeling products that the IMW FLN teams were developing and asked both to join the FLN and to host a workshop on her district. She wanted to apply the modeling products to her landscape and develop restoration plans for multiple areas on the forest. As Irwin stated at the time, “We wanted a better process to decide where to spend our limited treatment dollars” (cited in Fulks, 2007). The regional network leader, Louis Provencher, agreed and brought Greg Low and other TNC professionals to facilitate a “rapid conservation action planning process” (Lynn Decker, personal communication, 12-5-07). At the conclusion of the planning process, the Ely District had developed an environmental assessment and restoration implementation plans for 15 different project sites. These plans were informed by FRCC based LANDFIRE models developed using IMW FLN methodologies. According to FLN participants, other Forest Service personnel in the region witnessed the products and plans developed in the Ely District and approached the Nevada Chapter of TNC to facilitate similar planning efforts for other projects throughout the state (Fulks, 2007).

These cases demonstrate that FLN participants and planning products promote long range planning for ecological restoration at landscape scales. Planning products developed through the FLN four-step process and through FRCC based modeling exercises provide scientific data and justification for restoration action. These products inform not only FLN projects, but planning endeavors in the larger landscapes of which they are a part. Advocates of the FLN approach and ecological restoration tenets facilitate this process. They bring strong science and well honed arguments to the table to enable the integration of ecological fire restoration into planning documents that guide agency implementation efforts. In concert, these efforts spread the practice

of long range planning for ecological restoration at a landscape scale beyond the network boundaries to other nodes in fire management organizations.

Implementing Ecological Fire Restoration

Engaging in implementation at scales that are familiar to land managers but guided by landscape scale planning efforts is equally validated as a practice in the FLN. In this way, the FLN imaginary does not threaten land managers by requiring them to engage in practice that is unfamiliar or inconceivable within their organizational constraints. However, their actions on the ground are guided by a landscape scale vision, ensuring that ecological restoration objectives underlie their implementation.

As reported in Chapter 5, 45% of respondents to the 2007 FLN survey claimed that the FLN planning products had informed prescribed burn plans on their landscapes. These plans are used to describe the operational and implementation strategies for a particular prescribed burn event. The fact that FLN products informed these plans suggests that ecological restoration principles were applied on prescribed burn treatments conducted by participating organizations. In this way, FLN products have been used to inform immediate strategic actions on the landscape at managerial scales, ensuring that ecological restoration goals and objectives are integrated into implementation of fire management approaches.

In one example, the TNC and USFS coordinated a joint prescribed burn in 2008 on a 1200 acre unit in the Allegheny Mountains near Hot Springs, Virginia. The prescribed burn plan, primarily written by Sam Lindblom, the lead for the Allegheny Highlands FLN landscape, described aspects of the burn that had been informed through FLN related work including the vegetation conditions, likely behavior of the prescribed fire, and the justification of the burn. In

the text justifying the burn, there was no mention of hazardous fuels reduction or community protection. Instead, the plan outlined the importance of the burn for ecological restoration purposes:

This preserve contains some of the best remaining pine-oak-heath habitat in Virginia. This system is well understood to require frequent surface and mixed fire to reduce competition from invading mesophytic species such as red maple; and to create conditions favorable (sunlight penetration to forest floor, exposure of bare soil) for regeneration of pines of concern.

This justification for the burn articulates the importance of the natural community for preserving biodiversity and the essential role of fire in maintaining that system. It is informed by an ecological restoration perspective and the plan was implemented using restoration techniques. At their July 2008 workshop, participants from the Central Appalachians FLN toured the burn unit and examined the results from an ecological perspective.

The extent of ecological restoration implementation through FLN landscapes has increased each year since the inception of the network. By 2008, FLN landscapes were engaging in ecological restoration treatments on more than 500,000 acres a year (see Chapter 5). In 2007, participants on 43% of the landscapes attributed their increased implementation to work they had completed in the FLN. McRee Anderson reports that due in part to projects engaged in the FLN engaging in restoration work and new guidance in Land and Resource Management Plans informed by FLN work, the Ozark-St. Francis and the Ouachita National Forests have significantly increased their efforts to restore ecological systems. In 1996, prescribed fire was used as a treatment on 2,000 acres in the Ozark and 7,000 acres in the Ouachita. By 2007, the number of acres treated with prescribed fire had increased to 72,000 on the Ozark and 120,000 on the Ouachita. As described in Chapter 5, the 60,000 acre area enrolled in the Bayou Ecosystem Restoration Project was not only consistently treating 20,000 acres a year but had

achieved or was approaching the desired future condition of a restored oak woodland. While the program on the Ozarks was initiated through the work of the SCFLN and the Bayou project, the techniques and principles of ecological fire restoration have extended well beyond the FLN project boundaries.

On the Land between the Lakes landscape, not only have project managers regularly applied treatments as specified in the planning documents produced in the FLN and vetted through NEPA but they also expanded the total area of the project from an initial 5,000 acres to its current 8,800 acres. This area covers the entire oak grassland community type in the southern portion of LBL. Although prescribed fire treatments will not cover the entire unit in one event, the managers are staging their restoration treatments to encompass the entire landscape over time (Jim McCoy, personal communication, 3-14-07). With oak grassland restoration areas identified in the Land and Resource Management Plan, staff members are also engaged in developing the necessary planning documents for NEPA to initiate implementation on the northern portion LBL using the FLN project as a model.

Thus, implementation for ecological restoration is not only being applied on FLN projects, but expanding to new restoration project areas guided by recently revised Land and Resource Management Plans. The FLN participants and planning products extend their influence into new planning efforts and guide further implementation of ecological restoration treatments. FLN participants themselves are often guiding implementation on the ground as they frequently serve as fire managers within their organizations. Thus, the eyes on the ground maintain their focus on achieving ecological fire restoration goals through their implementation efforts.

Collaboration integrated into practice

Stated bluntly in one of the FLN newsletters, “Effective collaboration resulting in on the ground restoration is the hallmark of the FLN” (Fire Learning Network, July 2005). Operating at a landscape scale necessarily implies collaboration as ecological boundaries rarely coincide with administrative or ownership boundaries. FLN participants have identified the lack of coordination and cooperation among agencies and administrative units as a major hurdle to engaging in landscape scale ecological restoration of fire adapted ecosystems (see Chapter 6). Thus, collaboration is a necessary practice in the FLN.

The network provides a way to respond to the need for collaboration by encouraging and enabling collaborative partnerships. One of the core practices associated with the FLN imaginary is collaborating with other fire management professionals to achieve the common goal of landscape scale restoration. While engaging in collaboration to accomplish landscape scale ecological restoration goals on FLN landscapes and project, FLN participants develop collaborative relationships and build collaborative capacities that extend to other professionals and organizations in the fire management institution.

As reported in Chapter 5, 71% of respondents to the 2007 FLN survey reported improved collaborative relationships and partnerships established through their participation in FLN. The effects of improved collaboration extend beyond the FLN as some partners developed more formalized collaborative agreements through memorandums of understanding (MOUs) that apply to more than just FLN projects. In other cases, FLN participants and planning products are able to augment collaboration within agency programs or projects not otherwise associated with FLN. Increasing collaborative capacities within organizational units has led to greater potential for engaging in landscape scale ecological restoration. By working more effectively across

disciplines and professions, land management agency professionals are able to engage in integrated management, working to achieve multiple complementary goals on the same land rather than isolated management objectives. Moreover, enhancing collaborative relationships with organizations across land management boundaries facilitates engaging in landscape scale management. As Jeff Hardesty (personal communication, 11-2-06) has summarized the importance of collaboration in the FLN,

I think another really important outcome in many of the projects has been increased collaborations, increased understanding, increased acceptance on the part of stakeholders in those project areas. This has freed the hands of the agencies to do, in some cases good work that they had already planned, but in other cases, new work that is an outgrowth of [the FLN] plan.

Formalizing Collaborative Relationships

Formalizing collaborative relationships is one way to extend the FLN imaginary practice of collaboration beyond the FLN. It creates the possibility that collaborating across organizational and management boundaries will enable landscape scale planning and implementation. On the 2007 FLN survey, 43% of FLN participants claimed that they had formalized collaborative partnerships through developing Memorandums of Understanding (MOUs) or other formal agreements. The relationships they had developed in FLN translated into a larger scale agreement to collaborate across organizational and administrative boundaries. These agreements extend beyond FLN projects, making collaboration a *modus operandi* for fire management work broadly writ.

Onslow Bight MOU. To provide an example, one of the strategies that FLN participants on the Onslow Bight landscape identified as a key to overcoming organizational barriers within their region was to develop and sign a multi-organization MOU. They began to work in earnest

on the MOU at their workshop held in November, 2006. According to Margit Bucher (personal communication, 10-3-06), the Onslow Bight FLN lead, the MOU was designed to enable greater sharing of resources among landscape partners so that they could conduct more prescribed burn treatments together across the landscape rather than be confined to their own management units.

Prior to the MOU, many of the Onslow Bight partners worked together on an informal basis. From his short time on the Croatan National Forest, Mike Brod (personal communication, 5-12-09) observed that a lot of the cooperation that took place in the Onslow Bight region was “Under the table, we'll help you, you help us.” Partners built a lot of individual trust with each other, but they did not have the full support of their respective organizations. James Cherry, the fire management officer for the Croatan National Forest observes that he was able to cooperate with staff at both Camp Lejeune and Cherry Point military bases to share resources and conduct prescribed fire operations together. However, there were liability risks that weighed on that work without an MOU. When USFS Region 8 and North Carolina Forest Supervisor’s office staff discovered that Croatan had assisted on some larger scale burns and used the USFS helicopter for aerial ignitions, they put a stop to it (James Cherry, personal communication, 7-11-07).

Other partners were not able to cooperate effectively without the MOU. For example, Tommy Hughes (personal communication, 7-11-07) of the North Carolina Wildlife Resources Commission (WRC) lamented at the Onslow Bight’s third workshop in July 2007 that the WRC could not cooperate with TNC personnel on WRC or TNC land to conduct restoration treatments until they formally signed an MOU. According to Hughes, the problems of liability are significant as “Lawyers stop all good projects.”

The Onslow Bight FLN partners worked on the MOU for more than two years. They focused on establishing a legal foundation for sharing equipment and staff resources on

conservation projects, in particular, on restoring ecological systems through prescribed burning. Throughout the document, the MOU specifies how the signatories should engage in sharing resources and personnel to enable cross boundary prescribed burning, what the MOU terms “collaborative fire events.” However, the partners broadened their effort to establish a new entity through which they could collaboratively plan for and implement restoration strategies across the entire landscape. As the opening of the MOU clarifies,

The Parties agree to collectively initiate and implement a strategy for the restoration, management and conservation of the natural resources as the Onslow Bight Stewardship Alliance (OBSA) in southeastern North Carolina (NC). OBSA is a unique public/private landowner collaboration seeking to address conservation needs and opportunities on over one million acres in southeastern NC.

Later, the MOU specifies that through their collaborative efforts, the signatories will “Work to achieve landscape-level conservation through increased sharing of ecosystem management goals across agency boundaries.”

Lawyers from all of the participating agencies and upper level management had to approve of the document. In the spring of 2009, the MOU was signed by the North Carolina Wildlife Resources Commission, NC Division of Forest Resources, NC Division of Parks and Recreation, The Nature Conservancy, USDA Forest Service, Camp Lejeune Marine Corps Base and Cherry Point Marine Corps Air Station. With the signing of the document, the Onslow Bight Stewardship Alliance was formed (FLN Networker, May 7, 2009), formalizing collaborative partnerships for prescribed burning and other conservation planning and management efforts throughout the region. Although ad-hoc collaborative projects had been undertaken by many of the partners, Mike Brod (personal communication, 5-12-09) observes that with the MOU, “I think one of the biggest things the [Onslow Bight] network did is make the partnership official.” The signing of this MOU creates the possibility that the organizations represented in the Onslow

Bight partnership will not only conduct prescribed burning together, but engage in collaborative planning for the region to identify landscape scale ecological restoration goals and objectives to implement through the newly formed alliance.

MOUs and beyond. Other FLN landscapes have been able to develop formalized partnerships that have either led to the development of MOUs or spawned new collaborative partnerships beyond the FLN landscapes themselves. One of the oft cited models of collaboration among FLN landscape projects is the Tapash Sustainable Forests Collaborative, originally the Tieton Forest Collaborative. The Tieton landscape was enrolled in the Northwest FLN in 2004. Partners identified lack of inter-agency communications as one of the major barriers of working at a landscape scale. Betsy Bloomfield, the leader of the Tieton landscape in the Northwest FLN, observes that “The agencies were incompetent at working with each other and even working within their own agencies” (personal communication, 10-18-07). Developing and increasing communications across and even within organizations was seen as essential to achieving a consistent and coherent approach to fire restoration at a landscape scale in the Tieton Canyon, the central feature of the landscape.

Working in small groups with individual contacts, Bloomfield began to develop personal relationships with land management professionals in key agencies. Slowly, the partners brought more and more participants into the working group to build trust and establish inter-agency communications. The FLN helped create the space to develop collaborative relationships and communication approaches that crossed intra and inter-agency communication barriers.

Representatives from the key land management agencies in the region and TNC decided to develop an MOU to facilitate more formalized cross agency collaboration. The Tieton Forest Collaborative was established in 2006 with an MOU between TNC, the USFS, and Washington

State's Departments of Fish and Wildlife and Natural Resources. The MOU formalized the collaboration across agency boundaries. It set the stage to enable landscape scale ecological fire restoration. As identified in the MOU,

The members of The Tieton Forest Collaborative recognize the underlying ecological unity of the landscape that has been divided into administrative ownership boundaries that currently limit the ability to plan and work at the landscape scale. The Tieton Forest Collaborative members have an interest in working at the landscape scale and across administrative boundaries to achieve their mutual goals.

Among the common goals expressed in the MOU, signatories agreed to work together to “Restore the use of fire as a tool for achieving ecological objectives.” The Yakama Nation signed the MOU in October 2007 and the name of the collaborative was officially changed to the Tapash Sustainable Forest Collaborative to recognize that the landscape scale effort would extend beyond the Tieton Canyon to all of the dry forests of the east Cascade Mountains in Washington (The Nature Conservancy, 2007b).

Through its MOU, the collaborative developed an inter-agency fire management plan and completed its first inter-agency burn in 2007. Guided by their collaborative efforts, Bloomfield observes that the agencies working in the Tieton landscape are moving away from being “regulatory agencies” focusing on restricting land uses as defined by single-agency missions. Instead, they are working toward becoming what she calls “collaborative agencies,” establishing a collaborative culture, working together to build a common vision across the landscape to guide inter-agency cooperation (Betsy Bloomfield, personal communication, 10-18-07).

In another example, collaboration among agencies and TNC in the Laurentian Mixed Forest FLN spawned a broader collaborative partnership. Through their interactions in the FLN, participants developed collaborative working relationships that they sought to extend to cover a greater number of issues and concerns in the Border Lakes region of Minnesota and Ontario,

Canada. Working with other organizations and agencies in the region, FLN partners helped establish The Heart of the Continent Partnership (HOCP) (Fire Learning Network, 2007). The HOCP was formally established in February 2007 as a non-policy oriented group aiming to establish a common vision, mission and set of guiding values to promote the conservation of ecological systems in the 5 million acre border lakes region (Heart of the Continent Partnership, 2007). According to FLN participants, “much of [the partnership’s] work will be based on the science underpinnings generated by the Laurentian Mixed Forest FLN” (Fire Learning Network, 2007, p. 9). The collaboration has expanded beyond fire to address multiple ecological restoration concerns throughout the region. It has also extended the partnership beyond the land management agencies and TNC to include stakeholders from other NGOs and industry (Fire Learning Network, 2007; Heart of the Continent Partnership, 2007).

The formalization of collaboration through the FLN creates the potential to extend the landscape scale ecological restoration of fire adapted ecosystems beyond the projects enrolled in the FLN directly. First, it establishes formal agreements among agencies, NGOs, and other organizations and stakeholders in a region to engage in collaborative ecological restoration planning and action together. This ensures management across geographic and organizational boundaries. Second, prescribed fire and ecological principles that are woven into every FLN product are directly reflected in the agreed upon actions that animate each partnership. Whether through MOUs that formally link agencies in collaboration for ecological fire restoration or the creation of new NGOs to achieve broader conservation goals, the practice of collaboration has been catalyzed in the FLN and extended beyond the network to other agencies and organizations of the fire management institution.

Strengthening Integrated or Collaborative Management

Beyond these more formal arrangements, the FLN fosters collaborative and integrated natural resources management within the participating agencies and organizations. As described in Chapter 2, for decades, land management agencies have operated through specialized departments and professionals working on discrete aspects of natural resources management. In the USFS, this has translated into a “silo” approach for planning and implementation carving up a forest into plots where activities are undertaken to achieve one management goal or target such as wildlife habitat improvement, timber harvest, watershed water quality improvement, or prescribed fire for fuels reduction. The idea of integrated and collaborative management to achieve multiple goals on each forest stand gained traction in the 1990s with the rise of ecosystem management as a guiding paradigm for land management agencies. However, translating the ideas of integrated management into action proved elusive under the hierarchical and segregated organizational structure of the USFS. As John Andre described it, for years, the wildlife biologists and ecologists on the Bayou Ranger District were “chasing timber,” conducting wildlife habitat improvements on plots where harvesting of lumber had already occurred.

The FLN offers fire management professionals the opportunity to enable greater cooperation across organizational units and disciplines to engage in more integrated management. First, it focuses planning efforts on the role of fire. Fire has been described as the great integrator of resource management (Goldstein, et al., Forthcoming 2009), having implications for wildlife, water resources, safety and property protection concerns, and timber harvesting. It serves as a common thread that ties together social-ecological systems that co-evolved with the disturbance caused by the burning woods. As John Andre reflects on how the

FLN changed the culture on his district, he observes “[The FLN] gave us the ability to take a leadership role on the district where restoration of fire adapted ecosystems became a new kind of program unto itself. It gave us that stature to drive and carry other district programs to where we need work done within those restoration areas” (John Andre 6-12-06). Instead of timber management driving all aspects of natural resources management on the forest, ecological restoration of fire adapted ecosystems became a driver on much of the landscape.

Second, and perhaps more importantly, the FLN enhances the collaborative capacities of participants themselves. As they take leadership roles on their own projects, they promote collaborative relationships across disciplines and specializations within the USFS. Moreover, the FLN generates landscape scale depictions of ecological restoration, providing a vision that cuts across land ownership and administrative boundaries, fostering the necessity to engage in collaboration across organizational boundaries. In this way, the FLN provides the foundation for integrated management across disciplines and specializations and landscape scale management across organizational and administrative boundaries.

Collaboration in the FLN Planning Process. The FLN planning process and regional workshops reinforce the practice of collaboration at both regional and landscape levels. While all of the homework exercises refer to the importance of collaboration (see Chapter 5), the third homework specifically focuses on strategies to develop and enhance collaborative partnerships. Many of the regional networks hosted workshops specifically designed to build greater understanding and capacity to engage in collaboration. For example, in the South Central FLN, landscape level teams worked to strengthen existing partnerships and to identify and cultivate new potential partners leading up to their third workshop. The workshop sessions included presentations from each landscape about their struggles and triumphs in developing new

partnerships followed by open discussions and brainstorming sessions on how to overcome barriers and capitalize on successful efforts.

Jim McCoy, the landscape level lead from the Land Between the Lakes (LBL) National Recreation Area, reflects on this process of developing partnerships in the SCFLN. He benefited from his experience in the FLN as it built greater understanding and capacity to develop collaborative working relationships for ecological restoration on his landscape. In the July 2006 *FLN Dispatch*, McCoy noted that “The FLN walked us through the process of building a core group of key collaborators” (Fire Learning Network, July 2006). That process involved developing new partnerships by completing the third homework exercise ahead of the SCFLN workshop. McCoy struggled with the assignment at first. It was difficult to identify new potential partners and develop relationships with them. Through the process, though, McCoy reflected that “I learned a lot in the effort of reaching out to other groups. I think having learned how to reach out has helped me more than actually reaching out if that makes sense” (Jim McCoy, personal communication, 3-14-07). Although he did not successfully solidify new partner relationships, McCoy was able to identify potential partners and make initial contacts to describe the ecological restoration work he was trying to engage in through his FLN project.

At the third SCFLN workshop, McCoy observed the presentations of other regional participants. He also sought the insights and input of SCFLN participants when he gave his own presentation and described some of his struggles in reaching out to new partners. Through the interactive forum of the workshop, McCoy noted that “I learned quite a lot (about successful collaboration) from watching other people's successes.” He feels that through the homework and workshop interactions, he was able to improve his capacity to identify and reach out to potential

partners, a skill that could have ongoing potential benefits for his project (Jim McCoy, personal communication, 3-14-07).

Building on this new capacity, McCoy particularly enhanced collaboration and integration within LBL. By learning more about building cooperative partnerships and relationships at the regional level, McCoy was able to apply similar ideas and techniques to build stronger working relationships among the staff with whom he worked to develop plans for the Land Between the Lakes restoration areas. As he pointed out in the *FLN Dispatch* “This may sound strange, but strengthening our in-house collaboration has probably been the single biggest benefit of our participation in the FLN.”

Like most projects in the USFS, the LBL restoration project employed an Interdisciplinary (ID) Team for which McCoy served as the co-leader. The team included professionals from various disciplines and specializations on the forest, including the forester, hydrologist, wildlife biologist, and fire management officer. According to McCoy and the Supervisor of LBL, Bill Lisowsky, there is greater integration and working across disciplines and specializations on LBL now than before the FLN. Before the FLN, ID team members often operated in isolation and provided reviews for an emerging project but were less involved in collaboratively defining the vision, goals, objectives and strategies as a team. On the FLN project and since then, the ID team members tend to work more cooperatively to develop the planning products together. Both McCoy and Lisowsky trace improved collaboration to McCoy’s facilitation of the FLN project and the collaborative capacities that he has gained and reinforced through participating in the FLN. McCoy (personal communication, 3-14-07) points out that

Now, we have phases of wild life management, fire management, and timber management all working together to get this project implemented on the ground. Rather than the timber shop looking for their target in some other watershed and the wildlife shop looking for their target in some other watershed we’re all hitting

what we're tasked to do on annual basis within this project area... It's meaningful on the ground. The grand total is the bigger bang for the buck than all of us chasing our targets individually. We can be integrated.

The LBL supervisor reiterates the importance of McCoy's role in the group.

What Jim was able to do was to facilitate some of those discussions and include other members of the team in those discussions... Jim did a lot of cross pollinating and did a lot of the information sharing and acted as a facilitator, a conduit for that [learning]... I think that Fire Learning Network has allowed us to formulate projects in a more integrative way and it's helped each part of the [Interdisciplinary] team... work better together (Bill Lisowsky, personal communication, 11-28-07).

McCoy's participation in the FLN facilitated greater collaboration and integration among a staff operating within a system based on specified targets and distributed specialized tasks. That collaborative approach has also enhanced relationships with one of the central partners on the project, TNC, and is starting to generate new partnerships with other potential groups as McCoy continues to reach out (Jim McCoy, personal communication, 3-14-07; Bill Lisowsky, personal communication, 11-28-07).

McCoy's collaborative capacity has been evolving through work in the FLN and has been the result of cross scalar interactions. The homework led him to engage in a more concerted effort to build partnerships at a landscape level. That practice and his struggles with it led to productive dialogue at the regional workshop about how to improve in that collaborative work. His focus on using his collaborative skills more effectively within his work unit has broken down barriers and led to more integrated forest management planning and practice with a focus on ecological restoration. Meanwhile, the FLN Director attended the fourth South Central FLN workshop and heard about how McCoy had improved collaboration within his work unit between workshop 3 and workshop 4. She chose to feature his story in the national FLN newsletter further legitimizing his work, the importance of collaboration in the FLN, and one of

the potential outcomes of improved collaborative capacity among FLN participants. The FLN planning products, participants and even representations generate the potential to extend collaborative practice of the FLN imaginary into fire management organizations, enabling greater integration across specializations and collaboration across organizational boundaries.

Landscape scale models to promote integrated planning. FLN regional networks and landscapes that focus on developing modeling tools and techniques also have the potential to promote collaboration and integrated management. Developing FRCC based mapping systems not only focuses attention on the need for ecological restoration of fire adapted ecosystems, but also establishes a landscape scale of analysis building in the necessity to collaborate across agencies and organizations, disciplines and specializations. The Deschutes landscape in the Northwest FLN stands out as an example of how FLN participants and products can facilitate more integrated planning and management approaches.

The landscape lead for the Deschutes, Amy Waltz, occupies a cost-share position between TNC and the USFS. As a result, she is particularly suited to enable cross-boundary communications between these two organizations. But, as the network leader of the NWFLN, she also plays a role in fostering collaboration among numerous partners throughout the region. In this way, Waltz was able to promote collaboration not only between organizations but within organizations.

Similar to McCoy's work on LBL, part of Waltz's role has been to facilitate greater collaboration among staff working on the Deschutes National Forest. Waltz observes that the Interdisciplinary Teams for forest management projects have not collaborated effectively in the past. The ID teams on the Deschutes consist of a project lead and then two or three other staff members. Traditionally, the team lead would develop the proposal for the project and the other

team members would simply comment on it. Through her cost-share position and the relationships she formed in the FLN, Waltz has facilitated a proposal development process that brings team members together to work collaboratively and integrate multiple perspectives from the various disciplines and specializations represented on the team (Amy Waltz, personal communication, 10-18-07).

Beyond this project by project work, Waltz and other FLN participants engaged in forest wide strategy sessions initiated by the Deschutes National Forest Supervisor, Leslie Weldon, in November 2005. Prior to the strategy sessions, Weldon had been a long time participant and supporter of the FLN, attending three of the National FLN meetings from 2001-2003, and becoming part of the Deschutes landscape team and NWFLN early on. Part of her interest in participating in the FLN was to promote landscape scale and integrated management in the USFS as well as to build collaborative partnerships across resource management organizations and agencies. When asked why she supported her forest level staff participating in FLN, she remarks that

it was to me outstanding that The Nature Conservancy would be that force of convening and facilitating our folks in the Forest Service but also Fish and Wildlife Service and state fish and wildlife and forestry agencies to come together to focus on identifying the issues that we share and that we have a landscape out there that requires some large scale thought (Leslie Weldon, personal communication, 11-20-07).

Not long after the NWFLN was formed, Weldon initiated the strategy sessions on the forest. She designed the strategy sessions to try to expand the thinking and actions of USFS staff to be more in alignment with how the FLN was promoting landscape scale ecological restoration. In her words,

For years and years the USFS has been professing that it is important for us to take an integrated approach across resources with a particular emphasis on forest

vegetation management along with managing for particular outcomes for fire ecology and for habitat and for water. Yet, our approaches that we have typically taken inside the agency have been pretty much been focused on one resource at a time. What I really wanted to do [with the strategic planning effort] was put the problem on our own laps and have us talk about what are the differences that we want to see, how can we measure them and how do we want to hold ourselves accountable or it (Leslie Weldon, personal communication, 11-20-07).

For Weldon, the FLN had served as “an active laboratory for doing that,” helping work through the differences across disciplines and agencies over time “to get everyone speaking the same language and valuing all of the outcomes for what we’re trying to get to rather than just what their piece of it is” (Leslie Weldon, personal communication, 11-20-07).

The desire to engage in cross-boundary management preceded FLN. But the capacity to do so was lacking. Weldon was strategic in promoting the FLN among her staff, ensuring that more than biologists and ecologists participated in the network. In particular, she prompted some of the forest management and fuels and fire management staff to attend FLN workshops and get involved in the development of planning tools and products (Leslie Weldon, personal communication, 11-20-07; Doug Johnson, personal communication, 11-15-07; Cindy Glick, personal communication, 11-13-07). With wide representation among various disciplines at the forest level, Weldon sought to promote a more integrated approach among her staff through the FLN. By her own assessment and that of other participants from the forest, the FLN did help achieve more integrated thinking and collaboration across disciplines across the forest (Amy Waltz, personal communication, 11-1-07; Leslie Weldon, personal communication, 11-26-07; Doug Johnson, personal communication, 11-15-07; Lauri Turner, personal communication, 11-8-07). The FLN helped increase the “willingness to do things in the context of a much larger connected landscape, rather than by a unit-by-unit administrative boundary basis” (Leslie Weldon, personal communication, 11-1-07). The Assistant Forest Silviculturist on the Deschutes

at the time, Cindy Glick, feels that among the staff participating in the FLN, they developed a “common vernacular, helped unify goals and outcomes, put into science what we believe is the right thing to do, and helped us learn a little bit differently at a landscape level... I think the real benefit was it brought the agency together internally collaborative” (Cindy Glick, personal communication, 11-13-07). In essence, what the FLN was able to achieve by involving staff from multiple disciplines in the Deschutes National Forest was to infuse the forest level staff with the tenets of the network imaginary, promoting collaboration and operating at a landscape scale across jurisdictions and organizational boundaries to achieve ecological restoration goals.

The strategic planning effort on the Deschutes facilitated the extension of FLN participants and planning products to others within the forest. For the strategic planning effort, USFS staff, including district level and forest level personnel, divided into six strategy teams.

The teams were to explore how to

- 1) institutionalize the use of new forest planning tools,
- 2) integrate ecological outcomes for landscape treatments,
- 3) employ new approaches for managing resilient landscapes
- 4) increase project planning efficiency,
- 5) expand community support and engagement, and
- 6) identify a profile of forest products.

FLN participants participated on all six strategy teams. FLN products and participants were particularly influential in the teams focused on new planning tools, integrating ecological outcomes, and managing resilient landscapes.

The landscape scale FRCC based maps developed by the Deschutes FLN landscape team were frequently displayed on the walls or during PowerPoint presentations during the strategy

meetings (Amy Waltz, personal communication, 11-1-07). The strategy sessions began to emphasize landscape scale thinking as the maps displayed ecological system functions and relationships across district boundaries. As Weldon recalls, “I think what it did was show the possibilities. It was revealing the possibilities of how things could look and that was something to build upon” (Leslie Weldon, personal communication, 11-20-07). Cindy Glick (personal communication, 11-8-07) remembers that during the strategy sessions, the management staff across most disciplines and districts agreed that the tools being developed in the FLN should be adopted by the forest to facilitate landscape scale management for the purpose of ecological restoration. In her sessions on integrated management and new tools, the forest biologist, Lauri Turner (personal communication, 11-8-07) verbally described the mapping tools and the plans for further development of the tools. She received positive feedback from her colleagues working on the teams who expressed excitement about how far the FLN team had progressed and thought that a landscape scale mapping system that would facilitate the strategic placement of treatments would enable a more integrated management approach.

The strategy sessions served to accelerate the integration of landscape scale ecological restoration thinking across the forest and promote greater collaboration across forest units. In the strategy session promoting resilient landscapes, a new practice was born: “boundary-less management.” The landscape scale FLN maps helped promote this thinking as forest service staff reviewed the maps and then reacted by saying “where we need to go next is obviously working across district boundaries” (Amy Waltz, personal communication, 11-1-07). Collaborative and integrated management will be necessary to engage in boundary-less management, and the FLN participants who have enhanced their own capacities to integrate

resource management across disciplines and boundaries are becoming leaders in that effort to promote this kind of interaction (Amy Waltz, personal communication, 10-18-07).

Challenges to Bottom up-Middle out Change

The cases above demonstrate that the FLN can inspire the integration of practices for collaborative ecological fire restoration into the plans and practices of the organizations associated with the network. FLN participants and planning products introduce the tenets of landscape scale collaborative ecological restoration into their organizations where they work. In some cases, they promote these concepts and ways of managing upward in their units to supervisors and regional level staff members, generating the potential for change from the bottom up. They also promote changes from the middle out, within a particular organizational unit. FLN planning products and modeling tools articulate and encourage a collaborative, landscape scale approach to ecological restoration. FLN participants working within and across the network facilitate the integration of ecological fire restoration practices into various disciplines and management units in their home organization. They also facilitate greater collaboration among previously disconnected units and disciplines. In these ways, the practices of collaboration and ecological restoration extend beyond the network into the agencies and organizations participating in each FLN landscape and region.

However, promoting change from the bottom up and middle out is uneven. FLN participants sometimes struggle within their own units to gain acceptance for the landscape scale ecological restoration principles that animate their practice. The status quo is powerful. Resistance to change is palpable. These challenges and power dynamics continue to stall the work of the network in specific places and specific organizations.

In several cases in the FLN, pre-existing lack of trust between USFS units and appellant groups persists, impacting the viability of FLN produced plans and projects. Although ecological fire restoration might align with the organizational values of some of the groups, they remain skeptical and still threaten to engage in litigation against any project proposed by USFS staff (McRee Anderson, personal communication, 8-11-06; John Andre, personal communication, 6-14-06; John Omer, personal communication, 7-10-08; Nancy Roos, personal communication, 7-9-08; among others).

In other cases, internal conflict within the agencies has stalled progress toward promoting the tenets of ecological fire restoration. For example, the story of Jason Ingle stands out. Ingle worked as a wildlife biologist trainee on the Pleasant Hill Ranger District in Arkansas, one of the sites participating in the South Central regional network. When he moved to the Hoosier National Forest, Ingle attempted to promote the ideas of ecological restoration of fire adapted ecosystems, but to no avail. The forest management or timber extraction unit in the forest did not widely accept the data and justifications that Ingle provided. Others within the forest were unable to break from their discipline specific management paradigms and think in integrated ways across the forest. For these reasons, Ingle was unable to gain traction for a restoration project he tried to promote, despite the fact that the forest supervisor supported his work (Jason Ingle, personal communication, 6-14-06; Doug Zollner, personal communication 6-14-06).

In another example, John Omer, a forest ecologist on the London Ranger District in the Daniel Boone National Forest, has sought to promote the ideas and practices of ecological restoration of fire adapted ecosystems across his district and up to the forest level. Using data and products derived from FLN, he has built widespread support for the work he is championing on certain districts of the forest and among forest level staff as well (Allison Coons, personal

communication, 7-9-08; Nancy Roos, personal communication, 7-9-08). However, he has not been able to completely overturn the existing perspectives of fire as an enemy. Prominently displayed signs with messages such as “Fire Destroys Wildlife” and “Fire Destroys Watersheds” are scattered throughout the London Ranger District. The signs were taken down in 2007, refurbished, and put back up. Omer spoke with the district ranger about the signs, arguing that not only are the messages contradictory to their ecological restoration efforts, but also contrary to the scientific evidence that suggests that fire can enhance wildlife habitat and even improve watershed water quality over time through increased forest health. According to Omer, the District Ranger agreed in principle, but was under some level of pressure to keep the signs up (John Omer, personal communication, 7-10-08).

These examples point to the challenge of deeply embedded cultural norms and practices. While promoting collaborative ecological restoration practices, FLN participants face the challenges of overcoming existing fire and forest management practices. In some cases, they are successful in doing so. In others, they are unable to fully unseat lingering perspectives that are contrary to ecological fire restoration principles.

Fostering Change from the Top Down

Despite the fact that in some cases inspiring change from the bottom up or middle out occasionally stalls, the FLN has successfully promoted the adoption of landscape scale ecological restoration management practices in specific locations scattered across the nation. Beyond this bottom up-middle out approach, the FLN has also provided information that has led to policy changes that have the potential to extend the adoption of collaborative ecological fire restoration practices across fire management organizations more comprehensively.

At a conceptual level, policy change has always been an underlying goal of the FLN. As the FLN Director puts it, “We always had this intention and objective to inform policy and decision makers in the legislature... those words were in [strategic plans] from the very beginning” (Lynn Decker, personal communication, 3-18-09). Early efforts built on the bottom up and middle out approach. “We tried it by doing stuff like inviting [decision makers] to the FLN meetings” but few attended (Lynn Decker, personal communication, 3-18-09). Over time, the strategy shifted to connect FLN landscapes, people and products to the government relations staff of TNC’s Global Fire Initiative (GFI) and provide lobbyists with real stories to back up the argument for policy change. As the former Director of the GFI characterizes the process,

First, our policy work is in large part driven by what the landscape practitioners are saying are barriers to them getting done what they need to get done. Second, when you go to the Hill and you talk about policy, I think you’re most effective when you have real places and real people and real situations to talk about. Those are the real stories that gain people’s attention and it’s kind of the passion part of the policy work. (Ayn Shlisky, personal communication, 12-22-06).

This process of informing policy is a two way exchange. Betsy Bloomfield who works as a landscape lead in the FLN and as a policy advocate remarks that “this has become an interactive space where, FLNs can be delivery systems from the ground up to inform policy, and [can be the recipient] of the goods and services flowing from other levels back to the ground” (Betsy Bloomfield, personal communication, 12-8-08). Thus, the FLN collaboratives inform what types of policy changes are needed and provide stories and insights to assist policy advocates as they formulate legislation, rules, and regulations. Meanwhile, changes to policy further enable collaborative landscape scale ecological fire restoration practices on the ground.

The GFI government relations staff uses the *FLN Guidebook*, a comprehensive review of the FLN with an overview of the history of the national FLN and a description of each of the FLN landscapes and regions in two page formats that outline the major partners, plans, and

activities of each node of the network. Laura McCarthy takes specific pages to meetings in DC with Congressional members and staff, Administration staff and land management agency personnel. “Whenever I meet with someone new, I print [the overview pages of the *FLN guidebook*]. It's kind of my brochure. And then, I find out where they're from, and, so if they're from the Southeast, I'll print a selection of FLNs from the Southeast and attach it” (Laura McCarthy, personal communication, 6-11-09). She uses the handouts to build credibility for the work that TNC and the FLN are engaged in, provide context for how the FLN is working in specific places, and introduce policy related barriers that need to be addressed to continue to promote the ecological restoration of fire adapted ecosystems. As McCarthy puts it, she uses the FLN as “leverage” to get a policy discussion going or a “hook” to reel in potential supporters of landscape scale ecological restoration (Laura McCarthy, personal communication, 6-11-09).

Informing rules, regulations, and policies

Over time, the FLN provided indirect influence into a variety of rules, regulations, and policies at the national level. The role of the FLN was not direct in that few FLN participants or products actually made their way into the rule or policy making arenas. However, FLN exemplary stories, network planning protocols, and practitioner insights were utilized by GFI or government relations staff to formulate policy that would be relevant to FLN landscapes and to build support for that policy as it was vetted.

For example, in 2004, the Director of TNC’s Global Fire Initiative and former co-lead of the FLN was approached by the USFS Planning Director during revisions of forest planning rules. These rules govern how forest-wide management plans are developed, their format, planning processes, public involvement approaches, and more. The GFI Director was asked to

provide information about the FLN planning process which the USFS hoped to use as a model for the new planning rule. She attended several meetings with the USFS Planning Director and others in the USFS planning staff to provide input into the process and gave examples from the FLN to describe the planning process and effects on the landscapes (Ayn Shlisky, personal communication, 9-27-06; 3-9-07). In the end, TNC and the GFI pulled out of the process. The GFI and government relations staff felt conflicted using money meant for fire to address the full array of forest planning and management issues and the political complexity of the rule revisions were extensive (Ayn Shlisky, personal communication, 3-9-07; 3-7-08; Laura McCarthy, personal communication, 6-11-09). New forest planning rules were established April 21, 2008. The new rules incorporate a focus on identifying desired future conditions and developing adaptive management strategies to achieve them (Ayn Shlisky, personal communication, 9-27-06; Nancy Roos, personal communication, 7-9-08). The planning process mimics the FLN approach in many respects. While it is not possible to trace these changes in the planning rules directly to the FLN, it is possible that the process used by FLN as described by one of its creators made an impression through those early meetings and had some influence on the process of the revisions.

In another example, using the experiences of land managers in the FLN among others, an inter-agency team, the Wildland Fire Leadership Council, identified the inability to use what was described for a few years as the “appropriate management response” or AMR as a challenge to engaging in landscape scale ecological restoration (Lynn Decker, personal communication, 3-18-07; Laura McCarthy, personal communication, 6-18-09). The 1995 Federal Wildland Fire Management Policy included the phrase “appropriate management response.” The phrase was later utilized to represent an approach to fire management that allowed for resource benefit

during a suppression event. Federal guidance for implementation of the policy establishes the rules through which the policy should be implemented. Over time, the policy guidance employed the phrase AMR to describe the ability of fire managers to make a choice to adjust how a fire is managed in the field in order to maximize potential resource benefits, including ecological restoration benefits, while ensuring safety and property protection. Revisions to the rules in 2003 had limited the use of AMR to specific situations and once a fire had been designated for suppression, it could not be managed for other purposes (see Chapter 2; Laura McCarthy, personal communication, 6-18-09).

McCarthy, who sat on the Interagency AMR Task Group that was chartered by the Wildland Fire Leadership Council, helped develop implementation guidance about how and when AMR could be used opening greater flexibility to fire managers in the field to adjust their operations seamlessly between fire suppression and allowing certain systems to burn. At key points during the process, McCarthy consulted with GFI staff including the FLN Director and other network staff. The task group worked for two years and issued policy guidance in February 2009. The guidance includes a greater focus on collaboration with local fire resources than existed previously guidance, in part due to the TNC representatives on the committee pointing to their successful collaborations within FLN and elsewhere (Laura McCarthy, personal communication, 6-18-09).

Finally, in the American Recovery and Reinvestment Act (ARRA) of 2009, more colloquially known as the Economic Stimulus Bill, Congress designated \$500 million for the USFS for wildland fire management, specifically “hazardous fuels reduction, forest health protection, rehabilitation, and hazard mitigation” (“American Recovery and Reinvestment Act of 2009,” p. 56). TNC government relations staff worked tirelessly on including language in the bill

that would enable significant investments in landscape scale ecological restoration on public lands. In a meeting with potential partners to identify sites for funding, the Chief of the Forest Service, Abigail Kimbell, stated her preference for ecologically informed fuels reduction and repeatedly referred to FLN projects as potential locations for restoration investment (Lynn Decker, personal communication, 3-18-09). In DC when the Forest Service was in the early planning stages for its ARRA funding, Laura McCarthy, the lead government relations staff member for TNC's Global Fire Initiative, was asked if the Conservancy could develop a list of sites including many FLN landscapes that would be suitable places for investment of ARRA funding. However, on March 20, 2009, about a month after signing the ARRA, the Obama Administration issued a memorandum that limited contact with lobbyists in relation to determining where to spend the stimulus money making the list of sites from TNC null and void (Laura McCarthy, personal communication, 6-17-09).

Nonetheless, the case points out that Kimbell and other USFS leadership's knowledge about the potential of ecological fire restoration was shaped in part by her familiarity with the FLN and its associated landscapes, and her preferences in turn reinforce a reorientation of the USFS from an instrumental to an ecological perspective on fuels and fire. Of the projects funded through the USFS under the ARRA as of June 23, 2009, one is a major landscape scale ecosystem restoration initiative designating nearly \$9 million toward a regional longleaf pine restoration initiative across several Southeastern states. Another project invests nearly \$6 million toward prioritizing fuels treatments in Oregon and Washington using TNC expertise in LANDFIRE and other protocols developed through the FLN. Though the list provided by TNC government relations lobbyists had to be discarded in the process, projects associated with or

inclusive of FLN landscape and regional activities were submitted for consideration, and, in some cases, funded.

Forest Landscape Restoration Act

While the above rules, regulations, and policies align with the principles of the FLN imaginary and at least to a certain degree promote landscape scale ecological fire restoration, they can only be partly attributed to the work of FLN. Many of the linkages are indirect and some are relatively tenuous. However, the FLN has directly inspired a significant policy change to promote ecological restoration at a landscape scale: the Forest Landscape Restoration Act (FLRA).

The FLRA was born over the winter holiday in 2006. As the government relations representative for TNC's Global Fire Initiative (GFI), Laura McCarthy was charged with developing responses to policy barriers to ecological fire restoration. Having worked with the FLN for several years, and with a 10 year background in community forestry, McCarthy had become aware that one of the most difficult challenges for the landscapes attempting to engage in landscape scale ecological restoration of fire adapted ecosystems was funding. In short, through FLN, participants developed ecological restoration plans that they could not implement until they had a source of funding devoted to on the ground projects. During her down time over the holiday, McCarthy wrote a one page concept paper outlining an idea that would generate funding for FLN type projects that encouraged collaboration for ecological restoration at landscape scales (Laura McCarthy, personal communication, 6-11-09).

McCarthy passed the paper around to key staff in GFI and then sent it to a staffers working in the offices of the Chairman of the Senate Energy and Natural Resources Committee,

the Ranking Member of the committee, and the Chairman of the Senate Interior Appropriations Sub-Committee. The three Senate aides worked with McCarthy and two other TNC government relations staffers, meeting every other week for six months to develop the language of the act (Laura McCarthy, personal communication, 6-11-09).

According to McCarthy, she and the other TNC staffers used FLN landscapes as models for determining how to write the Act. Specifically, she relied on Margit Bucher in the Onslow Bight and Southern Blue Ridge FLNs, Betsy Bloomfield in the Northwest FLN, Sam Lindblom in the Central Appalachians FLN, and Lynn Jungwirth in the Klamath Siskiyou FLN. These FLN leaders had sites that were on the verge or already engaged in restoration but would be able to reach landscape level restoration treatments with more concentrated funding streams. McCarthy and the TNC staffers used the FLN sites to “ground truth” their policy work. They wanted to make sure that the policy they wrote would address the barrier of creating implementation funding for collaborative landscape scale ecological restoration of fire adapted ecosystems. As McCarthy frames it, “We were going back to the FLN, to this set of landscapes that I felt had enough experience to be able to answer the question ‘If we wrote the bill this way, would it work for you?’” (Laura McCarthy, personal communication, 6-11-09). They used these conversations to develop the language of the act to align with the FLN approach to ecological restoration and the funding mechanisms created in the act to ensure that collaborative ecological restoration at landscape scales would be prioritized.

The language of the act reflects the worldview and the practices associated with the FLN imaginary. As stated in the version of the legislation that eventually became law, “the purpose of this title is to encourage the collaborative, science-based ecosystem restoration of priority forest landscapes” (“Omnibus Public Land Management Act of 2009,” 2009). It enables those projects

that reflect the landscape scale collaborative ecological restoration tenets of the FLN imaginary to overcome one of their central barriers to restoration: funding for implementation.

Specifically, the Act established the Collaborative Forest Landscape Restoration Program to be managed by the Secretary of Agriculture in consultation with the Chief of the Forest Service and Secretary of the Interior. The program would annually select up to 10 landscape scale ecological restoration projects to fund at \$40 million per year over a 10 year period for a total potential investment of \$400 million over 10 years. Eligible projects would, among other criteria, have to have substantially completed ecological restoration plans with strategies that stretched over a ten year period, cover at least 50,000 acres, and consist mostly of lands within the National Forest System (those managed by the USFS) but also could comprise private and other public lands. Potential projects must also demonstrate that their ecosystem restoration strategies would protect old growth and restore pre-suppression fire regimes. And, they must be collaborative, involving multiple stakeholders and diverse interests in the development and implementation of ecosystem restoration plans. Finally, the act requires that the projects utilize a multiparty monitoring system to ensure that progress is being made and adaptive management can be carried out.

Once the language of the act was complete, it was introduced by New Mexico Senator Jeff Bingaman on February 6, 2008. Bingaman's speech invokes the tenets of the FLN imaginary that are reflected in the language of the bill.

As many of my colleagues know, we are facing serious forest health and wildfire challenges throughout our country. A century of over-aggressive fire suppression, logging, and other land uses have significantly deteriorated entire landscapes. These conditions have played an important role in the extraordinary wildfires and insect-caused mortality that we have seen literally on millions of acres of national forest and other lands. To address these problems, it is critical that we begin trying to restore our forests on a landscape scale. Landscape-scale restoration is key for controlling wildfire suppression costs. It is an important component of

successful economic development. It is important for the health of many of our forest ecosystems. Despite the importance of landscape-scale restoration, neither the National Fire Plan nor the Healthy Forest Restoration Act nor any of the other efforts we have made to date have been very successful in facilitating restoration and hazardous fuels reduction on landscape scales. A lack of sufficient funding is one of the primary reasons. Restoring landscapes takes a significant amount of funding over a significant period of time (Bingaman, 2008).

The Energy and Natural Resources Committee held hearings on the bill April 1, 2008. Scott Simon, the Director of TNC Arkansas, spoke in support of the bill and used the example of the Bayou Ecosystem Restoration Project and data about forest conditions generated in the SCFLN to provide justification for the bill. Forest Service Chief Abigail Kimbell also spoke in favor of the bill, specifically highlighting the collaborative landscape scale approach targeted by the act. As she testified to the committee,

We support the intent of the bill to work on a landscape scale, to integrate the best available science, and to implement proposals through a collaborative process. Although the Forest Service has been carrying out restoration work across landscapes under current authorities, S. 2593 would enhance our current efforts by helping prioritize landscape-level restoration work (Kimbell, 2008).

Meanwhile, FLN landscapes and regions sought to build support for the bill in their respective regions. For example, at the third workshop of the Onslow Bight FLN, participants developed talking points to provide to TNC government relations staff to solicit the support of North Carolina representatives (Margit Bucher, personal communication, 7-20-08).

The bill did not pass in 2008. However, it was included in the “Omnibus Public Land Management Act of 2009.” As the Omnibus bill was in preparation, FLN participants continued to play an important role in advocating for the Act. Lynn Jungwirth, the leader of the Klamath Siskiyou FLN, testified before the Senate Energy and Natural Resources Committee on March 3, 2009 in favor of the FLRA portion of the Act. The language of the FLRA remained the same. The Omnibus legislation passed the Senate on March 19, 2009, the House concurred with Senate

amendments on March 25, 2009 and the bill was signed into law by President Barack Obama on March 30, 2009. With passage of the act, Congress has launched a program that has the potential to invest up to \$400 million over 10 years to support collaborative landscape scale ecological restoration projects depending on annual appropriations to the program.

Promoting Change from the Bottom Up, Middle Out, Top Down

The FLN has successfully prompted the integration of collaborative ecological restoration practices into organizations and by professionals who are part of the fire management institution. As reported in this chapter, there has been a flurry of activity associated with the FLN. The action has been disparate and specific, tied to particular locations where FLN networks are engaging practitioners. It has also been more comprehensive as FLN participants, products, success stories, and gestalt impressions have informed rules, regulations, and policies that have opened new avenues for engaging in ecological fire restoration both through regulatory adjustments and funding opportunities.

These changes in plans, policies, relationships, and practices specifically address certain barriers to overcoming the frustrated transition in fire management. In particular, new collaborative practices and formal agreements enable landscape scale and integrated management approaches both within and across organizational boundaries. This softens administrative boundaries enabling greater cooperation across ecological scales. It also generates greater potential for breaking down some of the barriers that inhibit different units and disciplines from working together. Ecological restoration approaches being integrated into land management plans and enacted on the ground shifts management resources and priorities toward the restoration of fire adapted ecosystems further integrating management goals across

disciplines and units. Finally, with new policies, regulations, and funding streams generated at the federal level, new opportunities for engaging in landscape scale ecological fire restoration are emerging. While these changes do not seriously threaten the continued focus on reducing hazardous fuels for property protection and ensuring safety, it creates new options for testing strategies and practices for ecological fire restoration.

The network has led to these changes by inspiring practitioners within organizations to promote ecological fire restoration principles and landscape scale perspectives. Practitioners have been able to develop their own collaborative capacities and, as a result, generate greater opportunities for collaboration within and across agency and organizational boundaries. The planning products and technological tools of the FLN have likewise facilitated an increased focus on collaboration to engage in landscape scale ecological restoration. By enabling fire management professionals within agencies and organizations to promote this work and utilize FLN products to justify and provide scientific foundations for the work, the FLN has extended the reach of landscape scale ecological fire restoration practices.

Along with this direct engagement with professionals, the FLN has inspired changes to regulations, rules, and policies that guide management practices across the federal land management agencies. In general, FLN landscapes and regions have served as inspiration for new policy as they have identified policy related barriers to engaging in landscape scale ecological restoration. Moreover, the FLN has served as a touchstone to ensure that new policies would be developed in ways that would effectively address those barriers.

In these ways, the FLN inspires change simultaneously from the bottom up, middle out, and top down. By enlisting practitioners on the ground level and aligning their practices with the FLN imaginary, the FLN extends the practice of landscape scale ecological fire restoration

beyond the network itself from the bottom up. Rather than limiting their activities to FLN specific sites, these practitioners influence other organizational level plans, practices and personnel who begin to reflect the assumptions, expectations, and practices of the imaginary. Often, these practitioners work with colleagues at the same organizational level as well as promoting the tenets of the FLN imaginary up the hierarchy. Meanwhile, by informing federal policies and rule making, the FLN generates top down support for landscape scale ecological fire restoration, building new expectations and opportunities to engage in the practices associated with ecological restoration in fire management.

Conclusion

In this chapter, I have examined multiple ways in which the practices of landscape scale ecological fire restoration have been extended beyond the FLN to other organizations and regulatory systems of the fire management institution. In particular, I have focused on the sources and nature of the change underway and the scale at which landscape scale ecological fire restoration practices extend beyond the network.

The way that FLN inspires change is specific to each instance where landscape scale ecological fire restoration tenets and practices are incorporated in organizational plans, policies, and practices. However, FLN participants, planning products, and representations all frequently play important roles to varying degrees. FLN participants become advocates for landscape scale ecological fire restoration, not only in principle, but in practice. They engage in data collection, analysis, and strategy development techniques that reinforce an ecological perspective and a focus on restoring ecological health on a landscape scale. They utilize their collaborative capacities to build partnerships and work across disciplinary and organizational boundaries. In so

doing, they embody the practices of landscape scale ecological fire restoration and enact them within their own organizational units.

Meanwhile, they bring FLN planning products and representations into play within their organizational units as well. These material objects are a component of individual and collective agency as they become tools for FLN participants to reinforce the tenets and practices of landscape scale ecological fire restoration. Thus, “agency” is not only tied to embodied practices, but also to material objects that are produced and disseminated within an institutional context. I do not mean to suggest that these material objects have agency in and of themselves. Indeed, there are no cases in my research on the FLN in which these material objects circulated without FLN participants at some level accompanying and interpreting them to an intended audience. However, the role of these material objects is essential as they reinforce landscape scale ecological fire restoration through specificity, example, and contextually relevant data. Indeed, in some cases, information and data in FLN planning products have been transferred directly into other organizational planning documents.

The nature of the change evidenced within this chapter is also varied. The nature of the change exhibited here primarily is about the adoption and enactment of new kinds of fire management practices. Developing and enacting ecological restoration plans on fire adapted ecosystems and collaborating across and within organizational boundaries to achieve landscape scale restoration have been enacted in numerous organizational units. As FLN participants increasingly engage other fire management professionals in these practices, the spread of a new kind of fire management practice is enacted within and across organizations of the fire management institution.

The nature of the change being inspired by the FLN also includes the incorporation of landscape scale ecological fire restoration tenets into rules, regulations, and policy that guide fire management practice. Thus, guiding plans and policies now incorporate language that supports, even requires, ecological restoration of fire adapted ecosystems in particular places and particular ways. While these policy or regulatory changes do not ensure the widespread adoption of landscape scale ecological fire restoration, they do have the potential to reduce some of the barriers that continue to inhibit the transition from suppression to ecological restoration in fire management.

Finally, the scale of change that I have described here reaches all levels of the organization that is the bellwether of fire management policy and practice, the USDA Forest Service. New practices are being enacted at district and forest levels. District and forest plans incorporate ecological restoration goals, objectives, and strategies for fire adapted ecosystems. Officials at the highest level in the USFS have expressed support not only for the FLN but also for the principles and practices that are associated with landscape scale ecological fire restoration. New federal policies have been passed creating programs for funding and supporting landscape scale restoration planning and management efforts on the ground. Adoption of these principles and practices is uneven across the USFS and other fire management organizations. In some respects, these changes are tentative and experimental. For example, the FLRA represents a significant investment in landscape scale ecological fire restoration efforts, but the potential for \$40 million a year devoted to the program pales in comparison to the nearly \$1 billion a year devoted to fire suppression. Still, these principles and practices are getting tested in the fire management institution, creating the possibility that through their vetting they can gain legitimacy and be adopted more widely over time. In the final chapter of the dissertation, I

characterize the potential for the broader integration of landscape scale ecological fire restoration tenets and practices into the fire management institution and revisit how the FLN has the potential to continue to catalyze such change.

Chapter 8

Conclusion

Multi-scalar Collaborative Networks, Collaborative Planning, and Institutional Change

This is not going to be revolutionary. It will evolve over time. And we will have to have the patience and the determination and persistence to stay with it.

~Jim Hubbard, Director of State and Private Forestry, USFS

To bring about sustained, effective treatments, we need to change the will of society, agencies and politicians. We're not on the road to success until we actually start changing people's thinking and activities.

~Merrill Kaufmann, USFS Research, FLN Dispatch, May 2006

A Forest Service ecologist working in the Southwest gets a call that smoke is in the air on her district. With no lightening strikes in the area, she knows the ignition was caused by humans. She quickly calls her Integrated Resource Management team members together and they set out to assess the situation with a variety of tools in their trucks that would help ignite or extinguish fires. When they arrive, state forestry agency staff is already on the scene as are some local fire department volunteers. The ecologist asks them for their assessment. The state officials describe the blaze as covering nearly 50 acres and burning low through ground based fuels for the most part with occasional flare ups into the mid-story. When asked what they had done to that point, the state officials responded that they had determined that the blaze was burning through the forest in a way that helped the district meet its ecological desired future conditions as mapped on the landscape so they thought it would be best to let it burn as long as it didn't get out of control or threaten human lives or property. The ecologist pulls out her map of desired future conditions for the area and confirms that the blaze is burning at an intensity and during a season that would facilitate achieving the ecological restoration goal. The team outlines some of the containment

efforts they may have to implement to make sure the fire does not spread to nearby structures on private property, but otherwise they wait and see.

Over the course of the day the blaze covers several hundred acres. At one point, wind directions shift and the blaze moves toward a human settlement. The teams jump into action and build a defensible space around the structures in the path of the fire. However, they let the blaze burn through other areas. Rather than categorize the blaze as an all out suppression endeavor, they engage in ‘spot suppression’. Looking over her DFC maps of the district, the ecologist notes that if the blaze were to progress into the next watershed, it might threaten a rare ecosystem that the district was trying to restore after having been destroyed by a conflagration that roared through a decade earlier. At this stage of the restoration process, the system is delicate and fire intolerant. The team sets up a perimeter to hold the blaze back from that system, making sure to avoid trampling the stream banks which constitute the natural boundary for the blaze. As the flames approach, they burn low to the ground. The team is easily able to hold back the fire and keep it from damaging the system they hope to restore. Over the course of the next few days, the blaze slowly burns. Despite dry weather, the ecologist’s team had previously conducted multiple ecological restoration treatments in the area so that the fire was ignited in an area surrounded by systems that had recently been thinned and burned. As its fuel sources ran low, the fire sputtered out.

Introduction

This fictional anecdote provides a snapshot of what transformative change might look like in the response to one fire event on the ground. Transformative change involves a whole new way of thinking and doing things, institutional structures to support these new ways, and

individuals who internalize the new ways so that they act in accordance without having to think about it. In the anecdote, the ecologist, state fire staff, and local volunteers are of like mind. They come to a fire event ready to pause and assess, think about multiple goals, incorporate ecological values into their assessments alongside property protection. They are empowered to make on the ground decisions to maximize the achievement of multiple goals. As they seek to achieve desired future conditions, they can reap the benefits of allowing fire to take its course to a certain extent, even if it was caused by carelessness or arson. They use techniques and strategies that protect ecological systems and functions. Rather than ripping a fire line with a bulldozer to establish a perimeter around a fire and extinguishing it with all resources available, they gently nudge it where they want it to go. Federal and state policies provide the degrees of freedom necessary for practitioners to make these judgments in the field within a certain decision making framework. Forest plans and protocols further reinforce the need to balance multiple goals while ensuring that ecological goals are given high priority.

In this scenario, the fire, weather and land respond in relatively predictable and convenient ways. This is not always the case. But evidence suggests that if fire adapted ecosystems are restored and maintained on a broad scale then this scenario would be more and more plausible over time.

To contrast this scenario with the practices of fire managers in the 20th century, a human caused ignition would most likely be designated for suppression before any team arrived on the scene. If state or local fire professionals arrived first, suppression tactics would most likely have been initiated before the federal officials showed up. Fuels would be less likely to have been adequately thinned increasing the potential for flames reaching the crowns of trees and becoming a conflagration. The maps that they used to make their decisions would certainly have

highlighted human structures to be protected but would be less likely to have included descriptions of DFCs for the ecological systems in the area of the burn.

I provided this scenario at the start of this conclusion chapter to provide a contrast between fire management practice under existing policies, protocols, assumptions and expectations versus what fire management practice might become were it to reflect the assumptions and expectations of landscape scale ecological fire restoration. In this unsettled period of the fire management institution, the question becomes whether, to what extent, and how these new practices can be incorporated into and supported by the institutional structure and organizational systems that determine how fire is managed on public land.

Despite the increasing recognition in the fire management world that landscape scale ecological fire restoration is an appropriate direction for fire management in the future, the transition to the practices of landscape scale ecological fire restoration continues to be frustrated. Several aspects of organizational systems and individual practice inhibit progress toward a new approach to fire management. As described in Chapter 2, three principal concerns relate to how management often is confined within administrative boundaries on the landscape, the funding streams and policy guidance that privileges suppression, and the accountability mechanisms that provide disincentives for integrated and collaborative management.

In this conclusion, I describe how the FLN generates the potential to overcome some of these barriers. In so doing, it creates the possibility that more substantive change in the fire management institution can emerge over time. Although it is too early to claim that institutional change has emerged from the FLN, it has been instrumental in softening some of the barriers to landscape scale ecological fire restoration in specific locations and at various scales. In the aggregate, various aspects of how the network is designed, how it operates, and what outcomes it

generates specifically create the possibility that the barriers that frustrate the transition in fire management persist can be overcome. In particular, I focus on how the network was able to 1) utilize collaborative processes at each scale of the network and ensure cross scalar linkages that helped refine practices to overcome barriers to landscape scale ecological fire restoration, 2) generate coherence across the network without undermining creativity in each collaborative node, and 3) extend landscape scale ecological fire restoration practices beyond the network into the policies, plans, and practices of organizations that are central actors in the fire management institution. I revisit these aspects of the FLN and describe how the network plays a role in fostering broader social change within the fire management institution. Finally, I reflect on the implications of this study on planning theory and practice focusing on what new forms of planning education and practice may be required as planners are called on to participate in or manage multi-scalar collaborative planning forums.

Refining and Distributing Practices through Cross-Scalar Circulation

The FLN was able to facilitate the development of new fire management practices that enabled landscape scale ecological restoration of fire adapted ecosystems in particular places. The FLN was initiated to enable learning among fire management practitioners. The framework was built on a “learning by doing” approach. FLN has landscapes produce certain products to be used in planning for landscape scale ecological fire restoration and, in so doing, facilitates a process through which fire management practitioners learn how to engage in associated practices as they develop those products. In particular, the FLN focuses practitioners on two key aspects of landscape scale ecological fire restoration planning and management: the technical capacities to develop and implement plans that are applicable to the social-ecological contexts where they

work and collaborative capacities to more effectively engage in and guide collaborative planning processes.

In the FLN, ecological restoration planning expertise is both generated within and reproduced through the collaborative process operating across scales. Regional meetings have the feel of a technical group in that the participants tend to be resource management professionals, scientifically trained and technically adept. The approach at the regional level, however, is designed to generate shared learning and open ended possibilities rather than decide on a specific set of agreed upon scientific models or technical explanations. Expertise and knowledge are emergent within these forums, tentative claims and myriad possibilities to be applied in landscape contexts. Following regional meetings, experts return to landscape collaboratives, introduce new ideas, report on emergent suggestions for resolving challenges or trying out new kinds of practices, and participate with a broader array of stakeholders in the refinement of planning and modeling products being developed. Landscape collaboratives become testing grounds for emerging expertise being developed at the regional level. Knowledge is not imported to the landscapes as much as it is further shaped and refined through stakeholder interactions. Restoration strategies get tested in the field in specific ecological contexts and landscape collaboratives create an opportunity to both understand and interface with the complex social, institutional, and political contexts that shape fire management in a particular landscape. Management professionals from the landscapes then gather anew in regional forums to share new insights, describe results from experience testing ideas on the ground, and pose new conundrums.

Collaborative capacities are similarly generated through cross-scalar interactions. Echoing Margerum's (2002) observation that coordinators should be integral to the collaborative,

none of the FLN landscapes or regions depends upon professional facilitators to guide the collaborative process. However, these coordinators are not left to fend for themselves. Indeed, the “learning” focus that links regions and landscapes to each other for generating new technical expertise likewise generates new collaborative expertise. The professional practice that regional CoPs help shape is not only ecological restoration planning practice, but also a collaborative practice. Numerous regional workshops incorporate specific sessions devoted to sharing stories and techniques about engaging in collaborative planning processes to advance ecological restoration planning. The leaders of the landscapes and regions do not become the experts in collaborative practice who then guide the processes on their own. Instead, that capacity becomes distributed among participants throughout the network. By engaging in the practice of collaboration and reflecting on that practice in regional forums, the capacity to collaborate more effectively emerges from the interactions that occur at multiple scales.

A Model of Multi-scalar Collaborative Planning Networks

The effects of improved competency in certain practices become magnified in a multi-scalar collaborative planning context. The practices generated in the FLN not only are applied in specific locations, but are tested, refined, and distributed throughout the network. In the FLN, the regional forums where new ideas and knowledge are developed and shared are linked to landscape collaboratives where partners write restoration plans and test strategies on the ground. This means that the learning, innovation, and new capacities that emerge through the regional forums shape what takes place at the landscape level as well. What the association across scales allows is a process of shaping and distributing new knowledge, information, and expertise across a broader array of participants than a localized place based forum.

In the case of the FLN, the multi-scalar structure created interaction across different collaborative practice models and both generated and circulated the assumptions, expectations, and practices of the network imaginary across the entire network at every scale of the system. In Figure 8-1, I have depicted the network system as a series of interconnected spheres of activity. Each level of the network performs certain tasks appropriate to the scale and purpose of network action at that level. I have characterized the activities of the landscape level as developing plans, collaborating with stakeholders, and field testing new ideas. At the landscape level, diverse stakeholders representing various organizations and professions involved in fire management come together to develop ecological restoration plans and modeling or mapping tools to feed ecological restoration plans. They experiment with new ideas generated within their collaborative group or through interactions at regional and national levels.

At the regional level, participants bring planning products from landscapes to regional forums where they compare the plans and try to learn the processes each landscape team has gone through to complete planning products. Regional participants review each other's work and exchange ideas about how to improve plans or technologies or overcome barriers to restoration action. In some cases, regional participants develop new techniques to integrate into plans or try in the field. They also reflect on how to improve their collaborative practice, develop new partnerships, expand stakeholder involvement, and build consensus about ecological restoration approaches on their respective landscapes. Regional participants return to the landscape level, work with their collaborative on refining their planning products, develop the next stage of their plans, and field test new ideas and techniques generated or shared in regional forums.

Meanwhile, the national FLN interfaces at both regional and landscape levels, gathering lessons learned in these forums and disseminating success stories through presentations,

newsletters, and other representations. The national level also seeks to coordinate communication across regions and landscapes that may not otherwise interact on a regular basis.

These activities do not occur in isolation as both participants and material objects circulate throughout the network. While there are some FLN participants, particularly at the landscape level, who may have little to no contact with other levels of the network, most network participants circulate among two or more levels. Landscape level leaders attend regional forums to present landscape level work and obtain feedback from other regional participants. Regional participants gather in national forums to provide input into the design and activities of the overall network and attend landscape level gatherings to facilitate collaborative planning processes or disseminate innovative practices emerging from other landscapes and regional forums. National leaders present at regional meetings and provide guidance to regional leaders as they shape agendas and guide planning processes. This circulation of people is accompanied by a circulation of planning products, modeling tools, and representations that focus network action and serve as translating mechanisms across different network participants. In this way, landscape scale ecological fire restoration practices are developed, circulate, become legitimized, and become embodied in the practices of the participants and plans, products, and representations of the network (See Figure 8-1).

Regional Communities of Practice

Landscape Multi-stakeholder Collaboratives

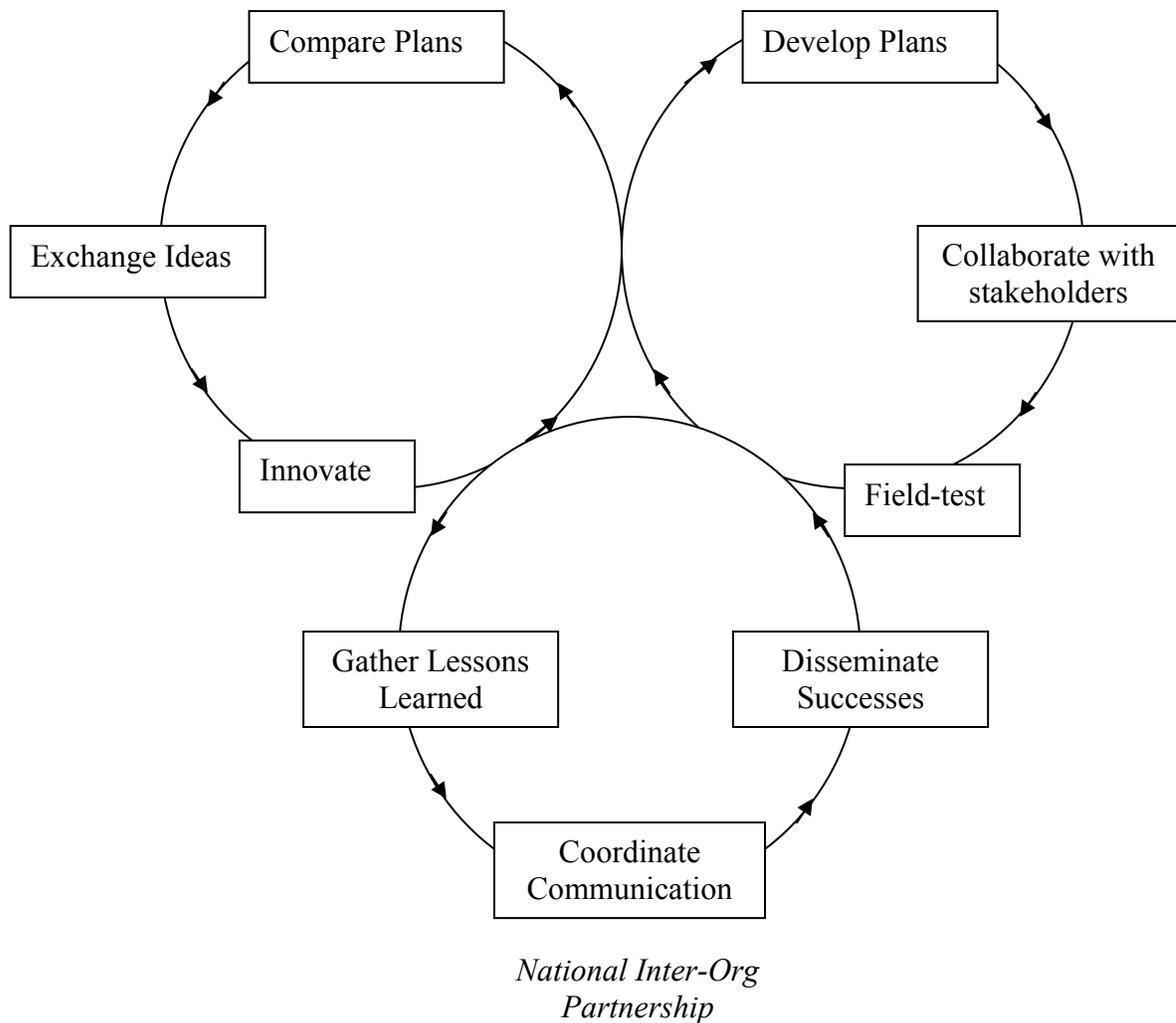


Figure 8-1: Cross-scalar circulation of FLN participants, planning products and representations throughout the system which enables the creation and circulation of landscape scale ecological fire restoration principles and practices

Generating a Network Imaginary: Coherence without Undermining Creativity

As described in Chapter 6, the FLN planning technologies allowed network participants to articulate a common narrative that provided a framework to understand the sources of ecological decline, the need for ecological restoration, the organizational barriers that they faced,

and the mechanisms through which they could engage in collaboration to work across organizational and spatial boundaries to engage in landscape scale planning and management. These principles and practices were reinforced through the various representations produced by the FLN, in particular through presentations, field excursions and publications such as the network newsletter, the *FLN Dispatch*. Through interactive forums, FLN participants further refined and disseminated the assumptions and expectations of the FLN imaginary and developed an array of practices that were aligned with the tenets of landscape scale ecological fire restoration. In short, through the FLN technologies, representations, and interactive forums, FLN participants became connected to each other and a common worldview that enabled them to engage in collaborative, landscape scale ecological restoration of fire adapted ecosystems.

These representations, technologies and participants circulate throughout the multi-scalar structure of the network, disseminating the tenets and defining the practices of landscape scale ecological fire restoration across multiple scales. The imaginary, thus, becomes both embodied and delegated (Latour, 1995) as certain mechanisms of circulation, objects, representations, and technologies have the imaginary embedded within them. Through the practice of developing objects and representations together and representing aspects of that practice in interactive forums, FLN participants shape the imaginary through “embodied habitus” and give it texture through the objects and representations themselves (Taylor, 2004). Practices that are associated with that imaginary are at once coherent with it and the result of creative engagement in specific locations with the assumptions and expectations of the imaginary itself.

Within this context, the FLN imaginary circulates throughout the network and is reinforced and enacted at multiple scales simultaneously. Each level of the network engages participants in particular activities related to developing ecological restoration plans for fire

adapted ecosystems. By linking these activities and actions together through the flow of people and products across each scale, the network becomes animated by similar kinds of assumptions, expectations, and practices. While the specific practices of an FLN participant will vary from one practitioner to another as they respond to particular social-ecological contexts within which they operate, they share and learn together within the broader network, testing their ideas, collectively responding to common and particular challenges, and disseminating lessons learned and success stories to further inspire creative approaches to engage in landscape scale ecological fire restoration. The FLN imaginary provides a framework for engagement of fire management professionals in defining new practices that cohere with the assumptions and expectations of ecological fire restoration. While the imaginary creates boundaries, it can be said that these boundaries, rather than being constrictive, are constructive, enabling FLN participants to utilize local knowledge and context specific social-ecological conditions to inform that practice in particular places.

Extending Practices beyond the Network

Not only did the FLN imaginary foster a common set of norms, expectations, and practices among FLN participants, it enabled and motivated participants to speak autonomously with one voice beyond the network. The practices of landscape scale ecological fire restoration refined within the network were transferred outside of that system as practitioners and planning products circulated across organizational and spatial boundaries.

As described in Chapter 7, the FLN participants and planning products directly influenced the integration of landscape scale ecological fire restoration approaches into various land and resource management plans across multiple agencies and levels of government. These

plans and people brought a landscape scale perspective and collaborative approach into the various organizations with which they interfaced. They utilized scientifically defensible justifications for engaging in ecological restoration work and planning products and technological tools to facilitate it. They built collaborative capacities that fostered greater collaboration both within and across agency boundaries. These approaches reinforced the integration of resource management across disciplines and specializations as well as promoted broader landscape scale visions and management efforts across organizational and administrative boundaries.

The circulation of success stories further defined and legitimized the vision and practices of landscape scale ecological fire restoration beyond the network. FLN representations do not express landscape scale ecological fire restoration tenets in abstract terms. Rather, they represent assumptions and expectations of the imaginary with concrete examples, individual perspectives, and stories about landscapes, collaborative groups, and fire. These representations gave FLN leaders the chance to change their approach to promoting collaborative landscape scale ecological fire restoration in the federal agencies. As Jeff Hardesty (personal communication, 11-2-06) puts it,

Before, we would go to the federal agencies and we would say, 'here's our eco-regional plan, here are the places we've identified on your property that we think are important and here's the data to support it. We think you ought to incorporate it into your land management plans.' What the FLN has done has provided specific examples of work happening on the ground that FLN partners can point to and have an influence on federal rule-making and policy.

As FLN leaders developed these representations and provided them to government lobbyists, landscape scale ecological fire restoration is being integrated into new rules, regulations, and policies. Success stories from the field are used to 'educate' public officials about what the FLN is about and how it is having an impact that not only meets the goals of TNC but those of the

agencies as well. Agency affiliated participants likewise become advocates of the FLN and its associated practices. Individuals in high places have become advocates for the network and its work. In this way, the FLN is able to use data from the bottom to generate organizational legitimacy and support from the top, fostering an increased ability to generate changes in rules and policies that govern the management practices of the fire management institution.

Catalyzing Institutional Change?

In the broader context of fire management, what is the potential the FLN can serve as a catalyzing force for institutional change from fire suppression to landscape scale ecological fire restoration? As described in Chapters 2 and 3, the fire management institution has been in an unsettled period (Swidler, 1986) for nearly four decades. This is an era during which different purposes and practices have been tested as the world of fire management is redefined. The tenets and practices of landscape scale ecological fire restoration are capturing the imagination of an ever growing cadre of fire professionals and organizational representatives who are or have been affiliated with the FLN. The FLN provides the context within which these practices can be developed, disseminated, and extended beyond the network to have an impact on the broader fire management institution. Through generating and testing landscape scale ecological fire restoration practices that can extend beyond the network to other nodes within the fire management institution, the FLN has the potential to foster broader institutional change.

Sources, Nature, and Scale of Change

In this context, the FLN offers a model for how multi-scalar collaborative networks have the potential to influence the institutional context within which they are situated. It does so by

operating as an incubator of change within the institution, involving practitioners at all levels of organizations within fire management and inspiring new shared understandings, new practices, and new ways of positioning oneself in the fire management world. As FLN participants become more and more adept at engaging in collaborative, landscape scale ecological fire restoration planning, they become ambassadors of change who can catalyze incremental changes in their own organizational units, in the way things are done, in the perspectives of their colleagues, in the plans and directives that guide future actions. The planning products that they produce provide justification for action and strategies for implementation that can be adopted and tested through agencies and organizations within the fire management institution. As action on the ground produces success stories, national FLN leaders and associated governmental relations staff increase their leverage to influence changes in policies and rules governing forest and fire management planning and implementation on public lands. Thus, the sources of change that emerge from the FLN include not only fire management professionals who promote landscape scale ecological fire restoration within their organizational units, but also the planning products that they produce and the success stories that are derived from network action.

Through the network infrastructure, the FLN creates and circulates landscape scale ecological fire restoration assumptions, expectations, and practices across space, time, and organizational boundaries. This generates the possibility for overcoming the barriers that have led to the frustrated transition in fire management from all-out suppression to ecologically informed planning and management. The FLN imaginary provides the coherent vision and embodied practices that represent what the transition might look like and how to get there. Extending the reach of the network imaginary beyond the network participants themselves provides the opportunity for the integration of the assumptions, expectations, and practices of

landscape scale ecological fire restoration into other aspects of the fire management institution. In so doing, the FLN generates the potential for overcoming the frustrated transition as it specifically responds to the need to work across administrative and management boundaries, collaborate across disciplines and organizational units in integrated ways, and informs new policies at the federal level that have the potential to adjust funding streams and policy directives incrementally to enable more landscape scale ecological fire restoration action on the ground. While the adoption of the FLN imaginary within and beyond the network is not uniform and institutional change has not fully been actualized, the nature of the change inspired by the network includes incremental effects that network participants and products have in specific locations and at the policy level that facilitate the adoption of landscape scale ecological restoration practices.

The spread of these practices reaches multiple organizational scales beyond the network. The network has had a direct influence on the particular practices of individual fire management professionals, organizational plans that reach across significant portions of landscapes, agreements between organizations that link plans and practices across a landscape, and, finally, all the way to federal policy to encourage further landscape scale ecological fire restoration planning and implementation. Thus, the network has had an impact on multiple levels of the fire management institution, in particular influencing the regulatory infrastructure and organizational practices that animate institutional order (see Figure 8-2).

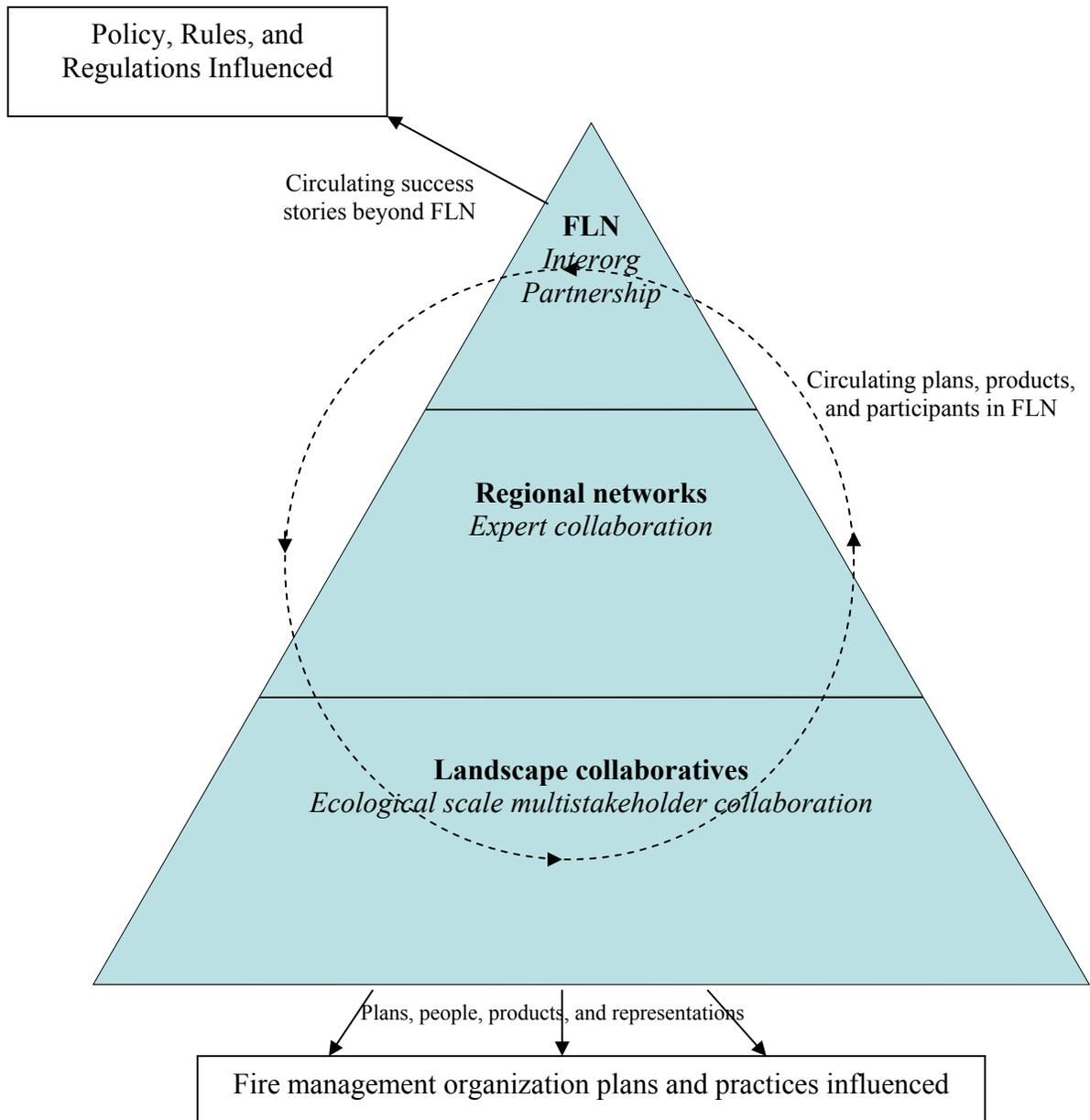
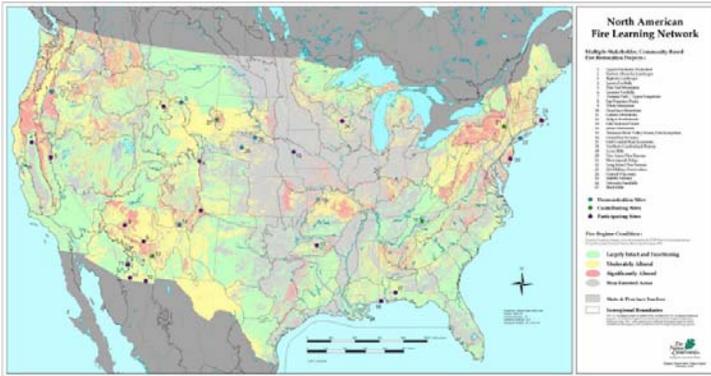


Figure 8-2: A model depicting FLN’s influence on the fire management institution. Plans, products, and people circulate throughout the network, generating the FLN imaginary, defining and refining landscape scale ecological fire restoration practice. Success stories emanate beyond the network and inspire changes to rules, regulations, and policies. Plans, policies, network participants, and representations influence organizational plans and practices to align with ecological restoration and collaboration.

The Spread of the Network to Distribute Change

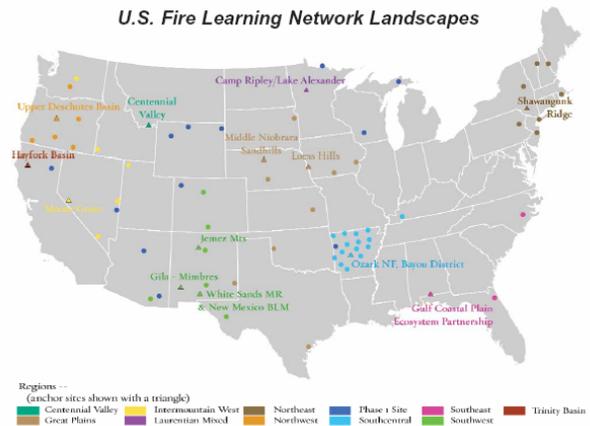
One of the aspects of extending FLN practices beyond the network that becomes important to reflect upon briefly is that, as described in Chapter 5, the FLN has been a dynamic network over its eight year existence. FLN participants are situated within the broader fire management institution through their organizational affiliations or professional practices. As the network grows, it brings new practitioners and new organizations or organizational units into the fold. As this occurs, an ever growing cadre of professionals and organizational nodes are exposed to the assumptions, expectations, and practices of landscape scale ecological fire restoration generated within the FLN. Extending the practices of landscape scale ecological fire restoration, therefore, has had the potential to be undertaken in a greater number of places and through a greater number of practitioners over time. The maps in Figure 8-3 demonstrate that over time, the network has been active in numerous locations and sites which in their aggregate amount to more than 650 representatives of distinct organizations or organizational units across over 100 landscapes participating through 14 regional networks. While the overall network has not grown significantly over the last several years, reaching a plateau of around 70 active landscapes in any given year, it has spread to new locations over time, introducing the tenets and practices of landscape scale ecological fire restoration to an increasing number of fire management professionals.

Figure 8-3: Expanding the Network. All maps courtesy FLN Director, 2009.



FLN in 2002 with 25 landscapes in the national network.

FLN in 2006 with ~70 landscapes in 10 regions and 12 continuing sites from the national network.



FLN in 2009 with 65 landscapes in 10 regions (4 new) in the national network.

The Potential for System-wide Change

These aspects of how and the extent to which the FLN has been able to foster the creation and integration of landscape scale ecological fire restoration practices into the fire management institution do not indicate institutional change. Institutions consist of a complex array of regulatory structures, organizational entities, normative frameworks, and cultural cognitive frameworks, the individual and collective mental maps that shape social order (Scott, 2003). In this dissertation, I have shown that in certain places and certain contexts, the FLN has been able to shape regulatory structures by influencing plans and policies as well as organizational entities by encouraging new kinds of practices and relationships within and across organizations. However, I have not shown that new normative and cultural cognitive frameworks have been adopted across the fire management institution.

For me, Taylor's (Taylor, 2004) concept of a social imaginary provides a mechanism through which to understand what is necessary to achieve a system-wide or institutional shift. The imaginary permeates all aspects of social life operating at multiple levels of social interactions and structures. It provides both the cognitive or mental map that guides individual and collective action and the expectations and assumptions that shape normative and regulative aspects of institutional systems. Imaginaries are dynamic and not monolithic. While a certain imaginary may become dominant, even hegemonic as it permeates societies, competing imaginaries co-exist and vie for prominence.

The FLN imaginary represents a re-ordering of institutional order within fire management to be attuned to an ecologically informed purpose and set of practices. At this phase, it is clear that FLN practitioners, planning products, and representations are promoting

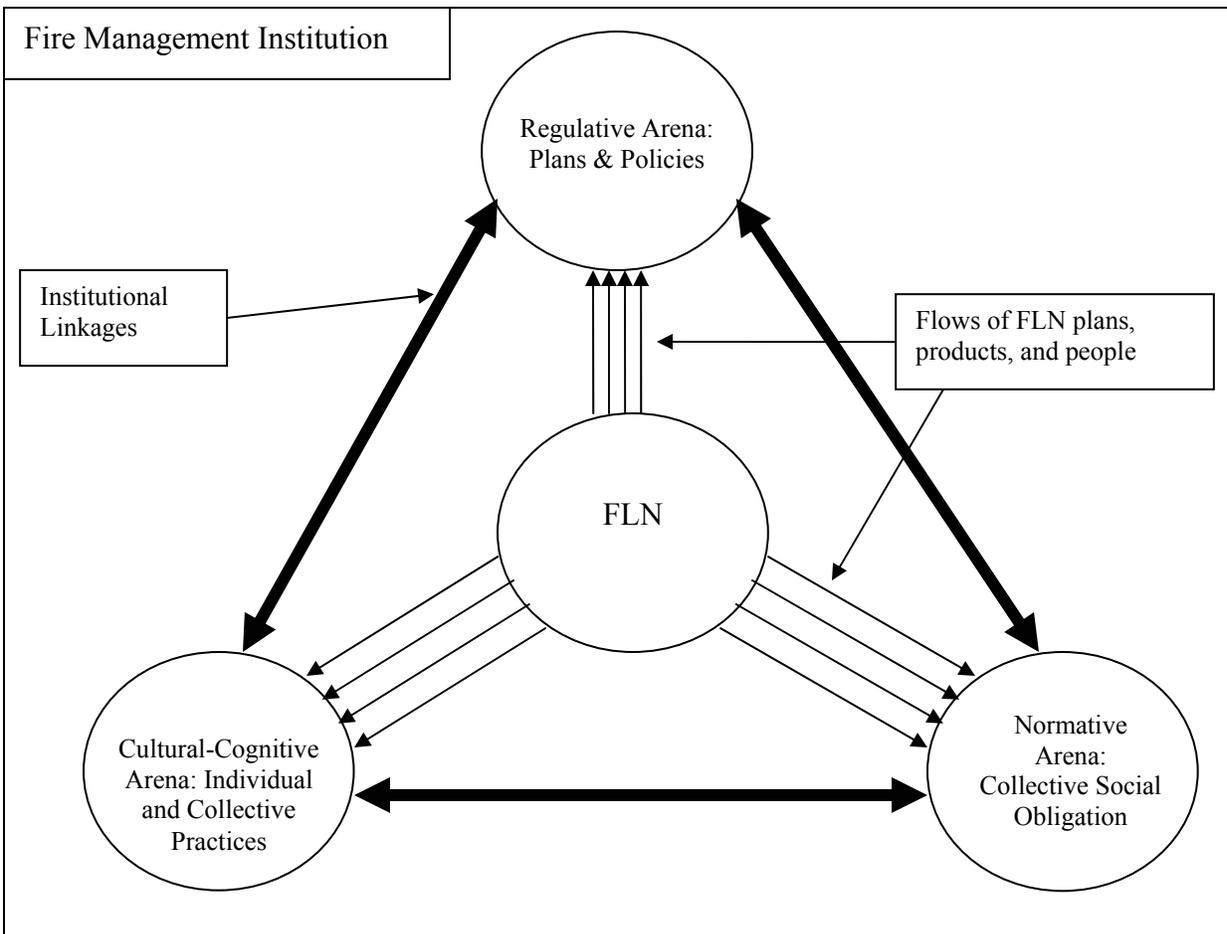
fire management plans, policies, and practices that are coherent with the FLN imaginary assumptions and expectations. This does not mean that the cultural cognitive and normative frameworks that currently animate fire management practice are being unseated across the institution. However, it is highly possible that these frameworks are being influenced by the actions, plans, products, practices, and rhetoric of the FLN (see Figure 8-4).

As FLN participants, products and representations are distributed beyond the network into other arenas of the fire management institution, they have the potential to have an impact on the normative and cultural-cognitive arenas of the institution along with the regulative arenas. Network participants and products inspire building landscape scale ecological restoration expectations into plans and policies and engaging in more integrated and collaborative management within and across organizational boundaries. As they do so, the taken-for-granted aspects of the fire management institution have the potential to shift toward a new shared understanding and social obligation to engage in collaborative landscape scale ecological restoration of fire adapted ecosystems. Organizational plans and policies and the practices of professional fire managers reflect new normative values with binding expectations that animate a common social obligation to engage in landscape scale ecological fire restoration. They also reflect a change in cultural-cognitive arenas where common beliefs and shared logics of action support landscape scale ecological fire restoration.

This does not mean that the normative and cultural cognitive shifts have fully taken place even where new policies and practices are being adopted. However, new mental maps and cognitive frameworks have the potential to emerge as new practices and new policies are being tested. Shifting the institution to assumptions, expectations, and practices of landscape scale ecological fire restoration occurs in specific nodes, specific places, and specific arenas. However,

as these nodes become more numerous and more distributed throughout the institution, the prospect of system wide change emerges.

Figure 8-4: A Conceptual Map of the Flows of FLN Participants and Products Disseminating and Integrating the FLN Imaginary into the Fire Management Institution



Thus, the potential for system-wide change in the fire management institution exists over the long term and the FLN appears to be playing a substantive role in defining the nature and scope of that change. Indeed, what the FLN provides is precisely what Swidler (1986) suggests is necessary for a new worldview and associated practices to be adopted within a social context. It

is serving as the active testing ground for new kinds of practices and new ideologies, defining and refining what it means to engage in landscape scale ecological fire restoration. Within the FLN, fire management professionals “are involved in constructing new strategies of action... learning new ways of organizing individual and collective action, practicing unfamiliar habits until they become familiar” (Swidler, 1986, p. 278). The more that FLN participants, planning products, and representations become vetted, tried, and adopted beyond the network, the greater the potential that institutional change will emerge, leading to a new settled period in the fire management institution, one that emphasizes working collaboratively within and across organizational boundaries, focuses on achieving ecological health through restoration at a landscape scale, and incubates social-ecological resilience in the face of the disturbance dynamics of fire.

Implications for Planning

What I have attempted to demonstrate in this dissertation is that multi-scalar collaborative networks have the potential to catalyze organizational and potentially institutional change. As outlined in the literature review, this question has multiple implications for the study and practice of planning. In a multi-scalar collaborative planning context, planners face challenges that are quite distinct from the well rehearsed multi-stakeholder place based collaborative forums that have heretofore dominated planning theory and practice (see Chapter 4). Multi-scalar collaborative planning networks represent an emergent form of planning practice. Establishing networks that link multiple collaborative planning endeavors provides a model of collaborative governance that extends across spatial and organizational scales. Planning practitioners can play numerous roles in these forums, from participants at various levels of the network to initiators,

guides, facilitators, and leaders of the collaborative endeavors at specific nodes or across the entire network. In either case, whether a leader or participant, planning practitioners must be open to a broader array of collaborative practice models and techniques than what has traditionally been offered by the planning literature. If leaders of such an endeavor, they must be able to navigate across different practice models and generate synergies among them. They may be called on to engage in strategic planning and adaptive management of the network itself, adjusting the design and processes of the network to respond to changing conditions and contexts. And, they will have to navigate the tension of maintaining flexibility and promoting innovation while ensuring that distinct collaborative groups are engaged in comprehensible and coherent planning activities. While designing and managing multi-scalar collaborative planning networks is a complex endeavor, the FLN offers numerous ways to engage in the practices and build the perspectives necessary to initiate, design, and engage in the process of managing such a network. I briefly touch on some of the primary implications and lessons that can be offered to planning practice through my examination of the FLN.

Integrating alternative models of collaboration

The first implication for planning practice and one that I allude to in Chapter 3 is that the dominant paradigm of collaborative planning, the multistakeholder consensus based collaborative forum, is no longer sufficient to guide either the practice or the evaluation of collaborative planning. This challenges planners to understand and build new types of collaborative forums, not just multistakeholder forums focused on conflict resolution and consensus building.

This is not necessarily a new insight to planning literature as other scholars have recognized the limitations of relying too heavily on the consensus building model (see Chapter 4). However, this analysis refines the focus. While broadening the scope of collaborative planning has been slowly emerging in the planning literature over the past few years, few scholars have articulated alternative approaches that integrate different collaborative practice models and describe the implications of using these models, particularly when operating across multiple scales simultaneously. In the case of the FLN, the network incorporates various collaborative practice models, requiring different kinds of skills to navigate collaborative processes at each level. While the skills and practices of engaging in multistakeholder collaborative planning forums at the landscape level are well rehearsed in the collaborative planning literature, new kinds of capacities may be necessary to engage in the collaborative work taking place in other forums. As a result, participants and leaders within these forums must broaden their understanding of collaboration beyond the dominant paradigm of collaborative planning literature to incorporate a wider array of possible designs and processes for collaborative practice. In short, collaborative planning practitioners may need to diversify the kinds of collaborative practice models they carry in their toolkit.

In the case of the FLN, regional networks were not structured similarly to multistakeholder collaborative forums. Instead, they were more akin to communities of practice. In the regional CoPs, network participants generated relevant expertise in both collaboration and in ecological fire restoration planning and they sought to develop new skills and capacities to inform their landscape level planning efforts. These collaborative arrangements are appropriate for developing new capacities and expertise among professionals, managers, and scientists but

may be less inclusive and less focused on fostering consensus agreements than their multistakeholder counterparts.

Collaborative planners may require different skills to participate effectively in and guide such collaborative endeavors. CoPs are not consensus oriented forums and do not foster formal agreements among participants. However, they are forums in which common or shared practices and perspectives can be developed among participants. Facilitating interaction within a CoP forum necessitates creating opportunities for open dialogue, sharing stories about experiences in the field, and small group interaction. Navigating within this context requires participants to be skilled at drawing out similarities and developing synthesis ideas and summaries to share with each other, not to be adept in guiding all parties to agree to a particular outcome or set of strategies. While basic communication and facilitation skills are useful in both consensus oriented and CoP-like forums, the focus and purpose of the forums are distinct enough that a facilitator seeking agreement in a CoP forum may undermine the essence of openness and creativity that is essential for innovating in practice. As collaborative planners experiment with alternative kinds of collaborative purposes and designs, we will need to draw on the insights of other fields to develop our understanding of what it takes to operate either as participant or facilitator in these forums.

Initiating and Designing Multi-scalar Collaborative Networks

The FLN also represents an emergent form of collaborative planning endeavor, the multi-scalar collaborative planning network. While certain kinds of problems can be addressed at single scales, many of the complex, dynamic, and wicked problems that elude planning and management institutions require cross scalar management approaches. Moreover, those who

wish to accelerate learning and sharing across collaboratives working on similar social problems would benefit from linking collaboratives into a network. In either case, linking collaborative planning forums at multiple levels into a coherent network may serve as a useful mechanism to enable cross scalar planning and learning.

Initiating and designing a multi-scalar collaborative planning network requires a different array of capacities and skills than initiating a place based multistakeholder collaborative planning process. As Alexander (2009) points out, operating in complex multi-organizational systems necessitates some capacity to engage in “institutional design.” Planning practitioners may play fundamental roles in both recognizing the need for multi-scalar collaboration and initiating them. Those who initiate multi-scalar collaborative planning networks must be able to design each scale of the network effectively to accomplish specific goals and purposes while also ensuring synergies between scales.

The FLN offers an instructive model here. The initiators of the FLN recognized natural resource managers needed to engage in landscape scale collaborative ecological fire restoration planning. The network was designed to foster capacity building to develop, refine, and effectively engage in this practice. In particular, this included building skills to integrate ecological restoration goals and objectives into planning products, to develop innovative responses to complex social-ecological system conditions to enable restoration, and to increase the capacities of managers to both facilitate and participate in collaborative planning forums.

The CoP-like forums of the FLN regions fostered the development of relevant expertise, particularly in ecological restoration planning and collaboration. As a result, the FLN built in a way to infuse the network with the necessary capacities to engage in collaborative ecological restoration planning. The participants learned together by practicing techniques at the landscape

level and assessing each other and sharing lessons learned at the regional level as they sought to increase their collective knowledge and expertise in an emergent practice. While this approach of linking communities of practice forums and multistakeholder collaborative planning efforts into a broader inter-organizational network structure is not the only way to design such an endeavor, it offers an innovative model from which to draw inspiration in the design of other such networks that aim to address cross-scalar and complex social problems.

Participating in and Managing Multi-scalar Networks

In a multi-scalar setting like FLN, planners may have to operate within and across scales, changing roles and utilizing different capacities within different sorts of practice models. They themselves may be participants in a CoP forum and a multistakeholder collaborative planning endeavor in the same network. While in one arena they may serve as a facilitator in a consensus building process, in the other they may have to foster opportunities for learning and exchange among professionals and experts. As a result, planning professionals, particularly those who operate as network leaders, may have to wear numerous hats.

At the macro level, network leaders must be able to navigate across these multiple scales, guiding different types of collaborative processes and engaging in constant adaptive management to facilitate sustaining and spreading the network. Planners engaged in such leadership roles must be skilled at strategic planning and adaptive management approaches, seeking way to evaluate and assess network functions and processes at various levels and strategically promote the network's legitimacy among key organizations and its expansion to new nodes. In a sense, the network leader must have an institutional mind, being able to analyze multiple aspects of network action and processes at all times.

Building Coherence While Fostering Creativity

The third aspect of multi-scalar network management that emerges from my analysis of the FLN is the need to build coherence across the network while ensuring that creativity and innovation are not stifled in each collaborative process. This is perhaps one of the most difficult challenges facing network leaders. It is a test for collaborative planning theory and practice broadly writ. Scholars and practitioners have struggled to identify ways to “scale up” collaborative planning endeavors in order to establish collaborative governance at broader scopes than isolated place based endeavors can obtain (see Chapter 4). One of the core tensions that animates this debate is how to ensure that multiple collaboratives linked together can maintain a focus on common purpose while not undermining the creativity and flexibility that enable innovation and learning at each collaborative forum.

The FLN navigated this tension by fostering what Goldstein and I have termed a network imaginary (Goldstein & Butler, Forthcoming 2009a). The network imaginary is both created within and disseminated throughout the network through planning products, technologies, representations, and interactive forums. In the case of the FLN, the initiators of the process did not intentionally seek to guide participants toward creating a network imaginary or even a guiding narrative. However, they were able to provide guiding frameworks that fostered this outcome. The strength of the FLN planning protocols and technologies is that while they bound the space within which practitioners could operate, the level of flexibility within those boundaries was extensive. This maintained the possibility that the planning products were simultaneously comprehensible across the entire network and relevant to specific local contexts. The planning protocols and technologies ensured that FLN participants would not deviate from

the common purpose of engaging in collaborative landscape scale ecological restoration planning, but it allowed each landscape and region to approach the endeavor by integrating local conditions, insights, and ideas into the planning products. In essence, it asked the right questions without predisposing the answers.

Meanwhile, the FLN developed a complex communications system to distribute success stories and promote practices that were coherent with the FLN imaginary. The network newsletters, FLN guidebook, briefing documents, brochures, website, listserv, and other mechanisms fostered a consistent array of representations of legitimate network action both within and outside the network. Presentations by network leaders and exemplary participants further reinforced appropriate and coherent action in the network.

For planning practitioners who engage in multi-scalar collaborative networks, the tension between coherence and creativity presents a particularly difficult challenge. However, using techniques such as consistent planning guidelines, widely distributed representations highlighting successful practice, and common forums that bring network participants from various levels of the network together from time to time can facilitate building the necessary coherence across the network. Care must be taken to not over prescribe expectations so that sufficient flexibility is obtained allowing for the emergence of creative and innovative responses to complex cross scalar problems. Unfortunately, there is no recipe for success here. Taking an adaptive approach and maintaining a level of flexibility in network design and process can enable making necessary changes to ensure that coherence can be achieved without overstepping the creative flows that animate collaborative engagement.

A Note to Planning Educators

Planning educators can facilitate the process of expanding planning practice to include the requisite perspectives and capacities to engage in multi-scalar collaborative networks. First, collaborative planning scholars have called for the integration of appropriate changes to planning education, and planning educators should ensure that curricula continue to offer and build opportunities to develop basic skills in facilitation and mediation, collaborative process design and management, and community involvement. These basic skills in collaborative planning continue to be necessary as the field is expanding. Though new and different skills may be necessary as well, these capacities are foundational to effective collaborative practice in nearly any collaborative forum.

Second, as educators introduce these topics into their courses, they should not solely rely on the planning literature but instead, draw on theoretical and practice based insights from other collaborative literatures such as collaborative learning in natural resources management, communities of practice in business management, and network management literature in public administration. This would expand the array of possibilities for collaborative process design and management beyond a narrowly defined subset and generate new questions for what constitutes the right constellation of skills necessary to engage in such collaborative forums.

Finally, planning educators should ensure that planning students become familiar with organizational design and theory with a particular focus on network approaches to enable cross scalar linkages across organizational and administrative boundaries. This would assist planning students in navigating complex organizational environments as well as building new organizational forms such as multi-scalar networks. As planning students become planning

practitioners, they can draw on this array of capacities to more effectively engage in initiating, designing, managing and participating in multi-scalar collaborative planning networks.

Conclusion

On the popular television show “The West Wing,” the show’s creator Aaron Sorkin wrote a lightning ignited fire in Yellowstone National Park into the script of the “Ways and Means” episode which first aired on October 24, 2001. Following this subplot, White House staff sought to determine how the President should respond, whether to call for suppression or to let it burn. As the President leaned toward letting the ignition burn, the fictional governor of Wyoming argued that the President was weak, didn’t care about the issues of the rural west, and was in bed with extreme environmentalists. When asked by one of his staff about the issue, the President argued that the fire would promote ecological health in the ecosystem where it was burning. “Do you know how I know this?” he asked rhetorically. “Because smart people told me so” he answered himself. He chose to follow the advice of the Secretaries of the Interior and Agriculture as well as the Chief of the Forest Service and let the blaze burn itself out.

This episode aired at a time when the fire management institution was in the process of being remade. Once centralized under the purview of the USFS, fire management in the United States began the simultaneous process of decentralization and nationalization in the 1980s and 1990s. Instead of the Forest Service maintaining and operating all of its own equipment and personnel, private contractors and other agencies have become involved and interagency bodies coordinate equipment and personnel across the nation. National standards for igniting and suppressing fires have been established and are overseen by the National Interagency Wildfire Coordinating Group. Wildland fire response on public and private lands has become a distributed

enterprise but coordinated at a national level. Meanwhile, local or community based efforts to redesign settlements to be less fire prone grew as the wildland urban interface or intermix fire was the dominant challenge through the 1990s. Community Wildfire Protection Plans put responsibility in the hands of local citizenry and their state and local governments rather than depending upon the Forest Service to be able to respond to all manner of fire on the landscape.

In this context, the purposes and means of fire management have become more diversified as well. Fire suppression is going nowhere. It will continue to be one of the primary tools of the fire management institution, particularly where the wild and the urban meet. However, other strategies such as ‘pre-suppression’ treatments including mechanical thinning, chemical treatments, and prescribed burning are meant to lower the frequency of conflagrations. Similar kinds of strategies are also utilized in the name of ecological restoration as fire adapted ecosystems have become “stressed” or “unhealthy” due to years of overzealous suppression. This diversity of purposes and means animates current fire management policies and practices and become variably employed depending upon the particular context and political pressures that exist when each blaze is ignited or treatment is initiated. A new national paradigm has not emerged to replace the all-out suppression approach, but a more diversified array of possibilities is being tested and the missions of public land management agencies are being rewritten in the process.

The FLN represents one facet of the many influences that began to build momentum for change in the world of fire management at the turn of the 21st century. Its role is an important one in overcoming the frustrated transition from a focus on fire suppression to a focus on landscape scale ecological fire restoration. As we have witnessed over the last three decades of the 20th century (see Chapter 2), agency rhetoric and superficial or contradictory policy or

procedural changes are insufficient. When beliefs, norms, expectations, and practices are deeply enconced, change can be elusive. While the FLN capitalized on the momentum emerging at the turn of the millennium, it played and continues to play a fundamentally important role in this emergent change. Namely, it fosters change from within by giving practitioners the perspectives, tools, and motivation to engage in ecological restoration at landscape scales through collaboration within and across organizational boundaries.

If the fire management institution transforms from a suppression focused to a landscape scale ecological fire restoration focused enterprise, will we be able to say that the FLN caused the change? I think not. But, we rightly will be able to say that it played a role in that process and served as a catalyzing force of that change. The FLN demonstrates that multi-scalar collaborative networks have the potential to serve as incubators of new kinds of practices and policies that can be integrated into a broader institution. Although fire suppression will continue to be an essential tool of fire management, it may slowly relinquish its role as the default response. The role of the FLN is important as it specifically addresses aspects of fire management policy and practice that inhibit the ability of the fire management institution to undergo a widely called for transition. Operating at multiple scales simultaneously it touches multiple levels and layers of institutional order, defining and enacting new practices, informing new plans and policies, and setting the stage for broader adoption of landscape scale ecological fire restoration principles and practices among fire management organizations. By utilizing multiple collaborative practice models at each scale, it creates distinct but interconnected learning environments within which fire management actors can generate and test new ideas and practices together. It creates coherence without undermining creativity, enabling, indeed inspiring participants to speak autonomously with one voice. As such, it provides a model of multi-scalar collaboration and demonstrates the

potential of what can be accomplished through coordinated and structured collaborative planning networks.

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Appendix A: IRB Permissions



Office of Research Compliance
Institutional Review Board
1880 Pratt Drive (0497)
Blacksburg, Virginia 24061
540/231-4991 Fax: 540/231-0959
E-mail: moored@vt.edu
www.irb.vt.edu
FWIA00000572(expires 7/20/07)
IRB # Is IRB00000567.

DATE: October 4, 2006

MEMORANDUM

TO: Bruce Goldstein
Robert B. Hull
Max O. Stephenson

FROM: David M. Moore 

Approval date: 4/25/2006
Continuing Review Due Date: 4/10/2007
Expiration Date: 4/24/2007

SUBJECT: **IRB Amendment 1 Approval:** "Improving Collaborative Decision-Making and Community Capacity Through Fire Learning Networks", IRB # 06-276

This memo is regarding the above referenced protocol which was previously granted approval by the IRB on April 25, 2006. You subsequently requested permission to amend your IRB application. Since the requested amendment is nonsubstantive in nature, I, as Chair of the Virginia Tech Institutional Review Board, have granted approval for requested protocol amendment, effective as of October 4, 2006. The anniversary date will remain the same as the original approval date.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

As indicated on the IRB application, this study is receiving federal funds. The approved IRB application has been compared to the OSP proposal listed above and found to be consistent. Funds involving procedures relating to human subjects may be released. Visit our website at www.irb.vt.edu for further information

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VIRGINIA POLYTECHNIC INSTITUTE UNIVERSITY AND STATE UNIVERSITY
An equal opportunity, affirmative action institution

DATE: April 6, 2007

MEMORANDUM

TO: Bruce Goldstein
Robert B. Hull
Max O. Stephenson

FROM: David M. Moore 

Approval date: 4/25/2007
Continuing Review Due Date: 4/10/2008
Expiration Date: 4/24/2008

SUBJECT: **IRB Expedited Continuation 1:** "Improving Collaborative Decision-Making and Community Capacity Through Fire Learning Networks", OSP #428267, IRB # 06-276

This memo is regarding the above referenced protocol which was previously granted expedited approval by the IRB. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. Pursuant to your request, as Chair of the Virginia Tech Institutional Review Board, I have granted approval for extension of the study for a period of 12 months, effective as of April 25, 2007.

Approval of your research by the IRB provides the appropriate review as required by federal and state laws regarding human subject research. As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

As indicated on the IRB application, this study is receiving federal funds. The approved IRB application has been compared to the OSP proposal listed above and found to be consistent. Funds involving procedures relating to human subjects may be released. Visit our website at www.irb.vt.edu for further information

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Invent the Future

DATE: April 24, 2008

MEMORANDUM

TO: Bruce Goldstein
Robert B. Hull
Max O. Stephenson

FROM: David M. Moore 

Approval date: 4/25/2008
Continuing Review Due Date: 4/10/2009
Expiration Date: 4/24/2009

SUBJECT: **IRB Expedited Continuation 2:** "Improving Collaborative Decision-Making and Community Capacity Through Fire Learning Networks", OSP #428267, IRB # 06-276

This memo is regarding the above referenced protocol which was previously granted expedited approval by the IRB. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. Pursuant to your request, as Chair of the Virginia Tech Institutional Review Board, I have granted approval for extension of the study for a period of 12 months, effective as of April 25, 2008.

Approval of your research by the IRB provides the appropriate review as required by federal and state laws regarding human subject research. As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

As indicated on the IRB application, this study is receiving federal funds. The approved IRB application has been compared to the OSP proposal listed above and found to be consistent. Funds involving procedures relating to human subjects may be released. Visit our website at www.irb.vt.edu for further information

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DATE: April 16, 2009

MEMORANDUM

TO: Bruce Goldstein
Robert B. Hull
Max O. Stephenson

FROM: David M. Moore 

Approval date: 4/25/2009
Continuing Review Due Date: 4/10/2010
Expiration Date: 4/24/2010

SUBJECT: **IRB Expedited Continuation 3:** "Improving Collaborative Decision-Making and Community Capacity Through Fire Learning Networks", OSP #428267, IRB # 06-276

This memo is regarding the above referenced protocol which was previously granted expedited approval by the IRB. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. Pursuant to your request, as Chair of the Virginia Tech Institutional Review Board, I have granted approval for extension of the study for a period of 12 months, effective as of April 25, 2009.

Approval of your research by the IRB provides the appropriate review as required by federal and state laws regarding human subject research. As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

As indicated on the IRB application, this study is receiving federal funds. The approved IRB application has been compared to the OSP proposal listed above and found to be consistent. Funds involving procedures relating to human subjects may be released. Visit our website at www.irb.vt.edu for further information

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