

ERI-Issues in Forest Restoration

## The History of the Four Forest Restoration Initiative: 1980s–2010



NORTHERN ARIZONA  
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Ecological Restoration Institute

## The Ecological Restoration Institute

The Ecological Restoration Institute at Northern Arizona University is a pioneer in researching, implementing, and monitoring ecological restoration of dry, frequent-fire forests in the Intermountain West. These forests have been significantly altered during the last century, with decreased ecological and recreational values, near-elimination of natural low-intensity fire regimes, and greatly increased risk of large-scale fires. The ERI is working with public agencies and other partners to restore these forests to a more ecologically healthy condition and trajectory—in the process helping to significantly reduce the threat of catastrophic wildfire and its effects on human, animal, and plant communities.

### Cover photo:

View from the Rim Visitors Center on the Black Mesa Ranger District of the Apache-Sitgreaves National Forest looking onto the Tonto National Forest portion of the Four Forest Restoration Initiative, which is an ambitious effort to collaboratively restore resiliency and function to 2.4 million acres across four national forests in northern Arizona. *Photo courtesy of the USDA Forest Service, Flickr.com*

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## Introduction

In this paper, we (Dave Egan and Erik Nielsen) present our account of how a divergent group of people, with a variety of values, interests and resources, recognized a social and ecological problem, and came together to find a collective answer. This is the story of the landscape-scale forest restoration effort known as the Four Forest Restoration Initiative (4FRI) and the ideas, groups of people, and series of related events as well as collaborative projects from which it eventually emerged. It is a record of the progress these people made from the mid-1990s until 2010. This is the latest chapter in the long and dynamic story of people as members of the ponderosa pine ecosystem in Arizona. As such, it provides a glimpse into the multi-dimensional interplay between humans and the environment in the American Southwest today.

Our information is based on earlier work by Windy Greer Selig and Nielsen designed to record the history of 4FRI. That work included identifying a timeline, compiling stakeholder comments about the importance of different events and documents as well as conducting stakeholder interviews. We used their study along with documentary evidence, both published and unpublished, and more recent interviews of other 4FRI stakeholders to produce this history of 4FRI.

## The Formative Years: Emerging Concepts, Relevant Events and Efforts (1980s-2005)

Various phenomena served as the foundation for the 4FRI, in particular: 1) emerging concepts and practices, 2) significant ecological events, 3) scientific recognition of a crisis, 4) mobilization of public/private efforts, and 5) key policy and management events.

### *Emerging Concepts and Practices*

- Ecological restoration  
The idea and practice of ecological restoration emerged as a recognized and new land management option in the late 1980s and early 1990s. The Society for Ecological Restoration (SER) was organized in 1987–88 and three prominent members of SER during its early years—Don Falk (first SER executive director), Steve Gatewood (second SER executive director), and Wally Covington (chair, SER science and policy committee)—each played key roles in activities to restore forest ecosystems in Arizona. During this period and well into the 2000s, ecological restoration derived much of its scientifically based working procedures from the idea of understanding reference conditions and maintaining or restoring an ecosystem’s natural/historic range of variability (Covington and Moore 1994, Landres et al. 1999, Moore et al. 1999, Swetnam et al. 1999, Egan and Howell 2001, SER 2004). The U.S. Forest Service (USFS) formally recognized the idea of ecological restoration in 2000 and continued to work throughout that decade to better understand restoration’s role in terms of agency policy and practice (U.S. Forest Service 2006).
- Collaboration  
In the United States, the interest in collaboration as a means of addressing land management issues began to take hold in the mid-1990s. Collaboration was seen as a way to shift to “win-win, let’s find our common ground” solutions among stakeholders who typically solved their differences about land management through the court system in a winner-loser format. This call for collaborative action came from community forestry groups, who were interested in working from the “bottom up” as well as from academics and government leaders who came to understand the need to move away from litigation-only solutions to federal forest management (Tilt 2005).

In terms of federal agencies, collaboration became officially endorsed by President George W. Bush, first in the Healthy Forests Restoration Act of 2003 and again in 2004 in Executive Order 13352, which "... directs agencies to implement environmental and natural resource laws to promote collaborative activity among Federal, State, local, and Tribal governments, private for-profit and nonprofit institutions, other non-governmental entities and individuals." In 2005, a memorandum from the Office of Management and Budget and the President's Council on Environmental Quality further directed federal agencies to build institutional capacity for collaborative problem solving.

- Community forestry

In the late 1980s and early 1990s, various economic and social factors caused the level of commercial logging on public lands to dramatically decline. By the mid-1990s, advocates of a new approach, called community forestry, began to organize in order to overcome the gridlock and sporadic violence produced during these "timber wars" (Bosworth and Brown 2007). The goals of community forestry groups were broad and included policies and practices designed such that "people in forest-dependent communities participate directly in decisions about forest land use and management that affect them, and that they have access to the resources (knowledge, credit, social networks of power brokers and policy makers, etc.) necessary to facilitate this participation" (Wilmsen and Isom 2003; see also DellaSala et al. 2003). They also embraced the ideas of bioregionalism (Berg 1978, Sale 1985) and small-is-beautiful (Schumacher 1973) because these concepts supported maintaining local control of land and promoting small, local business.

The Greater Flagstaff Forest Partnership, the White Mountains Natural Resources Working Group, the Collaborative Forest Restoration Program in New Mexico, and, ultimately, the 4FRI each represents various types of efforts in collaborative community forestry.

- Landscape-scale approaches: ecosystem management, landscape ecology, conservation biology

- o Ecosystem management

Ecosystem management as a land management concept came into its own in the late 1980s and early 1990s. Grumbine (1994) describes several principles of ecosystem management that are pertinent to envisioning and developing a landscape-scale project as: 1) multiple levels of analysis, 2) monitoring, 3) adaptive management, 4) interagency cooperation, 5) humans as part of the ecosystem, and 6) importance of human values.

Ecosystem management also entered the lexicon of the USFS in the early 1990s at the end of the George H.W. Bush's presidency (Steen 2000). The concept was heartily supported by the U.S. Forest Service chiefs during the President Clinton Administration. By 2000, the agency viewed the onset of large-scale wildfires and insect outbreaks in the West as ecosystem-oriented, landscape-scale problems (Laverly and Williams 2000).

- o Landscape ecology and GIS

The field of landscape ecology emerged in the mid-1980s as its leaders, especially Richard T.T. Forman, developed the conceptual framework and tools to look at landscapes, landscape patterns, and potential landscape-level management solutions in a wholly new way (Risser et al. 1983, Forman and Godron 1986, Franklin and Forman 1987, Forman 1995). Combined with the emerging technologies of computers and Geographic Information Systems (GIS) software, landscape ecology provided the means to address landscape- and ecosystem-scale issues with increasing levels of sophistication and versatility. ForestERA's landscape assessment work in northern Arizona and elsewhere stands as an example of the kind of results these concepts and technological innovations can produce.

- o Conservation biology  
Conservation biology, the scientific study of species that are deemed threatened, rare or in danger of extinction, emerged during the 1980s as a powerful, interdisciplinary set of ideas for natural resource management and policymaking. In the Southwest, this interest in conserving rare and threatened species (see Noss and Cooperrider 1984) manifested itself in extensive studies of, and debates about, conservation needs and protection for species such as the Mexican spotted owl, northern goshawk, and old-growth trees.
- Environmental ideas about forest management  
Empowered by the public participation potential of the National Environmental Policy Act (1969/1970) and the mandate to protect endangered species in the Endangered Species Act (1973), forest-oriented environmental action became a powerful national presence by the mid-1980s and early 1990s. Efforts to expose forest clearcutting to public scrutiny were extremely successful in raising awareness about that practice and casting suspicion on corporate logging operations and federal forest management. The organizations involved used appeals and litigation to question and halt various projects on public lands where issues of concern to them arose (e.g., endangered species protection, encroachment into roadless areas, old-growth logging). Wilderness area protection and expansion were often key agenda items. However, by the late 1990s, some environmental groups began working actively on the issues of community forestry and forest restoration (Southwest Forest Alliance 1996).



**Northern Arizona is home to the largest contiguous ponderosa pine forest in North America. The Four Forest Restoration Initiative, known as 4FRI, was formed as a collaborative effort to restore forest ecosystems on portions of four Arizona National Forests, which include the Apache-Sitgreaves, Coconino, Kaibab, and Tonto. Photo by Brady Smith, courtesy of Coconino National Forest, USDA Forest Service/Flickr.com**

### ***Significant Ecological Events***

Beginning in the early 1990s, the incidence of large (>10,000 acres) wildfires began to increase in the ponderosa pine-dominated, frequent-fire forests of northern Arizona. These fires often resulted in damage not only to wildlands but in some cases to homes that were built, with little planning or foresight, in heavily wooded areas of the wildland-urban interface (WUI) (Falk 2008).

- 1990: Dude Fire near Payson, Arizona; 24,000 acres burned, 60 homes destroyed, six firefighters killed.
- 1996: Horseshoe Fire, northwest of Flagstaff, Arizona: 8,650 acres burned.

- 1996: Hochderffer Fire, northwest of Flagstaff, Arizona; 16,400 acres burned; this and the Horseshoe Fire were largest wildfires ever on the Coconino National Forest.
- 1999: Rainbow Fire, north of Whiteriver, Arizona; 4,500 acres burned, 17 structures destroyed.
- 2000: Pumpkin Fire, northwest of Flagstaff; 15,779 acres burned, one structure destroyed.
- 2002: Rodeo-Chediski Fire, White Mountains of east-central Arizona; 468,638 acres burned, 13,500 homes threatened with 465 homes, six commercial properties, and 20 outbuildings destroyed; estimated cost of \$122.5 million for property loss, suppression costs estimated at \$46.5 million with emergency stabilization costs of nearly \$139 million (Western Forestry Leadership Coalition 2009); U.S. Senator Jon Kyl (AZ) blamed “radical environmentalists” for not allowing U.S. Forest Service to thin the forests (Kyl 2002), Sierra Club responded it is just trying to protect “large fire resistant old growth trees” (Sierra Club 2002); both fires were set by humans; media coverage was extensive both in Arizona and nationally; the event helped to advance the passage of the Healthy Forests Restoration Act.
- 2002: Outlet Fire, North Rim of the Grand Canyon National Park in northern Arizona; 14,000 acres burned.



The Rodeo-Chediski Fire of 2002 burned nearly 500,000 acres in east-central Arizona and was a key ecological event that helped spur the passage of the Healthy Forests Restoration Act. *Photo courtesy of Apache-Sitgreaves National Forest, USDA Forest Service*

Large wildfires continue to occur in northern Arizona and throughout the American West due to overstocked forest conditions, steady accumulation of fuels, extended periods of drought, human carelessness, lightning strikes, and other factors. The Wallow Fire, which burned 538,049 acres of forest and grassland in east-central Arizona in 2011, is the latest and largest fire of this type in the Southwest. In addition to burned acres, it destroyed 72 structures worth an estimated \$109 million, injured 16 people, forced the evacuation of nearly 6,000 residents from their homes, and cost taxpayers about \$80 million in suppression costs alone. The 2010 Schultz Fire in the San Francisco Peaks is another more recent example (see Combrink et al. 2013).

Extensive outbreaks of pine bark beetle populations, typically in physiologically weak or damaged forested stands, are also more commonplace now in northern Arizona. For example, aerial surveys conducted in the fall of 2002 indicated about 60,000 acres of bark beetle-damage forests are located in the Coconino National Forest and 7,000 acres in the Kaibab National Forest (DeGomez 2003).

### *Scientific Recognition of a Crisis*

Beginning in the mid-1970s and with increasing effort ever since, the forest research community has improved the scientific knowledge about frequent-fire forest types in the Southwest, and their importance and relation to fire, insects, wildlife, and humans. Scientists from various universities and state and federal agencies have observed, studied, and documented a significant decline in the health and resilience of the southwestern ponderosa pine ecosystem (Vance et al. 2001, Marlette 2004). Not only did these researchers provide a scientific basis to help others recognize and understand the crisis conditions within Arizona's forests, several of them, with Wally Covington of Northern Arizona University as the most visible proponent (Malakoff 2002), began to experiment with ways of solving the forest health problem, albeit at a relatively small scale. By 1992, Covington and other researchers began small-scale experimental work at the G.A. Pearson Natural Area within the Fort Valley Experiment Forest, 12 miles northwest of Flagstaff (Mast et al. 1999). The theoretical and experimental field work of Covington and many others provided a strong scientific basis for moving ahead to increasingly larger scale projects. In addition, Covington was influential in educating government officials and policymakers from both Washington, D.C. and Arizona about the need for science-based forest restoration.

Social science studies and experiments were also evident and active at the time. The 2003 workshop, "Barriers to Collective Forestry" (Moote and Becker 2003) is a case in point as are the small-scale, small-diameter wood utilization ideas of Brett KenCairn, an early member of the Grand Canyon Forest Partnership (Taylor 2003); the ideas presented in the Proceedings of the 2003 workshop, "Humans, Fire, and Forests" (Cortner et al. 2003); and the work of ERI social scientists, Ann Moote and Jesse Abrams, with collaborative forestry groups in Arizona and New Mexico.

A truly innovative collaboration between landscape ecologists and social scientists took place when ForestERA and the ERI teamed up to produce the Western Mogollon Plateau Adaptive Landscape Assessment (2003-2004) and the White Mountains Landscape Assessment (2005). Both of these assessments used a collaborative, science-based approach to help stakeholders identify critical features for protection from severe wildfires and other risk factors. They also provided a forum for stakeholders to visually explore, through the use of GIS-produced maps, a range of restoration scenarios designed to decrease the potential for wildfires and insect outbreaks. These efforts were the precursors to the collaborative work ForestERA and others produced for the Wood Supply Analysis in 2008.



**A dense, dog-hair thicket of Ponderosa pine stands in contrast to a more open, restored forest in the G.A. Pearson Natural Area within the Fort Valley Experimental Forest. Evidence gathered here in the 1990s by forest ecologists, including Wally Covington of the Ecological Restoration Institute, bolstered the need for science-based forest restoration. *Photo courtesy of ERI***

### ***Mobilization of Public/Private Efforts***

A number of issues—decline/loss of timber industry and infrastructure in the early 1990s, concern for endangered species, community-level anxiety about the next “mega-fire,” a shifting economic base in rural communities, conflicts about forest management and uses, and others—prompted the creation of numerous public and private organizations during this formative stage. Many of these organizations and their representatives, most of whom operated at a relatively small scale, became active in the process that led to the formation of 4FRI.

1985: Grand Canyon Trust is established by then Arizona Governor, Bruce Babbitt, as a national trust for projects in the Grand Canyon National Park, although its scope was almost immediately changed to include activities and projects throughout the Colorado Plateau.

1989: Center for Biological Diversity, initially known as the Greater Gila Biodiversity Project, is started by Kieran Suckling, Peter Galvin, Todd Schulke, and Robin Silver to “...secure a future for all species, great and small, hovering on the brink of extinction” (CBD mission statement).

1995: Covington and his research group, Arizona Game and Fish Department, and the Grand Canyon-Parashant National Monument begin the Mt. Trumbull Ponderosa Pine Forest Restoration Project on Mt. Trumbull in northwest Arizona (Moore et al. 2003).

1996: Covington becomes the director of the Ecological Restoration Program in the School of Forestry at Northern Arizona University. This program would evolve into the ERI in 2000.

1996: Upon accepting a faculty position at Northern Arizona University, Tom Sisk establishes the Laboratory for Landscape Ecology and Conservation Biology at NAU. The goal of the lab was to conduct research in conservation science, while addressing landscape-scale, ecosystem management issues.

1996–1997: Grand Canyon Forests Partnership (GCFP) organizes in response to the 1996 wildfires near Flagstaff with the goals of managing forest fuels in the WUI near Flagstaff and restoring the natural functions and processes of local ponderosa pine forests. Lead organizations included the Grand Canyon Trust, Northern Arizona University, the Flagstaff Fire Department, and the USFS/Coconino National Forest.

1997: White Mountains Natural Resource Working Group (NRWG) forms and collaborates with the USFS to set up three thinning prescriptions at the 7,000-acre Blue Ridge Demonstration Project, including a typical USFS fuels treatment, an ERI pre-settlement prescription, and a prescription designed by several environmental organizations. This group, which was founded by Lewis Tenney, was extremely influential in the development and implementation of the White Mountain Stewardship Contract (Abrams and Burns 2007).

1998: Northern Arizona Wood Products Association, a non-profit trade group, starts to provide support for local economic development, especially the use of small-diameter trees and logs. Molly Pitts was the executive director of the association from 2004 through 2012.



Forest restoration work is conducted on the Apache-Sitgreaves National Forest under the White Mountain Stewardship Contract. The WMSC was the largest 10-year stewardship contract in the nation and served as a testing ground for the use of stewardship contracting. *Photo courtesy of ERI*

1998: The Grand Canyon Forests Foundation, the non-profit wing of the GCFP, and the USFS sign a cooperative agreement to “work cooperatively to demonstrate new forest management approaches that improve and restore ecosystem health of ponderosa pine forest ecosystems in the Flagstaff urban-wildland interface area” (GCFF-USFS Cooperative Agreement 1998).

1999–2001: The GCFP, the ERI, and others begin the 1,700-acre Fort Valley Urban/Wildland Restoration Project near Flagstaff on an experimental area of the Coconino National Forest. Several environmental organizations (Sierra Club, Southwest Forest Alliance, Center for Biological Diversity, Flagstaff Activist Network; see Southwest Forest Alliance 2000) strongly critiqued and litigated this project. Based on the so-called “Flagstaff Model” of restorative forest thinning and social engagement (Friederici 2003), this project raised issues (e.g., diameter caps, thinning vs. burning, canopy cover) that would remain part of the discussion about implementing forest restoration in Arizona.

2000: The ERI approaches Sisk with the idea of conducting landscape-scale assessments of the Mogollon Rim forests (Covington 2014, Sisk 2014). This collaboration grew into the Forest Ecosystem Restoration Analysis Project (ForestERA), a multidisciplinary, participatory effort to assess the ecological and social implications of different restoration treatments at landscape and regional scales, including areas beyond the wildland-urban interface.

2002–2006: The GCFP changes its name to the Greater Flagstaff Forests Partnership (GFFP) in 2002; signs a Cooperative Agreement and Memorandum of Understanding with the USFS to work collaboratively to reduce the fire threat on about 180,000 acres in the greater Flagstaff area; Gatewood becomes its executive director in 2003. In addition to restoration activities, the GFFP undertakes public outreach about local forestry issues. It also commissions two wood supply studies (Mater Engineering 2002, 2004) and hears proposals for local wood products industries, including one about creating an oriented-strand board plant from Arizona Lumber Products, a company that had been recently purchased by Don Walters, a Flagstaff businessman and building contractor (Gatewood 2014).

2003: *Ecological Restoration of Southwestern Ponderosa Pine Forests*, edited by Peter Friederici, is published by Island Press. This book, along with other influential articles (Allen et al. 2002, Covington 2003, Sisk et al. 2005), made it clear that collaborative, science-based forest restoration efforts were underway in the southwestern United States.

2003–2004: The Western Mogollon Plateau Adaptive Landscape Assessment (Sisk et al. 2004) is undertaken by ForestERA, the ERI, and numerous northern Arizona stakeholders. The assessment area included portions of the Coconino, South Kaibab, Tonto, and Apache-Sitgreaves national forests. Because it was the first such workshop, the organizers sought to help participants understand the techniques of landscape-scale assessments and planning as well as the principles and goals of landscape-scale forest restoration. Ultimately, the diverse group of stakeholders was able to identify common values and threats, and prioritize landscape features in need of protection from wildfires by using this visual, collaborative means of analysis.

2004: The NRWG completes their Community Wildfire Protection Plan (CWPP) for At-Risk Communities of the Sitgreaves National Forest in Apache, Coconino, and Navajo Counties (Logan Simpson Design Ltd. 2004). By 2007, 12 CWPPs were completed in Arizona, addressing the wildfire protection needs of 73 communities.

2005: White Mountains Landscape Assessment is completed by ForestERA, the ERI, and 43 regional stakeholders. Like the similar landscape assessment in the western Mogollon Rim, this project provided a forum where stakeholder values, concerns, and ideas could be translated into spatially explicit prioritization and management action scenarios based on the best available science (Abrams 2005, Abrams et al. 2005).

2005: Covington and Vosick (ERI) begin talks with John Pasquantino of the Office of Management and Budget (OMB) as well as U.S. Forest Service personnel (e.g., Doug Crandall) and Arizona U.S. Senator Kyl and his staff in Washington, D.C. about a landscape-scale “pilot project” that would involve a number of the national forests in northern Arizona and would be supported by collaborative effort (Covington 2014). The OMB was interested in this idea because they were concerned about ever-increasing wildfire suppression costs and whether hazardous fuel reduction treatments had the potential to reverse that budgetary trend. They believed that such a landscape-scale project could provide answers to that question (Murfitt 2014).

### ***Key Policy and Management Events***

There were a number of policy actions at the federal level, regionally, and in Arizona that were vital to resolving the crisis in the frequent-fire forests of the West. Nationally, the USFS was in transition during this period, trying to find its place with several new and demanding constituent groups, particularly recreational visitors and environmental organizations. At the same time, the agency was beginning to experience a dramatic increase in wildfire suppression costs—an ever-increasing expense that strained the budget for other management activities, including forest restoration. Its leadership was trying to address issues on a variety of fronts from litigation over endangered species to seemingly constant challenges to, and rewrites of, its planning rules. The Southwestern Region of the USFS (R3) spent significant time studying northern goshawk populations and developing guidelines for silvicultural treatments that addressed the habitat needs of that species (Reynolds et al. 1992) as well as recovery plans for the Mexican spotted owl. In addition, the USFS was being pushed to accept a new role as a collaborator in a more diverse discussion about wildfires and forest management of public lands.

1998: Congress authorizes 28 stewardship contracts as a demonstration project in the Department of Interior and Related Agencies Appropriations Act of 1999.

1999: The General Accounting Office produces a report, *Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats* (GAO 1999).

September 2000: Secretary of the Interior, Bruce Babbitt, and Secretary of Agriculture, Dan Glickman, present President Clinton with a report titled, *Managing Impacts of Wildfires on Communities and the Environment* (USDI and USDA 2000).

October 2000: The U.S. Forest Service responds to the 1999 GAO report with the publication of *Protecting People and Sustaining Resources in Fire-adapted Ecosystems: A Cohesive Strategy* (Lavery and Williams 2000).

2001: Arizona Governor Jane Dee Hull issues Executive Order 2001-16 creating the Governor’s Forest Health/Fire Plan Advisory Committee in response to “the catastrophic wildfire season of 2000 and concerns for future catastrophic wildfires.” The committee is designed to have members from academia, fire departments, environmental groups, tribes, logging industry, and county government, among others.

2001: Federal Wildland Fire Management Policy Update endorses the earlier 1995 policy, but now includes a set of guiding principles related to ecological restoration and increasing public safety from wildfires.

2001: U.S. Forest Service [Collaborative Forest Restoration Program](#) (CFRP) begins in New Mexico. The program proves highly successful in implementing collaborative, relatively small-scale forest restoration and small-diameter tree utilization projects across that state. It is influential as a model for similar work in Arizona and other states, and for the federal legislation that authorized the Collaborative Forest Landscape Restoration Program in 2009.

2002: The Western Governors Association (WGA) releases *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment*—a key policy statement and strategy about western forests that has the endorsement of the Secretaries of Agriculture and the Interior, the National Association of State Foresters, the National Association of Counties, and the Intertribal Timber Council. The WGA set as its goals: 1) improve fire prevention and suppression, 2) reduce hazardous fuels, 3) restore fire-adapted ecosystems, and 4) promote community assistance (Western Governors Association 2002; revised 2006).

2002: President G.W. Bush announces the Healthy Forests Initiative (HFI), which recognized the need for federal action to limit the number of large wildfires. The HFI also called for legislative and other legal measures that would help expedite the review of fuel hazard reduction and forest restoration plans. However, such attempts at streamlining the review process were quite controversial, especially the use of collaborative-approved categorical exclusions that could not be appealed. While adopted by the USFS in 2004, the use of such categorical exclusions was later overturned in the courts (see Sierra Club v. Bosworth, 2007).

2002–2004: In July 2002, Harv Forsgren becomes the regional forester for R3. With his direction, the Regional Leadership Team, in January 2004, agreed that restoring the ecological functionality of fire-adapted ecosystems was the central priority for R3. The team also committed the Region to reducing the threat of catastrophic wildfire to communities and lowering treatment costs by fostering private sector involvement to create the infrastructure to utilize excess biomass. The team agreed to focus and realign its resources to accelerate vegetation treatments across the Region to accomplish these goals (USDA Forest Service 2005).

2003: Nora Rasure (Supervisor, Coconino NF) and Mike Williams (Supervisor, Kaibab NF) begin discussions about how to move forest restoration forward in northern Arizona given the new R3 central priority, concern about increasing frequency and size of wildfires, the implications of the revised Federal Wildland Fire Management Policy Update, and the scientific and collaborative work of local groups like the ERI, GFFP, and NRWG (Rasure 2014, Williams 2014).

2003: Arizona Governor Janet Napolitano replaces the previous Governor's Forest Advisory Committee with the Governor's Forest Health Advisory Council and the Governor's Forest Health Oversight Council (Executive Order 2003-16). Membership includes participants from academia, local governments, environmental groups, fire departments, state agencies, and federal agencies.

2003: Congress expands the application of stewardship contracting in the Consolidated Appropriations Resolution of 2003 by amending the 1998 authorizing legislation. The amendments allow federal agencies to award an unspecified number of multi-year stewardship contracts through a period ending in September 2013.

2003: Prompted by President G.W. Bush's Healthy Forests Initiative and other calls for federal action, Congress passes the Healthy Forests Restoration Act of 2003 to address the issue of large wildfires and improve the rate of forest restoration activities. While politically controversial, the legislation was effective in motivating federal agencies to collaborate with communities to develop hazardous fuel reduction projects (i.e., Community Wildfire Protection Plans) and place priority on WUI treatment areas identified by communities.

September 2003: Arizona Governor's Forest Health Advisory Council adopts Guiding Principles for Forest Ecosystem Restoration and Community Protection. The Guiding Principles address the following topics: integration, sustainable communities and economies, ecological integrity, land use and planning, funding and compliance, and practices. The Integration Principle calls for: "... a statewide forest health evaluation to identify high-priority communities, critical infrastructure, habitats, and watersheds at risk. This evaluation can also provide the framework for monitoring individual projects and cumulative effects." This principle paves the way for future work on the Statewide Strategy.

2004: USFS R3 awards the White Mountain Stewardship Contract (WMSC) on the Apache-Sitgreaves National Forests to Future Forests LLC, operated by Rob Davis and Dwayne Walker and his brothers. The contract allows for the treatment of 5,000 to 15,000 acres per year, up to 150,000 acres in ten years. This project is the first and largest 10-year stewardship contract in the nation, and it is hoped that its implementation will provide lessons for larger-scale forest restoration projects. It also serves as a testing ground for the use of stewardship contracting and some of its tools, such as trading “goods for services,” “best value contracting,” and “tree designation without marking” as well as multi-party monitoring. The WMSC met many concerns of local leaders and stakeholders: 1) guarantee of a baseline level of activity sufficient for a wood products business to make the necessary capital investments; 2) awarding of the contract to a local wood business; 3) prescribed work within the WUI as a means of protecting local communities from wildfires; and 4) a 16-inch diameter cap to assure environmental organizations that larger trees would only be cut under special circumstances. With the diameter cap and local collaborative support in place, the USFS could proceed with fewer concerns about litigation and work stoppages (Abrams 2011; see also Sitko and Hurteau 2010).

2004: The Governor’s Forest Oversight Council presents Governor Napolitano with 31 recommendations for needed directives, initiatives, and funding to help address forest health issues in the state (Governor’s Arizona Forest Oversight Council 2004, Muller 2004). This document contains the beginnings of ideas and actions later expressed more fully in the Statewide Strategy.

2004: The Restoration Economy Subcommittee of the Arizona Forest Health and Advisory Councils develops the Guiding Principles for a New Economy Based on Forest Restoration.

2005: Arizona Congressman Rick Renzi introduces Community Forest Restoration Expansion Act of 2005 (H.R. 3590) to expand the CFRP to Arizona; measure dies in subcommittee.

2005: The Arizona Governor’s Forest Health Advisory Council and the Governor’s Forest Health Oversight Council select a subcommittee, led by Aumack and Sisk, to frame a 20-year forest strategy for Arizona.



**Arizona Governor Janet Napolitano visits a restoration project near Flagstaff in 2004. Her support for forest restoration efforts across the state energized members of the Forest Health Advisory Council and the Forest Health Oversight Council and fueled a productive time in the events that led to the formation of 4FRI. Photo courtesy of the state of Arizona**

## **The Pivotal Years: The Forest Health Councils and Collective Action, 2006-2007**

From 2006 through 2007, many of the groups, organizations, and individuals who had been working separately on the forestry problem in Arizona began to come together to take collective action. In this section, we review the various forums, products, and activities that took place during this period, focusing especially on the work of the Governor’s Forest Health Advisory Council and the Governor’s Forest Health Oversight Council, and developments of the Statewide Strategy and the Wood Supply Study.

### ***Governor’s Forest Health Advisory Council and the Governor’s Forest Health Oversight Council (2006-2007)***

During the Napolitano Administration (2003–2009), members of the Governor’s Forest Health Advisory Council and the Governor’s Forest Health Oversight Council were extremely focused and productive. By all accounts, the participants seemed to thrive in the knowledge that they were working as advisors to Governor Napolitano and that their goal to restore Arizona’s forests had her attention and support. As Sisk recalls, “The atmosphere was charged with energy. It was a very productive, and rarely contentious, environment” (Sisk 2014). Schulke remembers

it as being “the first time for comprehensive thinking” (Schulke 2014). These councils provided a relatively long-term, government-supported structure for people from different parts of the state (e.g., White Mountains, Flagstaff, Phoenix, Tucson) and from different perspectives (e.g., academia, business, NGOs, environmental organizations, state agencies, local fire departments). They served as a forum for people to work with and get know one another, to build friendships and alliances, and to create constructive, hopeful solutions. The USFS was represented at meetings during this time and the local and regional USFS leadership knew about the activities of the councils.

2006: Work begins in earnest on the *Statewide Strategy for Restoring Arizona’s Forests*, including holding a May workshop in Flagstaff to receive comments from stakeholders.

April 2007: The subcommittee completes the final working draft of the Statewide Strategy.

May 2007: Six public meetings are held throughout the state to obtain citizen comments about the final working draft of the Statewide Strategy.

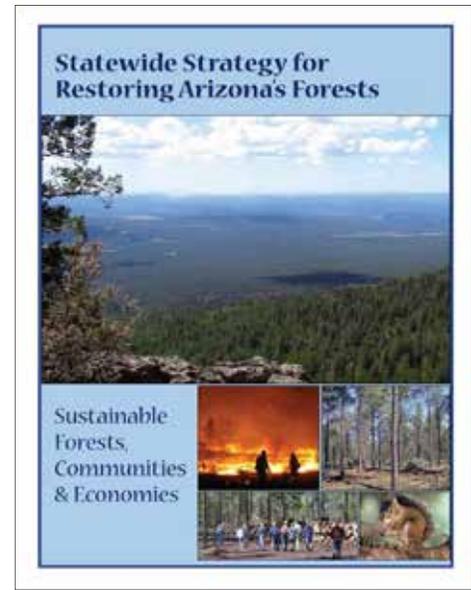
June 2007: The two councils approved the final document, the *Statewide Strategy for Restoring Arizona’s Forests: Sustainable Forests, Communities & Economies* (hereafter, the Statewide Strategy; Aumack et al. 2007), on June 14. They conveyed it to Governor Napolitano on June 21.

### **The Statewide Strategy to Restore Arizona’s Forests**

The Statewide Strategy was a groundbreaking, pro-active document. It outlined five key strategies and made 16 recommendations as to how those strategies might be carried out by various federal and state governmental organizations, agencies, and committees. In these strategies and recommendations, the councils and the governor sought to increase federal funding and state support for restoration/hazardous fuel reduction treatments throughout Arizona. Federal land management agencies were called on to begin planning and working at the landscape level. The Statewide Strategy also outlined a number of ideas for developing and sustaining forest-based business enterprises that could process the type, quality, and quantity of wood removed during thinning operations. The authors of the Economics section also recognized that those same businesses would have to help offset the costs of restoration activities. Finally, the Statewide Strategy provided detailed descriptions of the forested areas within nine bioregions in Arizona—Arizona Strip, Basin and Range, Central Highlands, Chuska Mountains, Kaibab Plateau, Northeastern Woodlands, Sky Islands, Western Mogollon Rim, and White Mountains. These descriptive chapters used ForestERA-based maps as well as text and figures to provide information about the people, wildlife, economic base, collaborative efforts, future restoration needs, and other features of these areas.

The publication of the Statewide Strategy marked a high point in the work of the two councils. It was the councils’ first large product and demonstrated the hopes of those involved, their commitment to the process, and their breadth of knowledge and experience with the issue. The Statewide Strategy, for the first time, put together the overarching concept of landscape-scale, community-supported, industry-funded, accelerated forest restoration. It would serve as a foundational document for all future discussions about forest management in Arizona and was often referred to in discussions with state and federal agencies leading up to the creation of the 4FRI.

Its publication was followed by strong support by Governor Napolitano and significant media coverage throughout the state. Shortly thereafter, the governor dissolved the two councils and created a single group, the Arizona Governor’s Forest Health Council (FHC), which she charged with developing ways to implement the Statewide Strategy (Executive Order 2007-17).



**The *Statewide Strategy for Restoring Arizona’s Forests* was presented to Governor Napolitano on June 21, 2007. It outlined strategies and recommendations to increase federal funding and state support for restoration and hazardous fuel reduction treatments and is regarded as a pivotal document for the development of large-scale restoration efforts like 4FRI.**

### **Analysis of Small-diameter Wood Supply in Northern Arizona**

While not a direct product of the two councils, the *Analysis of Small-diameter Wood Supply in Northern Arizona* (hereafter, the Wood Supply Study; Hampton et al. 2008, Hampton et al. 2011) has its origins in informal meetings among several members of the councils. The need for such a study is clearly described in the Statewide Strategy (Recommendation 6—“Land managers should work with stakeholders to clarify the amount, availability, and location of wood and biomass generated through restoration, community protection and fire management across the region.” Action: “The U.S. Forest Service and other federal land management agencies should fund and participate in a collaborative and objective evaluation of the amount and characteristics of wood and biomass available for utilization across Arizona.” On p. 31, “The U.S. Forest Service should conduct a regional supply analysis to determine availability of woody material and help guide coordination of restoration treatments.”).

Late 2006: Council members, Aumack, Steve Campbell (AZ state representative and NRWG member), Gatewood, Schulke, and Vosick meet informally to discuss the need for an accurate analysis of the wood available in Arizona forests from restoration treatments (Aumack 2014, Schulke 2014). Several members of this group then urged ForestERA to put together a proposal to R3 to carry out this task (Hampton et al. 2008). Davis and Schulke meet with Elaine Zieroth (Supervisor, Apache-Sitgreaves NF) to discuss the idea; Zieroth meets with Forsgren to promote the study (Davis, pers. comm.).

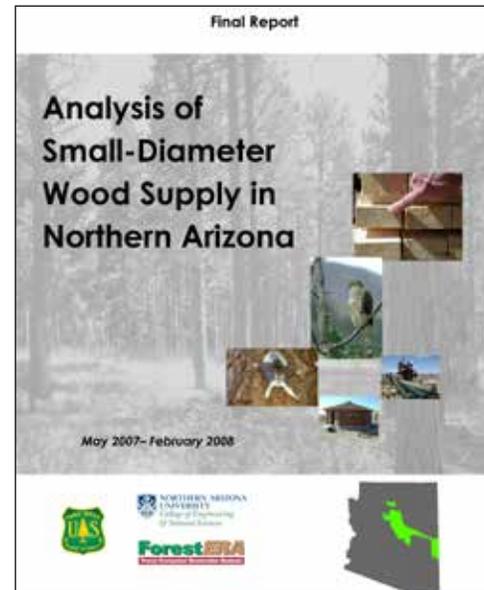
January 2007: Pascal Berlioux, who had been hired in 2006 by Don Walters as President and CEO of the newly incorporated Arizona Restoration Forest Products (AZRFP), makes a presentation to the Governor’s Forest Health Oversight Council. Berlioux tells the council that AZRFP supports the timely undertaking of a collaborative, science-based analysis of the wood supply in Arizona.

Early 2007: Aumack and Schulke meet with Forsgren to discuss the need for such an analysis (Aumack 2014). By April, Forsgren verbally agrees that R3 will fund ForestERA to undertake the study (Wood Supply Steering Committee Meeting Minutes, April 9, 2007). He also sets a number of goals and a deadline for the project. In a letter to Haydee Hampton (lead ForestERA staff member on the project), he outlined his thoughts about the importance of the study: “The utility of the study is threefold. First, it will provide us [USFS R3] a better understanding of the zone of agreement across the broad spectrum of stakeholders of the range of available biomass resulting as a byproduct of various restoration treatment scenarios. Secondly, it will provide an additional dimension to build our discussions at the local level as to the scale and scope of restoration treatments. Thirdly, it will assist both us and potential private investors in assessing the appropriate scale of infrastructure development to utilize the biomass produced as a byproduct of restoration projects” (Forsgren to Hampton, July 19, 2007).

May 2007: A 20-member stakeholder group, including a steering committee of Davis, Gatewood, Schulke, Vosick and Zieroth, begins work on the Wood Supply Study. Sessions are led by ForestERA staff and facilitated by Rosemary Romero. The group met seven times during 2007, beginning in June and ending in late November.

February 2008: The *Analysis of Small-diameter Wood Supply in Northern Arizona* (Hampton et al. 2008) was completed and distributed.

Using up-to-date, remote sensing-based forest structure data, the Wood Supply Study group analyzed potential treatment scenarios for a 2.4-million-acre analysis area across the Mogollon Plateau in order to create a science-based estimate of wood volume in three tree diameter classes (<5”, 5–16”, and >16” diameter at breast height).



**The results from the *Analysis of Small-diameter Wood Supply in Northern Arizona* helped frame an economic and ecological picture of implementing treatments at the landscape scale in northern Arizona, across an area nearly identical to 4FRI.**

The group reached consensus (i.e., 100% agreement) about treatments across two-thirds of the analysis area. Specifically, the group unanimously agreed that 26% of the analysis area should not be considered a source for wood supply from mechanical restoration treatments due to steep topography, endangered species habitat, streamside management zones, and other factors. They also agreed by consensus that 41% of the study area was appropriate for mechanical thinning. In addition, the group reached a high level of agreement, but not consensus, that an additional 33% of the analysis area might be available as a source of wood using mechanical restoration treatments (Hampton et al. 2008).

Within less than a year of the publication of the Statewide Strategy, the stakeholders produced a second document that would prove essential in terms of setting the stage for 4FRI. The Wood Supply Study was the result of the experience gained in the earlier landscape assessment/stakeholder processes by ForestERA and many others within the study group. Equally important, it was the first collaborative project of this scale that worked closely with the R3 Office. The results of the consensus-approved scenarios showed that even when hundreds of thousands of acres were taken “off the table,” there was still more than 1 million acres with enough trees and biomass to support a wood products industry and allow it to find investors for needed infrastructure improvements. It helped all parties put a realistic economic and ecological frame on the issue of implementing restorative treatments at the landscape scale in northern Arizona, across an area that turned out to be nearly identical to the area of 4FRI. Moreover, despite some hard feelings about the way consensus was reached, the group did find a zone of agreement or “social license” that Forsgren felt R3 needed to proceed with its plans for accelerated restoration of fire-adapted ponderosa pine forests in the area.

During roughly the same period the stakeholders were developing the Wood Supply Study, Forsgren organized a USFS regional task group to study the feasibility of developing one or more long-term stewardship contracts within the region. By December 2007, the group produced a draft Multi-Forest Stewardship Contract Feasibility Assessment in which they concluded the most effective way to accomplish landscape-scale treatments would be through the creation of multi-forest planning, preparation, and contract administration teams dedicated to the project.

The positive results of the Wood Supply Study raised hopes that the USFS would be able to quickly implement its first on-the-ground, landscape-scale restoration treatment in the area. This was especially the case because, realistically or not, Forsgren “promised” such a level of action within 90 days of the completion of the study (Aumack 2014, Gatewood 2014, Pitts 2014, Sisk 2014, Schulke 2014; also see letter from Forsgren to Gatewood, July 2007, which suggests a Request for Proposal by December 2007/January 2008). However, while some stakeholders thought the Wood Supply Study results would provide an immediate springboard for decisive action and on-the-ground implementation, events and actions proved otherwise.

In late 2007, Forsgren left his job as R3 Regional Forester. His deputy, Gilbert Zepada, was named acting Deputy Regional Forester, and Corbin Newman was eventually assigned to replace him. Although concerted efforts continued forward, there was an emotional letdown and an immediate sense of uncertainty, especially from those representing industry, environmental organizations, and local communities (Aumack 2014, Pitts 2014, Sisk 2014). Davis made this observation: “I really don’t know exactly why, but there was something that occurred between the supply study being finished, a few discussions with the Forest Service about what they were going to do, and then all of a sudden the 4FRI took off. I don’t know who and why that really happened, but there is something significant during that period. At one time I thought it was all just going to go away” (Davis 2012).

## **The Pivotal Years: Accelerated Restoration, Pilot Study, New Alliances, CFLRP, 2008-early 2009**

During 2008 and the early months of 2009 numerous activities took place to promote and accelerate the implementation of forest restoration in Arizona, in particular: 1) continued work by the new Forest Health Council to implement the Statewide Strategy and use the findings and social license of the Wood Supply Study; 2) increased engagement by R3 and the four national forest supervisors in northern Arizona with the Forest

Health Council; 3) efforts in the U.S. Congress that would result in the creation of the Collaborative Forest Landscape Restoration Program (CFLRP); and 4) the development of a new alliance between the AZFRP and environmental groups, highlighted by their April 2009 Memorandum of Understanding.

### ***The Governor's Forest Health Council (2008–2009)***

The Governor's Forest Health Council (FHC) was now focused on implementing the Statewide Strategy. To that end, the FHC discussed and implemented various activities, including:

- Securing support and funding from government officials and NGOs at all levels for implementation of the Statewide Strategy using the information and social license obtained during the Wood Supply Study, and to maintain a high level of political pressure/concern on the U.S. Forest Service for landscape-level treatments on national forests in Arizona.

To help accomplish this goal, Berlioux and Aumack made presentations to all seven northern Arizona counties, the Northern Arizona Council of Government, the Eastern Arizona County Organization, and the County Supervisors Association of Arizona from December 2008 to February 2009. They secured resolutions of support from these groups for industry-supported, landscape-scale, accelerated restoration in northern Arizona as outlined in the Statewide Strategy. Copies of the county-signed resolutions were sent to R3 (Aumack 2014, Berlioux 2014).

- Assisting the USFS in conceptualizing and implementing their plans for accelerated restoration and/or other restoration-related activities.

There were two documents produced by the FHC at this time—*Fire on the Landscape: Planning for Communities, Fire, and Forest Health* (Falk et al. 2008) and *The Guiding Principles for Forest Restoration and Community Protection: Wildlife Habitat*, developed by Steve Rosenstock from the Arizona Game and Fish Department and other stakeholders (i.e., Schulke and Gatewood).

There was also a change in FHC leadership with Pitts replacing Vosick as the co-chair with Aumack.

### ***U.S. Forest Service and the Forest Health Council: Accelerated Restoration and the Pilot Project (2008–2009)***

Corbin Newman turned out to be a strong, although more cautiously pragmatic, supporter of accelerated restoration in the Southwest (Covington 2014, Rasure 2014, Williams 2014). Very shortly after arriving in Albuquerque, he attended a FHC meeting to discuss the Statewide Strategy and the Wood Supply Study, the Forest Plan revisions process, R3 staffing changes, and to quell rumors that the White Mountain Stewardship Contract would be cancelled (Minutes of the FHC, March 13, 2008). He met with the FHC again in June 2008 and indicated that R3 was now looking closely at how to accelerate restoration at the landscape scale, but that it wouldn't happen as soon as some people hoped because of the scope of the treatment (35,000–100,000 acres as opposed to the then typical project size of 5,000–10,000 acres) and the amount of work involved. He proposed that R3 and representatives of the FHC work together to study this issue (Minutes of the FHC, June 12, 2008).

The FHC agreed and they formed the Southwestern Region Restoration Task Force, which met four times during August and September 2008. This group was co-chaired by Williams (Kaibab NF) and Don Bright (R3 Director, Forest Management), and included FHC representation from Berlioux, Gatewood, Scott Higginson (Renergy Holding, Inc.), and Schulke. In October 2008, they produced a draft report titled,

*Alternative Approaches to Accelerating Forest Restoration in Northern Arizona* (Southwestern Region Restoration Task Force 2008). This study looked at five contracting and implementation alternatives and what each would mean in terms of both the efficiencies of planning operations and shifting costs away from the U.S. Forest Service (Berlioux 2014, Gatewood 2014). While the draft report did not affirm any one of the alternatives, it did conclude that doing business-as-usual (i.e., relatively small projects, carried out by individual forests, working within the compartmentalized organizational structure) would not work for large-scale forest treatments given the present budget and political climate.

Shortly after the release of the Wood Supply Study, Rasure (Coconino NF) and Williams (Kaibab NF) expanded their conversations about accelerated restoration to include Gene Blakenbaker (Supervisor, Tonto NF) and Chris Knopp (Supervisor, Apache-Sitgreaves NF) (Rasure 2014). Newman encouraged these meetings because he wanted the four supervisors to discuss realistic ways to move ahead using the ideas developed in the Statewide Strategy and the data from the Wood Supply Study (Rasure 2014, Williams 2014). At times, these meetings included personnel from R3, including directors and regional foresters (Rasure 2014). They signaled a move away from each forest working on its own individual projects and toward a four forest restoration strategy (Rasure 2014). During this same period, the Kaibab NF also launched the Kaibab Forest Health Focus project. It produced a series of recommendations for high-priority areas on all three districts of the Kaibab National Forest, and provided guidance about restoration treatments and other appropriate management actions (ForestERA 2009).

During 2008 and the first quarter of 2009, the four forest supervisors, R3 personnel, and various invited stakeholders (e.g., Aumack, Berlioux, Covington, Schulke, Ed Smith (The Nature Conservancy), U.S. Fish & Wildlife Service representatives; Rasure 2014, Williams 2014) discussed the topics of accelerated restoration as well as a “pilot project” that the ERI had moved forward following numerous conversations with the OMB and other officials in Washington, D.C. (Covington 2014, Murfitt 2014). Parallel discussions took place at FHC meetings under the headings of the Implementation Plan (accelerated restoration based on the Wood Supply Study and the Southwestern Region Restoration Task Force report) and the Northern Arizona Pilot Project (Minutes of the FHC, 2008-2009).

While these discussions and meetings were important to the continuing progress toward forest restoration on public lands in Arizona, they were ultimately overshadowed by the passage of the Collaborative Forest Landscape Restoration Program (CFLRP) legislation and the subsequent effort to establish the 4FRI as a CFLRP project. The Northern Arizona Pilot Project never took place, although the work by the FHC Landscape Working Group toward that goal helped shape the Four Forest Strategy by identifying project objectives as well as the scale of the project and the best locations (FHC letter to Newman, November 23, 2008). The FHC was able to garner local political support through its resolution for accelerated forest restoration. Enough support, in fact, to prompt Newman to send a letter to the FHC that among other things stated, “The four forest supervisors have recently agreed to take the following actions.: 1) Develop a four-forest strategy for evaluating large landscapes and identifying priorities for treatments taking full advantage of the wood supply study. 2) Work expeditiously to identify planning, contracting, and collaboration mechanisms that support an acceleration of restoration consistent with the wood supply study consensus agreement. 3) Identify and implement a streamlined environmental analysis methodology that meets National Environmental Policy Act and all other pertinent legal requirements. 4) Organize and aggressively complete restoration across a 750,000-acre landscape within the wood supply study area by the end of the next decade. 5) Implement thinning and fuels reduction projects using long-term stewardship contracts, agreements and other tools that provide for reasonable assurance of long-term wood supply” (Newman to Aumack and Pitts, March 9, 2009).

March 9, 2009: A stakeholder meeting is held to develop points of agreement (a precursor to the Path Forward) about implementation of accelerated restoration across northern Arizona; these talking points were sent to R3. At this meeting, the effort went from being called the Four Forest Restoration Strategy to the Four Forest Initiative.

### ***The Collaborative Forest Landscape Restoration Program Legislation (2007-2009)***

The U.S. Congress established the Collaborative Forest Landscape Restoration Program (CFLRP) when it passed [Title IV of the Omnibus Public Land Management Act of 2009](#) on March 30, 2009. This federal law brought the needed focus and funding to collaborative forest restoration efforts, not only in Arizona, but throughout the western

United States. It provided the “mechanism” (Covington 2014) and the “way” (Williams 2014) for the USFS and its collaborative partners to proceed with landscape-scale restoration on the four forests in northern Arizona. Efforts to move this idea through Congress began in 2007 and came from several NGOs, in particular The Nature Conservancy, with support from American Forests, the Forest Guild, Sustainable Northwest, the Watershed Research and Training Center, and Conservation Northwest. United States Senator Jeff Bingaman (NM) was the major proponent of the legislation in the Senate, with Scott Miller of the senator’s staff as the chief author of the legislation; Senator Diane Feinstein (CA) and Senator Peter Domenici (NM) and their staffs were also consulted and involved. Congressman Raul Grijalva (AZ) and his staff played an active role in the House of Representatives. Both R3 and FHC stakeholders knew about the proposed legislation when it was first introduced in 2008 with some groups, like the GFFP, writing [letters of support](#).

### ***The Emerging Alliance between AZFRP, Northern Arizona County Representatives, and the Environmental Community***

When Berlioux first became active within the stakeholder group, he was by his own admission “pretty naïve” about what had gone on beforehand and, being used to the “matter-of-fact, get it done or get out the way” business world, was unsure how to act in the collaborative environment of stakeholder-driven discussions (Berlioux 2014). However, he had enough business acumen to see that he had to find allies and build support, for the AZFRP to succeed. To that end, Berlioux took several initial steps to make himself and AZFRP a legitimate, large-scale, wood products industry stakeholder.

December 2006 to July 2007: Berlioux made presentations to various groups about the AZFRP proposal for construction of an oriented strand board production facility in Winslow and associated biomass electricity-generating facilities along the Mogollon Rim. He secured resolutions and letters of support for the AZFRP proposal from all seven counties of northern Arizona (Navajo, Apache, Gila, Greenlee, Graham, Yavapai, Coconino), the Northern Arizona Council of Government, the Eastern Arizona County Organization, and numerous communities and organizations (e.g., Flagstaff Mayor, City of Winslow, Society of American Foresters).

October 2007: The AZFRP released the *Impact Analysis of Arizona Forest Restoration Products’ Oriented Strand Board Facility* report (Hjerpe and Gunderson 2007), which concluded that the AZFRP business proposal would support 600 jobs and inject \$170 million annually in the northern Arizona economy.

Berlioux also became active as a public participant at the Forest Health Council, and was a contributing member of the Wood Supply Study Working Group and other stakeholder groups. During his participation as part of the Southwestern Region Restoration Task Force, Berlioux showed his business plan data to R3 staff and believes he convinced them and Forsgren that “industry-supported restoration” was a viable alternative (Berlioux 2014).

Through these efforts, Berlioux began to gain favor with leaders from the environmental community and the local government community, both of whom earlier had serious doubts about him and the type of business he had in mind (Berlioux 2014, Schulke 2014, Pitts 2014, Tenney 2012, Stephenson 2012). In particular, local government representatives came to see the AZFRP as a legitimate solution to help boost their rural economies during the economic downturn of the late 2000s as well as to safeguard their communities from wildfires (Tenney 2012, Stephenson 2012).

April, 2009: Signing of a Memorandum of Understanding between Arizona Forest Restoration Products, Inc., the Center for Biological Diversity and the Grand Canyon Trust, to Work Cooperatively to Restore Degraded Ponderosa Pine Ecosystems in Northern Arizona. Signatures: Pascal Berlioux (AZFRP), Taylor McKinnon (CBD), and Ethan Aumack (GCT).

In early 2008, after the Wood Supply Study was released and as the hoped-for pace of accelerated restoration slowed and the process of more studies and discussions resumed, some stakeholders had a “fear of non-action” and a sense that only “forceful politics” was going to make R3 move forward with any urgency (Aumack 2014, McKinnon 2012, Schulke 2014). The idea for the MOU developed in response to those thoughts. After working

with Berlioux during the Wood Supply Study, Schulke began to think that the AZFRP had the “appropriate” business philosophy and scope (i.e., industry-supported restoration using only small-diameter trees, working at a landscape scale) to garner the support of environmental groups (Schulke 2014). In addition, he recognized that Berlioux had developed a significant level of support from local community leaders in northern Arizona. Sometime that spring, Berlioux met with Schulke and showed him all the details of the AZFRP business plan and answered his questions about it (Berlioux 2014). A level of trust emerged from that discussion that convinced both parties they could and should show support for one another in a public way in order to push the USFS and the process forward (Berlioux 2014, Schulke 2014). However, because the MOU was a “huge political risk” for the CBD, it took “a long time” to negotiate the final draft (Schulke 2014). The connection between Berlioux and Aumack was likewise strengthened during this period, especially as they began working together obtaining endorsements from the counties and NGOs for the FHC resolution supporting accelerated forest restoration in Arizona. They both considered that resolution an important means of providing the “forceful politics” needed given the situation; the MOU was another step (Berlioux 2014).

The public reaction to the MOU was memorable. The three parties expected their statement to be very well received, but a number of other stakeholders, as well as some in the R3 leadership, were decidedly upset by it (Aumack 2014, Berlioux 2014, McKinnon 2012, Schulke 2014, Sisk 2014). The reasons for this negative reaction were numerous but revolved around the lack of consultation with the rest of the then-forming 4FRI stakeholder group and wording in the MOU which gave the impression that the contractor (AZFRP) could make implementation decisions independent of the USFS and the collaborative group (e.g., excluding thinning any trees greater than 16 inches in diameter at breast height). However, various local and Washington-based officials in the USFS, along with some stakeholders, did value having an agreement between industry and environmental interests that suggested a way forward without litigation or other interferences. As Aumack points out, “The intent of the MOU, from my perspective, was that it would take off the table the traditional rationale for not moving forward with landscape-scale restoration, thereby forcing everybody, meaningfully, to agree. And it had that effect, and it had some very negative consequences to go along with it in terms of being politically forceful” (Aumack 2012).

## **Emergence of 4FRI: April 2009–August 2010**

With the passage of Title IV of the Omnibus Public Land Management Act of 2009, the way became clear for landscape-scale, community-supported, industry-funded, accelerated forest restoration in northern Arizona. Now there was federal legislation available to financially and structurally support the kind of forest and community restoration efforts that people and organizations in Arizona had worked so long and hard to achieve.

During its first year of operation, 4FRI began to organize both in terms of the collaborative stakeholders and the USFS. The 4FRI Collaborative Stakeholder Group (4FRISG) established a steering committee, various working groups (Landscape Strategy, Science and Monitoring, Communications, Industry Engagement, and CFLRP Proposal), developed a charter (4FRISG 2010c), and several other important foundational documents. Additionally many members of the stakeholder group made multiple trips to visit key politicians and agency personnel in Washington, D.C. to advocate for the 4FRI concept and funding to support its implementation. For their part, the four forests (Apache-Sitgreaves, Coconino, Kaibab, Tonto) assigned a project team leader (Henry Provencio) and several other staff members (e.g., Mike Chaveas, Courtney Schultz, Linda Wadleigh). They also hired meeting facilitators, and began discussions among their staff and the stakeholder group about how to proceed.

Two items were of immediate concern: 1) developing *The Path Forward* (4FRISG 2010a) as a foundational document to guide implementation of the 4FRI Project and 2) preparing the proposal for acceptance into the CLFRP. While these were not the only activities that the stakeholder group undertook, these two became the highest priority because the project had not yet been authorized for funding and, in order to receive authorization, the group needed to demonstrate that there was an agreed-upon social license to implement the project.

### ***The Path Forward***

May 2009: R3 hosts a stakeholder meeting in Flagstaff on May 1 to discuss the “Four Forest Restoration Initiative”—the first official use of the name in a public forum. A topic of discussion is R3’s uneasiness with the proposed limits (i.e., “sideboards”) for landscape-scale restoration that were expressed in the so-called “Points of Agreement” document. This document came out of discussions between R3 and stakeholders during the development of the draft 2008 accelerated restoration report by the Southwestern Region Restoration Task Force.

May 2009: A group of 12 stakeholders is formed on May 11 to begin work on a document that would come to be known as *The Path Forward*. These stakeholders include: Aumack (GCT), Berlioux (AZFRP), Covington (ERI), Bruce Greco (ERI), Shaula Hedwall (USFWS), McKinnon (CBD), Pitts (NAWPA), Sarah Reif (AZGF), Rosenstock (AZGF), Schulke (CBD), Ed Smith (TNC), and Larry Stephenson (EACO).

The development of *The Path Forward* took longer than expected and revisited many of the issues that had divided the stakeholders for years (i.e., old-growth trees/large-tree retention/diameter caps) as well as reviving a growing concern, also experienced during the Wood Supply Study, that having both majority and unanimous consensus decisions was the proper means for making decisions in this situation. In order to break through these contentious issues, the stakeholders adopted a consensus decision matrix that allowed members to express agreement while simultaneously articulating their reservations. After many months of work and several drafts, the 4FRISG finally adopted *The Path Forward* in March, 2010. Many stakeholders used the matrix to document their reservations, but ultimately supported the document and explicitly agreed to not undercut the agreement in the future. Whatever its weaknesses, the document provided a serviceable zone of agreement for the theoretical and practical work ahead and included a vision, principles, key strategies, and sideboards for implementation.



**On August 13, 2010, the Secretary of Agriculture selected the 4FRI Project as one of the first CFLRP projects in the country.**

### ***The 4FRI Stakeholder Group Charter***

Adoption of *The Path Forward* set the stage for another foundational document, the 4FRI Stakeholder Group Charter, which was signed by 40 signatories from 28 organizations in June, 2010. The charter laid out the 4FRI vision and mission as well as key actions needed to achieve these goals. The organizational structure outlined in the charter included a steering committee, working groups, and a rotating chair. It also included a matrix of decision rules and deliberation for guiding agreements or disagreements, role of facilitation, collaborative and communication norms, annual self-evaluation, and guidelines for membership and participation to enable participation from among the wide range of interests. The charter’s mission also helped shape the goals of the Memorandum of Understanding between the stakeholders and the USFS.

### ***The CFLRP Proposal***

The CFLRP legislation includes an extensive review process that requires interested stakeholder groups and their partners in the USFS to submit a detailed account of the need for a collaborative landscape-scale forest restoration projects and supporting evidence as to why they believe the project will be successful.

April 2009: The USFS releases a Request for Information (RFI) for a Four Forest Restoration Initiative (4FRI) Project.



**Top: The 4FRI Stakeholder Group along with all four forest supervisors met on February 23, 2011 to sign a Memorandum of Understanding. Bottom (left to right): Coconino National Forest Supervisor Earl Stewart; Navajo County Supervisor David Tenney; and Coconino County Supervisor Mandy Metzger. Photos courtesy of ERI**

February–March 2010: Minutes from 4FRI meetings indicate that the proposal, the writing of which was led by USFS 4FRI Assistant Team Leader, Courtney Schultz, was completed in draft form in March 2010. Titled, *The 4 Forest Restoration Initiative: Promoting Ecological Restoration, Wildfire Risk Reduction, and Sustainable Wood Products Industries: A proposal for funding under the Collaborative Forest Landscape Restoration Program* (4FRISG 2010b), it was submitted to R3 for its review by the end of that month, and sent to USFS Washington Office by the May 14 deadline for final proposals. The Washington Office reviewed all proposals and sent their decision by August, 2010.

August 2010: On August 13, 2010, the Secretary of Agriculture announced the selection of ten CFLRP projects in nine states. The 4FRI Project was named as one of the first CFLRP projects in the country and was awarded \$2 million through the CFLRA grant, plus an additional \$1 million from the USFS “Chief’s Reserve.”

After receiving CFLRP authorization, the 4FRISG and the USFS continued working on various issues, in particular finalizing a [Memorandum of Understanding](#), which was signed by all four forest supervisors and 20 stakeholders representing industry, environmental, county, and academic interests on February 23, 2011. This MOU outlined the following goals:

- “1) accelerate landscape-scale restoration across the Mogollon Rim to support resilient, diverse stands, that sustain populations of native plants and animals;
- 2) restore forests so they pose less threat of destructive wildfire to forest communities;
- 3) create sustainable forest industries that strengthen local economies while conserving natural resources and aesthetic values; and
- 4) engage the public at large through increased public outreach, education, and support for this initiative.”

Working collaboratively at the landscape scale to restore ponderosa pine forest ecosystems in Arizona had finally become a reality. However, much work remained after signing the MOU, including awarding the largest stewardship contract in USFS history, a massive NEPA planning process, followed by several stages of implementation, monitoring, and adaptive management.

## Conclusion

The 4FRI emerged and evolved from a number of ideas and a series of purposeful actions with the common goal of achieving landscape-scale forest restoration in the ponderosa pine ecosystems of northern Arizona. Extraordinary in its vision and scope, 4FRI developed from a dynamic confluence of ecological and socio-political changes, policy openings, stakeholder and government learning experiences with smaller-scale projects (e.g., White Mountain Stewardship Contract), and consistent pressure from both outside and inside the USFS for a significant change and adaptation. A review of 4FRI's history also strongly suggests that groups who are able to make collective decisions possess real power through the use of the collaborative process. However, this means having the resolve to keep the larger goal in mind at all times, and overcoming the emotional turmoil often created by individualistic or potentially divisive actions.

Whether 4FRI will achieve its various goals remains a work-in-progress. However the project unfolds, the history of 4FRI exemplifies the willingness of diverse interests to face a significant problem and work toward an ecologically and socially acceptable solution.

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A visual timeline of events documenting the history of 4FRI from the 1980s to 2010 is available online at <http://prezi.com/iwdz-m7horl8/the-history-of-4fri/>.

## References

- Abrams, J. 2011. The policy context of the White Mountain Stewardship Contract. Pages 163-176 in D. Egan, E.E. Hjerpe, and J. Abrams, eds, *Human dimensions of ecological restoration: Integrating science, nature, and culture*. Washington, DC: Island Press.
- \_\_\_\_\_. 2005. *Report on a needs assessment for collaborative landscape planning in the White Mountains of Arizona*. Flagstaff, AZ: Ecological Restoration Institute.
- Abrams, J., H. Hampton, J. Prather, B. Dickson, J. Rundall, Y. Xu, J. Anderson, and T. Sisk. 2005. *Report on the White Mountains Landscape Assessment: A collaborative, science-based approach to forest restoration in eastern Arizona*. Flagstaff, AZ: Ecological Restoration Institute and Forest Ecosystem Restoration Analysis Project, Northern Arizona University.
- Abrams, J. and S. Burns. 2007. *Case study of community stewardship success: The White Mountain Stewardship Contract*. ERI-Issues in Forest Restoration. Flagstaff, AZ: Ecological Restoration Institute.
- Allen, C.D., M. Savage, D.A. Falk, K.F. Suckling, T.W. Swetnam, T. Schulke, P.B. Stacey, P. Morgan, M. Hoffman, and J.T. Klingel. Ecological restoration of southwestern ponderosa pine ecosystems: A broad perspective. *Ecological Applications* 12(5):1418-1433.
- Arizona Governor's Forest Health Oversight Council. 2004. *The report of the Arizona Governor's Forest Health Oversight Council*. Phoenix, AZ: Arizona Governor's Forest Health Oversight Council.
- Aumack, E. 2014. Interview with D. Egan, Feb. 25.
- \_\_\_\_\_. 2012. Interview with W. Greer Selig.
- Aumack, E., T. Sisk, and J. Palumbo, eds. 2007. *Statewide strategy for restoring Arizona's forest: Sustainable forests, communities, and economies*. State of Arizona, Governor's Forest Health Councils. Phoenix: Arizona Public Service.
- Berg, P., ed. 1978. *Reinhabiting a separate country: A bioregional anthology of northern California*. San Francisco: Planet Drum.
- Berlioux, P. 2014. Interview with D. Egan, March 5.
- Bosworth, D. and H. Brown. 2007. After the Timber Wars: Collaborative community-based stewardship. *Journal of Forestry* 105(5):271-273.
- Combrink, T., C. Cothran, W. Fox, J. Peterson, and G. Snider. 2013. *A full cost accounting of the 2010 Schultz Fire*. ERI—Issues in Forest Restoration Series. Flagstaff, AZ: Ecological Restoration Institute.
- Cortner, H.J., D.R. Field, P. Jakes, and J.D. Buthman, eds. 2003. *Humans, fires, and forests: Social science applied to fire management, A workshop summary*. Flagstaff, AZ: Ecological Restoration Institute.
- Covington, W.W. 2014. Interview with D. Egan, Feb. 25.
- \_\_\_\_\_. 2003. Restoring ecosystem health in the frequent-fire forests of the American West. *Ecological Restoration* 21(1):7-11.
- Covington, W.W. and M.M. Moore. 1994. Southwestern ponderosa forest structure changes since Euro-American settlement. *Journal of Forestry* 92(1):39-47.

- Davis, R. 2012. Interview with W. Greer Selig.
- DeGomez, T. 2003. Arizona Bark Beetle Outbreak – Fall 2003 Update. Flagstaff: University of Arizona Cooperative Extension.
- DellaSala, D.A., A. Martin, R. Spivak, T. Schulke, B. Byrd, M. Criley, C. van Daalen, J. Kreilick, R. Brown, and G. Aplet. 2003. A citizen's call for ecological forest restoration: Forest restoration principles and criteria. *Ecological Restoration* 21(1):14-23.
- Egan, D. and E.A. Howell, eds. *The historical ecology handbook: A restorationist's guide to reference ecosystems*. Washington, D.C.: Island Press.
- Falk, D., C. Cox, D. Hill, T. McKinnon, E. Rosenberg, K. Siderits, and T. Swetnam. 2008. *Fire on the landscape: Planning for communities, fire, and forest health*. Report of the Arizona Forest Health Council to the Office of the Governor. Tucson, AZ.
- ForestERA. 2009. The Kaibab Forest Health Focus. Flagstaff, AZ: ForestERA, Northern Arizona University.
- Gatewood, S. 2014. Interview with D. Egan, Feb. 24.
- Forman, R.T.T. 1995. *Land mosaics: The ecology of landscapes and regions*. Cambridge, England and New York: Cambridge University Press.
- Forman, R.T.T. and M. Godron. 1986. *Landscape ecology*. New York: John Wiley.
- Franklin, J.F. and R.T.T. Forman. 1987. Creating landscape patterns by forest cutting: ecological consequences and principles. *Landscape Ecology* 1:5-18.
- Friederici, P. 2003. The "Flagstaff Model." Pages 7-25 in P. Friederici, ed., *Ecological restoration of southwestern ponderosa pine forests*. Washington, DC: Island Press.
- Four Forest Restoration Initiative Stakeholder Group. 2010a. Path Forward. Available on the web at [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5180874.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5180874.pdf).
- Four Forest Restoration Initiative Stakeholder Group. 2010b. The 4 Forest Restoration Initiative: Promoting Ecological Restoration, Wildfire Risk Reduction, and Sustainable Wood Products Industries. A proposal for funding under the Collaborative Forest Landscape Restoration Program. Flagstaff, AZ: Ecological Restoration Institute and US Forest Service.
- Four Forest Restoration Initiative Stakeholder Group. 2010c. Four Forest Restoration Initiative Stakeholder Group Charter. Available on the web at [http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5180873.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5180873.pdf).
- General Accounting Office. 1999. Western National Forests: A cohesive strategy is needed to address catastrophic wildfire threats. General Accounting Office Report GAO/RCED—99-65. Washington, DC: General Accounting Office.
- Grumbine, E. 1994. What is ecosystem management? *Conservation Biology* 8(1):27-38.
- Hampton, H.M., S.E. Sesnie, B.G. Dickson, J.M. Rundall, T.D. Sisk, G.B. Snider, and J.D. Bailey. 2008. Analysis of Small-Diameter Wood Supply in Northern Arizona. Forest Ecosystem Restoration Analysis Project, Center for Environmental Sciences and Education, Northern Arizona University.

- Hampton, H.M., S.E. Sessie, J.D. Bailey, and G.B. Snider. 2011. Estimating regional wood supply based on stakeholder consensus for Forest Restoration in northern Arizona. *Journal of Forestry*. 109(1), 15-26
- Hjerpe, E. and R.J. Gunderson. 2007. *Impact analysis of Arizona Forest Restoration Products' oriented strand board facility*. Flagstaff, AZ: Northern Arizona University, The W.A. Franke College of Business, The Center for Business Outreach.
- Kyl, J. 2002. Environmental activists place forests at risk. *Arizona Republic*, B9. June 26.
- Landres, P.B., P. Morgan, and F.J. Swanson. 1999. Overview of the use of natural variability concepts in managing ecological systems. *Ecological Applications* 9(4):1179-1188.
- Laverty, L. and J. Williams. 2000. Protecting people and sustaining resources in fire-adapted ecosystems: A cohesive strategy. The Forest Service Management Response to the General Accounting Office Report GAO/RCED—99-65. Washington, DC: U.S. Forest Service.
- Logan Simpson Design Ltd. 2004. *Community Wildfire Protection Plan for at-risk communities of the Sitgreaves National Forest in Apache, Coconino, and Navajo counties*. Tempe, AZ: Logan Simpson Design Ltd.
- Malakoff, D. 2002. Arizona forest ecologist puts stamp on forest restoration debate. *Science* 297:2194-2196.
- Marlette, J. 2004. *Greater Flagstaff Forest Partnership: A research reference guide, second edition*. Flagstaff, AZ: Greater Flagstaff Forest Partnership.
- Mast, J.N., P.Z. Fule, M.M. Moore, W.W. Covington, and A.E.M. Waltz. 1999. Restoration of a presettlement age structure of an Arizona ponderosa pine forest. *Ecological Applications* 9(1):228-239.
- Mater Engineering. 2004. A CROP pilot project design and implementation project for the Greater Flagstaff Forest Partnership. Corvallis, OR: Mater Engineering.
- \_\_\_\_\_. 2002. Restoration resource and investment potential final report. Corvallis, OR: Mater Engineering.
- McKinnon, T. 2012. Interview with W. Greer Selig.
- Moore, K., B. Davis, and T. Duck. 2003. Mt. Trumbull Ponderosa Pine Restoration Project. Pp. 117-132 in USDA Forest Service Proceedings, RMRS-P-29.
- Moore, M.M., W.W. Covington, and P.Z. Fule. 1999. Reference conditions and ecological restoration: A southwestern ponderosa pine perspective. *Ecological Applications* 9(4):1266-1277.
- Moote, A. and D. Becker. 2003. *Exploring the barriers to collective forestry: Report from a workshop held at Hart Prairie, Flagstaff, AZ, September 17-19, 2003*. Flagstaff, AZ: ERI Papers in Restoration Policy. <http://library.eri.nau.edu/gsd/collect/erilibra/index/assoc/HASH724e.dir/doc.pdf>.
- Muller, S. 2004. Governor takes get-tough approach to fire. *Arizona Daily Sun*, February 10.
- Murfitt, L. 2014. Interview with D. Egan, March 4.
- Noss, R.F. and A.Y. Cooperrider. 1984. *Saving nature's legacy: Protecting and restoring biodiversity*. Washington, DC: Island Press.
- Pitts, M. 2014. Interview with D. Egan, Feb. 21.
- Rasure, N. 2014. Interview with D. Egan, Feb. 25.

- Reynolds, R.T., R.T. Graham, and M.H. Reiser. 1992. Management recommendations for the northern goshawk in the southwestern United States. Gen. Tech. Rep. RM-GTR-217. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station.
- Risser, P.G., J.R. Karr, and R.T.T. Forman. 1983. *Landscape ecology: Directions and approaches*. Illinois Natural History Survey, Special Publication Number 2. Champaign: Illinois Natural History Survey.
- Sale, K. 1985. *Dwellers in the land: The bioregional vision*. New York: Random House.
- Schulke, T. 2014. Interview with E. Nielsen, April 12.
- Schumacher, E.F. 1973. *Small is beautiful: Economics as if people mattered*. London: Blond & Briggs Ltd.
- Sierra Club, Arizona Chapter. 2002. *Mistaken and misinformed on Arizona fires*. News release, June 24. [http://arizona.sierraclub.org/pr\\_and\\_alerts/pr\\_and\\_alerts\\_2002/alert\\_06-22-02.asp](http://arizona.sierraclub.org/pr_and_alerts/pr_and_alerts_2002/alert_06-22-02.asp).
- Sisk, T.D. 2014. Interview with D. Egan, March 15.
- Sisk, T.D., H.M. Hampton, J. Prather, E.N. Aumack, Y. Xu, M.R. Loeser, T. Munoz-Erickson, B. Dickson, and J. Palumbo. 2004. *Western Mogollon Plateau Adaptive Landscape Assessment Report*. Flagstaff: Northern Arizona University, Center for Environmental Sciences and Education. [http://www.forestera.nau.edu/docs/Products/WMPALA/WMPALA\\_FinalReport\\_Vol2.pdf](http://www.forestera.nau.edu/docs/Products/WMPALA/WMPALA_FinalReport_Vol2.pdf).
- Sisk, T.D., M. Savage, D.A. Falk, C.D. Allen, E. Muldavin, and P. McCarthy. 2005. A landscape perspective for forest restoration. *Journal of Forestry* September:319-320.
- Sitko, S. and S. Hurteau. 2010. *Evaluating the impacts of forest treatments: The first five years of the White Mountain Stewardship Project*. Phoenix, AZ: The Nature Conservancy.
- Stephenson, L. 2012. Interview with W. Greer Selig.
- Society for Ecological Restoration (SER) Science and Policy Working Group. 2004. *SER primer on ecological restoration*. Tucson, AZ: Society for Ecological Restoration
- Southwest Forest Alliance. 1996. *Forests forever! A plan to restore ecological and economic integrity to the Southwest's national forests and forest dependent communities*. Flagstaff, AZ: Southwest Forest Alliance.
- \_\_\_\_\_. 2000. *Why the Flagstaff Restoration Model should not be applied to public forest lands*. Flagstaff, AZ: Southwest Forest Alliance.
- Southwestern Region Restoration Task Force. 2008. Alternative approaches to accelerating forest restoration in northern Arizona. Unpublished internal document. Albuquerque, NM: US Forest Service Region 3.
- Steen, H.K. 2000. Traditional forestry hits the wall: Excerpt of an interview with F. Dale Robertson (August 12-14, 1999). *Forest History Today* Spring:2-8.
- Sturtevant, V., M.A. Moote, P. Jakes, and A.S. Cheng. 2005. Social science to improve fuels management: A synthesis of research on collaboration. Gen. Tech. Rep. NC-257. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Station.
- Swetnam, T.W., C.D. Allen, and J.L. Betancourt. 1999. Applied historical ecology: Using the past to manage the future. *Ecological Applications* 9(4):1189-1206.
- Taylor, D. 2003. Thinking small diameter: An interview with Brett KenCairn. *Ecological Restoration* 21(1):29-33.

Tenney, D. 2012. Interview with W. Greer Selig.

Tilt, W. 2005. Lessons from community-based collaboration in the West. *The Quivira Coalition Newsletter* 7(2):1, 22-30.

U.S. Department of the Interior (USDI) and U.S. Department of Agriculture (USDA). 2000. Managing the impact of wildfires on communities and the environment: A report to the President in response to the wildfires of 2000. Washington, DC: U.S. Department of the Interior and U.S. Department of Agriculture.

U.S. Forest Service, Restoration Framework Team. 2006. Ecosystem restoration: A framework for restoring and maintaining the nation's forests and grasslands. Washington, DC: USDS Forest Service. [http://www.fs.fed.us/restoration/documents/RestFramework\\_final\\_010606.pdf](http://www.fs.fed.us/restoration/documents/RestFramework_final_010606.pdf).

U.S. Forest Service. 2005. Regional Strategic Action Plan. Albuquerque, NM: U.S. Forest Service, Southwestern Region.

Vance, R.K., C.B. Edminster, W.W. Covington, and J.A. Blake, compilers. 2001. Ponderosa pine ecosystems restoration and conservation: Steps toward stewardship. Proceedings of a conference held April 25–27, 2000 in Flagstaff, AZ. Proceedings RMRS-P-22. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Western Forestry Leadership Coalition. 2009. *True costs of wildfires in the western United States*. Lakewood, CO: Western Forestry Leadership Coalition.

Western Governors' Association. 2002. A collaborative approach for reducing wildland fire risks to communities and the environment: 10-year comprehensive strategy implementation plan. Denver, CO: Western Governors' Association.

Williams, M. 2014. Interview with D. Egan, March 28.

Wilmsen, C. and J.E. Isom. 2003. *Community forestry and community well-being in the United States*. A paper presented to the XII World Forestry 2003, "Forests, Source of Life," Quebec City, Canada. <http://www.fao.org/docrep/ARTICLE/WFC/XII/0558-C1.HTM>.



Ecological restoration is a practice that seeks to heal degraded ecosystems by reestablishing native species, structural characteristics, and ecological processes. The Society for Ecological Restoration International defines ecological restoration as “an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability. . . Restoration attempts to return an ecosystem to its historic trajectory” (Society for Ecological Restoration International 2004).

Throughout the dry forests of the western United States, most ponderosa pine forests have been degraded during the last 150 years. Many ponderosa pine areas are now dominated by dense thickets of small trees, and lack their once diverse understory of grasses, sedges, and forbs. Forests in this condition are highly susceptible to damaging, stand-replacing fires and increased insect and disease epidemics. Restoration of these forests centers on reintroducing frequent, low-intensity surface fires—often after thinning dense stands—and reestablishing productive understory plant communities.

The Ecological Restoration Institute at Northern Arizona University is a pioneer in researching, implementing, and monitoring ecological restoration of dry, frequent-fire forests in the Intermountain West. By allowing natural processes, such as fire, to resume self-sustaining patterns, we hope to reestablish healthy forests that provide ecosystem services, wildlife habitat, and recreational opportunities.

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