Ecological Restoration Institute Work Plan
Fiscal Year 2009

Ecological Restoration Institute/Northern Arizona University
Dr. Wally Covington, Director
Lucy Murfitt, Director of Partnerships and Collaboration
Dr. Pete Fulé, Managing Director

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# Table of Contents

Executive Summary ........................................................................................................ 3  
Introduction ..................................................................................................................... 5  
Recent Funding and Accomplishments – FY 2007 ......................................................... 6  
Ecological Restoration Institute – Northern Arizona University ................................. 9  
Monitoring and Evaluation ......................................................................................... 15  
Acknowledgements ....................................................................................................... 15  
APPENDIX A – Letter to President Bush from Senators ................................................ 16
Executive Summary

This work plan presents an integrated and coordinated series of actions for $5.95 million in Fiscal Year 2009. The funding is allocated equally between the institutes ($2 million each). The figure was derived by considering the funding trends since in FY’05, acknowledging the desire by the Congressional delegations of the three states to see the institutes funded at this level (see letter to President Bush, Appendix D), and in consultation with Harv Forsgren in April of 2007 prior to briefing Congressional staff in Washington DC. The work plans of each of the three Institutes represented by the Southwest Ecological Restoration Institute Charter are included in this document.

As a step toward assuring that the work of the Institutes and their partners is coordinated, the Institutes have collaborated closely in producing this plan as envisioned in the authorizing legislation (the Act) and Charter. The Institutes will continue to work in close cooperation in achieving this program of work, and for FY 2009, the three Institutes are proposing two joint projects. For clarity of review and accountability, this document includes separate work plans for each Institute for FY 2009.

All projects are developed as part of the Duties specified in the Act, in response to specific needs expressed by stakeholders (affected entities, in the Act). Formal needs are identified in reports from workshops, conferences, surveys, collaborative meetings, governmental task forces and councils, and field trips. Informal needs are identified in one on one communications, by phone, or through correspondence. The Institutes work collaboratively with stakeholders throughout the year to develop project plans, and the annual work plans which are then reviewed by a multi-agency Development Team and approved by a multi-agency Executive Team (under the leadership of the USDA Forest Service’s Southwest Regional Forester). The plans provide the logic and basis for federal appropriation requests.

Major activities include direct knowledge support to practitioners and stakeholders designing treatments, assessment and testing of operational, experimental, and demonstration restoration and hazardous fuel reduction treatments, synthesis and analysis of information regarding the Historic Range Variation, work on invasive exotic plants, examination of wildlife responses, analysis of treatment effects on fire behavior, improving the use of explicit evidence in restoration programs and treatments, analysis of impacts of wood chipping as a slash disposal technique, an evaluation of decision models and tools for managers and stakeholders, geographic information system and collaborative facilitation support for greater ecosystem scale restoration treatment strategies, knowledge support for wood and other resource utilization sectors, technical and training support for monitoring and evaluation, and technical and information support for community-based groups.

This work plan uses two distinctly different definitions with regard to the term “peer reviewed”. The enabling legislation establishing the Institutes requires that the Institutes conduct an annual “peer review” of their work. In this context, “peers” are defined as the “affected entities” that are the customers for the services of the Institutes. The affected entities are
defined in the statute as: A) land managers; (B) stakeholders; (C) concerned citizens; and (D) the States of the interior West, including political subdivisions of the States.

All of the activities presented in this work plan are designed to be responsive to stakeholder needs and to be synthesized with the larger body of scientific evidence, translated into appropriate languages for target audiences, and delivered in a range of formats from in person one on one and group presentations and discussions, to printed and electronically accessible fact sheets, short technical reports, longer white papers and management reports, and peer reviewed archival literature.
Introduction

On October 5, 2004 President Bush signed into law the SOUTHWEST FOREST HEALTH AND WILDFIRE PREVENTION ACT, establishing three Institutes for the purpose of ensuring that the best available science is used in the development, implementation and monitoring of forest restoration treatments designed to restore the ecological and economic health of the West's frequent-fire forest landscapes.

Implementation of the Act was assigned to the Forest Service and began in earnest in October of 2004. Procedures have been established for the annual preparation of work plans. In addition to meeting the overall objectives specified in the Act (Table 1), a core requirement for the plans is that the proposed activities address information and service needs identified by land managers and the diverse stakeholders concerned about restoring forest health and unnatural wildfire in the most timely, effective, and efficient manner possible. Each plan originates with a formal process that engages leaders in the practitioner, stakeholder, policy and academic community to identify information and service needs. The Institutes then work collaboratively throughout the year with stakeholders to prepare plans for projects that are then presented in annual work plans. These work plans are ultimately reviewed, revised, and approved by representatives and executives of state and federal land management agencies. The plans provide the logic and basis for federal appropriation requests.

Table 1: Duties specified in the Southwest Forest Health and Wildfire Prevention Act (PL 108-317)

1. Develop, conduct research on, transfer, promote, and monitor restoration-based hazardous fuel reduction treatments to reduce the risk of severe wildfires and improve the health of dry forest and woodland ecosystems in the interior West;
2. Synthesize and adapt scientific findings from conventional research to implement restoration-based hazardous fuels reduction treatments on a landscape scale using an adaptive ecosystem management framework;
3. Translate for, and transfer to, affected entities any scientific and interdisciplinary knowledge about restoration-based hazardous fuels reduction treatments;
4. Assist affected entities with the design of adaptive management approaches (including monitoring) for the implementation of restoration-based hazardous fuels reduction treatments;
5. Provide peer-reviewed annual reports (peers are affected entities).

In June of 2005 the Governors of the states of Arizona, Colorado and New Mexico signed a Charter that defines the relationship of the Institutes to their Universities, States and State Foresters. The Charter demonstrates a commitment to cooperation and collaboration among the Institutes to maximize efficiency, acknowledge complementarities and avoid redundancy.

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1 Members of the Executive and Development Committees represent the following agencies: USFS, Department of the Interior/BLM/BIA, State Foresters of AZ, CO, NM, and the directors of the three Institutes
Fundamental to successful implementation of the Act and the Charter is the ongoing identification of key roles for the institutes and their partners as well as identification of specific knowledge service needs and systematic responses to responding those needs. Identification of these needs comes from a variety of sources. Formal needs are identified in reports from workshops, conferences, surveys, collaborative meetings, governmental task forces and councils, and field trips. Informal needs are identified in one on one communications, by phone, or through correspondence, and each Institute provides a separate summary of restoration needs in each state later in this work plan.

Recent Funding and Accomplishments – FY 2007
Arizona

The Ecological Restoration Institute at Northern Arizona University has operated since 1995 to serve as a neutral convener of diverse stakeholders and to provide the best available science to land managers, practitioners, communities, and stakeholders who design and implement forest restoration treatments. The history, size and highly leveraged state and competitive grants funding of the ERI has enabled an active program of work and numerous accomplishments during calendar year 2007. Activities to date include:

- Field Consultations to help design treatments.
  - In cooperation with Region 3 the ERI contributed to two, two-day workshops that highlighted ERI demonstration projects comparing different approaches to complying with Goshawk Guidelines
  - The ERI is actively working with Region 3 to advance restoration based hazardous fuel reduction treatments to protect Mexican Spotted Owl PACs.
- 61 Presentations about treatments and treatment responses for land managers and stakeholders.
- Fulfilling 37 information requests during 2007 from elected officials, land managers, resource specialists, stakeholders, businesses and the public.
- Conducting 16 field trips for stakeholders and land managers to visit restoration sites.
- Conducting 9 rapid assessments in cooperation with land managers that will inform treatment design. This activity is particularly important because it provides the scientific underpinning for the design of effective treatments that accomplish multiple natural resource benefits in addition to fire risk reduction.
  - Eagar South Project/ Apache-Sitgreaves National Forest
  - Perk-Grindstone Project/ Lincoln National Forest
  - Upper Bonito Project / Lincoln National Forest
  - Pinyon-Juniper Project/ St. George and Kanab, Utah BLM, Page, AZ
  - Pinaleño Project/ Coronado National Forest
  - Region 3 land Management Plan Revisions/Apache-Sitgreaves, Coconino and Kaibab National Forests
Financial and technical support for completion of The Statewide Strategy for Restoring Arizona’s Forests. The document creates a twenty-year road map for Restoring Arizona Forests. This represents an 18 month collaborative process involving ForestERA, Governor Janet Napolitano’s Forest Health Councils and stakeholders in Arizona.

Producing publications for a variety of audiences:
- Scholarly- 10
- Practitioner and stakeholder publications
  - Working Papers- 4
  - White Papers- 2

Working in partnership. In 2007 this includes over 60 collaborators that include:
- All National Forests in Region 3, 1 in Region 2, 1 in Region 6
- Department of Interior Agencies-BLM, BIA, NPS
- Tribes and Pueblos
- Rocky Mountain Research Station
- State Agencies in New Mexico and Arizona
- Business
- Nongovernmental Organizations
- Academic entities and communities
- Communities

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**The FY 2009 SWERI Work Plan**

**Coordinated Activities**

The Southwest Ecological Restoration Institutes (SWERI) are actively planning and coordinating proposed services for FY 2009. Representatives from the three Institutes met many times to jointly participate in workshops, visit field projects, share ideas concerning future work plans, and to discuss Institute activities with national, regional, and state policymakers.

Specific coordinated actions for 2009 include: 1. Determining overall resource benefits achieved through restoration and reducing wildfire threat using a landscape analysis (project 3 in all three work plans); 2. Assessing the effectiveness and efficiency of alternative treatments and the strategic location of those treatments (project 3 in all three work plans); and, 3. A synthesis of our current state of knowledge concerning the ecology and management of southwestern mixed conifer and aspen forests. In addition to these specific projects, the three Institutes will continue to jointly visit field projects, hold discussions with policymakers, and seek better ways to coordinate activities across state lines.
The Ecological Restoration Institute is well positioned to make significant contributions to support the restoration of frequent fire forests in FY’08 and FY’09. Evidence for this includes:

- Language in the FY’09 President’s budget that calls for a pilot landscape assessment in Region 3 to demonstrate the value of planning treatments at the landscape scale;
- The completion of the Statewide Strategy for Restoring Arizona’s Forests. A document validates the need for bold action that is the cornerstone of our work;
- Completion of the Region 3 Wood Supply Assessment that will facilitate the decisions about stewardship contracts and the regional coordination of mechanical treatments—actions that are necessary to attract and retain private sector investment; and,
- Ongoing scientific investigation and monitoring that through its longevity reduces uncertainty and provides rigorous guidance for appropriate management action.

The series of actions proposed in this work plan are fully integrated to support all facets of land management action from ecological restoration to support for sustainable economies and communities. They are also designed to support creation of the social contract required to move forward.

**Project 1: Ponderosa Pine/Mixed Conifer**

The ERI is known for 30 years of continuous, applied scientific investigations that explore all aspects of the restoration of forest health in frequent fire forests. The primary emphasis for our work is the ponderosa pine ecosystem and adjacent forest types. The work proposed in 2009 will maintain the commitment to monitoring a variety of biophysical and fire behavior responses to treatments. These data are best-monitored and most reliable long-term restoration sites in the Southwest. Requests for ecosystem responses and fire behavior responses to treatments are some of the most frequent information requests we receive from land managers. The need for this information was validated by collecting information requests at the Restoration of Frequent Fire Forests Conference held in Flagstaff in October 2006. In addition, the need was identified by the Arizona Governor’s Forest Health Advisory Council and ongoing discussions with land managers and Forest Service personnel working on forest plan revisions.

Items one and two listed below will contribute to the joint SWERI project number 4 in the NMFWRI and CFRI plan on dry mixed conifer forests.

**Deliverables**

1) Monitoring of treatment actions and ecosystem responses derived from field studies conducted in 2009 from sites in the Long-term Ecological Assessment Restoration Network (LEARN). Analysis of this long-term monitoring will inform working papers, presentations, field trips and workshops included in other projects.
   a. Summary of activity
2) Scientific paper/ fact sheet describing LEARN study results
3) Cheatgrass ecology: invasion by cheatgrass affects fire hazard and fire severity in ponderosa pine ecosystems. In FY 09 the ERI will complete a multi-year study of
cheatgrass ecology. Partially funded in prior years by the Rocky Mountain Research Station. Deliverables include
a. One dissertation; and,
b. One scientific paper on the effect of experimental treatments on cheatgrass.

4) Wildlife: The Arizona Game and Fish Department (AGFD) Research Branch and NAU Ecological Restoration have collaborated on long term studies of wildlife responses to restoration treatments in northern Arizona. Primary focus will be completion of products from data collection for ongoing studies in Flagstaff area Wildland Urban Interface (WUI) areas. Other efforts will include, but not be limited to, coordination with ERI, local stakeholders and others to develop, plan, and implement new research, education, and outreach activities. Deliverables include:
a. A summary report; and,
b. Two journal manuscripts.

5) Wildlife Systematic Review. Key questions in implementing ecological restoration center on wildlife impacts. A growing body of research exists to address the positive and negative, short-term and long-term effects. This project will follow a formal systematic review process to address how restoration, in the context of food webs, support multi-species conservation. Deliverable:
a. systematic review; and,
b. executive summary (that will be developed into a white paper) for managers

6) The use of native species for seeding after restoration treatments and wildfire is recommended by agency guidelines and widely agreed to be useful, but there are almost no quantitative data on seeding effects in the Southwest. In FY'09 we will assemble existing information and develop new data in a chronosequence study of past seeding treatments on Federal lands following restoration and fire to determine persistence of seeded species, both natives and non-natives (including sterile non-natives). This activity will build from work conducted with the Rocky Mountain Research Station.
a. Summary report; and,
b. presentation to resource managers

7) Post-wildfire fuels: post-fire salvage of timber is an issue of concern to managers, policy makers, and the public. An ecological reason cited in support for removing trees is the fear of reburn and the damage it may cause to soils. However, a countervailing concern is that salvage logging itself has negative consequences. Little reliable quantitative scientific information exists in the Southwest to help evaluate the vulnerability of severely burned forests in the semi-arid Southwest to environmentally harmful reburning. In FY09 the ERI will complete a multi-year project on post-wildfire fuel loads that measured fuels in northern AZ (2007)and central/southern AZ (2008). Deliverable:

8) Results from a workshop conducted in FY08 that will explore “least you need to know” monitoring approaches. Deliverable:
a. White paper or working paper depending upon the level of detail that will be needed to report conclusions

Project 2: Pinyon/Juniper

There is little information to guide the design or anticipate the outcomes of comprehensive restoration and fuel reduction treatments in pinyon-juniper ecosystems, but
southwestern land management agencies are confronted with millions of acres of fire-prone pinyon-juniper ecosystems. Degradation of these systems leads to wildfires and forest health problems that are considered undesirable by managers, coupled with poor forage and wildlife habitat and increased erosion. This project will synthesize existing information about pinyon-juniper ecosystems, making it available to managers and scientists, and contribute new data on fire ecology that will support environmental analyses of proposed treatments.

Expanding our work to pinyon-juniper ecosystems is consistent with the Duty #1, Table one articulated in PL 108-317 and responds to requests from the Washington DC office of the Bureau of Land Management, practitioners and stakeholders at the district and local level throughout the Southwest and requests for information provided at the Southwest Ecological Restoration Institute conference in October 2006. Unfortunately, when funding has been short in previous fiscal years this work has been reduced or stopped entirely.

**Deliverables**

1) Preparation of a series of publications on pinyon-juniper ecology and restoration in the Southwest. Coordination of manuscript preparation and journal submission.

2) Pinyon-juniper fire ecology: understanding the role and frequency of natural fire in pinyon-juniper ecosystems is essential to inform the design of restoration treatments. Currently there is much confusion about this topic in the management and stakeholder communities. Previously collected and new data on fire dates, stand ages, and fire evidence will be analyzed to help answer this important variable. Deliverable:
   a. A scientific paper/fact sheet describing fire ecology study results.

3) There is a substantial body of literature on southwestern pinyon-juniper ecosystems but it has not been brought together to address practical questions related to restoration and fuel reduction treatments. This project will follow a formal systematic review process of pinyon-juniper ecology, existing research, and past management treatments. The information will be applied to address the design and implementation of restoration and related treatments in pinyon-juniper. Deliverable:
   a. A systematic review and executive summary for managers

**Project 3: Implementation of Restoration-based Treatments at the Landscape Scale**

The *Statewide Strategy for Restoring Arizona’s Forests* and the *Wood Supply Study* have opened a window of opportunity for advancing to project-level planning and on the ground treatment implementation. This project is designed to “capture the moment” and actualize the science-driven, broad-based public consensus that has emerged from these recent efforts.

In order for this effort to be successful, best available science across disciplines (ecological, social, political, and economic) must be readily accessible to a wide cross-section of restoration stakeholders to include the Forest Service. ERI is poised to provide that science support for accelerating restoration at the landscape scale.

Initial work on this project began in FY 2008. The work included ERI participation in and support to the Arizona Governor’s Forest Health Council and a Landscape Implementation
Working Group convened by the Council. The Council, through the Working Group, successfully completed the following work to advance the project: development of objectives, development of criteria and data layers to determine the scale of the project; and identification of potential project sites in northern Arizona.

In FY2009, the ERI will continue this project in cooperation with CFRI and NMFWRI.

Deliverables:

1. Capacity development toward a spatial decision support system that is composed of spatial data, models, and software tools that provide users with the data and the guidance needed to develop alternative treatment scenarios that can accelerate restoration.

2. Knowledge Synthesis report of available, viable, contracting tools and mechanisms to cost-effectively implement treatments on a landscape-scale.

3. Lessons-learned report on collaboration in project planning.


Project 4: Technical support for land managers (state, federal and tribal)

One of the most important activities of the ERI is to respond to requests for assistance from land managers. We have found that as veteran Forest Service employees retire the need for direct, hands-on help is increasing. A cornerstone of this service is to work with local personnel to understand the historic and desired forest conditions at a proposed treatment site through preparation of Rapid Assessments (RAPs). The ERI will bring qualified field technicians to the site, where a quick inventory is performed to assess historic fire regime, forest structure and other site attributes. This work provides the logic to develop comprehensive forest restoration treatments. Work to support the RAPs includes fulfilling information requests and numerous site visits that include training opportunities.

In 2009, we will also continue to respond to requests from National Forests in Region 3 as well as personnel at the regional office to provide scientific support for forest planning. In addition, our team will conduct field trips and other services for land managers that are outside the Rapid Assessment approach. A testimonial to the value of this work is included below.

“The Uncompahgre Plateau Project and U.S. Forest Service sponsored a field tour in June with the Colorado Forest Restoration Institute-Colorado State University and the Ecological Restoration Institute-Northern Arizona University to view the current conditions of ponderosa pine stands on the Uncompahgre Plateau. We are very excited about the possibility of...
establishing demonstration sites on the Plateau that allow people to see the range of forest conditions that follow various restoration treatments.” Uncompahgre Plateau July 2007 newsletter.

**Deliverables**

1) Continued support for Forest Plan Revisions  
2) Ten Rapid Assessments  
   a. List of associated information Requests  
   b. List of associated field visits/training  
3) Five field trips (non-RAP related)

**Project 5: Support for the restoration economy**

Based on experience over the last eight years the ERI receives requests for information by business and communities to provide information and technical support on issues relevant to a restoration economy. In the past the ERI has been asked to do a variety of activities including: analyze and characterize the supply of wood in a 40 mile radius of Flagstaff; participate in community forums designed to attract business; provide information to public officials on utilization; and, help fund other entities like the Greater Flagstaff Forests Partnership to participate in wood utilization activities. This item in the work plan anticipates that these requests will continue.

**Deliverable**

1) Complete two information requests

**Project 6: Stakeholder Assistance**

The ERI is committed to implementation of the Statewide Strategy for Arizona’s Forests. Although ERI work on this project is largely state funded, elements of the strategy pertain directly to work that supports federal and tribal land management action.

Community stakeholders have unique information and technical assistance requirements. These require expertise with individuals who understand socio/political issues, can assist collaboration and can anticipate what communities need.

**Deliverables**

1) Support for the Statewide Strategy  
   a. Two information requests to support the strategy  
2) Five information requests to assist communities and stakeholders
Project 7: Knowledge Services

The ERI strives to deliver information in the form and language required by diverse audiences. We also seek to support immediate information needs to address land management challenges. This suite of information products is designed to meet the information needs of the public, policy makers, land managers, academics, business and environmentalists. Below is a recent testimonial supporting the importance of these products.

“…Like so many (Forest Service) retirees, my work is not finished. I continue to speak publically on the issues of forest and watershed health, contributing the challenge of informing the public of natural resource reality. I have three such engagements in January. The Southwest Working Papers from the ERI represent an important part of continuing education, not only for me, but for the members of my audience. ERI’s work is appreciated.”

George Duda

Deliverables

1) The ERI maintains an integrated web site that includes publications and information about the biophysical and social science aspects of restoration. Recommendations are peer reviewed and the ERI maintains the highest standards for information posted to the site.
   a. Support for web
2) Occasional short summaries that compile best available information are needed by non-technical stakeholders and practitioners.
   a. Two white papers
3) Practitioners and stakeholders need very short, concise descriptions of land management options and the outcomes of those options.
   a. Four working papers
4) Direct communication with individuals is still the knowledge delivery choice preferred by practitioners and stakeholders alike. The ERI will continue to provide in person delivery to convey emerging scientific information on restoration treatments, community collaborations and other relevant topics.
   a. Fifteen presentations
5) Seeing is believing. Fortunately, many restoration treatments have been applied throughout the Southwest. The ERI will continue to take diverse audiences to the field to demonstrate and discuss the outcomes of forest restoration on ecological health and wildfire behavior.
   a. Fifteen field trips

Duty #5- Provide annual peer-reviewed reports

The legislation establishing the Institutes requires an annual peer-reviewed report.
**Deliverable**

1) Peer-reviewed report 60 days after completion of the agreement.

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**Monitoring and Evaluation**

The three institutes will provide a peer-reviewed annual report summarizing work completed with this funding fourteen months following activation of the agreement. The Institutes will follow billing protocols and requirements established by the Forest Service. The progress reports, along with all materials resulting from work funded under this agreement, will be provided to the project representatives for the Forest Service.

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**Acknowledgements**

The preparation of the SWERI work plan would not be possible without the dedicated work of the many natural resource practitioners, land managers, stakeholders, community groups, and government officials at the federal, state, tribal, and local level. These individuals, the lay public, and policy makers are committed to restoring the ecological and economic integrity of frequent fire forest landscapes and the communities that depend upon them. Among these individuals, we wish acknowledge in particular the hard work and valuable contributions made by the Southwest Ecological Restoration Institutes Coordinating Committee and that of the Interagency Development and the Executive Teams in reviewing, discussing, and helping to improve the Institutes' work plans. Finally, we wish to acknowledge the long hours and great skill of the professional staff at each of our Institutes and within our universities who helped produce this work plan.
December 3, 2007

The President
The White House
Washington, DC 20500

Dear Mr. President:

The dry forests and woodland ecosystems of the Southwest are particularly vulnerable to unusually intense wildfires. At the same time, they are particularly responsive to forest restoration and fuels reduction management. The use of the best available science is critical to maximize the effectiveness of each dollar spent on forest treatments so that projects solve multiple resource problems simultaneously, including uncharacteristic wildfire, declining wildlife habitat, a reduction in critical watershed function, and impaired resource and recreational values for people.

In 2004, you signed the Southwest Forest Health and Wildfire Prevention Act, Public Law 108-317. The legislation, which passed with strong bipartisan support, authorizes $15 million per year for three institutes in the Southwest so that the best available science is used to develop, implement, and monitor forest restoration treatments that are tailored to the forests of the Southwest. The three institutes are the Ecological Restoration Institute at Northern Arizona University, the New Mexico Forest and Watershed Restoration Institute at Highlands University, and the Colorado Forest Restoration Institute at Colorado State University, each of which works in partnership with each other, the Federal and State land management agencies, private land owners, and other entities involved in forest restoration. The Institutes have worked with the Forest Service and the Department of the Interior to identify a $6 million budget for fiscal year 2009.

The Institutes fill a critical void that exists between applied and existing scientific findings, and the translation and transfer of that research to inform forest management in the Southwest. It is through their work that we will slow the spiraling costs of wildfire
suppression and restore the many important functions of our forests. We urge you to fund the Southwest Forest Health and Wildfire Prevention Act at $6 million in the Administration’s forthcoming budget request for fiscal year 2009.

Thank you for your support for restoring the health of southwestern forests.

Sincerely,

JON KYL
United States Senator

JEFF BINGMAN
United States Senator

JOHN MCCAIN
United States Senator

PETE DOMENICI
United States Senator

WAYNE ALLARD
United States Senator

KEN SALAZAR
United States Senator