

**Ecological Restoration Institute Work Plan
Fiscal Year 2008**

Reconciled Plan for the Development Team meeting on 2/6/08

Ecological Restoration Institute/Northern Arizona University
Dr. Wally Covington, Director
Diane Vosick, Associate Director
Dr. Pete Fulé, Associate Director

February 6, 2008

Table of Contents

Executive Summary	3
Introduction.....	5
The Ecological Restoration Institute-Northern Arizona University	10
Project 1: Ponderosa Pine/Mixed Conifer Restoration	10
Project 2: Landscape-Scale Analysis	12
Project 3: Technical support for land managers, agencies and tribes	13
Project 4: Issues in Utilization and Harvest	14
Project 5: Assistance to Stakeholders and communities to support Collaborative Treatment Design	15
Project 6: Knowledge Services	15
Monitoring and Evaluation	20
Acknowledgements	20
Appendix A – State Needs Assessments	21
Appendix B – Specific Land Manager Needs	23

Executive Summary

This work plan presents an integrated and coordinated series of actions for **\$2.56** million in Fiscal Year 2008. The Ecological Restoration Institute at Northern Arizona University (ERI), the Colorado Forest Restoration Institute at Colorado State University (CFRI), and the New Mexico Forest and Watershed Restoration Institute at New Mexico Highlands University (NMFWRI) will receive \$1,969,000, \$246,000 and \$345,000, respectively after deductions associated with the 1.56% rescission. The three states represented by the Southwest Ecological Restoration Institute Charter collaborated to produce this work plan. This level of collaboration was an important facet of the authorizing legislation (the Act) and Charter. For clarity of review and accountability the plan includes separate work plans for each Institute for FY 2008.

The original SWERI work plans approved for FY2008, and approved by the multi-agency Executive Team, totaled \$6.23 million. In April 2007 the Institutes worked with Region 3 to identify what we thought would be a more realistic appropriation request given the FY'08 federal budget situation. That work plan called for \$2 million for the ERI and \$500,000 each for CFRI and NMFWRI. The final outcome, which was included in the H.R. 2764, The Consolidated Appropriation Act, 2008, included \$2 million for ERI/NAU, \$350,000 for NMFWRI/NMHU and \$250,000 for CFR/CSU. The Institutes have worked diligently to develop fiscally responsible approaches to ramping up Institute activities and to keep the total budget well below the Congressional authorization of \$15 million.

All projects are developed as part of the Duties specified in the Act (Table 1), 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.

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).

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 Historical 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. Capacity building for the Colorado and New Mexico institutes continues to be a central objective in FY 2008.

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. For some of the deliverables, reference is made to “publication in a peer-reviewed publication”. In this case the term is used in the context that is specific to a professional community and is defined as follows:

"Peer review is a process used for checking the work performed by one's equals (peers) to ensure it meets specific criteria. Peer review is used in working groups for many professional occupations because it is thought that peers can identify each other's errors quickly and easily, speeding up the time that it takes for mistakes to be identified and corrected...Generally, the goal of all peer review processes is to verify whether the work satisfies the specifications for review, identify any deviations from the standards, and provide suggestions for improvements."
http://whatis.techtargget.com/definition/0,,sid9_gci936459,00.html

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 consultation to 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, 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 agencies¹. The plans provide the logic and basis for federal appropriation requests.

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.

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. Each Institute provides a separate summary of restoration needs in each state later in this work plan; for the coordinated purposes of SWERI, these needs can be summarized under five general topic areas below:

1. Fundamental Ecological Knowledge

- 1.1. Characterize Historical/Natural Range of Variation for dry forest and woodland types, particularly for pinyon-juniper and lower elevation mixed conifer landscapes, and especially for transition zones between vegetation types. Cultural historical variation should also be considered in relation to ecological factors.

2. Treatment Development, Monitoring and Evaluation

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

- 2.1. Improve prescriptions for restoration treatments, including multi-resource responses; and including predictions of changes in fire behavior after treatment.
 - 2.2. Develop knowledge on the interaction of restoration treatments, wildfire, and livestock grazing management on invasive exotic plant responses and other key indicators of ecosystem health.
 - 2.3. Develop monitoring approaches, protocols, and opportunities for both short-term and long-term assessments of operational restoration treatments.
 - 2.4. Provide examples of forest restoration projects (ones that worked well, and ones that didn't) to help with education/outreach, spanning a range of treatments (residual density, etc.).
 - 2.5. Consolidate information on restoration treatments and wildlife impacts, especially endangered species.
 - 2.6. Evaluate impacts of wood chipping and mastication
 - 2.7. Synthesize knowledge of the ecological impacts of post-fire salvage logging and restoration.
 - 2.8. Develop, implement, and evaluate approaches for strategic prioritization of treatments using a collaborative framework.
 - 2.9. Synthesize knowledge regarding the availability and use of native plant seeds, prescribed fire, and wildland fire use in restoration treatments on public and private lands.
- 3. *Economics/Utilization***
- 3.1. Develop assessments of utilization opportunities, including economics and broader social aspects; for both dry mixed conifer, ponderosa pine and pinyon-juniper types
 - 3.2. Support efforts to identify and attract new businesses for processing and marketing restoration wood products.
- 4. *Human Dimensions***
- 4.1. Provide training for implementing treatments for forest restoration and fire hazard reduction.
 - 4.2. Foster collaborative restoration and conservation partnerships.
 - 4.3. Develop and implement restoration public education and outreach.
 - 4.4. Provide technical support to communities who seek to design treatments and/or create Community Wildfire Protection Plans in a collaborative framework.
 - 4.5. Provide support on social science disciplines to recipients of the Collaborative Forest Restoration Program.
- 5. *Information, Interpretation, Synthesis and Technology Transfer***
- 5.1. Develop geospatial information capabilities for restoration treatments
 - 5.2. Foster restoration treatments by developing practitioner-useful information on treatment costs and effectiveness.
 - 5.3. Create a variety of opportunities to inform the public about the full array of forest restoration and fire hazard issues.
 - 5.4. Provide support on biophysical considerations for treatments to CFRP projects.
 - 5.5. Develop visualization approaches that help communities understand the likely appearance of post-treatment landscapes
 - 5.6 Provide field trip, workshops, presentations, white papers, fact sheets, working papers and status of knowledge summaries in response to requests from policy makers, public, land managers, and the general public.
 - 5.7 Assist information management professionals to coordinate activities to ensure efficiency, avoid redundancy and provide maximum utility of information and services.

Accomplishments

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 2006. These include:

- Field Consultations to help design treatments.
 - In cooperation with Region 3 we are exploring consistencies between restoration treatments and Goshawk Guidelines using demonstration blocks.
 - We are working to support the application of a 5,000 acre restoration treatment in the White Mountains to demonstrate consistency between restoration treatments and Goshawk conservation.
 - The ERI is actively working with Region 3 to advance restoration based hazardous fuel reduction treatments to protect Mexican Spotted Owl PACs.
- 27 Presentations about treatments and treatment responses for land managers and stakeholders.
- Fulfilling 40 information requests during 2006 from elected officials, land managers, resource specialists, stakeholders, businesses and the public.
- Conducting 25 field trips for stakeholders and land managers to visit restoration sites.
- Preparing 7 rapid assessments to inform treatment design.
- Contributing to the first draft of a 20 Year Strategic Vision for Restoring Arizona Forests. A collaborative process involving ForestERA, Governor Janet Napolitano's Forest Health Councils and stakeholders in Arizona.
- Co-hosting with the other two institutes a national conference on the restoration of frequent fire forests for land managers and stakeholders for 140 participants.
- Producing publications for a variety of audiences:
 - Scholarly- 30
 - Thesis- 1
 - Dissertation-3
 - Practitioner and stakeholder publications
 - Working Papers- 6
 - GTR, Handbooks, White Papers- 3
 - Six chapters for future publication on old growth management in frequent fire forests
- Providing Continuing Education/Workshops/Short Courses
 - Land managers- 7
 - 2 Workshop for stakeholders and managers interpreting current environmental review processes and appropriate and effective collaborative approaches to treatment design
- Working in partnership. In 2006 this includes 20 new and 42 ongoing relationships. These collaborators 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

Coordinated Action

The Southwest Ecological Restoration Institutes (SWERI) actively coordinate and plan each year's work. The three institutes met many times during the year to jointly conduct workshops; to offer in-field training; and to share knowledge and expertise in developing plans for the future.

Specific coordinated actions for 2008 include: 1. An integrated approach to developing evidence-based approaches in forest restoration; 2. Continued coordination between all three institutes on investigations and work related to pinyon-juniper ecosystems; and, 3. Identification of biophysical monitoring protocols that are simple, inexpensive and can be used by managers or stakeholders in the field.

This proposed program of work mobilizes the unique assets of a University to help solve the problem of unnaturally severe wildfire and degraded forest health. The actions focus on restoring landscapes and communities where unprecedented wildfires threaten ecological and community sustainability. The ERI will help cooperative efforts led by land management agencies and communities by providing comprehensive focused studies and monitoring and evaluation research and technical support.

In response to reduced funding as a result of the rescission the ERI eliminated action #7, under Project One that would investigate the onsite impacts of slash disposal using an air curtain.

Project 1: Ponderosa Pine/Mixed Conifer Restoration

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. The work proposed in 2008 will continue to reap the benefits of treatments initiated over the past five to ten years by collecting data that monitor 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 the information requests we received from the Restoration of Frequent Fire Forests Conference held in Flagstaff in October 2006. In addition our previous needs assessment conducted with the Arizona Governor's Forest Health Advisory Council uncovered the need for this information as well.

These activities support Duty #1, Table One of PL108-317, specific land manager requests identified in Appendix B and requests from participants at the 2006 Restoration Conference.

Deliverables

- 1) Summary of treatment actions and ecosystem responses from sites in the Long-term Ecological Assessment Restoration Network (LEARN) for practitioners. Analysis of this long-term monitoring will inform working papers, presentations, field trips and workshops included under projects 4,6
- 2) One article for a scientific journal summarizing responses.
- 3) Invasive plants are vexing practitioners and restoration projects throughout the Intermountain West. Severe wildfire can lead to invasion by exotic plants, but thinning and prescribed burning can also lead to the unintended establishment of nonnative plants. In 2008 we will monitor and evaluate existing treatments to analyze how restoration treatments should be modified to avoid creating opportunities for invasion. It will incorporate findings from ongoing work funded by, and in cooperation with, the Rocky Mountain Research Station.

- a. A technical note summarizing responses to treatment actions and interaction with exotic plant invasions.
- 4) The Arizona Game and Fish Department in cooperation with the BLM Strip District and the ERI have monitored wildlife responses to landscape-scale restoration since 1997. The findings have shown that restoration treatments are beneficial or neutral to most wildlife species and have provided data on ways to mitigate undesirable effects. This in turn, has led to a change in attitude among wildlife practitioners and stakeholders towards restoration. This funding will permit monitoring of animal responses to continue on restoration projects in northern Arizona.
 - a. Prepare four manuscripts on wildlife responses from Mt. Trumbull and other restoration sites.
 - b. Continue monitoring wildlife responses to restoration treatments.
 - c. Help organize and participate in a joint ERI, Forest Service, BLM, Arizona Game and Fish workshop for wildlife professionals to discuss results.
- 5) Understanding how different restoration treatments influence extreme crown-fire behavior is essential to properly design restoration treatments focused on reducing hazardous fuels and reducing wildfire intensity. This information will help determine the amount of thinning, burning and frequency of prescribed burning that are necessary to maintain long-term reduction of hazardous fuels. This project will be a retrospective analysis of areas that were treated prior to wildfire to determine how the treatment modified fire intensity. Data to inform this analysis were collected in 2007.
 - a. A systematic Review of all known literature and conclusions in 2008
- 6) The re-establishment of native understory plant communities is a critical factor in forest restoration. This project will evaluate different seeding approaches with the goal of encouraging natives while discouraging exotics. It will incorporate findings from ongoing work funded by, and in cooperation with, the Rocky Mountain Research Station.
 - a. Technical note completed in 2008
- 7) 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. This may be partially due to the very contemporary nature of the problem (it is only in the last 10 years we've seen overstocked forests burn catastrophically at a large scale). This project will conduct an analysis of fuel loads at sites that have burned catastrophically and analyze the potential for reburning. The information from this project will contribute to land management decisions about salvage logging and post-fire rehabilitation.
 - a. Preparation of an evidence-based evaluation of the literature and preparation of recommendations for land managers
- 8) Land management policy calls for monitoring of the biophysical responses of land treatments. Yet, very little monitoring is done due to lack of human and financial resources dedicated to the task. Unfortunately, there is a common misperception that monitoring has to be expensive and exhaustive to be credible. What is needed is a simple, yet robust set of variables that can be simply measured by land managers to inform adaptive management. Based on 10 years of monitoring by ERI at sites across the West we will use a collaborative framework to identify those monitoring variables that are the most robust for demonstrating whether or not treatments are on a trajectory for

achieving their restoration goals. Previous work developed for the Collaborative Forest Restoration Program will be used to inform this project.

- a. An integrated land manager and expert workshop will be held to identify the most important monitoring variables that indicate trends
- b. In FY'08 we will begin preparation of publications, scientific and practitioner oriented. These papers will be completed in FY'09

Project 2: Landscape-Scale Analysis

To strategically locate restoration-based hazardous fuel reduction treatments to achieve maximum benefit and efficiency planning must unfold at the landscape scale. The same is true for properly managing for multiple-species conservation. The ForestERA program provides technical support for collaborative processes attempting to prioritize treatments at the landscape scale. It also can help achieve collaboration objectives during the forest plan revision process.

The ForestERA tool is now actively used by stakeholders in many areas of the Southwest to inform decision-making. Following the initial landscape assessment in the White Mountains the Natural Resources Working Group has continued to request support services, it is proposed as the platform to be used in a stakeholder driven collaborative process for characterizing the wood available for wood utilization initiatives in Arizona, it provided information for the Greater Flagstaff Community Wildfire Protection Plan, and is being used Arizona Game and Fish for wildlife planning.

Evidence for the importance of this tool is the fact that it is referenced in the multi-agency USDA/DOI Wildland Fire Use Guide (http://www.fs.fed.us/fire/fireuse/wildland_fire_use/use_index.html). The Guide includes examples of the Western Mogollon Plateau Adaptive Landscape Assessment data (pp.17-18) and describes the use of landscape-scale analysis in Wildland Fire Use planning. The authors downloaded the images directly from the ForestERA web pages. The introduction states that it "provides **standardized procedures**, specifically associated with the planning and implementation of wildland fire use."

In 2008, ForestERA will continue to provide GIS support for implementation of the "20 Year Statewide Strategy for Restoration of Arizona's Forest" completed in May 2007. In addition, they will continue developing a model for Goshawk occupancy that will contribute to understanding habitat relations with this important animal. **(Update, 1/21/08- the ForestERA program will begin supporting a pilot project identified in the FY'09 Forest Service Budget Justification during FY'08. To accommodate this work two other activities were dropped: support for the Statewide Strategy and Support for previously completed landscape assessments).**

This work supports Duty #2, Table one of the Act. Specific audiences for each action are identified in the deliverables.

Deliverables

- 1) Preparation of data layers and analyses in cooperation with Arizona Game and Fish, the U.S. Fish and Wildlife Service and the Rocky Mountain Research Station that estimate

the occupancy or occurrence patterns and habitats of northern goshawk in the forested regions of northern and eastern Arizona.

- 2) Consultation and preparation to support activities identified in the President's FY'09 budget. The Forest Service budget justification for FY'09 includes the following language: "The request includes funding for a pilot project with partners in the Southwest Ecological Restoration Institutes to develop and test prioritizing restoration-based fuel reduction treatments that use the best available science and a collaborative process. (P.L. 108-317)." Final products from this work will include an analysis of potential priority locations and scheduling for restoration treatments that will restore forest health and simultaneously reduce the risk of unnatural fire. The final products to be completed in FY'09 will be informed by a collaborative process, include an analysis of how this assessment performed in terms of planning efficiency, and include a discussion about the ecological and economic efficiency of following the prioritization recommendations.

The other two institute New Mexico and Colorado will be actively engaged throughout the process. The hope is that if this approach proves effective it will be transferred to planning and implementation of treatments in the other states.

Initial work in FY'08 will accomplish the following:

- a. In consultation with the affected Forest Service parties, including RMRS, identify a site for the assessment;
- b. Determine the roles and responsibilities of participants and develop a scope of work;
- c. Design of a collaborative process;
- d. Identification and refreshing of data layers required to conduct the analysis; and,
- e. Outline of process for evaluating the economic and ecological efficiency of prioritized treatments.

Project 3: Technical support for land managers, agencies and tribes

The literature shows that the preferred approach to learning by land managers is face to face contact. In response to requests from managers the ERI provides technical assistance in many forms from the classroom to the field. Demonstration plots are also an effective way to help people understand how to design and implement restoration treatments. Rapid Assessments that conclusively demonstrate historical fire regimes, stand density, spacing and structure for a given project is particularly powerful evidence that supports science-based treatment design. The ERI considers these activities some of the most important aspects of our work.

In 2008, we will also respond to requests from Region 3 to be involved with Forest Plan Revisions. This support will also be provided to other federal agencies and tribes who request it. **(Update 1/21/08, the promised information requests have been re-organized under the RAPs).**

This work responds to Duties #3 and #4, Table one of the Act and numerous land manager requests for assistance.

Deliverables

- 1) A report that describes information support for Forest Plan Revisions
- 2) One workshops for practitioners
- 3) 15 field consultations
- 4) 6 rapid assessments (RAPs)
 - a. 15 field consultations to support RAPs
 - b. 15 responses to information requests to support RAPs

Project 4: Issues in Utilization and Harvest

The lack of economic value and places for small diameter wood creates a bottleneck that prevents thinning from proceeding at the pace and scale required to avoid catastrophic fire and restore forests. This issue is also one of the most volatile to navigate because of fears that economic utilization will ultimately drive and pervert sustainable forest management. The ERI is committed to provide objective information to inform the debate on the appropriate scale of utilization. In 2008 we will continue to provide objective information services and support for collaboration that we hope will lead to private industry opportunities for the harvest and marketing of small diameter wood products. The need for assistance to advance small wood utilization and marketing was expressed repeatedly as service needed by participants at the October 2006 Southwest Ecological Restoration Institute conference.

Concern about global warming and greenhouse gases has made its way to the new Congress. Numerous policies are emerging that may formalize in the public sector private markets for carbon sequestration credits. The ERI launched a study in 2005 to analyze whether or not wildfire avoidance achieved through forest restoration treatments can be qualified to receive carbon credits. The results of this study are anticipated in early 2007. In 2008 we will pursue efforts to implement findings of the study. **(Update 1/21/08. In the past the ERI has subcontracted with the Greater Flagstaff Forests Partnership (GFFP) to support work oriented to utilization and marking issues. The GFFP has laid-off their executive director and is redefining their future work.)**

These actions respond to Duties #3 and #4, Table one of the Act, The Governor's Forest Health Councils, private industry and needs identified at the 2006 Conference.

Deliverables

- 1) A report on information provided to support utilization
- 2) A white paper for policy-makers that analyzes whether or not carbon credits can be obtained for restoration treatments that reduce the risk of catastrophic crown fire and associate carbon release (see project 6)

Project 5: Assistance to Stakeholders and communities to support Collaborative Treatment Design

The ERI assists 13 community collaborative groups to understand, design and help monitor land management treatments that restore forests. These activities are based on requests from communities such as the Natural Resources Working Group, the Pinaleños group, Prescott Area Wildland Urban Interface Council, Greater Flagstaff Forests Partnership and others. These groups request one-on-one consultations, short workshops and information services.

This project responds to Duties #1,#3, #4 of the Act, community requests and needs identified at the 2006 Conference.

Deliverables

- 1) Ten responses to requests for information
- 2) Three field consultations

Project 6: 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.

Better education and information transfer responds to the heart of PL108-317, duties #1,#3,#4, The needs of the Governor's Forest Health Council, Specific land manager needs (Appendix B) and information services identified at the 2006 Conference.

Deliverable

- 1) An emerging approach to provide the best available research to medical practitioners is through "evidence-based" medicine. Studies, clinical analyses and expert opinion are weighted for their credibility and analyzed to help define the best therapies to address medical problems. The ERI seeks to use an evidence-based approach for the preparation of systematic reviews of existing research and information that can inform forest restoration. We propose two reviews.
 - a. Systematic Review of how restoration treatments influence extreme crown-fire (see Project 1, #5)
 - b. Evidence-based review of the literature and synthesis of recommendation for land managers pertaining to the potential for burned areas to re-burn severely (See Project 1, #7)

- 2) In 2006 the number of requests for information, fact sheets and other rapid response information increased dramatically. Establishing a help desk will provide a useful point of entry for and stakeholders seeking advice (**Update on 1/21/08, the ERI determined that establishing one formal position to manage requests is unnecessary. Staff is already doing this and therefore we will continue to fill requests using available expertise. With the funding saved from establishing a position the ERI will complete a comprehensive field guide to the understory plants of Northern Arizona. This guide will serve as an important benchmark of knowledge in a landscape that may change radically due to climate variability. This guide is also in demand by field biologists, educators and land managers**).
 - a. Report on requests
 - b. Completion of the Field Guide to the understory plants of N. Arizona
- 3) Occasional short summaries that compile best available information are needed by non-technical stakeholders and practitioners.
 - a. One white paper based on the carbon credit analysis (see project 5)
- 4) Practitioners and stakeholders need very short, concise descriptions of land management options and the outcomes of those options. The Working papers distill information that already exists in the literature or is generated through activities conducted in projects 1 and 2.
 - a. 4 Working Papers or Technical Notes (See Project 1, #3, #6)
- 5) 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. Report on major updates to the web
- 6) 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. 15 presentations
- 7) 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. 15 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.

The agreement period will be determined based on timing of funds. That is why deliverable dates are represented as “months” following the time the agreement is signed.

Project Timelines and Milestones

Project 1: Restoration Treatment Design for Pine/Mixed Conifer

Month	Activity	Milestones
1	Pre-planning, update special use permits, identify resources needed. Deliverables (1-7)	Planning completed
1	Issue subcontract for Arizona Game & Fish activities (4)	Agreement completed
1	Planning for wildlife professional workshop(4)	Date, location and participants identified
1	Planning for “least you need to know monitoring workshop” (8)	Date, location and participants identified
2-10	Field activity: monitor LEARN site (1,2)	Field activities completed.
2-11	Continue wildlife monitoring and analysis (4)	Data collected analyzed.
6-9	Field data collection for fuel load analysis (8)	Information collected on post-wildfire fuel loads
8-11	Complete analysis of samples, monitoring data for deliverables (1,3,5,6,8)	Data and samples analyzed.
8-11	Analyze treatment effects on potential crownfires (5)	Treatment effects on fire behavior analyzed
10	Hold wildlife workshop (4)	Workshop complete
10	Hold “least you need to know” monitoring workshop (8)	Workshop complete
7-12	Prepare reports for managers and in appropriate formats for peer-reviewed publication	<ol style="list-style-type: none"> 1. LEARN site monitoring and data analysis completed 2. One article for scientific journal summarizing LEARN site responses 3. Technical note summarizing responses to treatment actions and interactions with exotic plants 4. Four monographs in preparation/completed 5. Completed systematic review of treatment influence on extreme crown behavior 6. Technical note of best seeding techniques to establish natives 7. Systematic review of potential for burned sites to re-burn severely 8. Preparation of results from workshop for peer-reviewed publication and practitioners

Project 2: Landscape Assessment

Month	Activity	Milestones
12	Analysis and estimates of the occupancy or occurrence patterns and habitats of northern goshawk in the forested regions of northern and eastern Arizona. (1)	Report on outcomes.
1-4	Work with ERI and Region 3 to identify site for landscape analysis in a collaborative framework(4)	Site identified
5-10	Develop technical capacity to conduct the analysis (4)	Data layers assembled
11-12	Begin conducting, analyzing and refining analysis in a collaborative framework (4)	First iterations of analysis complete. Report on activity

Project 3: Technical Support for Land Managers, Agencies and Tribes

Month	Activity	Milestones
Ongoing 12	Support for Forest Planning (1)	Report on activities
1	Identify topic for workshop one (2)	Identify topic and prepare timeline
2-6	Plan workshop, prepare materials, invite participants (2)	Materials complete, participants invited
12	Workshop given (2)	Workshop Complete
Ongoing 12	6 Rapid Assessments (3)	Copy of assessments
Ongoing 12	15 Field consultations to support RAPs (3)	List of consultations
Ongoing 12	15 Responses to information requests to support RAPs (3)	List of information requests

Project 4: Issues in Utilization and Harvest

Month	Activity	Milestones
12	Assistance to facilitate small wood utilization (1)	Annual report on assistance
1	Analysis of status of carbon credits and restoration and scoping to determine contributions (3)	Analysis complete and actions identified

2-10	Follow up on scoping (3)	Actions underway
12	White paper for policy makers on the relationship of carbon credits to restoration treatments (3)	White paper complete

Project 5: Assistance to Stakeholders and Communities to Support Collaboration

Month	Activity	Milestones
Ongoing 12	Responses to requests for information (1)	10 Information requests
Ongoing 12	Field consultations by request (2)	3 consultations completed

Project 6: Knowledge Services

Month	Activity	Milestones
1	Evidence-based studies (1a,b)	Outlines and project plans complete for three systematic reviews
2	Primary authors recruited and if needed contracts prepared (1)	Contracts complete
3-9 12	Synthesis and analysis of topics (1) Three evidence-based analyses prepared for publication (1)	Analysis complete 3 studies completed
12	Respond to information requests (2)	List of information requests
1	Subcontracts established to finish Plant Guide- Writer and Artist (2)	Contracts Completed
2-7 12	Complete art and narrative for plant guide (2) Guide published	Manuscript complete Published guide
4-12	Preparation of White paper based on Project 5	White paper complete
1	Topics for two Working Papers finalized (4)	Working Papers outlined, authors identified
2	Contracts initiated for out-sourced Working Papers (4)	Contracts complete
6	Working Papers one and two in production (4)	2 Working Papers completed
7	Topics for two Working Papers identified (4)	Working Papers outlined, authors identified
12	Working papers three and four in production (4)	2 Working Papers completed
Ongoing	Web updates (5)	Report on web updates
1-6	Presentations on Restoration (6)	7 Presentations completed
7-12	Presentations on Restoration (6)	8 Presentations completed
1-6	Field Trips on Restoration (7)	7 Field Trips completed
7-12	Field Trips on Restoration (7)	8 Field Trips completed

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.

Acknowledgements

The preparation of this work plan would not have been 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 at all levels 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 to 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.

Ecological Restoration Institute/NAU

Forest restoration and wildfire hazard reduction needs-Updated to reflect 2006 Conference

The ERI identifies information needs in an ongoing and iterative process. The work proposed by the Ecological Restoration Institute at Northern Arizona University for FY 2008 responds to needs expressed by diverse stakeholders over the past 10 years as well as from a participant questionnaire distributed at the Southwest Ecological Restoration Institute – Restoration of Frequent Fire Forest conference in October of 2006.

The core of our work is oriented towards providing answers to numerous requests for information by land managers and stakeholders concerning ecological responses to restoration treatments. (e.g., monitoring and evaluating alternative treatments, determining variations in reference conditions across sites, information support to collaborative groups). On almost a daily basis ERI staff provide rapid responses to questions from community collaboratives, managers, policy makers and others on wide-ranging topics relevant to restoration. Finally, much of our work is informed by one-on-one encounters in the field.

In addition to the above sources for requests, the FY 2007 work plan responds to knowledge needs from:

- The document compiled as a part of implementation of PL108-317, “Examples of Specific Land Manager Needs, March 10, 2005.”
- Information from formal needs assessments conducted prior to 2005 including: a Needs Assessment of Community Practitioners; and, a survey of practitioners to determine best approaches for transferring scientific information. Both were completed in 2003.

Ecological Needs

1. Historical range of variability (pinyon-juniper, mixed conifer, ponderosa pine) (BLM, Forest Service, 2006 Conference)
2. How will climate change influence the natural range of variability (2006 Conference)

Treatment Development, Monitoring, and Evaluation

3. Analyze and compare the effectiveness of different hazardous fuel reduction treatments (Governor Forest Health Council, BLM and Forest Service practitioners)
4. Analyze and compare the effectiveness of different restoration treatments including herbaceous responses to restoration treatments in pinyon-juniper and ponderosa pine (Gov Forest Health Council, BLM state and Dept of Interior, 2006 Conference)
5. Determine animal responses to restoration treatments (BLM, Arizona Game and Fish, 2006 Conference)
6. Conduct seeding trials to determine how to establish native plants in pinyon-juniper and ponderosa pine (BLM)
7. Investigate interactions of restoration treatments, wildfire, and exotic species invasion (BLM, Forest Service, 2006 Conference)

8. Prioritize restoration treatments in a collaborative framework (WGA-10 Year Strategy, Healthy Forest Restoration Act, Arizona Forest Health Council Recommendations)
9. Analyze more outcomes from prescribed fire and wildland fire. Is it possible to achieve restoration goals using fire only? (2006 Conference)
10. Identify practices that minimize the harmful effects of mechanical treatments (2006 Conference)
11. Identify means to support the recruitment and conservation of old growth (2006 Conference)
12. Identify what needs to happen to support forest health resilience in the face of climate change (2006 Conference)
13. What do diameter caps do to the effectiveness of restoration over time (2006 Conference)
14. More research is needed on the ecological consequences of chipping (2006 Conference)
15. Expand thinking about restoration to the rehabilitation of severely burned areas (2006 Conference)
16. What is the effect of fire on high altitude grass meadows (2006 Conference)

Economics/Utilization

17. Support efforts to identify and attract new businesses for the processing and marketing of small diameter wood. (Governor's Forest Health Councils, business partners, 2006 Conference)
18. Assuming that infrastructure is reconstructed to remove and process wood, how many trees over 16 inch DBH would need to be removed to make restoration treatments cost neutral? (2006 Conference)

Human Dimension

19. Provide technical support to communities who seek to design treatments, create Community Wildfire Protection Plans in a collaborative framework and assistance on best practices for smooth collaborative functioning (2006 Conference)
20. Provide technical expertise to recipients of the Collaborative Forest Restoration Program
21. Full restoration is a hard sell to the public. A synthesis of information on landscape perspectives and full restoration would be helpful (2006 Conference)

Information Interpretation, Synthesis, and Technology Transfer

22. Evaluate the ecological impacts of post-wildfire fuel loads and whether or not they create the potential for harmful reburns (Policy makers)
23. Provide field trip, workshops, presentations, white papers, fact sheets, working papers and status of knowledge summaries on requests (policy makers, public, practitioners, stakeholders).
24. Assist individuals and organizations involved in information management to coordinate activities to ensure efficiency, avoid redundancy and provide maximum utility of information and services.(Governor's Forest Health Councils)

Workforce

25. Develop clear guidance for markers to ensure restoration treatments with clumpy structure can be properly applied (2006 Conference)

Appendix B – Specific Land Manager Needs

Land manager needs expressed to the Development Team, 2005

1. Define stand/patch structure and disturbance regimes as related to reference conditions, at the landscape scale by vegetative cover type, that represent ecological functionality.
2. Develop a process to prioritize restoration treatments as related to risk for both wildland urban interface and landscape scale ecosystems.
3. Develop/study fuels and restoration treatments that support other land management objectives and not strictly fuels/restoration objectives.
4. Address uneven-aged silvicultural systems and not just even-aged management.
5. Develop/study and propose fuels and restoration treatments that allow for both commercial and noncommercial harvest.
6. Determine natural ranges of variability and stand dynamics including historical representation of Pinyon-Juniper ecosystems.
7. Identify the appropriate application of restoration treatments at the landscape scale.
8. Promote agreement on what treatment prescriptions are appropriate spatially and temporally across the landscape using an integrated approach across a wide variety of disciplines.
9. Develop a geospatial analysis process to strategically place landscape restoration and wildland urban interface protection treatments to optimize patch dynamics and buffer infrastructure
10. Develop experimental designs with plot, site or area level sampling for research that is hierarchical and therefore easy to aggregate for extrapolation to the landscape scale.
11. Develop innovative methods to present synthesized scientific information in a way that is easily accessed by the intended user (field specialist and first line managers)
12. Develop a series of demonstration sites that illustrate a variety of proven scientific methods to address various management issues;
13. Determine the effects of anthropogenic influences as they relate to restoration treatment efficacy.
14. Define the relevant social, economic, and ecological factors associated with the wildfire and restoration programs.
15. Design and convene collaborative forums to build a common vision on the socioeconomic and environmental impacts of wildfire, and the increase in ecological services that can result from forest restoration treatments.
16. Format data and information for technology transfer so that it is compatible with Agency corporate information systems and the standards of the Federal Geographic Data Committee (FGDC).
17. Develop innovative methods to transfer the scientific results that are being funded through the National Fire Plan and Joint Fire Sciences Program;

18. Identify a range of suitable treatments and their appropriate application including costs, advantages and disadvantages, and application guidelines.
 19. Delivery mechanisms that would disseminate information on suitable treatments including written materials, on the ground workshops, and collaborative pilot projects with practitioners.
 20. Design approaches to adaptive management that includes collaboration, multi-scale monitoring, and spatial and ground-based monitoring systems. Develop assessments, plans and NEPA related documents that identify management options based on thresholds, monitoring trigger points and critical indicators to invoke adaptive management options.
 21. Determine effectiveness of treatments to maintain or reestablish native vegetative communities associated with historical disturbance regimes.
 22. Develop and deliver long distance learning and short courses for college credit in the Biological Sciences and other subjects for Interagency Fire Management Program certification from the technician to professional series
 23. Promote the development of a network or clearinghouse for storing, retrieving and distributing relevant restoration information to the public, research and management community.
 24. Provide Collaborative Forest Restoration Program (CFRP) grantees, grant applicants and their partners with current scientific information and assist in the design, implementation and monitoring of forest restoration and small diameter utilization projects implemented under the CFRP.
 25. Improve the capacity to utilize excess woody material by developing and improving on existing technologies and evaluating the impacts of state and federal incentive programs
 26. Develop a variety of products (brochures, posters, displays, popular articles, media pieces, demonstration plots or areas, public conferences, workshops and forums) to provide information on the role of fire, fire management, and the need for active restoration efforts.
 27. Deliver information to the public that follows Agency direction and policy regarding publication and video production standards, and is congruent with Agency communication plans. Evaluate Information that may relate to pending decisions prior to releasing it to the public.
-