

Final Report
on
Cooperative Work Plan FY'06

December 31, 2006

Progress Report to the USDA Forest Service
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Introduction

The ERI is a national leader in developing, testing and transferring science-based treatments to accomplish forest restoration. Our intent is simple – to develop practical science-based restoration treatments that can be readily implemented on the ground. This concise objective is the foundation of our many accomplishments. However, our goals do not stop there. While scientists are continually seeking to develop creative strategies for improving forest health, other staff members transfer this information by:

- Creating collaborative networks with federal agencies and other stakeholders;
- Working to synthesize scientific findings into outreach materials for diverse audiences;
- Assisting land managers with specific problems in the forest; and
- Providing technical assistance to those who seek to create healthy forests in their communities.

On October 5, 2004 President Bush signed into law the SOUTHWEST FOREST HEALTH AND WILDFIRE PREVENTION ACT, identifying the Ecological Restoration Institute at Northern Arizona University as one of three Institutes in the Southwest established for the purpose of ensuring the best available science is used in the development, implementation and monitoring of forest restoration treatments. The report outlines the great progress we have made in accomplishing this goal with Fiscal Year 2005 funds.

This report is the final report articulating the deliverables for Goals 1 through 4.

Work Plan Summary

The plan of work outlined in this memo served to accomplish the following four goals.

Goal One: Support a knowledge-based and spatially explicit collaborative landscape-scale assessment to help design a twenty year strategy for restoring degraded frequent fire forest ecosystems. The strategy strives to engage stakeholders to prioritize the location of restoration-based and hazardous fuel reduction treatments to protect and enhance community protection and economic viability; human and wildlife habitats; watersheds and other critical components of Arizona's landscape ecosystems.

Goal Two: Develop, transfer, apply, monitor, and update practical science-based forest restoration treatments to improve the health of ponderosa pine forests.

Goal Three: Synthesize, translate and deliver biophysical and social science knowledge into communication products for land managers, communities and other stakeholders to inform project-level action.

Goal Four: Provide technical assistance to collaborative efforts by affected entities to develop, implement, and monitor adaptive ecosystem management restoration treatments that are ecologically sound, economically viable, and socially responsible.

Summary of Deliverables

Goal One: Support a knowledge-based and spatially explicit collaborative landscape-scale assessment to help design a twenty year strategy for restoring degraded frequent fire forest ecosystems. The strategy strives to engage stakeholders to prioritize the location of restoration-based and hazardous fuel reduction treatments to protect and enhance community protection and economic viability; human and wildlife habitats; watersheds and other critical components of Arizona's landscape ecosystems.

Goal one responds to requests from members of the Arizona legislature, Governor's Forest Health Councils and the scientific community. The ERI will work with federal, state, local, and non-governmental partners to design (within a collaborative and cooperative framework) a twenty year cohesive strategy to help design effective, performance-based treatments that are strategically located to protect communities, wildlife habitat, watersheds, and key elements of the landscape.

Recognition of the need to address declining ponderosa pine forest ecosystem health at a landscape scale was explicitly recognized by Congress following the large fires of 2000. Report language in the FY'2001 Interior Appropriations and Related Agencies Committee Report directed the ERI to, "*conduct an adaptive ecosystem analysis of ponderosa pine and related forests as a prototype for larger ecosystem analyses, and to fill the gaps between project or district/forest level analyses and regional analyses to support future operational scale treatment*". In response to this request, the ERI funded Dr. Tom Sisk to develop a landscape scale forest planning tool (ForestERA) that could analyze different treatments and predict their outcomes. An explicit goal of this project is to ensure that the tool is practical and accessible to forest managers and interested stakeholders and capable of analyzing action at the landscape scale. **A final report from the ForestERA is included in Appendix A.**

1. The ERI and ForestERA supported a knowledge-based and spatially explicit collaborative landscape-scale assessment to help design a twenty year strategy for restoring degraded frequent fire forest ecosystems in Arizona. Deliverables include:

- The first draft of a strategic vision for Arizona. The first draft used the collaborative landscape assessments conducted for the Western Mogollon Plateau and in the White Mountains as the basis for creating a model vision based on broad stakeholder participation. Discussion of the draft was a central focus of the Governor Napolitano's Forest Health Summit in March of 2006. **Completed, Appendix B.**
- Provided access to the data layers developed by ForestERA to the Forest Service and stakeholders. **Ongoing, view the ForestERA link at http://www.forestera.nau.edu/data_overview.htm or see a copy of the web site in Appendix C.**
- Develop a final Strategic Vision to help inform forest plan revisions and provide the logic for future state-level forest restoration actions. The final report is expected by April, 2007 with a roll-out to the public expected at that time. **Draft Completed, Appendix C.**
- Representatives of ForestERA assisted the Forest Service and US Fish and

Wildlife Service in exploring and identifying uses of the ForestERA decision support tool that assists land managers evaluate the impact of hazardous fuel reduction treatments on Mexican Spotted Owls. **Draft Completed, Appendix D.**

- Representatives of ForestERA defined work to be accomplished for incorporating existing socio-economic information into the decision support tool. These actions will be the basis for that section in the FY2007 Work Plan for the Ecological Restoration Institute. In support of this effort ERI and ForestERA attended numerous meetings and co-hosted a White Mountains Landscape Analysis workshop in Show Low, Arizona. As a result of that meeting a proposal titled “Analysis of Small-Diameter Wood Supply in Northern Arizona” has been prepared for inclusion in the FY2007 Work Plan. **Completed, Appendix E.**
 - Abrams, J. 2006. White Mountains Landscape Assessment. Presentation to the Little Colorado River Watershed Coordinating Council, Flagstaff, AZ. January 13, 2006. 11 attendees.
 - Abrams, J. White Mountains landscape assessment: Update to the Natural Resources Working Group. Show Low, AZ. February 14, 2006. 38 participants.
 - Abrams, J., Sisk, T., Hampton, H. White Mountains Landscape Assessment follow-up stakeholder workshop (ERI co-chaired with ForestERA). Show Low, AZ. July 31, 2006. 24 participants.
 - Abrams, J. 2006. Report on an Evaluation of the White Mountains Landscape Assessment. Unpublished report. Ecological Restoration Institute, Flagstaff, AZ.
 - Hampton, H. Proposal. “Analysis of Small-Diameter Wood Supply in Northern Arizona.”

**The deliverables in this section fulfill the following needs articulated in the “ Examples of Specific Land Manager Needs, July 5, 2005”: A(1)a,c,d,f; A(2)d & f; B(2)d; C(1-2)a*

Goal Two: Develop, transfer, apply, monitor, and update practical science-based forest restoration treatments to improve the health of ponderosa pine forests.

To achieve goal two the ERI obtained, synthesized and analyzed scientific information in support of forest restoration. Specifically, these activities lead to explicit recommendations to provide the best available science to land managers and other stakeholders for purposes of informing and encouraging appropriate management activities. These activities included: (1) monitoring and analysis of key results of established restoration treatments, and: (2) timely study/synthesis/analysis responses to emerging management questions.

1. The ERI monitored a wide-range of diverse ponderosa pine restoration treatments in the Intermountain West. This ongoing monitoring of the Long-term Ecological Restoration Network (LERN) contributed to our understanding of various responses to different treatments ranging from full restoration through minimal cutting and burn-only treatments. Sites in the LERN network include: the Mount Trumbull Restoration Project in the Grand Canyon/Parashant National Monument, the Pagosa Springs Ranger District on the San Juan National Forest, multiple sites in the Grand Canyon National Park, the Gus Pearson Natural Area, Fort Valley-Coconino National forest, Centennial Forest-

Coconino National Forest, Camp Navajo-Arizona National Guard, and sites in the Apache-Sitgreaves and Gila National Forests.

The LERN data provided some of the most comprehensive and reliable information to inform actions by forest managers in the Southwest because of their geographic representation, and because they track multiple characteristics of forest structure, fuels and fire behavior.

- Summarized and analyzed monitoring activities at existing ponderosa pine restoration demonstration sites focused on the implications for operational-scale treatment design and implementation. **Complete, see Appendix F.**
- 2. The ERI synthesized and adapted scientific findings, based on needs assessments and land manager requests, from conventional research programs for the implementation of forest and woodland restoration on a landscape scale. These analyses are formatted to match the Status of Knowledge documents developed by the research stations with a focus on providing the information in a language and format that is accessible to the land management community.
 - Three status of knowledge reports designed to provide background on current management issues and trends. As the result of a workshop conducted earlier in the year a number of status of knowledge reports will be combined into one publication. **Draft in progress and expected to be available by 3/31/07, preliminary list of contributing authors in Appendix G.**

**The deliverables in this section fulfill the following needs articulated in the "Examples of Specific Land Manager Needs, March 10, 2005": A(2)e, B(2)b, B(2)c, C(2)a-c, D(2)a*

Goal Three: Synthesize, translate and deliver biophysical and social science knowledge into communication products for land managers, communities and other stakeholders to inform project-level action.

In 2003 the ERI conducted a survey of state and federal land managers to determine how the ERI can effectively transfer the best available science to field practitioners. The strongest preferences were for either field-based training or a combination of classroom and field-based instruction. Consistent with other surveys learning from the web scored much lower as a technical transfer tool. Following the survey, the ERI initiated land manager workshops that explain and demonstrate the differences and overlaps between ecological restoration treatments and hazardous fuel reduction treatments. The workshops include lectures and field trips designed to ensure transfer of this knowledge to project-level action. Our work has led to a change in attitude about the amount of fuel reduction necessary to enable the return of low-intensity fire. The level of interest expressed by practitioners could lead to creating a permanent continuing education program at the field level.

The ERI continued to offer an integrated set of communication tools and activities to maximize information exchange with land managers, stakeholders and decision-makers.

1. In 2006 we offered training workshops for land managers and broadened the workshops to include other stakeholders. The goal was to teach participants about ecological restoration treatments and their potential to reverse declining forest health and reduce the risk of severe wildfires across the forest landscape; and to help them to design, implement, monitor and regularly revise wildfire treatments based on the use of adaptive ecosystem management. This was accomplished by offering six continuing education workshops that included field training:

1. Denton, C., H.B. Smith, D. Lund, and C. Bullington. "Principles of Ecological Restoration Workshop" for Ponderosa Fire Advisory Council. Flagstaff, AZ. April 22, 2006. Note that due to immediate fire situation there was only one attendee and the workshop was cancelled.
2. Moote, M.A., J. Abrams, S. Burns, K. Carter, T. Dooley, J. Harrington, and N. Rana, "Collaborative Forest Management." Scottsdale, AZ. May 18-19, 2006. 57 participants.
3. Smith, H.B. "The Generic Ecological Restoration Prescription." Presentation given at the Approaches to Ponderosa Pine Restoration Prescriptions Workshop. Co-Hosted Workshop with TNC. Jemez, NM. June 27, 2006. 20 participants.
4. Abrams, J., Sisk, T., Hampton, H. White Mountains Landscape Assessment follow-up stakeholder workshop (ERI co-chaired with ForestERA). Show Low, AZ. July 31, 2006. 24 participants..
5. Lund, D. One-day field workshop on restoration principals. Also conducted Rapid Assessment for the Santa Fe National Forest. Jemez Springs, NM. July 20-26. 2006. 14 participants.
6. Denton, C. and D. Lund. "Goshawk Workshop" for Forest Service Arizona, Flagstaff, AZ. October 5, 2006. 80 attendees.
7. Denton, C. "Goshawk Workshop" presentation, participated in panel discussion, and led field trip for Forest Service. Albuquerque, NM. November 2, 2006. 75 participants

The ERI is also contacted by agencies and other stakeholders to attend meetings, review reports and offer professional perspectives on diverse issues. A few of these instances include:

1. Smith, H.B., D. Lund, M. Tuten, and W. Chancellor. Attended meeting with Gila National Forest. Mimbres, NM. January 18, 2006.
2. Denton, C. "White Mountain Stewardship Monitoring Board Meeting." Assisted in development of final recommendations for monitoring. Pinetop, AZ. January 19, 2006. 15 participants.
3. Denton, C. Restoration project meeting for the Gila National Forest. Prepared a formal response to project objective, desired future condition, and proposed actions. Reserve, NM. February 13, 2006. 12 participants.
4. Denton, C. Attended monthly Ruidoso meeting. WUI group meeting. Ruidoso, NM. March 20-21, 2006.
5. Lund, D. Review draft report format. Walter Mann Plot Reports for Kaibab NF. Fredonia, AZ. April 11, 2006.
6. Denton, C. Eastside Project Meeting, Final Proposed Action Meeting, Coconino NF. Flagstaff, AZ. April 13, 2006. 25 participants.
7. Lund, D. Eastside Project Meeting, Coconino NF. Project status review. Flagstaff, AZ. April 18, 2006. 7 participants.

8. Denton, C. Attended Burro Creek Project meeting. Reserve Ranger District, Gila National Forest. Reserve, NM. May 1, 2006. 9 attendees.
9. Lund, D., C. Denton, H.B. Smith. Attended Annual ERI/BLM Mt. Trumbull Meeting. Mt. Trumbull, AZ. May 23-25, 2006. 20 attendees.
10. Denton, C. and D. Lund. Met with USFS R-3 silviculturist to discuss upcoming workshops for fall and spring; discussed common objectives of land management for ERI and USFS. Flagstaff, AZ. June 5, 2006. 3 participants.
11. Denton, C. Sent USFS R-3 Regional Office documents relating to pre-settlement uneven age structure, effects of diameter caps, and considerations for developing desired future conditions in ponderosa pine, pinyon-juniper, and mixed conifer. Flagstaff, AZ. June 6, 2006. 1 participant.
12. Denton, C. Attended the White Mountain Stewardship Contract Monitoring Board Meeting. Show Low, AZ. June 15, 2006. 10 attendees.
13. Lund, D. Attended monthly Project Team meeting for Greater Flagstaff Forest Partnership. Flagstaff, AZ. June 20, 2006. 11 participants.
14. Denton, C. Attended monthly Project Team field trip for Greater Flagstaff Forest Partnership. Reviewed Woody Ridge project and Mountaineer project with Coconino N.F. Flagstaff, AZ. June 27, 2006. 20 participants.
15. Denton, C. Attended monthly meeting with Otero County Natural Resource Working Group. Cloudcroft, NM. July 19, 2006. 17 participants.
16. Denton, C. Attended monthly meeting of the Greater Ruidoso WUI Working Group. Ruidoso, NM. July 24, 2006. 25 participants.
17. Denton, C. and D. Lund. Met to review Warm Fire effects with restoration principles. Kaibab National Forest, Fredonia, AZ. August 06, 2006. 4 participants.
18. Denton, C. Discuss goshawk field trip notes with USFS Regional Office. Kaibab National Forest. August 08, 2006. Flagstaff, AZ.
19. Denton, C. Monthly Ruidoso WUI Working Group meeting. Ruidoso, NM. August 29, 2006. 23 participants.
20. Denton, C. Met to discuss possible collection of presettlement evidence for use in the Perk-Grindstone project EIS. Smoky Bear Ranger District. Flagstaff, AZ. August 31, 2006. 2 participants.
21. Denton, C. Retook photos of Bald mesa Demo project on Coconino NF. Flagstaff, AZ. September 1, 2006.
22. Lund, D. Met with Coconino National Forest and Arizona Game and Fish to review Pinyon Juniper project on Anderson Mesa. Flagstaff, AZ. September 13, 2006. 3 participants.
23. Denton, C. and D. Lund. Attended USFS Uneven Age Workshop, Santa Fe, NM. September 18-20, 2006. 33 participants.
24. Denton, C. Monthly Ruidoso WUI Working Group meeting. Ruidoso, NM. September 27, 2006. 31 participants.
25. Smith, H.B. Mt. Trumbull Coordination Meeting with BLM and AZ. Game and Fish Dept. Flagstaff, AZ. December 6-7, 2006. 25 attendees.

2. For three years the ERI has produced brief “working papers” designed to translate scientific information for application in treatment design and implementation. These papers are short, non-technical and appreciated by land managers and stakeholders. In this funding period six working papers were published:
 1. Abella, S.R., P.Z. Fulé, and W.W. Covington. 2006. Diameter caps for thinning southwestern ponderosa pine forests: viewpoints, effects, and tradeoffs. *Journal of Forestry*. 104(8):407-414. **Complete, Appendix G**
 2. Lowe, K. 2006. "Effects of Forest Thinning Treatments on Fire Behavior." The Ecological Restoration Institute Working papers in Southwestern Ponderosa Pine Forest Restoration # 15. Flagstaff, AZ. **Complete, Appendix G**
 3. Lowe, K. 2006. "Snags and forest restoration" The Ecological Restoration Institute Working Papers in Southwestern Ponderosa Pine Forest Restoration #16. Flagstaff, AZ. **Complete, Appendix G**
 4. Minard, A. with C. Peterson, D. Vosick and D. Egan. 2006. Backyard wildlife habitat and fire safety: A guide for residents of Flagstaff. Ecological Restoration Institute Occasional Paper. Flagstaff, AZ.
 5. Minard, A. In press. "Bat conservation and forest restoration treatments." Ecological Restoration Institute Working Papers in Southwestern Ponderosa Pine Forest Restoration #17. Flagstaff, AZ. **Complete, Appendix G.**
 6. Springer, J. In press. "Seeding in ponderosa pine forest treatments." Ecological Restoration Institute Working Papers in Southwestern Ponderosa Pine Forest Restoration #18. Flagstaff, AZ. **In Press.**
3. Development of information pertinent to management actions for posting on the Web.
 - Updates and new material included for stakeholders and land managers. **These may be viewed on the ERI Web Site (<http://www.eri.nau.edu/cms/>).** **Some sample web-sites are included in Appendix H**
4. Held national workshop on restoration of long-needled pine forests for land managers and stakeholders that focused on interpreting current research findings for application on the ground. **Completed.**

The ERI co-hosted a national conference in Flagstaff the week of October 24th-26th. The conference, “Conserving and Restoring Frequent Fire Landscapes of the West: Linking Science, Collaboration and Practice”, was designed along the theme of bringing together land managers, stakeholders, and scientists to improve their abilities to integrate science and collaboration into restoration treatment design and land management.

Each of the three days supported the overall theme beginning with the first day where groups of expert panelists analyzed the positive and negative factors that guide the design of restoration prescriptions. On the second day conference attendees attended all-day field trips to see prescriptions on the ground and discuss how they were developed and whether or not they achieve the identified goals and objectives. On day three, a panel explored designing and implementing treatments at the landscape scale followed by sixteen oral presentations. The 140 people who attended the conference were a good representation of the groups for whom this conference was designed.

In addition to the diverse and excellent speakers and presenters other highlights included a spectacular hailstorm during the last half-hour of the field trips and a raffle for four signed proofs by acclaimed wildlife artist and sculptor, Bruce Sink.

Other sponsors of this conference included the Bureau of Land Management, the Arizona Game and Fish Department, Colorado State Forest Service, The Wilderness Society, Merriam Powell Center for Environmental Research, the Grand Canyon Trust, the Center for Environmental Sciences and Education, U.S. Fish & Wildlife Service, and the Society for Ecological Restoration International.

➤ **A copy of the conference program, summary of conference evaluations, and questions elicited from attendees may be viewed in Appendix I.**

5. Preparation of fact sheets and white papers on request

➤ Three fact sheets, **December 2006**

1. Denton, C. and D. Egan. In press. Ponderosa pine fact sheet. The Ecological Restoration Institute. Flagstaff, AZ.
2. Denton, C. and D. Egan. In press. Mixed conifer fact sheet. The Ecological Restoration Institute. Flagstaff, AZ.
3. Denton, C. and D. Egan. In press. Chaparral fact sheet. The Ecological Restoration Institute. Flagstaff, AZ.

➤ Two white papers for decision-makers and stakeholders. **3 completed.**

1. Daly, C., C. Moseley, M. Enzer, and A. Mootte. 2006. "Forest Service Contracting: a basic guide for restoration practitioners." Published in collaboration with the University of Oregon Ecosystem Workforce Program, Sustainable Northwest, and the Flathead Economic Policy Center. The Ecological Restoration Institute White Paper. Flagstaff, AZ.
2. Ostergren, D. 2006. "Wilderness management and the restoration of fire: An analysis of laws and regulations in northern Arizona." The Ecological Restoration Institute White Paper. Flagstaff, AZ.
3. Rudeen, A. 2006. "Communications between Forest Managers and property owners in Pine Flats: a case study of community interactions in a high fire hazard area." ERI Issues in Forest Restoration. The Ecological Restoration Institute White Paper. Flagstaff, AZ.

6. 20 Field trips for stakeholders to visit restoration sites. **27 Completed.**

1. Denton, C. and J. Bedell. Participated in a field review of 14 completed projects within Ruidoso WUI area to determine effectiveness and compliance with Community Wildfire Protection Completed the final report for the meeting. Ruidoso, NM. February 20-22, 2006. 8 participants.
2. Lund, D. Reviewed a Pinyon-Juniper restoration project with Kaibab National Forest and AZ Game and Fish Department. North Kaibab. February 21-23, 2006. 6 participants.
3. Bedell, J. Field trip for USFS national and regional fire, vegetation and wildlife ecologists on the Prescott Mexican Spotted Owl Project. Distributed 2005 report and 2006 fire scar data. Prescott, AZ. March 14, 2006. 26 participants.

4. Denton, C. and D. Lund. Put in plot boundary for goshawk restoration project at Kaibab NF. Williams, AZ. April 12, 2006.
5. Denton, C. and D. Lund. Woody Mtn. Project review, Coconino NF. Flagstaff, AZ. April 25, 2006. 23 participants.
6. Lund, D. Led and assisted in marking of the Riparian block of the Ecological Restoration demonstration project. Beaverhead, NM. May 6, 2006. 15 participants.
7. Denton, C. and D. Lund. Met with a research team from the University of Nevada, Las Vegas to assess land and determine if they should work with the USFS on setting up research plots, presettlement structure, and fire history. Las Vegas, NV. June 22, 2006. 10 participants.
8. Smith, H.B. Gave a field tour of a planned restoration project on the Jemez Ranger District of the Santa Fe National Forest. Approaches to Ponderosa Pine Restoration Prescriptions Workshop. Jemez, NM. June 27, 2006. 20 participants.
9. Denton, C. and D. Lund. Review goshawk demo plots on Kaibab National Forest with the Arizona Game and Fish Department research branch. Williams, AZ. July 12, 2006. 4 participants.
10. Denton, C. and D. Lund. Reviewed goshawk plots with a Coconino National Forest marking crew. Williams, AZ. July 13, 2006. 15 participants.
11. Denton, C. Met with Coconino National Forest and Arizona Game and Fish to review Pinyon Juniper project on Anderson Mesa. Flagstaff, AZ. August 4, 2006. 3 participants.
12. Lund, D. Worked with Kaibab National Forest district personnel and ERI crews on Goshawk Study Plots in Williams, AZ. August 4, 2005.
13. Lund, D. Kaibab NF goshawk demo plots. Williams, AZ. August 9, 2006. 3 participants.
14. Denton, C. and D. Lund. Kaibab NF Goshawk demo plots. Fredonia, AZ. August 15, 2006. 3 participants.
15. Denton, C. and D. Lund. Review goshawk demo plots with USFWS and AG & FD. Williams, AZ. August 22, 2006. 15 participants.
16. Smith, H.B. Field discussion examining Goshawk Demonstration Site. Flagstaff, AZ. August 22, 2006. 18 participants.
17. Denton, C. and D. Lund. Review Warm Fire effects on Goshawk territories with RMRS, Richard Reynolds. Jacob Lake, AZ. August 23, 2006. 4 participants.
18. Denton, C. and D. Lund. Field review of final mark on Valles Caldera project with representatives of USFS and TNC, Albuquerque, NM. September 11, 2006. 6 participants.
19. Denton, C. and D. Lund. "Field Review for White Mountain Stewardship Contract multi-part Monitoring Board." Springerville, AZ. September 21, 2006. 20 participants.
20. Denton, C. "Review and discuss effects of Hochderfer and Pumpkin Wildfires", Natural Areas Conference. Flagstaff, AZ. September 22, 2006. 15 participants.

21. Smith, H.B. Field discussion examining Goshawk Demonstration Site. October 16, 2006. 18 participants.
 22. Denton, C. Led field review of ERI goshawk demonstration block on Kaibab NF to R3 Regional Leadership Team meeting. Flagstaff, AZ. October 18, 2006. 45 participants.
 23. Denton, C. "ERI's role in collaborative effort in Coconino NF fuels project". 2006 ERI National Conference. Flagstaff, AZ. October 25, 2006. 80 participants.
 24. Smith, H.B., W. W. Covington , D. Vosick, P. Z. Fulé. "Review of Forest Restoration Practices." Field trip and review meeting with BLM and AZ Game and Fish Dept. Mt. Trumbull, AZ. November 1 and 2, 2006. 12 attendees.
 25. Denton, C., D. Lund, and D. Brewer. 2006. Field review of 3 restoration prescriptions/marks on Eagar South project with the Apache/Sitgreaves NF. Springerville, AZ. December 5, 2006. 15 attendees.
 26. Denton, C., D. Lund, and D. Brewer. Field trip to locate, identify, GPS, and map pre-settlement evidence for conditions for the Mexican Spotted Owl PAC on Perk-Grindstone project on the Smokey Bear District of the Lincoln NF. Ruidoso, NM. December 11-14, 2006. 9 participants.
 27. Lund, D. Reviewed a Pinyon- Juniper project on the Coconino National Forest with the Arizona Game and Fish Department. Flagstaff, AZ. July 14, 2006. 3 participants.
7. 10 Presentations on forest restoration for stakeholders. **27 Completed**
1. Moote, M.A. "Multiparty Monitoring Overview". Collaborative Forest Restoration Program Annual Meeting, January 24, 2006. 95 participants.
 2. Smith, H.B. "Forestry Scientific Community Role in Today's World of Chain Saw and/or Crosscut Saw Usage." 2006 R-3 Chain/Crosscut Saw Conference. Prescott, AZ. February 8, 2006. 30 participants.
 3. Springer, J. D. "Emerging from the ashes: soil seed banks, seeding and natural regeneration following fire in Arizona." Arizona State Botanists Conference, Desert Botanical Gardens,
 4. February 11, 2006, Phoenix, AZ. 100 participants
 5. Bedell, J. "Examples of Restoration Presentations and Rapid Assessment." Presented at the "Knowledge service needs for restoration and conservation management of tribal lands workshop." February 14, 2006. 30 participants.
 6. Smith, H.B. "Writing and implementing ponderosa pine restoration prescriptions- an open discussion with scientists and practitioners to discuss the current science and lessons earned in practice." Santa Fe, NM. February 22, 2006. 50 participants.
 7. Covington, W.W. "Past, present, and future of changes in communities, forest health, and fire in the West". Presented to Congressional Committee on Resources. Washington, DC. March 2, 2006. 30 participants.
 8. Denton, C. 30 minute presentation of ecosystem restoration. Flagstaff Fire Dept. Flagstaff, Arizona. April 13, 2006. 15 participants.

9. Smith H.B. "The AZ Experience-Findings of NAU's Ecological Restoration Institute". Colorado Forest Restoration Institute Workshop in cooperation with CO State Forest Service. Deckers, CO. April 27- 28, 2006. 44 attendees.
10. Abrams, J. "Frequently asked questions about collaboration." Collaborative Forest Management Workshop. Scottsdale, AZ. May 18, 2006. 57 participants.
11. Moote, M.A. "Expectations of Collaboration," Collaborative Forest Management Workshop. Scottsdale, AZ. May 18, 2006. 57 participants.
12. Moote, M.A. and N. Rana. "Collaboration Troubleshooting," Collaborative Forest Management Workshop. Scottsdale, AZ. May 18, 2006. 57 participants.
13. Moote, M.A. "Expectations of Collaboration," Collaborative Forest Management Workshop. Scottsdale, AZ. May 18, 2006. 57 participants.
14. Moote, M.A. "Collaboration Best Practices," Collaborative Forest Management Workshop. Scottsdale, AZ. May 19, 2006. 57 participants.
15. Denton, C. "Effects of Ecological Restoration." Presentation at the Navajo Nation Timber conference. Farmington, NM. May 25, 2006. 80 attendees.
16. Smith, H.B. "The Generic Ecological Restoration Prescription." Presentation given at the Approaches to Ponderosa Pine Restoration Prescriptions Workshop. Jemez, NM. June 27, 2006. 20 participants.
17. Huffman, D. Participant in workshop to synthesize state of knowledge concerning pinyon-juniper fire history. Sponsored by Colorado State University and The Nature Conservancy. Boulder, CO. August 1, 2006.
18. Fulé, P.Z. and D.C. Laughlin. 2006. "Wild land fire use effects on forest structure over an elevation gradient, Grand Canyon National Park" [oral presentation]. 33rd Annual Natural Areas Conference: Stewards of the Old and New West. Flagstaff, AZ. September 21, 2006. 40 attendees.
19. Laughlin, D.C. and P.Z. Fulé. "Plant community stability following native disturbance in fire-prone forests" [oral presentation]. 33rd Annual Natural Areas Conference: Stewards of the Old and New West. Flagstaff, AZ, September 21, 2006. 100 participants.
20. Vosick, D. "The Arizona 20 year strategy to restore Arizona Forests." USFS Region 3 Leadership Team. Flagstaff, AZ. October 19, 2006. 40 participants.
21. Hampton, H.M., B.G. Dickson, Y. Xu, J.B. Abrams, J.M. Rundall, and T.D. Sisk. Collaborative development of prioritized restoration plans for southwest forest and woodland ecosystems. Presentation at conference "Conserving and Restoring Frequent Fire Landscapes in the West: Linking Science, Collaboration, and Practice." Flagstaff, AZ. October 26, 2006.
22. Farris, C., P.Z. Fulé, M.L. Van Horne, T.W. Swetnam, C.H. Baisan, and D.A. Falk. A multi-scale assessment of targeted and systematic fire scar sampling at three sites across the Southwest. 3rd International Fire Ecology & Management Congress, San Diego, CA. November 13-17, 2006.
23. Fulé, P.Z. "Do never-logged forests differ from logged forests in their response to fire exclusion, Arizona and Durango?" 3rd International Fire Ecology & Management Congress, San Diego, CA. November 13-17, 2006.

24. Fulé, P.Z. Fire regime changes in pine-oak ecosystems, Durango and Chihuahua. 3rd International Fire Ecology & Management Congress, San Diego, CA. November 13-17, 2006
 25. Kaye, J., M. Kaye, S. Eckert, P. Fulé, S. Hart, K. Prewitt, and S. Haase. Accumulation of carbon and nutrients in ponderosa pine trees during 120 years of fire exclusion. Managed Ecosystems: Results from Research, Education, and Extension USDA CSREES National Research Initiative projects; 2006 USDA/CSREES NRI Managed Ecosystem Project Investigators Reports; Agronomy, Crop, and Soil Science Societies Meeting; Indianapolis, IN. November 14, 2006.
 26. Moore, M.M., A.J. Sánchez Meador, D.W. Huffman, J.D. Bakker, D.M. Bell, P.F. Parysow, P. and Z. Fulé. Long-term and anticipated changes in southwestern conifer forests: Analysis and modeling of historical USDA permanent plot data. Managed Ecosystems: Results from Research, Education, and Extension USDA CSREES National Research Initiative projects; 2006. USDA/CSREES NRI Managed Ecosystem Project Investigators Reports; Agronomy, Crop, and Soil Science Societies Meeting; Indianapolis, IN. November 14, 2006. 50 participants.
 27. Vosick, D. Interview with KCPW Radio, Salt Lake City, UT, about Forest Restoration and the ERI Conference. Salt Lake City, UT. October 23, 2006.
8. Six Rapid Assessments (field estimates of localized reference conditions, fire regime, and restoration prescription development, etc.) of treatment sites that provide explicit recommendations for action.
1. Denton, C., J. Bedell, and D. Lund. Rapid Assessment and review of projects on Mt. Graham and Catalina Mountains, Coronado National Forest. Safford and Tucson, AZ. January 23-25, 2006. 10 participants. **Kmm has copy of report from Charlie.**
 2. Tuten, M. and D. Smith. Dutch Gulch Stewardship Project: Assessment of forest reference conditions. Report submitted to the Gunnison Field Office, Bureau of Land Management, Gunnison, CO. January 24, 2006. **Report in Appendix J.**
 3. Denton, C., D. Lund. Assisted in mark of Goshawk Demonstration plot. Also participated in review and discussion of Goshawk and Ecosystem Restoration plot with R3 Regional Office and Coconino and Kaibab National Forest personnel. Williams, AZ. May 15-18, 2006. 25 attendees. **Kmm has copy of report from Charlie.**
 4. Smith, H.B., Tuten, M. Ecological monitoring plan and pre-treatment forest structure measurements. Jemez, NM. June 27, 2006. 20 participants. **Kmm has copy of report from Matt (“Valles” (Jemez CFRP) Rapid Assessment.**
 5. Denton, C. and D. Lund. Rapid Assessment of an existing treatment on the Coconino National Forest. Located and laid out a 5 acre plot within the Woody Ridge treatment area. Developed a pre-settlement map, and a map with existing post-treatment leave trees. Developed trees per acre data and basal area for the Coconino National Forest. Flagstaff, AZ. July 18, 2006. 2 participants. **Kmm has copy of report from Charlie.**

6. Smith, D. and Binkley, D. Field Visit to Mancos-Dolores Ranger District of the San Juan National Forest by Colorado State University CORI and Northern Arizona University, ERI. July 25-26, 2006. 11 attendees. **Report in Appendix J.**

The following meetings were conducted to review past rapid assessments and support potential opportunities for future rapid assessments:

1. Denton, C., Lund, D. Met with North Kaibab district timber and wildfire staff to discuss possible rapid assessment on district for goshawk demo plots. Fredonia, AZ. August 30, 2006. 3 participants.
2. Denton, C. WUI Working Group Field Assessment Committee to review and assess effectiveness on completed projects. Ruidoso, NM. October 11-12, 2006. 12 participants.
3. Denton, C., D. Lund, and D. Brewer. 2006. (Discussion phase for future RAP) Field review of 3 restoration prescriptions/marks on Eagar South project with the Apache/Sitgreaves NF. Springerville, AZ. December 5, 2006. 15 attendees.
4. Denton, C., D. Lund, and D. Brewer. 2006. (Discussion phase for future RAP). Perc-Grindstone project, Lincoln National Forest. Assess pre-settlement conditions of Mexican Spotted Owl territories.

**The deliverables in this section fulfill the following needs articulated in the "Examples of Specific Land Manager Needs, March 10, 2005": A(3)a, C(2)a-c, D(2)a*

Goal Four: Provide technical assistance to collaborative efforts by affected entities to develop, implement, and monitor adaptive ecosystem management restoration treatments that are ecologically sound, economically viable, and socially responsible.

Working with communities, local government and stakeholders is key to developing comprehensive solutions to the wildfire crisis. The ERI continued to support collaborative efforts by providing information, service and in the case of the Greater Flagstaff Forest Partnership funding through an integrated program of work.

1. Finding ways to utilize the huge quantity of small diameter wood generated during restoration continues to impede implementation of treatments at the pace and scale required to adequately address the problem. It is an issue at the interface of ecology, economy and social acceptability. The ERI continues to participate in efforts to promote small wood utilization. A fundamental and controversial question associated with utilization is defining exactly how much harvesting and utilization is ecologically sustainable. The answer can lead to higher comfort by interest groups who want land management decisions decoupled from economic activity. The ERI will continue to support utilization efforts through analysis and technical assistance.
 - Fulfillment of two information requests based on private sector and collaborative utilization process needs. These information requests will be at a range of scales from the local to the state level and are anticipated to come from diverse stakeholders (e.g., the Arizona Joint Legislative Healthy Forest Task Force, the Arizona Governor's Forest Health Councils, local collaborative groups).
Complete, Appendix K.

- Snider, G., P.J. Daugherty, and D.B. Wood. 2006. [The irrationality of continued fire suppression: An avoided cost analysis of fire hazard reduction treatments versus no treatment.](#) *Journal of Forestry* (104)8:431-437.
- **Agenda from Vosick**

2. Increasing demands for collaborative planning and assessment process do not automatically lead to successful development and implementation of restoration projects that meet the needs and interests of multiple stakeholders. There is considerable confusion about what collaborative conservation means and how it can best be integrated into existing planning and management procedures. The ERI provided information, training, and technical assistance in collaboration best practices, including multiparty monitoring and stewardship contracting.

- Developed and conducted a training module on collaboration best practices. **Complete, Appendix L.**
 - Moote, M.A., J. Abrams, S. Burns, K. Carter, T. Dooley, J. Harrington, and N. Rana, "Collaborative Forest Management," May 18-19, 2006. 57 participants.
 - sessions included presentations and interactive working sessions on: collaboration mandates; NEPA and collaboration in environmental review; the 2005 Forest Planning Rule and collaboration in forest plan revision; collaboration in development of Community Wildfire Protection Plans; and appeals, litigation, and conflict resolution
- Responded to requests for information and technical assistance related to collaboration. **Ongoing and includes the following:**
 - A.** Assistance to Coronado National Forest, Safford Ranger District, planning and facilitating initial meetings of the Pinaleños Partnership – Moote, Abrams

Co-chaired meetings:

 - Moote, A. and J. Abrams. Pinaleños field trip and partnership planning meeting – local community. July 18, 2006. Safford, AZ. 16 participants.
 - Moote, A. and J. Abrams. Pinaleños field trip and partnership planning meeting – scientists and environmental groups. July 19, 2006. Safford, AZ. 10 participants.
 - Moote, A. and J. Abrams. Pinaleños field trip and partnership planning meeting – tribes. July 20, 2006. Safford, AZ. 11 participants.

Presentation:

 - Moote, M.A. Collaborative Forest Partnerships. Pinalenos Partnership Kickoff Meeting, August 23, 2006. Safford, AZ. 27 participants.
 - Abrams, J. Partnership Structure and Operating Guidelines. Pinalenos Partnership Meeting. September 22, 2006. Safford, AZ. 25 participants (expected).
 - B.** Assistance to Greater Flagstaff Forests Partnership clarifying the expectations, roles, and responsibilities of the Partnership, its collaborators, and local land manager/owners. Conducted 3 member surveys, developed written materials for

Partnership Advisory Board and for the GFFP Web site, presented results at monthly GFFP Partnership Advisory Board meetings and Annual Retreat.

Chaired meetings:

- Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. January 6, 2006. 8 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. February 13, 2006. 6 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. March 8, 2006. 5 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. April 5, 2006. 6 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. May 22, 2006. 6 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. July 25, 2006. 3 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. August 2, 2006. 6 participants.
 - Moote, A. Greater Flagstaff Forest Partnership Highest Priority Immediate Goal #2 Planning Meeting. September 6, 2006. 6 participants.
3. The forest planning process and environmental review process for forest treatments have changed with the passage of the Healthy Forest Restoration Act and the Healthy Forests Initiative. Precisely how things are changing and the implications for public involvement are unclear to many citizens. The ERI in partnership with others held a practitioners workshop for land managers and community practitioners to explain the new authorities and how they are currently interpreted and implemented.
- One practitioner workshop. **Complete, Appendix M.**
 - Written guidance on current policy and planning procedures. **Complete, Appendix N or link to ERI website: <http://www.eri.nau.edu/cms/content/view/856/1081/>.**
4. The Greater Flagstaff Forest Partnership (GFFP) is an exemplar of community-based, collaborative forestry. Central to the success has been a strong core partnership of the Coconino National Forest, Northern Arizona University and an environmental organization, the Grand Canyon Trust surrounded by a constellation of partners willing to work on the multitude of challenges presented by the forest health crisis.

The ERI, City of Flagstaff and Coconino County have provided support to GFFP for several years. This not only helps get work done but enables the ERI to investigate the collaborative process and monitor the pros and cons of different approaches to collaboration and the effectiveness of collaboration for getting work done on the ground. Much like the ERI has statistically valid plots for analyzing ecological responses to restoration, the GFFP provides a working lab for analysis of human values and interactions that influence land management. This experience is transferred to other collaborative organizations to make them more effective.

The funding and integrated support provided to the GFFP enabled participation in the planning, implementation and coordination of treatments in the Flagstaff WUI and at the landscape level.

- Annual Performance Review Report. **Complete, Appendix O.**

**The deliverables in this section fulfill the following needs articulated in the “Examples of Specific Land Manager Needs, March 10, 2005”: A(3)a, C(2)a-c, D(2)a*

Conclusion

This report documents completion of effort on FY'06 funding of \$1.6M. The ERI and its partners are grateful to the Forest Service for this financial support. This funding is focused on synthesizing and analyzing existing scientific information into fact sheets, white papers, working papers and peer-reviewed manuscripts; identifying wildlife habitat use in WUI treatment areas; and inventorying the impacts of landscape-level wildland fire use in ponderosa pine and other higher elevation forest types. We have also continued to work with NGOs and businesses to identify and refine methods for extracting and utilizing small diameter trees. These efforts will make substantial contributions to the advancement of forest restoration in the southwest.

Appendices

Appendix A: ForestERA Final Report for 2006 Federal Funds

Appendix B: Powerpoint presentation

Appendix C: Sample of web site for data layers & draft of Final Strategic Vision

Appendix D: Impact of hazardous fuel reduction treatments on Mexican Spotted Owls

Appendix E: Agenda, Meeting Notes, Proposal “Analysis of Small-Diameter Wood Supply in Northern AZ”

Appendix F: Final Report for LEARN

Appendix G: Status of Knowledge and Working Papers

Appendix H: Web-Based Information

Appendix I: National Conference

Appendix J: Rapid Assessment Reports

Appendix K: Information Requests

Appendix L: Training Module

Appendix M: 2005 Practitioner’s Workshop

Appendix N: Written guidance on current policy and planning procedures

Appendix O: Report from GFFP