NEW MEXICO FOREST AND WATERSHED RESTORATION INSTITUTE
AT NEW MEXICO HIGHLANDS UNIVERSITY

ANNUAL REPORT

2010-2011

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With contributions from staff of the NMFWRI

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THE NEW MEXICO FOREST AND WATERSHED RESTORATION INSTITUTE

Background. The Federal Southwest Forest Health and Wildfire Prevention Act of 2004 (Public Law 108-317) established the Southwest Ecological Restoration Institutes (SWERIs) *to demonstrate and promote the use of adaptive ecosystem management to reduce the risk of wildfires, and restore the health of fire-adapted forest and woodland ecosystems of the interior west.* The purposes of the Act include: *to enhance the capacity to develop, transfer, apply, monitor, and regularly update science-based forest restoration treatments that will reduce the risk of severe wildfires, and improve the health of dry forest and woodland ecosystems in the interior west.* No other agencies or organizations in the southwest US have this federal mandate nor play such a strong and unique role in fire mitigation and public safety, forest health and restoration, technical assistance and outreach, and restoration-based economic development.

One of three restoration institutes established by the Act (partner institutes are the Ecological Restoration Institute, housed at Northern Arizona University, and the Colorado Forest Restoration Institute, housed at Colorado State University), the New Mexico Forest and Watershed Restoration Institute (NMFWRI) is housed at New Mexico Highlands University, home of the only Bachelor of Science in Forestry program in the state. Widely known and highly regarded throughout New Mexico and the southwest region, the NMFWRI provides outreach services and technical assistance that enable watershed restoration on forest and landscape levels not available elsewhere in the state. Importantly, the NMFWRI is looked upon to fulfill the role as a neutral broker of partnerships and collaborations among multiple land management agencies, watershed interests and stakeholders to achieve restoration objectives across jurisdictions and landscapes. While other entities involved in restoration have funding and regulatory roles related to land management, the NMFWRI does not have a financial stake in the outcomes of any project and does not have any authority or role related to compliance. The NMFWRI, therefore, provides neutral, practical advice and facilitation and can comment fairly and impartially on positions held by all stakeholders.

NMFWRI areas of expertise. NMFWRI's seven-person professional staff brings specific expertise, education, and experience in the following areas: remote sensing and spatial data analysis, GIS/GPS, mapping, forest inventory, forest operations and wood products, collaborative processes, social dimensions of natural resource management, and silviculture. The NMFWRI represents the state's only dedicated capability for supporting the spatial data analysis needs of external stakeholders in the natural resources sector – public, tribal, or private – as a public service on a case-by-case basis. The NMFWRI also represents the GIS/GPS capacity for Highlands University and for most of northern New Mexico, and partners with other entities in the state, such as New Mexico Tech and New Mexico State University, to solve problems related to forest and watershed restoration. This includes forestry expertise that the NMFWRI provides to the Bureau of Geology and the Aquifer Mapping Program at NM Tech, and NMSU's Range Improvement Task Force. NMFWRI's GIS work unit also provides help with maps and other geographic information to New Mexico groups engaged in forest restoration and land

management, but who are too small to maintain their own GIS capability. These groups include soil and water conservation districts, municipalities, private groups and individuals, and tribal organizations.

In some cases, the Institute's areas of expertise are unique in the state. For example, as the state struggles to create employment and rejuvenate its forest products industry, no other outreach organization in New Mexico has expertise in forest operations, wood products, and forest worker safety. The NMFWRI has provided technical assistance to individual, tribal, and collective forest industry interests – including the New Mexico Forest Industries Association. In addition, the NMFWRI has helped develop capacity, expertise, and employment in the forestry sector, perhaps most notably through its partnership with the Alamo Navajo School Board, Inc., where the NMFWRI has been instrumental in (a) reducing the workers compensation rates of forest workers there from 27 to 13.5 percent; (b) helping to develop sustainable employment in forest restoration, including monitoring and timber marking; and (c) working with the Alamo Navajo Community develop a thriving and sustainable primary wood processing economy that is being used as a model for forest restoration-based enterprises in the state. This model has been extended to the Ramah Navajo community and forms the basis for a newly developed credit-bearing certificate in forest and watershed restoration. Moreover, the NMFWRI has also developed indicators for assessing the social and economic outcomes of forest restoration practices, including metrics for restoration-based employment, and has recently developed and published guidelines for monitoring riparian restoration projects.

FY 2010-'11 budget and work plan. In FY 2010-'11, approximately 40 percent of the NMFWRI's budget derived from federal appropriations; 40 percent from state appropriations; and the remaining 20 percent from contracting for restoration-related work ranging from technical assistance with GIS to the a grant from the BLM to investigate and refine procedures for vegetation delineation. The total federal appropriation for the NMFWRI during FY 2010-'11 was $150,000.

The Institute's revised federal FY 2010-'11 work plan was divided into three project areas:

1. Technical Assistance for and outreach to stakeholders;
2. Forest and watershed restoration monitoring; and
3. New Mexico's restoration-based economy

In *Section One* of this annual report, each of these three projects is accompanied by project descriptions and specific deliverables, with side-by-side comparisons of specific work that the Institute has completed associated with each proposed deliverable. However, while the focus of this annual report is the Institute's commitments and work completed vis-à-vis its federal FY 2010-'11 work plan, in order to paint a comprehensive picture of the Institute's work during the past fiscal year, this annual report also outlines work accomplished using state appropriations and contracting. Therefore, additional work accomplished by the NMFWRI that complements and/or is outside of the federal work plan for FY 2010-'11 is outlined in *Section Two* of this document.

SECTION ONE

RECAPITULATION OF NMFWRI'S FY 2010-'11 FEDERAL WORK PLAN AND

WORK ACCOMPLISHED AND DELIVERED UNDER THAT PLAN

Project 1: Technical assistance for and outreach to stakeholders

One set of identified needs revolves around tools and information that are useful for communities, agencies, and collaborative restoration groups. Some projects must be coordinated across multi-jurisdictional boundaries to achieve forest and woodland restoration on a landscape scale. This type of organization and mapping will also assist the forest products industry in estimating potential wood supplies over several years.

A recent agreement among USDA-Forest Service Region 3, New Mexico NRCS, and NM State Forestry has selected the Gallinas watershed as the priority watershed for the state, and a target for a landscape-scale, cross-jurisdictional restoration effort. The Gallinas River watershed is the drinking-water watershed for Las Vegas, and the only source of water for the city; a large crown fire in the area would be disastrous. The NMFWRI has been involved in the restoration of this watershed from its inception.

NMFWRI has become a valuable mapping resource for small government agencies, non-profit organizations, private landowners, and local field offices of larger government organizations that have little or no in house GIS and GPS capabilities. Land managers throughout the state often request help with mapping and spatial data analysis to create visual representations of past and current projects and to help prioritize future projects. NMFWRI's staff expertise and GIS/GPS infrastructure has allowed it to be very responsive to ad hoc requests for support from these organizations.

Project one deliverables outlined in the FY 2010-'11 work plan:	Activities completed during FY 2010-'11
1. *Continued close involvement with the collaborative effort to restore the Gallinas River watershed.* The role of the NMFWRI will vary as needed, but will include mapping services, prescription development, public education, monitoring, monitoring training, and collaborating with citizens' groups in the watershed. A record of the Institute's contributions will be kept.	**The NMFWRI continued to maintained and revise the western San Miguel County fire history map and updated the map with new fire and treatment data from NMSF and USFS, most recently to inform the Gallinas Partnership.** **The NMFWRI Director was a member of the Board of Directors of the Hermit's Peak Watershed Alliance (HPWA) through FEB 2012.** **A NMFWRI GIS staff member is a member of the HPWA's Technical Team.** **The NMFWRI initiated and co-manages the newly formed Gallinas Partnership, whose mission is to *improve the health and safety of the Gallinas and neighboring watersheds to mitigate the potential for catastrophic wildfire and to secure a more certain and sustainable water supply to the City of Las Vegas and the region through the development and implementation of a comprehensive and connected watershed plan and hazardous fuel reduction strategy.*** **The NMFWRI also chairs two of the four working groups comprising the Gallinas Partnership – Economic Development and Outreach/Education – and serves on the Partnership's Steering Committee.** **The NMFWRI houses and maintains the website for the Gallinas Partnership – www.nmfwri.org/gallinas-watershed-project.** **The NMFWRI authored several white papers/commentaries on forest restoration, published in the Albuquerque Journal (3) and the Las Vegas Optic (2), and posted on the NMFWRI website at its "Watershed Restoration RT" site. The commentaries published in the Optic described the Gallinas Partnership.** **The NMFWRI was invited to discuss the Partnership on KLVF in Las Vegas on three occasions in 2011.**

2. *Continued close involvement with the SW Jemez Partners and other landscape and forest-scale restoration initiatives*. The SW Jemez collaboration is comprised of core members from the Santa Fe National Forest, the Valles Caldera National Preserve, the Nature Conservancy, the Pueblo of Jemez, and the NMFWRI. It is focused on the landscape-scale restoration of the eastern portion of the Jemez River watershed. An annual report will summarize the contributions of the NMFWRI to these efforts.	**The NMFWRI continues to chair the Vegetation Monitoring Committee for the SW Jemez CFLR.** **The NMFWRI supported the development of and is a signatory to the recently funded Zuni Mountains CFLRP. This included setting up a collaborative folder on the Forest and Watershed Health Clearinghouse, a GIS FTP site, and creating maps for the project proposal.**
3. *Providing technical assistance to other landscape and forest-level restoration efforts*. In addition to its active outreach role in several CFRP projects throughout the state, the NMFWRI will continue providing technical assistance to many landscape and forest-level restoration projects, including the Isleta Multi-Jurisdictional Collaborative Landscape Analysis CFRP; the Barbero Thinning and Burning (Rowe Mesa) CFRP; the Roger Tucker utilization CFRP; the Estancia Basin Watershed and Forest Health, Restoration, and Monitoring Project; the Upper Rio Grande Multi-jurisdictional project; and the development of the Zuni Mountain Landscape Restoration (Cibola CFLRP) project. To date, technical assistance to these projects has included mapping, prescription development, and consultation on sampling intensities and inventory design. The NMFWRI anticipates demands for assistance to continue and to expand to assistance with assessing the socio-economic outcomes of restoration projects. NMFWRI's annual report will summarize the Institute's contributions.	**The NMFWRI continued to facilitate the Estancia Basin project, facilitates and manages the Greater Rio Grande Watershed Alliance, and initiated and collaborates in the management of the Gallinas Partnership. The NMFWRI provides technical assistance, including in GIS and mapping, to all three groups.** **The NMFWRI is conducting the socio-economic assessment of the Roger Tucker and Old Wood CFRPs.** **The NMFWRI is testing its newly developed riparian monitoring guidelines with the GRGWA.**
4. *The development of project maps for stakeholders throughout the state.* Anticipated activities include continued support to thinning project mapping and noxious weed map creation for several soil and water conservation districts, updates to Community Wildfire Protection Plan maps, and project maps for various Collaborative Forest Restoration Program grantees, tribal entities, and local watershed groups. As awareness of this service grows, additional requests will be filled on a case-by-case basis and depending on available funding.	**The NMFWRI provided maps to a number of entities and activities, including:** • **Taos CWPP** • **Questa CWPP** • **Edgewood SWCD** • **East Torrance SWCD** • **Claunch-Pinto SWCD** • **Tierra Y Montes SWCD** • **Forest Guild** • **NMHU ITS**

	• **Alamo Navajo** • **Hermit's Peak Watershed Alliance** • **NMFIA** • **Biophilia Foundation (Pritzlaff Ranch)** • **Sapello Watershed Group** • **Dan Flinter (Private Landowner)** • **NMSU Cooperative Extension** • **Michael Benjamin CFRP** • **NMSF Forest and Watershed Health Office** • **NMHU Students and Faculty** **See Appendix A for an elaboration on numbers of maps and stakeholders benefitted.**

Project 2: Forest and watershed restoration monitoring

In December 2008, the NMFWRI released a report addressing long-term monitoring of New Mexico's CFRP. This report identified a minimal set of ecological indicators for measurement and a set of 20 projects for long-term monitoring, and recommended that the measurements be collected and archived in a manner that can be easily managed and shared. Archiving and sharing monitoring data will provide researchers and others from both within and outside the NMFWRI the ability to investigate questions related to forest and landscape scale restoration where they are currently lacking. For example, the NMFWRI often fields questions on maintenance cycles for treatments on various sites throughout the state.

The NMFWRI has been identified as the organization best situated to re-measure the plots and manage data from long-term monitoring, two tasks which are compatible with our enabling legislation. The NMFWRI anticipates working with people at the Long-Term Ecological Research (LTER) group at the University of New Mexico, who have experience with maintaining data archives. Five CFRP projects, treated in 2005-06, are scheduled for five-year re-measurement in FY 11. This is a continuing task with new CFRP projects rolling into the re-measurement pool going forward, and will therefore require increasing financial and staffing support in proportion to the numbers of new projects selected for long-term monitoring. The NMFWI's level of commitment to this project will be re-evaluated annually based on federal appropriations.

In addition, the NMFWRI will continue CFRP pre- and post-treatment monitoring for some projects, depending on demand, the Institute's capacity, and available funding. These efforts establish semi-permanent plots and inventories pre-treatment vegetation, wildlife, and surface fuels. GIS and GPS are used to plan the locations of these plots and to provide the required precise plot positions, so they can be revisited for post-treatment and long-term monitoring. The NMFWRI maintains all monitoring data in electronic form in order to make them most useful and accessible to researchers and project managers. Data will be used to track the effectiveness of some prescriptions and provide a mechanism for assessing the degree to which CFRP project objectives have been met. In FY2011, the NMFWRI will

continue to partner with land managers, researchers and others, to more fully realize the value of these data to future watershed restoration efforts, as resources allow.

Over the past two years, we conducted the pre-treatment measurements on a private ranch in the Sacramento Mountains as part of a project designed to quantify water savings in a mixed conifer thinning. In addition, the NMFWRI has been partnering with New Mexico Tech to develop more robust remote sensing models for the project. The NMFWRI is partnering with multiple state and federal agencies as well as two universities on this project. We will continue our involvement with this study during the coming year.

Project two deliverables outlined in the FY 2010 -'11 work plan:	**Activities completed during FY 2010 -'11**
1. *Assessment of long-term CFRP monitoring*. Decisions will be made as to which new projects will be added to those selected for long-term monitoring, and long-term data collection and storage will be established/continued. Individual long-term monitoring reports and a technical release will summarize progress and outcomes of this effort. Information will also be posted on the NMFWRI website.	**The NMFWRI performed five-year monitoring on five CFRP projects:** **These reports have been completed, submitted to USFS, and posted on the NMFWRI website.** **Data, maps, and reports for pre- and post-treatment monitoring for NMFWRI projects have been provided to collaborators (Figure 1, p. 9). Project datasets have been assembled on CD disks and in electronic format and are available so that project data can she shared easily upon request.**
2. *Post-treatment monitoring on the Sacramento Mountains water budget project*. The NMFWRI will continue its collaboration with this research team, especially those from New Mexico Tech, with the intent of developing partnerships on future projects. A summary document will be developed that describes the project and the role of the NMFWRI. Information will also be posted on the NMFWRI website. However, because treatments have not been established on schedule, monitoring efforts by the NMFWRI will likely be delayed until 2012.	**All pretreatment monitoring for this project was completed in FY2009. NMFWRI is now awaiting completion of treatments, which have been delayed, before initiating post-treatment monitoring. Additional pretreatment data summaries and GIS data were provided to collaborators during FY10.** **The NMFWRI is working on a way to provide percent canopy estimates for the project area using imagery and the eCognition software.**

Project 3: New Mexico's restoration-based economy

The NMFWRI and the restoration community are often confronted with questions related to the economic dimensions of watershed restoration, including: costs associated with the start-up of a logging or thinning business; the impact of forest restoration on local economies; and costs associated with proactive vs. reactive fire management. More generally, our stakeholders are interested in how forest restoration directly provides socioeconomic benefits related to timber, jobs, and recreational activities (hunting, fishing, and ecotourism). In addition, they often seek information on the long-term feasibility and profitability of forest restoration work.

In addition, CFRP and CFLRP promote the development of restoration-based employment and businesses in the context of community involvement and collaboration. While watershed restoration projects in New Mexico are currently subsidized by the federal government through the CFRP, In the view of the NMFWRI and many of its stakeholders, a *sustainable* restoration effort will depend on the development of local restoration-based economies, the success of which relies on a number of factors, including reliable and predictable availability of raw material, a trained labor force, local entrepreneurship, and production capacity and viable markets for small diameter thinnings from restoration treatments.

Finally, the NMFWRI has recently entered into a partnership with the Alamo Najavo School Board Inc. to develop a model for business and job creation related to forest restoration by providing training in restoration monitoring, forest worker safety, harvesting processes, firewood processing, and lumber manufacturing. Importantly, the partnership calls for the development of outreach capacity in the primary processing of small-diameter thinnings within the Alamo Navajo Community so that other communities and individuals can benefit from lessons learned at Alamo Navajo.

Project three deliverables outlined in the FY 2010-'11 work plan:	**Activities completed during FY 2010-'11**
1. *Support of restoration-based forest industry*. The NMFWRI will assist the NMFIA with data gathering and analysis associated with the NMFIA capacity study. Results of the NMFIA capacity survey will be posted on the NMFWRI web site and be the subject of outreach material. Other industry support efforts will focus on individual forestry sector entrepreneurs and CFRP utilization grant grantees, as requested.	**The NMFWRI helped to revise the NMFIA website at http://www.nmfia.net/. NMFWRI has also continued with the revision of the NMFIA contact spread sheet.** **The NMFWRI sits on the Advisory Board for the Forest Worker Safety program, housed under NMFIA.** **NMFWRI has assisted with the NMFIA forestry sector capacity study, including executing phone surveys of NM loggers and primary and secondary wood processors, as well as initial analysis of the data. The NMFWRI developed a report of the NMFIA survey, in hard copy and posted at: www.nmfwri.org/images/stories/pdfs/projects/NM_forest_sector_report_web.pdf.**

2. *Continued development of forest restoration capacity in NM*. The NMFWRI plans to continue to provide technical assistance and outreach in the development of workshops on restoration-based businesses based, in part, on the model/partnership developed between the NMFWRI and the Alamo Navajo community. In addition, we plan to extend the Alamo-Navajo-NMFWRI partnership model to other communities as a way of building both outreach capacity and restoration-based economies that will help to further enable and sustain watershed restoration efforts in the region. Outreach will include not only the extraction and primary processing of small-diameter thinning, but also treatment monitoring and pre-treatment marking, for example. An annual report will summarize progress.	**The NMFWRI developed ecological monitoring workshops for the CFRP in the winter/spring 2011 and scheduled them consistent with the needs expressed by District Foresters.** **In the summer 2011, the NMFWRI trained 16 members of the Ramah Navajo community in field forestry and ecological monitoring.** **Also, in the summer 2011, the NMFWRI partnered with the Magdalena office of the Cibola NF to train two timber marking crews from Alamo Navajo.** **In the fall 2011, the NMFWRI developed a credit-bearing certificate in Forest and Watershed Restoration.**
3. *Estimating costs, efficiencies, and effects of restoration treatments*. Little is known about the costs/efficiencies and effects associated with restoration treatments, including the removal of small-diameter trees and woody biomass. With in-house expertise in the social sciences and forest operations science, the NMFWRI will conduct applied research using the collection of cost/productivity data from operators and contractors, as well as from CFRP grantees and their contractors. The NMFWRI views this project as continuing and open-ended, as new research questions in this area emerge. Results of this work will be posted on the NMFWRI web site and be the subject of outreach to the restoration community. However, due to reductions in federal appropriations, this project will be scaled back in FY11.	**This project was scaled back due to reductions in funding. However, the NMFWRI discussed partnering with the NMFIA to develop workshops for members of NM's forestry sector.** **Beginning in 2011, the NMFWRI has engaged in discussions with HU faculty about NSF and USDA proposals focusing on woody biomass. Those discussions have continued in 2012.** **An NMFWRI white paper on developing restoration-based economies was produced and posted at: www.nmfwri.org/watershedrestorationroundtable/white-papers.** **A poster on restoration-based economic development is posted at www.nmfwri.org/watershedrestorationroundtable/stories.**

SECTION TWO

OUTLINE OF WORK ACCOMPLISHED BY THE NMFWRI IN ADDITION TO THAT PROPOSED IN ITS FY 2010-'11 FEDERAL WORK PLAN

The following outlines work conducted by the NMFWRI that complements or is in addition to that outlined in the NMFWRI's federal FY 2009-'10 work plan and not directly funded through its federal FY 2010 -'11 work plan. This section is divided into three parts: (1) activities and projects in which the NMFWRI has been involved and for which there are specific, tangible deliverables; (2) NMFWRI's role in CFRP and CFLRP projects; and (3) meetings, trainings, workshops, and conferences during the past fiscal year that the NMFWRI has participated in, conducted, and/or sponsored.

PART 1. Activities and projects in which the NMFWRI has been involved and for which there are specific, tangible deliverables.

Project	Description	NMFWRI Role/Deliverables	Comments
Estancia Basin Watershed health, restoration, and Monitoring Project (EBWHRM)	Evaluate the effects of thinning programs and other treatment options on groundwater recharge, vegetation, wildlife, and other resources within the Estancia Basin. The study evaluates four test sites in ponderosa pine and piñon/juniper forests. This is a cooperative effort among the Edgewood, East Estancia, and Claunch-Pinto Soil and Water Conservation Districts. Funding is provided by the New Mexico Water Trust Board and the US Forest Service (via NMSF).	Facilitated meetings, evaluate treatment prescriptions, provide technical inputs on monitoring project. Provided maps, GIS/GPS training, and data management support. Non-voting member of team.	Often described as a model for collaboration in natural resources management. Website: http://www.nmfwri.org/nm-watershed-collaborative-center.
Greater Rio Grande Watershed Alliance	Collaboration between Soil and Water Conservation Districts, Pueblos, agencies and stakeholders working to restore riparian ecosystems in the Rio Grande Watershed in central and northern New Mexico.	GIS and Mapping Support, POC for monitoring. Serve on technical committee that will recommend projects and procedures.	NMFWRI will manage monitoring and other technical assistance efforts. Scope of this effort needs to be defined. Website: http://www.nmfwri.org/nm-watershed-collaborative-center.
Forest and Watershed Health Information Clearinghouse (aka "The Portal")	Provides centralized access to ecological, socio-cultural and economic information related to restoration and maintenance of New Mexico forests and watersheds. The clearinghouse functions as a library as Well as a shared workspace. Shared workspace will also enhance collaboration, training, and knowledge among those involved in forest and watershed restoration.	Funded by NMSF through NMFWRI. Provide technical inputs and system administrator support.	The Clearinghouse is a joint project of New Mexico State Forestry and the New Mexico Forest and Watershed Restoration Institute, pursuant to the state's Forest and Watershed Health Plan.
CFRP Socio-economic indicators	There has been increasing interest in the social and economic dimensions of CFRP and other restoration projects.	The NMFWRI developed socio-economic indicators for CFRP projects. The *Journal of Forestry* accepted for publication a peer-reviewed paper on	Report posted at: http://www.nmfwri.org/projects.

		the socio-economic indicator development by the NMFWRI.	
CFRP Riparian Monitoring Handbook	2010 CFRP conference attendees identified that current CFRP monitoring protocols are deficient for assessing Bosque environments. NMFWRI received funding from USFS to develop guidelines for Bosque monitoring suitable for CFRP projects.	Published guidelines.	Report posted at: http://www.nmfwri.org/collaborative-forest-restoration-program.
SW Fire Science Consortium	Way for managers, scientists, and policy makers to interact and share science in ways that can effectively move new information to management practices. The Southwest is one of the most fire-dominated regions of the US, but limited in terms of regional organizations focused on fire research and information dissemination. In the Southwest there are many localized efforts to develop scientific information and to disseminate that to practitioners on the ground, but these initiatives are often not well coordinated or aware of all the information and resources that are available. The real need for a consortium is to help bring these parallel efforts together to be more efficient and inclusive. NMFWRI also seek to link the academic community and the management community in educating future fire professionals with up-to-date science as well as practical experience.	Serving on governing board.	Board consists of representatives from federal agencies, AZ and NM state agencies, NAU, NMFWRI, ERI, Forest Guild,
Alamo Navajo CFRP	Complex project designed to establish economic development around forestry, giving seasonal fire crew work in the off season, improve educational levels in the community,	Assisted with monitoring, GIS, and reporting support. In addition to these efforts, in 2010 the NMFWRI entered into a formal agreement with the ANSBI to (a) develop capacity in all phases of forestry restoration; (b) develop a model for forest restoration economies; and (c) outreach to other communities and individuals to help them develop similar enterprises in order to further enable restoration	Used as a template for similar effort in Manzanos. Need to improve monitoring skills.

		efforts (see Sidebar, p. 21). The NMFWRI has also continued to provide on-the-ground training to members of the /Alamo Navajo Community in the extraction and primary processing of restoration thinning.	
CFRP	CFRP projects around the state. Addressing ecological restoration, economic, and educational development goals.	Provided mapping and data analysis support to NMFWRI monitoring activities. Also provided direct support to grantees. Maintained static and online maps of CFRP project locations. In addition, the NMFWRI established or remeasured plots for vegetative monitoring for the following projects during 2011. The projects are listed by principle contact, project funding source, and location. • Patrick Griego, watershed protection CFRP, Gallinas; • Michael Benjamin, Fire video CFRP, Las Vegas RD; • Anne Bradley, Jemez mountain salamander CFRP, Jemez Mountains; • Ensenada, CFRP 5-yr remeasure, southwest of Tres Piedras; • Bluewater, CFRP 5-yr remeasure, west of Grants;	Bringing together diverse stakeholders such as USFS, DOD, State gov't, tribes, land grants, and private industry that often had a history of antagonism.

		• Sierra Black Range, CFRP 5-yr remeasure, Winston/Poverty Creek; • SBS II Cedar Creek, CFRP 5-yr remeasure, Ruidoso; • Monument Canyon, CFRP 5-yr remeasure, Jemez Springs;	
CFLRP	Landscape-scale collaborative projects that address ecological restoration and regional socio-economic objectives.	Provided mapping support and inputs to development of monitoring objectives.	Bringing together diverse stakeholders such as USFS, DOD, State gov't, tribes, land grants, and private industry that often had a history of antagonism.
Biophilia Foundation (Pritzlaff Ranch)	The primary mission of the Biophilia Foundation is to support efforts that protect, restore, enhance, and preserve wildlife habitat for all species of native plants and animals. The Pritzlaff Ranch serves as a resource for the education and training of private citizens, public school students and teachers, university students, local landowners and business managers, and professional forest workers on topics of conservation and sustainable management of forests and watersheds.	Provided infrastructure maps, thinning management maps, and mapping support to prescribed fire operations. Assisted researches with maps, GIS data, and monitoring. Created a historical aerial photo study of the ranch. I addition, alongside ranch personnel, we marked a ten-acre area for restoration according to goshawk guidelines. The plan is for the ranch to use this area as a model to be expanded into neighboring stands.	New ecological projects manager in place. Need to reestablish relationships.
Wind River Ranch	The mission of the Wind River Ranch Foundation is to conserve wild landscapes in northern New Mexico through ecological restoration, research, and education.	Supporting student research activities. Providing GIS and mapping support.	Ranch may transfer to USF&WS, with additional education mission.
Las Vegas NWR	Situated on a high plateau where the Great Plains, the Rocky Mountains and the Chihuahuan desert	Provided maps for refuge management, fire management, and	Almost all work was accomplished by student intern. LVNWR provided

	come together, Las Vegas National Wildlife Refuge provides habitat for a diversity of plant and animal life. Established for migratory birds traveling along the Central Flyway, this 8,672 acre refuge is comprised of native grasslands, croplands, marshes, ponds, timbered canyons and streams which provide important habitat for over 254 species of birds.	visitor services. Support was also provided to MaxWell NWR, a subordinate unit to the LVNWR.	plotter paper and ink cartridges.
Storrie Project	The Storrie Project Water Users Association is a group of irrigators and other landowners near Las Vegas who share water from the Gallinas River through a network of ditches, pipelines, and reservoirs.	Provided image and topographic map of the project.	Almost all work was accomplished by student intern. This is the first comprehensive map of the project area within recent memory.
Taos County Community Wildfire Protection Plan	This planning document lays out the vulnerabilities of Taos County communities to wildfire and begins a strategy to mitigate the risk of wildfire.	Provided map updates to WUI boundaries and thinning project.	Taos County recently hired a GIS specialist who will be able to take on most of NMFWRI's GIS support. The NMFWRI expects some new requests related to restoration planning and treatments.
Gallinas fire history mapping	Comprehensive map of western San Miguel County focused on the Gallinas Watershed and adjacent watershed. Shows fire history, past, present, and future vegetation treatments, WUIs and other planning areas, and critical infrastructure.	Build and maintain map. Gather data from various entities working in the area.	May evolve into an atlas due to volume of data and variety of themes.
Hermit's Peak Watershed Alliance	HPWA performs long-term ecological monitoring of plant communities, river and riparian health and specialize in wildlife monitoring including birds, beaver, butterflies, elk and amphibians in our local watersheds. Engages in various public and educational outreach activities.	Created maps for annual Christmas Bird Count, annual Butterfly count, and for 319-project proposal.	Group is evolving into a traditional watershed group. Has obtained organic GIS/GPS capability through 319 grant funding.
Tierra Y Montes SWCD	Local Soil and Water Conservation District. Supporting forest and stream restoration projects in the region.	Provided maps in support of several projects and presentations.	May collaborate on historical aerial photo study.
NMHU Student and Faculty support	NMHU Natural Resources students and faculty frequently request GIS assistance for classes and projects.	Taught classes and workshops. Assisted students and faculty with creating maps and posters. Some projects included bathymetric mapping of Peterson Reservoir, researching and	NMHU now has a minor and certificate program for GIS.

		downloading imagery, guest lecturing in classes, creating maps for archeology filed work and classes.	
IT Support	Maintain GIS/Remote Sensing software licenses, maintain plotter, provide general computer support, and submit ITS work orders when problems occur with computers.		
BLM Albuquerque District Vegetation Delineation Project	The BLM Albuquerque District has identified a need for improved delineation between forested and non-forested lands in their district.	Developed an automated approach to delineate forest and woodland stands on BLM lands near the Malipais Region in Cibola and Catron Counties. Definiens eCognition software was used to in the analysis of 2010 SPOT imagery (Système Pour l'Observation de la Terre, French Remote Sensing Satellite). Stands were delineated within 12 digit HUC boundaries and given FORVIS codes provided by BLM. Landfire data was used to populate information on the stands providing dominate vegetation species and percent canopy cover attributes.	NMFWRI is currently finishing up the project and are writing up the final report. Data will be provided as shapefiles with associated metadata.
BLM Taos District Vegetation Classification Project Development	The BLM Taos District desires a detailed vegetation map to support various management activities.	As a result of work that was done for the BLM forest stand delineation project, the NMFWRI was contacted to do possible work for the Taos BLM district. They desired a detailed vegetation classification for San Juan County. Before contracting a project, the NMFWRI is testing an area to be classified using one foot true color ortho-imagery for San Juan County. A small study area was selected to test the methodology using Definiens eCognition.	The NMFWRI is still testing the methodology but hope to have preliminary results by February.

BIA Training	Bureau of Indian Affairs Northern Pueblo Agency supports several Pueblos in various aspects of natural resources management, including mapping and restoration monitoring.	Traveled to the Bureau of Indian Affairs Northern Pueblo Agency offices to help their Forestry Division with GIS and GPS support. Assistance was provided with their Trimble and Garmin GPS units. Help was also given using ArcGIS software to make basic maps.	The Northern Pueblos would like further help with GPS and GIS support.
NMFIA Economic Analysis	The NM Forest Industry Association is developing a directory of businesses that utilize wood products. It has also been working on an analysis to support obtaining preferred status for NM business in USFS contracting.	Printed the most recent NM wood manufactures map and provided copies of our most recent excel files. Maps and data were provided in both hardcopy and digital formats. Maps and statistical data were provided for the economic analysis study. The NMFWRI also aided the NMFIA with the conduct and analysis of their capacity survey and the development of their strategic plan.	NMFIA study analyzed and reported by NMFWRI: http://www.nmfwri.org/projects.

PART 2. NMFWRI activity related to the CFRP and CFLRP in the past year.

Collaborative Forest Restoration Program (CFRP)

CFRP – grant application support . NMFWRI supported the CFRP grant application for the following projects. The projects below are listed by how far they advanced in the selection process, organization, and project name.

Proposals formally evaluated but not selected for funding:

- Kuykendall & Sons Sawmill, *Maquinita Ecosystem Health Project*
- Jaramillo & Sons Forest Products, *Quality Environment and Economic Sustainability Project - Phase II*
- Alfonso Chacon III Forest Enterprises, *Healthy Forests/Healthy Communities in the Vallecitos*

Proposals selected for funding:

- Old Wood, *Advanced Manufacturing of Flooring from Small Diameter Timber*
- Roger Tucker, *Improved Utilization of Small Diameter Trees in Central New Mexico*
- Alamo Navajo School Board, *Multi-jurisdictional Collaborative Landscape Analysis*
- National Wild Turkey Federation, *Puerco Landscape Planning Project*
- Alamo Navajo School Board, *Building Economic Opportunity through Workforce Diversification*

Collaborative Forest Landscape Restoration Program (CFLRP)

Southwest Jemez Mountains (SWJM) – The NMFWRI continued its active involvement as a principle Partner in the SWJM CFLR. The broader group of collaborators includes dozens of groups, but the principle Partners are those that have been meeting for five years: the Valles Caldera National Preserve, the Santa Fe National Forest, the Nature Conservancy, Jemez Pueblo, and NMFWRI. We participated in monthly meetings of the Partners and occasional meetings of the Monitoring Committee. We assumed responsibility for oversight of vegetation monitoring for the Committee, which included making sure protocols were compatible on the Santa Fe and on the Caldera.

In addition, the NMFWRI is a collaborator in the Zuni Mountain CFLRP, which was approved but received no funding during calendar year 2011.

PART 3. Partial list of meetings, trainings, workshops, and conferences during the past fiscal year that the NMFWRI has participated in, conducted, and/or sponsored.

- *319 grant applicant support*. Every year, the Surface Water Quality Bureau of the NM Environment Department awards money from the federal EPA to do in-stream restoration work; these projects are commonly referred to as 319 Grants. Three different groups asked us to be part of their 319 grant applications this past year, two on the Rio Gallinas and one on the Rio Santa Barbara. One of the proposals on the Rio Gallinas was successful, submitted by the Citizen's Watershed Monitoring Team, with our role supporting GIS and mapping.

- *WHO-CG meetings*. The NMFWRI participated in all the quarterly meetings called by the Watershed Health Office of State Forestry. These meetings contribute greatly to the coordination of restoration work among state and federal agencies across New Mexico.

- *Prescribed Fire Council*. Several meetings of the officers and Steering Committee were held during the year. It held its second annual meeting in November at the Pritzlaff Ranch, with about 40 attending. The sessions included a tour of our restoration demo area and the area that had been prescribe burned in November 2010. An NMFWRI staff member continues to serve as the organization president.

- *Smoke Rule*. Most of this work occurred in 2010. However, some questions still remain around the way wildfires are reported, and discussions continue with most of the original committee members. The new rule is expected to be complete and submitted for review to the state's Environmental Improvement Board later this year.

- *Water Quality Workshop*, with the SWQB in Santa Fe in January; training in TMDLs.

- *Climate Change Conferences* on Management and Fire, with the Forest Service at Ghost Ranch in January.

- *Rural Community Assistance Corporation*. Presentation to a regional meeting of state coordinators of the Rural Community Assistance Corporation, in Santa Fe in August. Reid talked about reducing threats to water supply. The RCAC is interested in helping municipalities manage their watersheds.

- *National Tree Farm Convention*. National Tree Farm Convention field day, in the mountains east of Albuquerque in August. Reid conducted three short presentations on groundwater, including how to measure infiltration and how thinning affects water yield from a watershed.

- *Biophilia Foundation Wildlife Corridor* workshop at the Pritzlaff Ranch in August.

- *MESA students*. MESA students from San Miguel and Mora Counties, two presentations to 60 people total. The theme of their conference was Science and Natural Disasters; Reid spoke on restoration as a way to avoid the unnatural disaster of catastrophic wildfire.

- *Forest Service Region's Desired Conditions tours*. Participated in the Forest Service Region's Desired Conditions tours in June, September, and October. The last tour led to a discussion with the Regional DC team about a possible DC demonstration area in the Northridge CFRP area. This possibility continues to be pursued. In addition, Reid participated in helping prepare for DC tours in New Mexico in 2012.

- *Monitoring*. Monument Canyon - In addition to the remeasure, measuring the regeneration in this area will provide data to support a lesson about the need to maintain thinned areas to avoid dog-hair thickets. During September, I took a fairly extensive series of 0.01-acre plots to determine density.

- *NMHU grad students*. Reid reviewed Ben Gillock thesis and participated in his defense.

- *Handbook updates*. Reid wrote the Fuels Transect section of the monitoring training handbook and contributed photos for our thinning guide.

- *Technical assistance in p-j.* Reid prepared a document describing our protocol for taking plots in PJ, prompted by an external question about how we deal with trees with multiple stems. It was posted on the NMFWRI website.

- *Southwest Fire Science Consortium*. Reid was asked to be a member of the Research and Education Committee of the Southwest Fire Science Consortium. During a webinar/conference call on in October, we were introduced to our duties, principally to help with a yearly review of proposals and with the yearly evaluation of the organization.

- *Track Fire*. In the spring, Reid wrote up a prescription for treating mixed conifer in Sugarite State Park. It was not chosen by the management group to be implemented; however, before any treatment could occur, the Track Fire burned over the park and devastated the watershed. Since then, Reid has visited the park with other FWRI staff to talk about possible responses. One of these trips included travel with Las Vegas city officials to visit with counterparts in Raton.

- *Search committee*. Mora Research Station Superintendent - I am serving as a member of the search committee for the Supervisor. The job announcement was posted by NMSU in December.

- *Las Conchas fire*. As mentioned above under the JMS CFRP, we measured one of these sites before it burned in the Las Conchas fire. Reid submitted an abstract for February's SW Fire Ecology Conference, with these plots as a case study of heavy fuels. The abstract was accepted in December, and will be presented in late February in Santa Fe. In addition, Reid helped with the Congressional staffer tour of the fire in October. I helped with the organization and traveled with the staffers during the tour.

- *Support to the SLO*. Reid participated in a meeting at the State Land Office in Santa Fe about the Luera/Pelona landscape-scale, inter-agency restoration.

- *Biophilia.* Reid spent a day at the Pritzlaff Ranch with Biophilia staff on a demonstration goshawk mark, in November.

- *Southwest Fire Science Consortium*. Zebrowski serves on the Executive Board for the Consortium, which assists in the exchange of knowledge between academic researchers and fire practitioners in the SW.

- *NMHU*. Zebrowski served on the Search Committee that resulted in the hiring of a faculty member in the area of fire ecology at NMHU.

- *Other invited speaking engagements*.

    - Egan, A. and V. Estrada. 2011. Socio-economic indicators for forest restoration projects: A Delphi study. Collaborative Forest Restoration Program meeting, April 6-8. Santa Fe, NM.

    - Egan, A. 2011. New Mexico Forest industry Association Capacity Survey: Background and first pass through the data. Collaborative Forest Restoration Program meeting, April 6-8. Santa Fe, NM.

    - Egan, A. 2011. Forest and watershed restoration. Delivered to (1) Ministry of the Environment rangers (March 8) and (2) Escuela Ambiental students (March 10), Jarabocoa, Dominican Republic.

    - Egan, A. 2011. Socio-economic indicators for watershed restoration projects. Delivered to workshop participants (March 7), Jarabacoa, Dominican Republic.

- *Outreach to tribal communities*. Developed with the ANSBI a formal partnership between the New Mexico Forest and Watershed Restoration Institute and the ANSBI for the development of (a) forest restoration-based economic opportunity in the Alamo Navajo Community; and (b) ANSBI-based outreach capacity and expertise. 2010.

- *International cooperation*. Developed and signed a Memorandum of Understanding between the Escuela Ambiental, Jarabacoa, Dominican Republic, and both NM Highlands University and the New Mexico Forest and Watershed Restoration Institute for (a) the exchange of faculty; (b) the matriculation of Escuela Ambiental graduates at NMHU for degree completion; and (c) the

placement of Escuela Ambiental students and graduates as interns with the NMFWRI, funded by the DR's Ministry of the Environment. 2010-present.

- *Community outreach*. Invited to be interviewed on Las Vegas, NM, KFUN radio regarding the mission of the NMFWRI and the health and safety of the Gallinas watershed, September 23, 2011; September 30, 2011; January 6, 2012.

- *Outreach to the forestry sector*. Invited to participate in and present at the series of *Bridging the Gap* meetings in New Mexico, sponsored by the USDA Forest Service and the New Mexico Forest industry Association: Cibola National Forest, Sept. 24; Santa Fe NF, Oct. 15; Gila NF, Oct. 22; Lincoln NF, Oct. 29; and Carson NF, Nov. 19, 2011.

- *Other partnerships*.

    - Member, New Mexico State University's Range Improvement Task Force Advisory Board, 2011-present.

    - Co-founder, Gallinas Watershed Partnership, 2011; Chair of Economic Development and Education/Outreach Working Groups, 2012-present.

    - Gallinas Watershed Partnership Steering Committee, 2011-present.

APPENDIX A: Maps and GIS and GPS products delivered by the NMFWRI in 2011

Maps were provided by the NMFWRI in 2011 as follows:

Project/Entity
Taos CWPP
Peñasco CWPP
Estancia Basin Watershed Health…
Tierra Y Montes SWCD
NMHU ITS
Alamo Navajo
Hermit's Peak Watershed Alliance
NMFIA
Biophilia Foundation (Pritzlaff Ranch)
Dan Flinter (Private Landowner)
NMSF FWHO
NMHU Students and Faculty
Greater Rio Grande watershed Alliance
NM Watershed Forum (NMED)
Las Vegas NWR (USF&WS)
Wind River Ranch
Storrie Project

GIS Data Sets of various types were provided in 2011 to the following:

Entity
USFS
BIA
Biophilia Foundation (Pritzlaff Ranch)
Forest Guild
NMSF
BLM
NM Tech/Bureau of Geology

GIS and GPS training and outreach were provided in 2011 as follows:

Entity/Activity
GIS and GPS lessons for NMHU courses
GIS Course for federal wildland firefighters (401 series)
Estancia Basic SWCDs
Individual GPS and GIS training for NMHU students/faculty
Tierra Y Montes GIS and GPS field support
Biophilia Foundation GIS and GPS Support
GIS and GPS lessons for NMHU courses
GIS Course for federal wildland firefighters (401 series)


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