



# **Forests and Watersheds**

**A Newsletter for Decision-Makers**

**March 2015**  
**New Mexico Forest and Watershed Restoration Institute**

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FOREST AND WATERSHED  
RESTORATION INSTITUTE  
AT NEW MEXICO HIGHLANDS UNIVERSITY



## 2015 Forests and Watershed Newsletter introduction

*By Ron Gardiner*

Water source protection from the damage of catastrophic wildfires is the challenge of our generation. Meeting the challenge must engage all of the state's water and natural resources agencies in management, mitigation and the protection of our water sources. All of these agencies share some management responsibilities for watershed health; water source protection (water quality), water supply (water quantity), public safety (private property & commerce), economic development and or losses and habitat stability (hunting, fishing & ESA/range and farmlands).

Watershed management and planning is the one function that is common to all agencies. It is also something that engages all community and commerce constituencies as stakeholders. Local, state, federal, tribal governments and the public, we are all stakeholders in watershed health. Every ranch and farm depends on a watershed condition in his or her area.

While the state grapples with how to develop watershed policy and administration, the issues of watershed health are very local and personal. A case can be made that everyone is a stakeholder in the health of his or her local watershed. Ground water users, small business, big business, municipalities, counties, soil and water districts, water and energy utilities all depend on the health of the local watershed and suffer when those forests and watersheds are unhealthy and or burn in wildfires.

All water users can trace back their connection to a watershed, whether it is distant or right above them. All fire departments near forested areas of New Mexico have a stake in knowing and responding to watershed and forestry conditions in their local area. Several power utilities can testify to being a stakeholder in forest conditions. And, of course pueblos such as Santa Clara and Cochiti and businesses such as an the Dixon Apple Orchard are sad testimonies to stakeholders being damaged from events arising on federal and private lands and the consequence of unhealthy local forests.

Recent scientific studies after these mega fires in New Mexico are reflecting a substantially large loss of water to evaporation and sublimation in the range of 10 to 50% in the burned areas. Snow packs do not hold as much water and in the summer rains evaporate faster, never getting to our streams and aquifers. If any other state or level of government challenged us with such a substantial loss of water it would draw much attention from decision makers and lawyers alike.

With the fires we have experienced in NM, and the fires that are likely in the future, the issue then becomes a matter of mitigation and trying to make New Mexico communities and landscapes whole again after the fires. The ripples go all through the local and state economy including the cost to replace what was there before the fires such as critical water and road infrastructure like what has happened in Ruidoso, which then falls on the state and local government to re-invest in those lost assets. Of course the costs and tragedies to private properties and people lives is dis-heartening and has been constantly in the headlines after these events.

Other articles in this newsletter will review the details of the proposed legislation and other alternatives considered. Dr. Reid, the Director of the New Mexico Forest and Watershed Restoration Institute, assisted by the Legislative Council Service, convened the work group through facilitated meetings and conference calls throughout the year. The NM FWRI is tasked by its mission to provide an independent source of forestry and watershed information and also to provide scientific and technical resources to forested communities at risk of wildfires.

The goal of each edition of the Forests and Watersheds Newsletter is to inform decision makers and stakeholders of issues and developments that concern New Mexicans and their decision makers when living with forests, watersheds, wildfires and water scarcities.

# How much is being done and what is there to do?

By Kent Reid

The first issue of our newsletter, published last summer, presented the broad sweep of land management issues and agencies in New Mexico. This issue continues with that broad sweep, including articles from collaborators that couldn't be included last time. But the core of this issue is a message of how much needs to be done and how we can do it.

When the agencies and other groups met in August to discuss the charge from the Interim Water and Natural Resources Committee to come up with a plan for long-term, sustainable funding for forest and watershed restoration, the first thing we discussed was how much work is being done currently. When you add together state and federal spending on restoration, the total is in the neighborhood of \$16 million a year, varying some from year-to-year.

This amount sounds substantial, until you look at the task ahead of us, which was the second thing we discussed. The task ahead is so enormous because we have excluded fire for so long. (Fire was excluded for reasons that seemed good at the

time, and I will not indulge myself by pointing fingers at land managers who came before me.) Much of New Mexico is covered with plant communities that function best when regular, low intensity fire burns them. Portions of three of these plant communities – piñon-juniper, ponderosa pine, and mixed conifer – total almost 7 million acres.

Because we excluded fire, these three communities now have many more woody stems on them than they used to. One piece of good news is that research shows that if we treat only 40% of the landscape, and that 40% is the right 40%, the risk of the entire landscape burning goes way down. I'm assuming that we can pick the right 40%, so our area of action is reduced to fewer than 3 million acres.

We have to treat these acres because if we don't, they run a real risk of burning catastrophically when they do burn. We can't do this all at once. One possibility is to consider the historic interval between fires, and mimic that interval. Tree rings show us that almost all of New Mexico had regular fires, and the rings recorded the interval between these non-lethal

fires. That interval was different for our three plant communities, but 10 years is an acceptable average and it makes the arithmetic easy. If we set annual treatment targets based on the 10-year interval, we get the ambitious number of 277,000 acres a year. If we spread treatment out over 20 years, we no longer are mimicking the historic fire interval, but we have a more manageable annual target of 138,400 acres.

Cost of thinning varies widely among the plant communities, and varies within the community by density and slope. If we use state-wide averages for each of the three plant communities and multiply those by the annual targets for each community, we get a needed total annual investment of not quite \$61 million.

This is a lot of money. No one source can pay all of it. The state, federal agencies, and industry are all going to have to step up. We all will have to resolve some differences and set aside others. We will need to work together, leveraging every program, every project, and every dollar. The payoff will be a better New Mexico.

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## Keeping our best and brightest with an ounce of prevention

By Brent Racher, President  
NM Forest Industry Association

Stakeholders and decision makers have spent the last few years discussing and debating the various aspects of forest and watershed restoration at the scale implementation is necessary to achieve desired results in New Mexico. These desired results primarily are to prevent the disasters that are occurring from wildfires and subsequent damage to water sources. In this discussion, we have come to the broad agreement that the scale of forest and watershed restoration needs to be expanded.

There are many stakeholders at the table for this discussion, and moving past the broad agreement for the

need of forest and watershed restoration, we have to decide how to get this done. This is an issue that involves federal, state, and local governments, as well as tribal and private interests. Within the State government, there are many silos of authority over the watersheds and the economic growth that will come with increasing the scale of watershed restoration. House Bill 38 for the 2015 New Mexico State Legislature is the product of these numerous silos of State government coming together with other federal, local, and private stakeholders to work together after encouragement from the Legislature in 2014. Also, finding the balance between the Legislatures' approval of laws and funding mechanisms

with the long-term effect necessary and the Executive Branch's implementation of these laws and funding is important, and has been carefully considered in HB 38.

It is exciting for us that live and breathe forest and watershed restoration to see this discussion advance with the hope that decisions will be made sooner, rather than later. It will allow private industry investment and job creation in rural areas, helping to further diversify the State's economy while providing the jobs and opportunities that will keep our best and brightest in New Mexico. It exemplifies the adage "an ounce of prevention is worth a pound of cure."



## Federal Watershed Legislation

*By Laura McCarthy,  
The Nature Conservancy*

Senator Martin Heinrich introduced the Restoring America's Watersheds Act at the end of the 113th session of the United States Congress to improve the health of watersheds on national forest lands. Senator Heinrich plans to introduce the bill again in this 114th Congress. This federal legislation would:

- Direct greater resources toward fire-impacted watersheds.
- Encourage partnerships with non-federal stakeholders to invest in forests that provide important water resources.
- Minimize runoff and sedimentation from old roads into forest streams.
- Encourage local collaboration in restoring our forests' health.

The Water Source Protection Program established by the legislation would reside within the USDA Forest Service. The bill's purpose is to ensure that national forests continue to

be a reliable surface water source for New Mexico's residents, farmers and ranchers, and businesses. Senator Heinrich introduced the bill because of concern that recent large, catastrophic fires have damaged New Mexico's forest watersheds, and communities have been faced with the costs of cleaning ash, sediment, and debris out of streams and reservoirs, and the possibility of reduced water supplies for years to come.

The legislation is intended to build on partnerships between cities, businesses, water utilities, farmers and ranchers, and the Forest Service. The bill creates an authority where matching funds can be provided by downstream water users for restoration projects on headwater forests. The program will reduce the risk of catastrophic fire to water supplies, and has the added benefit of stimulating jobs in the forest products industry in rural communities. The legislation would improve the ability of the Forest Service's to partner with communities to protect forested headwater sources and to provide reliable forest

workers with jobs.

The legislation has three other sections that address sediment from roads and trails, assessment of watershed conditions, and new funding authorization for the Collaborative Forest Landscape Restoration Act. The bill would make permanent an authority for the Forest Service to reduce sediment from roads and trails by reclaiming unused roads and "storm-proofing" existing forest roads to prevent them from washing out, an authority that Congress has provided for the past decade through Appropriations bills. The bill would also make permanent the Forest Service's Watershed Condition Framework, a program rolled out in 2011 for consistent and systematic assessment of watershed conditions and an important tool for measuring progress achieved through restoration programs. Finally, the bill would increase the funding authorization for the Collaborative Forest Landscape Restoration Act from \$40 million to \$80 million, and extend the sunset date from 2018 to 2023.

# How watersheds work

By Ron Gardiner

Understanding the workings of a watershed is not complex and does not require a degree in ecology to understand. There are no foresters or ecologists and few firefighters in the New Mexico legislative body. Decision makers come to Santa Fe from every walk of life and all must weigh in on the issues of our day. Understanding the landscape around us does not require an academic understanding, but an intuitive one that everyone has.

Plants and soils work to absorb and shade water from the effects of the sun. Degraded rocks and plants accumulate into organic topsoil full of bacteria and fungi. Soils provide nutrients that grow grasses, shrubs, and trees. Soils are also a porous sponge and allow water to percolate down through sand and gravel, creating mountain aquifers that charge streams through a base flow of ground water, long after the storms have passed.

Three vegetative canopies or layers, like three umbrellas, cover most forested landscapes and upper watersheds. Those layers are grasses, shrubs, and trees. All together they work as umbrellas shading and storing water, protecting it from the effects of the sun. Ideally the landscape is much like an organic wet towel laid over a hard pan of bed rock, holding water and producing the rich forests, streams, rivers, and aquifers that provide water to our ditches, fields, communities, cities, wells, and reservoirs.

Any course in hydraulics or anatomy will refer to the theory of pumps, pipes and fluids. The fluid in a watershed is life-giving water. The pipes are all the wells, irrigation works, and drinking water projects. And the "pump" is the sun, evaporating water and carrying to the top of the hill, where it falls as snow or rain and flows toward the valleys. It is not magic, but it is a process we depend upon, living as we do in an arid land prone to drought and wildfires.



These relationships between the soils and plants have a critical influence with how much water gets protected from the sun under plants and in the soils. Every drop that is shaded from the sun is potentially available for possible use, but it also must pass through a gauntlet of exposure to the sun and evaporation on its way to our taps and fields. A healthy watershed is more prone to retain both soils and water higher up on the watershed. The soils hold the water; therefore, it is a constant battle with evaporation and erosion to protect water at its source in high elevation forests.

Wildfires were once an integral part of the landscape's processes. They served as a kind of exfoliation of old and diseased material, making room for new growth. These former fires were more frequent and of much smaller scale because one year's wildfire area was next year's fuel break. The fires tended to get smaller, rather than the landscape fires of these past years that have tended to get bigger.

Small fires release nutrients locked up in plants and plant material, a beneficial addition to the soil profile completing the nutrient cycle. Large-scale fires consume all the nutrients from that soil through super-heating, turning the remains to white ash or lye and often baking the soils beneath to a pottery-like shell several inches deep, resulting in what are called "hydrophobic" soils. When this happens on upper slopes, rains

cannot percolate into the soil and it runs off, quickly picking up speed to produce the kind of torrential floods that we have witnessed after the Cerro Grande, Las Conchos, and White Water Baldy fires. A healthy forest takes the steep peak off the runoff, storing and gradually releasing water back to the streams and the deep aquifers.

This is what a healthy watershed acts like. Dr. Reid's article will address what a healthy forest looks like.

"If we lived in a desert and our lives depended on a water supply that came out of a steel tube, we would inevitably watch that tube and talk about it understandingly. No citizen would need to be lectured about his duty toward its care and spurred to help if it were in danger. Teachers of civics in such a community might develop a sense of public responsibility, not only by describing the remote beginnings of the commonwealth, but also how that tube got built, how long it would last, how vital the intake might be if the rainfall on the forested mountains nearby ever changed in seasonal habit or amount. It would be a most unimaginative person, who could not see the vital relation between the mountains, the forests, that tube and himself." --- Isaiah Bowman, "Headwaters Control and Use - Influence of Vegetation on Land-Water Relationships" 1937



## Restoration definition

By Kent Reid

I am often asked for a definition of a restored forest. The definition I carry around in my head is a restored forest has been treated to the point that the ecosystem functions as it should. Another way of saying that is “It depends”. One set of characteristics doesn’t fit all New Mexico forests.

That said, I can make a few general statements. My three-word take-home message about a restored New Mexican forest is “Groups and Openings”. A longer take-home message is that the main missing ecosystem component is fire. In general, a New Mexico watershed is restored when fire can be returned to it without severe damage.

We have three forest types that we need to restore: piñon-juniper or PJ, ponderosa pine, and mixed conifer. All of them saw regular fire, and all of them now have too many trees. Restoring these forests means removing the excess of these trees, typically from 65 to 90% of the total, but removing mostly small-diameter trees that historically would have been removed by fire.

When these are removed, the trees that are left should not be evenly spaced, but vary in density. The variation should be great enough that some areas – the openings - have no trees. Other group-sized areas will have very young trees. Other areas – the groups – may have not even been thinned. In ponderosa pine, most of the stand will be opening with different-sized groups of pines scattered throughout, which is very different than what we have now. Mixed conifer will have openings, which historically were created when groups of trees burned, and the overall stand will be denser than in ponderosa. For PJ at a county level we can make generalities, but at a state level it is more complicated, to the point that specifics for PJ won’t be discussed here.

While “Groups and Openings” sums up what the residual stand should look like, other factors need to be considered in reaching that condition.

We need to pay attention to the trees that are left after a restoration thinning. In every treatment, we leave the healthiest, most vigorous trees.

While the emphasis is on cutting

and removing small diameter trees, in many cases too many trees of all diameters are present; in these cases, we remove trees from all the diameters.

Insect and disease conditions in the stand may mean that restoration treatment may need to be delayed, or some other treatment applied instead.

The proportion of species will be different than what we have now; for instance, a ponderosa pine stand will have very little white fir in it, and more young aspen will be in a mixed conifer landscape.

Finally, a forest is not restored until it has been burned. When a low-intensity ground fire has been reintroduced at least once to the area, we can be reasonably sure that a wildfire that starts in the area will not replace the stand, destroying both wildlife habitat and the ability of the watershed to catch, store, and deliver water. This necessary element of fire may seem odd, but excluding it has given us the out-of-whack landscape we have today, and we need it for the ecosystem to function properly.

*This newsletter is intended as a source of information for decision makers. As part of this service, we will print contributions by people associated with a wide variety of agencies, NGOs, and citizen groups. So that our readers may be able to fully understand what these groups do and how they think, we do not edit these contributions. We may not agree with all the details expressed by the contributors, and may envy their budgets, but we all want to work together to have a healthy landscape and healthy communities. – Kent Reid*



## New Mexico Forest and Watershed Restoration Act

By Laura McCarthy,  
The Nature Conservancy

New Mexico legislators took a critical step last year to help protect water sources contaminated or disrupted by catastrophic wildfires in 2011, 2012 and 2013. At the December meeting of the New Mexico Water and Natural Resources Interim Committee, lawmakers voted to endorse H.B. 38, the Forest and Watershed Restoration Act. The Committee's endorsement sends a signal that it is time to act on a long-term solution to the state's wildfire problem. The bill has bi-partisan support, with the sponsorship of Representative Paul Bandy (R-Farmington) and Senator Peter Wirth (D-Santa Fe).

The key provision of the Forest and Watershed Restoration Act is to establish a fund to address the problem of overgrown, fire-prone forests. The legislation would prevent wild-

fire costs from escalating, including costs of homeowners' insurance premiums, and improve the health of the forested watersheds that are important surface water sources for our state.

The bill was developed after Memorials were adopted by unanimous consent in the 2014 session by both the House and Senate. Sponsored by Senator Phil Griego (D-San Jose) and Representative Zach Cook (R-Ruidoso), the Memorials called for agencies and stakeholders to work with the appropriate Committees to develop a long-term funding solution for forest and watershed restoration. Over the summer, Dr. Kent Reid, Director of the New Mexico Forest and Watershed Restoration Institute, convened State, Federal, Tribes and local government agencies and diverse interest groups to assess the need for statewide water-

shed restoration and consider alternative long-term funding solutions.

The Legislature would provide some funding this year for forest and watershed restoration, and this would enable the State to leverage Federal, Tribal, local government and private investment. The combined impact of consistent restoration funding would be protecting water supplies and providing new employment opportunities in rural areas.

The message from the Water and Natural Resources Interim Committee was clear: an investment by New Mexico to prevent wildfires and water source damage will save all of us money in the long run. We can pay for restoration now, or we'll pay later with burn scars, ash-laden water, and higher priced insurance.



# Woody biomass: an answer to New Mexico's threat of fire, drought, and economic woes?

By Monique DiGiorgio  
Executive Director,  
Chama Peak Land Alliance

Until somewhat recently, the words "renewable energy" evoked for me thoughts of distributed solar panels and large-scale wind and solar farms appropriately placed across our western landscapes. Previously, at a position with Western Environmental Law Center, I studied the challenges of balancing the potential impacts of large scale, industrialized renewable energy projects (water use, endangered species habitat) with the current climate crisis and our need as a society to shift as soon as possible from a fossil fuel dependent nation to a renewable energy reliant nation.

It wasn't until 2010, when I met private landowners in Chama, New Mexico, that our forests and watersheds as a source of renewable energy really entered my thinking. And, as it did, the "pros" to using small diameter, woody biomass as a local, renewable energy source became readily apparent. (side note: when considering renewable energy, an "all of the above" approach has inherent appeal, including solar, wind, small-scale hydro, and biomass.) Landowners managing complex ranches in northern New Mexico take a similarly complex approach to land management by balancing ecological improvements such as wildlife habitat, riparian restoration, and overall ecosystem health with economic revenue streams that can sustain this land ethic. In the case of forest and watershed health, the production and use of woody biomass as energy appears to have the potential to support both the ecology and economy of our headwater forests. Headwater forest treatments that produce woody biomass provide water source protection from wildfires, wildlife habitat improvements, air quality improvements (through a reduction in pile burning), a reduction in greenhouse gas emissions

(due to fewer severe wildfires) and increased carbon retention as well as the avoided costs of fossil fuel use, and the creation of an appropriately scaled, renewable energy industry in a rural region in need of economic assistance.

With these considerations in mind, the question to be asked for New Mexicans is "Can biomass generated as a byproduct of forest treatments be used as a feedstock for locally produced renewable energy as part of the solution to the economic and environmental challenges we face as a community?" In the San Juan – Chama region of northern New Mexico and southern Colorado, we are asking this question and all indications thus far seem to point to "yes."

A study completed in 2013 by the Chama Peak Land Alliance showed that a sustained annual forest yield could support a 10-20 MW biomass power generation facility, or a series of smaller facilities, in the San Juan – Chama region. Subsequent commitments by private landowners and tribes showed that 557,000 bone dry tons of forest biomass is currently available and could be committed to develop a biomass utilization plant. Private landowners in this region are in a unique position because they can act now on forest treatments that might otherwise take years to permit and approve on nearby federal lands. Impacts to water quality and water quantity in this region are far reaching because the San Juan - Chama provides one third of New Mexico's drinking water!

We recognize that biomass utilization should include appropriately scaled facilities, state of the art technology to address air emissions, creative ways to increase carbon sequestration and produce value-added products such as biochar, and local community input and design for siting a facility. Current challenges to biomass production include the need for policies that incentivize biomass as a renewable energy

resource (meeting the requirements of New Mexico's Renewable Energy Portfolio Standard); feedstock availability on federal lands; and market demand/response for biomass power and associated byproducts (e.g., heat, biochar).

To address these challenges, the state of New Mexico can play a leadership role by incentivizing the development of a biomass power generation sector (currently there are no biomass power facilities in NM) that provides baseload power (24/7) as part of the state's renewable portfolio; approving funding to assist landowners in implementing watershed treatments in our headwater forests (such as the forestry and watershed treatment bill endorsed by the NM Water and Natural Resource committee this interim session); and engaging rural communities in designing and siting a biomass power facility that is ecologically and economically beneficial.

This support will translate to opportunities throughout the state of New Mexico. For example, the state of New Mexico recently received an award from the USDA to create a Statewide Wood Energy Enterprise Team to ramp up biomass use and confront the challenges we face in using biomass as an abundant, renewable energy in New Mexico. An "all hands on deck" approach among policy makers, private landowners, businesses, non-governmental organizations, and local communities should be encouraged at every turn. Policy makers in New Mexico are in a unique position to help make this vision a reality.

The Chama Peak Land Alliance is an association of conservation-minded landowners working collaboratively to practice and promote ecologically and economically sound land management in the southern San Juan Mountains of Colorado and northern New Mexico. For more information: [www.chamapeak.org](http://www.chamapeak.org).

# Benefits of a statewide water assessment

By Sam Fernald,  
NM Water Resources Research  
Institute, NMSU

A Statewide Water Assessment for New Mexico is a new initiative being coordinated by the New Mexico Water Resources Research Institute. The project was made possible by the 2014 New Mexico Legislature and New Mexico Governor Martinez. The Statewide Water Assessment will complement existing state agency water information resources. Currently, the New Mexico Office of the State Engineer administers the state's water supply that is tied to water rights. However, much more water than the administrative supply moves in and out of New Mexico. This assessment will provide new, frequently updated, spatially representative information on water budgets for the entire state.

The Statewide Water Assessment is coordinating and funding several research components with direct relevance to New Mexico's watershed management and sustainability. A project under the direction of Talon Newton, New Mexico Bureau of Geology and Mineral Resources and Dr. Fred Phillips of New Mexico Tech, Recharge Data Compilation and Recharge Area Identification for the State of New Mexico, will initially provide an extensive review of recharge estimates in different parts of the state from previous studies and identify recharge areas in the state. The researchers will build a geographic information system (GIS) model that will be used to determine potential recharge locations within the state. The researchers will incorporate digital elevation models representing topography, monthly average precipitation estimates, potential evapotranspiration, geology, significant drainages, and vegetation. These analyses will be presented as a map that shows regions in the state that are likely recharge areas. Researchers will provide a framework upon which recharge will be quantified in the future with an additional 1-2 year effort if funded. The recharge map will

also serve as a stand-alone product that will be of great value to decision makers and researchers.

Among many potential users, this recharge map would have a visual impact and direct use for legislators, land-use managers, fire-management planners, educators and watershed managers about where primary recharge areas are located within the state. This effort will largely benefit state agencies, specifically the New Mexico State Engineers Office, Interstate Stream Commission, the NM Environment Department and the State Land Office. It will also be pertinent to the planning efforts of federal agencies such as the Bureau of Reclamation, the Army Corps of Engineers, and the Natural Resources Conservation Service. This effort of examining recharge on a statewide level can help address topics of long-term declines of the water table due to reduction in recharge due to drought, as well as use of water beyond the recharge amount. For tree thinning projects that may benefit the water supply, identified recharge areas will help target the locations for tree removal that will have the greatest positive impact on increased recharge. This knowledge will become even more critical as the state prepares for declines in runoff and groundwater supply as a result of ongoing global climate change.

Another project, Groundwater Level and Storage Changes in New Mexico, will highlight changes in water levels on a regional scale and identify data gaps where future work is needed. This project is under the direction of Stacy Timmons, NM BGMR, KC Carroll, New Mexico State University, Mike Johnson, OSE, and Matt Ely, US Geological Survey. In many regions of New Mexico we know that water levels are declining, but all of the data have not been compiled to address the amount of decline in specific areas. The project's first objective is to compile available groundwater level data for New Mexico through collaboration with federal and state

agencies and universities including the USGS, OSE, and NMSU. The second objective is to develop regional maps for selected basins that show changes in water levels over 5-year intervals, reflecting the frequency of measurements performed in a particular region. From these results, New Mexico will have a useful tool to aid in planning for future water management needs.

Comparison of Operational Precipitation and Evapotranspiration Products is another project funded through the Statewide Water Assessment. Participating researchers include Thomas Schmutge, NM WRRI, Jan Hendrickx, NM Tech, Dan Cadol, NM Tech; Steve Walker, NMSU; Ken Peterson, NM WRRI; and Ian Hewitt, NMSU. The overall study goal is to develop a procedure for a cost-effective assessment of existing precipitation and evapotranspiration products at spatial and temporal scales needed by New Mexico's water resources managers. Specifically, objectives are: 1) Compare and contrast the five precipitation and three evapotranspiration products and quantify biases present over the entire state and over specific ecological climate zones; 2) Validate each product against reliable measurements; 3) Validate two existing methods for assessment of the reference ET for the New Mexico environment. These objectives contribute to the main goal of producing the first statewide precipitation and evapotranspiration products for New Mexico with a quality assessment and a plan for how to improve these products at the proper spatial and temporal scales. These products will assist in the state's management of watersheds, particularly in terms of vegetation and land cover management for improved water yield.



## BLM Restore New Mexico partnerships are key to success

*By Aden Seidlitz,  
Acting State Director  
BLM New Mexico*

With over 13 million acres of public lands in New Mexico, the Bureau of Land Management (BLM) manages land in just about every watershed in the State. Over a million of those are forested acres, making the BLM a key stakeholder in forest and watershed restoration. Key to the success of this restoration is the BLM's Restore New Mexico (Restore NM) Program. Started in 2005, this is a landscape-scale, collaborative restoration effort to restore our State's grasslands, woodlands, and riparian areas to a healthy and productive condition. The Program strives to be "colorblind" and includes restoration efforts across multiple jurisdictions and ownerships including State, private, and Federal lands.

With its roots in abandoned oil and gas well reclamation, Restore NM has broadened its portfolio to include forest thinning, brush management, riparian restoration, habitat enhancement, and rangeland improvements. Benefits of collaborative partnerships

have included land health improvements across the landscape regardless of ownership, defragmentation of degraded lands, re-establishment of extant species, and reestablishment of natural ecosystem processes. Additionally, leveraging funds to allow restoration efforts to continue despite budget cuts has become an important objective.

Restore NM would not be possible without the efforts of numerous partners. Key players from the beginning include the New Mexico Association of Conservation Districts, the Natural Resource Conservation Service (NRCS), several soil and water conservation districts, the New Mexico Department of Game and Fish, New Mexico State University's Jornada Experimental Range, and of course New Mexico's agricultural producers. In the past few years, the BLM has added new partners, including New Mexico State Forestry, the New Mexico Forest Industries Association, the National Wild Turkey Federation, and the Forest and Watershed Restoration Institute at Highlands University.

Over the past decade, more than \$45 million has been spent by the BLM and its partners on the Restore NM Program, resulting in the restoration of over 3 million acres of State, private, and public lands across New Mexico. Across southern New Mexico, invasive creosote is being replaced with healthy native grasses, benefiting wildlife and increasing groundwater supplies. Restore NM partners are removing salt cedar from streams, allowing native cottonwood-willow bosques to thrive. Throughout western and northern New Mexico, the BLM is partnering with the State to reduce hazardous fuels through forest restoration projects. In these areas, funds from the State are being leveraged and matched with Federal funds from the BLM and NRCS. A continuation of these strong partnerships will help the BLM secure continued funding for a variety of restoration work. The BLM is always looking for new partners and new opportunities. For more information about the Restore NM Program, and information of on how to become a valued partner, please visit: [www.blm.gov/nm/restore](http://www.blm.gov/nm/restore).

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