



CLEARING THE WATERS

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In This Issue: pg

Post-fire Watershed Stabilization Projects 1

Updates from MASS 5

Events 7

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Post-fire Watershed Stabilization Projects

By John Moeny

WPS Environmental Scientist - Southern Field Team

In late 2020, the Surface Water Quality Bureau (SWQB) finalized contracts with



KEYSTONE
RESTORATION ECOLOGY

Keystone Restoration Ecology to provide post-fire watershed stabilization services in two watersheds that had recently burned during the 2020 summer fire season. The Medio fire burned 4,000 acres on the Santa Fe National Forest north of Santa Fe, while the Tadpole Fire burned 12,000 acres on the Gila National Forest north of Silver City. These two projects aim to protect existing water quality and prevent watershed degradation that could lead to water quality impairments in future years.



Smoke across the landscape during the Tadpole Fire. Photo from inciweb.

For many years, post fire watershed restoration has focused largely on vegetative and physical treatments that prevent large scale soil loss and erosion. Use of aerial seeding and mulching or felling standing dead trees to lay on the contour of a slope dramatically improves soil retention and promotes the successional process of forest regeneration. Even

continued on page 2



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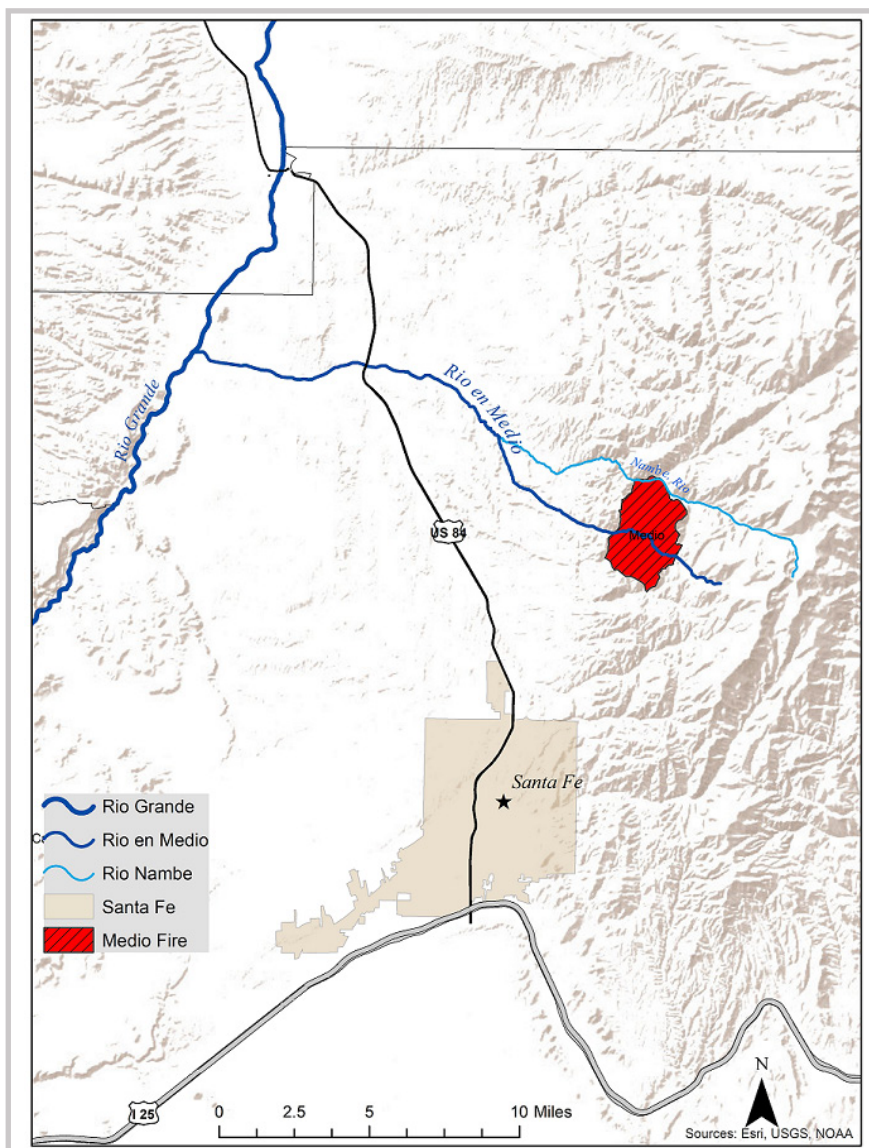


with these upland treatments, most burned watersheds experience flood flows 10 to 100 times greater than flows in unburned conditions. Downstream channels must respond to the additional water and sediment inputs by increasing capacity, often through downcutting and widening channel banks. These unstable, eroded and incised channels become new sources of sediment input for streams, often exceeding the sediment loads being carried down from the hillslopes. While uplands may stabilize in three to five years after a fire, unstable and eroding channels may take a decade or more to reach pre-burn levels of stability and sediment retention.

In 2011, David Rosgen began pioneering post-fire watershed stabilization techniques on Trail Creek, a small tributary to the South Platte River that provides drinking water to the city of Denver, CO. Trail Creek was burned in the 2002 Hayman Fire Colorado's largest fire at the time. Nearly a decade after the fire Trail Creek was still mobilizing sediment at rates sixteen times greater than pre-fire conditions despite the uplands having recovered most of their vegetative cover in the form of grasses, shrubs and young conifer trees. By identifying the sources of sediment input and stabilizing the eroding channels, Rosgen and the project partners were able to drastically reduce sediment mobilization and help protect a critical water supply for Denver. This work was completed many years after the fire and after the initial channel downcutting and widening created the sediment supply problem, but the two projects recently funded by SWQB aim to implement channel stabilization before destructive flooding destabilizes the existing channels.

At the site of the Medio Fire, the Rio en Medio project, flood flow modeling predicts 400 cfs flows from a 1.5" rain event in the watershed, while in an unburned condition that same precipitation event might generate a 60 cfs event. Keystone Restoration Ecology recently implemented a treatment plan that included installation of over seventy structures within the Rio en Medio drainage and tributaries that were considered to be at high risk for erosion. The work utilized locally sourced rock and logs and was completed prior to the onset of the summer monsoon season.

Medio Fire map, Santa Fe National Forest, NM.



continued on page 3



Post fire condition of the Rio en Medio watershed, Santa Fe National Forest.



Construction crew from Keystone Restoration Ecology completes post-fire watershed stabilization work in the Rio en Medio watershed, Santa Fe National Forest, June 2021.

continued on page 4

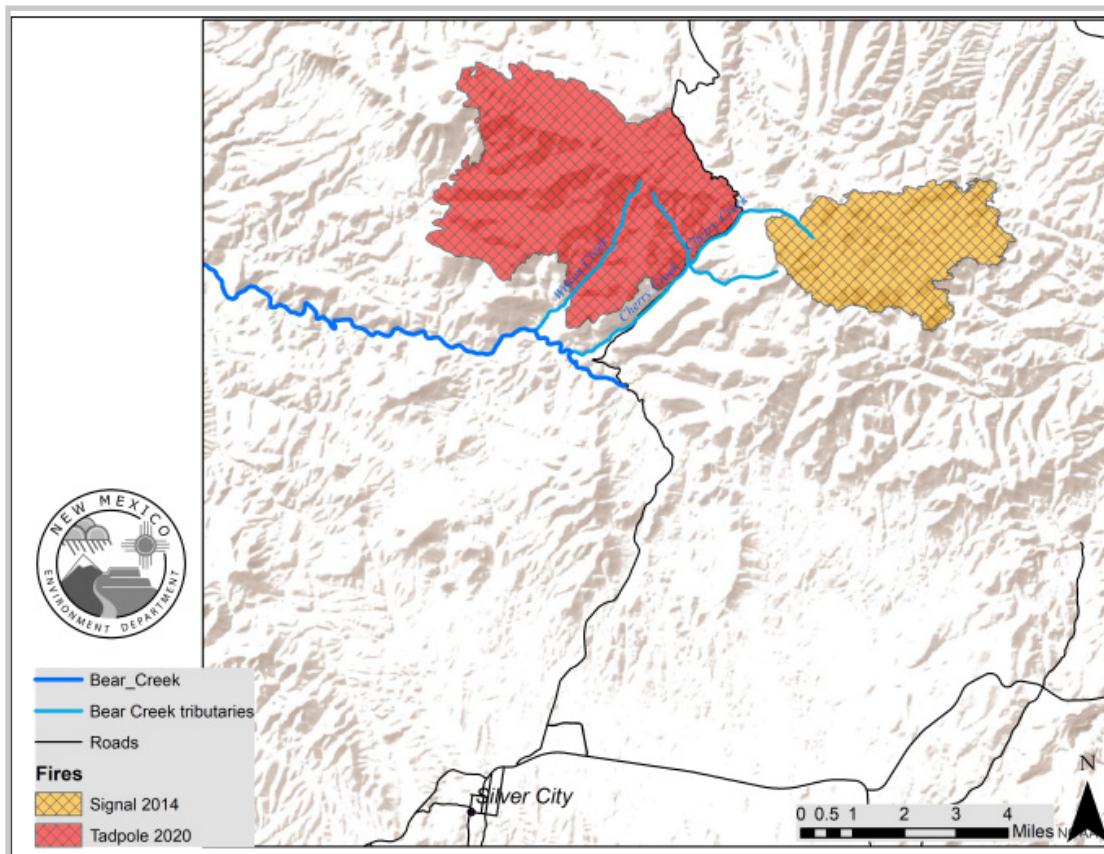
In the Gila National Forest, the Tadpole Fire burned 12,000 acres in the Bear Creek watershed. Bear Creek is a small tributary of the Gila River. The stream's headwaters sit on the continental divide near the historic mining town of Pinos Altos at an elevation of 7,000 feet, while the confluence with the Gila River thirty miles downstream lies at 4,557 feet. Despite being a minor tributary to the Gila River, Bear Creek is an ecologically significant surface water providing critical habitat for the federally endangered Loach Minnow (*Tiaroga cobitis*). The upper Bear Creek watershed includes a perennial tributary, Cherry Creek.



Staff from the Gila National Forest discuss growing headcut and wetland loss in Cherry Creek.

The Cherry Creek watershed was also burned in the 2014 Signal Fire, which initiated channel incision and widening in a meadow wetland near the base of Signal Peak (photo on right). The wetland lies in a valley type transition zone between the steeper uplands and the flatter valley bottom where the U.S. Forest Service has developed two campgrounds. The wetland provides a key location where stormwater flows are spread across a wide floodplain, allowing water to infiltrate. With the wetland already becoming channelized from the Signal Fire, both the Gila National Forest and SWQB

were concerned that the 2020 Tadpole Fire would result in additional wetland loss and higher flood flows in Cherry Creek with the potential to impact the two campgrounds downstream.



Tadpole Fire and Signal Fire map, Gila National Forest.

continued on page 5

Environmental clearances are still pending, but SWQB anticipates that Keystone Restoration Ecology will be able to complete channel stabilization work later this summer, or at the latest in early 2022. Proposed treatments include several large Zuni bowls to capture water and sediment draining from the adjacent highway, plug and pond treatments to reestablish the former floodplain, and boulder cross-vanes and rock baffles to provide grade control.

Both projects were funded through EPA's non-point source pollution prevent grant program, administered by the Watershed Protection Section of the SWQB. A price agreement for Ecological Services maintained by the New Mexico Department of Game and Fish was used for the procurement.

The SWQB hopes these two projects serve as examples of pro-active watershed protection following large-scale wildfire that provide a cost-effective alternative to addressing watershed degradation long after the damage has occurred. Staff from the SWQB, U.S. Forest Service and Keystone Restoration Ecology will monitor the projects in the coming years to gauge their effectiveness and look for places to improve structure design or placement.

UPDATE FROM THE MONITORING, ASSESSMENT AND STANDARDS SECTION

MONITORING TEAM NEWS

Field Sampling Plans are in place and the monitoring team is out collecting data and water samples from New Mexico's rivers, stream and lakes. In 2021-22, they are working in the Jemez, Lower Pecos, Rio Puerco, Rio San Jose and Little Colorado watersheds.



Monitoring Team staff Eliza Martinez collecting stream flow data at the East Fork Jemez River below La Jara Creek.

continued on page 6

WATER QUALITY STANDARDS TEAM NEWS

The New Mexico Water Quality Control Commission (WQCC) scheduled a Triennial Review hearing that began on July 13, 2021. In addition to revised definitions and clarifications, SWQB is proposing several Designated Use amendments, and updates to the aquatic life and human health criteria and the numeric ammonia criteria. Review of the Water Quality Standards (WQS) on a three-year basis is required by Section 303(c) of the federal Clean Water Act. More information on the current proposed amendments to the WQS, including comments submitted during the public comment period, are at <https://www.env.nm.gov/surface-water-quality/2020-triennial-review/>.

TMDL/ASSESSMENT TEAM NEWS

The Clean Water Act §303(d)/§305(b) 2020-2022 Integrated Report (<https://www.env.nm.gov/surface-water-quality/303d-305b/>) was approved by EPA Region 6 on January 22, 2021. The 2020-2022 Integrated Report focuses on water quality assessments in the Upper Rio Grande and San Juan River watersheds.

Total Maximum Daily Loads (TMDLs) have been submitted to the WQCC for Bluewater Lake (plant nutrients impairment) and the Jemez River watershed (various impairments). The final TMDL reports can be accessed from the SWQB website. TMDLs can lead to new or revised National Pollutant Discharge Elimination System permit limits and inform stakeholders for watershed planning and restoration efforts.

Note: Unless otherwise noted, documents referenced in this article can be found under *What's New* at <https://www.env.nm.gov/surface-water-quality/>.

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EVENTS & ANNOUNCEMENTS

August

August 13th - August 15th - Midnight Meadows in the Carson National Forest. Join Albuquerque Wildlife Federation volunteer restoration service project at Midnight Meadows. For additional details or to sign up: Contact Scial at rioscial@gmail.com or abq.nmwildlife.org/projects.html. Midnight Meadows is one of the “wetland jewels” that our partner group Amigos Bravos has identified as needing special protections and restoration priority in the Carson National Forest. During this year’s project, we will continue our work building rock restoration structures and fence exclosures to restore and protect this precious wetland. Our restoration project will follow AWF’s Covid-19 safety protocols. Directions and further details will be sent to you once you sign up.

August 27th - August 29th - Valle Vidal in northern New Mexico. Join Albuquerque Wildlife Federation volunteer restoration service project at Valle Vidal. AWF will be returning to the Valle Vidal to continue work building exclosure fences to protect fragile wetlands and building rock structures to spread water across the landscape. For additional details or to sign up: Contact Kristina at abqwildlifefederation@gmail.com or abq.nmwildlife.org/projects.html. Our restoration project will follow AWF’s Covid-19 safety protocols. Directions and further details will be sent to you once you sign up.

September

September 10th - September 12th - Limestone Canyon, near Magdalena, NM. Join Albuquerque Wildlife Federation volunteer restoration service project at Limestone Canyon. Additional details and to sign up will be posted soon at: abq.nmwildlife.org/projects.html.

September 16th - September 19th - Silver City - Hybrid (in-person and virtual) - 17th Annual Gila River Festival- *Gila River Festival (Re)Connect with the River*. This year’s hybrid event explores our connection to Nature, how the environment shapes human identity, and celebrates our connection to one another and to the Gila River watershed. Speakers include philosopher Kathleen Dean Moore, New York Times best-selling author Doug Tallamy, nature/science writer Sharman Apt Russell, poet Michelle Otero and conservationist Michael Casaus. Expert-guided field trips and workshops on a variety of topics, such as birding, rock art, geology, medicinal native plants, and kayaking will explore the diversity of connections and interrelationships reflected in the Gila’s natural and cultural history. For additional details or to sign up: www.gilariverfestival.org/.

September 24th - September 26th - Rio en Medio, near Santa Fe, NM. Join Albuquerque Wildlife Federation volunteer restoration service project at Rio en Medio. Additional details and to sign up will be posted soon at: abq.nmwildlife.org/projects.html.

Save the Date

October 26 - 28, 2021 - 66th Annual New Mexico **Virtual** Water Conference. *Reality and Resilience: Planning for New Mexico's Water Future*. NM WRRI has been hosting an annual water conference for over half a century. The conference is held each fall rotating to different cities throughout the state. The two-day meeting provides a public forum for the discussion of important and often critical state water issues. The Water Conference Advisory Committee includes water experts from various entities around the state and meets annually to recommend a theme, topics, and speakers for the upcoming conference. Each year a comprehensive conference proceedings is produced.

If you have a related event that you would like distributed, please send an email to susan.styer@state.nm.us