

CLEARING THE WATERS

Newsletter

Volume 17, No.2

Fall 2012

Inside this Issue:	pg.
Watershed Forum	1
Technology Update	3
Cooperator Spotlight	4
Fire and Water Quality	6
Announcements	8

Editor:

Matt Schultz

matthew.schultz@state.nm.us

If you would like to receive this newsletter by email, or to be removed from the mailing list, please contact Bessie Muzumdar bessie.muzumdar@state.nm.us

CTW is also available on our website at:

www.nmenv.state.nm.us/swqb/wps

This newsletter is published quarterly by the Watershed Protection Section of the New Mexico Environment Department's Surface Water Quality Bureau. Funding provided by a CWA §319(h) grant from EPA.



Watershed Forum Workshops Scheduled This Fall Across New Mexico

The New Mexico Watershed Forum is a biennial event that brings together watershed groups, non-governmental organizations, contractors, Tribes and Pueblos, soil and water conservation districts, and local, state, and federal agencies interested in watershed management and protection. The Forum provides opportunities for local leadership to team up and share successes, challenges, and innovations while networking and discussing watershed issues. Events in 2008 and 2010 were held in Albuquerque, and featured projects within a short drive of the conference venue. Feedback from participants indicated a demand for greater involvement by watershed groups, and a desire to highlight watershed work in more of New Mexico.

Accordingly, this fall seven New Mexico watershed organizations will present a series of intensive two-day watershed restoration and protection workshops across New Mexico under the banner of the 2012 New Mexico Watershed Forum. See next page for a list of workshops. All interested residents, land stewards, landowners, and professionals are invited to attend. The workshops are a sharing of the latest information, lessons learned, and success stories in the field of watershed restoration and protection in New Mexico. For detailed workshop program and registration details, please contact the watershed organization that coordinates and presents a workshop of your interest.



Watershed Forum Field Trip in 2010

Continued on page 2

**NMED Surface Water Quality Bureau's
Watershed Protection Section**

www.nmenv.state.nm.us/swqb/wps



The New Mexico Watershed Forum is going on the road in 2012! Please consider attending one or more of these workshops on watershed management and restoration topics:

Workshops – Dates & Places

Santa Fe - Sept. 21st & 22nd: **Caring for Arroyos in your Neighborhood**

Register with Felicity Broennan at (505) 820-1696 or e-mail her at: felicity@santafewatershed.org or go online: www.santafewatershed.org

Pecos - Sept. 26th & 27th:

**A Changing Landscape:
The Pecos Watershed and its Future**

Register with Lexy St. James at (505) 757-3600 or e-mail her at: upwa@pecoswatershed.org

Las Vegas - Sept. 28th & 29th:

**Preparing for and Adapting to Drought
in Northern New Mexico**

Register with Molly Walton at (505) 820-2544, ext. 6# or e-mail her at: mwalton@quiviracoalition.org

Silver City - Oct. 4th & 5th:

**Rainwater Harvesting: A Graceful
Resolution for an Urban River**

Register with Van Clothier at (575) 388-5296 (office), (575) 590-0549 (cell), or e-mail him at: streamdynamics@aznexus.net

Cerrillos - Oct. 6th & 7th:

**Watershed Restoration ~ The Cutting
Edge: Catching , Sinking, Storing, and
Using Water Where it Falls**

Register with Amanda Bramble at (505) 780-0535, ampersandproject@yahoo.com, or go online: www.ampersandproject.org

Mosquero - Oct. 11th & 12th:

**Canadian River Riparian Restoration
Project ~ Treatment Results and
Discussion**

Register with Summer Eaton at (575) 646-2362, seaton@nmsu.edu

Farmington - Oct. 16th & 17th:

**Collaborating for Water Quality in the
San Juan Basin**

Register online:
<https://sites.google.com/site/sanjuanwatershedgroup/riverhealthworkshop>

For more information, including updates, please visit www.nmenv.state.nm.us/swqb/wps/2012WatershedForum

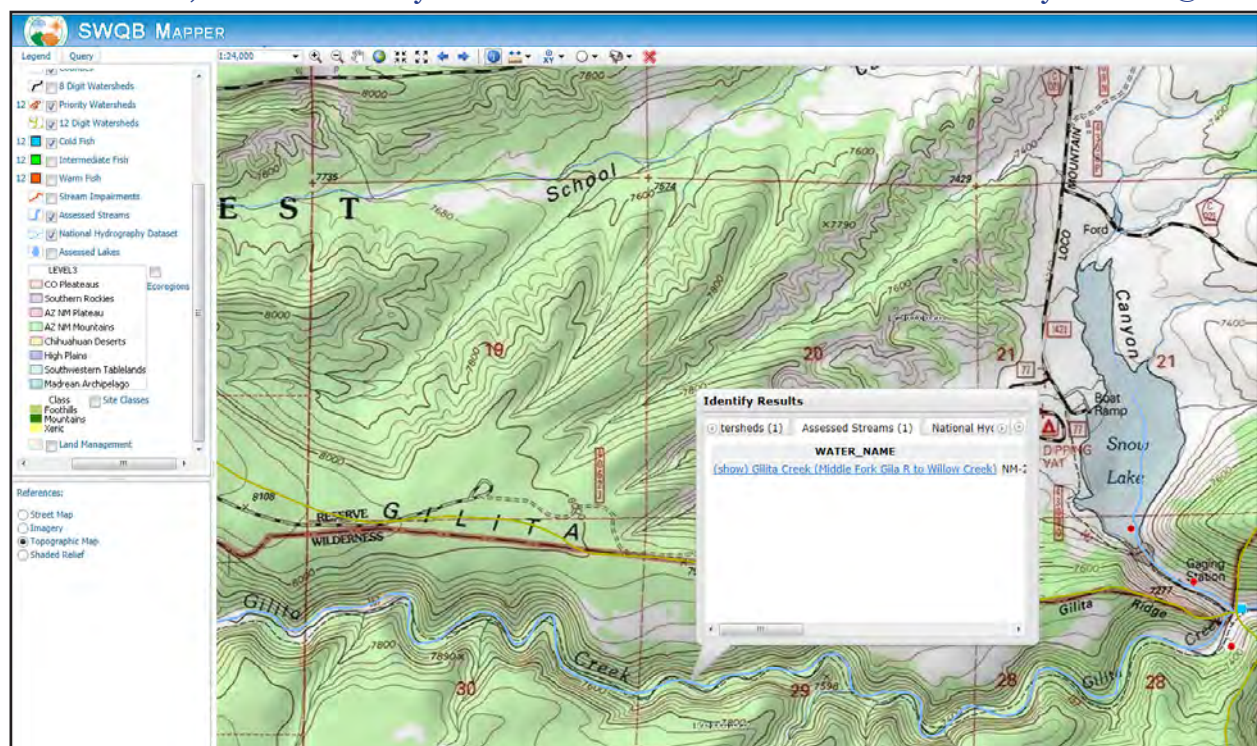
EGIS Mapper: New and Improved

Since Clearing the Waters profiled the Environment Department's EGIS Mapper in Summer 2011 (<ftp://ftp.nmenv.state.nm.us/www/swqb/WPS/CTW/ClearingTheWaters-Summer2011.pdf>), there have been numerous updates and improvements. The Environmental Geographic Information System (EGIS) Mapper (<http://gis.nmenv.state.nm.us/EGIS/>) is an interactive online map developed by NMED displaying key environmental features and geographic relationships in New Mexico. The data represent a broad range of department activities including abatement sites, brownfields, hazardous waste facilities, underground storage tank facilities, and solid waste facilities, to name a few. These data layers can be turned on and off over a background navigated much like Google's street map.

A separate online map "SWQB Mapper" (<http://gis.nmenv.state.nm.us/SWQB/>) focusing primarily on surface water quality issues has also been developed in concert with the EGIS Mapper. The SWQB Mapper contains spatial data on water quality sampling stations, NPDES permits, assessed streams and lakes, fishery types (i.e. cold, intermediate, or warm), and ecoregions. The site also provides access to key information about the New Mexico Nonpoint Source Management Program. The "stream impairments" layer displays streams not meeting water quality standards, which have TMDLs describing the impairments, and indicates which water quality standards are not being met. Another important layer, called "priority watersheds", indicates the watersheds that drain most directly to these streams, where restoration projects or management changes are likely to be most effective.

Cooperators planning watershed restoration activities can use the SWQB Mapper to find USGS gages, watercourse information, and watershed boundaries (both 8-digit and 12-digit HUCs). The SWQB Mapper now includes the "NHD Plus" layer (after zooming to about 1:24k), which provides useful watercourse data (e.g. mean flow, drainage landcover characteristics, catchment areas, etc.) More details on NHD Plus can be found at www.horizon-systems.com/nhdplus. Also in the SWQB Mapper are active wildfire perimeters refreshed from InciWeb (<http://inciweb.org/>) every six hours that allow users to determine the potentially affected watersheds, streams, and lakes from active wildfires.

For more information, contact Zachary Stauber NMED GIS Coordinator at: zachary.stauber@state.nm.us.



Cooperator Spotlight

Gila-Rio Grande Las Cruces Chapter of Trout Unlimited

By Jeff Arterburn, Chapter President



The newly formed Gila-Rio Grande Las Cruces Chapter of Trout Unlimited (TU) began their first project on the Sacramento Ranger District to benefit Rio Grande Cutthroat Trout. The project is located in the upper reach of Aqua Chiquita, with the goal to restore the Aqua Chiquita back to a cold water fishery with Rio Grande Cutthroat Trout and provide recreational fishing opportunities of a native New Mexican fish. Currently, this stream is not supporting its designated use for cold water aquatic life due to benthic-macroinvertebrate bioassessments.

Landowners and anglers may remember fishing the Aqua Chiquita in the past, but this perennial stream has since experienced impacts from fires and floods which may be the reason why there are no fish currently in this perennial reach. At the same time, this is what makes Aqua Chiquita a good candidate stream to reintroduce Rio Grande Cutthroat Trout as there will be no competition from non-native fish. The Lincoln National Forest, New Mexico State University Fish, Wildlife and Conservation Ecology Program, New Mexico Game and Fish Department, New Mexico Environment Department, US Fish and Wildlife, and local landowners have joined to support the Aqua Chiquita restoration initiative.

Collaborators conducted a stream habitat survey; collected benthic aquatic invertebrates; assessed stream substrate; surveyed cross sections of the stream; collected water quality data, and conducted electro-shocking to determine if fish were present. Temperature data loggers were placed throughout the study reaches of the stream to measure temperature changes throughout the year, which will be analyzed by NMSU students. This information will help identify what restoration activities are needed to restore Aqua Chiquita back to a coldwater fishery. This winter Trout Unlimited and collaborators will plant willows to provide canopy cover necessary for maintaining stream temperature and protection when fish are returned to Aqua Chiquita. Other restoration activities may include improvement of pool structure and fish habitat, restoration and enhancement of an important associated wetland, and fencing to provide protection of the site from cattle along the upper portion of the project area.



Aqua Chiquita restoration initiative collaborators

Wildfire and Water Quality in New Mexico

By Matt Schultz, NMED-SWQB

Heavy fuel loads in the forests, caused largely by years of wildfire suppression, and drought created one of the most active fire seasons in New Mexico history. Across the Southwest, wildfire numbers, size, and severity are increasing. The two largest wildfires on record in New Mexico have occurred in back-to-back years, 2011 (Las Conchas Fire 156,593 acres) and 2012 (Whitewater-Baldy Complex Fire 297,845 acres). While much of the immediate concern of wildfire impacts on the hydrologic cycle focuses on increased risk from flooding, debris flows, and landslides during the initial post-fire period, water quality impacts can adversely affect designated uses for domestic, agricultural, and industrial purposes as well as aquatic/fishery habitat for varying periods of time following the fire.



Whitewater-Baldy Complex Fire burning in the Whitewater Creek watershed above the town of Glenwood. Photo courtesy of the Gila National Forest.

The resulting fire effects on watershed processes are a function of the burn size, severity, proportion of watershed burned at high severity, slope, and location. Burn severity is defined by fire intensity, duration, and consumption of vegetation and litter, and is determined by fuel load, fuel type, moisture content, and weather. For example, areas categorized as high severity typically have exposed mineral soil, ash accumulations, and most vegetation, surface litter, and soil organic matter consumed by fire. These extreme changes to soil structure can cause water-repellant (“hydrophobic”) soil conditions, and the resulting decreased infiltration can lead to amplified surface runoff, erosion, channel scour and instability, and sediment transport and deposition. These watershed effects in New Mexico are exacerbated by localized, high-intensity rainfall

during the monsoon season (July-September) that often immediately follows the regular wildfire season (April-June). This combined with lack of vegetation and litter for soil stabilization and roughness to slow runoff can result in annual peak streamflow discharges 1 to 2 orders of magnitude above normal, and mobilize combustion by-products, suspended, and dissolved material which affects the physical, chemical, and biological quality of the water.

Increased suspended sediment and turbidity is one of most noticeable water quality effects of wildfire as a result of ash and fine grain material transported in water. Post-fire sediment yield, or sediment outflow, can be up to several orders of magnitude greater than unburned areas depending on geology, soil, topography, vegetation, fire characteristics, weather patterns, and

Continued on page 6



Post-fire Gilita Creek flood damage to the Bursum Road from the Bear Fire (2006) in the Gila National Forest. Photo courtesy of the Gila National Forest.

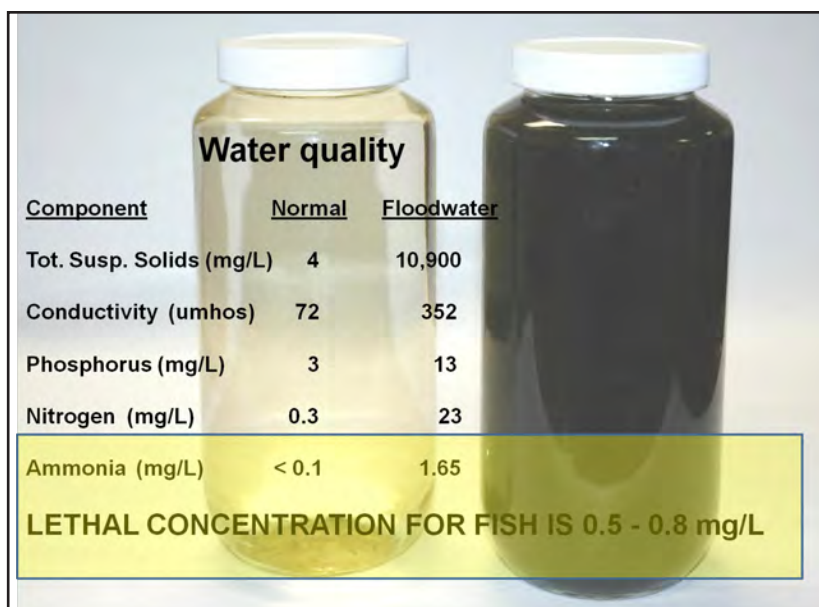
FIRE continued from page 5

land use practices in the watershed. This elevated post-fire sediment from increased runoff generation can fill water-supply reservoirs and/or disrupt operations at drinking water treatment plants. If the water is to be treated, the sediment load increases treatment needs and costs to remove, and might even be beyond the treatment capacity of the plant. Oftentimes, water providers seek alternatives, if possible, to sediment laden surface water by pumping limited groundwater reserves. For example, the Buckman Diversion, which supplies drinking water to Santa Fe suspended pumping operations from their diversions on the Rio Grande due to water quality concerns following wildfire. The large quantities of post-fire sediment can also smother biological habitat required by aquatic organisms, and significant decreases in dissolved oxygen can occur leading to physiological stress.

Water quality chemical constituents nitrogen, phosphorous, calcium, magnesium, and potassium vary greatly after wildfire. Key chemical constituents in post-fire stormwater monitoring are cyanide and ammonia where acutely toxic levels are common especially in impacted, small drainages with little dilution. Ammonia is suspected for last year's fish kills in the middle Rio Grande. Bacteria content is another important aspect if the water is used for human consumption or recreation. Limited observations of the following trace elements: Fe, Mn, As, Cr, Al, Ba, and Pb, have occurred, but are usually below acutely toxic levels. Polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), dioxins, and furans may also increase in response to combustion and deposition in ash and sediment, although data are limited. Typically these concentrations return to pre-fire levels 1 to 4 months after the fire as stores of ash and mineral sediment are flushed from the watershed. Although even this short duration may be problematic for water providers and detrimental to aquatic life, and impacts can extend long distances downstream.



Fish kill at the Valles Caldera National Preserve due to Las Conchas post-fire water quality impacts. Photo courtesy of Bob Parmenter.



Water quality comparison for normal base flow (left) and post-fire floodflow (right) at the Valles Caldera National Preserve. Courtesy of Bob Parmenter.

Some watershed processes recover quickly after wildfire while others require decades or even longer. The rate of forest overstory and understory vegetation reestablishment generally determines the recovery rate of soil stabilization and water quality components. Understory vegetation generally regenerates faster than overstory vegetation (see photo). In widespread high severity burn areas, loss of seed banks, altered soil processes, and difficult conditions for recolonization significantly lengthens the time for forest establishment. Three to five years are typically required before sediment yields decline to pre-fire levels. However, the loss of shade and resulting increased solar radiation leading to elevated stream temperatures (thermal pollution) will require more time for canopy tree regrowth. In the 5 years following the Hayman Fire in Colorado, summer streamwater temperatures

Continued on page 7

FIRE continued from page 6

were still 4°C higher in burned streams than unburned, which is likely to degrade habitat suitability for coldwater species and lead to significant reductions in coldwater fish habitat.

Changes to channel morphology from increased annual peak flows and runoff velocities include rill and gully erosion, debris flows in steep headwater basins, and scour and incision in low order channels. In contrast, further downstream the primary effect is aggradation due to decreased channel gradient. Erosion processes generally return to background levels 3 to 5 years after the fire, but the accumulated sediment in the downstream channels may take an order of magnitude longer to export due to decreased sediment transport capacity with annual peak flows returning to normal, which can have long term effects on channel morphology. After a significant wildfire affecting federal lands, a Burned Area Emergency Rehabilitation (BAER) team is formed to assess the potential fire effects to lives, property, and critical natural and cultural resources within and near the burned area, and propose rehabilitation options to minimize these risks from runoff and erosion.

As far as preventative watershed treatments, fuel load reduction practices such as thinning and prescribed burns may have limited and temporary adverse effects on water quality, but can prevent the substantially greater impacts from high severity wildfires. In fact, water utilities in Denver and Santa Fe are investing in forest thinning and watershed rehabilitation to reduce the risk of high severity fires in critical water source areas. Forest treatment guidelines have been developed by the New Mexico Forest and Watershed Restoration Institute (www.nmfwri.org/images/stories/pdfs/forestry_Restoration_Papers/PrescriptionGuide.pdf) and New Mexico State Forestry (www.emnrd.state.nm.us/SFD/ForestMgt/documents/ForestPracticesGuidelines2008.pdf) based on forest type, history of human impacts, and current forest structure. Forest ecology matters because, historically, forest types experienced distinct fire regimes based on frequency and severity. For example, Southwestern ponderosa pine forests typically experienced high frequency, low severity fires which maintained an open structure, whereas spruce forests typically experienced low frequency, high severity fires also known as stand replacement fires. Forest restoration goals, which are sometimes different than strictly reducing fuel loads in critical areas such as the wildland urban interface, include changing the structure of the forest to achieve an appropriate size, age, and distribution structure, reestablishing natural processes such as cool fires where appropriate, fostering a healthy grass and forb cover, modifying treatments for stream corridors and fragile soils, and protecting wildlife habitat. Forest restoration aims to return stands to within their natural range of variability in terms of forest density and fuel loading, and resilient to natural disturbances.



Rapid recovery of grass and forb species after the Las Conchas Fire in the Valles Caldera National Preserve. Photos courtesy of Rouke McDermott.

Some vegetation types recover rapidly after a fire (above) while others take a long time (below)



High elevation forest in Gila National Forest in the aftermath of the Whitewater-Baldy Fire. Photo courtesy of the Gila National Forest.

GET INVOLVED!

See the events below for opportunities to learn about watersheds and how to restore them.

September 21-22nd: Caring for Arroyos in your Neighborhood. Santa Fe, NM. Register with Felicity Broennan at (505) 820-1696, felicity@santafewatershed.org, or www.santafewatershed.org.

September 25-26th: Wetland Restoration & Creation Workshop. Bat Conservation International and the American Museum of Natural History, Southwestern Research Station. Portal, AZ. For more information, see www.batcon.org/index.php/get-involved/event-registration.html?view=01home&layout=page.

September 26-27th: A Changing Landscape: The Pecos Watershed and its Future. Pecos, NM. Register with Lexy St. James at (505) 757-3600 or upwa@pecoswatershed.org.

September 28-29th: Preparing for and Adapting to Drought in Northern New Mexico. Las Vegas, NM. Register with Molly Walton at (505) 820-2544, ext. 6# or mwalton@quiviracoalition.org.

September 29th: National Prescription Drug Take-Back Day. 10:00 am - 2:00 pm. More information, including a search function for local collection sites can be found at www.deadiversion.usdoj.gov/drug_disposal/takeback/index.html.

October 2nd: Sandia Ranger District Volunteer Restoration Event. Albuquerque Wildlife Federation. For more details, see <http://abq.nmwildlife.org/>.

October 2-5th: New Mexico Rural Water Association Fall Conference. Las Cruces, NM. For more information see www.nmrwa.org/.

October 4-5th: Rainwater Harvesting: A Graceful Resolution for an Urban River. Silver City, NM. Register with Van Clothier at (575) 388-5296 (office), (575) 590-0549 (cell), or e-mail him at streamdynamics@aznexus.net.

October 6-7th: Watershed Restoration ~The Cutting Edge: Catching , Sinking, Storing, and Using Water Where it Falls. Cerrillos, NM. Register with Amanda Bramble at (505) 780-0535, ampersandproject@yahoo.com, or www.ampersandproject.org.

October 11-12th: Canadian River Riparian Restoration Project ~ Treatment Results and Discussion. Mosquero, NM. Register with Summer Eaton at (575) 646-2362, seaton@nmsu.edu.

October 16-17th: Collaborating for Water Quality in the San Juan Basin. Farmington, NM. Register online: <https://sites.google.com/site/sanjuanwatershedgroup/riverhealthworkshop>.

October 25-27th: Fourth Natural History of the Gila Symposium. Western New Mexico University. Silver City, NM. For more information, see <http://gilasymposium.org/>.

November 14-16th: Quivira Coalition 11th Annual Conference. Albuquerque, NM. For more information, see www.quiviracoalition.org/.

If you have an event that you would like posted, please email matthew.schultz@state.nm.us