

CLEARING THE WATERS

NEWSLETTER

VOL. 12 ~ NO. 2

SUMMER, 2007

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Rx for Gullies

by Mike Matush, SWQB Watershed Protection Section

There are many ways to repair gullies, or critically eroding areas. Many prescriptions start with altering the physical state of the gully itself and others start above the gully and divert runoff that promotes the initial erosion problem. One approach is to maintain the gully slope, but amend the slope length and surface to accommodate excessive runoff events. Others completely redesign the critical area and create a new watershed basin that traps excessive runoff. The overall idea of mitigating critical erosion is to restore a previous condition or to improve condition by producing a higher and better use. All agree that gully erosion can become an irreversible problem that affects natural drainages unless management practices are applied.



The Mangas Water Quality Project in the Burros Mountains of the Gila National Forest has taken gully remediation seriously. The project has incorporated most of the following management practices which can change critical eroding areas into thriving, highly producing ecosites. The accompanying photos show the progress of restoration efforts.

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NMED SURFACE WATER QUALITY BUREAU'S
WATERSHED PROTECTION SECTION

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

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VOL. 12 NO. 2
SUMMER 2007

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



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At the beginning a gully restoration project, gully sites are surveyed and remediation practices are designed according to size and condition of their individual watersheds. These sites are normally at the top of watersheds and total runoff areas are confined to 25 acres or less. A system of gully plugs are constructed to trap excessive runoff and sediment. In most gullied areas a system of 3 to 4 plugs are installed with heavy equipment. Occasionally small diversion spreader dams are installed to spread surface sheet flow prior to entering a plug system.



Mangas Site 1, September 2003,
grass seeding successful.

All plugs are designed to hold a maximum of one half acre foot of runoff water. Gully plugs are basic pond designs with standard spillways and dams. Each gully plug spillway leads directly into the next downhill plug. As the first uphill plug fills with water and sediment, additional runoff runs directly into the next plug and into the next succeeding plugs until all ponds are full and the excess runoff is controlled in a safe manner. Grasses are introduced in the plug, spillway and dam to decrease erosion and increase infiltration of runoff or rainfall.

These plugs are designed to drain water quickly, trapping only sediment and enhancing alluvial or groundwater storage. An added advantage of the plug design is the temporary supply of water to wildlife. These temporary water catchments also increase plant diversity including deeper rooted grasses and wildflowers. Eventually all gully plugs will fill with sediment and the initial design will leave a flatter sloped swale with small complex slopes, the remnants of the former dams and spillways.

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Mangas Site 1, Spring 2007.

This type of prescription design has proven very successful in the Burros, increasing groundwater storage and soil moisture and providing a more productive habitat for wildlife and livestock. As the site heals, it becomes evident that these once fertile loamy swales in between rocky hillsides can be restored their original condition or to a higher and better use.

The Mangas project plan is a watershed-based approach that involves collaboration between the Grant Soil and Water Conservation District, Gila National Forest, private landowners, and the 319(h) program. The project included a prescribed burn program encompassing over 55,000 acres in the Burro Mountains as well as gully remediation. Complete vegetation monitoring surveys, in combination with erosion models, are completed prior to and after implementation of conservation practices to evaluate effectiveness of these practices.

These designs are standard USDA Natural Resource Conservation Service engineering practices. For questions, comments or tours related to these types practice, contact Ellen Soles with the Gila Watershed Partnership at 928-310-8955 or NMED SWQB, Silver City, at 505-827-0505. ~

Golden Algae in the Pecos River

by Scott Hopkins, SWQB Monitoring and Assessment Section

In recent years the repeated occurrence of fish kills has caused concern among residents of the lower Pecos in New Mexico and west Texas. It has been determined that the cause of these fish kills is a microscopic organism commonly known as golden algae (*Prymnesium parvum*). *P. parvum* is increasing its range from its historical habitat in estuaries and other coastal areas world-wide into fresh water environments.



Fish Kill in the Lower Pecos River.
Inset Photo of *Prymnesium parvum* by Dr. Carmelo Tomas, UNC Wilmington

This organism is not, in fact, an alga but rather a bi-flagellate haptophyte, in between the algae and the protozoans. It is able to photosynthesize like an alga but is also very mobile and capable of attacking and engulfing other micro-organisms and secreting poisons which can kill large gill-breathing animals like fish and shellfish. It is thought that this adaptation developed to help *P. parvum* balance its nutrient requirements. It is not known to harm terrestrial organisms.

Research from around the world has shown that *P. parvum* becomes toxic when the ratio of nitrogen (N) to phosphorus (P) goes above or below its range of tolerance. Nitrogen is very soluble and hence is bio-available; phosphorus is relatively insoluble, and so is not readily bio-available. Nitrogen rich stormwater runoff can upset the N/P ratio, triggering a toxic bloom. It is unclear how this organism might be controlled to prevent such a negative environmental trigger.

When *P. parvum* blooms, usually during the cooler months, water bodies turn a golden brown and become foamy. True algae will typically die off and dead fish begin to wash up on shore, often attracting scavenging birds.

During the Surface Water Quality Bureau's water quality survey of the lower Pecos in 2003, *P. parvum* had spread up the Pecos River and into Brantley Reservoir. As of 2007, it had advanced as far north as Roswell. In all probability the salinity north of Roswell is too low to support further spread. ~

Antidegradation Policy Changes Promote Restoration in ONRWs

by Pam Homer & Tim Michael, SWQB Water Quality Standards, Planning, and Reporting Team

In June, the Water Quality Control Commission adopted amendments to the state's antidegradation policy as it applies to Outstanding National Resource Waters (ONRWs). An essential component of New Mexico's Surface Water Quality Standards, the policy guards against degradation in all surface waters and provides special protection for ONRWs. The amendments are aimed at ensuring that watershed protection and restoration projects can be implemented in ONRWs, even though temporary disruptions in water quality may result.

In adopting these amendments, the Commission was responding to concerns expressed during deliberations on the ONRW designation of the waters of the Valle Vidal, in particular, the strict prohibition of degradation in waters designated as ONRWs. Some ONRWs have impairments and would benefit from restoration efforts. Watershed restoration projects, however, may create temporary water quality impacts. For example, reintroducing meanders on a channelized stream may disturb sediment, and restoring native riparian vegetation may temporarily increase temperature. The prohibition of *any* degradation was viewed as a possible barrier to implementing beneficial projects which serve the overarching protection and restoration goals of the Clean Water Act.

The amendments allow for temporary and short-term degradation of water quality, but only if it "can be shown to result in restoration or maintenance of the chemical, physical or biological integrity of the ONRW ..." Approval must be obtained from the Surface Water Quality Bureau or a designated management agency, such as the U.S. Forest Service, or from the Commission directly if the project includes use of a piscicide. Such degradation is to be limited to the shortest time possible and may not exceed 12 months, unless approval is obtained from the Commission for a longer period. The approval process considers cumulative effects and assures that the short-term degradation does not imperil any existing use of the water or harm the essential character of the ONRW. Appropriate best management practices must be implemented.

The amendments take effect August 1, 2007. To read the full text of the changes, visit the Surface Water Quality Bureau website at www.nmenv.state.nm.us/SWQB/Standards. ~

At the present time, the Rio Santa Barbara and some of its tributaries, and waters within the United States Forest Service Valle Vidal Special Management Unit have been designated as ONRWs.

Waters eligible for ONRW designation include waters that are part of a national or state park, wildlife refuge or wilderness areas, special trout waters, waters with exceptional recreational or ecological significance, and high quality waters that have not been significantly modified by human activities.

Any person may request that the Water Quality Control Commission designate a water as an ONRW. For more information about ONRWs or the process for nominating waters as ONRWs, see the Surface Water Quality Bureau's ONRW website, <http://www.nmenv.state.nm.us/swqb/ONRW/>.



USDA Under Secretary Tours Project on Mangas Creek Watershed

by Mike Matush, SWQB Watershed Protection Section

Mark Rey, Under Secretary for Natural Resources and Environment at the U.S. Department of Agriculture, joined area ranchers, Forest Service and National Resources Conservation Service employees and others at an Earth Day event in the Burro Mountains of southwest New Mexico. The group celebrated a cooperative project among area residents, the Grant Soil and Water Conservation District, the USDA Forest Service, the NM Environment Department (NMED), and the USDA Natural Resource Conservation Service (NRCS) to improve the watershed within the Mangas Valley.

Dusty Hunt, Chair of the Grant SWCD, said the project was necessary to restore a balance in the watershed. "Because the Mangas watershed has lost its equilibrium with Mangas Creek, we're seeing a lot of erosion," Hunt said. The solution: bring fire back into the ecosystem.

After decades of wildfire suppression, the density of pinon and juniper in the area has increased. According to Hunt, that prevented native grasses from helping the watershed absorb rainfall, helping to create the arroyos that rapidly channel water into Mangas Creek. The resulting runoff carried nutrients and other sediments into Mangas Creek and, eventually, the Gila River. "The case we made to the Environmental Protection Agency 319(h) program," Hunt said, "is that we could return equilibrium by reintroducing fire into the system." During the past several years, project partners completed a number of burns, totaling more than 55,000 prescription acres, in the Mangas watershed area. In addition, more than 250 erosion control structures were completed to abate gully erosion in the watershed.

Hunt was quick to point out the cooperation of various agencies and organizations involved in the years-long project. "Probably not one entity could have pushed this project forward," he said, "but any one of them could have stopped it." It was that cooperation that prompted Rey's visit. He said that the Mangas restoration served as a model for the Department of Agriculture, which has pushed for additional funding for such projects. According to Rey, the federal, state and local agencies involved had "essentially demonstrated the essence of cooperation in conservation projects." "The project has proven to be a highly effective means, on almost a pilot project basis," Rey said, "of erasing political barriers where mixed landownerships are involved, to accomplish landscape-scale conservation work." Rey said the Department of Agriculture was promoting such approaches in proposals submitted to Congress earlier this year. "In breaking new ground, the cooperators here have provided the inspiration and ideas for some new approaches that we have proposed to Congress as part of the administration's 2007 Farm Bill."

The Mangas project has been funded through a variety of sources, but mainly by grants established under Section 319(h) of the Clean Water Act. According to David Hogge, NMED Program Manager for the Surface Water Quality Bureau's Watershed Protection Section, "more than \$3 million in 319 funding has been spent in the Gila River Basin, with additional funding applied toward the Mimbres and San Francisco rivers." Mike Matush, 319 project manager, said the Mangas project was unique beyond the cooperation exhibited by the project partners. "We're looking at the whole watershed or landscape to fix one surface water body," he said. "In this part of the country, you have to look at the whole watershed to identify the sources of problems in a perennial stream." Partnering with NRCS to leverage funding like EQIP (Environmental Quality Incentives Program) will be another key to continuing work in the Mangas watershed. "What we've found," Matush said, "is a lot of the agriculture producers in these areas need help with agriculture lands that affect surface water quality. That's why we can combine 319 and EQIP, and help small farmers along the river channel." ~

EVENTS CALENDAR

AUGUST & SEPTEMBER, 2007

8/4 X-Stream Makeover Cedro Creek Wet Meadows

Learn from on-site restoration specialists about building One Rock Dams, Baffles, Weirs and Vanes. For more info visit www.quiviracoalition.org or contact: education@quiviracoalition.org, or 505-820-2544

8/23 Rio Grande Salt Cedar Clean-up

At Taos Junction Bridge (down in Pilar). Help cut back new growth of Salt Cedar, an invasive non—native that is negatively impacting the health of the riparian habitat along the river. For more info visit Amigos Bravos at www.amigosbravos.com or contact 505-758-3874.

\$\$ Grant Funding for Watershed Groups and Restoration Projects

Coming soon.... Request for Proposals for the Federal Clean Water Act Section 319(h) grants

Check the Surface Water Quality Bureau's website www.nmenv.state.nm.us/swqb or call 505-827-0187 for information about release and due dates for the proposals. Estimated release time is late August or early September.



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