Environmental Flows Bulletin
December 2013

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Director's Note

By Marilyn C. O'Leary

Marilyn C. O'Leary was appointed interim director of the Utton Center in June 2013. She will work with the Utton Center staff and School of Law natural resources faculty to spearhead strategic planning efforts for the Center with the possibility of expanding the Center's work to include drought management projects and water and energy issues. Professor O'Leary previously directed the Utton Center from its establishment in 2001 until 2007. She practiced water law and public utility law in the public and private sectors during her 20 years in the practice of law. She also served on the New Mexico Public Utility Commission from 1982–1987, as executive director, commissioner, and commission chair. She was a founding member of the Natural Resources Section of the State Bar (now NREEL), a member of the Committee on Women in the Legal Profession, and a co-chair of the Equal Access to Justice Campaign.

Continued awareness of the importance of environmental flows is highlighted by this issue's report on the New Mexico River Stewardship Program. Water shortage, whether caused by cyclical drought, global climate change, or an unfortunate coincidence, will make it difficult to keep water in our rivers. We are faced not only with deciding what we want our rivers to look like but how we are going to share our shortages. The Utton Center's values of impartiality and "preventive diplomacy" have been used in the past to bring diverse interests together to seek

resolution of water-related problems. We are exploring how we might facilitate constructive conversations and solutions in the future around these issues.

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Questions Remain on Statewide River Program

In August, Governor Susana Martinez and Ryan Flynn, New Mexico Environment Department Cabinet Secretary Designate called a press conference alongside the Rio Grande in Bernalillo. With the Sandia Mountains for a backdrop, Martinez announced her support for improving the quality of New Mexico's rivers. She also called upon state legislators to approve $1.5 million in capital outlay funding.

According to a two-page fact sheet provided by the New Mexico Environment Department (NMED), the New Mexico River Stewardship Program would allow the department to match federal funds available under the Clean Water Act.

About a third of the state's rivers and streams fail to meet state water quality standards. According to the fact sheet—which points out the economic benefits of clean water from tourism and non-residents visiting the state for hunting and fishing—the program would address issues such as downstream flooding, erosion, and increased sediment yield from wildfires and the restoration of historic floodplains to reduce downstream flooding.

The new program would be similar in structure to one that's about to sunset. In 2007, Governor Bill Richardson asked the New Mexico State Legislature to fund the River Ecosystem Restoration Initiative (RERI). Its purpose was to restore instream ecosystem functions and watershed health to major water basins throughout the state. Over the course of four years, RERI supported 48 projects statewide and provided about $8.2 million in matching funds. The legislature did not fund the program in 2012 or 2013—and it will expire in June 2014, when the last of the four-year projects is completed.

In mid-November, NMED Secretary-designate Flynn and James Hogan of the Surface Water Quality Bureau presented information about the program to New Mexico's legislative Water and Nature Resources Committee.

The two explained that the program would focus on improving river and water quality. If funding is approved and the program implemented, the department will issue a request for proposals, then rank those proposals based on a number of criteria, including a clear need for the project, a demonstrated ability to deliver results, and local involvement in the project.

Flynn explained that the governor plans to request $1.5 million—and that the department would welcome additional funding. When asked by Rep. Jeff Steinborn if Martinez planned to use the governor's capital outlay money or was requesting that the legislature allocate funding from its pot, Flynn replied, "It's not her capital outlay and your capital outlay, that's not how she sees it."

Stating that the question represented a tangent, Sen. Phil Griego, chair of the committee, stopped the discussion.

Meanwhile, when asked for more detailed questions about the program's priorities, a spokesperson for the department sent an email response to "check back after the 2014 Legislative session."

For more information:

River Ecosystem Restoration Initiative (RERI) projects:
http://www.nmenv.state.nm.us/swqb/RERI/

Floods on the Pecos Scour Restoration Project

Pecos River restoration in September. Photo by Paul Tashjian, USFWS.

In mid-September, when provisional data from the Pecos River reported more than 20,000 cubic feet per second (cfs) pouring down the river, Paul Tashjian was worried. Tashjian, senior hydrologist with the US Fish and Wildlife Service in Albuquerque, has spent more than a decade planning and carrying out restoration of a 12-mile stretch of the river near Bitter Lake National Wildlife Refuge. "It scared the crap out of me," he says. "That would have done damage!"

But that gage reading was high, thankfully. Once the data had been adjusted, Tashjian estimates the river there ran for three days at about 8,500 cfs. "I was so jazzed because those flows on the Pecos were just what we needed," he says. "We had designed this whole project to have those bigger flows a part of it—and we need the high flows to move the channel and reconnect the floodplain."

Thanks to partnerships among the Fish and Wildlife Service, the US Bureau of Reclamation, the Interstate Stream Commission, the Carlsbad Irrigations District, and others, Tashjian's dream in the late 1990s to create quality habitat for riverine fish—including the threatened Pecos bluntnose shiner—became a reality.

For decades prior to restoration, this stretch of the river had become disconnected from the surrounding plains. The bed was channelized, the bank was armored with salt cedar—and it frequently dried even when the stretch below was wet.

The three-phase, $2.5 million project was funded through a number of programs, including the state's River Ecosystem Restoration Initiative (RERI) and the federal American Recovery and Reinvestment Act. It has included salt cedar removal, the reintroduction of native plants, and riverbank lowering. The Bureau of Reclamation has also reconnected an oxbow in the river.

"It really hadn't seen high flows since we did restoration in 2009. It needed that," Tashjian says. "It moved the channel some places; it widened it out and open new sculpted habitat, which is new habitat for the fish."

A few weeks after the flooding, Fish and Wildlife Service crews spread out along the river to monitor for populations of the Pecos bluntnose shiner. "We had very few fish, and we had lots of sites without shiners," says Stephen Davenport. "But we did have young-of-year fish, so there is evidence they reproduced, and because of the big flows, the fish are going to be able to survive through the winter."

"The cool thing was seeing the river that was nearly dry—and then full of water," he says. That stretch of the river had been dry over the summer, and the past two summers, as well: "All that flooding had saturated the banks—not just directly adjacent to the river, but a good ways inland."

Restoration Projects—and a Parched Valley—Absorbed Floodwaters

Beginning on September 10, a low-pressure system doused New Mexico with "near record monsoon moisture," according to the National Weather Service (NWS). For a nine-day period, widespread and heavy rains fell. In many places, the storm's totals exceed what had fallen over the course of entire year: At Whitewater Creek in Catron County, more than ten inches of rain fell. In DeBaca County, more than eight inches were recorded at Sumner Dam. And in Albuquerque, more than four-and-a-half inches of rain fell over the course of nine days.

Just before September's heavy rains, the Rio Grande in Albuquerque was in danger of drying. Photo by Laura Paskus.

On the afternoon of Friday, September 13, warnings sounded in the Middle Rio Grande: A rush of water would be heading down the river and into Albuquerque. The social media site, Twitter, buzzed with flow observations from higher in the valley and the City of Albuquerque, the National Weather Service, and water management agencies warned people to stay back from the river and out of the bosque.

At the Pueblo of San Felipe, the US Geological Survey gage measured flows of about 9,000 cubic feet per second (cfs). Ignoring warnings, people headed to the bridge at Alameda Boulevard to watch the water surge into Albuquerque as evening fell.

Knowing that the waters would attenuate on the way downstream, water managers predicted that the flows on the north side of Albuquerque would reach about 6,000 cfs. But the river peaked at only about 4,300 cfs in Albuquerque. At the Central Bridge, it crested at 5.74 feet (4,350 cfs) at 11:30 p.m.

According to the NWS, action stage is eight feet. That is, when the river reaches eight feet, agencies need to take mitigation actions to prepare for possible high flows. Moderate flood stage is ten feet, and major flood stage, 12 feet. According to its historical crest information, the Rio Grande through Albuquerque reached a high of 12.3 feet on April 24, 1942, long before much of the valley's flood control and diversion infrastructure was in place. The next highest crest occurred on August 10, 1967 with a crest of 7.82 feet.

In addition to the inherent attenuation of flows as they move downstream within a river system, a combination of factors affected the Rio Grande's flows, says Carolyn Donnelly, a hydraulic engineer with the US Bureau of Reclamation. One such factor was the presence of habitat restoration projects. Through its state, federal, municipal, and tribal partners, the Middle Rio Grande Endangered Species Act Collaborative Program has funded restoration of 1,564 acres in the valley. Those projects have been undertaken for the benefit of the Rio Grande silvery minnow and the southwestern willow flycatcher, the river valley's two endangered species. Projects have lowered banks and created side channels. When river flows are above a certain height, water can flow into these areas to benefit habitat for the two endangered species. And in the case of a flood, they can also capture and slow flows heading downstream.

While some of New Mexico's smaller towns experienced flooding, Albuquerque is insulated from flooding from high river flows, adds Bureau of Reclamation spokeswoman Mary Carlson. A system of levees keeps the river from overbanking and the Albuquerque Metropolitan Arroyo Flood Control Authority's (AMAFCA) system of concrete diversions helps protect city infrastructure and neighborhoods from runoff from the Sandia Mountains and other arroyos.

While the high flows brought people streaming to the river, a sight that was more dramatic occurred over the weeks prior to September's storm. Prior to those high flows on September 13, the river channel through Albuquerque was threatening to dry. On September 9 and 10, the river's flows at the Central Bridge were below 50 cfs—and less than half what the US Fish and Wildlife Service mandates water managers maintain under the Endangered Species Act for the silvery minnow. Beginning in early June, biologists salvaged fish throughout the summer from drying sections of the river south of the city. The most severe day of drying was September 5, when a total of 32.40 miles of river dried—8.20 miles within the Isleta Reach and 24.20 miles in the San Acacia reach.

Conditions like those point to what may have really happened to those big flows rolling down the Rio Grande. "The whole valley was so damn dry," says David Gensler, the Middle Rio Grande Conservancy District's hydrologist. "We had the lowest flows we've ever seen in our drains this summer right before that storm came through."

Pointing out that if 1,000 acres of the restoration project areas had flooded to a depth of six inches, those areas would have captured only 500 of the 18,000 acre feet of water flowing down the river on September 13. The restoration projects helped slow some flows, he says, but the dry riverbed and stressed aquifer absorbed a more substantial portion of the flow.

“The whole valley was dried out and the water table had been drawn down through the summer,” says Gensler. “It was like a parched sponge sitting there.”

For more information, visit:

The National Weather Service’s “Historic Rainfall Event: September 10-18, 2013” page:
http://www.srh.noaa.gov/abq/?n=2013SeptemberFlooding
(Scroll to the clickable map at the bottom of that page to view hydrological summaries of impacts by county.)

The US Geological Survey’s New Mexico Water Resources page:
http://nm.water.usgs.gov/

Middle Rio Grande Endangered Species Act Collaborative Program:
http://www.mrgesa.com/

Middle Rio Grande Conservancy District’s Water Data page:
http://mrgcd.com/Water_Readings_North_and_South.aspx

Damming a River to Save It

Allyson Siwik walks through the floodplain of the Gila River. Photo by Laura Paskus.

One word comes to mind as Allyson Siwik walks through the floodplain of the Gila River above the towns of Cliff and Gila: Flattened.

In early October, the sky is a brilliant blue and the cottonwood leaves are just beginning to show a bit of yellow. Meanwhile, signs from last month’s floods are all around: Grasses and bushes are bent flat against the muddy soil. Downed trees and debris piles choke what may once have been a path. Meanwhile, the Gila is calm, running at 68 cubic feet per second—down from a peak of 12,400 cfs less than a month earlier when prolonged rains sent the river swelling. “Healthy rivers are better at mitigating floods,” says Siwik, pointing toward the messy floodplain all around. “The water came up, spread out over that area; it reduced the velocity of the water and also recharged the groundwater.”

Most days of the year, the Gila is what people from other regions of the United States would probably call a stream. Or maybe a creek. But for 13 days in September, its flows ran above

1,000 cfs. (And for three days, it was above 4,000 cfs.) The flooding here, as well as within many of its tributaries, showed what the river could do. “The Gila River is what makes southwestern New Mexico so special,” says Siwik. “It’s America’s last wild river.”

The Gila River just downstream from the wilderness boundary. Photo by Laura Paskus.

More than 30 years ago, New Mexico was promised access to 18,000 acre feet of Colorado River water. All New Mexico needed to do was find a downstream water user in Arizona willing to trade Gila and San Francisco River water for Colorado River water. New Mexico didn’t find that partner until 2004, when Congress passed the Arizona Water Settlements Act (AWSA) of 2004. That law created a procedure allowing New Mexico to use that water. In 2004, the amount of water was reduced to 14,000 acre feet, to account for consumptive use. And technically, it’s 140,000 acre feet over a ten year period, with a maximum annual diversion of 64,000 acre feet.

Under AWSA, New Mexico would pay an exchange fee for the water from the Gila River Basin, which would allow Arizona’s Gila River Indian Community to take advantage of its Colorado River water from the Central Arizona Project. The federal government set aside two funds for New Mexico: $66 million spread across ten years to develop water projects that meet water supply demand in the state and another $34 to potentially build a diversion and storage project for the Gila waters. The funds are paid by the US Bureau of Reclamation and administered by the New Mexico Interstate Stream Commission (ISC), whose nine members are appointed by the governor.

Over the past two years, ISC staff members have evaluated applications for a variety of projects, ranging from conservation programs to diversion plans. Today, the projects have been whittled down to 15, which staff are evaluating for technical feasibility and design options, environmental impacts, cultural considerations, economics, and water supply. In January, they will report to the legislature, and then issue a final report on studies mid-way through the year. The commission will issue its preliminary decision in August 2014 and a final decision in November. If the commission decides New Mexico will undertake a diversion and storage project on the Gila, it must notify the US Secretary of the Interior by December 31, 2014. If New Mexico chooses not to divert water, it will receive only $66 million of the federal funding.

Whereas environmental groups, such as the Gila Conservation Coalition and the Center for Biological Diversity, have long opposed diversion, ISC Deputy Director Craig Roepke says the Arizona Water Settlements Act “provides the opportunity to turn period drying (on the Gila) to a continuously flowing, healthy river.” According to Roepke, development will also benefit the riparian habitat, farmers, and the regional economy.

At the end of October, Roepke, along with ISC staffers Helen Sobien, Ali Effati, and David Anderson shared a presentation about AWSA with the Utton Center.

“When people picture the Gila River, they picture wilderness, green, and a flowing river,” says Roepke. “But near Redrock, the river is bone dry.” There are seven major irrigation diversions off the river, the uppermost of which are in the Cliff-Gila Valley. A stretch of the river ran dry in the Cliff-Gila Valley in June 2013, says Roepke. When that happens, there is a shortage of water for both agricultural and environmental needs. Not only that, he says, but there’s a “false sense of security” regarding the stability of the Mimbres Aquifer, which supplies water to both Silver City and Hurley. (Information about the ISC’s refutation of an earlier US Geological Survey about the aquifer is available within the presentation given to the Utton Center.) Developing the Gila Basin’s water would also protect towns and cities, he says.

Roepke also points out that a diversion wouldn’t take all the water from the river. Under the terms of the Conservation Use and Forbearance Agreement of the AWSA, New Mexico must allow minimum bypass flows. Under the law, at most, New Mexico can divert 350 cfs from the river, though the ISC has informally set that number at 150 cfs. (In addition, New Mexico cannot divert water unless there is at least 30,000 acre feet of water stored in Arizona’s San Carlos Reservoir.)

To better understand the region—and using money from that first pot of federal money—the ISC has already funded 22 different studies, including those related to hydrological models, streamflow projections, riparian health, and climate change.

Those studies are crucial to understanding the river and its future. For example, in a recent draft report to the ISC, Dr. David Gutzler, professor in the University of New Mexico’s Earth and Planetary Sciences Department, points out that the Gila is “arguably the southernmost snow-fed river” in North America. Monsoon rains augment summer flows. According to Gutzler, the flows of southwestern snow-fed rivers are expected to decrease due to the warming temperatures projected to occur over the next century. Already, the area has experienced a two-degree Fahrenheit temperature increase for January through April since the 1930s.

From 1929 through 2012, the annual average flow at the Gila gage was 155.6 cfs. According to Gutzler’s draft, by 2021-2050, the upper Gila River will see a reduction in flows of about eight percent during the peak-flow season. The timing of peak streamflow and the shape of the hydrograph will also change over the next several decades. As temperatures continue to increase, snowpack will diminish. And as cold season precipitation becomes runoff immediately—rather than accumulating as winter snowpack, then melting in the spring—spring season flows will decrease in the basin.

But Roepke isn’t worried that diminished flows in the future will affect New Mexico’s ability to divert and store water. According to his projections, even with a 30 percent reduction in flows, New Mexico would still be able to divert 9,661 acre feet annually.

During the September flooding, for instance, New Mexico could have taken out about 28,000 acre feet of water. “We’re not talking about cutting it off and taking everything like with a mainstem dam,” says Roepke. Rather, he points out that a diversion would skim water off the top of the flows.

In a follow-up email, Roepke adds that diverting, storing, and releasing water for environmental needs is “neither new nor exceptional.” Many projects, including those along the Colorado and San Juan rivers that allow spring water releases for fish spawning, are designed so dam operations help meet ecological needs. “Releasing water from storage to meet environmental needs is old hat,” he writes.

The difference with AWSA, he writes, is that the AWSA diversion and storage proposals would be designed to protect both “people and the environment.”

But the science is clear: flow alteration is the primary driver of the degradation of aquatic communities. In a 2010 paper in *Frontiers in Ecology and the Environment*, researchers assessed streamflow alterations at 2,888 monitoring sites in the US Mean annual streamflows were altered in 86 percent of those streams. According to the paper, “diminished flow magnitudes were the primary predictors of biological integrity for fish and macroinvertabrate communities.” In addition, the likelihood of impairment doubled with the increasing severity of diminished streamflows.

Since the early 1980s, biologist David Propst has worked with two endangered fish that still survive in the Gila River, the loach minnow and the spikedace. The situation is particularly serious for the spikedace, only three populations of which remain, says Propst. And they’ve become increasingly rare in the stretch of the river through the Cliff-Gila Valley, a place that was once a stronghold for the fish. In August 2012, following the Whitewater Baldy Fire, biologists sampled the valley and found several fish. In October 2013, the fish wasn’t found at any of the four sites it had previously populated.

Retired from the New Mexico Department of Game and Fish, Propst remains involved with fish studies in the area. He says there are better solutions to keeping water in the stretch of the Gila that dries in the summer “If the State Engineer’s Office properly enforced diversion rights, that would reduce the drying,” he says. “They’re diverting more that they’re entitled—whether they’re doing that to maintain the head or to put on fields—and they’re diverting water all 12 months of the year.”

Taking care of the river—and serving the needs of the farmers—doesn’t require an upstream diversion and storage facility, says Propst. Rather, irrigation diversions could be better regulated and also updated to be more efficient.

He also disputes the position of the ISC that diversion and storage would be environmentally beneficially to the river and riparian habitat downstream. “I defy them to come up with one example where you have a cross-channel structure, a diversion or a dam, that does not have demonstrably negative effects on downstream flora and fauna,” he says. “They’re grabbing for straws.”

For more information:

The Interstate Stream Commission’s New Mexico Arizona Water Settlements Act website:

http://www.nmawsa.org/

"The Grant County Beat" covered the October 21, 2013 ISC AWSA public meeting in a six-part series of stories. The first part is available online at:
http://www.grantcountybeat.com/index.php/news/news-articles/12834-isc-awsa-quarterly-public-meeting-102113-part-1

Draft report by Dr. David Gutzler estimating streamflow reductions in the Upper Gila River due to climate change:
http://nmawsa.org/ongoing-work/draft-stream-flow-projections-for-the-upper-gila-river/view

December 2012 issue of Environmental Flows Bulletin:
http://uttoncenter.unm.edu/EFlows/EFlowsDec12.pdf