CLEARING THE WATERS

A quarterly newsletter by the Surface Water Quality Bureau

Volume 25, No. 4 Winter 2020/2021

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This newsletter is published quarterly by the New Mexico Environment Department's (NMED) Surface Water Quality Bureau (SWQB). Funding is provided by a Clean Water Act (CWA) §319(h) grant from the U.S. Environmental Protection Agency (EPA).

Wildlife-Friendly Fencing and Stream Restoration

By Alan Klatt, NMED SWQB - Restoration and Implementation Team

In 2019, I reached out to the New Mexico Department of Game and Fish and asked for guidance on wildlife-friendly fencing. It was recommended that I check out Colorado Parks and Wildlife "*Fencing with Wildlife in Mind*." I was warned and pass on the warning to you, this guidance includes some disturbing photos of wildlife being injured and killed by fences – hopefully this emphasizes just how important this topic is and will help prevent needless future harm. The ideal wildlife-friendly fence will use smooth wire for the top and bottom, will have a top wire at a height of 42" or less and at least 16" between the bottom wire and the ground (unless the exclosure is intended for deer and elk in which case an 8-ft tall fence may need to extend to the ground), will include an escape ramp or other exit gate, and should be visible.

Wildlife-friendly fencing is an important consideration for many stream restoration projects. During 2018 and 2019, the Surface Water Quality Bureau allocated over $2.3 million dollars towards 20 restoration projects using federal Clean Water Act Section 319 funds and state River Stewardship Program funds. Of these 20 restoration projects, 13 (or 65%) included an objective to reduce stream temperature, 17 projects (or 85%) planted riparian vegetation to increase canopy cover and shade which in addition to keeping streams cool provides many co-benefits such as reducing erosion, increasing nutrient cycling, and supporting wildlife habitat to name a few, and 10 projects (or 50%) incorporated riparian fencing. New Mexico is a fence out state which means if you want your plants to become established, there's a good chance an exclosure fence will be needed at least until the willows and cottonwoods grow taller than the grazing height of cattle and

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Aerial Imagery Comparison: Rio de las Vacas, pre and post riparian exclosure and planting project (May 2012 Top and September 2017 Bottom).

water quality standards for aquatic life (Figure 1). Nonpoint source pollution (including heat) is preliminarily attributed to unidentified sources, unmanaged or improperly managed rangeland grazing, on-site treatment systems (e.g., septic systems), drought-related impacts, wildlife other than waterfowl, and loss of riparian habitat. Exclosure fencing may not always be an appropriate management tool, but when it is necessary to increase shade and decrease water temperature for fish, it's critical that wildlife-friendly fencing be used.

Durability and maintenance concerns are also major considerations for any fencing project. A high-tensile fence (12.5-gauge wire will not elongate until 1,350 pounds) which again will reduce the likelihood of wildlife getting caught and injured. For high elevation areas that receive heavy snow, the browsing height of elk if both stressors are present.

As to why water temperature is important, it's critical to fish and other aquatic organisms because it influences their metabolism, behavior, reproduction and mortality. The amount of dissolved oxygen in water decreases as temperature increases. Endangered western native trout cannot survive in waters where maximum temperatures consistently exceed 21-22 degrees Celsius (69.8-71.6 degrees Fahrenheit) even though they may be able to tolerate brief daily periods of higher temperatures. SWQB uses several criteria to describe temperature data such as the 4T3 and the 6T3 (the temperature limit across four or six consecutive hours and three consecutive days), and of course the maximum water temperature which is likely to occur around July.

Temperature is the most common water quality impairment in New Mexico. Over 2,300 miles of streams are impacted by surface water temperatures that exceed

Figure 1: Temperature impaired streams (red lines) from the 2020 Integrated List and Report.

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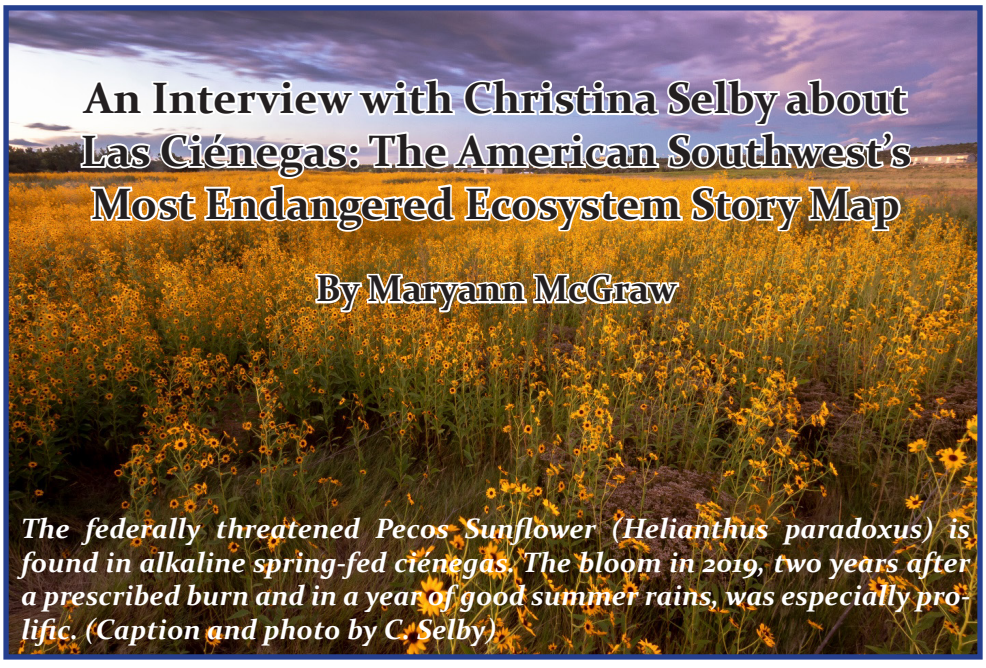
the U.S. Forest Service recommend to me that 10-12 gauge wire be used. A successful riparian fencing project will likely be a small component of a larger land use management plan or watershed-based plan and will take into account a larger ecosystem or holistic perspective that includes outreach, education, and other social, historical, and economic factors. Some additional strategies for success include allowing sufficient water gaps between exclosures to allow access to the stream, not blocking existing trails, minimizing trailing around the outside of the exclosure fence, or harden such high traffic areas against erosion using rock or brush mattresses.

For questions or more information about this or other stream restoration topics, contact Alan Klatt of NMED's Watershed Protection Section.

Photo comparison: Rio de las Vacas, pre and post riparian exclosure and planting project (April 2014 top photo and July 2016 bottom photo).



Christina Selby - Conservation Photographer and Ecologist, has created an awareness in New Mexico about the plight of Arid-Land Spring Ciénegas. Using the innovative Story Map (Esri) platform and releasing it in chapters on a weekly basis last September, the curiosity of New Mexicans and others was piqued by her intriguing story filled with her outstanding photographs of one of the American Southwest's most endangered ecosystems.

We asked Christina what motivates her to tell the stories that "enchant hearts and inspire action."

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Interview with Christina Selby continued from page 3

1. What inspired you to become a photographer of nature?

As an ecologist by degree and a naturalist at heart, I have always had a profound fascination with biodiversity and a love of the natural world. When I moved to New Mexico sixteen years ago, the diversity of wildflowers in the Rocky Mountains inspired me to get serious about photography. I wanted to learn the name of every flower, understand where they grew, how they related to and interacted with pollinators and animals, and what stories they told about their environment. I used to collect wildflowers in plant presses in order to learn about them, but the presses took up a lot of room in my little office and I didn't feel good about killing the flowers to learn their names. Taking pictures allowed me another way to take them home with me so I could pour over field guides until I identified each flower.

By the time I mastered the basics of photography, I had left the non-profit environmental education organization I co-founded and was working as a freelance science writer, publishing stories about conservation efforts for endangered species, habitats, and ecosystems. I translated the discoveries and work of conservation scientists to the general public so people could understand the science and why it was so important. About that time a new field of photography, called conservation photography, was being established by Cristina Mittermeier, who is an incredible photographer in her own right. In conservation photography taking photographs is only a small part of the work, it's what you do with them that matters most. Conservation photographers may be satisfied with taking a pretty picture and selling it to someone who will hang it on their wall. For conservation photographers, we are driven by the desire to collaborate with scientists, agencies, environmental groups, etc. to use our images to educate people about conservation issues and inspire people to take action on behalf of nature.

Today, I bring together all my skills as a conservation storyteller. I use multiple tools of narrative writing, photography, filmmaking, illustration, design, and more to translate data and facts into emotionally compelling visual stories that enchant people's hearts and inspire them into action.

2. Why New Mexico?

I originally moved here after living in Central America for three years and New Mexico felt like that Latin part of the world which I really had come to love. When I started, I would travel to faraway places to tell conservation stories. But once I had a family and kids, I wanted to work closer to home. That's when I really started to get to know the diversity of landscapes, geography, species, cultures, and therefore stories that there are to tell and need to be told here. From badlands to the Rocky Mountains to lowland deserts and everything in between, we have so much natural beauty and biodiversity, and the conservation challenges that come with it. We also have the scientists, organizations, communities, tribes, and individuals working to preserve it.

3· How did you first find out about New Mexico's wetlands and in particular what drew you to the plight of Arid-Land Spring Ciénegas?

I was aware of the issues and challenges surrounding New Mexico's wetlands having been part of the environmental non-profit scene here for over a decade. Several years ago, I attended a Northern Wetlands Roundtable where Daniela Roth gave a presentation about the Pecos sunflower in the ciénegas of Santa Rosa. She mentioned that she wanted to do a video about it as the poster child for plant conservation, and I later approached her about collaborating. I thought we would do a couple trips to the field and create a short video for the web and that would be it. But the more I talked with Daniela, the more intrigued I became. First because of the unique work she was doing to involve the community of Santa Rosa in rare plant conservation, and later, because of my firsthand experience with the ciénega.

I knew I wanted to capture the Pecos sunflower bloom on camera which happens every September and lasts only about a month. So, I worked with Daniela to set up a long-term timelapse camera on Blue Hole Ciénega

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The heavy rains of summer monsoons soak Blue Hole Ciénega Nature Preserve in Santa Rosa, New Mexico bringing dormant invertebrates to life, prompting rare and endangered plants to bloom, and attracting birds and wildlife. (Caption and photo by C. Selby)

Nature Preserve that took a photo every 15 minutes for over a year. (I later used those images to put together into a short video that shows the wave of flowers that spreads across the preserve.) This required me to make a trip to Santa Rosa every 3 weeks or so to change out the memory card in the camera. With each visit, I got to see the changes in the seasons and began to appreciate the subtle beauty of the ciénega and how important these places are to wildlife, pollinators, native plants, and even people. Each time I visited I would explore a new section of the preserve or the other properties in the area that have ciénegas. After I found out from Bob Sivinski that there were several yet unidentified or even unknown species in the springs, I began to poke around in the springs and spring runs so I could photograph them. I was amazed that there were species still unknown to science in our backyard! In my previous storytelling work I had traveled the world in search of rare biodiversity: accompanied a team of scientists on an expedition for six weeks to remote reaches of the Amazon river looking for lost species of monkeys, been to the Himalayas in search of endangered wildflowers. To learn that all along there were species still being discovered and named on the edge of a small town in New Mexico? That blew my mind. The more I learned about the ciénega habitat, the more intrigued and concerned I became about the rare and endangered plant and animal species that live there. Ciénegas are one of the most endangered ecosystems in the Southwest and I've since learned in talking with Larry Stevens of the Springs Stewardship Institute (SSI) in Arizona, that arid land spring ecosystems, of which ciénegas are one type, are likely the most endangered ecosystem in the Southwest and a conservation priority for the region. Endemic species of snails, fish, plants, etc. can live in a single spring and nowhere else in the world. To me, these places are treasures that we must take care of. We can't let them fade from the earth because we didn't know about them.

4. What appealed you to using the Story Map format for telling your story?

First of all, Esri's Story Maps are free and easy to use so anyone can build a story map, you just need to sign up for a free account. Their templates allow for various creative ways of combining narrative text, imagery, video, audio and other multimedia with maps and thus are a great way to tell the story of a place, a conservation program, a species, a scientific discovery, or whatever you are working on. As a content creator interested in educating the public on various conservation issues, the platform allows me to put together information in a creative, in depth, engaging way that you can't get across through a social media post or on a regular website. Story Maps can serve as a focal point of a conservation campaign, supplement curriculum in high school classrooms, they can be shared with decision makers to educate them on an issue or legislation that might come across their desk, or shared with potential donors to conservation causes, etc. If you have high quality content, you can make a beautiful story map that will engage people you might not otherwise reach. For me, it is one tool among many that helps get the word out and attract and grow an audience for a cause or campaign.

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5· What are your hopes for the future?

I have small hopes and big, bold hopes. I hope that for many generations to come Santa Rosans are able to continue to celebrate and treasure the Pecos sunflower, the ciénegas and all the endangered and endemic species that live right outside their back doors. I hope that they build a nature trail with interpretive signs through the nature preserve to educate locals and tourists alike about ciénegas and how important they are across the Southwest. I hope that the City uses the story map and the movie to raise funds for these efforts. I hope that the town becomes famous not only among scuba divers for Blue Hole Lake, but also for their unique and fascinating ecosystem that they are the caretakers of.

Elementary students in Santa Rosa learn about the ciénegas at the first ever "Sunflower festival." (Caption and photo by C. Selby)

My big hopes are that humans learn how to co-exist with nature. That we continue to set aside areas for nature to be wild and free in all its glory and that those places are connected by corridors that allow the free flow of wildlife and genes to stabilize biodiversity in the face of changing climate. I hope that we all start to learn and live by the concept of "enough" rather than constant and continual growth to the detriment of the other species we share this planet with. I hope we can learn to use our natural resources sustainably and leave the beauty of the earth intact for future generations to enjoy and be fortified and sustained by. I hope that my kids grow up to be thoughtful, kind, generous, ecologically intelligent, just, peaceful human beings. And I hope that we can mitigate the climate change so I can continue to be able to walk in the mountains and enjoy the gift of wildflower blooms and that those walks sustain me and give me the courage to continue to do this work on behalf of nature.

6. How can others get involved in saving Ciénegas?

In order to conserve something, we have to first name it and put it on the map. There are still many ciénegas out there that don't have a name and are not on any map; and more that we haven't studied and don't know what species they harbor. Helping with those efforts is a great way to get involved. Organizations or individuals can organize "BioBlitzes" in arid land springs and invite groups of scientists, amateur naturalists, volunteers, and photographers to document the ecosystem and all the species that can be found. Sharing those results in databases like the one the SSI has created, or UNM Heritage program, or through NMED Wetland Roundtables, can help build the data needed to understand these ecosystems and inform conservation and restoration strategies.

If you want to know more about my Saving Beauty project that raises awareness about rare plants, their unique habitats, and the endangered species that share their home, visit www.savingbeautyproject.com. We have a link to the Las Ciénegas story map on the website. Please share the link widely to get the word out about ciénegas. If you want to share it on your organization's social media, I've got a folder with images and captions ready to go I can share with you. As time and funds allow, I'll continue to post stories and videos on the website as we visit and document other arid land springs. If you have a ciénega or other arid land spring ecosystem that you would like to collaborate to document or want support and imagery for a related conservation campaign please get in touch with me at christina@christinamselby.com.

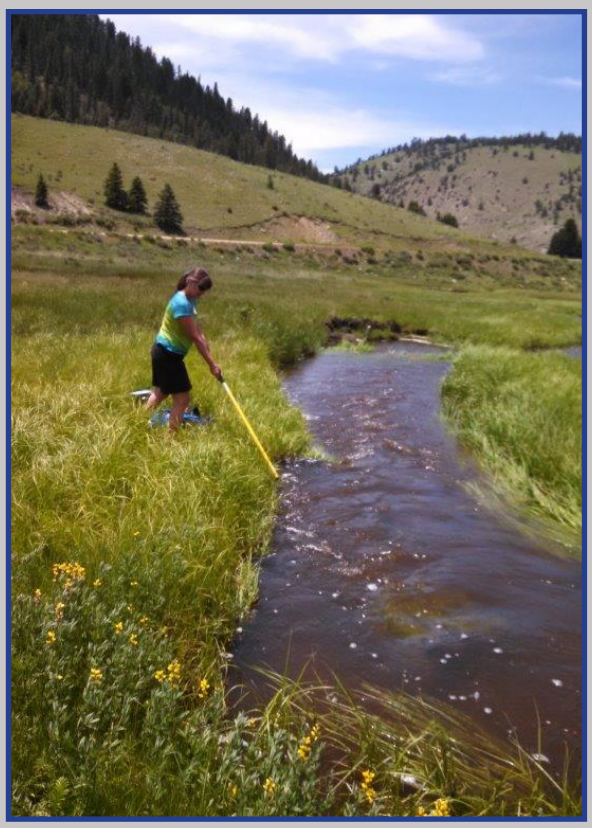
To learn more about Arid-Land Spring Ciénegas, also see Arid-Land Spring Ciénegas of New Mexico Wetlands Action Plan by Bob Sivinski at https://www.env.nm.gov/surface-water-quality/wap/.

Watershed Protection Section Staff Update

Santa Fe

Good Bye, *Meg Hennessey and Karen Menetrey*

Meg Hennessey left NMED in June, 2020 to join the Cuyahoga Soil and Water Conservation District as a Watershed Coordinator in Cleveland, Ohio. The historical tendency of the Cuyahoga River to catch fire, galvanizing passage of the Clean Water Act in 1972, was surely not lost to Meg. At NMED Meg managed Section 319 and River Stewardship Program projects, provided input on Forest Plan revisions for the Santa Fe and Carson National Forests, and provided outreach and environmental education. She quickly learned the methods and principles of project management. Her fresh perspective and passion for outreach helped the Surface Water Quality Bureau reach segments of New Mexico's population not familiar with water quality programs, including younger New Mexicans. We know Meg will bring the same level of skill and enthusiasm to her new position at the Cuyahoga SWCD.



The Surface Water Quality Bureau said good-bye to Karen Menetrey in December 2020. Karen has been an invaluable employee with SWQB since 2005. Her main duties were to manage the state funded river restoration programs under various names including River Ecosystem Restoration Initiative (RERI) and more recently the River Stewardship Program. During her time at SWQB, Karen helped bring about over 80 RERI and River Stewardship Program projects, restoring more than 130 river miles and nearly 4000 riparian acres. In addition, Karen was an excellent project officer in the Wetlands Program managing Wetlands Program Development Grants and notably organizing the New Mexico Northern Wetlands Roundtable. Karen was a keen advocate of restoring beaver habitat and beaver to their historic range. She was also a lot of fun in the field and brought wisdom and expertise to everything she did. It will be hard filling her shoes! Karen is now a Program Manager of the Remediation Oversight Section in NMED's Ground Water Quality Bureau. Good luck in your new position Karen!

Watershed Protection Section Staff Update

Santa Fe

Welcome, *Emily Toczek and Kathryn Lacey Mendoza!*

Emily Toczek joined the Watershed Protection Section in December 2020. Emily comes back to her hometown of Santa Fe from Colorado where she attended college and worked as a consultant. Emily has a geology degree from Ft. Lewis College in Durango and most recently worked for Wood Environment & Infrastructure where she directed drilling activities, installation and development of wells, monitoring for seismic activity utilizing various field instruments, operation and maintenance of subsurface remediation systems, and underground and above ground storage tank inspections, testing, and removal. She also has stormwater sampling experience and monitored one hundredand fifty different sites across the Los Alamos National Lab technical areas as an employee of TerranearPMC, LLC.

We are happy to have Emily join the WPS where she will be working on Nonpoint Source and River Stewardship planning and restoration projects as well as Clean Water Act Section 401 water quality certifications of federally-administered dredge and fill permits in NM!

Kathryn "Kate" Lacey Mendoza started in the Surface Water Quality Bureau as the new River Stewardship Program Coordinator in January 2021. Kate comes to NMED from the Albuquerque Bernalillo County Water Utility Authority where she was a Senior Water Resource Scientist. Kate's experience covers water resources management and water quality protection and included management of the Bear Canyon Aquifer Storage and Recovery project, work with the Middle Rio Grande Endangered Species Collaborative Program, and overseeing contracts within a specified budget and writing scopes of work for water resources management support, such as groundwater quality monitoring, endangered species monitoring, and habitat restoration site monitoring. Her prior positions were a Water Resource Specialist with the Albuquerque Bernalillo County Water Authority, Pathways Intern in physical science with the Cibola National Forest, a Research Assistant with UNM, and a Senior Firefighter with the U.S. Forest Service. Kate has a BS from the University of Arizona in Natural Resources with emphasis in Watershed Management and Hydrology and a Master's of Water Resources degree with focus in Hydroscience from the University of New Mexico.

Please welcome Kate to the Watershed Protection Section!

Updates from The SWQB Monitoring, Assessment and Standards Section

Monitoring Team News

The monitoring team is working on Field Sampling Plans for the next two survey years. In 2021-22, they will move on to the Jemez, Lower Pecos, Rio Puerco, Rio San Jose and Little Colorado watersheds. Stakeholder outreach will start in February 2021.

A new report, titled "*Calibration of Biological Condition Gradient Models for Fish and Macroinvertebrates in Sandy-bottom Rivers in the Southwestern U.S.*," has been completed by Tetra Tech consulting firm for the EPA. The report describes the development of a pair of models for evaluating the biological condition of sandy-bottom rivers in the southwestern U.S. Assessments of biological conditions often rely on a reference condition approach. However, rivers are often subject to cumulative environmental degradation associated with intensive human activities that occur in large river valleys. Assessments might then be comparisons to reference conditions that do not represent natural biological integrity, but instead represent a shifted baseline. The biological condition gradient framework describes a standard scale of biological integrity that is independent of observed "best current" conditions. Starting with data sets from New Mexico, fish and macroinvertebrate sample data were reviewed by expert panels and assigned to one of six levels along a biological condition gradient. Predictive decision models were developed that could replicate the expert decisions through application of a series of quantitative rules. The models assigned samples to the same levels assigned by the experts with good agreement for both fish and macroinvertebrate assemblages. Sample data from comparable river systems in a broader southwestern region were then used to validate the model. Model predictions were never more than one level different than the expert assignments. At the end of the model calibration and validation process, the experts were confident that the two models could be used in other assessments of sandy-bottom southwestern U.S. rivers. The report is available under "What's New" at https://www.env.nm.gov/surface-water-quality

Water Quality Standards Team News

A review of the Water Quality Standards on a three-year basis is required by Section 303(c) of the federal Clean Water Act. The public comment period on NMED's proposed amendments to the Standards was extended to January 6, 2021, with virtual public meetings on November 12 and 16. Although public comment has closed, the Public Comment Draft of the proposed amendments is still posted on the SWQB website. The WQCC has scheduled a Triennial Review hearing for July 13-16, 2021.

The 2020 SWQB Water Quality Management Plan/Continuing Planning Process was approved by the EPA on October 23. The WQMP/CPP is available at https://www.env.nm.gov/surface-water-quality/wqmp-cpp/.

A third-party petition to designate the upper Pecos River, including its tributaries and associated wetlands, as Outstanding National Resource Waters has a scheduled hearing on April 13, 2020 before the WQCC. This hearing is open to the public. More information about WQCC meetings is on line at https://www.env.nm.gov/water-quality-control-commission/wqcc/.

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TMDL/Assessment Team News

The Clean Water Act *§303(d)/§305(b) 2020-2022 Integrated Report* was approved by the New Mexico Water Quality Control Commission (WQCC) on December 8, 2020, and by EPA on January 22, 2021 . The *Integrated Report* is a statewide document, and most new water quality assessments in this edition are in the Upper Rio Grande and San Juan River watersheds.

EPA Region 6 has approved *E. coli*, sedimentation, and temperature Total Maximum Daily Loads (TMDLs) for eight stream reaches in the Rio Chama watershed. TMDLs describe stream impairments and pollution reduction targets needed to meet water quality standards. TMDLs can lead to new or revised National Pollutant Discharge Elimination System permit limits and inform stakeholder and watershed planning and restoration efforts.

SWQB is preparing TMDLs for plant nutrients in Bluewater Lake if approved, these will be the first TMDLs for a lake in New Mexico. A separate report will establish TMDLs for dissolved arsenic, specific conductance, temperature and turbidity, for five stream reaches in the Jemez River watershed. Public comment periods and meetings will be scheduled in February and March for these projects.

EVENTS & ANNOUNCEMENTS

February

February 12th - 14th - Santa Fe. 15th Annual Love Your River Day. Join Santa Fe Watershed Association, any time and all day, for our now socially-distanced annual Valentine's Day cleanup event for the Santa Fe River and arroyos! Show the watershed some extra love this season by sending SFWA a "valentine" for the River, via email or snail mail. Register at the link below for a chance to win great prizes, thanks to our wonderful sponsors! Because of COVID-19, our stewards and volunteers haven't been able to get out and collect trash along the river and arroyos as much as usual, so your help is even more appreciated! We ask that you please wear your face mask, gloves, and practice social distancing as recommended by the CDC. Please email us photos, number of volunteers, number of trash bags collected, and how much time you spent along the river/arroyos. Be sure to send us pictures of red rocks you find to be entered in our raffle again! More information about this event can be found; https://www.santafewatershed.org/event/15th-annual-love-your-river-day/.

February 27 - March 2nd, 10th, and 13th - Virtually. *Rio Chama Watershed Congreso 2021: Our United Watershed*, by San Juan Chama Watershed Partnership. Welcome everyone! The Congreso concept is that collaborative decision-making can combine local knowledge with scientific management to sustain indigenous cultures, provide educational and economic opportunity for young residents and protect our resources. Our sixth annual Rio Chama Watershed Partnership Congreso is being held virtually through four 2-hour long sessions, across a period of two weeks. This year's theme is focused on "*Uniting our Watershed*" and the Partnership has invited local landowners, state and federal agency representatives, business owners, students, and educators young and old, to share with us their experiences in our shared landscape.

The four sessions are as follows:

- Stewards of the Uplands - February 27th 10AM - 12PM
- Valuing Rivers - March 2nd 1PM - 3PM
- Next Generation Water Keepers - March 10th 1PM - 3PM
- Moving Our Work Onward - March 13 10AM - 12PM

For our most current agenda of events as well as detailed session and presentation information, please visit Congreso 2020's landing page at : https://www.sanjuanchama.org/rio-chama-congreso-2021. Registration information will be provided in your registration confirmation email.

Save the Date - April

April 16th-18th; April 23rd-25th - Rio Mora National Wildlife Refuge. The Albuquerque Wildlife Federation is excited to announce their tentative 2021 schedule of ecological restoration volunteer service projects will start in April. The first project will focus on assisting the managers of the Rio Mora National Wildlife Refuge with developing an interpretive trail for the public. We are holding two dates for this project in order to allow us to break the work groups into smaller parties if needed to comply with public health orders, as well as to hedge against the possibility of bad weather. So we may hold projects on one of both of these weekends in April. Please note that all of project dates and locations are subject to change or cancellation based on public health restrictions and the needs of our partner groups. More details will be posted at www.abq.nmwildlife.org/projects.html as the project gets closer.

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