



# MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM

## August 2022 Newsletter

### WHEN IT RAINS, IT POURS: SCALING THE UNCERTAINTY OF THE NORTH AMERICAN MONSOON

Provided by Catherine Murphy, Program Support Team (PST)

When residents of the southwestern United States reflect on the monsoon, they frequently use adjectives like “magical” and “tempestuous,” as if they are describing a treasured, if somewhat unreliable, old friend (Buono 2021). Associations of the monsoon with cherished childhood memories of dancing in the rain or epic tales of flash floods are often invoked. Many also characterize the onset of monsoon season in terms of a sensory experience, such as the sudden heaviness of humid air, the drumbeat of raindrops on a roof, or the earthy aroma of rain on dry soil, known as petrichor (Gilger 2021). This visceral, and sometimes spiritual, relationship with the highly variable meteorological phenomenon that is responsible for more than half of the annual precipitation in the Southwest might explain why its uncertainty is commonly portrayed in biblical terms, such as “feast or famine.” The uncertainties around the timing, amount, and location of monsoon precipitation, as well as the complex interactions of factors that influence each, have largely precluded a strong role for monsoons in forecasting for water resource planning and management (Grantz 2007). Concurrently, planning in the face of water scarcity is especially important for managers in the Middle Rio Grande (MRG) as monsoon precipitation becomes even more variable and less dependable with climate change. Given their difficulties planning under monsoon conditions while facing complex challenges such as allocating increasingly scarce resources and managing for multiple stakeholders, the common joke among MRG managers is to “pray for rain.”

Technically, a monsoon is a seasonal change in the direction of the prevailing winds of a region. During the North American Monsoon, the summer sun heats the continental land mass and forms an area of high pressure over the Southwest. This region of high pressure shifts the prevailing winds from westerly to southerly, drawing moisture from the Gulf of California, eastern Pacific Ocean and the Gulf of Mexico (Adams and Comrie 1997). As the moist air moves over the warm land surface, convective storms develop and generally follow a daily pattern of dry mornings and rainy afternoons. In New Mexico, monsoon precipitation often occurs in spates of rainy days interrupted by periods of drier weather (Becker 2021). New Mexico's monsoon season officially runs from June 15 to September 30, marking the end of the hydrological water year, which tracks precipitation beginning on October 1.

*Continued on pg 2*

### FEATURED THIS ISSUE:

- ◆ Uncertainty of Monsoons Article
- ◆ Ecological Disturbance Photo Contest
- ◆ What's Happening in the MRG?
- ◆ MRG Announcements
- ◆ Recent Publications
- ◆ Admin & Science Updates
- ◆ New Member
- ◆ Upcoming Dates



Congratulations Matthew Schmader, the winner of the Ecological Disturbance Photo Contest! More info on pg 4.

# UNCERTAINTY OF MONSOONS ARTICLE CONT.

Influences on the timing, strength and location of monsoon precipitation operate at different spatial scales, but not independently of one another. At the large synoptic scale, factors such as Hadley circulation and the El Niño Southern Oscillation affect the supply of moisture to the North American Monsoon indirectly via their influence on Pacific tropical storms and the position of the subtropical ridge (Zhang and Wang 2015). Pacific sea surface temperatures, however, modulate the land-ocean temperature gradient, which more directly determines the timing and strength of the monsoon (Grantz et al. 2007, Wang et al. 2020). An inverse relationship of drier winters leading to wetter summers in New Mexico is well-documented in the literature, but causal mechanisms are varied and not completely understood (Higgins et al. 1998, Grantz et al. 2007, Woodhouse and Udall 2022). At the mesoscale, features such as local topography, vegetation dynamics and soil moisture hydrology can generate complex seasonal land-atmosphere feedbacks (Woodhouse and Udall 2022). The strength of these feedbacks, also known as precipitation recycling, in the Southwest suggests that improving the accuracy of evapotranspiration estimates also may improve monsoon precipitation forecasts (Bohn and Vivoni 2016).



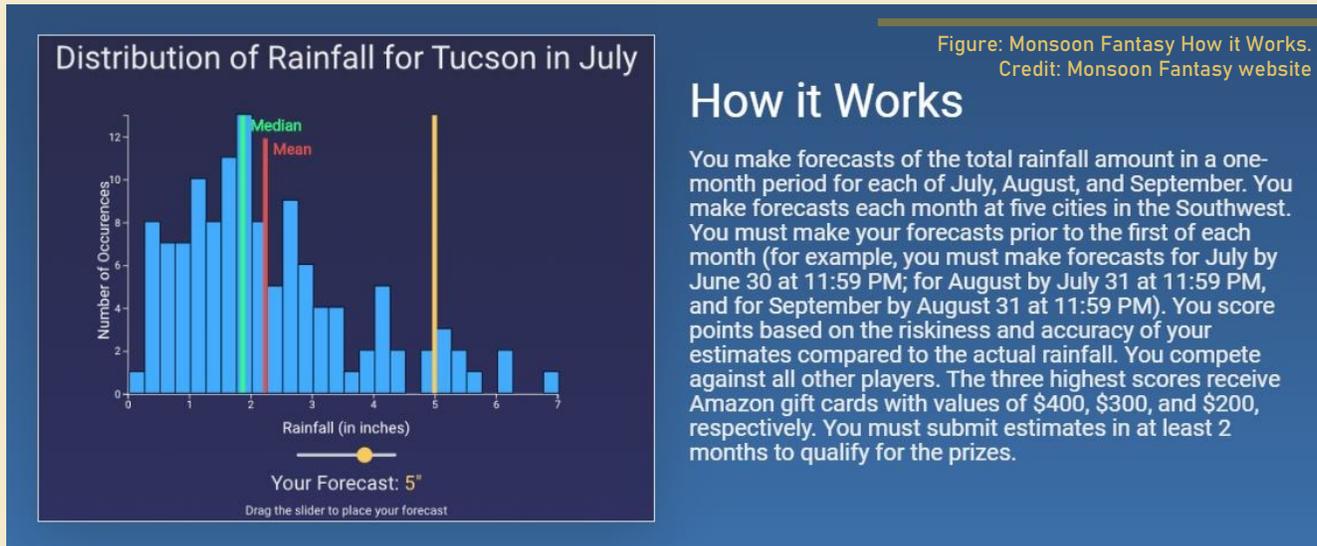
Photo: Monsoon thunderstorms west of Albuquerque, New Mexico.  
Credit: Todd Shoemake, available at <https://flic.kr/p/fyEVqv>

Given these different spatial scales of influence, it follows that precipitation in the North American Monsoon also varies on different temporal scales, including interdecadal, interannual, seasonal, and diurnal. Each factor operating at a particular spatiotemporal scale involves a unique type and amount of uncertainty. The implications of these uncertainties on water management impact everything from scenario planning to day-to-day operations. Accounting for greater than 50% of annual precipitation, monsoon rains affect the need for and amount of irrigation and environmental releases throughout the season, which in turn influence storage and, ultimately, downstream deliveries. Despite the difficulties of predicting when, where, and how much rain will fall locally, management of increasingly scarce water resources would benefit greatly from improved long-lead, synoptic scale forecasts (such as antecedent land and ocean conditions; Grantz et al. 2007), as well as improved shorter-term, mesoscale models (such as evapotranspiration-precipitation dynamics; Bohn and Vivoni 2016). In the future, characterizing uncertainties for various planning and forecasting needs at the appropriate spatial and temporal scales might strengthen the role of the monsoons in our approach to adaptive management.

*Continued on pg 3*

# UNCERTAINTY OF MONSOONS ARTICLE CONT.

For all those motivated by the thrill of competition, check out the Arizona Institute for Resilience “Southwest Monsoon Fantasy Forecasts” game, in which players use their experience to make monsoon forecasts for five major cities in the Southwest Monsoon region, score points from July to September, and compete with other players for monetary prizes (<https://monsoonfantasy.arizona.edu/home>).



## REFERENCES

- Adams, D. and A. Comrie. 1997. The North American Monsoon. *Bulletin of the American Meteorological Society* 78(10), 2197–2214.
- Becker, E. 2021. *The North American Monsoon*. ENSO Blog, Published 26 August 2021. <https://www.climate.gov/news-features/blogs/enso/north-american-monsoon>.
- Bohn, T. J., and Vivoni, E. R. 2016. Process-based characterization of evapotranspiration sources over the North American monsoon region. *Water Resources Research*, 52, 358–384. doi:10.1002/2015WR017934.
- Buono, P. 2021. “We Are Rivers” podcast. *Episode 41: Gushing Over the Monsoon*. American Rivers. 17 September 2021. <https://soundcloud.com/user-51615419-679542510/gushing-over-the-monsoon>.
- Gilger, L. 2021. “Arizona Monsoon Stories” podcast. *Bonus Episode: A Marker In Our Memories*. KJZZ.org. 24 September 2021. <https://media.kjzz.org/s3fs-public/podcast/MonsoonVMepisode-pod.mp3?uuid=630926afa6859>.
- Grantz, K. 2007. *Interannual variability of the North American Monsoon hydroclimate and application to water management in the Pecos River Basin* [Doctoral dissertation]. University of Colorado, Department of Civil, Environmental and Architectural Engineering.
- Grantz, K., Rajagopalan, B., Clark, M., & Zagana, E. 2007. Seasonal Shifts in the North American Monsoon. *Journal of Climate*, 20 (9), 1923–1935. <https://journals.ametsoc.org/view/journals/clim/20/9/jcli4091.1.xml>.
- Higgins, R. W., Mo, K. C., & Yao, Y. 1998. Interannual Variability of the U.S. Summer Precipitation Regime with Emphasis on the Southwestern Monsoon. *Journal of Climate*, 11(10), 2582–2606. <http://www.jstor.org/stable/26244217>
- Wang, B., Biasutti, M., Byrne, M. P., Castro, C., Chang, C., Cook, K., Fu, R., Grimm, A. M., Ha, K., Hendon, H., Kitoh, A., Krishnan, R., Lee, J., Li, J., Liu, J., Moise, A., Pascale, S., Roxy, M. K., Seth, A., Sui, C., Turner, A., Yang, S., Yun, K., Zhang, L., and Zhou, T. 2021. Monsoons Climate Change Assessment. *Bulletin of the American Meteorological Society*, 102(1), E1–E19. <https://journals.ametsoc.org/view/journals/bams/102/1/BAMS-D-19-0335.1.xml>.
- Woodhouse, C. A., and Udall, B. 2022. Upper Gila, Salt, and Verde Rivers: Arid Land Rivers in a Changing Climate. *Earth Interactions*, 26(1), 1–14. <https://journals.ametsoc.org/view/journals/eint/26/1/EI-D-21-0014.1.xml>
- Zhang, G., and Wang, Z. 2015, Interannual variability of tropical cyclone activity and regional Hadley circulation over the Northeastern Pacific. *Geophysical Research Letters*, 42, 2473– 2481. doi: 10.1002/2015GL063318.

# ECOLOGICAL DISTURBANCE PHOTO CONTEST

Collaborative Program photographers were invited to join in a photo contest with the theme of “*Ecological Disturbance in the MRG*,” and a winner has been chosen! The winning photo was taken by *Matthew Schmader* from the University of New Mexico. The photo, titled “*Chevy Levee*,” depicts a car exposed on the west side of the river north of I-40 after the June 2004 wildfires in Albuquerque. The photo will be featured on the front page of the Program Portal (<https://webapps.usgs.gov/MRGESCP/>).



# WHAT'S HAPPENING IN THE MRG?

Find out what's happening in MRG, including a recent Bosque Burn Site Task Force meeting, upcoming events and funding opportunities, and recent publications.

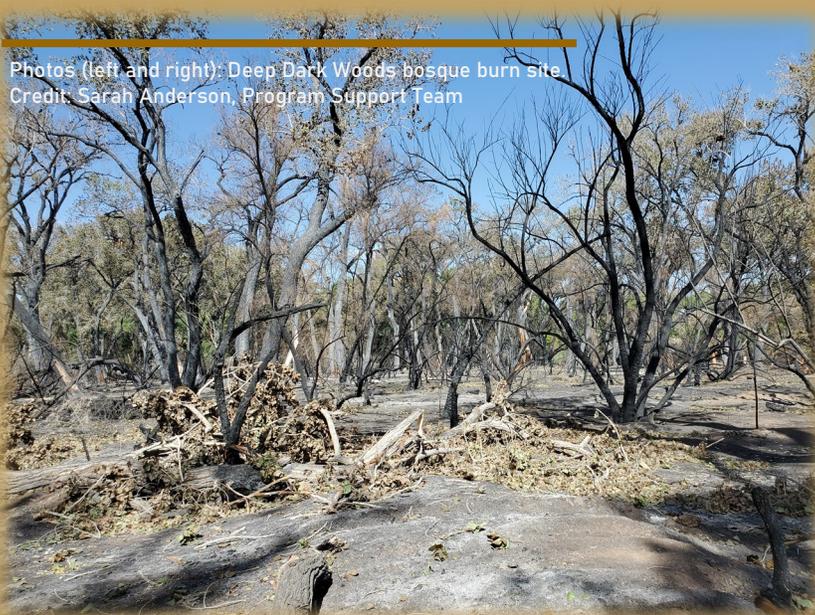
## BOSQUE BURN SITE TASK FORCE

In response to the May 25, 2022 human-caused wildfire that burned approximately 30 acres of the bosque ecosystem behind the Bosque School in Albuquerque, a task force of interested stakeholders met on **June 30, 2022** to discuss management implications and options for restoring this area post-fire. The purpose of the **Bosque Burn Site Task Force** meeting was to better understand both the social and ecological implications of the fire in this high-use recreational area and to generate ideas for how to move forward. Given the public attention the area garners, it was important for meeting attendees to consider public safety, long-term ecological implications, and social perception as part of a holistic approach to restoration.

Ideas generated as part of this meeting are already being implemented including data collection to better understand the unstable post-fire conditions and regeneration of both native and invasive species, as well as steps taken to address public perception and safety. Students at the Bosque School created videos linked to posted QR codes in and near the site to educate the public of the dangers associated with post fire areas that have many dead and dying cottonwood snags. Still more ideas were generated at this meeting that addressed soil health, topography, regaining vegetative diversity, and controlling invasive species. Aspects of these ideas will be implemented at the site in the future.

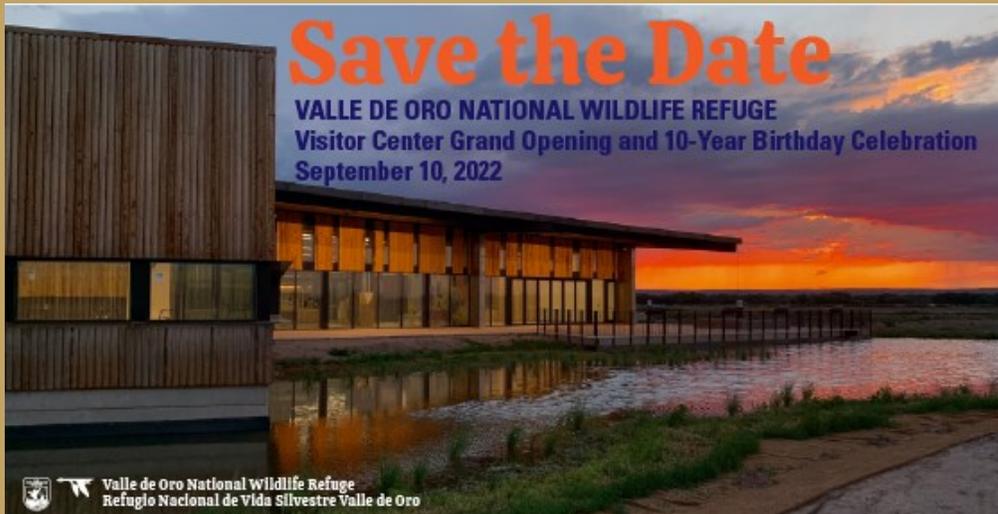
More information about this fire is included in the write-up on **Collaborative Seminar: Post May 2022 Montañño Fire Analysis** on page 9. A recording of the seminar is linked on the front page banner of the Program Portal (<https://webapps.usgs.gov/MRGESCP/>).

*Continued on pg 6*

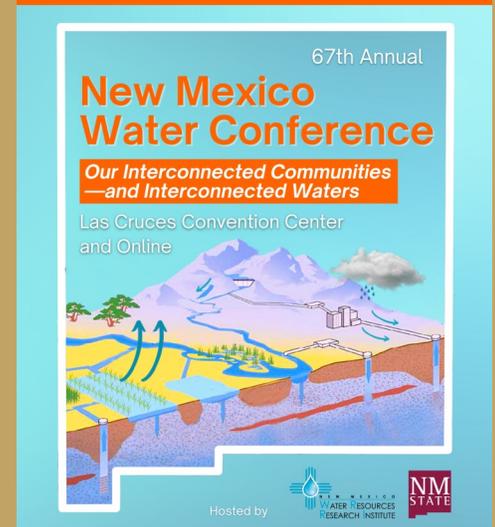


Photos (left and right): Deep Dark Woods bosque burn site  
Credit: Sarah Anderson, Program Support Team

# WHAT'S HAPPENING IN THE MRG? CONT.



SAVE THE DATE!  
October 26-27, 2022



## MRG ANNOUNCEMENTS

### — EVENTS —

- Save the date for the [67th Annual New Mexico Water Conference](#) on [October 26–27, 2022](#) to take place at the Las Cruces Convention Center and online. This year, the theme is [Our Interconnected Communities—and Interconnected Waters](#). The event will be hosted by the New Mexico Water Resources Research Institute and New Mexico State. More information will be available at <https://nmwrri.nmsu.edu/>
- The [grand opening of the new refuge visitor center](#) and [10th birthday of the Valle de Oro National Wildlife Refuge \(NWR\)](#) is happening on [September 10, 2022](#), time TBA! Join the fun and enjoy exhibits, music, and refreshments!
- The [MRG Urban Waters quarterly meeting](#) will be held on [September 13, 2022](#) at 1:30—3:00 PM MT. Contact Jaren Peplinski at [ciudad.peplinski@gmail.com](mailto:ciudad.peplinski@gmail.com) for more information and the virtual meeting link.

### — FUNDING OPPORTUNITIES —

- The New Mexico Forestry Division selects high-priority forest and watershed restoration projects each year to receive funding made available through the [Forest and Watershed Restoration Act \(FAWRA\)](#). The project proposals are reviewed based on their public benefits, including water source protection, wildfire risk reduction, and fish and wildlife habitat conservation. More information on FAWRA can be found at [www.emnrd.nm.gov/sfd/forest-and-watershed-restoration-act-fawra/](http://www.emnrd.nm.gov/sfd/forest-and-watershed-restoration-act-fawra/)
- The U.S. Fish and Wildlife Service has a variety of programs engaging diverse youth in wildlife conservation and public land management. Under this grant opportunity, the award floor is \$2,000 and the ceiling is \$2 million. The application submission deadline is [September 15, 2022](#). Apply at [www.grants.gov/web/grants/view-opportunity.html?oppld=336983](http://www.grants.gov/web/grants/view-opportunity.html?oppld=336983)

*Continued on pg 7*

# WHAT'S HAPPENING IN THE MRG? CONT.

## RECENT PUBLICATIONS

### [Final Rio Grande Silvery Minnow Annual Augmentation Plan 2023-2028.](#)

Archdeacon T. (2022). Prepared by U.S. Fish and Wildlife Service, New Mexico Fish and Wildlife Conservation Office. <https://tinyurl.com/mt9he62k>

### [Rio Grande Silvery Minnow Population Monitoring During May 2022.](#)

Dudley R.K., Platania S.P., White G.C. (2022). Prepared for U.S. Bureau of Reclamation. <https://tinyurl.com/45xf3xpn>

### [Southwestern Willow Flycatcher Breeding Habitat Suitability, 2021.](#)

Siegle R., Moore D. (2022). Prepared by Bureau of Reclamation, Technical Service Center, Denver, Colorado. Prepared for Bureau of Reclamation Albuquerque Area Office. <https://tinyurl.com/y37wtpbs>

### [Techniques for Developing Bars and Islands in Incising Channels.](#)

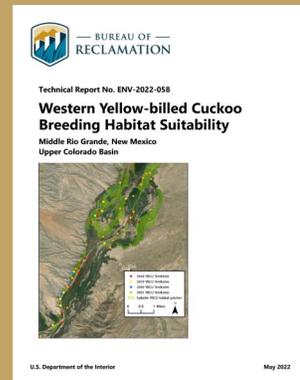
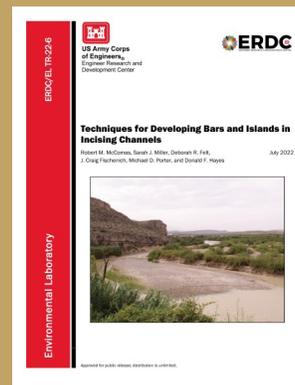
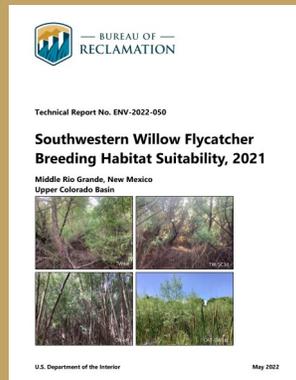
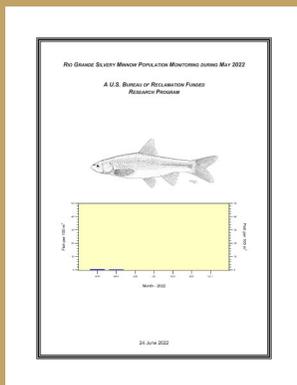
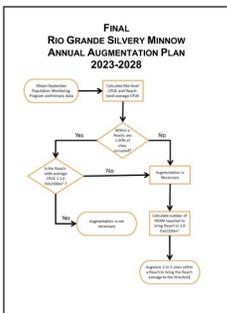
McComas R.M., Miller S.J., Felt D.R., Fischenich J.C., Porter M.D., Hayes D.F. (2022). Report prepared for Environmental Laboratory Ecosystem Management and Restoration Research Program and U.S. Army Corps of Engineer, Albuquerque District. <http://dx.doi.org/10.21079/11681/44720>

#### Abstract:

Sandbars and islands provide important nesting and foraging habitat for birds (including listed species) and shallow water habitat for many aquatic species in riverine ecosystems. In-stream habitat is especially important in incised channels lacking floodplain connectivity, with channel bars providing important riparian habitat. However, some river management practices significantly alter and sometime eventually eliminate these important habitats. Several U.S. Army Corps of Engineers districts are planning or actively building instream bars and islands using flow management and/or instream structures. Sister agencies (e.g., U.S. Bureau of Reclamation) have similar initiatives downstream of their reservoir structures. This report outlines considerations for establishing and managing sandbar and island features. It presents a compilation of proven techniques for promoting sandbar and island development and for reducing erosion of these features.

### [Western Yellow-Billed Cuckoo Breeding Habitat Suitability.](#)

Siegle R., Moore D. (2022). Prepared by Bureau of Reclamation, Technical Service Center, Denver, Colorado. <https://tinyurl.com/4bk2t8d7>



## — SAVE THE DATES —

- The [Portal Stakeholder Meeting](#) will be held virtually on **September 22, 2022 from 1:00—4:00 PM MT**. The Program Portal (<https://webapps.usgs.gov/MRGESCP/>) is the Collaborative Program's website and serves as an event calendar, data mapper, document library, administrative record, and clearinghouse for data and information related to endangered species. The Program Portal has been updated over the last few years, and it's time to show off the current functionalities and get your feedback to help make future improvements!
- Save the date for the [Management of Vegetated Islands and Bank-Attached Bars Workshop](#) on **October 4-5, 2022**. The issue of managing vegetated islands and bars has been repeatedly raised by Collaborative Program members, and is highly important in the MRG today. Participants will discuss these vegetated islands and bars and develop recommendations on management strategies for different management goals. Exact times of the workshop are yet to be determined. The final schedule will be provided at a later time. The event is currently planned to be in-person, but we will move to virtual if needed.
- Save the date for the [2022 Collaboratory](#) on **December 6-7, 2022**. Exact times are yet to be determined. The final schedule will be provided at a later time. The event is currently planned to be in-person, but we will move to virtual if needed. The objectives of the Collaboratory are listed below:
  - ◇ Summarize and communicate scientific findings
  - ◇ Define management priorities for the next two years
  - ◇ Increase the management relevance of the Collaborative Program
  - ◇ Integrate the efforts of the Collaborative Program and individual signatories to better inform adaptive management

## — COLLABORATIVE SEMINARS —

### [Post May 2022 Montaña Fire Analysis \(A.K.A “Deep Dark Woods Fire”\)](#)

Katia Chavez, Rayne McCollough, and Dan Shaw, Goodman Project/Black Institute, Bosque School Science Department — August 11, 2022

Link: <https://youtu.be/XMUeqfXxvGg>

The alterations of New Mexico's landscapes left in the wake of the 2022 wild fires will serve as stark reminders of the powerful impacts of fire for many years to come. However, Katia Chavez, Rayne McCollough, and Dan Shaw gave their audience hopeful encouragement with an engaging and paradoxical look into the tragedy, dangers, and signs of life that are emerging in the aftermath of the 2022 Montaña Fire, just two months post-fire.

The human-caused Montaña fire began on May 25, 2022, and burned about 30 acres of bosque total within the City of Albuquerque. The seminar was specific to the fire where it burned on the west side of the river, which includes about 20 acres. The fire occurred within a popular recreational area managed by the City of Albuquerque's Open Space Division. One of the burn sites is near the Bosque School and within an area affectionately referred to as the “Deep Dark woods” — a uniquely adapted cathedral-like, cottonwood-dominated feature of the riparian corridor located on the west side of the Rio Grande floodplain.

*Continued on pg 9*

## — COLLABORATIVE SEMINARS CONT. —

### [Post May 2022 Montaña Fire Analysis \(A.K.A “Deep Dark Woods Fire”\) Cont.](#)

With public safety being at the forefront of post-fire management concerns, the presenters told the story of a clever public engagement strategy involving the Bosque School and Horizons Albuquerque Middle School students, who designed hand-crafted signs to alert the public to Open Space’s new regulation restricting entry to the burn site. Each sign included a QR Code link to an entertaining yet poignant public safety awareness video (hosted, written, & directed by Donny Kelley-Currens) regarding the post-fire dangers associated with the unstable, charred remains of the standing dead and dying cottonwood snags.

The second half of the presentation focused on the impetus for the post-fire analysis: to better understand the potential for the bosque system to adaptively “shift” from a historically-driven flood disturbance regime to one driven by fire. The presenters summarized the state of bosque fire science, fire behavior and consequences, and the study findings regarding cottonwood regeneration, competition, and stand recovery from observations in the Deep Dark Woods. Katia, Rayne, and Dan recommended post-fire management practices on safety and education, as well as several proactive, scientifically based practices to ameliorate competition from invasive exotic plant species in order to enhance bosque system adaptation to and recovery from fire.

### [2021 RGSM Population Monitoring](#)

Robert K. Dudley, American Southwest Ichthyological Researchers (ASIR) and the Museum of Southwestern Biology at the University of New Mexico — August 23, 2022

Link: <https://youtu.be/6hMCDZ72mrY>

Robert K. Dudley provided an update on the 2021 Rio Grande silvery minnow (RGSM) Population Monitoring Program (PMP). Dr. Dudley started with a history of the PMP, and included comparisons to the Population Estimation Program and ongoing occupancy modeling. He also reviewed the RGSM life history and how closely each stage is timed to the historical hydrograph.

Dr. Dudley then summarized the population monitoring analyses through 2021, as well as preliminary 2022 results. He noted that in 2021 and 2022, the timing of the hydrograph runoff peak does not align with historical means, with a noticeable shift to earlier spring runoff in 2022. The 2022 monitoring data are showing very low recruitment, which can forecast a low October census number. Looking at the 2022 data in context of the long-term trends, 2022 abundance is lower compared to other years. Mesohabitat-specific density trends continue to track the overall trend, and backwaters remain dominant among habitats. Mixed model results from the PMP indicate that the sampling design appropriately captures changes in density over time, and that inclusion of additional sites does improve precision of the estimate slightly. Combining this sampling scheme with the consecutive-days occupancy sampling each November helps to overcome some of the issues associated with patchy RGSM distribution, especially at very low flows. Dr. Dudley’s takeaway points included:

- Ongoing efforts to restore dynamic river flows, reconnect fragmented reaches, and reestablish a functional floodplain should help to support resilient and self-sustaining populations of RGSM
- Continued efforts to provide reasonable spring spawning and summer survival conditions will be essential for securing a self-sustaining wild population of RGSM in the MRG
- Reestablishing resilient RGSM populations at other locations within the historical range would help substantially to ensure its long-term persistence in the wild
- Continued study of the key factors that regulate this complex aquatic ecosystem would be essential for developing and implementing successful strategies for long-term recovery of RGSM

# NEW MEMBER AND UPCOMING DATES

## UPCOMING MEETINGS

**Executive Committee Meeting**  
September 8, 2022  
9:00 AM—12:00 PM MT

**RGSM Hypotheses Development  
Ad Hoc Meeting**  
September 20, 2022  
1:00 PM—2:30 PM MT

**Portal Stakeholder Meeting**  
September 22, 2022  
1:00 PM—4:00 PM MT

**Management of Vegetated  
Islands and Bank-Attached Bars  
Workshop**  
October 4–5, 2022

**Science and Adaptive  
Management Committee Meeting**  
November 8, 2022  
8:00 AM—12:00 PM MT

**2022 Collaboratory**  
December 6–7, 2022

## MRG EVENTS

**Valle de Oro NWR Grand Opening**  
September 10, 2022

**MRG Urban Waters Quarterly  
Meeting**  
September 13, 2022  
1:00 PM—3:00 PM MT

**New Mexico Water Conference**  
October 26–27 2022

## WELCOME LTC JERRE HANSBROUGH!



On July 7, 2022, Lieutenant Colonel (LTC) [Jerre Hansbrough](#) (pictured left) assumed command of the U.S. Army Corps of Engineers (USACE) Albuquerque District, which serves more than 200,000 square miles of the Southwestern USA by providing comprehensive engineering, construction, regulatory, environmental, and emergency response support. The district includes nine USACE dams, four major military installations, and

nearly 200 miles of the Rio Grande. As a result of his new command, LTC Hansbrough relieved Patrick Stevens as the [USACE representative on the Executive Committee](#).

LTC Hansbrough is from Canton, Ohio. He graduated from the United States Military Academy at West Point in 2004 with a Bachelor of Science Degree in Chemistry and Life Science and commissioned into the Corps of Engineers. He earned a Master of Science degree in Civil Engineering from the University of Hawai'i.

Prior to his current assignment, LTC Hansbrough was the Theater Exercises Branch Chief at U.S. Indo-Pacific Command, Camp H.M. Smith, Hawaii. and served as an Army Fellow at the Asia Pacific Center for Security Studies, Honolulu, Hawaii, with emphasis on global infrastructure development.

Credit: Mike Marcus, MRG Water Advocates

The information in this newsletter should not be attributed to the Collaborative Program or its Executive Committee, but to the organization from which it was submitted.

For comments and inquiries, contact:

Program Support Team | (307) 630-6961 |

[mtuineau@west-inc.com](mailto:mtuineau@west-inc.com)