

# NEVADA WATER NEWS

WRITTEN AND COMPILED BY: NICOLE DAMON  
DESIGNED BY: LORI FULTON

## PROJECT SPOTLIGHT

### “How Do Forest Treatments Affect Water Quantity in the Truckee Watershed?”

This project is funded through the United States Geological Survey Water Resources Research 104(b) grant made available to each Water Resources Research Institute.



Bridge over the Truckee River in Reno, NV.

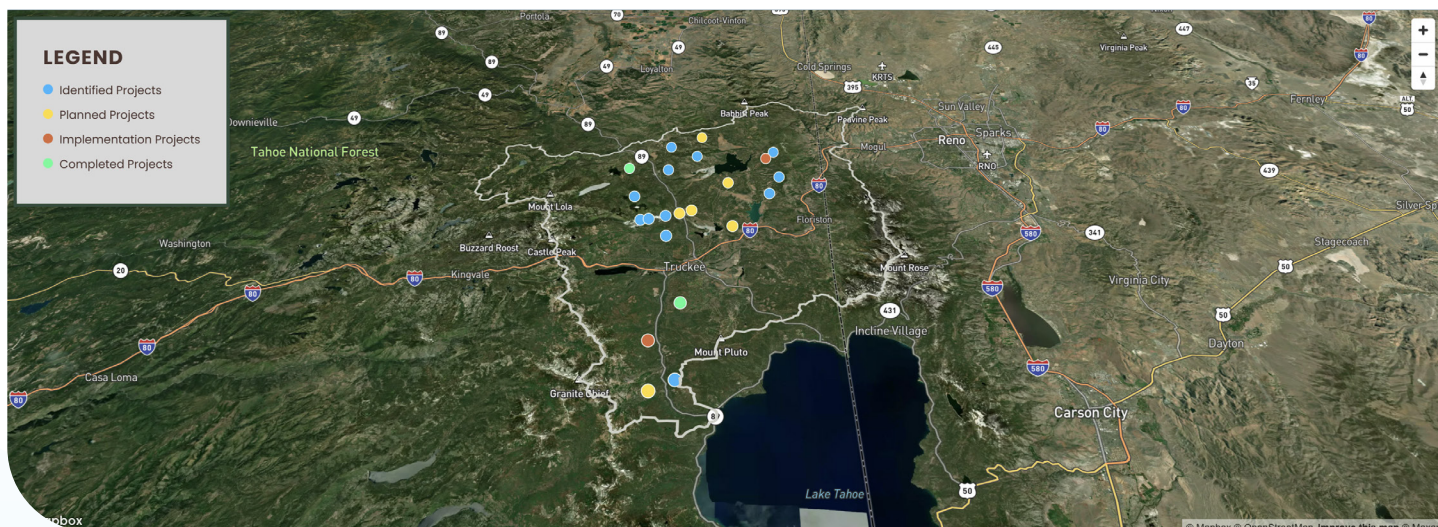
Snowpack in forested mountains is the primary source of water for the Truckee River, which supplies northern Nevada communities with drinking water. With increased drought and wildfire in these areas, watershed managers often use forest management treatments such as logging and prescribed fires to reduce the risk of wildfire and protect water infrastructure. However, it is currently unclear how these treatments could affect water resources in the treated areas. Although these techniques help reduce fuel to prevent wildfires, they may also make it harder for water to seep into the ground or enter streams. Conversely, thinned forests generally need less water, and may leave more water available for streamflow. To ensure reliable water supplies, water and land managers need to better understand and predict the effects of forest management on water resources.

*Continued on page 2*

## IN THIS ISSUE

“How Do Forest Treatments Affect Water Quantity in the Truckee Watershed?” .....	1
NWRI Program Announcements .....	4
NWRI Student Interview: Sara Zeitoun .....	5
NWRI Internship Interview: Kiana Fullmore .....	7
NWRI Internship Interview: Lauren Keyashian .....	8
NWRI Internship Interview: Heather Crawley .....	9
Events .....	10
Contacts .....	11

*If you have questions about submitting a NWRI proposal, email Suzanne Hudson at [Suzanne.Hudson@dri.edu](mailto:Suzanne.Hudson@dri.edu). Visit the NWRI website at [www.dri.edu/nwri](http://www.dri.edu/nwri) for current RFP information.*



Locations of forest thinning projects that were undertaken on U.S. Forest Service lands (<https://www.truckeeforests.org/projects/>). The project team will compare data from some of these forest sites with untreated forest sites to assess the effect of forest thinning on water systems in treated areas.

**Understanding the effects of forest treatments on water supplies will help water managers prioritize future treatment opportunities and better meet the needs of the communities relying on the Truckee River.**

The focus of the project “How Do Forest Treatments Affect Water Quantity in the Truckee Watershed?” is to assess the effects of forest treatments on snowmelt and the amount of water entering the soil and occurring as surface runoff.

“Forest treatments used to mitigate wildfires generally include some form of tree thinning to reduce future fire spread and severity, but these mitigation activities have unknown impacts on the water balance,” explains Dr. Gabrielle Boisramé, the co-PI with Dr. Christine Albano of the project that also includes research assistant Conor Croskery and PhD student Mimi Payne. “Using heavy equipment to thin trees may cause soil compaction, which reduces water infiltration and increases flooding. Thinning trees also reduces forest canopy, which affects the timing of snowmelt in ways that are either helpful or harmful for water resources depending on the specific area. Thinning can increase evaporation from the soil or lead to dense vegetation regrowth, which reduces long-term water availability.” The goal of the project is to find out if thinning forests will increase or decrease the amount of water people can use downstream in the city of Reno.

The DRI research team will work with experts from the U.S. Forest Service and Truckee Meadows Water Authority (TMWA) to help guide fieldwork within the Truckee River watershed. The researchers will compare forest sites that have been treated using a combination of prescribed fire, pile burning, and mechanical or hand vegetation thinning with nearby untreated forest sites. The field data will be used to evaluate the effect of various treatments on snowpack and soil properties. Data from remote sensing and existing meteorological stations will also be collected to estimate the effect of forest treatments on the timing and volume of snowmelt, surface runoff, and water entering the soil. “We will use forest treatment plots located in snow-dominated areas in the Truckee Basin and similar untreated forest plots as controls,” Boisramé says.

*Continued on page 3*



**The Truckee River flows through forests in California and into Nevada.**

“Data collection will include snow depth and density, snow melt dates, and physical soil properties such as density, texture, moisture, and temperature. We hope to learn how these forest treatments have altered snow accumulation and melt, water uptake by plants, and soil infiltration.”

The team will conduct winter field visits to measure snow depth, density, and albedo (i.e., the proportion of solar radiation reflected by the snow surface). These measurements will allow them to calculate the amount of water stored in the snowpack. They will then compare the amount of water stored between the treated and untreated sites, and estimate how much water is available for runoff or infiltration. The researchers will use this information to estimate the overall effect of forest treatments on Truckee River water supplies. “The interactions between forest canopies and snowpack are complex, and this work will help expand our understanding of how different types of forest treatments in the Truckee Watershed will affect snowpacks either positively or negatively,” explains Dr. Christine Albano.

The team will also assess the effects of soil type, topography, treatment type, and amount of vegetation removed on snowpack retention, soil moisture,

and groundwater recharge at the forest sites. “This information can help inform the design of future forest treatments to maximize the benefit to Nevada’s water resources,” Albano adds. “The findings may also be relevant to other snow-dominated and fire-prone watersheds nationally.” As part of this project, the team will produce maps and information sheets to communicate the effects of various forest treatments on water resources, as well as some guidelines that can be used in future forest restoration work.

Having a better understanding of the effects of forest treatments on water supplies will also help water managers better meet the needs of the communities relying on the river. They can use the results of this analysis to respond to changing water-related needs and adjust as wildfire and drought conditions have more significant effects on water availability. “We hope that this information will help predict the impact of future forest treatment activities, and allow managers to plan ways to either mitigate negative impacts, such as increased erosion or flooding, or design projects to maximize benefits, such as increased snow storage and reduced transpiration losses,” Albano says. Water managers can integrate the project results into decision support tools to more accurately simulate the effects of

*Continued from page 3*

forest treatments on streamflow and water supplies and better prioritize future treatment activities. The research team will also use this project to improve methods for monitoring water resources that can be applied to other locations in the future. It will also allow them to build support for ongoing future forest management activities to conserve Nevada's valuable water supplies.

An important part of the NWRRI program is to support the next generation of water researchers. This project will include graduate students from UNR and will likely include undergraduate students from UNR and TMCC as field assistants. "Students and early-career researchers will participate in fieldwork and preliminary data analysis," Albano says. "This will give them experience in research methods, project planning, and working with real-world data. We also hope they will be able to grow their network through interactions with our partners at TMWA and the U.S. Forest Service."



Photo by Jessi LeMay

## ***NWRRI Program Announcements***

We are excited to announce that Dr. Trey Flowers, the new Executive Director of DHS at DRI, will be serving as the new director of the NWRRI program. Dr. Flowers comes to DRI from the National Weather Service's Office of Water Prediction (OWP) with a background in hydrology, biogeochemistry, surface and subsurface flow, and contaminant transport. He has professional engineering licenses in both civil and environmental engineering. The goals of NWRRI are to develop the water sciences knowledge and expertise that support Nevada's water needs, encourage our nation to manage water more responsibly, and train the next generation of water resources professionals. We know our new director will continue to support these goals.

# Publications

### **The following publication resulted from the NWRRI project "A Storyline Approach to Assess the 1997 New Year's Flood in Western Nevada":**

Yu, G., A.M. Rhoades, C.M. Albano, J.J. Miller, M.J. Webb, T. Dahl, and I. Floyd, 2026. Storylines for the 1997 New Year's Flood: The role of watershed antecedent conditions and future warming in shaping discharge in the Truckee River watershed. *Journal of Hydrology*, 669: Part A.

<https://doi.org/10.1016/j.jhydrol.2026.135080>

**NWRRRI STUDENT INTERVIEW:****Sara Zeitoun**

We asked Sara Zeitoun, a fourth year undergraduate student at UNR who worked on the NWRRRI project “Comparative Analysis of Historical Streamflow Trends for the Upper Carson and Walker River Basins,” about her current studies and plans for the future. Here’s what she had to say:

**What are you studying and what sparked your interest in that field?**

I am currently studying political science and environmental studies. I find the link between the two fields to be a great way to understand how environmental policy and research can support meaningful change.

**What did this project entail and how did you participate?**

This project involved collecting data from several sites in the Upper Carson and Walker River Basins and identifying trends in those basins. I extracted data from agencies such as USGS and used programs such as R and ArcGIS to visualize changes and trends in key categories. Dan Saftner and Dr. Rishi Parashar, the project PIs, then used the work I generated in their statistical analysis of the study areas.

**What did you learn from your experience on this project?**

This was actually my first time using R! Having clear tasks laid out within the program was a really engaging way to learn its functions. I also got to use ArcGIS for the first time outside of the classroom and apply what I learned in school.

**What do you find most interesting about water resources research?**

Understanding our water systems is the key to making mindful decisions as land use changes over time. Nevada has so many interesting, unique features that provide many opportunities for study. With more energy infrastructure and data centers in the state and continued population growth, water resources research will continue to be an extremely important field of study.



Photo by Sara Zeitoun

“

*“Getting firsthand experience in a project that incorporates an understanding of regional water systems and the surrounding landscape as a way to inform future policy decisions has been an excellent way to combine my areas of study.”*

—SARA ZEITOUN

*Continued on page 6*

# NWRRRI

### Has working on this project given you any insights into your future studies?

Absolutely! Working on this project has provided me with a lot of insights into different research paths. Getting firsthand experience in a project that incorporates an understanding of regional water systems and the surrounding landscape as a way to inform future policy decisions has been an excellent way to combine my areas of study.

### What are your goals for the next steps in your studies?

I will begin taking graduate courses during my last semester through UNR's accelerated master's program. My plan is to continue with political science while shifting my focus to public policy and administration. I've previously taken energy and climate change policy courses, which have been the most influential in my educational and career plans. While pursuing my graduate degree, I plan to continue working on projects that will develop my professional skills.

### Do you have a favorite dish that you like to make?

My favorite dish is kafta and potatoes over rice. My father is from Lebanon, and it was always my favorite traditional dish growing up. Since moving away from home, it's a comforting dish that reminds me of home and my heritage.

## EVENTS

Please keep an eye on the event websites for changes in conference schedules.

### “Occurrence of Lithium in Nevada” with Garrett Wake

April 14, 2026; Las Vegas, NV  
[www.aegsnv.org/meetings](http://www.aegsnv.org/meetings)

### GSA 2026 Cordilleran Section Meeting

April 21–24, 2026; Loreto, Baja California Sur, Mexico  
[www.geosociety.org/GSA/GSA/Sections/cd/2026mtg/home.aspx](http://www.geosociety.org/GSA/GSA/Sections/cd/2026mtg/home.aspx)

### Water Rights in Nevada Class

April 21, 2026; Elko, NV  
[www.nvwra.org/2026-april-water-rights-class](http://www.nvwra.org/2026-april-water-rights-class)

### Advanced Water Rights in Nevada Class

April 22, 2026; Elko, NV  
[www.nvwra.org/advanced-water-rights-class](http://www.nvwra.org/advanced-water-rights-class)

### 2026 NWRA Tour Of Cortez with Nevada Gold Mines

April 22– 23, 2026; Elko, NV  
[www.nvwra.org/2026-mine-tour](http://www.nvwra.org/2026-mine-tour)

### World Environmental & Water Resources Congress

April 26–29, 2026; Mobile, AL  
[www.ewricongress.org/](http://www.ewricongress.org/)

### 22nd Annual Truckee River Field Study Course

April 30–May 1, 2026; Reno, NV  
[www.nvwra.org/2026-truckee-river-tour](http://www.nvwra.org/2026-truckee-river-tour)

### “Sediment-bound Phosphorus in the Las Vegas Wash” with Dr. Zach Perzan

May 12, 2026; Las Vegas, NV  
[www.aegsnv.org/meetings](http://www.aegsnv.org/meetings)

### Webinar: Professional Ethics for Engineers and Geoscientists

May 12, 2026; Online  
[www.ngwa.org/detail/event/2026/05/12/default-calendar/26may12web](http://www.ngwa.org/detail/event/2026/05/12/default-calendar/26may12web)

### Field Trip to Lower Las Vegas Wash with Dr. Zach Perzan

May 16, 2026; Las Vegas, NV  
[www.aegsnv.org/meetings](http://www.aegsnv.org/meetings)

### AbSciCon 2026

May 17–22, 2026; Madison, WI  
[www.agu.org/abscicon](http://www.agu.org/abscicon)

Continued on page 10

**NWRRRI INTERNSHIP INTERVIEW:*****Kiana Fullmore***

Kiana Fullmore participated in the NWRRRI Undergraduate Internship Immersion Program. She worked on the project “Understanding Soil Moisture in a Changing Environment” and was mentored by Dr. Kailong Li of DRI. The project assessed how water and energy cycles influence vegetation growth, soil structure, and wildfire risks. We asked Kiana about her experience and plans for the future. Here’s what she had to say:

**What are you currently studying and how did you find out about the internship?**

I am studying chemistry. I found this internship through the science majors resource page at my school.

**How did you participate in the project?**

I worked under Dr. Kailong Lee analyzing soil moisture data. This project entails coding and analyzing data to predict how soil moisture levels affect wildfires. I organized data through programs like Python while simultaneously graphing the data using ArcGIS.

**What did you learn from participating in the project?**

I learned that analyzing soil moisture is critical for monitoring drought, managing water resources, and predicting fire risk in Nevada. By tracking soil moisture, we can improve spring runoff forecasts. Runoff forecasts help us predict wildfire dangers, support agricultural water management, and track ecosystem responses.

**Did the internship give you any ideas for your future studies?**

I found the process of how data are collected for this project to be fascinating! Some of the techniques we used include gravimetric sampling and sensor-based methods. Hydrology is a broad field and this internship sparked my curiosity in the microbiology of soil microbes.

**What are your goals for the next steps in your studies?**

I plan on finishing my degree in chemistry and pursuing a research position in environmental toxicology.



*Photo by Kiana Fullmore*

“*I learned that analyzing soil moisture is critical for monitoring drought, managing water resources, and predicting fire risk in Nevada.*”

–KIANA FULLMORE

NWRRRI

## NWRR I INTERNSHIP INTERVIEW:

# Lauren Keyashian

Lauren Keyashian participated in the NWRR Undergraduate Internship Immersion Program. She worked on the project “What’s Shaking in Southern Nevada?” and was mentored by Dr. Cleat Zeiler of DRI. The project included analyzing data from seismoacoustic monitoring stations in central and southern Nevada to ensure the devices provide accurate predictions. We asked Lauren about her experience and plans for the future. Here’s what she had to say:

### What are you currently studying and how did you find out about the internship?

I’m currently interning as a data research specialist and I’m working to identify data analytics in seismology. I researched internships and I came across the DRI webpage and applied.

### How did you participate in the project?

I used AI to identify the stations collecting seismological data. The objective of this project is to study the waveforms being captured by the Incorporated Research Institutions for Seismology (IRIS) database and apply AI to events based on locations where a quarry blast, which is the controlled fracturing of rock, is detected.

### What did you learn from participating in the project?

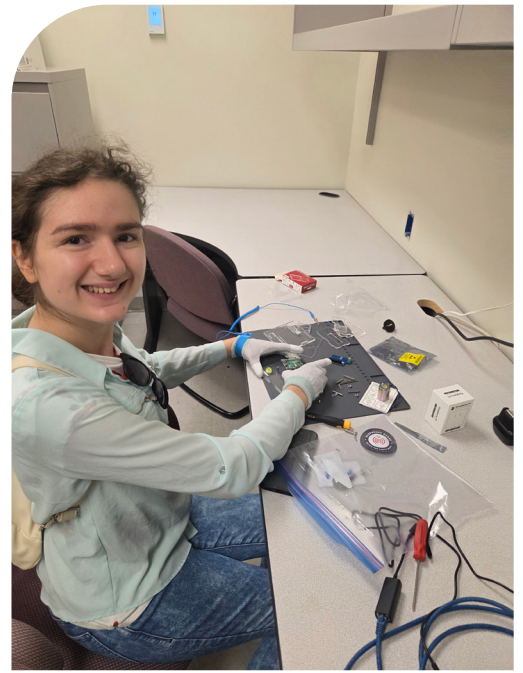
I have not worked on some of the platforms before such as ObsPy, which is an open-source Python framework used in processing seismological data. I enjoyed learning more about the different platforms I can use to demonstrate my skills.

### Did the internship give you any ideas for your future studies?

Analyzing the data for quarry blasts and identifying unique applications for seismology is both interesting and satisfying. Implementing programming such as Python is fun, and participating in this internship has furthered my interest in automation and software engineering.

### What are your goals for the next steps in your studies?

I’ve been thinking about continuing to take classes in computer information technology and technical physics. My goal is to be an engineer or a cybersecurity specialist.



Lauren assembling the Raspberry Shake, which collects seismoacoustic data (photo by John Russell).

“

*“I really enjoy the project that I am currently working on. Analyzing the data and identifying unique applications for seismology is both interesting and satisfying.”*

–LAUREN KEYASHIAN

NWRR I

## NWRRRI INTERNSHIP INTERVIEW:

# Heather Crawley

Heather Crawley participated in the NWRRRI Undergraduate Internship Immersion Program. She worked on the project “Water and Fire: Philosophy and Communication of Science” and was mentored by Connie Taylor of DRI. The project included using fire ecology and water-related issues as a case study to examine contemporary fire science and Traditional Ecological Knowledge (TEK) to understand science as both a method and way of knowing. We asked Heather about her experience and plans for the future. Here’s what she had to say:

### What are you currently studying and how did you find out about the internship?

I am a biology major with an interest in forest ecology. I found out about the internship through TMCC’s Handshake app.

### What was the focus of the project you worked on?

Our project focused on analyzing how fire and water issues affect forests and what changes need to be made to help reduce the large, intense fires we are experiencing in our area.

### What did you learn from participating in the project?

I learned about the detrimental effects of removing Indigenous fire culture, which was originally used to burn off old growth and prime soils for future harvests. Consequently, there is more fuel for fires, which can lead to massive, severely destructive fires. We also read a lot about conducting good science. I enjoyed learning about the spread of false information and the type of information environment that creates.

### Did the internship give you any ideas for your future studies?

Before I came into this study, I was unsure about what exactly I wanted to do with a biology degree. Discovering how fire affects forests has made me very interested in pursuing forest wildlife studies along with forest ecology.

### What are your goals for the next steps in your studies?

My goals are to obtain the Wildlife Technician Certification through TMCC so that I can start working in the field, and then further my career once I earn my degree.



Photo by Jessi LeMay

“

*“Discovering how fire affects forests has made me very interested in pursuing forest wildlife studies along with forest ecology.”*

—HEATHER CRAWLEY

NWRRRI

Continued from page 6

# EVENTS

Please keep an eye on the event websites for changes in conference schedules.

## AWRA 2026 Geospatial Water Technology Conference

May 18–20, 2026; Niagara Falls, NY

[www.awra.org/Members/Events\\_and\\_Education/Events/2026-Landing-Pages/01\\_GWTC/GWTC2026.aspx](http://www.awra.org/Members/Events_and_Education/Events/2026-Landing-Pages/01_GWTC/GWTC2026.aspx)

## Well Design, Construction & Rehab Workshop

May 19, 2026; Reno, NV

[www.nvwra.org/2026-well-design-rehab-workshop](http://www.nvwra.org/2026-well-design-rehab-workshop)

## Well Rehab Workshop

May 20, 2026; Reno, NV

[www.nvwra.org/2026-well-rehab-workshop](http://www.nvwra.org/2026-well-rehab-workshop)

## Darcy Lecture – Trees are Groundwater Stakeholders Too

June 3, 2026; Online

[www.ngwa.org/detail/event/2026/06/03/default-calendar/darcy-lecture---trees-are-groundwater-stakeholders-too](http://www.ngwa.org/detail/event/2026/06/03/default-calendar/darcy-lecture---trees-are-groundwater-stakeholders-too)

## UCOWR 2026

June 8–10, 2026; San Antonio, TX

[ucowr.org/conference](http://ucowr.org/conference)

## Chapman Conference: Updating Usable Projections of Future Sea Level

June 8–11, 2026; Montreal, QC, Canada

[www.agu.org/chapman-sea-level](http://www.agu.org/chapman-sea-level)

## Webinar: Why Water Rights Matter

June 11, 2026; Online

[www.nvwra.org/webinars](http://www.nvwra.org/webinars)

## Webinar: Why Water Rights Have Unique Tax Treatment

July 9, 2026; Online

[www.nvwra.org/webinars](http://www.nvwra.org/webinars)

## Webinar: Why Water Scarcity Is a Financial Issue

August 13, 2026; Online

[www.nvwra.org/webinars](http://www.nvwra.org/webinars)

## 2026 Floodplain Management Association Annual Conference

September 8–10, 2026; Long Beach, CA

[floodplain.org/page/AnnualConference](http://floodplain.org/page/AnnualConference)

## Meeting the Challenges of Groundwater in Fractured Rock Conference

September 21–22, 2026; Burlington, VT

[www.ngwa.org/detail/event/2026/09/21/default-calendar/26sep5017](http://www.ngwa.org/detail/event/2026/09/21/default-calendar/26sep5017)

## 2026 Fall Week of Water Events

September 21–24, 2026; Reno, NV

[www.nvwra.org/2026fallweekofwater](http://www.nvwra.org/2026fallweekofwater)

## GSA Connects 2026

October 11–14, 2026; Denver, CO

[connects.geosociety.org/](http://connects.geosociety.org/)

## 2026 Tour of Virgin Valley Water

October 28, 2026; Las Vegas, NV

[www.nvwra.org/tour-of-virgin-valley-water](http://www.nvwra.org/tour-of-virgin-valley-water)

## CANVAS 2026

November 1–4, 2026; Portland, OR

[www.sciencesocieties.org/canvas](http://www.sciencesocieties.org/canvas)

## AWRA 2026 Annual Water Resources Conference

November 9–11, 2026; Philadelphia, PA

[www.awra.org/Members/Events\\_and\\_Education/Events/2026-Landing-Pages/01\\_Annual/Annual2026.aspx](http://www.awra.org/Members/Events_and_Education/Events/2026-Landing-Pages/01_Annual/Annual2026.aspx)

## AGU26

December 7–11, 2026; San Francisco, CA

[www.agu.org/annual-meeting](http://www.agu.org/annual-meeting)



Las Vegas bearpoppy (photo by Tsvetelina Stefanova).

Success and dedication to quality research have established DHS at DRI as the Nevada Water Resources Research Institute (NWRRI) under the Water Resources Research Act of 1984 (as amended). The continuing goals of NWRRI are to develop the water sciences knowledge and expertise that support Nevada's water needs, encourage our nation to manage water more responsibly, and train students to become productive professionals. The work conducted through the NWRRI program is funded through the United States Geological Survey Water Resources Research 104(b) and 104(g) grants made available to each Water Resources Research Institute (USGS Grant/ Cooperative Agreement No. G21AP10578). DRI administratively houses and logistically supports the operations of NWRRI.

## CONTACTS



**Dr. Trey Flowers**  
*Director*  
 Trey.Flowers@dri.edu  
 775.673.7379

**Matt Bromley**  
*Deputy Director*  
 Matt.Bromley@dri.edu  
 775.673.7944

**Suzanne Hudson**  
*Program Administrator*  
 Suzanne.Hudson@dri.edu  
 702.862.5464

**Nicole Damon**  
*Communications*  
 Nicole.Damon@dri.edu  
 702.862.5531