



WESTERN WATER ASSESSMENT

A NOAA RISA TEAM

May 2022 Newsletter

In this newsletter...

- Farewell, Lineke
- PhD student Natalie Bennett
- High-Impact Events Database
- Utah Hazard Planning Tool
- Post-fire effects on streamflow
- Extreme heat webinar
- Deepening hydrologic drought in the Intermountain West
- Featured articles

WWA News

Farewell, Lineke

Lineke Woelders left WWA at the beginning of March this year to be a Geospatial Analyst/Hydrologist at Gro Intelligence based out of New York City. Before becoming a research scientist for WWA in 2019, she was a postdoctoral research scientist in paleoclimatology for the Institute of Arctic and Alpine Research (INSTAAR). Lineke was the lead author of [*Snowpack Monitoring in the Rocky Mountains: A User Guide*](#) (2020), as well as a contributing author for two chapters of the [*Colorado River Basin Climate and Hydrology: State of the Science*](#) (2020). She used her skills in data analysis and visualization to create beautiful maps and figures for the team. We will miss Lineke and her bright spirit on the team. We wish her all the best in her future endeavors!



WWA Student Highlight: PhD student Natalie Bennett

Natalie Bennett is a WWA-supported PhD student in the Environmental Studies department advised by WWA Co-PI Lisa Dilling. Before entering graduate

school, Natalie worked for the US Global Change Research Program, where she connected local stakeholders with climate adaptation information and developed an understanding of the growing need for applied and locally relevant research. Her work at CU probes the human dimensions of wildfire management and adaptation in the wildland-urban interface. Natalie's Master's thesis, which she will be defending this summer, involved conducting interviews across Colorado to explore how Community Wildfire Protection Plans and other factors enable communities to become fire adapted. Her findings affirm the need for wildfire management to occur within communities, rather than for communities, and for collaboration and participation across local stakeholders to reduce risks. Currently, Natalie is working with the City of Boulder Open Space and Mountain Parks Department and Boulder Fire-Rescue to conduct a survey of households in at-risk neighborhoods of the city to investigate homeowner attitudes, behaviors, and actions surrounding wildfire. Her dissertation work will use a combination of qualitative and quantitative methods to continue to explore the individual and community-scale behavioral dimensions of wildfire adaptation.

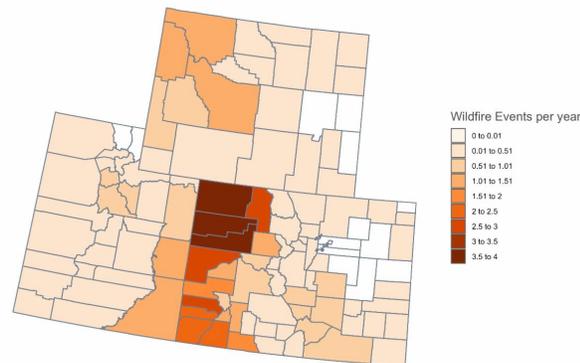


Research and Products

Updated & Improved: High-Impact Events Database

Over the last six months, we have been updating the [High-Impact Events Database](#) for recent and missing historical high-impact weather and climate events in our region. The database is not a scientific dataset, but rather a collection of significant weather and climate-related events in Colorado, Utah, and Wyoming. The types of events included are: avalanches, cold waves, dam failures, droughts, floods, hail, high winds, landslides, tornadoes, wildfires, and winter storms. We searched federal, state, county, and local databases, library archives, news accounts, and other sources for our collection. We are currently working on additional features that will make the database more usable and engaging, and hope to finish these features during the summer. Follow us on Twitter to catch our on-this-day-in-history event posts at [@WWAnews](#) and stay tuned!

Wildfire Events in Colorado, Utah, Wyoming 1996-2021



Source: NOAA NCEI Storm Events Database

Additionally, we created a set of monthly maps using NOAA's National Center for Environmental Information (NCEI) [Storm Events Database](#) to better understand the spatial

and seasonal patterns in event occurrence for six event types that are common in our region: flash floods, floods, hail, heavy snow, high wind, and wildfires. These “Event Maps” show the average number of events for each month of the year, by county, for the period of record available for that event type. This resource is still in development. We welcome your feedback so that we can make it more useful.

New Resource: Utah Hazard Planning Tool

The Utah Hazard Planning Tool provides resources about the historical incidence, current risk, and future projections of natural hazards in the state. The resource provides links to online tools and data, and brief descriptions of the information and how to access it.



UTAH HAZARD PLANNING TOOL

The information is specific to Utah, but is relevant to most of the West for information on avalanches, cold temperature extremes, dam failure, debris flow, drought, extreme heat, flooding and heavy rainfall, landslides, wildfire, wind events, and winter storms. The report version of the Utah Hazard Planning Tool is available [here](#). A dashboard-style version of the tool and an in-depth summary of how climate change is impacting Utah's natural hazards will be available soon.

New Research: Post-fire effects on streamflow

In recent years there has been considerable disagreement on how streamflow may change in post-wildfire watersheds. In a recent journal article, “[Growing impact of wildfire on western US water supply](#),” co-authored by WWA Director Ben Livneh, the research team asks, “How will increasing wildfire activity affect water resources in the water-limited western United States?” The research team analyzed streamflow observations from a large number of both burned and unburned watersheds in the western U.S. They found that immediately post-fire, in a forest where at least 20% of the area burns, streamflow increases 20% to 30%, with the effect lasting approximately six years. The paper underscores the importance of improving our knowledge of post-fire environments to present and future regional water resources.

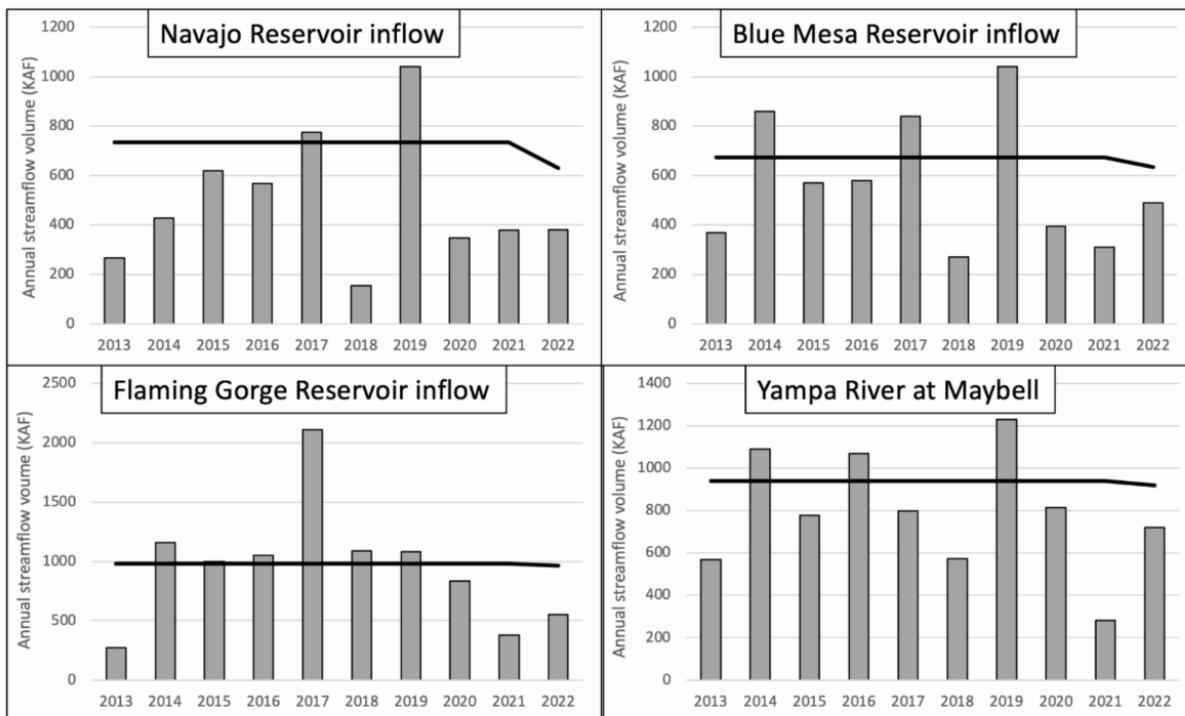
Coming Soon: Extreme heat webinar

WWA will continue its webinar series in July with: “Extreme heat in the West: climate change, health, and inequalities.” Seth Arens and Katie Clifford will explore how a changing climate is impacting the frequency and severity of extreme heat events, human health impacts from heat, and how impacts are experienced unequally in the Intermountain West. Be on the lookout for a save-the-date email soon!

Climate Event

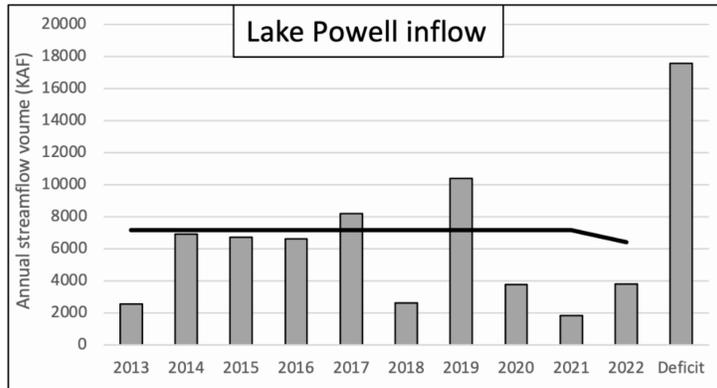
Deepening hydrologic drought in the Intermountain West

Long-term regional drought conditions continued during the winter of 2021-22. A snowy December left many locations with much-above-average snowpack, but January and February were among the driest on record for most locations. Mediocre March and April precipitation did not make up for lost precipitation earlier in the winter. Consequently, drought conditions remain over the entire region and seasonal runoff forecasts project a third year in a row of much-below-average runoff for the Upper Colorado River and Great Basins. For some of the region, especially in the Four Corners, 2022 is the 22nd year of drought and the entire region has experienced drought since late 2019.



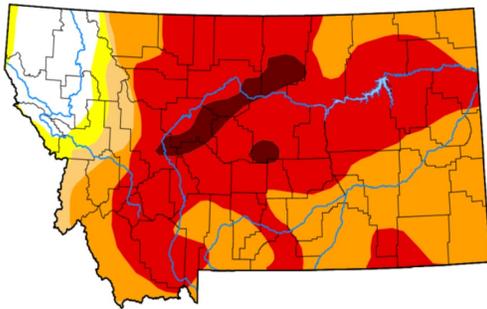
Annual streamflow volume from 2013-2022. Bars are observed annual streamflow volume (2022 is the May 1st forecast by CBRF). Line is that average streamflow for 1981-2010, changing to 1991-2020 in 2022.

Over the last 10 years, the northern portion of the Colorado River Basin has experienced less drought than the southern portion, but annual streamflow volume was below average during 4 of the past 10 years at Flaming Gorge Reservoir and 7 of the last 10 years on the Yampa River. Further south, annual streamflow volumes were below average in 7 of the last 10 years at Blue Mesa Reservoir and 8 of the last 10 years at Navajo Reservoir. Drought during the last 3 years has reached the level of crisis at Lake Powell; the reservoir sits at 23% capacity and its elevation reached the all-time low of 3,522 feet, just 32 feet above the elevation of minimum power generation for Glen Canyon Dam. The annual inflow volume to Lake Powell was below average in 8 of the last 10 years, including a near-record low in 2021. Since 2013, Lake Powell inflow is at a deficit of nearly 18 million acre-feet compared to average flows.



Annual streamflow volume for the inflow to Lake Powell (bars). Line represents 1981-2010 average annual streamflow volume, changing to 1991-2020 average in 2022. The bar labeled deficit represents the cumulative deficit in streamflow volume over 10 years.

WWA Features



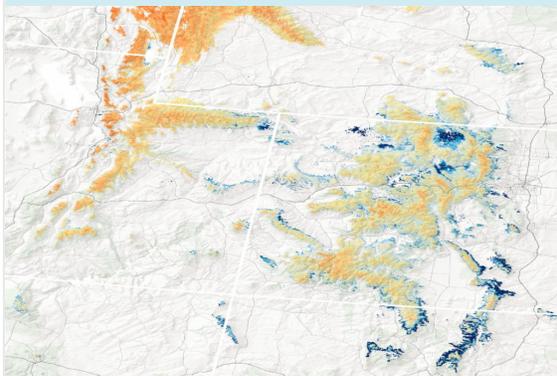
Researchers say increasing forest fires are 'unhinging' streamflow patterns in the western U.S.

[Read article](#)



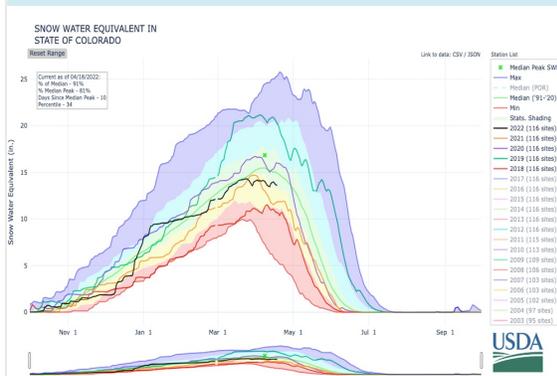
Wildlife commissioner strives to listen to all voices

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Taking stock of Rocky Mountain snowpack

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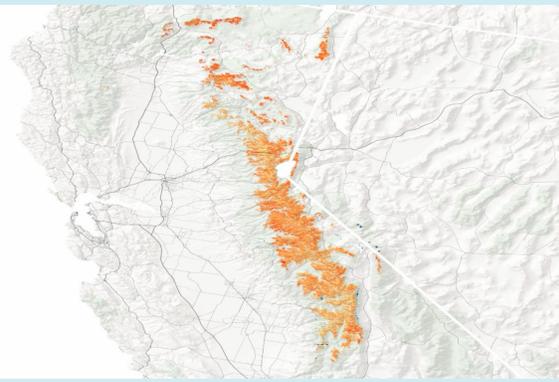
Where Colorado's snowpack stands as water, fire concerns grow heading into summer

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After wildfires, scorched trees could disrupt water supplies

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Wild fluctuations in Sierra snow

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