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WestFAST News

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World Water Day: How the USGS is Using Imagery as Data for Water Science

While World Water Day only comes around once a year on March 22, USGS scientists work every day to deliver information on a wide range of water resources and conditions. Learn more about how the USGS is using a network of cameras to provide valuable water information.

USGS March 21, 2024

Water plays a vital role in supporting all living things on Earth. This valuable resource is used in a multitude of ways, including for drinking, agriculture, recreation and health care needs. Every day, scientists at the U.S. Geological Survey work to provide water information that is fundamental to protecting and effectively managing the nation's water resources.

A team of USGS scientists are working to advance the use of cameras and imagery as part of the USGS's water monitoring efforts. The Hydrologic Imagery Visualization and Information System is a network of over 600 cameras that provide the USGS and our partners with the ability to remotely monitor conditions at sites where a camera is installed. Most cameras are installed at USGS streamgages in the U.S., Guam, and Puerto Rico.



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A HIVIS camera along the San Antonio River in San Antonio, Texas. Check out this monitoring site [here](#).

Information from HIVIS cameras can be viewed through the [HIVIS Dashboard](#). The dashboard displays an interactive, filterable map for users to locate cameras. Each camera provides still-frame images and select cameras provide timelapse videos. The majority of cameras have images that are updated every hour or more frequently, providing a near real-time picture of site conditions.

The dashboard also displays an interactive hydrograph for cameras located at a USGS streamgage. The hydrograph shows streamgage data alongside a series of images, in order to provide users with a better understanding of what a particular water level looks like at the location of a streamgage.

HIVIS cameras provide a variety of benefits to the USGS and other users. The cameras can improve emergency responders' ability to respond to emergencies, as the cameras allow for remote verifications of hazardous conditions, such as flooding or ice jams. The public can use the cameras to monitor water conditions for recreation and personal safety. Using the cameras can also enhance safety for USGS personnel, as the cameras lower the risk associated with driving and collecting data at streamgages during dangerous conditions.

HIVIS is basically the storefront of the USGS National Imagery Management System, a software system that disseminates imagery from USGS cameras. As of February 2024, the system takes in approximately 20,000 images a day and produces about 80,000 data products associated with the cameras daily.

The development of the imaging application has given a major boost to the USGS efforts to use imagery as data. There are more advancements to the system on the horizon, including using artificial intelligence and machine learning to detect ice jams and harmful algal blooms, and to estimate streamflow, water levels, ice cover and snow cover.

To see if there's a HIVIS camera near you, visit apps.usgs.gov/hivis/.

Check out this footage that one of our cameras in Alaska captured.



Sources/Usage: Public Domain. [View Media Details](#)

Check out this monitoring site [here](#).

Biden-Harris Administration Announces Major Milestone to Protect Short-Term Stability of Colorado River Basin

President Biden's Investing in America agenda has led to record water savings, helped stave off immediate collapse of Colorado River system.

Interior Department continues long-term planning with robust input from Basin States, Tribes and other parties.

DOI March 5, 2024

The Biden-Harris administration today announced a significant milestone in its efforts to protect the stability and sustainability of the Colorado River System and strengthen water security in the West. With historic water conservation enabled by President Biden's Investing in America agenda, the Administration has [staved off the immediate possibility](#) of the Colorado River System's reservoirs from falling to critically low elevations that would threaten water deliveries and power production. Due to record conservation investments as well as improved hydrology, Lake Mead levels today, at elevation 1075 feet, are the highest since May 2021, when they were at 1073 feet.

Today, the Department of the Interior's Bureau of Reclamation released a [final Supplemental Environmental Impact Statement \(SEIS\)](#) in the ongoing, collaborative effort to update the current interim operating guidelines for the near-term operation of Glen Canyon and Hoover Dams to address the ongoing drought and impacts from the climate crisis. The identified preferred alternative reflects a historic, consensus-based proposal – secured by the Biden-Harris administration in partnership with the seven Colorado Basin states – that will lead to at least 3 million acre-feet (maf) of system water conservation savings through the end of 2026, when the current guidelines expire.

As part of these water use reductions, the Department today also announced three new System

Conservation Implementation Agreements that will commit water entities in California to conserve up to 399,153 acre-feet of water in Lake Mead through 2026. The Department also announced additional progress with the Republic of Mexico to conserve Colorado River System water.

"President Biden made a promise to the American people to invest in communities, bolster climate resiliency, and protect our nation's natural and cultural resources – and our collective efforts to protect the stability of the Colorado River System reflect significant efforts to uphold that promise," said **Acting Deputy Secretary Laura Daniel-Davis**. "Today's historic action to protect this precious resource and the communities that rely on it is made entirely possible by the President's Investing in America agenda, which is funding crucial projects to conserve water, increase the efficiency of water use, and upgrade existing infrastructure. As we close out this chapter on our short-term efforts, we look toward the future with eyes wide open on how to solve for the challenges that still lie ahead."

"The Biden-Harris administration has been working to bring every tool and every resource to bear as we seek to both minimize the impacts of drought and develop a long-term plan to facilitate conservation and economic growth," said **Principal Deputy Assistant Secretary for Water and Science Michael Brain**. "This Administration has held strong to its commitment to work with states, Tribes and communities throughout the West to find consensus solutions in the face of climate change and sustained drought. We will continue to prioritize these key values as we move forward in our long-term planning efforts."

"Reclamation is grateful to our partners across the Basin – including the Basin states Governor's Representatives, the 30 Basin Tribes, water managers, farmers and irrigators, municipalities, power contractors, non-governmental organizations, and other partners and stakeholders – for their unprecedented level of collaboration throughout this process," said **Reclamation Commissioner Camille Calimlim Touton**. "As we move forward, supported by historic investments from the President's Investing in America agenda, we will continue working collaboratively to ensure we have

long-term tools and strategies in place to help guide the next era of the Colorado River Basin."

"Today's milestone is the result of strong leadership from the Department of the Interior, complemented by a whole-of-government effort to harness funding and resources from the President's Investing in America agenda, and steadfast engagement from Colorado River Basin states, Tribes, and water users," said **White House Council on Environmental Quality Chair Brenda Mallory**. "The Biden-Harris Administration will continue building partnerships and deploying historic resources to build a more resilient future for the West."

Final SEIS Reflects Months of Collaboration with Basin States, Tribes, Other Parties

In order to protect Glen Canyon and Hoover Dam operations, system integrity, and public health and safety through 2026 – at which point the current interim guidelines expire – an initial draft SEIS was [released](#) in April 2023. Following a [historic consensus-based proposal](#) – which committed to measures to conserve at least 3 maf of system water through the end of 2026 – Reclamation temporarily withdrew the draft SEIS to allow for consideration of the new proposal. The bureau [released](#) a revised draft SEIS in October 2023 as part of the process to fully analyze this proposal.

The preferred alternative will conserve at least 3 maf of system water through the end of 2026 and allows for reducing releases from Lake Powell down to 6 maf if the reservoir is projected below 3,500 feet over the subsequent 12 months. This would be implemented across a range of elevations in Lake Mead and would be in addition to the already existing 2007 Interim Guidelines shortages and contributions under the Lower Basin Drought Contingency Plan. The Record of Decision is anticipated in the coming weeks. Today's announcement is the result of robust discussion with all parties across the Basin – including 27 nation-to-nation consultations with Tribes across the region.

The results of updated SEIS modeling indicate that the risk of reaching critical elevations at Lake Powell and Lake Mead has been reduced substantially. As a result of the commitment to record volumes of conservation in the Basin and improved hydrology, the chance of falling below

critical elevations was reduced to eight percent at Lake Powell and four percent at Lake Mead through 2026. However, elevations in these reservoirs remain historically low, and long-term conservation measures will still be necessary to ensure continued water delivery to communities and to protect the long-term sustainability of the Colorado River System.

Historic Funding from President Biden's Investing in America Agenda

President Biden's Investing in America agenda is integral to the efforts to increase near-term water conservation, build long term system efficiency, and prevent the Colorado River System's reservoirs from falling to critically low elevations which would threaten water deliveries and power production. Because of this funding, conservation efforts have already benefited the system this year.

Reclamation today announced three new System Conservation Implementation Agreements in California that will conserve water in Lake Mead, including agreements with:

- **Bard Water District, in cooperation with Metropolitan Water District:** This agreement commits up to 18,090 acre-feet of conserved water through 2026;
- **Coachella Valley Water District:** This agreement commits up to 30,000 acre-feet of conserved water through 2026;
- **Palo Verde Irrigation District, in cooperation with Metropolitan Water District:** This agreement commits up to 351,063 acre-feet of conserved water through 2026;

In total, 24 conservation agreements across California and Arizona are expected to conserve up to 1.58 maf of water through 2026, with an investment of up to \$670.2 million from the Inflation Reduction Act, which overall provides \$4.6 billion to address the historic drought across the West. Reclamation continues to work with local partners on addition conservation agreements under development.

Through the [Bipartisan Infrastructure Law](#), Reclamation is also investing another \$8.3 billion over five years for water infrastructure projects, including water purification and reuse, water

storage and conveyance, desalination and dam safety. Since the Law's signing, the Department has provided more than \$2.9 billion to fund 425 projects, including \$825 million for 131 aging infrastructure projects; \$377 million to 231 WaterSMART grants; \$382 million for 12 water storage and conveyance projects; and \$698 million to seven rural water projects.

In addition, the International Boundary and Water Commission and Reclamation are leading a complementary effort with the Republic of Mexico on additional water savings measures Mexico will implement through 2026. We continue to work bilaterally and cooperatively with Mexico as an integral part of our short and long-term planning processes for the future of this Basin.

Long-Term Planning Continues with Robust Collaboration

The short-term SEIS process is separate from the [ongoing long-term efforts](#) to protect the Colorado River Basin starting in 2027. The post-2026 process currently underway is working to develop new guidelines that will replace the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead, which are set to expire at the end of 2026.

The post-2026 process is a multi-year effort that will identify a range of alternatives and ultimately determine operations for Lake Powell and Lake Mead and other water management actions for decades into the future. Using the best-available science, Reclamation will develop a draft environmental impact statement (EIS) that will analyze how future operational guidelines and strategies can be sufficiently robust and adaptive to withstand a broad range of hydrological conditions and ultimately provide greater stability to water users and the public throughout the Colorado River Basin.

The completed draft EIS is anticipated by the end of 2024 and will include a public comment period. Reclamation anticipates a final EIS will be available in late 2025, followed by a Record of Decision in early 2026.

As part of Reclamation's robust and transparent process to gather feedback, the bureau has held

several virtual public webinars and continues to engage Basin parties via stakeholder briefings; the formation of a new Federal-Tribes-States working group; two meetings of the Integrated Technical Education Workgroup; and individual communications.

NASA Data Shows How Drought Changes Wildfire Recovery in the West

NASA March 27, 2024



California's 2017 Thomas Fire (shown) was included in a new analysis of more than 1,500 wildland fires teasing out how drought and fire combine to affect western U.S. lands. USDA Forest Service/ Stuart Palley

A new study using NASA satellite data reveals how drought affects the recovery of western ecosystems from fire, a result that could provide meaningful information for conservation efforts.

The West has been witnessing a trend of increasing number and intensity of wildland fires. Historically a natural part of the region's ecology, fires have been exacerbated by climate change—including more frequent and intense droughts—and past efforts to suppress fires, which can lead to the accumulation of combustible material like fallen branches and leaves. But quantifying how fire and drought jointly affect ecosystems has proven difficult.

In the new study, researchers analyzed over 1,500 fires from 2014 to 2020 across the West, and also gathered data on drought conditions dating back to 1984. They found that droughts make it harder for grasslands and shrublands, such as those in Nevada

and Utah, to recover after fires—even the less severe blazes. Forests, if not burned too badly, rebound better than grasslands and shrublands because some forest roots can tap into water deeper in the ground. The team reported its findings in the February 2024 issue of *Nature Ecology & Environment*.

“Many of the West’s grasslands experience low-severity fires,” said Shahryar Ahmad, lead author of the study and a research scientist at NASA’s Goddard Space Flight Center in Greenbelt, Maryland. “This study shows that even those blazes can trigger a slow recovery in these ecosystems if accompanied by a preceding drought.”

If ecosystems don’t have enough time to bounce back before another drought or fire, that could lead to permanent changes in the types of plants growing there. That, in turn, can increase the risk of soil erosion and landslides, and alter the usual patterns of water running off into streams and lakes.

“Once a fire is contained, that's when the remediation efforts happen,” said Everett Hinkley, the national remote sensing program manager for the U.S. Forest Service, who wasn’t involved in the new research. “Understanding how a particular ecosystem and land cover type is going to respond after the fire informs what actions you need to take to restore the landscape.”

Without such restoration, changes in land cover can cascade to potentially affect agriculture, tourism, and other community livelihoods. To track the recovery of the different ecosystems, the researchers examined changes in evapotranspiration (ET)—the transfer of water to the atmosphere through evaporation from soil and open water and transpiration from plants—before and after the fires. Monitoring evapotranspiration helped the team identify whether different ecosystems, such as forests and grasslands, completely recovered after a fire, or if the recovery was delayed or disrupted.

That evapotranspiration data came from [OpenET](#), a tool that [calculates evapotranspiration](#) at the scale of a quarter-acre across the western United States. It does so using models that harness publicly available data from the Landsat program, a partnership between NASA and the U.S. Geological Survey, along with other NASA and NOAA satellites.

“This study highlights the dominant control of drought on altering resilience of vegetation to fires in the West,” said Erin Urquhart, the water resources program manager at NASA Headquarters in Washington. “With ongoing climate change, it is imperative that land managers, policymakers, and communities work together, informed by such research, to adapt to these changes, mitigating risks and ensuring the sustainable use of water and other natural resources.”

The research also showed that forests, grasslands, and shrublands all struggle to recover from droughts that occur close in time with high-severity fires, which are becoming more common in the West. That can lead to potentially lasting changes not only in the plant communities but also in local and regional water dynamics.

Severe fires damage plants to such an extent that evapotranspiration is greatly reduced in the following years, the researchers found. So instead of evaporating into the atmosphere, more water sinks into the ground as recharge or becomes runoff.

Using a subset of nearly 800 fires from 2016 to 2018, the researchers calculated that across all the ecoregions in the study, an average of about 528 billion gallons (two cubic kilometers) of water was diverted as runoff or recharge during the first year after a fire. That’s equivalent to North Dakota’s annual water demand, or one quarter of Shasta Lake, California’s largest humanmade lake.

When more water becomes runoff, it means less could be available for ecosystem recovery or agriculture. As Earth’s climate continues to warm, understanding these shifts is crucial for developing strategies to manage water resources more effectively and ensure water security for future generations.

Continued Decline of Wetlands Documented in New U.S. Fish and Wildlife Service Report

More than half of wetlands in the lower 48 states are gone, and losses continue, mostly in the

Southeast, Great Lakes and Prairie Pothole regions.

FWS March 22, 2024

A new report released by the U.S. Fish and Wildlife Service reveals wetlands – 95 percent of which are freshwater — covered less than 6 percent of the lower 48 states as of 2019 – which is half the area they covered since the 1780s. The report also identifies that loss rates have increased by 50 percent since 2009 and that without additional conservation actions taken to protect these ecosystems, wetland loss will likely continue, reducing ecosystem benefits for people and habitat for fish, wildlife and plants.

This sixth edition of the national “Wetlands Status and Trends” report to Congress measured wetland change from 2009 to 2019 and builds on data from a series of reports spanning 70 years, highlighting the importance of wetlands.

“The reasons for these losses are multiple, but the results are clear – wetland loss leads to the reduced health, safety and prosperity of all Americans,” said Martha Williams, Director of the U.S. Fish and Wildlife Service. “This report serves as a call to action to stop and reverse wetland loss and ensure we continue to provide future generations with clean water, protection against natural disasters, and resilience to climate change and sea level rise, as well as habitat for many plants and animals.”

The report shows wetland loss has disproportionately impacted vegetated wetlands like marshes and swamps. The rapid disappearance of vegetated wetlands between 2009 and 2019 has resulted in a loss of 670,000 acres, an area approximately equal to the land area of Rhode Island. Declines in vegetated wetlands primarily occurred in the Southeast, Great Lakes, and Prairie Pothole regions. Decreases were particularly prevalent in the coastal watersheds of the Carolinas, the Delmarva Peninsula, Florida, Louisiana and Texas, as well as near the Mississippi and Mobile rivers.

The main drivers of wetland loss have shifted over time. In the mid-1900s, loss was primarily caused by drainage and fill associated with agriculture. During the 2009 through 2019 study period, loss

was associated with development, upland planted forest, and agriculture. However, other drivers also likely contributed to the loss, including climate change and sea level rise, especially along the coasts.

To achieve no net loss of all wetlands, including vegetated wetlands, the report concludes that a strategic update is needed to America's approach to wetland conservation. Conserving and restoring vegetated wetlands will be critical to addressing climate change and threats to biodiversity.

Wetlands are one of the most productive and biodiverse habitats, with 40 percent of all plant and animal species living or breeding in wetlands. Threatened and endangered species are no exception, with approximately half of all Endangered Species Act species in the United States being wetland dependent. Wetlands provide stopover and wintering habitats for more than 4 billion birds from Canada as well as breeding habitats for nearly five billion migratory birds en route to the tropics. Wetlands also provide shelter and vital nursery habitat for many species of fish and are an important source of cultural resources for communities and many Native American Tribes.

Positioned at the transition between dry land and deepwater systems, wetlands are characterized by unique biological, chemical and hydrological conditions. Wetlands provide a multitude of ecological, economic and social benefits, as well as habitat for fish, wildlife and a variety of plants. Wetlands hold and slowly release flood water and snow melt, buffer against coastal storms, recharge groundwater, act as filters to cleanse water of impurities, recycle nutrients and provide recreational opportunities for millions of people. Wetlands are also nurseries for many salt and freshwater fishes and shellfish of commercial and recreational importance.

The Service uses funding sources like the Bipartisan Infrastructure Law to invest in conservation efforts to combat climate change and restore ecosystems that will provide long-lasting benefits to the American people. Within the Service and many other federal agencies, the Wetlands Status and Trends reports guide the funding, planning and implementation of wetland protection, restoration and enhancement, habitat assessments, strategic

habitat conservation, and ecosystem management activities. To read the report, visit <https://www.fws.gov/project/2019-wetlands-status-and-trends-report> For related images, visit <https://www.flickr.com/photos/usfwshq/albums/72177720314317155>.

Other Federal News

DOE 3/18/24. DOE Unveils Roadmap for the Next Generation of Geothermal Power

DOI 3/22/24. Interior Department Invests Nearly \$11 Million from President Biden's Investing in America Agenda to Restore Lands and Waters

DOI 3/27/24. Biden-Harris Administration Announces \$35 Million from Investing in America Agenda for Small Storage Projects in California and Utah

DOI 3/28/24. Biden-Harris Administration Finalizes Rules to Strengthen Protection and Recovery of Threatened and Endangered Species and Their Habitats

DOI 3/28/24. Interior Department Announces \$30 Million from President Biden's Investing in America Agenda for Water Savings in the Upper Colorado River Basin

EPA 3/1/24. EPA launches new office to strengthen engagement with agricultural and rural communities

EPA 3/19/24. Biden-Harris Administration engages states on safeguarding water sector infrastructure against cyber threats

EPA 3/21/24. EPA requires industrial facilities to enhance preparation for chemical discharges to water in adverse weather conditions, better protecting the environment and public health

EPA 3/22/24. EPA celebrates \$3 billion in WIFIA loans, investing in America's infrastructure this World Water Day

EPA 3/25/24. EPA issues PFAS test order as part of National Testing Strategy

FWS 3/1/24. U.S. Fish and Wildlife Service Provides Over \$1.3 Billion to Advance State Fish and Wildlife Conservation and Outdoor Recreational Access

NASA 3/19/24. NASA, Industry Improve Lidars for Exploration, Science

NASA 3/26/24. New NASA Software Simulates Science Missions for Observing Terrestrial Freshwater

NOAA 3/8/24. The U.S. had its warmest winter on record

NOAA 3/26/24. NASA, SpaceX Target New Launch Date for NOAA Weather Satellite

USDA 3/12/24. Biden-Harris Administration Bringing High-Speed Internet, Clean Drinking Water and Modern Infrastructure to Tribal Communities

The Western States Federal Agency Support Team (WestFAST) is a collaboration between 16 Federal agencies with water management responsibilities in the West. WestFAST was established to support the Western States Water Council (WSWC), and the Western Governors Association in coordinating Federal efforts regarding water resources.