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# WestFAST News

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## NASA-Led Study Provides New Global Accounting of Earth's Rivers

*The novel approach to estimating river water storage and discharge also identifies regions marked by 'fingerprints' of intense water use.*

NASA April 26, 2024



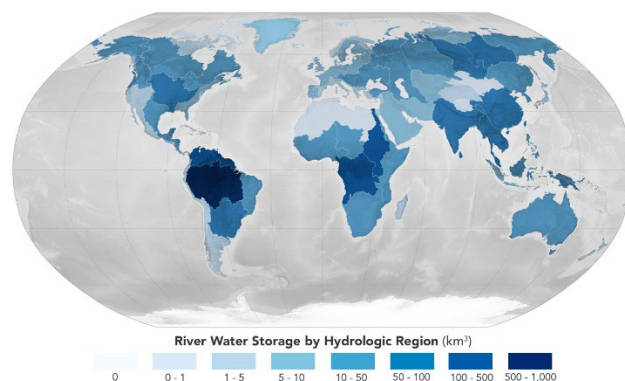
The Colorado River supplies water to more than 40 million people as it snakes through seven U.S. states, including the part of southeastern Utah seen in this photo snapped by an astronaut aboard the International Space Station. The Colorado basin was identified in a NASA-led study as a region experiencing intense human water use.

NASA

A study led by NASA researchers provides new estimates of how much water courses through Earth's rivers, the rates at which it's flowing into the ocean, and how much both of those figures have fluctuated over time — crucial information for understanding the planet's water cycle and managing its freshwater supplies. The results also

highlight regions depleted by heavy water use, including the Colorado River basin in the United States, the Amazon basin in South America, and the Orange River basin in southern Africa.

For the study, which was recently published in *Nature Geoscience*, researchers at NASA's Jet Propulsion Laboratory in Southern California used a novel methodology that combines stream-gauge measurements with computer models of about 3 million river segments around the world.

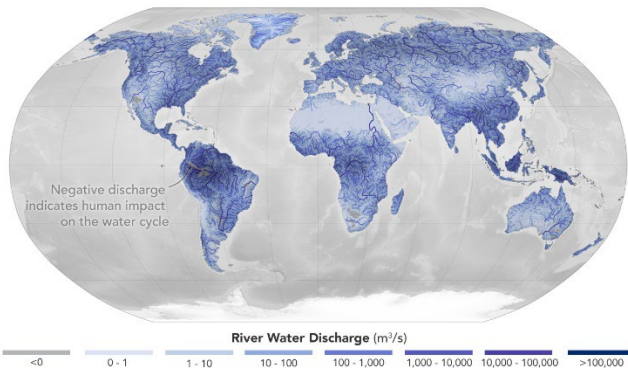


A NASA-led study combined stream-gauge measurements with computer models of 3 million river segments to create a global picture of how much water Earth's rivers hold. It estimated that the Amazon basin contains about 38% of the world's river water, the most of any hydrological region evaluated.

The scientists estimate that the total volume of water in Earth's rivers on average from 1980 to 2009 was 539 cubic miles (2,246 cubic kilometers). That's equivalent to half of Lake Michigan's water and about 0.006% of all fresh water, which itself is 2.5% of the global volume. Despite their small proportion of all the planet's water, rivers have been vital to humans since the earliest civilizations.

Although researchers have made numerous estimates over the years of how much water flows from rivers into the ocean, estimates of the volume of water rivers collectively hold — known as storage — have been few and more uncertain, said JPL’s Cédric David, a co-author of the study.

He likened the situation to spending from a checking account without knowing the balance. “We don’t know how much water is in the account, and population growth and climate change are further complicating matters,” David said. “There are many things we can do to manage how we’re using it and make sure there is enough water for everyone, but the first question is: How much water is there? That’s fundamental to everything else.”



The NASA-led study estimated flow through 3 million river segments, identifying locations around the world marked by intense human water use, including parts of the Colorado, Amazon, Orange, and Murray-Darling river basins, shown as gray here.

Estimates in the paper could eventually be compared with data from the international Surface Water and Ocean Topography (SWOT) satellite to improve measurements of human impacts on Earth’s water cycle. Launched in December 2022, SWOT is mapping the elevation of water around the globe, and changes in river height offer a way to quantify storage and discharge.

### ‘Fingerprints’ of Water Use

The study identified the Amazon basin as the region with the most river storage, holding about 204 cubic miles (850 cubic kilometers) of water — roughly 38% of the global estimate. The same basin also discharges the most water to the ocean: 1,629 cubic miles (6,789 cubic kilometers) per year. That’s 18% of the global discharge to the ocean, which averaged 8,975 cubic miles (37,411 cubic kilometers) per year from 1980 to 2009.

Although it’s not possible for a river to have negative discharge — the study’s approach doesn’t allow for upstream flow — for the sake of accounting, it is possible for less water to come out of some river segments than went in. That’s what the researchers found for parts of the Colorado, Amazon, and Orange river basins, as well as the Murray-Darling basin in southeastern Australia. These negative flows mostly indicate intense human water use.

“These are locations where we’re seeing fingerprints of water management,” said lead author Elyssa Collins, who conducted the analysis as a JPL intern and doctoral student at North Carolina State University in Raleigh.

### A New Way to Quantify Rivers

For decades, most estimates of Earth’s total river water were refinements of a 1974 United Nations figure, and no study has illustrated how the amount has varied with time. Better estimates have been hard to come by, David said, due to a lack of observations of the world’s rivers, particularly those far from human populations.

Another issue has been that there are many more stream gauges monitoring the levels and flow of large rivers than there are of small ones. There’s also broad uncertainty in estimates of land runoff — the rainwater and snowmelt that flow into rivers.

The new study started from the premise that runoff flowing into and through a river system should roughly equal the amount that gauges measure downstream. Where the researchers found inconsistencies between simulated runoff from three land surface models and gauge measurements taken from approximately 1,000 locations, they used the gauge measurements to correct the simulated runoff numbers.

Then they modeled the runoff through rivers on a high-resolution global map developed using land-elevation data and imagery from space, including from NASA’s Shuttle Radar Topography Mission. This approach yielded discharge rates, which were used to estimate average and monthly storage for individual rivers and the planet’s rivers in total.

Using a consistent methodology enables comparisons in flow and human drawdown between different regions.

“That way we can see where in the world the most amount of river water is stored, or where the most amount of water is being emptied into oceans from rivers,” said Collins, now a postdoctoral researcher at the University of North Carolina at Chapel Hill.

## **Biden-Harris Administration Finalizes Critical Rule to Clean up PFAS Contamination to Protect Public Health**

*EPA action designates two widely used PFAS as hazardous substances under the Superfund law, improving transparency and accountability to clean up PFAS contamination in communities.*

EPA April 19, 2024

Today, April 19, 2024, the U.S. Environmental Protection Agency (EPA) is taking another step in its efforts to protect people from the health risks posed by exposure to “forever chemicals” in communities across the country. Exposure to per- and polyfluoroalkyl substances (PFAS) has been linked to cancers, impacts to the liver and heart, and immune and developmental damage to infants and children. This final rule will designate two widely used PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, and will help ensure that polluters pay to clean up their contamination.

This final action will address PFOA and PFOS contamination by enabling investigation and cleanup of these harmful chemicals and ensuring that leaks, spills, and other releases are reported. This action builds on the recently finalized standards to protect people and communities from PFAS contamination in drinking water and represents the latest step the Biden-Harris Administration is taking to protect public health and welfare and the environment under [EPA’s PFAS](#)

[Strategic Roadmap](#) and to prevent cancer before it starts through the Biden Cancer Moonshot.

In addition to the final rule, EPA is issuing a separate [CERCLA enforcement discretion policy](#) that makes clear that EPA will focus enforcement on parties who significantly contributed to the release of PFAS chemicals into the environment, including parties that have manufactured PFAS or used PFAS in the manufacturing process, federal facilities, and other industrial parties.

“President Biden understands the threat that “forever chemicals” pose to the health of families across the country. That’s why EPA launched its PFAS Strategic Roadmap, a whole-of-agency approach to protecting public health and addressing the harm to communities overburdened by PFAS pollution,” said EPA Administrator Michael S. Regan. “Designating these chemicals under our Superfund authority will allow EPA to address more contaminated sites, take earlier action, and expedite cleanups, all while ensuring polluters pay for the costs to clean up pollution threatening the health of communities.”

EPA is taking this step to designate PFOA and PFOS under CERCLA because both chemicals meet the statutory criteria for designation as hazardous substances. Under the rule, entities are required to immediately report releases of PFOA and PFOS that meet or exceed the reportable quantity of one pound within a 24-hour period to the National Response Center, State, Tribal, and local emergency responders. The designation of PFOA and PFOS as hazardous substances under CERCLA enables the agency to use one of its strongest enforcement tools to compel polluters to pay for or conduct investigations and cleanup, rather than taxpayers. Designation is especially important as delay in addressing contamination allows PFOA and PFOS more time to migrate in water and soil, worsening existing contamination.

The final rule also means that federal entities that transfer or sell their property must provide notice about the storage, release, or disposal of PFOA or PFOS on the property and guarantee that contamination has been cleaned up or, if needed, that additional cleanup will occur in the future. It will also lead the Department of Transportation to

list and regulate these substances as hazardous materials under the Hazardous Materials Transportation Act.

“It’s long past time for the polluters who poisoned all of us to be held responsible. This comes too late for all the people who were poisoned without their knowledge or consent and have paid the price for one of the greatest environmental crimes in history,” said Ken Cook, President and co-founder of Environmental Working Group. “But today’s designation of PFOA and PFOS as hazardous substances is the first step to bring justice to those who have been harmed. By putting the needs of the people ahead of the profits of the polluters, the Biden EPA is once again delivering for the American people.”

This final action is based on significant scientific evidence that these substances, when released into the environment, may present a substantial danger to public health or welfare or the environment. PFOA and PFOS can accumulate and persist in the human body for long periods of time, and evidence from scientific studies demonstrate that exposure to PFOA and PFOS is linked to adverse health effects.

“This is another important step by EPA to protect people and communities from harmful PFAS chemicals, including legacy PFAS contamination across the U.S. The science is clear that PFAS chemicals are linked to a wide range of health harms including cancer, damage to cardiovascular and immune systems, poor pregnancy outcomes, and effects on the developing child,” said Dr. Tracey Woodruff, Professor & Director, Program on Reproductive Health & the Environment (PRHE)/Environmental Research and Translation for Health at the University of California, San Francisco. “By listing PFOA and PFOS as hazardous substances under the Superfund Law, it means that these chemicals will have to be cleaned up from hazardous waste sites and polluters must pay the bill. This is great news for the many communities grappling with PFAS contamination – many of which are also low income and communities of color. This is another step toward protecting people from the health harms of this well-known toxic chemical.”

EPA’s Superfund program has worked effectively for more than 40 years to target and prioritize cleanups of the nation’s most contaminated sites

that present unacceptable risks to human health and the environment. The Superfund program addresses more than 800 hazardous substances, including widespread, highly mobile, and persistent chemicals, like PFOA and PFOS. The program also promotes safer industrial practices that enhance community protections by reducing the likelihood of future releases. Additionally, cleanups allow communities to put land back into productive use, providing opportunities for jobs and economic growth.

In addition, EPA’s enforcement policy, consistent with EPA’s past practice over decades of implementing the law, will provide additional clarity on the agency’s intent not to pursue certain parties such as farmers, municipal landfills, water utilities, municipal airports, and local fire departments, where equitable factors do not support seeking CERCLA cleanup or costs. EPA has a proven track record of developing and applying enforcement discretion policies that are effective and well-received by stakeholders, ensuring entities that have contributed significant contamination are held accountable.

### **Biden-Harris Administration Takes Critical Action to Protect Communities from PFAS**

In addition to efforts across the government, EPA has taken action under the agency’s [PFAS Strategic Roadmap](#) to control PFAS at its sources, hold polluters accountable, ensure science-based decision making, advance environmental justice, and address the impacts on disadvantaged communities. Since launching the [Roadmap](#) in 2021, EPA has taken a suite of actions to protect communities from exposure to “forever chemicals” including:

- *Established first-ever national legally enforceable drinking water standard for PFAS:* In April 2024, EPA finalized National Primary Drinking Water Regulation (NPDWR) for six PFAS which will protect 100 million people from PFAS exposure, prevent tens of thousands of serious illnesses, and save lives. This action complements the Biden-Harris Administration’s commitment to combatting PFAS pollution and delivering clean water.
- *Dedicated \$9 billion in funding to address PFAS and other emerging contaminants in*

*drinking water:* President Biden’s Bipartisan Infrastructure Law secured the largest-ever investment in tackling PFAS pollution in drinking water. An additional \$12 billion in funding from the Bipartisan Infrastructure Law supports general drinking water investments, including PFAS treatment. The investments are part of the [Justice40 Initiative](#), which aims to ensure that 40 percent of the overall benefits of certain federal investments flow to disadvantaged communities.

- *Guidance on Destroying and Disposing of PFAS:* EPA released updated Interim Guidance which outlines the best-available science on techniques and treatments that may be used to destroy or dispose of PFAS and PFAS-containing materials from non-consumer products, including aqueous film-forming foam for firefighting, and highlights innovation and emerging technologies that warrant further evaluation.
- *Addressing on-going uses of PFAS:* In January 2024 EPA finalized a rule that prevents companies from starting or resuming the manufacture or processing of 329 PFAS; released three methods to better measure PFAS in the environment; and announced the addition of seven PFAS to the list of chemicals covered by the Toxics Release Inventory (TRI), consistent with the Fiscal Year 2020 National Defense Authorization Act.

EPA will publish the Final Rule in the *Federal Register* shortly. The rule will be effective 60 days after the rule is published in the Federal Register.

[Read more about the CERCLA final rule here.](#)

[Read EPA’s CERCLA Enforcement Discretion Policy here.](#)

[Read more about EPA’s strategy to address PFAS here.](#)

[Read more about EPA’s Superfund program here.](#)

[Read more about the Superfund Enforcement Program here.](#)

## **USDA Makes \$1.5 Billion Available to Help Farmers Advance Conservation and Climate-Smart Agriculture as Part of President Biden’s Investing in America Agenda**

*Funding from the Inflation Reduction Act will help farmers save money, create new revenue streams, enhance natural resources, and tackle the climate crisis.*

USDA April 3, 2024

Agriculture Secretary Tom Vilsack today announced the availability of an historic \$1.5 billion in fiscal year 2024 to invest in partner-driven conservation and climate solutions through the Regional Conservation Partnership Program (RCPP) as part of President Biden’s Investing in America agenda. The U.S. Department of Agriculture (USDA) is accepting project proposals now through July 2, 2024, that will help farmers, ranchers, and forest landowners adopt and expand conservation strategies to enhance natural resources while tackling the climate crisis. These projects in turn can save farmers money, create new revenue streams, and increase productivity.

The investments in climate-smart agriculture that USDA has made since the beginning of the Biden-Harris Administration, and will continue to make through the Inflation Reduction Act and [Partnerships for Climate-Smart Commodities](#), are estimated to support over 180,000 farms and over 225 million acres in the next 5 years.

Today’s investment is made available through the Farm Bill and the Inflation Reduction Act, the largest climate investment in history, which has enabled USDA’s Natural Resources Conservation Service (NRCS) to boost funding for RCPP. Additionally, NRCS is announcing progress on its effort to streamline and simplify RCPP and improve processes and implementation.

“We had unprecedented demand for the Regional Conservation Partnership Program last year, showing the robust interest in conservation from farmers and ranchers,” Secretary Vilsack said.

“Through the increase in funding from President Biden’s Inflation Reduction Act, we’re able to invest even more this year in this important program, increasing our impact across the landscape. We’re looking forward to seeing what the more streamlined and customer-oriented Regional Conservation Partnership Program can do to get more conservation on the ground in the coming months and years.”

There are two separate funding opportunities being announced today: RCPP Classic and RCPP Alternative Funding Arrangements (AFA). RCPP Classic projects are implemented using NRCS contracts and easements with producers, landowners and communities in collaboration with project partners. Through RCPP AFA, the lead partner works directly with agricultural producers to support the development of innovative conservation approaches that would not otherwise be available under RCPP Classic. NRCS will set aside \$100 million for Tribal-led projects to be used between both funding opportunities.

The 2024 RCPP funding priorities are climate-smart agriculture, urban agriculture, conservation, and environmental justice. This funding advances President Biden’s [Justice40 Initiative](#), which aims to ensure that 40 percent of the overall benefits of certain climate, clean energy, and other federal investments flow to disadvantaged communities marginalized by underinvestment and overburdened by pollution. Today’s action also advances President Biden’s *America the Beautiful* initiative, a 10-year, locally led and nationally scaled conservation initiative that includes the voluntary efforts of farmers, ranchers and private landowners.

NRCS encourages proposals led by historically underserved entities or Indian tribes.

Project proposals for RCPP are being accepted through the [RCPP portal](#). Details on the [RCPP Classic](#) and [RCPP AFA](#) funding opportunities are available on [Grants.gov](#).

NRCS will be hosting webinars to provide additional information. Learn how to participate at the [RCPP website](#).

## More about RCPP

RCPP is a partner-driven approach to conservation that funds solutions to natural resource challenges on agricultural land. By leveraging collective resources and collaborating on common goals, RCPP demonstrates the power of public-private partnerships in delivering results for agriculture and conservation.

In November 2023, NRCS announced more than \$1 billion for 81 RCPP projects across the country. [View the interactive map of awarded projects here](#).

Since the beginning of the Biden-Harris Administration, NRCS has invested a total of \$1.8 billion in 256 RCPP projects covering 49 states and territories.

## More about the RCPP Improvement Effort

Through a concerted effort in 2023 using feedback and expertise from partners, employees, leadership and stakeholders, NRCS identified several improvements to RCPP that the agency has implemented and will continue to implement in the months and years ahead. In fiscal year 2024, NRCS is:

- Streamlining RCPP agreement negotiation to allow simultaneous execution of program partnership and supplemental agreements;
- Updating policy and business tools to streamline the development of RCPP agreement deliverables and reducing the need for nationally approved waivers;
- Conducting annual comprehensive training for state program managers and support staff; and
- Delegating additional authority to State Conservationists to support locally led projects.

NRCS will continue to invest in creating a new business tool to support greater automation of RCPP agreement development, obligating funding to partners, and quicker processing of payments.

NRCS is working on model easement deeds to streamline implementation of RCPP easements that use common deed terms for specific land uses.

This year, NRCS aims to reduce negotiation time from 15 months to 6 months, with the goal to reduce the time even further in future years.

For the full list of RCPP improvements NRCS has identified, please [visit our website](#).

In addition to improving RCPP, NRCS is also working to make improvements to its Agricultural Conservation Easement Program and Conservation Stewardship Program to make them function better for producers, partners and staff.

### **More about the Inflation Reduction Act**

These two RCPP funding opportunities include Farm Bill and Inflation Reduction Act funds.

In total, the Inflation Reduction Act provides \$19.5 billion over five years to support USDA's oversubscribed conservation programs, including \$4.95 billion for RCPP over five years. The Inflation Reduction Act, part of President Biden's Investing in America agenda, represents the single largest investment in climate and clean energy solutions in American history. [Learn more about NRCS' Inflation Reduction Act investments in fiscal year 2023](#).

USDA touches the lives of all Americans each day in so many positive ways. In the Biden-Harris administration, USDA is transforming America's food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to safe, healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by removing systemic barriers and building a workforce more representative of America. To learn more, visit [www.usda.gov](http://www.usda.gov).

## **Upcoming Events**

[WestFAST Webinar: Introducing the 3D Hydrography Program](#)  
May 8, 10am MT, Virtual

[2024 WSWC Summer \(204th\) Meetings](#)  
July 24-26, West Fargo, North Dakota

## **Other Federal News**

[BLM 4/5/24. BLM invests \\$4.8 million to address drought in western states as part of President Biden's Investing in America agenda](#)

[BLM 4/15/24. BLM adopts categorical exclusions to expedite geothermal energy permitting](#)

[BLM 4/22/24. BLM seeks input on \\$348 million in proposed conservation and restoration funding recommendations](#)

[DOI 4/1/24. Biden-Harris Administration Announces \\$320 Million for Tribal Domestic Water Infrastructure](#)

[DOI 4/4/24. Biden-Harris Administration Announces \\$19 Million from Investing in America Agenda for Innovative Solar Panel Installation Over Canals](#)

[DOI 4/8/24. Biden-Harris Administration Announces \\$79 Million from President Biden's Investing in America Agenda for Wildfire Mitigation and Recovery](#)

[DOI 4/11/24. Interior Department Finalizes Action to Strengthen Endangered Species Act](#)

[DOI 4/16/24. Interior Department Delivers Nearly \\$30 Million for Drought Resilience in the Upper Colorado River Basin from President's Investing in America Agenda](#)

[DOI 4/18/24. Secretary Haaland Announces Up To \\$95 Million through the President's Investing in America Agenda for Water Resources and Ecosystem Health](#)

DOI 4/23/24. Biden-Harris Administration Announces New Interagency Effort to Support Tribal Water and Sanitation Infrastructure

DOI 4/23/24. Biden-Harris Administration Announces More Than \$70 Million from Investing in America Agenda for National Fish Passage Program Projects to Address Climate Resilience and Strengthen Local Economies

EPA 4/2/24. EPA Launches New Website to Improve Transparency in Permitting

EPA 4/3/24. EPA Recognizes Excellence and Innovation in Clean Water and Drinking Water Infrastructure Projects

EPA 4/9/24. EPA Releases Updated Interim Guidance on Destroying and Disposing of Certain PFAS and PFAS-Containing Materials

EPA 4/10/24. Biden-Harris Administration Finalizes First-Ever National Drinking Water Standard to Protect 100M People from PFAS Pollution

EPA 4/23/24. EPA Announces Online Collection of Environmental Justice Resources

FEMA 4/16/24. DHS Announces \$1.8 Billion in Preparedness Grants

FEMA 4/17/24. Biden-Harris Administration Announces up to \$295 Million Available to Activated States Through FY23 Swift Current to Help Communities Withstand Impacts of Climate Change

FEMA 4/19/24. Biden-Harris Administration Announces \$26 Million in Awards for the State Assistance Dam Safety Grant Program

FEMA 4/19/24. Biden-Harris Administration Announces Extreme Heat Summit Series to Advance Nationwide Climate Resilience Goals

FWS 4/3/24. U.S. Fish and Wildlife Service Reopens Public Comment Period on Proposal to list

both Species of Western Pond Turtle under the Endangered Species Act

FWS 4/11/24. U.S. Fish and Wildlife Service Provides \$21 Million in Grants for Boating Infrastructure, Local Communities and Water Recreation

FWS 4/25/24. \$7.5M More in Bipartisan Infrastructure Law Funding to Support Salmon and Communities

NASA 4/19/24. NASA Data Helps Beavers Build Back Streams

NOAA 4/12/24. Last month was Earth's warmest March on record

Reclamation 4/17/24. Biden-Harris Administration provides \$13.3M in grants to enhance water management and forecast tools in the West as part of Investing in America agenda

Reclamation 4/23/24. Biden-Harris Administration provides more than \$11 million for water sustainability and efficiency as part of Investing in America agenda

USACE 4/1/24. USACE releases draft National Levee Safety Guidelines for public comment

USGS 4/3/24. Illegal Oil and Gas Wastewater Dumps Disrupt Foundations of Fragile Desert Ecosystems

USGS 4/10/24. Studies Reveal Presence and Distribution of PFAS in New Mexico's Water Resources

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.