



The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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INFRASTRUCTURE FOR WATER SECURITY

THE NEED FOR A NATIONAL WATER POLICY & COMMISSION

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Introduction

The Infrastructure Investment and Jobs Act (IIJA) (Public Law (P.L.) 117-58) was signed into law on November 15, 2021. The legislation provides for a generational investment in transportation, broadband, electric grid/power, and water infrastructure. The Act authorizes \$550 billion in new infrastructure spending over five fiscal years. Approximately 18% of the IIJA funds are allocated to water infrastructure. Our national water infrastructure is in dire need of reinvestment (ASCE 2021). The IIJA legislative goal is to invest in infrastructure to improve water supply and water quality and to support water security and climate resiliency in watersheds.

Decisions on how and where IIJA funding will be utilized will be a function of the policy and economic metrics utilized by each involved agency to determine priorities and funding allocations. Historically, determination of where federal funds are invested has been through a combination of politics, agency mission, and calculations of anticipated benefits and costs.

Planning authorization, financial analysis of anticipated benefits and costs, and coordination on permitting for construction are all part of the process in determining where federal dollars are invested. Addressing the need for construction of new — and reinvestment in aging — water infrastructure should be accomplished utilizing a strategic approach that incorporates sound economic principles to identify true benefits and costs. Increasingly, the importance of addressing intergenerational shortcomings and equitable distribution of infrastructure support has also become apparent.

Climate change is increasing the risk and challenges of designing, operating, and managing water infrastructure. Costs, both financial and human, are increasing as extreme weather events become more frequent and intense. Calendar year 2021 was the seventh consecutive year in which the United States experienced ten or more weather and climate disaster events that cost more than \$1 billion each in overall damages (NOAA 2022). Water infrastructure strategy needs to adapt to changing climatic conditions to sustain our water security.

This article will discuss:

- the history of funding decision making and the evolution of cost-benefit metrics used by the federal government for water infrastructure
- the coordination between federal water agencies and water infrastructure priorities
- the integration of non-traditional economic metrics in assessing water infrastructure projects
- the challenges facing federal water infrastructure prioritization with climate change

Water Security

Water Control

Sustainability Trend

Benefit-Cost Analysis (BCA)

Monetizing Challenge

Planning Agencies

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Background

Since the founding of the Nation, the federal government has supported water infrastructure to aid both urban water use and agriculture. As populations and industry expanded into flood plains, federal focus expanded to include protection from floods and improved transportation through utilization of levees and channelized rivers. This control of water emphasized engineered structures, including: dams, levees, channelized rivers, pumps, locks, shoreline berms, and flood walls.

Beginning with the passage of the Federal Water Pollution Control Act (P.L. 80-845, 1948), water quality became a part of federal water infrastructure investment. Federal water infrastructure development grew from local water protection and supply projects to government-supported mega-funded regional enterprises. We are now trending back to local projects focused on ensuring reliable, secure, and sustainable water supplies.

Since the 1920's, the federal government has used **benefit-cost analysis (BCA)** to inform decision-making on federal investments by comparing monetized benefits and costs of proposed projects. More recent improvements in the scientific understanding of how ecosystems function has increased the need to find ways to integrate additional values into the traditional water resource planning. The "services" provided by healthy ecosystems can include water quality protection and water supply stabilization. However, monetizing these non-traditional project benefits and values is difficult and requires an expansion on how we view and calculate benefit-cost allocations. Capturing the costs and benefits of storm and flood damage reduction, non-structural infrastructure, environmental and climate services, social justice, equity/diversity issues, and intergenerational fairness are all now necessary to prioritize spending. The present Administration has directed that 40% of IJA funding be directed toward disadvantaged communities (Executive Order 14008, 2021).

Funding for federal water infrastructure becomes available through annual Congressional appropriations to water-concerned agencies. Over the last two decades agencies have increasingly come to depend on additional funds allocated to water infrastructure through supplemental legislation often associated with natural emergency events.

Water infrastructure planning and construction in the United States is conducted via several separate federal agencies. In 1965, Congress tried to address the siloing of federal water policy by passing the Water Resources Planning Act (P.L. 89-80, 1965). The Act directed the establishment of a federal Water Resources Council that focused on river basin and agency coordination. During the Reagan Administration, funding for Water Resources Council was withdrawn and, as a result, federal water agency coordination diminished. Currently a smaller forum for water management coordination occurs through the Water Subcabinet (Executive Order 13956, 2020) but it lacks statutory authority to implement interagency actions. As a result, project coordination amongst the federal water agencies is inconsistent, including with regard to assessing infrastructure value and prioritization.

Since the 1960's there have been periodic attempts to change the national water resources planning effort. These include: expansion of the cost-sharing requirements for local water project co-sponsors; decentralization of decision-making authority in water project planning and operations; and efforts to capture the value of climate and ecosystem services.

Federal Water Infrastructure Investments: A Brief History

Over 200 years of water resource development, environmental and resource management, and population growth have produced a complex web of: federal, state, and tribal laws and regulations; local ordinances; water and power contracts; treaty obligations; and Tribal water settlements. All these aspects combine to define present physical and administrative water use patterns and controlling infrastructure.

The Federalist nature of our constitution has led to the states having considerable control over management of water resources. Further refinements address individual communities, tribes, legislatively approved water districts, and other forms of joint management authorities.

Infrastructure generally refers to constructed hard structures that facilitate economic activity (CRS 2021). A federal government definition generally includes physical structures and equipment that increase economic growth and/or provide public safety. Infrastructure investments can be made by the government, the private sector, or through public-private partnerships. The extent to which public infrastructure results in long-term economic growth depends in part on the productivity of specific infrastructure projects. Federal government investment in infrastructure is made through annual appropriations or special legislation.

<p style="text-align: center;">Water Security</p> <p>Federal Budget</p> <p>Economic Feasibility</p> <p>Policy Issues</p> <p>Water Agencies & BCA</p> <p>National Resources Planning Board</p> <p>Abolished</p> <p>River Basin Survey</p> <p>Water Development Agencies</p>	<p>Development of Economic Planning Procedures</p> <p>The Budget and Accounting Act of 1921 (P.L. 67–13) established the framework for the modern federal budget. This Act required that the President submit an annual budget for the entire federal government to Congress. The object of the budget bill was to consolidate the spending of agencies in both the executive and legislative branches of the government. The Act created the Bureau of the Budget (now called the Office of Management and Budget (OMB)) to review funding requests from government agencies and to assist the President in formulating the budget. The Act also created the General Accounting Office (now known as the Government Accountability Office (GAO)) which serves to audit, evaluate, and investigate government agencies actions, policies, and matters in relation to the receipt, disbursement, and application of public funds.</p> <p>The Bureau of Budget managed the Administration budget process and required that all proposed projects, including water infrastructure, pass a test of economic feasibility. This feasibility test included:</p> <ul style="list-style-type: none"> • Ensuring that the benefits of the project exceed its costs (Benefit Cost Analysis (BCA)) • Local interests agreeing to repay costs that were not allocated to the federal government <p>Policy issues emerged as the agencies began to implement BCA. Issues of concern included:</p> <ul style="list-style-type: none"> • Overestimation of primary benefits and underestimation of primary costs • Estimation of secondary benefits in respect to benefits to others than the water users — which typically accrue locally or regionally • Intangible benefits such as safety, recreation, scenic value, and wildlife — which typically accrue on a broader geographic scale • Failure to evaluate planning alternatives including nonstructural alternatives • Cost-sharing allocations to non-federal stakeholders • Repayment requirements for irrigation projects • Use of federal hydropower revenues to pay for federal investments and irrigation components <p>The responsibility for coordinating the planning and development of federal water infrastructure included the Bureau of the Budget, various federal agencies, and Congress. The primary federal water agencies that used the BCA approach were: the Bureau of Reclamation (Reclamation); the Army Corps of Engineers (Army Corps); the Soil Conservation Service (now the Natural Resources Conservation Service); and the Federal Power Commission.</p> <p>Utilizing the National Industrial Recovery Act of 1922 as authority, in 1934 President Roosevelt issued Executive Order 6777 (E.O. 6777, 1934) and established the National Resources Planning Board (NRPB). The NRPB served as the only overall national resource planning agency in US history. The NRPB evolved from public works to include broader social and economic planning. The NRPB focused on public works and broader social and economic multi-use planning associated with key national needs. Recognized needs included: policy; organization; infrastructure location; and postwar planning keyed to identification of potential benefits; and costs of development (Warren 1979). The NRPB was abolished in 1943 and thereafter the Executive Branch did not have an organizational unit with authority to propose and integrate social priorities into federal water resources programs. Congressional committees assumed more authority.</p> <p>In 1943, the Federal Power Commission and the Departments of Agriculture, Interior, and War (now Defense) entered into an agreement to coordinate their separate responsibilities associated with development of river basin surveys. The Federal Interagency River Basin Committee (FIRBC) was established. However, the FIRBC had no statutory powers to require coordination of methodologies or standardization of economic analysis (Machette et al. 1996).</p> <p>In 1950 the FIRBC Subcommittee on Benefits and Costs submitted a report on “<i>Proposed Practices for Economic Analysis of River Basin Projects</i>” (Hort Holmes 1979). The report was approved by all four agencies but was non-binding. The FIBAC was abolished by letter of President Dwight D. Eisenhower to Secretary of the Interior Douglas McKay on May 26, 1954. The FIBAC was succeeded by the Interagency Committee on Water Resources (IACWR) — an entity that allowed additional agencies to participate. The IACWR continued to support coordination, but Congress was not supportive of the Executive Branch review of water policies nor developing comprehensive river basin plans (Hort Holmes. 1979).</p> <p>The federal water resources program during the 1960’s was first and foremost a water development program. Construction of infrastructure was its most important function, with operation and maintenance a secondary priority. This water infrastructure development program was centered in six federal agencies: the Army Corps; Reclamation; the Soil Conservation Service; the Tennessee Valley Authority; the Public Health Service; and the Federal Power Commission.</p>
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Water Security

1965 Act

Act Objectives

Infrastructure Supporting Development

National Water Commission

Commission Report

Economic Principles

Siloed Thinking

Net Economic Benefits

The Kennedy and Johnson administrations worked to develop more consistent approaches to river basin management to help guide regional economic development and increase integration of social and other non-monetized benefits. On July 21, 1965, these efforts were manifested in the passage of the Water Resources Planning Act (P.L. 89-80).

...policy of the Congress to encourage the conservation, development, and utilization of water and related land resources of the United States on a comprehensive and coordinated basis by the Federal Government, States, localities, and private enterprise with the cooperation of all affected Federal Agencies, states, local governments, individuals, corporations, business enterprises, and others concerned. (Water Resources Planning Act, 1965)

Title I of 1965’s Water Resources Planning Act established the Water Resources Council (WRC), which had two main objectives: (1) maintain a continuing study and prepare assessments of the adequacy of supplies of water necessary to meet regional and national interests; and (2) maintain a continuing study of relation of regional or river basin plans and programs to the requirements of the Nation and the adequacy of administrative and statutory means for coordination. Section 103 called for the Water Resources Council (in consultation with other entities) to establish principles, standards, and procedures for participating federal agencies in the preparation of comprehensive regional or river basin plans with regard to the formulation and evaluation of federal water and water-related resource projects. This authority was utilized to develop the Principles and Standards (WRC 1973) that would augment the traditional Benefit-Cost Analysis utilized by the federal agencies.

The second piece of legislation of importance to federal water infrastructure planning was the Public Works and Economic Development Act of 1965 (P.L. 89-136 1965) which authorized the creation of the Economic Development Administration (EDA). EDA had an oversight role in the implementation of public works grants and loans. The concept of infrastructure to support National Economic Development (NED) was recognized (Hort Holmes, 1979).

A Commission, A National Water Assessment, A Lost Opportunity

In 1968, Congress authorized the creation of the National Water Commission to “provide for a comprehensive review of the national water resource problems and programs (P.L. 90-515).” Congress directed the Commission to review present and anticipated national water resource problems, programs, and policies in the context of their relationship to the total environment — including aesthetic values affecting the quality of life of the American people (Ingram et al. 1975). The Commission was created out of a compromise in Congress over the development of dams and related irrigation infrastructure in the Lower Colorado River Basin which — if they had been developed — would have used more water than the river could supply (CRS 2009). Members of the Commission were politically appointed experts from the field of water resource management. The Commission existed from 1968 until it completed its report in 1973.

The final Commission report included 17 chapters, supporting appendices and 232 recommendations. One of the thematic areas of the report’s conclusions and recommendations was directly relevant to the use of economic principles and the assessment of values.

Sound Economic Principles, such as consumers’ willingness to pay, should be used to encourage better use of water resources, but tempered by governmental attention to protection of environmental values. (National Water Commission Report 1973)

The Final National Water Commission report was completed and underwent several Congressional oversight hearings (CRS 2009). However, neither the Water Resources Council, President Nixon, nor subsequent administrations completed the legislative requirements of transmitting the final report to Congress and requesting action on the report’s recommendations. As a result, federal water policy continued to evolve in an ad hoc manner reflecting the changing dynamics of population growth, politics, and engineer-dominated agency cultures — conditions which supported siloed thinking and marginalized public input.

Net Economic Benefits Focus

The federal objective of water and related land infrastructure planning is to contribute to National Economic Development (NED) consistent with protecting the Nation’s environment. Project alternatives are compared based on the anticipated contribution the project will make to NED. Contributions are

Water Security

Tangible & Intangible Benefits

BCA Application

BCA Concerns

Overall Value

Discounted Future Costs

Discount Rates

Rates Range

Coordination Effort

defined as increases in the net value of the national output of goods and services — expressed in monetary units — for the planning region and the Nation. Contributions to the NED include increases in the net value of anticipated goods and services that are marketed or not marketed (NWF 2018).

The National Resources Planning Board (1934-1943) recognized two general categories of benefits and costs — tangible and intangible. Tangible benefits include products of services, and indirect affects, including jobs and stimulation of private enterprise through public works spending. Intangible benefits — while recognized — proved difficult to identify and monetize.

The use of the Benefit Cost Analysis (BCA) to assess the economic viability of federal water agency projects is attributed to Section I of the Flood Control Act of 1936 (Hort Holmes, 1979).

... the Federal Government should improve or participate in the improvement of navigable waters or their tributaries including watersheds thereof, for flood control purposes if the benefits to whomsoever they may accrue are more than the estimated costs ... (Flood Control Act of 1936)

The 1936 BCA statutory directive applied specifically to Army Corps flood control improvements and the Department of Agriculture. BCA was adopted by all water planning agencies and by the Water Resources Committee of the National Resources Planning Board (Hort Holmes, 1979). Inconsistency arose when each agency adopted different criteria for estimating benefits and costs.

BCA has proven controversial due its dependence on subjective decisions as to what should or should not be included as benefits and costs, as well as how they should be evaluated (NWF 2018). Primary concerns are associated with: (1) the equity and distribution of costs and benefits; (2) uncertainties in estimates associated with growth projections; and (3) some benefits and costs that may not be monetized. From 1936 through the late 1950’s the federal government and Congress continued to develop the qualitative practices and measurements used to assess water development projects, including the annual determination of the discount rate to be used to estimate future costs and benefits.

To determine the overall value of a policy or an infrastructure project to society, the US government calculates costs and benefits for both now and in the future. To assess future impacts, they must be reduced in value (or “discounted”), since future costs and benefits are less significant than those same costs and benefits today. Higher discount rates mean that future effects are considered increasingly less significant while a low discount rate indicates a higher significance of future impacts (CRS 2016).

The Office of Management and Budget (OMB) advises federal agencies annually on recommended discount rates. The agencies then develop specific policy direction on the discount rates to be used in project formulation. Water resource projects, outside contracts, and federal energy management programs are exempt from GAO and OMB guidelines. These projects fall under different regulations that identify alternative methods to determine discount rates (CRS 2016).

The Water Resources Planning Act of 1965 and the Water Resources Development Act of 1974 both require an annual determination of a discount rate for federal water resources planning (P.L. 93-251 1974, P.L. 89-80 1965). The current guidance for assessing water resource projects is the approved “*Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*” (Principles and Guidelines, 1983).

The discount rates used by federal agencies have ranged from 2% to 7% in real terms. The effective real rate used by Reclamation and the Army Corps could be higher when market rates, which include an expected inflation component, are applied to expected real benefits and costs. The 2022 discount rate utilized by the Army Corps and Reclamation is 2.25%. (Federal Register 2022).

The Water Resources Council & the 1973 Principles and Standards and Revision

As noted above, the Water Resources Council (WRC) was established in 1965 under the direction of the Water Resources Planning Act (P.L. 89-80, 1965) with the directive to coordinate federal water programs and policy. Up until the passage of this law the US water resource agencies largely acted autonomously in proposing and assessing project plans.

Duties of the WRC were to:

- Conduct continuing assessments of water supplies
- Coordinate basin plans with larger regional and federal programs, including policy recommendations
- Establish “principles and standards” for evaluating projects that included the integration of environmental and social objectives with the traditional cost-benefit analysis
- Review and make recommendations on river basin commission plans
- Allot financial grants to states for planning purposes

Water Security

Evaluation Standards

Effort Shortcomings

Assessment Principles

Defunding

Economic Development Focus

Revised Guidelines

Assessment Accounts

The WRC developed and issued detailed national water assessments in 1968 and 1975 and produced multiple river basin and planning studies. The WRC included the major federal water infrastructure agencies, Office of Management and Budget, and the Council on Environmental Quality, with support and information provided by river basin commissions and, after 1970, the newly-created Environmental Protection Agency (EPA) (CRS 2009).

One duty of the WRC was to develop “principles and standards” for evaluating project alternatives, including the integration of environmental and social objectives and assessment with cost-benefit analysis. These *Principles and Standards* (P&S) were completed by the WRC in 1973 (Federal Register 1973).

The WRC was a unique and forward-thinking approach to coordinating national water policy. However, its effectiveness was hindered by: unclear governance; undefined guidelines; lack of a dispute resolution process; and lack of the statutory authority to implement actions. These shortcomings reduced the WRC’s ability to implement needed actions in river basins and limited their value to Congress (GAO 1977). As a result, neither a supportive constituency in Congress or with stakeholders in the river basins existed. The lack of follow-through restricted WRC’s capacity for planning and cooperation.

In 1977-78, P&S revisions acknowledged that water and related land resources are not unlimited or free, and that care and efficiency must be expended in their management and use (Hrezo 1980). It was recognized that projects needed to be assessed based on their contribution to: national economic development; regional economic development; environmental quality; and other social effects (Hrezo 1980). Direction was given to consider nonstructural options for all water resource projects and recognize that water and land resources have economic costs, including the marginal costs of water and the public’s willingness to pay.

Water as an Economic Good: It is necessary to obtain estimates of the marginal costs of these resources, of the public’s willingness to pay for them, and of any external economies associated with water and related land resources (P&S 1973).

In 1981 Secretary of the Interior James Watt, who was serving as the WRC chairman, requested Congress reduce funding for the program. Congress obliged and the Water Resources Council and all but four of the river basin commissions were disbanded and coordination between the federal water infrastructure agencies was no longer required.

1983 Principles and Standards to Principles and Guidelines: The Reagan Revisions

In 1983, the Reagan Administration replaced the *Principles and Standards* with the 1983 *Economic and Environmental Principles and Guidelines for Water and Related Resources Implementation Studies* (1983 *Principles and Guidelines*), thereby establishing National Economic Development (NED) as the sole required objective of development and limited the recognition of other objectives (Galloway 2011).

The 1983 *Principles and Guidelines* applied to four water resource agencies: Reclamation; the Army Corps; the Tennessee Valley Authority; and the US Department of Agriculture (USDA) Soil Conservation Service. The revised evaluation and screening process for new water projects was consistent with the budgets and missions of the four agencies. The 1983 *Principles and Guidelines* were organized around three areas: (1) standards; (2) NED benefit evaluation procedures; and (3) environmental quality benefit evaluation procedures. In addition, a two-page set of Principles was included to provide context for the assessment. Challenges for enforcement and coordination developed when the Reagan administration reduced and then defunded the Water Resources Council and shifted more of the role of managing water resources to the states.

Assessing the Economic Aspects of Water Infrastructure Alternatives

Federal water infrastructure agencies independently develop internal policies to implement the Benefit Cost Analysis process based on their interpretation of OMB guidance. 1983 *Principles and Guidelines* continue to be used to frame decisions — though in several agencies waiver processes exist that can be used to deviate from normal procedures.

The 1983 *Principles and Guidelines* established four accounts that can be used for project assessment:

- National Economic Development (NED)
- Regional Economic Development (RED)
- Environmental Quality (EQ) — nonmonetary effects on impacted ecological, cultural, and aesthetic resources
- Other Societal Effects (OSE) — including but not limited to community impacts, health, safety, displacement energy conservation

<p>Water Security</p> <p>Assessment Intent</p> <p>Assessment Limitations</p> <p>Economic Priority</p> <p>Review Effort</p> <p>Procedures Development</p> <p>Army Corps Evaluation</p> <p>Corps Interim Procedures</p>	<p>The 1983 <i>Principles and Guidelines</i> do not place equal weight on the four accounts, nor do they provide direction on calculation of the benefits and costs. NED is the primary account used for project alternative consideration and the only mandated account that must be used to evaluate federal water projects. The other three accounts are not considered as equivalent objectives. This process has historically relied upon predictive models and monetization techniques approved by the CBO and OMB. Assessments using the 1983 <i>Principles and Guidelines</i> are intended to:</p> <ul style="list-style-type: none"> • Assess public benefits, with a focus on striving to maximize public benefits relative to costs. There is no hierarchy among the interrelated economic, social, and environmental goals when evaluating alternatives for investments. • Elevate the Locally Preferred Plan (LPP). When one exists it should be included in the final array, permitting transparency from the initial stages and reducing conflict in cases where a local sponsor has a “plan” to solve the problem(s) addressed by the proposed project. • Elevate the nonstructural plan. Where one exists, it must be included in the final array regardless of whether an agency can implement. • Facilitate choices for the recommended project(s) where the public benefits approach involves tradeoffs among plans and output. • Facilitate collaboration and elevate ecosystem, sustainable economic development, floodplain, environmental justice, public safety and watershed considerations. • Capture the level of analysis. • Recognize that limited fiscal resources may impact the assessment process. <p>Current direction from OMB is limited in defining how to accurately capture the impact of: climate change; ecosystem services; environmental justice; tribal justice; or the use of nature-based solutions for infrastructure investments.</p> <p>Since 1983, the 1983 <i>Principles and Guidelines</i> and the Benefit-Cost Ratio have guided the evaluation and formulation of water projects proposed by the water resources agencies. The 1983 <i>Principles and Guidelines</i> directed the four federal water resources agencies to recommend the project alternative with the greatest net economic benefit consistent with protecting the Nation’s environment unless the agency grants a waiver.</p> <p>Reagan Revisions Reconsidered — An Ongoing Process</p> <p>During the George W. Bush administration, concern from stakeholders over the process for water project authorizations resulted in Congress directing the Army Corps — in consultation with the Secretaries of the Interior, Agriculture, Commerce, Housing and Urban Development, Transportation, EPA, Energy, Homeland Security, the National Academy of Sciences and the Council on Environmental Quality (CEQ) — to undertake a revision of the 1983 <i>Principles and Guidelines</i> (P.L. 110-114, 2007). However, the Bush Administration did not act on this Congressional direction.</p> <p>In 2009, the Obama Administration initiated a review and modernization process coordinated through the CEQ. In December 2013, an updated set of <i>Principles, Requirements, and Guidelines</i> (PR&G) was released. The updated PR&G emphasized goals to: maximize economic development; avoid the unwise use of floodplains; and protect and restore natural ecosystems (CEQ 2014). CEQ developed revised documents after extensive consultation with federal agencies and the public and coordinated the development of Agency Specific Procedures (ASPs) for many of the agencies in 2014. The Army Corps did not complete their ASP as Congress — annually from 2015 to 2020 — prohibited the agency from spending funds to do so.</p> <p>The previously deactivated Water Resources Council was administratively re-convened in 2014 and 2015 for issuing the PR&G and interagency guidance on a federal flood risk management standard (CRS 2016).</p> <p>In the Water Resources Development Act of 2018 (WRDA 2018) (P.L. 115-270) Congress directed the Army Corps, in conjunction with the National Academy of Sciences, to initiate a study assessing the economic principles and analytical methodologies currently used by the Army Corps to formulate, evaluate, and budget water resources development projects. Recommendations were to be made to Congress on potential changes to the principles and methodologies to improve: transparency; return on federal investment; cost savings; and the prioritization process used during the formulation, evaluation, and budgeting of projects. No action was taken by the Army Corps to complete this Congressional direction.</p> <p>In WRDA 2020 (P.L. 116-260), Congress directed the Army Corps to complete its ASP process. In January 2021 the Army Corps provided interim ASP planning direction giving equal consideration in project studies to all benefits of a proposed project and its alternatives — with equal consideration of economic, environmental, and social categories. The Army Corps issued a Federal Register Notice</p>
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Water Security

Guidance: Economic, Social & Environmental Considerations

“Intangible” Benefits

Non-Traditional Benefits

Monetization Difficulties

Extreme Events

Water Security

Non-Use Values

in January 2022 regarding the modernization of Army Civil Works Policy Priorities, which included rulemaking on proposed implementation of PR&G (FR 2022). The Army Corps is currently working through the public and internal process to complete the direction provided by Congress.

The updated PR&G modernize and lay the foundation for how the federal government analyzes infrastructure investments that impact water resources — including consideration of economic, environmental, and social sectors. The PR&G and associated ASPs are not regulations and therefore are not legally binding. They are meant to provide the guidance to federal water resource agencies to improve consistency and compatibility in federal water resources investment decision-making. This includes analysis of the public benefits and costs as well as identifying the need to include tribal trust responsibilities, distributed impacts, and the use of full cost accounting to assess tradeoffs between investment alternatives. Agency policy and cultures continue to be the primary decision framework.

Climate Change Considerations & Improving Benefits and Costs Analysis

Benefit-cost analysis (BCA) as applied to federal water agency projects originated in the Federal Flood Control Act of 1936 (P.L. 74-738, 1936). During the 1950’s, Reclamation and other agencies expanded their economic assessment procedures to include the development of “indirect” or “secondary” economic gains stimulated by water development projects. During this period “intangible benefits” were identified but not quantified. These benefits could include: saving lives and improving the well-being of the local population through flood control; scenery enhancement; expanded recreation; and wildlife habitat.

Capturing Non-Traditional Benefits and Values

Benefits and values provided by ecosystem services, climate resiliency, environmental and societal justice, and nature-based water infrastructure alternatives have emerged as values important to integrate into project decisions. These non-traditional benefits and values can be realized through both engineered (structured) and non-structural approaches. However, they can be difficult to capture in terms of traditional economics.

Quantification challenges exist due to location-specific issues and case-specific biological and societal factors. The added value that water infrastructure projects provide is challenging due to wide-ranging ecosystem and societal interactions including impacts to biodiversity, climate, clean energy, social justice, and increasingly water security. These factors are difficult to monetize. However, ecosystem goods and services are more often being monetized by considering their total economic value to society.

Infrastructure Value Associated with Climate Change and Water Security

The Intergovernmental Panel on Climate Change (IPCC) released its sixth synthesis report on climate change and concluded that climate change is increasing the risk and challenges in the design, operation, and management of water infrastructure (IPCC 2021). According to the US General Accounting Office, calendar year 2021 was the 7th consecutive year in which the US experienced ten or more weather and climate disaster events that cost more than \$1 billion each in overall damages (GAO 2022).

Traditional approaches to building sea walls, surge barriers, bigger pumps, and levees are not keeping up with the extreme water related events and the need to protect the public and critical infrastructure. The loss of critical infrastructure directly affects the water security of the local population and the economy.

Water security includes traditional and non-traditional infrastructure, agency policy, governance, water justice, and the adaptability of approaches to capture and utilize a spectrum of economic values and costs. Assessing these values and costs are important in respect to how water resource agency decision-makers determine where to prioritize infrastructure expenditures.

Water Security: “The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.” (UN Water 2013)

Analytical efforts are being developed to quantify non-use values so that they can be part of the assessment and decision-making process. Understanding both the temporal and spatial ecosystem economic values when evaluating the benefits of nature-based solutions is necessary to ensure infrastructure investments embrace the largest public good. Researchers have found that value varied based on location-specific elements including biological and societal factors (Johnson et al. 2020, Le Coent et al. 2021).

Natural Infrastructure for Water Management

Investing in nature for multiple objectives



Adapted from Congressional Research Service
Congressional Testimony, March 24, 2021

**The Role of the Federal Government in Water Infrastructure:
RECOMMENDATIONS: ASSEMBLING THE WATER RESOURCES COUNCIL
& A CLIMATE-FUTURES FOCUSED NATIONAL WATER COMMISSION**

Water Security

Accelerating Needs

Integrating Facts

Information-Based Approach

Comprehensive Strategy

Increasing Complexities

Culture of Cement

Non-Monetary Benefits (Externalities)

“Green” Infrastructure

Climate Challenges

Integrating Values

Reports on national and international water issues, either floods or droughts, appear daily. While natural hydrologic events have occurred in the past, the frequency and intensity of today’s events, enhanced by multiple anthropogenic driven issues, are requiring a rethinking of how we prioritize, fund, locate, and integrate water infrastructure investments. Many water decision-makers focus on short-term actions needed to mitigate water needs and use the traditional approaches in determining where infrastructure investments should be made. This often fails to give equal weight to the accelerating infrastructure needs associated with climate-driven changes to hydrology and the water cycle.

Federal investment in water infrastructure should be based on a clear and understandable set of principles and guidelines that reflect an ability to integrate known facts, balance known risks and benefits, and ultimately allow decision-makers to pragmatically prioritize where funding should be directed.

The Nation faced significant challenges to its investment in water infrastructure during the 1940s’ through the 1960’s and — in more politically cooperative times — determined that a coordinated, information-based approach was needed to help coordinate, direct, and enhance the decision and legislative process. The Water Resources Council was Congressionally authorized in 1965, as was the National Water Commission in 1968. Both efforts helped to shape a coordinated approach to water policy and infrastructure investment. Both were terminated due to politics and lack of national leadership.

In 2009, a bill was introduced in the House of Representatives that called for the establishment of the Twenty-First Century Water Commission (House of Representatives 2009). The duties of the Commission were to include: (1) assessing the Nation’s future water supply and demand; (2) evaluating current water management programs of the federal, interstate, state, local, and private entities to increase water supplies and improve the availability, reliability, and quality of freshwater resources; and (3) consulting with representatives of the agencies and entities to develop recommendations for the development of a comprehensive national water strategy. The introduced legislation did not move forward.

Today we are faced with an increasingly complex set of issues affecting the Nation’s infrastructure decision-making process. More demand and less coordination on both surface and groundwater supplies, increasing water quality challenges from visible and invisible chemicals and pollutants, endangered species, disenfranchised communities, environmental and social justice, and the impact of climate change are all challenging the approach the federal government makes on investing in the next generation of water infrastructure. Today there are 26 Federal agencies that have “water” in their mission statements. Fifty states, four territories, and multiple trans-border entities manage water-related efforts. Coordination usually occurs only when politically expedient or legally necessary, centered around individual infrastructure issues. Limited to no coordination occurs at the river basin, regional, or national water security levels.

The culture of concrete has made water variability and extremes worse by trying to “engineer” solutions to address droughts and floods. The expansive concrete and rebar infrastructure management systems constructed to handle droughts and floods have led to unintended consequences. One of the consequences has been the reduction of national and regional water security.

To sustainably manage our water resources for the future we need to embrace a more holistic approach to water management. This approach requires capturing the value of a multitude of non-monetary benefits that are associated with water, including but not limited to: ecosystems services; nature-based approaches; climate services; and improvements provided to disenfranchised communities and marginalized people. These externalities to the traditional Benefit/Cost approach can and will lead to a more appropriate approach to water infrastructure decisions and management.

We need a different way to look at how we determine what water infrastructure projects are worth investing in. Traditional hard infrastructure will still be important, but the concrete culture of the past must now embrace and appropriately utilize nature-based “green” infrastructure, as a viable and value-added alternative or supporting element. An improved way forward should start with a shift in agency culture and approaches.

Climate change and its impacts on water security requires us to be vigilant in how we develop and protect our water resources. While traditional cost-benefit analytics were useful in the past, they are inadequate today. To meet the challenges of the future we need to plan to pivot and adopt a different mindset as to how we engage with water infrastructure. This requires developing and implementing economic assessment approaches that integrate values associated with climate, ecosystem, justice, and nature-based approaches on an equal level with traditional infrastructure. Just tweaking “business as usual” is not going to integrate the new and the old. Business as usual is what got us here in the first place.

Water Security

National Water Policy

Evaluation Consistency

Overcoming Silos

Congress directed the formation of the federal Water Resources Council and the National Water Commission in 1965 with the direction to develop a cooperative path forward. What is needed now is a return to a coordinated national water policy built around the current and future needs of the Nation and a consistent and transparent set of tools to assess where the Nation invests in water infrastructure.

Governance and policy-directed decisions are the hard part of any national water approach. To be effective a Water Resources Council policy initiative must develop legitimacy and the statutory ability to get entities to cooperate and build bridges between the various water resource agencies' siloed approaches. This approach requires legislative and administrative support and would be most effective if organized in the Office of Management and Budget, Executive Office of the President. This would ensure that both national water policy and economic consistency in evaluation occurs and help navigate the budget process.

The old way of addressing water policy through siloed agency cultured thinking is not adequate for a climate-driven future. Historic political power blocks of farmers, developers, legislators, and urban voters lack the incentive to work together to address the challenges of water and water infrastructure. Leaders who understand the value of collaboration and the power of policy direction will need to step forward if we are to ensure water security for the Nation.

FOR ADDITIONAL INFORMATION:

DAVE WEGNER, Woolpert Engineering, 970/ 759-0083 or David.L.Wegner@gmail.com

David Wegner was appointed to the US Environmental Protection Agency's (EPA's) Environmental Financial Advisory Board in July of this Year. He is retired from a senior staff position on water, energy, and transportation committees in the US House of Representatives. In that position he worked on legislation that directly affected administration policy and federal agency actions related to EPA, the US Army Corps of Engineers, the US Department of the Interior (DOI), the Bonneville Power Administration, the Tennessee Valley Authority, and the US Department of Energy. Prior to serving in Washington, DC, he worked for over 20 years for DOI managing water and science programs in the Colorado River basin and the Grand Canyon. During his tenure at DOI he was instrumental in formulating the Adaptive Management approach for other river systems impacted by dams and river operations. From 1997 through 2008 he built a private international environmental company that focused on global water and climate issues. Currently he works as a senior scientist for strategic planning for Woolpert Engineering and provides input and strategic counsel to NASA/JPL, academic institutions, members of Congress and staff, and international organizations focused on water, energy, coastal, reservoir management, and climate issues. Mr. Wegner is a frequent lecturer on the use of science in natural resource management and on the history of western water. He serves on the boards of the National Academy of Sciences, Glen Canyon Institute, the Sonoran Institute and mentors several post-docs in the US, Europe, and Asia through the International Association of Hydrologic Research.

Water Security

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DROUGHT: CONDITIONS & RESPONSES

EDITED TESTIMONY PRESENTED TO THE

UNITED STATES SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES JUNE 14, 2022

Drought

Editors' Introduction: On June 14, 2022, the US Senate Committee on Energy and Natural Resources was presented with expert testimony on drought conditions in the American West, including what is being done, what is not being done, and what additional actions are warranted. Testimony was received from: Bureau of Reclamation Commissioner Camille Calimlim Touton; Southern Nevada Water Authority General Manager John J. Entsminger; and Family Farm Alliance President Patrick O'Toole. What follows are selected excerpts from their testimony which have been edited and abridged to fit our format. All accompanying graphics were added by your editors. Full versions of this testimony are available from the Committee's website: www.energy.senate.gov/hearings.

**Statement of Camille Calimlim Touton
Commissioner, US Bureau of Reclamation**

My statement today provides a status update on drought in the western United States, the short and long-term operational actions being taken to address it, and the allocation of additional resources — such as those provided by the Bipartisan Infrastructure Law (BIL) (PL 117-58).

In most Western watersheds there have been successive and compounding years of drought. Many Bureau of Reclamation (Reclamation) facilities have realized below average inflows in water year 2022, while storage across the West is also below average at many facilities. Water supplies for agriculture, fisheries, ecosystems, industry, cities, and energy are no longer stable given anthropogenic climate change, which threatens food and energy security, human health, the regional economy, and biodiversity.

Overview of Current Regional Reservoir Conditions

According to the US Drought Monitor, as of June 7, 2022, more than 40 percent of the United States is currently experiencing at least moderate drought. Almost 93 percent of the western United States is experiencing drought or abnormally dry conditions, and more than 70 percent of the western United States is experiencing severe or extreme drought conditions. Across much of the Southwest, California, and parts of the Pacific Northwest and Missouri River Basin, the footprint of drought will likely intensify throughout the summer, with severe to exceptional drought throughout those regions.

Colorado River Basin

The Colorado River Basin is in the 23rd year of a historic drought. Both Lake Powell and Lake Mead — the two largest reservoirs in the United States — are at historically low levels with a combined storage capacity of 28 percent of capacity.

Reclamation and its partners have been successful in conserving water in Lake Mead and Colorado River System reservoirs; more needs to be done as the system reaches critically low water levels. The system is at a tipping point. An example of how Tribal Nations and water managers have addressed these conditions is shown in how, over the past 15 years, approximately 4.6 million acre-feet (maf) have been conserved in Lake Mead through voluntary measures by the three Lower Basin States, Tribal Nations, and Mexico. This has been accomplished through: the creation of Intentionally Created Surplus; system conservation water; water for Mexico's water reserve under Minutes 318, 319, and 323; as well as other water conservation efforts. These measures added 70 feet to Lake Mead's elevation and delayed the first shortage declaration by six years.

Over the past few years, Reclamation has worked with the Upper and Lower Basin States, Tribes, and stakeholders on Colorado River Drought Contingency Plans (DCPs), which were implemented in 2019. The DCPs provide a framework for additional actions to help the basin adapt to drought. An example of this is a 2021 Lower Basin Memorandum of Understanding (MOU), called the 500 Plus Plan. The plan, developed under both the DCP and 2021 MOU, aims to conserve additional water above what is required under a Lower Basin shortage condition and contributions under the Lower Basin DCP. The 500 Plus Plan parties have identified and are funding projects in each of the three Lower Basin States, and the projects include tribal, agricultural, and municipal water users.

On May 3, 2022, Reclamation announced two separate drought response actions that will help increase Lake Powell storage by nearly 1.0 maf over the next 12 months (May 2022 through April 2023).

The two actions include:

**Operational
Actions**

**Compounding
Drought**

**Drought
Monitor**

**Largest
Reservoirs**

**Conservation
Actions**

500 Plus Plan

- Drought**
- Releases & Storage**
- Minimum Power Pool**
- Reservoir Levels**
- New Guidelines Development**
- Central Valley Allocations**

- Approximately 500,000 acre-feet of water will be released from Flaming Gorge Reservoir, located approximately 455 river miles upstream of Lake Powell, pursuant to an agreement as part of the Upper Basin Drought Contingency Plan (adopted in 2019)
- Another 480,000 acre-feet will be left in Lake Powell by reducing Glen Canyon Dam’s annual release volume from 7.48 maf to 7.00 maf, as outlined in the 2007 Interim Guidelines that control operations of Glen Canyon Dam and Hoover Dam.

Regarding current conditions, in March 2022 Lake Powell dropped below elevation 3,525 feet, meaning the reservoir was less than 35 feet above the minimum power pool of 3,490 feet (i.e., minimum elevation at which hydropower can be generated).

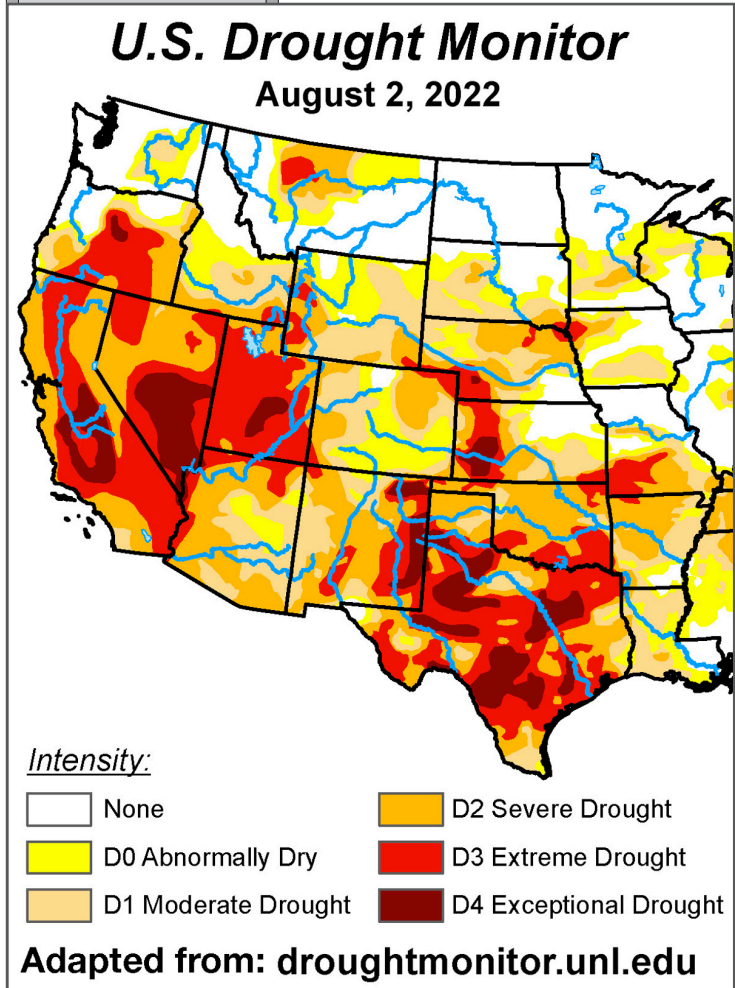
According to the *May 2022 Most Probable 24-Month Study*, the April-July runoff forecast into Lake Powell is 3.80 maf, or 59 percent of average. Lake Powell’s water surface elevation is projected to end the calendar year at 3,522.94 feet (22 percent full). Lake Mead is projected to reach an elevation of 1,039.92 feet (27 percent full) on December 31, 2022. While not official until the *August 2022 24-Month Study*, a shortage condition for the Lower Basin is projected in calendar year 2023.

Looking to the future, Reclamation is preparing to develop new operating guidelines given that the 2007 Interim Guidelines expire in 2026. Reclamation is targeting initiating a formal National Environmental Policy Act (NEPA) process in early 2023. Collaboration and involvement by partners and stakeholders (Tribal Nations, States, water districts, etc.) will be paramount for the effort to be successful. Prior to the start of the formal NEPA process, Reclamation is preparing to issue a “pre-scoping” Federal Register notice (targeting the week of June 20) to ask for input on both the stakeholder engagement process and the substantive elements and strategies for post-2026 operations.

Significant and additional conservation actions are required to protect the Colorado River system infrastructure and the long-term stability of the system.

California Great Basin

California’s Central Valley is experiencing its third consecutive critically dry year. Reclamation issued a zero percent allocation to federal Central Valley Project irrigation water service contractors, reduced allocations to the senior Sacramento River Settlement and San Joaquin River Exchange contractors, and set allocations for municipal and industrial contractors to minimum health and safety levels. The State of California’s allocations for water from the State Water Project are similarly low.



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Reclamation has worked with federal agencies, Tribes, and local partners on efforts to mitigate the impacts of drought in the Klamath Basin. In 2022, this included the development of the 2022 Annual Operations Plan, the 2022 Drought Plan (released April 29, 2022), and the allocation of tens of millions of dollars for drought relief, including \$20 million for the Klamath Drought Relief Act efforts. The Operations Plan describes the 2022 temporary operating procedures for Water Year 2022 as well as a series of drought mitigation measures to potentially minimize involuntary shortages among Project contractors. These measures include the Klamath Project Drought Response Agency’s drought relief programs, voluntary water transfers among project contractors, and voluntary water conservation efforts. The latest water supply estimate for the Klamath Project is 18 percent of the maximum project supply of 350,000 acre-feet, or 62,000 acre-feet.

The on-going drought this year across the West is having significant impacts to agriculture, municipalities, Tribal communities, hydropower, and fish and wildlife. Reclamation continues to communicate and aid our stakeholders and inform them of the various grants and programs available to help in this exceptionally dry year. Reclamation is also providing limited additional water to communities to help meet their public health and safety needs on a case-by-case basis. Reclamation is taking extraordinary measures at the conservation hatchery facilities we support to protect the vital refugial and supplemental populations of fish species and continues to further habitat maintenance and restoration.

Drought

Northwest Reservoirs

Diversion Change

Snake River Basins

North Dakota Flooding

Montana Irrigation

Recreation Impacts

Columbia Pacific Northwest

In the Columbia-Pacific Northwest, many reservoirs have well below average water supply for this time of year. Low snowpack and continued dry conditions have resulted in low reservoir refill rates across the region. For example, as of June 2, 2022, reservoirs in the Deschutes River Basin in Oregon are 37 percent full, which is 46 percent of average for this time of year. The basin started the irrigation season at a record-low 39 percent of capacity. Storage contractors received a storage allocation shortage for the first time this year and irrigation deliveries are expected to cease in late July.

Over the past decade, irrigation districts in the Deschutes Basin have been successful in implementing water conservation programs through state and federal funding programs, including Reclamation’s WaterSMART and the Natural Resources Conservation Service’s PL 83-566 Watersheds funding program. Additionally, Reclamation is working with districts to grow supplies, with partners like the North Unit Irrigation District (NUID) on an appraisal-level study for a potential project to move NUID’s point of diversion downstream to Lake Billy Chinook, where NUID would pump water uphill to its current distribution system. NUID’s water rights in the Crooked River would remain instream to the new diversion point and support fish habitat in those critical reaches. Reclamation allocated \$200,000 in Fiscal Year (FY) 2022 supplemental drought funding for this project. The goal of the appraisal-level study is to determine if a feasibility study is warranted.

In southern Idaho and western Wyoming, the middle and upper Snake River basins are also experiencing drought conditions. As of June 2, 2022, the Upper Snake system of reservoirs is 58 percent full (72 percent of average). Reclamation is working with stakeholders in the basin and hosted an informational meeting to discuss streamflow forecasts and projected reservoir operations on May 19, 2022. The current runoff forecast for the Snake River near Heise, Idaho is 76 percent of average.

Missouri River Basin

The Missouri River Basin is experiencing drought conditions across much of the basin. Conversely, areas of North Dakota are experiencing above normal precipitation and resultant high water and flooding. Jamestown Reservoir (federally owned, managed by Reclamation) near Jamestown, North Dakota on the James River is an example of these conditions. As of June 2, 2022, 30.8 percent of the reservoir’s flood control pool was occupied.

In Montana, drought conditions in the Milk River Basin will result in a shortened irrigation season, with water deliveries ceasing in mid to late June. Reclamation is working with irrigation districts and river pumpers to determine possible water supply availability for the latter portion of the irrigation season. The East Bench Irrigation District and the Clark Canyon Water Supply Company in Southwestern Montana are currently in tier 3 of their drought management plan, their highest level, requiring them to reduce water use by 35 percent and likely shortening their irrigation season by a few weeks.

Last month, Reclamation announced that many reservoirs in eastern Montana would be below desired recreation levels for upcoming weekends. This highlights conditions that will impact many of Reclamation’s recreation sites this year — lower water levels at the recreation sites will reduce the access

and, in some cases, enjoyment of recreation activities at the facilities.

The Missouri Headwaters Basin Study being conducted by Reclamation and the Montana Department of Natural Resources and Conservation describes strategies to address water resource challenges in the Missouri River and Musselshell River basins upstream of Fork Peck Reservoir in Montana. The purposes of this collaborative planning study are to inform stakeholders of current and future water supply challenges and to identify and evaluate strategies for improving resiliency to these challenges and for improving water supply reliability.

Colorado River Basin Storage (as of June 12, 2022)

Reservoir	Percent Full	Storage (maf)	Elevation (feet)
Lake Powell	27%	6.64	3,536
Lake Mead	28%	7.37	1,046
Total System Storage	35%	20.71	- - -

Total system storage was 42% of capacity, with 25.01 maf in storage, at this time last year.

Adapted from: Reclamation, Colorado River System Mid Term Projections, June 16, 2022 www.usbr.gov/ColoradoRiverBasin/documents/20220616-ColoradoRiverSystemMid-termProjections-Presentation.pdf.

- Drought**
- North Platte Conditions**
- Allocation Expected**
- Oklahoma Irrigation**
- Rescue Plan Funds**
- Texas Salinity Measures**
- Elephant Butte Shortage**

Strategies include actions like changing current management practices, changing operations, and modifying or developing new infrastructure.

Arkansas, Gulf, and North Platte River Basins

Drought conditions in the North Platte River Basin of Colorado, Wyoming, and Nebraska persist. On May 12, 2022, Reclamation announced the latest projections for water supply availability.

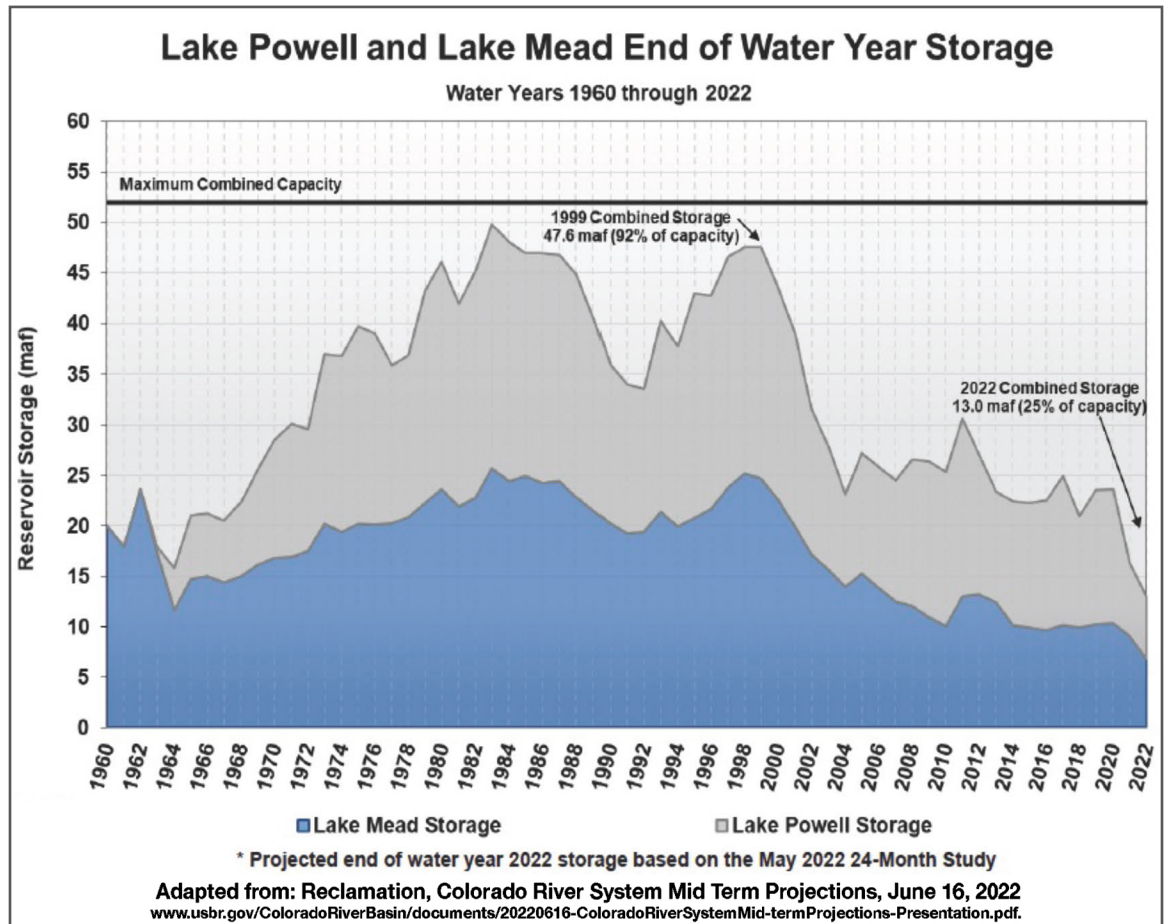
The May forecast indicated spring snowmelt would be below average. Total April-July runoff into the North Platte River system above Glendo Dam is expected to be 545,000 acre-feet, which is 72 percent of the 30-year average. Based upon forecasted conditions, an allocation is expected for North Platte Project contractors. North Platte Project contractors are delaying taking water deliveries until mid-June and will likely discontinue water deliveries in early September to conserve water supply.

Water storage in Lugert-Altus Reservoir, W.C. Austin Project, Oklahoma is currently less than 24 percent of conservation storage capacity, which is insufficient to allow water deliveries for irrigation of the 48,000 acres served by the Lugert-Altus Irrigation District. The District has been notified that they will receive approximately \$25 million in American Rescue Plan Act (ARPA) funding through the State of Oklahoma for implementation of water conservation and improvement measures throughout the District which will help to maximize deliveries when water is available in future years. The District also plans to apply for a WaterSMART Water and Energy Efficiency Grant, leveraging their ARPA funding to use as the required 50 percent match.

Water storage in Lake Meredith, Canadian River Project, Texas is currently at nine percent of conservation storage capacity. Reclamation is working with local officials to help evaluate salinity management strategies to mitigate saline conditions in the reservoir that are being exacerbated by the continued drought.

New Mexico and Basins in the Southwest

Other basins in the southwest are also experiencing drought conditions. For example, the Rio Grande Basin has experienced challenging hydrology the past several years. As of June 2, 2022, storage at Elephant Butte Reservoir was at 12 percent of capacity. If the monsoon rains do not materialize in the Rio Grande Basin, Elephant Butte could end the irrigation season at 2 percent of capacity. Regarding the Pecos River, the Carlsbad Irrigation District has allocated 1.4 acre-feet of water per acre.



Drought

Collaborating Agencies

Interagency Working Group (IWG)

Infrastructure Improvements

Resilience Efforts

Coordination Across the Government

Reclamation is working with Tribal Nations, States, agriculture, power customers, municipalities, conservation organizations, and other stakeholders on addressing drought conditions and impacts. Reclamation is working alongside Department of the Interior (DOI) agencies and other federal agencies to ensure drought actions complement the work of these partners.

Additionally, DOI participates in several points of coordination established among federal agencies working to optimize federal drought response, including: the National Climate Task Force; the Interagency Drought Relief Working Group; the National Drought Resilience Partnership; the Water Subcabinet; the White House Council on Native American Affairs; and works directly with federal entities including the Western Area Power Administration. Each of these groups provide important avenues for coordination, and collaboration, and encompass both immediate drought relief as well as long-term drought resilience efforts geared at responding to ongoing climate threats.

In April 2021, the Biden-Harris Administration launched the Drought Resilience Interagency Working Group (IWG) to address worsening drought conditions in the United States and to support Tribes, farmers, ranchers, and communities impacted by ongoing water shortages. On June 1, 2022, the Drought Resilience Interagency Working Group released its one-year summary report. Chaired by the Secretaries of the DOI and the Department of Agriculture, the Drought Resilience IWG builds upon existing resources and coordinates across the Federal family to provide targeted, near-term relief and support to drought-stricken communities. The IWG is also working to improve communities' long-term resilience to drought, given that drought cycles are increasing in severity due to climate change.

The Bipartisan Infrastructure Law (BIL) provides historic investments of over \$13 billion to help communities meet water supply demands through a wide variety of infrastructure improvements; this funding follows-through on the President's promise to build climate resilience, and focus on water efficiency, storage, conveyance, water recycling, and watershed protection. In particular, the Drought Resilience IWG members are working to effectively deploy the \$8.3 billion in BIL funds for Reclamation's efforts to increase water resilience and the \$918 million BIL investment in US Department of Agriculture's (USDA's) Natural Resources Conservation Service for watershed infrastructure projects. The IWG also has coordinated drought relief activities in hard-hit watersheds including the Klamath, Rio Grande, California's Central Valley and the Colorado River Basin, and has launched a Federal-State task force with the Western Governors' Association to advance drought and soil monitoring systems.

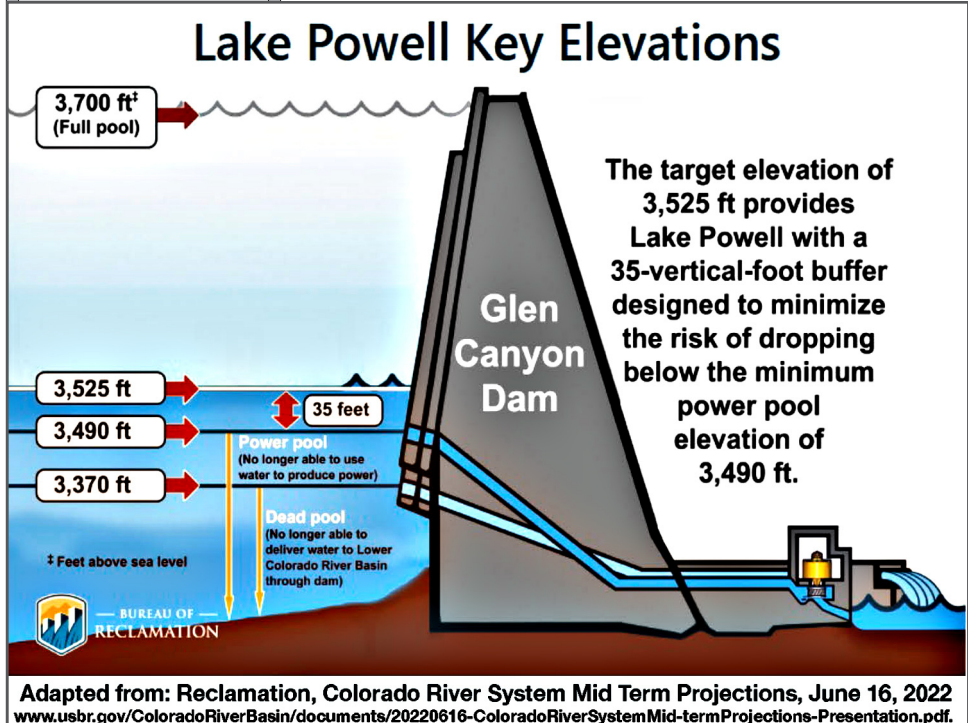
In addition to these cooperative efforts, on June 1, 2022, the White House announced its Action Plan on Global Water.

Solutions

The severe drought seen in the West highlights the need for immediate actions as well as for thoughtful planning and work to make both our infrastructure and operational decisions more resilient to withstand

water resource scarcity and variability. Across the West, Reclamation has continued working on using the best available science to improve water supply forecasting and operations planning and modeling to help inform decision-making and meet competing demands.

Reclamation and its partners continue to make investments, both short term and long term, to address drought conditions in the West. But no amount of funding can completely offset the severe shortfalls in precipitation being experienced this year across the American West. We will experience unavoidable reductions in farm water supplies and hydropower generation, ecosystem degradation, and urban areas. We all need to do more together to conserve more water. DOI and state, Tribal, and local partners have planned for this by being proactive and fully using the tools we have.



Drought Relief Projects
WaterSMART Projects
Program Applications
Water Recycling
Immediate V. Future Projects
Funding Availability
Drought Resilience

Investments in Drought Response Actions

In FY 2021, Reclamation reprogrammed \$100 million for a suite of drought relief projects, including: 1) salinity control; 2) water conservation; 3) temporary pumps and pipes to access water below intakes; 4) wildfire suppression and fuel reduction; 5) Tribal assistance activities; 6) reservoir re-operations; 7) forecasting tools; 8) fishery projects; 9) groundwater recharge; 10) water storage; and 11) water transfers.

Congress provided additional resources in FY 2022 (PL 117-43), with a \$210 million supplemental appropriation for drought and wildfire. Last year, Reclamation selected 227 new WaterSMART projects, leveraging \$73.2 million in Federal funding with Tribes, States, and local entities. These funds are utilized with the aim of realizing on-the-ground projects that would: foster water conservation; increase the efficiency of water deliveries; enhance the reliability of supply during drought; construct water reuse and recycling facilities; and restore watersheds. These projects also involved the development of applied science tools and collaborative planning effort to address drought and climate change.

During FY 2022, DOI has completed a steady stream of drought-related or water conservation-related funding awards across the West as part of existing programs to help make local communities more resilient or diversify local water supplies, selecting 56 projects to be funded with \$55.3 million in WaterSMART funding across the western states.

A few WaterSMART-funded examples include:

- January and March 2022: Drought Resiliency Projects selected, \$38 million for 23 projects in 7 western states.
- May 2022: Water and Energy Efficiency Grants selected, \$17.3 million for 33 projects in 11 western states.

We are currently reviewing applications for Reclamation’s Cooperative Watershed Management Program, the Title XVI - Water Reclamation and Reuse Program, Desalination Construction Projects, Applied Science Grants, Small-Scale Water Efficiency Projects, and Drought Contingency Planning. Announcements will be made this summer.

Water recycling projects can provide growing communities with new sources of clean water, increasing flexibility and diversifying the water supply. Reclamation has several funding opportunities that support water reuse and desalination, including through the WaterSMART Title XVI Water Reclamation and Reuse Program, the WaterSMART Desalination Construction Program, and the Desalination and Water Purification Program. The BIL has authorized an additional \$1 billion for water recycling projects, of which Reclamation plans to distribute nearly \$500 million over the next two years.

Bipartisan Infrastructure Law

The drought highlights the need for immediate actions as well as for thoughtful planning and work to make our infrastructure and operational decisions more resilient to withstand future water resource scarcity and variability. Fortunately, with resources made available by Congress through the Bipartisan Infrastructure Law (BIL), Reclamation has been able to prioritize and accelerate projects that will create new water supplies to prepare for the future. Funds from the BIL will support: water storage projects (\$1.15 billion); rural water projects (\$1 million); water recycling projects (\$1 million); desalination projects (\$250 million); WaterSMART Grants (\$400 million); and drought contingency plans (\$300 million).

Reclamation’s BIL funding opportunities have been steadily announced throughout 2022, continuing through the summer, collectively making hundreds of millions of dollars available.

- The Aging infrastructure/Extraordinary Maintenance (XM) funding process for FY 2022 was kicked off in December, culminating with FY 2022 project selections announced May 9, 2022.
- Additional funding opportunities for water recycling and desalination were announced in January 2022;
 - Applied science in opportunities announced in February 2022. Small scale water efficiency project opportunities announced in February 2022.
- Drought resiliency project opportunities announced in March 2022.
- Water and energy efficiency grant (WEEG) opportunity announced in May 2022.
- Information on the small water storage program was posted in January and May 2022.

In addition to these funding opportunities, BIL-funded projects selected via internal formulation processes were announced for dam safety in March 2022, and rural water, also in March 2022. More opportunities are on the way during 2022.

With nearly \$12.4 billion in overall BIL funding, DOI will invest in critical water resource projects including infrastructure, conservation, and environmental restoration. Specifically, Reclamation will allocate \$8.3 billion of BIL funding over the next five years to continue building drought resilience throughout the West. Work has begun through the allocation of \$1.6 billion in FY 2022 to various programs and projects. Recent announcements include \$420 million for Rural Water Projects across the country and over \$240 million for aging infrastructure.

Drought

Projects List

Collaboration

Reckoning

Demand Management

Consumption Drop

Green Infrastructure

Agriculture Considerations

Additional projects that will move forward in FY 2022 include:

- Water storage and conveyance projects
- Extraordinary maintenance for aging infrastructure and transfer works
- Rural water projects
- Water recycling and reuse projects
- Desalination projects
- Safety of Dams projects
- WaterSMART grants
- Watershed management projects
- Aquatic ecosystem restoration and protection
- Multi-benefit watershed health improvements
- Endangered Species and Recovery Program
- Watershed and Flood Prevention Program
- Emergency Watershed Program

The Natural Resources Conservation Service (NRCS) has already announced nearly \$600 million worth of BIL-funded projects under these authorities.

Conclusion

Addressing these challenges and climate change requires constant collaboration, persistence, and using the best available science across the landscapes and communities that rely on our western rivers. This Administration is working every day to collaborate with States, Tribal Nations, farmers, and communities impacted by drought and climate change to build and enhance regional resilience.

Statement of John J. Entsminger

General Manager, Southern Nevada Water Authority & Governor’s Representative, State of Nevada

I am not a person prone to hyperbole, but I can assure you from on the ground that the ominous tenor of recent media reports is warranted. What has been a slow-motion train wreck for 20 years is accelerating, and the moment of reckoning is near.

While the situation is objectively bleak, it is not in my view unsolvable. There is little we can do to improve the Colorado River’s hydrology. The solution to this problem—and by solution I don’t mean fully restoring reservoir levels but rather avoiding potentially catastrophic conditions—is a degree of demand management previously considered unattainable.

Nevada’s efforts are a case in point. With only 1.8 percent of the river’s allocated flows, we are little more than a rounding error. Lake Mead loses twice as much water to evaporation than we use each year. However, this tiny volume of water sustains 70 percent of the state’s population. Our population has increased by approximately 800,000 during the past two decades, but our water consumption last year was 26 percent less than it was at the turn of the century.

We achieved this by: paying customers to replace grass with drip-irrigated plants; setting mandatory irrigation schedules; and strictly enforcing water waste rules. We have removed enough grass to lay a roll of sod all the way around the Earth. And we’re not done — in addition to even tighter restrictions on ornamental grass, our sights are now set on improving irrigation efficiency and reducing evaporative cooling water use. There are headwinds along this journey, including a reluctance of the business community to embrace conservation and ESG [Environmental, Social, & Governance] metrics that value energy efficiency over saving water.

Our key advantage is that we capture and recover virtually every drop of indoor water. This is why continued financial and administrative support for projects on the Las Vegas Wash — green infrastructure through which we return water to Lake Mead — is so important. We also encourage federal support of large-scale water recycling projects for communities without access to a large reservoir.

In engaging my colleagues in other states, it is clear they recognize the urgency of this situation and are ramping up conservation efforts. However — and there is no way around this — cities alone cannot address this crisis, not because of indifference but because we simply don’t use enough water to tip the scale.

As in the cities, the primary consumptive use in the agricultural sector is grass. Around 80 percent of Colorado River water is used for agriculture and 80 percent of that 80 percent is used for forage crops like alfalfa. I’m not suggesting that farmers stop farming, but rather that they carefully consider crop selection and make the investments needed to optimize irrigation efficiency.

Drought Measurement Deadpool Risks
Farming Viewpoint
Infrastructure Needs
“Regulatory Droughts”
Forest Health
Locally-Driven Solutions
New Infrastructure
Watershed Approach

My view has always been that you can't improve efficiency unless you can measure it, so I strongly support the current Open ET bill [S.2568] sponsored by Senator Cortez Masto. This legislation will provide access to more consistent, accurate water use data than is currently possible.

By reducing their use of Colorado River water, agricultural entities are protecting their own interest. If Lake Mead reaches deadpool, Nevada's allocation will undoubtedly be further reduced, but we can still meet critical needs because we invested \$1.4 billion to secure our access to water. However, at that same elevation, California, Arizona, and Mexico will be cut off entirely because water can't escape Lake Mead. We are at 150 feet from 25 million Americans losing access to the Colorado River, and the rate of decline is accelerating.

The burden of shortage cannot be borne by any single community or sector. Rather, I urge every Colorado River user to follow our lead and do all they can to preserve what remains of the Southwest's lifeblood. Our collective future depends upon it.

Statement of Patrick O'Toole - President, Family Farm Alliance

The Family Farm Alliance (Alliance) is a grassroots organization of family farmers, ranchers, irrigation districts, and allied industries in 16 Western states. We are committed to the fundamental proposition that Western irrigated agriculture must be preserved and protected for a host of economic, sociological, environmental and national security reasons — many of which are often overlooked in the context of other national policy decisions.

At a time when Western water projects are typically operating at full strength, with delivery canals bringing essential water supplies to the headgates of thousands of farmers and ranchers, crushing drought conditions are once again leaving millions of acres of productive farm and ranch land without water.

Drought Challenges

The current drought crisis underscores some key concerns:

Improved Water Infrastructure is needed to protect future water supply reliability. A national coalition of over 220 organizations last year urged Congress to include Western water infrastructure provisions in any potential infrastructure or economic recovery package. Your Committee clearly heard and acted on our coalition's request.

Water Management in the West is becoming too inflexible. Water users served by Western federal water projects – including but not limited to – California's Central Valley Project, the Klamath Project in Oregon and California, and Oregon's Deschutes River Basin – are facing “regulatory droughts” as well as hydrologic droughts. We need a new way of looking at how we manage environmental demands for our limited water resources. We need a broader view of how water is used to meet environmental needs, one that considers state water laws, science, population growth, food production and habitat needs.

Fierce Western Wildfire Disasters are becoming an annual occurrence. This underscores the importance of improving on-the-ground management and restoration actions that can lead to improved forest health, which benefits every Western watershed's water supply capability.

Now is the time for collaboration, not confrontation. Now more than ever, agricultural producers, municipalities, tribes and conservation groups need to come together to provide locally driven solutions. If we don't, the public policies and resource management strategies that we need to maintain a viable and sustainable rural West will be impossible to achieve.

Western farmers and ranchers faced a brutal growing season in 2021 as drought conditions drastically reduced water deliveries. Many were forced to make difficult decisions about the future of their operations. Cattle ranches and dairy farms liquidated their herds as they ran short of feed and water. Some farmers were forced to tear out certain crops to plant less water-intensive ones. Others let their fields lie fallow.

Drought Solutions

There are things that Congress and this committee can do to alleviate this disaster and better prepare and manage for future droughts. Federal investments in improving and building new water supply infrastructure — partnering with the Western states and non-federal water users — can help prevent or reduce the impacts of future droughts. Moving away from flow-based single species management to collaborative watershed-based approaches that respect all uses will help prepare Western water stakeholders for a more predictable and secure future. We need to act, and act now, to accomplish these tasks.

Perhaps the only silver lining is that this unprecedented drought crisis will hopefully draw public and political attention to Western agriculture's critical role in providing a safe and reliable food supply, boosting the national economy, and continuing the country's stature as the world's premier food basket. We can

<p>Drought</p>	<p>only hope that this leads to necessary, reasonable policies that support farmers and investment in rural communities, including water infrastructure and increased water-storage capacity.</p>
<p>Food Security</p>	<p>Western irrigated agriculture has been dealing with changes in climate and hydrology for over a century. But the prognosis for water supplies in the future is not positive and will continue to negatively impact this important source of our Nation’s food supply, the economic engine for most of our rural Western communities. Coupled with the growing demand for existing water supplies from burgeoning cities and the environment, irrigated agriculture is fast becoming a target for one thing — water.</p>
<p>Solution Options</p>	<p>The Alliance believes we must look to several solutions in order to maintain water and food security:</p> <ul style="list-style-type: none"> Invest in Western Water Infrastructure — new water storage and improved conveyance facilities, groundwater recharge, water conservation, water management improvements, water reuse and desalination can all help alleviate the stress on our existing water supplies, especially for agriculture in the growing West. Invest in Technology — we must manage our water supplies better through more efficient and effective use of technology to improve the modeling and predicting of weather patterns, snowpack, and runoff forecasting, as well as using technology to manage our water storage and distribution to improve efficiencies in utilizing our precious water resources.
<p>Adaptive Strategies</p>	<p>Improve Regulatory Processes at the federal level to expedite permitting and get these new water projects to construction within a reasonable period of time at a reasonable cost, as well as create collaborative partnerships between federal, state and local entities interested in finding solutions to our water-climate problems through adaptive strategies that can work on the ground.</p>
<p>Short-Term Capability</p>	<p>There is also a need for short-term action. As we move into the dry portion of another serious unprecedented West-wide drought year, preparing for this requires a level of reaction that is immediate and sustainable. We recommend a fast-track response capability from the US Department of Agriculture (USDA) and the Interior Department that enables a localized response by farmers and ranchers. Farmers and ranchers need programs through their local Natural Resources Conservation Service (NRCS) offices to assist with the purchase of infrastructure including solar panels, pipeline materials, well-drilling, tanks, gated pipe and projects to develop water. Such projects can benefit wildlife and wetlands as well as food production. An immediate and local response is imperative.</p>
<p>Federal Investment</p>	<p>Congress has helped this past year by passing the Infrastructure Investment and Jobs Act (IIJA), which includes more than \$8 billion for projects that will enhance water supply reliability across the West, including repairing aging dams and canals, building new surface and groundwater storage and conveyance facilities, funding water conservation and recycling projects, and improving watershed and ecosystem management. The Western water provisions included in this legislation represent a once-in-a-generation federal investment that will bolster our aging water infrastructure and keep water flowing to our nation’s farms and ranches. It will also improve our ability to provide water supply reliability for cities and the environment in future droughts. The package both aligns with the solutions water managers across the Western United States have requested for years and provides a balanced package of tools that local and regional managers may select from to best resolve the water needs and challenges in their local communities.</p>
<p>Streamlining Need</p>	<p>With the infusion of federal infrastructure dollars, there is no better time to ensure that our federal systems and programs work efficiently together. As an example, we encourage the swift adoption of a Memorandum of Understanding between NRCS and the Bureau of Reclamation (Reclamation) to streamline the National Environmental Policy Act (NEPA) compliance process and eliminate duplicative costs, time delays and inefficiencies. We also support greater collaboration and a reduced reliance on autonomous business centers at the federal level that often act as silos and create barriers for local community collaboration and support. Finally, we believe reducing federal bureaucratic red tape within agencies to allow worthy water and groundwater supply and conveyance projects to move forward must become a priority. As an example, streamlining and prioritizing the federal government’s ability to exchange like-kind federal tracts of land for non-federal properties will become even more important as non-federal entities begin to develop the water supply infrastructure needed to meet future drought challenges.</p>
<p>Land Exchange</p>	<p>As IIJA funding is put to use, Congress also has an important oversight role to ensure federal agencies are held accountable and the historic investment translates to progress on the ground. We appreciate the sense of urgency and responsiveness by agency leadership to date as they work to get funding out the door. And yet, we are already seeing instances where the pace of study or analysis on the early stages of projects puts into question whether they will be far enough along to seek construction funding before the IIJA expires. In the midst of catastrophic drought, changing hydrology due to climate change, and other factors, every level of federal employee must be implored to be creative and aggressive in getting projects done.</p>
<p>Urgency</p>	<p>As IIJA funding is put to use, Congress also has an important oversight role to ensure federal agencies are held accountable and the historic investment translates to progress on the ground. We appreciate the sense of urgency and responsiveness by agency leadership to date as they work to get funding out the door. And yet, we are already seeing instances where the pace of study or analysis on the early stages of projects puts into question whether they will be far enough along to seek construction funding before the IIJA expires. In the midst of catastrophic drought, changing hydrology due to climate change, and other factors, every level of federal employee must be implored to be creative and aggressive in getting projects done.</p>

Drought

Forest Service Lands

Damaged Forests

Forest Service Expectations

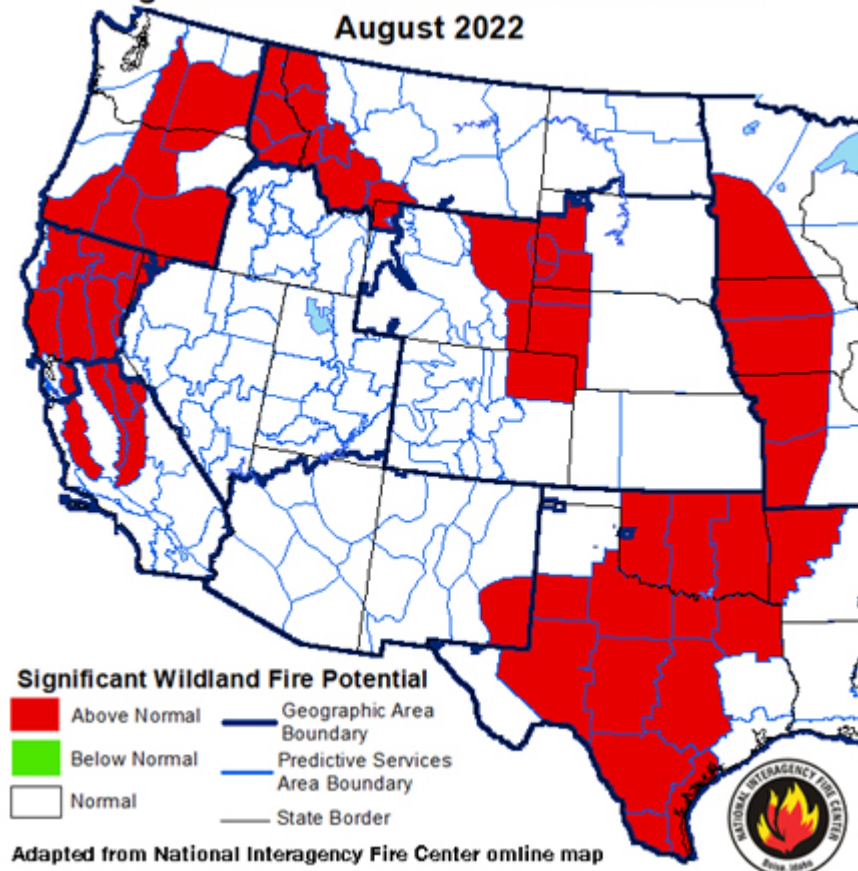
The State of Western Forests

Improving the condition of our nation’s forested lands is of primary importance to water providers. National Forest lands are overwhelmingly the largest, single source of water in the US and, in most regions of the West, contributing nearly all the water that supplies our farms and cities. In addition, our already fragile water infrastructure can be severely damaged or rendered useless by wildfire and post-wildfire flooding and debris flows. These burned areas hold no water at all, leading to floods, erosion, and mudslides. It also increases turbidity in the streams flowing through our watersheds. The unhealthy state of our national forests, which were initially reserved specifically to protect water resources, has led to catastrophic wildfires that threaten the reliability, volume, and quality of water for thousands of acres of irrigated agricultural lands, tens of millions of Americans, along with the wildlife, recreational, and multi-purpose values of these lands.

Our great Western forests are damaged and diseased. This came about through a perfect storm of neglect, misguided litigation, lack of use of science, strained management budgets, and, of course, climate change. We can have no doubt that the West is warming, and some places are warming more rapidly than past modeling has predicted. Insect outbreaks have weakened and killed trees. Violent winds have brought these trees down providing an abundant source of fuel. Drought and forests cluttered with dead fall timber serve as a tinderbox for increasingly intense and devastating fires. Our National Forests in the Rocky Mountain Region are suffering from climate-driven lack of function. The inability to develop a logical management strategy has led to these consequences: catastrophic fires, lack of wildlife habitat and critical interruption of our water supply.

Today’s wildfires are often larger and more catastrophic than in the past. Some of the blame can be attributed to climatic conditions, like reduced snowpack in alpine forests, prolonged droughts and longer fire seasons. Western population growth has also played a role, since we now have more homes within or adjacent to forests and grasslands. However, decades of fire suppression and inability to manage our forests through controlled burns, thinning, and pest/insect control probably play an even bigger role. The US Forest Service (Forest Service) is not fully meeting agency expectations, nor the expectations of the public, partners, and stakeholders, to improve the health and resilience of forests and grasslands, create jobs, and provide economic and recreational benefits. The Forest Service spends considerable financial and personnel resources on NEPA analyses and documentation, as well as environmental litigation.

**Significant Wildland Fire Potential Outlook
August 2022**



<p>Drought</p>	<p>In recent years — catalyzed by the ominous increase in Western wildfire activity — we have worked with other organizations, seeking ways to discourage litigation against the Forest Service relating to land management projects. We have supported efforts to develop a categorical exclusion under NEPA for covered vegetative management activities carried out to establish or improve habitat for economically and ecologically important Western species like elk, mule deer, and black bear. Thus, we have advocated for expediting and prioritizing forest management activities that achieve ecosystem restoration objectives.</p>
<p>Procedural Reform</p>	<p>Reforming the Forest Service’s NEPA procedures is needed at this time for a variety of reasons. An increasing percentage of the Forest Service’s resources have been spent each year to provide for wildfire suppression, resulting in fewer resources available for other management activities, such as restoration. In 1995, wildland fire management funding made up 16 percent of the Forest Service’s annual spending, compared to 57 percent in 2018. Along with a shift in funding, there has also been a corresponding shift in staff from non-fire to fire programs, with a 39 percent reduction in all non-fire personnel since 1995.</p>
<p>Risk Management Need</p>	<p>Additionally, the Forest Service in 2019 had a backlog of more than 5,000 applications for new special use permits and renewals of existing special use permits that are awaiting environmental analysis and decision. On average, the Forest Service annually receives 3,000 applications for new special use permits. Over 80 million acres of National Forest System land need restoration to reduce the risk of wildfire, insect epidemics, and forest diseases. It is essential to begin taking a risk management approach to restoring and managing our Western forests before the fear and over analysis cause more forest land, along with the multiple values to water supply, wildlife habitat, recreation, and food production, to be lost.</p>
<p>Snowmelt</p>	<p>Upper Watershed Water Supplies</p> <p>It is hard to overstate the importance of snowmelt as a source of fresh water in parts of the Rocky Mountain West, and great attention is paid to ecosystem water cycles in this region. Some of the snow that falls in the mountains goes directly from crystalline snow to water vapor, bypassing the liquid water phase. This phenomenon — sublimation — accounts for the loss of a large portion of the snowfall during the winter months in the Rocky Mountains. Snow intercepted by tree branches sublimates the fastest, often disappearing within a few days of a snowfall. Recently published work by the Rocky Mountain Research Station (RMRS) teases apart how the loss of spruce canopy affects the sublimation rates for snow both in the canopy and on the ground in these ecosystems. These findings have some important implications to snow interception and retention. <i>See: “Beetle Outbreaks in Subalpine Forests and What They Mean for Snowmelt”</i> May 2021. RMRS, US Forest Service.</p>
<p>Sublimation Rates</p>	<p>The Forest Service conducted research on the Upper North Platte River in 2000 and 2003. It shows that management restricting timber harvest had already severely impacted the watershed and water yield to the tune of a minimum of 160,000 acre-feet (AF) per year. The Forest Service uses Equivalent Clear-cut Acres modeling to predict water yield associated with vegetation disturbance, primarily associated with timber harvest and wildfire. The literature and research show that implementing a 100-year rotation on all eligible timber lands would sustain an increase of 50-55,000 AF of water per year — for just one part of one forest in the state of Wyoming.</p>
<p>100-Year Rotation Benefit</p>	<p>Across the West, federal laws, regulations and environmental litigators have greatly restricted our ability to thin forests and take other actions to aggressively combat invasive insects like the pine beetle. As a result, large swaths of national forest lands essentially remain unmanaged. In some places, all you can see for miles is a sea of dead trees, victims of the pine and spruce beetles.</p>
<p>Thinning & Pest Control</p>	<p>Overgrown Western forests also means forests are using more water than they did historically. Because the moisture content of the trees and brush is so low, it makes them more vulnerable to fire and parasites, such as the bark beetle, which has ravaged millions of acres throughout the West. The Western wildfire disasters have underscored the importance of improving on- the-ground management that can lead to improved forest health. Thinning out trees can reduce water stress in forests and ease water shortages during droughts. By reducing the water used by plants, more rainfall flows into rivers and accumulates in groundwater. If we could calculate potential water yield impacts with even more confidence, we could determine how much water could be freed up by thinning forests and controlling pests and invasive insects like the pine and spruce beetle. Fortunately, we are seeing more recent, positive developments towards this end.</p>
<p>Management Benefits</p>	<p>Scientists affiliated with the National Science Foundation Southern Sierra Critical Zone Observatory in 2018 conducted a study in the forests of California’s Sierra Nevada mountains. The team of scientists from the University of California and the National Park Service combined sensors that measure evapotranspiration with satellite images of “greenness” on the landscape to estimate the additional freshwater runoff that could be created by thinning overgrown forests. Their research, published in 2018 in the journal <i>Ecohydrology</i>, shows that water loss from evapotranspiration has decreased significantly over</p>
<p>Freshwater Runoff</p>	<p>Scientists affiliated with the National Science Foundation Southern Sierra Critical Zone Observatory in 2018 conducted a study in the forests of California’s Sierra Nevada mountains. The team of scientists from the University of California and the National Park Service combined sensors that measure evapotranspiration with satellite images of “greenness” on the landscape to estimate the additional freshwater runoff that could be created by thinning overgrown forests. Their research, published in 2018 in the journal <i>Ecohydrology</i>, shows that water loss from evapotranspiration has decreased significantly over</p>

Drought
Water Flow/Yield
Site Specific
Snowpack Functions
Controlled Fires
Grassland Grazing
Flood Irrigation
Invasive Species

the past three decades, due in large part to wildfire-driven forest thinning. Forest thinning has increased in recent decades to stave off disastrous wildfires fueled by dense forests. This study shows that restoring forests through mechanical thinning or prescribed burning can also save California billions of gallons of water each year. The total effect of wildfires over a 20-year period suggests that forest thinning could increase water flow from Sierra Nevada watersheds by as much as 10 percent.

There are numerous other anecdotal reports from around the West of water yield increases resulting from clearing pinon and juniper stands in northwestern Utah, arid communities in the high desert of Oregon and Northern California, the Pecos River watershed in New Mexico and the upper Purgatoire River in eastern Colorado. Pinon and juniper reduction in the Gallup, New Mexico area triggered the reappearance of flowing water in once dry arroyos that had not been there for decades. A 2016 study conducted on the San Carlos Apache Reservation showed that different vegetation types displayed various responses to water availability. This further highlights the need for individual management plans for forest and woodland, especially considering the projected drier conditions in the Western US.

Forest Health Solutions

Actively Manage and Restore our Federal Forests

Drought brings less snowfall in many areas. The snow that falls melts off up to 45 days earlier and runs off downstream on frozen ground. Therefore, the snowpack no longer functions as a reservoir delaying the release of water in a timely manner. However, the forest floor can be restored through thoughtful management. A responsible level of continuous fuels reduction includes a combination of robust mechanical thinning and prescribed fire. This can be employed to significantly reduce evapotranspiration, tree stress, disease, and pest infestation, preserve healthy forest conditions, and protect species and habitats.

Use Controlled Fire and Grazing as Management Tools to Restore Forests

Wildlife habitat has suffered profoundly from the “pick-up-sticks” of dead trees on the forest floor, from disruption in water function, and most dramatically, from widespread hot fires. These large catastrophic fires not only eliminate habitat, but kill millions of animals, birds and insects. Controlled fire is one of the tools that can be used to improve forest grounds. However, it is not the only tool.

The grasslands existing in forest lands sustain not only grazing wildlife like deer, elk, bighorn sheep, and antelope, but also forage for domestic livestock like cattle and sheep. Proper grazing improves soil through hoof actions and fertilization from manure. Grazing returns carbon to the soils and is a tool, indeed almost the only tool, for improving and restoring soils. Again, it must be properly managed, but many grazers are experts in just those practices. Narrow policy proposals that disconnect the role of responsible grazing, or even seek to eliminate this practice, from grassland function will result in cascading impacts to habitat connectivity, soil health, wildlife habitat, and carbon sequestration.

Secure Long-Term Conditions of Water Flows

The forests act as a sponge. Winter snowfall settles among the trees, and snowmelt and rainfall alike traditionally soak into the humus and healthy soils on the forest floor. Climate change and human mismanagement have disrupted this crucial cycle.

In the Intermountain West, flood-irrigated wet meadows provided by ranchers as part of their agricultural operations comprise the bulk of the wetland habitat in snowpack-driven systems. These hay meadows and irrigated pastures provide important habitat for sandhill cranes, white-faced ibis, northern pintails, and other priority waterbirds, as well as an array of ecosystem benefits. Flood irrigation naturally maintains underlying groundwater that is less vulnerable to a warming climate and key to supporting seasonally flooded wetlands on the surface. Filling these “sponges” through flood irrigation is critical to slowing the movement of water through the system and thus increasing resiliency in the face of drought. Likewise, upland watershed and forest management activities can help increase water quality and quantity, as well as mitigating the risk of catastrophic wildfire.

Improve Watershed Yield Through Better Forest Management

As previously discussed, there is a significant gain in water supply to streams because the consumptive use of water is reduced when the number of trees growing as forests are managed to avoid the conditions that result in catastrophic insect infestation or wildfires.

Improve Invasive Species Management

Addressing the harmful impacts of invasive species should also be a priority. Water users confront challenges associated with invasive species across the West, where salt cedar (Tamarix), quagga mussels, and cheatgrass — just to name a few — all proliferate. For example, Tamarix species along riparian corridors or around desert springs can seriously reduce underground water tables and surface water availability, drying up wetlands, and reducing flows. Tamarix species can increase flooding in riparian areas by narrowing channel width. In addition, the plants are flammable and can introduce fire into wetland

Drought

and riparian communities that are not adapted to periodic burning. While millions of dollars have already been spent on efforts to reduce the impacts of these and other non-native pests, it hasn't been enough. And more invasive species will continue to arrive.

NEPA Reform

National Environmental Policy Act (NEPA) Concerns

The current implementation of the NEPA is reactive, cumbersome, time consuming and does not enable the Forest Service to implement forest management strategies in a timely manner. We have advocated for some key general recommendations to improve the Forest Service application of environmental laws:

- 1) Allow landscape-level land management plans to guide individual actions on the ground without duplicative administrative process under federal environmental laws.
- 2) Direct the creation and use of categorical exclusions already allowed under NEPA in preventing catastrophic wildfires and restoring forest habitat and ecosystems more effectively and on a timely basis.
- 3) Use the NEPA process to consider how a robust vegetative management program could improve forest health, improve water quality and lead to increased available water supply by reducing demand from overly dense tree and vegetative cover.

Real World Success Stories

North Yuba Forest Partnership

Last May, USDA announced that the North Yuba River watershed in Northern California will be one of the first 10 landscape investments to be funded nationally through the Forest Service's Wildfire Crisis Strategy. The North Yuba landscape stretches from New Bullards Bar Reservoir in Yuba County up to the Sierra Crest along Highway 49 in Sierra County. The anticipated forest health work builds upon and scales up previously successful and innovative efforts that have already resulted in the treatment of thousands of acres of National Forest lands in the North Yuba River watershed, including work financed through the utilization of a groundbreaking, public-private financing tool called the Forest Resilience Bond.

Launched earlier this year, the strategy outlines the need to treat up to an additional 20 million acres on national forest lands and up to an additional 30 million acres of other federal, state, Tribal, private and family lands over the next decade. The partnership is using the latest science to integrate multiple stakeholder priorities into projects with the objective of accomplishing forest restoration and wildfire risk reduction at a landscape scale. Partnership activities include meadow restoration, ecological thinning of forest density and prescribed fire.

The North Yuba Forest Partnership (NYFP), of which Yuba Water Agency (an Alliance member) is a founding member, is a diverse group of nine organizations passionate about forest health and the resilience of the North Yuba River that shares the ambitious goal of implementing forest restoration across 275,000 acres of the watershed. Founded in 2019, members of the NYFP include Blue Forest Conservation, the National Forest Foundation, the Tahoe National Forest, Yuba Water Agency, the South Yuba River Citizens League, Sierra County, the Camptonville Community Partnership, Nevada City Rancheria, and The Nature Conservancy. By mitigating the risk of high-intensity wildfire and restoring forest health, the NYFP will protect a variety of vital resources, including wildlife habitat, water supply, opportunities for recreation, as well as multiple communities.

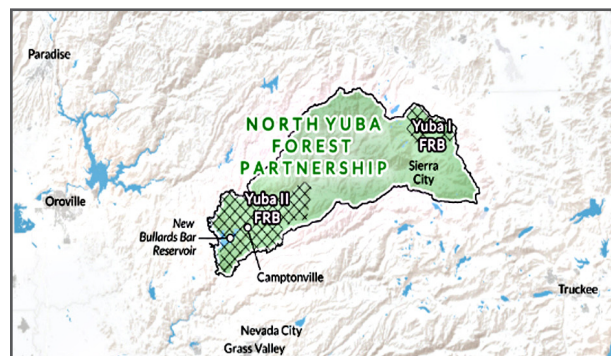
The USDA investment will result in over \$25 million in additional federal IJA funding for the Partnership's work over the next three fiscal years and almost 17,000 additional acres of forested watershed lands treated. Last month USDA awarded the Partnership an additional \$3 million for this year as one of 15 projects selected nationwide under the Collaborative Forest Landscape Restoration Program. The Partnership's work demonstrates that comprehensive and collaborative approaches can help us tackle even the toughest natural resource issues.

Forest Resilience Board

Forest Restoration

Partnership

Collaborative Approach



Launched in 2019, the \$4 million Yuba I FRB finances over 7,000 acres of treatment to protect 15,000 acres of forest.

A \$25 million Yuba II FRB would finance over 28,000 acres of treatment to protect 48,000+ acres of forest.

**Drought
Restoration
Initiative**

**Watershed
Enhancement**

**Large-Scale
Projects**

Local Solutions

**Instream
Rights**

“Call” Protocol

**2021:
Dry Conditions**

**Governor’s
Decision**

Headwaters of the Colorado River Project

My family is helping to lead an effort to design a comprehensive, multistakeholder, large landscape initiative to restore two severely degraded (non-functioning) 50,000-acre watersheds — one in the Medicine Bow National Forest in Wyoming and a second in the Routt National Forest in Colorado. Our vision is to restore two forested rangelands to a resilient state that filters and stores water, produces protein, sustains wildlife and fisheries, sinks carbon, produces renewable energy feedstocks and enables economically viable rural communities to thrive.

The Little Snake River Watershed is a fascinating combination of a functioning conservation district that has a 30-year record of nationally recognized river restoration, grazing habitat enhancement, fish passage, and migratory bird habitat enhancement projects. Our team is designing a plan to implement an integrated, multidisciplinary and multilevel watershed enhancement project that will demonstrate how collaborative and cooperative restoration efforts can be carried out at scale and replicated in watersheds across the West.

Men and women like my family, who live and work in the forests have up-close and personal experiences upon which they formulate their assessment of the conditions in these forests. In our view, the forested watersheds are in a state of dramatic decline as a result of decades of siloed, top-down management, litigation that has prevented many pragmatic enhancement and restoration initiatives from moving forward. Climate change has further taken a major toll on watershed health. We believe it is time for a new way forward, one that would be characterized by large landscape scale, integrated and multidisciplinary enhancement projects guided by multi-stakeholder collaboration.

Conclusion

The epic drought we have been experiencing across the western United States, especially in the last three years, and other weather abnormalities are different than in the past. Our community has found that solutions are local. We find that solutions come from the land. Farmers, ranchers, foresters and fishers all across the West work in the extremes of elements and volatile weather, and we share a love of the land. We see the pressure on the land we manage and our water supplies. Sadly, strategies appear to be evolving to take water from Western farmers, from food production, and redirect it to other uses.

The revival of Colorado River and other Western watershed forests is crucial to combating the effects of climate change. By bringing together changemakers and working collaboratively, we can change the paradigm of forest management. Success will mean healthier forests, healthier wildlife populations, more prosperous and dynamic local communities, more recreation opportunities, greater economic benefits and much-needed security in our water supplies.

FOR ADDITIONAL INFORMATION:

Full versions of the abridged testimony appearing above are available from the US Senate Committee on Energy and Natural Resources website: www.energy.senate.gov/hearings.

~~~~~ **INSTREAM WATER RIGHT CALLS IN MONTANA** ~~~~~  
NEW PROTOCOL FOR MAKING “CALLS”

by David Moon, Editor

On July 22, Montana Fish Wildlife & Parks (FWP) released a new protocol it developed for making a “call” on junior water rights to protect instream water rights in Montana. The *Water Right Call Protocol* (July 22, 2022)(*Protocol*) is an 84-page document produced by FWP (available at webpage listed below). The *Protocol* is a “procedure for deciding where and when to make call on water rights that are junior to instream flow water rights held by Montana Fish, Wildlife & Parks (FWP) for fisheries, fish & wildlife and recreation purposes, and which water rights to include.” *Protocol* at 1.

The *Protocol* grew out of dry conditions in Montana in 2021 and the need to protect instream water rights. “With lower-than-average snowpack, FWP Water Program and Fisheries Division staff were aware that streamflows were likely to be low and conditions would warrant making call on water rights junior to FWP-held instream flow water rights in some areas. Toward the end of the legislative session and the weeks that followed, Director Worsech was briefed on the various functions of the Water Program, including participation in Montana’s water rights adjudication, and engaging with water permit applicants to find creative mitigation solutions. However, when streamflow began to drop quickly, it was clear that the Water Program Manager had not adequately prepared the director and Governor’s Office for the prospect of FWP making water right calls. As a result, when the program proposed to make call on juniors in the Smith and Shields River basins, the governor instructed us not to as there was inadequate evidence that the fisheries would benefit from said calls. The governor asked the program to articulate the process we use in determining which water rights we recommend calling and why.” *Id.*

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|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Instream Rights</b><br/>“Making a Call”</p> | <p>FWP provided background concerning instream water rights in Montana and what is entailed in “making a call.”</p> <p>Water in Montana is allocated for both private and public uses based on a “prior appropriation” system. As a typical summer wears on and water levels decrease, an older or “senior” water right holder may ask the newer or “junior” water right holders to discontinue their use. This is referred to as “making a call.”</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Instream Flow</b></p>                       | <p>FWP has instream flow water rights in many rivers and streams. These rights are junior to most existing rights, but senior to some junior users on those rivers or streams. On these sources, FWP has the ability to make call, or ask junior water users to shut off their water. While utilization of FWP’s water rights by making a call is an important component of protecting aquatic life in rivers and streams, FWP has also enjoyed great success by participating in community efforts that implement voluntary use reductions and other tools to mitigate against water shortages.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>Voluntary Reductions</b></p>                | <p>FWP has instream flow water rights in many rivers and streams. These rights are junior to most existing rights, but senior to some junior users on those rivers or streams. On these sources, FWP has the ability to make call, or ask junior water users to shut off their water. While utilization of FWP’s water rights by making a call is an important component of protecting aquatic life in rivers and streams, FWP has also enjoyed great success by participating in community efforts that implement voluntary use reductions and other tools to mitigate against water shortages.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>Process Improvements</b></p>                | <p>In 2021, when FWP was proposing a call on junior water users in the Smith and Shields River, a review of FWP’s water call process revealed an opportunity to make improvements that would increase process transparency, clarify resource benefits, and provide predictability to water users.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>Uncertainty</b></p>                         | <p><i>Water Right Call Synopsis</i> (July 22, 2022; see webpage listed below for <i>Synopsis</i>). FWP summarized the <i>Protocol’s</i> development and its approach to protect instream water rights at the beginning of the <i>Synopsis</i> before setting out the “Revised Process.” FWP first noted that instream flow water rights in many river basins across Montana “are critical components of FWP’s fishery and recreation management. Multiple factors are considered in determining how, why, and when FWP uses those water rights to keep water instream when flows are low. With some public uncertainty about the process for making a call, the governor last summer charged the director to make clear and transparent the protocol for making a call.” <i>Synopsis</i>.</p>                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>New Process</b></p>                         | <p><b>Revised Process</b></p> <p>The revised process includes the following steps for making call on FWP water rights:</p> <ol style="list-style-type: none"> <li>1. Ongoing monitoring on rivers in which FWP has a water right.</li> <li>2. Assessment as to whether the water level will fall below FWP’s instream flow right.</li> <li>3. Determination of resource impacts and potential call benefits.</li> <li>4. Evaluation of which junior water rights to call based on factors outlined in the new process, including but not limited to use, connectivity, and presence of a local drought plan.</li> <li>5. Staff recommendation of call to the director, outlining water rights impacted and benefits to the resource.</li> <li>6. Call approval.</li> <li>7. Call issuance.</li> </ol> <p><i>Id.</i></p>                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>Practical Details</b></p>                   | <p>The <i>Protocol</i> is meant to be a detailed, “living” guidance for calls that is updated as needed. Therefore, along with discussions of non-call basins and the call protocol itself, this document contains an appendix of individual watershed assessments. These assessments describe the individual watershed, local efforts to address flow, factors such as the presence of commissioners in the watershed, and river-specific fisheries information. They also list the number of junior water rights and discuss how many would be recommended for call under the requisite streamflow conditions, and why. The intent of this exercise was to assemble all relevant information in one place, make a preliminary determination of which basins would be recommended as call-eligible and clearly explain why. The intent is also for these documents to be iterative: conditions change from year to year, watershed groups can form but also dissolve, and commissioners can be appointed one year and not the next. Our intent is for these assessments to be updated as needed and help inform the ultimate decision on whether call will be made.</p> |
| <p><b>Adaptive Assessments</b></p>                | <p><i>Protocol</i> at 2.</p> <p>As of August 6, 2022, three river basins have active junior water right calls by FWP: the Gallatin River (August 2 call); the Shields River (July 28 call); and the Smith River (July 28 call). Each of these three basins has a specific Basin Call Memo produced by FWP to explain the call. See webpage listed below to access the three Basin Call Memos.</p> <p><b>For Additional Information:</b><br/>Bill Schenk, Montana Fish Wildlife &amp; Parks, 406/ 444-4042 or bschenk@mt.gov<br/>FWP Water Right Call Protocol (PDF) available at: <a href="https://fwp.mt.gov/conservation/fisheries-management/water-management">https://fwp.mt.gov/conservation/fisheries-management/water-management</a> &gt;&gt; Water Rights Call Process (PDF)</p>                                                                                                                                                                                                                                                                                                                                                                                 |

## WATER BRIEFS

**CONSERVATION PLAN WEST  
UPPER COLORADO BASIN PROPOSAL**

During testimony to the Senate Natural Resources Committee on June 14, 2022, Bureau of Reclamation (Reclamation) Commissioner Camille Calimlim Touton asked the Colorado River Basin States to develop plans to provide an additional two to four million acre-feet (MAF) of water in 2023 to protect critical water elevations at Lake Powell and Lake Mead. Touton also indicated that if the states did not develop such plans by mid-August, Reclamation was “prepared to take unilateral action under its existing authority to protect the system.”

The Upper Basin states of Colorado, New Mexico, Utah, and Wyoming responded to the Commissioner and presented their “5 Point Plan for Additional Actions to Protect Colorado Storage Project Initial Units” in their July 18th letter to Commissioner Touton. As a caveat to their 5 Point Plan, the Upper Basin states recognized that “...bringing the system into balance will require collaboration and efforts from all Basin States and water use sectors. Accordingly, we stand ready to participate in and support efforts, across the Basin, to address the continuing dry hydrology and depleted storage conditions. However, the options the Upper Division States have available to protect critical reservoir elevations are limited. The Upper Basin is naturally limited to the shrinking supply of the river, and previous drought response actions are depleting upstream storage by 661,000 acre-feet. Our water users already suffer chronic shortages under current conditions resulting in uncompensated priority administration, which includes cuts to numerous present perfected rights in each of our states.” The components of the 5 Point Plan are as follows:

1. Seek amendment and reauthorization of the System Conservation Pilot Project legislation originally enacted in 2014. The amendment will provide for extension of the authorization and reporting periods to September 30, 2026, and September 30, 2027, respectively, and seek funding to support the program in the Upper Basin. Upon obtaining reauthorization, the necessary funding, and finalizing any required agreements, we intend to reactivate the program in the Upper Basin in

2023.

2. Commence development of a 2023 Drought Response Operations Plan (2023 Plan) in August 2022 with finalization in April 2023 consistent with the Drought Response Operations Plan Framework (Framework). A 2023 Plan must meet all the requirements of the Drought Response Operations Agreement and the Framework. These requirements include, but are not limited to, determining the effectiveness of any potential releases from upstream Initial Units to protect critical elevations at Glen Canyon Dam, and ensuring that the benefits provided to Glen Canyon Dam facilities and operations are preserved.
3. Consider an Upper Basin Demand Management program as interstate and intrastate investigations are completed.
4. Implement, in cooperation with Reclamation, the Bipartisan Infrastructure Law for Upper Basin Drought Contingency Plan funding to accelerate enhanced measurement, monitoring, and reporting infrastructure to improve water management tools across the Upper Division States.
5. Continue strict water management and administration within the available annual water supply in the Upper Division States, including implementation and expansion of intrastate water conservation programs and regulation and enforcement under the doctrine of prior appropriation.

*Upper Basin States Letter, July 18, 2022.*

The Upper Basin states followed the 5 Point Plan with these admonitions: “The challenges in the Colorado River Basin affect us all and require collaboration across the entire Basin. We request your support as we advance our 5 Point Plan, including for federal legislation to reauthorize the System Conservation Pilot Program and for funding to support the Plan through September 2026.

Reclamation data shows that Lower Basin and Mexico depletions are more than double the depletions in the Upper Basin. Therefore, additional efforts to protect critical reservoir elevations must include significant actions focused downstream of Lake Powell. Otherwise, the effectiveness of our 5 Point Plan will be limited.” *Id.*

This last paragraph quoted is most telling with its reference to the need to “include significant actions focused downstream of Lake Powell” — i.e. in the Lower Basin (Nevada, Arizona, California) and Mexico. It is also noteworthy that the Upper Basin states’ letter does not discuss any mandatory cuts or reductions in the relative allocations of the two basins and Mexico, yet also points out that “...Lower Basin and Mexico depletions are more than double the depletions in the Upper Basin.”

**For info:** *Upper Basin States Letter of July 18, 2022*, available at: [www.documentcloud.org/documents/22089578-2022-july-18-letter-to-reclamation](http://www.documentcloud.org/documents/22089578-2022-july-18-letter-to-reclamation)

**RECLAMATION OPS WEST  
OPERATIONS GUIDELINES REVISION  
INPUT REQUESTED**

On June 23<sup>rd</sup>, Reclamation published a Federal Register notice to assist in its efforts to develop future Colorado River operating provisions. Several decisional documents and agreements that govern the operation of crucial Colorado River facilities, Lake Powell and Lake Mead, and the current management provisions for Colorado River water will expire at the end of 2026. Reclamation is seeking specific input on how to foster meaningful participation by all stakeholders in preparation for beginning the National Environmental Policy Act (NEPA) process to develop post-2026 operating approaches for the Colorado River. Reclamation is targeting an early 2023 start for this NEPA process.

The notice asks for specific suggestions on the process and the substance of how best to analyze future operations and what those operations should include. It also highlights the changing circumstances in the Colorado River Basin since 2007, including declining hydrology, drought, and low-runoff conditions impacted by a warmer, changing climate, inclusivity in Colorado River decision-making, and the need for continued operational alignment and partnership with the Republic of Mexico.

Specific documents and agreements that expire at the end of 2026 include the December 2007 *Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead*, among other essential management documents,

## WATER BRIEFS

both within the United States as well as international agreements between the United States and Mexico under the 1944 Water Treaty.

The Colorado River Basin is experiencing a 22-year drought and low runoff conditions, and reservoirs within the basin are at historic low levels. There are extensive impacts throughout the Colorado River Basin, including water for homes and crops, to the generation of electricity.

The public input period ends September 1, 2022.

**For info:** [www.usbr.gov/ColoradoRiverBasin/](http://www.usbr.gov/ColoradoRiverBasin/)

### SALMON PROTECTION CA CHILLED HATCHERY WATER

Reclamation and US Fish & Wildlife Service (Service) are partnering to protect winter-run Chinook salmon in a crucial year of their life cycle at the Livingston Stone National Fish Hatchery (LSNFH) during the third consecutive drought year in California. The Service operates the hatchery while Reclamation provides water, power, and funding to support operations and maintenance. Water managers, fish biologists, and project managers from Reclamation and the Service have been working together to best meet critical water needs anticipated during this unprecedented drought.

During years of average or greater precipitation, water quality at LSNFH is generally suitable for salmon. However, as water temperatures from Shasta Lake are expected to be elevated this year due to the lake's low level, Reclamation and the Service have installed several temporary water chilling units to cool and stabilize the water supply to the hatchery.

Winter-run Chinook salmon are particularly vulnerable to drought and warming water temperatures. This third year of extreme drought coincides with the three-year life cycle of winter-run Chinook salmon. Poor survival during the last two drought years makes this a critical year for the population's survival. In each of the preceding drought years, poor conditions have led to elevated temperature-related mortality in early life stages of these fish in the Sacramento River.

With the help of these chillers, the hatchery will continue to provide a critical safety net for winter-run Chinook salmon while in-river conditions remain poor. As water

temperatures must be maintained below 56 degrees Fahrenheit for successful winter-run reproduction, the chilling units will cool the hatchery's water supply up to 20 degrees F. at 3,000 gallons per minute. Since water supply to the hatchery is pulled directly from Shasta Dam, there are complex interactions between the water temperatures in the hatchery and dam operations. Technicians are on site monitoring the chilling units 24-hours a day in order to ensure success.

The contract to install, maintain, and monitor the chilling units was awarded to Montcal, LLC, a joint venture Native American (American Indian) and economically disadvantaged woman-owned small business.

LSNFH was initially constructed in 1997 as a conservation and rearing facility for the Endangered Species Act-listed winter-run Chinook salmon after years of population decline. Located directly below Shasta Dam on the banks of the Sacramento River, the location of the hatchery is ideal to promote winter-run Chinook salmon, downstream of where historic winter-run spawning habitats were located.

**For info:** [www.usbr.gov/mp/nao/lsnfhw.html](http://www.usbr.gov/mp/nao/lsnfhw.html) or [www.fws.gov/fish-hatchery/livingston-stone](http://www.fws.gov/fish-hatchery/livingston-stone)

### GRASSLAND CRP SIGNUP US THREE MILLION ACRES

The US Department of Agriculture (USDA) is accepting offers for more than 3.1 million acres from agricultural producers and private landowners through this year's Conservation Reserve Program (CRP) Grassland Signup, the highest in history. This program allows producers and landowners to continue grazing and haying practices while protecting grasslands and promoting plant and animal biodiversity and conservation. The program is part of the Biden-Harris Administration's broader effort to address climate change and conserve natural resources.

"This year's record-breaking Grassland CRP signup demonstrates the continued success and value of investments in voluntary, producer-led, working lands conservation programs," Agriculture Secretary Tom Vilsack said. "Grassland CRP clearly demonstrates, time and time again, that conservation priorities and agricultural productivity not only have the capacity to coexist but also complement and enhance one

another. Through all our working land conservation programs, farmers and ranchers play a critical role in helping secure the future of both our food production and our natural resources."

Nationwide, this year's Grassland CRP signup surpassed last year's 2.5 million acres by 22%. So far this year, producers have enrolled 2 million acres through the General Signup and more than 464,000 acres have been submitted through the Continuous CRP Signup. This means about 5.6 million acres are entering CRP in 2023, surpassing the 3.9 million acres expiring this year. Top states included Colorado (642,000 acres), South Dakota (nearly 425,000 acres) and Nebraska (nearly 422,000 acres). States with the highest increase in acres compared with last year include Arizona (141% increase), California (129% increase), and Utah (122% increase).

Because Grassland CRP supports not only grazing operations but also biodiversity and conserving environmentally sensitive land such as that prone to wind erosion, USDA's Farm Service Agency (FSA) created two National Priority Zones in 2021: the Greater Yellowstone Migration Corridor and the Dust Bowl Zone. For this year's signup, FSA expanded the Greater Yellowstone Wildlife Migration Corridor Priority Zone to include seven additional counties across Montana, Wyoming, and Utah, to help protect the big-game animal migration corridor associated with Wyoming elk, mule deer, and antelope. FSA accepted offers on more than 1.4 million acres in these two zones.

As part of USDA's Justice40 efforts, producers and landowners who are historically underserved, including beginning farmers and military veterans, will receive 10 additional ranking points to enhance their offers. From more than 5,000 underserved producers, USDA accepted offers of more than 1.9 million acres, about 87% of those who submitted applications.

Additionally, USDA is working to broaden the scope and reach of Grassland CRP by leveraging the Conservation Reserve Enhancement Program (CREP) to engage historically underserved communities. CREP is a partnership program that enables states, Tribal governments, and non-profits to partner with FSA to implement CRP practices and address high priority conservation and environmental

## WATER BRIEFS

objectives. Interested entities are encouraged to contact FSA.

Producers can still make an offer to participate in CRP through the Continuous CRP Signup, which is ongoing, by contacting the FSA at their local USDA Service Center.

**For info:** [www.fsa.usda.gov/programs-and-services/conservation-programs/](http://www.fsa.usda.gov/programs-and-services/conservation-programs/)

### RESERVOIR RELEASE CO BOOSTING INSTREAM FLOWS

On July 19th, Colorado Water Trust (CWT) completed a request for 1,000 acre-feet of water of the maximum total 5,100 acre-feet of water CWT has contracted for in 2022 for the Yampa River. This project, in partnership with the Upper Yampa Water Conservancy District (UYWCD), began releases on July 21st and aims to support the Yampa River, the fish and wildlife that depend on it, as well as the recreational uses on the river.

During the summer and fall of 2022, CWT aims to purchase and release up to 5,100 acre-feet (or 1.7 billion gallons) of water from Stagecoach Reservoir. CWT's releases will be made when the Yampa River falls below healthy levels for fish and riparian habitat. The 5,100 acre-feet is the most water CWT has ever had available to add to the river in a single year. When water temperatures in the Yampa River exceed healthy levels, water purchased from Stagecoach Reservoir passes through an 18-mile stretch, past the downtown area of Steamboat Springs. When temperatures are in a healthier range, water will continue to be released to benefit the critical fishery below Stagecoach Reservoir. In addition, CWT may also purchase and release up to 650 acre-feet of water from Elkhead Reservoir, downstream of Steamboat Springs, to protect a critical reach of the Yampa River that is home to endangered, native fish and possibly also for use by agriculture depending upon conditions.

Since 2012, CWT has led local efforts to restore the Yampa River. Throughout the past decade, CWT has purchased and released over 13,850 acre-feet (4.5 billion gallons) of water to boost flows in dry years. At times, CWT's boosted flows contributed to over half of the flow of the Yampa River as it passed through the city of Steamboat Springs. The Water Trust has also had success in prior years, thanks to its partnerships in the Yampa

Valley, at maintaining enough flow in the Yampa River to prevent recreational closures along the river. According to CWT, keeping the Yampa River flowing strong throughout the dry summer and fall months supports not just the environment, and the fish and wildlife that depend on the river, it is also important for the community. CWT's project helps keep local fishing and tubing businesses thriving, supports a bustling tourism industry comprised of many people who come to enjoy the beauty of the Yampa River, and provides more water for ranchers downstream.

CWT noted its gratitude for the hard work and collaboration of the community of Steamboat Springs, which has made this project possible. CWT, a nonprofit organization with a staff of eight, continues to raise funds for the Yampa River project this year. In total, the Water Trust expects the project to cost roughly \$280,000. To date, the Water Trust has raised 87% of that sum thanks to generous donors.

**For info:** Alyson Meyer Gould, CWT, 720/ 570-2897 or [agould@coloradowatertrust.org](mailto:agould@coloradowatertrust.org)

### DROUGHT PLANS WEST WATERSMART GRANTS PROGRAM

Reclamation is announcing the award of six drought planning activities for 2022 WaterSMART, Drought Contingency Planning grants. This program provides federal cost-share funds for entities to develop and update comprehensive drought plans, building long-term resiliency to drought.

The selected projects support drought planning development and updates to help meet the unprecedented drought conditions in the West. These projects will support these communities in building drought resiliency by planning for and preparing for drought through monitoring and prioritization of mitigation and response actions to protect vulnerable resources during times of drought.

Arizona:

City of Kingman, located in Mohave County, Arizona, will use \$100,000 in federal funds to develop a new drought contingency plan. The plan will improve water supply reliability for the City of Kingman that currently utilizes groundwater from the Hualapai Basin and is experiencing exceptional and unprecedented drought conditions. Total Project Cost is \$200,000.

California:

Three Valleys Water Municipal District, in Eastern Los Angeles County, will use \$200,000 in federal funds to develop a new drought contingency plan. Three Valleys Water Municipal District has had severe restrictions to portions of its service area. The new Drought Contingency Plan will address the region's concerns with drought and leverage existing and in-progress member agency planning efforts. Total Project Cost is \$400,000.

Colorado:

Uncompahgre Valley Water Users Association, in Montrose, Colorado, will use \$200,000 in federal funds to develop a drought contingency plan to evaluate new approaches for water shortage contingency plan actions, review climate conditions, and develop a response framework for irrigation and municipal deliveries during future drought conditions. Total Project Cost is \$400,000.

Upper Gunnison River Water Conservancy District, in Gunnison, Colorado, will use \$140,480 in federal funds to develop a new drought contingency plan to address extended drought, build long-term resiliency in the basin, and provide a framework for sustainable water management. Total Project Cost is \$306,620.

New Mexico:

City of Roswell, located in Chaves County, New Mexico, will use \$200,000 in federal funds to develop a new drought contingency plan to increase their water reliability and improve water management through conservation, expanded technologies, and improved modeling capabilities. This planning effort will work in tandem with Roswell's 2021 Water Conservation Plan. Total Project Cost is \$400,000.

Oregon:

Santiam Water Control District in Stayton, Oregon, will use \$25,000 in federal funds to update their existing drought contingency plan to address emerging concerns, improve the drought monitoring process, incorporate new mitigation actions, and streamline the operational and administrative framework and plan update process. Total Project Cost is \$50,000.

**For info:** Reclamation Drought Response Program website: [www.usbr.gov/drought/](http://www.usbr.gov/drought/)

- August 16** **WEB**  
**Enforcement and Compliance History Online (ECHO) Webinar**, 1:30-2:30pm Eastern Daylight Time. Access, Download & Use Data for Online Analyses. For info: <https://echo.epa.gov/help/training#upcoming>
- August 16-18** **UT**  
**2022 National Water Use Data Workshop, Salt Lake City**. Utah Dept. of Environmental Quality Bldg., 195 North 1950 West. Collaboration Between Western States Water Council Water Information Management Systems (WIMS) Group, USGS, Interstate Council on Water Policy & Internet of Water. For info: [westernstateswater.org/events/2022-national-water-use-data-workshop/](http://westernstateswater.org/events/2022-national-water-use-data-workshop/)
- August 17** **CA**  
**Water Education Seminar, Orange**. Santiago Canyon College. Presented by the California-Nevada Section, American Water Works Association on Water Distribution, Water Resources, Water Quality, etc. For info: [www.ca-nv-awwa.org/canv/CNS/EventsandClasses/Event\\_Display.aspx?EventKey=WES220817A](http://www.ca-nv-awwa.org/canv/CNS/EventsandClasses/Event_Display.aspx?EventKey=WES220817A)
- August 17-18** **CA**  
**7th Annual California Water Data Summit, Irvine**. UC Irvine. For info: [www.cawaterdatasummit.org/](http://www.cawaterdatasummit.org/)
- August 17-18** **DC**  
**2022 Water Finance Conference, Washington**. Hilton Washington DC Capital Hill. RE: Water and Wastewater Utility Finance. For info: [www.waterfinanceconference.com](http://www.waterfinanceconference.com)
- August 18** **WEB**  
**Regulatory Compliance for Water & Wastewater - Virtual Event**, For info: [www.euci.com/events/all-conferences/](http://www.euci.com/events/all-conferences/)
- August 18-Sept. 22** **WEB**  
**NPDES Basic Permit Writers' Course - Virtual Guided Learning**, Afternoon Sessions Running 5 Weeks. Presented by EPA Office of Water. For info: [www.eventbrite.com/e/us-epa-npdes-permit-writers-course-virtual-guided-learning-august-pm-tickets-377337154587](http://www.eventbrite.com/e/us-epa-npdes-permit-writers-course-virtual-guided-learning-august-pm-tickets-377337154587)
- August 18-19** **WEB**  
**Wastewater Collection Systems Course**, RE: Operations, Maintenance, Troubleshooting, and Technologies. For info: [www.euci.com/events](http://www.euci.com/events)
- August 23-Sept. 1** **Sweden**  
**World Water Week: "Seeing the Unseen: The Value of Water"**, Stockholm. Norra Latin. August 23-25 Online Only; August 28-Sept. 1 On-site; August 29-Sept. 1 On-line Also. For info: [www.worldwaterweek.org](http://www.worldwaterweek.org)
- August 24** **WEB**  
**Creating the Workforce of the Future Webinar**, 1:00pm-2:30pm Eastern Time. Presented by Water Infrastructure and Resiliency Finance Center of EPA: East Central University. For info: [www.epa.gov/sustainable-water-infrastructure/water-sector-workforce-webinars](http://www.epa.gov/sustainable-water-infrastructure/water-sector-workforce-webinars)
- August 29-31** **TX**  
**Smart Water Summit - Improving North American Water Utility Infrastructure, San Antonio**. La Cantera Resort & Spa. For info: [smartwatersummit.com](http://smartwatersummit.com)
- August 30-Sept. 1** **TX**  
**Texas Groundwater Summit, San Antonio**. Hyatt Regency Hill Country Resort. Expert Presentations on All Areas of Groundwater Management. For info: <https://texasgroundwater.org/news-events/events/texas-groundwater-summit/>
- September 6-8** **OR & WEB**  
**Oregon Conservation Education and Assistance Network (OCEAN) CONNECT+ Hybrid Conference, Seaside**. Seaside Convention Center; In-Person or Virtual Event. Training Focused on Technical & Administrative Aspects of Conservation Implementation. For info: [connectoregon.net](http://connectoregon.net)
- September 8** **CO**  
**16th Annual President's Reception - Water Education Colorado, Denver**. Balistreri Vineyards. Commemorating Weco's 20th Anniversary & Honoring 2022 Awardees Gregory Hobbs, Jr. (Posthumous) & Sonja Chavez. For info: [wateredco.org/2022-presidents-reception](http://wateredco.org/2022-presidents-reception)
- September 8-9** **WA**  
**5th Annual Water Law in Central Washington Conference, Ellensburg**. Central Washington University, 400 E. University Way. Update on Water Rights Law, Updates from Regulators, and Updates on Recent Trends and Practices. For info: The Seminar Group: 206/463-4400, [info@theseminargroup.net](mailto:info@theseminargroup.net) or [theseminargroup.net](http://theseminargroup.net)
- September 11-13** **CA**  
**WaterReuse California Annual Conference, San Francisco**. Hyatt Regency Embarcadero. RE: Drought Response, Project Delivery Methods, and Inter-Agency Collaboration. For info: <https://waterreuse.org/sections/waterreuse-california/meetings-events/>
- September 11-14** **OR**  
**Water Infrastructure Conference & Exposition, Portland**. Hilton Portland Downtown. Presented by the American Water Works Assoc. For info: [www.awwa.org/Events-Education/Water-Infrastructure](http://www.awwa.org/Events-Education/Water-Infrastructure)
- September 11-15** **Denmark**  
**International Water Association Congress & Exhibition: Shaping Our Water Future, Copenhagen**. Bella Center Copenhagen; On-line & On-site. For info: [www.worldwatercongress.org](http://www.worldwatercongress.org)
- September 12-14** **FL**  
**2022 NAWC Water Summit - Tapping Into Tomorrow, Miami**. JW Marriott Miami Turnberry Resort & Spa. Presented by National Association of Water Companies. For info: [nawc-2022-water-summit.mailchimpsites.com](http://nawc-2022-water-summit.mailchimpsites.com)
- September 13** **CO**  
**Colorado Water Trust's Annual Riverbank Celebration, Denver**. Denver Botanic Gardens. Includes Presentation of David Getches Flowing Water Award. For info: [www.coloradowatertrust.org](http://www.coloradowatertrust.org)
- September 13-15** **WS**  
**One Water Summit 2022, Milwaukee**. Wisconsin Center. Awarding of US Water Prize. Presented by US Water Alliance. For info: <http://www.uswateralliance.org/events/summit2022>
- September 13-16** **Alberta**  
**WCW Annual Conference & Exhibition, Calgary**. Hyatt Regency. Presented by Working Together for Water. For info: [www.wcwwa.ca](http://www.wcwwa.ca)
- September 15** **WA**  
**Celebrate Waters 2022 - CELP Celebration, Seattle**. Ivar's Salmon House. Center for Environmental Law & Policy Event: 5-7pm Pacific Time. For info: <https://celp.org>
- September 18-21** **CO**  
**Rocky Mountain Water Conference - "Welcome Back!", Keystone**. Keystone Conference Center. Presented by the Rocky Mountain Water Environment Association & Rocky Mt. Section - American Water Works Association. For info: [rmwea.org](http://rmwea.org)
- September 19-20** **AZ**  
**Tribal Water Law 10th Annual Conference: Water Security on the Path to Resiliency, Scottsdale**. We-Ko-Pa Casino Resort. For info: CLE International: 800/ 873-7130 or [www.cle.com](http://www.cle.com)
- September 19-21** **MT**  
**Western Collaborative Conservation Network's Confluence 2022 Conference, Pray**. Chico Hot Springs Resort. RE: Collaboration and Regional Governance, Watersheds, and Cross-Cultural Collaboration. For info: <https://collaborativeconservation.org/>
- September 20** **TX**  
**Texas Rainmaker Award Dinner, Austin**. Bullock Texas State History Museum. Hosted by the Texas Water Foundation. For info: [www.texaswater.org](http://www.texaswater.org)
- September 20-23** **IL**  
**2022 Water Modeling Workshop, Chicago**. Palmer House Hilton. Hosted by EPA in Collaboration with ACWA (Assoc. of Clean Water Administrators). For info: ACWA Modeling Website: <https://www.acwa-us.org/event/2022-water-quality-modeling-workshop/>; Jasper Hobbes, ACWA, [jhobbs@acwa-us.org](mailto:jhobbs@acwa-us.org) or EPA Water Modeling Workgroup, [water\\_modeling\\_workgroup@epa.gov](mailto:water_modeling_workgroup@epa.gov)
- September 21-24** **TN**  
**SEER 30th Fall Conference, Nashville**. Renaissance Nashville Hotel. Sponsored by the ABA Section on Environment, Energy, and Resources (SEER). For info: [ambar.org/SEERevents](http://ambar.org/SEERevents)
- September 22** **WEB**  
**Pollution Prevention Waste Management Virtual Workshop**, Hosted by Expert Staff from TCEQ, U.T. Arlington & US EPA. For info: [www.tceq.texas.gov/p2/events/pollution-prevention-waste-management-workshop](http://www.tceq.texas.gov/p2/events/pollution-prevention-waste-management-workshop)
- September 24** **OR**  
**20th Annual Celebration of Rivers, Portland**. Crystal Springs Rhododendron Garden, 5801 SE 28th Avenue. For info: <https://bit.ly/20thgathering>
- September 26-29** **MD**  
**WaterPro Conference, National Harbor**. Gaylord National Resort & Convention Center. Hosted by National Rural Water Association. For info: [waterproconference.org](http://waterproconference.org)
- September 28** **WEB**  
**Utility Cyber Defense: How to Engineer a Better Approach - Webinar**, 11:00am-12:30pm Mountain Zone. Presented by American Water Works Association. For info: [www.awwa.org/Events-Education/Events-Calendar/mid/11357/OccurrenceId/620?ctl=ViewEvent](http://www.awwa.org/Events-Education/Events-Calendar/mid/11357/OccurrenceId/620?ctl=ViewEvent)
- September 28-29** **CA**  
**World Water-Tech North America Innovation Summit, Los Angeles**. For info: [worldwatertechnorthamerica.com](http://worldwatertechnorthamerica.com)
- September 29-30** **MT**  
**Buying & Selling Ranches and Farmland Conference, Billings**. Northern Hotel. For info: The Seminar Group: 206/ 463-4400, [info@theseminargroup.net](mailto:info@theseminargroup.net) or [theseminargroup.net](http://theseminargroup.net)
- September 29-30** **NM**  
**New Mexico Water Law 29th Annual Conference - Drought Conditions, 50 Years of the Clean Water Act & More, Santa Fe**. La Fonda on the Plaza. For info: CLE International: 800/ 873-7130 or [www.cle.com](http://www.cle.com)
- October 3** **UT**  
**Utah Water Law Conference - The Colorado River, The Great Salt Lake & Utah Lake, Salt Lake City**. Marriott University Park. For info: CLE International: 800/ 873-7130 or [www.cle.com](http://www.cle.com)
- October 5-6** **MT**  
**22nd Annual Montana Water Law Conference, Helena**. Great Northern Hotel. For info: The Seminar Group: 206/ 463-4400, [info@theseminargroup.net](mailto:info@theseminargroup.net) or [theseminargroup.net](http://theseminargroup.net)
- October 5-6** **CO**  
**Western Colorado Water & Wastewater Conference, Grand Junction**. Grand Junction Convention Center. Presented by the Rocky Mountain Section - American Water Works Association. For info: [rmsawwa.org](http://rmsawwa.org)



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## CALENDAR

(continued from previous page)

**October 8-12** **LA**

**WEFTEC 2022: The Water Quality Event, New Orleans.** New Orleans Morial Convention Center. For info: [www.weftec.org/exhibit/Exhibit2022/](http://www.weftec.org/exhibit/Exhibit2022/)

**October 11-13** **CO**

**2022 Sustaining Colorado Watersheds Conference - Bridging Connections: Learning From the Past, Investing in the Future, Avon.** Westin. Hosted by Colorado Watershed Assembly, Water Education Colorado & Colorado Riparian Association. For info: [coloradowater.org](http://coloradowater.org)

**October 23-26** **CA**

**Fall Conference of the California-Nevada Section, American Water Works Association, Sacramento.** SAFE Credit Union Convention Center. For info: <https://www.ca-nv-awwa.org/> >> Fall Conference

**October 24-26** **CA**

**CASQA 2022 Annual Conference: "Celebrating Milestones: Taking the Next Steps for Stormwater", Palm Springs.** Palm Springs Convention Center. For info: California Stormwater Quality Association, [www.casqa.org](http://www.casqa.org)

**October 24-27** **NE**

**Platte River Basin Conference & 3rd Playa Research Symposium - Braided Paths: Science, Policy, and Culture, Kearney.** Hosted by the Nebraska Water Center. For info: <https://watercenter.unl.edu/2022-nebraska-water-conference>

**October 25-27** **IA**

**Interstate Council on Water Policy 2022 Annual Meeting, Quad Cities.** Hotel Blackhawk. For info: Beth Callaway, ICWP, 307/ 772-1999 or [www.icwp.org](http://www.icwp.org)

**November 4-5** **CA**

**Water Law Institute, San Diego.** TBA. Presented by The Foundation for Natural Resources and Energy Law (formerly Rocky Mountain Mineral Law Foundation). For info: [www.fnrel.org/conferences](http://www.fnrel.org/conferences)

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**Water Law**  
*in Central Washington*

**TSG**

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