



Leading *the* Charge



W Y O M I N G W A T E R S T R A T E G Y

Governor Matthew H. Mead • 2015

GOVERNOR MATTHEW H. MEAD

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A Message From

GOVERNOR MATTHEW H. MEAD

Water is Wyoming's most important natural resource. It is critically important not only to Wyoming but to our country. Wyoming is a headwaters state. The water that begins in our mountains travels down our nation's great rivers. Water that starts here makes its way to the Pacific Northwest, the Gulf of California, and the Gulf of Mexico. From statehood, we have recognized the need to protect and develop our water.

Wyoming water law is rooted in our Constitution where the founders of the state voiced its importance, outlined governing principles, and created the authorities to manage it. The water within our borders belongs to our state. Responsible stewardship and beneficial use are essential to safeguarding it. Our rights to water must be exercised or may be lost. That is the way of it in the West.

As a state, we have seen recent challenges to our water resources and our rights to manage them. In the last year alone, federal agencies have sought greater control of surface water, groundwater, and even our watersheds. We have also faced challenges from neighboring states who would like a greater portion of our water. We have and will continue to challenge these actions. We owe it to those that came before us and those who will come after us.

During the last year and a half, I visited with citizens throughout Wyoming and asked their opinions about what we should do regarding Wyoming water. The responses were clear. We need to act. We need to keep doing what our forebears did. We need to improve our resources so this legacy to future generations is not only there for them, but it is even better.

This Water Strategy begins the process. It contains four specific themes: Management, Development, Conservation and Protection, and Restoration. Each theme has initiatives to move them forward. Each initiative is aimed at creating opportunities for generations to come. The opportunities are varied, from improving our capacity to store and deliver water, to protecting the farms and fish that depend on it.



We have world-class technical experts and agencies primed to carry out these efforts. We have forward-thinking leaders and legislators who set the groundwork. We have the support of the citizens of Wyoming.

In the pages that follow, I outline ten initiatives. They are areas of consensus.

They are priorities. The time to work on these priorities is now. Water does not wait for us. In the words of an old song: "It just keeps rolling along." The time to start projects we need tomorrow must be today. These efforts take time; they take money; and they take commitment. Wyoming is up to the challenge.

I look forward to working on water issues with you – members of the public, local communities, agencies, and the Legislature. These issues are bigger than my administration, any one agency, or any one individual. They do not begin or end with us. As those who came before us, we have an obligation to take stock of what we have, improve it, protect it, and leave it to those who come after us better than we found it.

Sincerely,

Matthew H. Mead
Governor



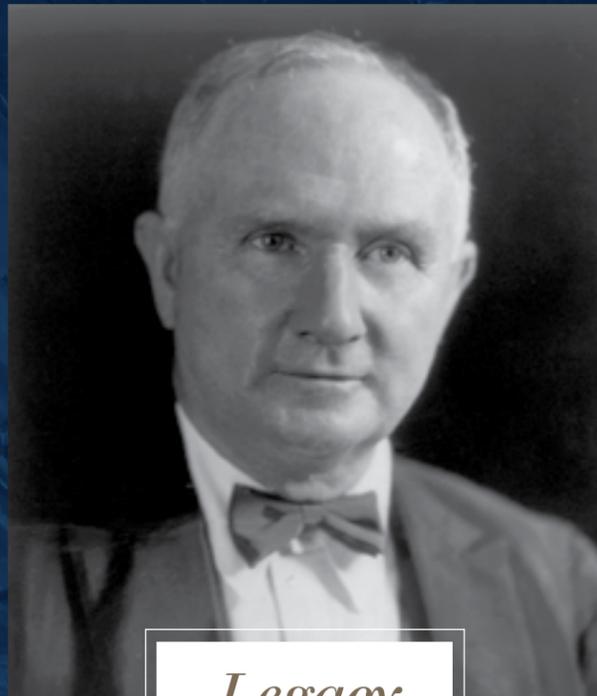
Legacy

In 1869, 35-year-old Major John Wesley Powell, a one-armed Civil War hero, began a voyage on the waters of Wyoming with the charge to explore the Colorado River. Congress had authorized his trip to study the West's geology and water supply. His expedition began near the present day town of Green River where he embarked with three boats and nine men.

Powell's voyage would ultimately help define the future of Wyoming, the American West, and the world. He became an advocate of planning for the development of water and land resources in the West. Powell urged that control of the West's rivers, irrigation of its arid lands, and equitable distribution of water become national priorities. In 1888, Congress placed Powell at the U.S. Geological Survey, with instructions to survey locations for the development of irrigation projects. He would later go on to lead the USGS. The West is full of towns and landmarks named after him, including the Wyoming town of Powell and Lake Powell on the Colorado River.

Introduction





Legacy

Wyoming became a territory in 1869, in the aftermath of the Civil War. Stockman and businessman Francis E. Warren, along with Joseph Carey and others, started an irrigation venture, the Wyoming Development Company, at the site that became Wheatland. They knew they needed water law to protect their rights to water as well as those of other users. They hired Elwood Mead* for the job. Territorial Engineer was the title.

Mead was already renowned for his work as an engineer who taught engineering and irrigation science. Francis Warren requested permission from the Territorial Governor, Thomas Moonlight, to recruit Mead. The Governor hired him sight unseen in March 1888. The Governor later admitted that if he had known Mead was only thirty years old, he would not have hired him, believing he would fail. Failure was not in Mead's character.

He built Wyoming's water law, now heralded nationwide as the model for the West. He became the first Wyoming State Engineer, and delegates to the Constitutional Convention incorporated his position and ideas into the state Constitution. Following his successes in Wyoming, he would go on to lead irrigation investigations for the U.S. Department of Agriculture, and later head the Bureau of Reclamation. One of Mead's greatest achievements, the construction of Hoover Dam, was completed just as he died. Lake Mead was named after him.

*No relation to current Governor Matthew H. Mead

Introduction



In 2013, Governor Matthew H. Mead developed an Energy Strategy with the input of people throughout the State of Wyoming. That strategy was built on a vision of excellence in energy development and environmental stewardship, with a foundation of accountability and action. One of the important initiatives identified in the Energy Strategy was the creation of a Water Strategy. Water, like energy, is linked to opportunities for growth, development, security, and a strong economy. To keep succeeding, Wyoming needs to protect, plan for, and utilize water for the highest benefit of its citizens. The challenge is not new; rather, it is to continue the legacy that was left to us by previous generations.

Stewardship is a fitting description of how we manage renewable resources, like water. Those resources are available to us for use today as a result of the actions of our predecessors in planning, building, and conserving. We have a responsibility to plan for the future, as they did. The Water Strategy was developed to follow their lead, build on the foundations they left, and create opportunities for those that follow. Governor Mead's Water Strategy, like the Energy Strategy before it, creates goals that can be targeted and measured. Those goals are captured in ten specific initiatives, which follow.

Leaders in Wyoming have set the foundations for meeting our water goals in a variety of key areas.

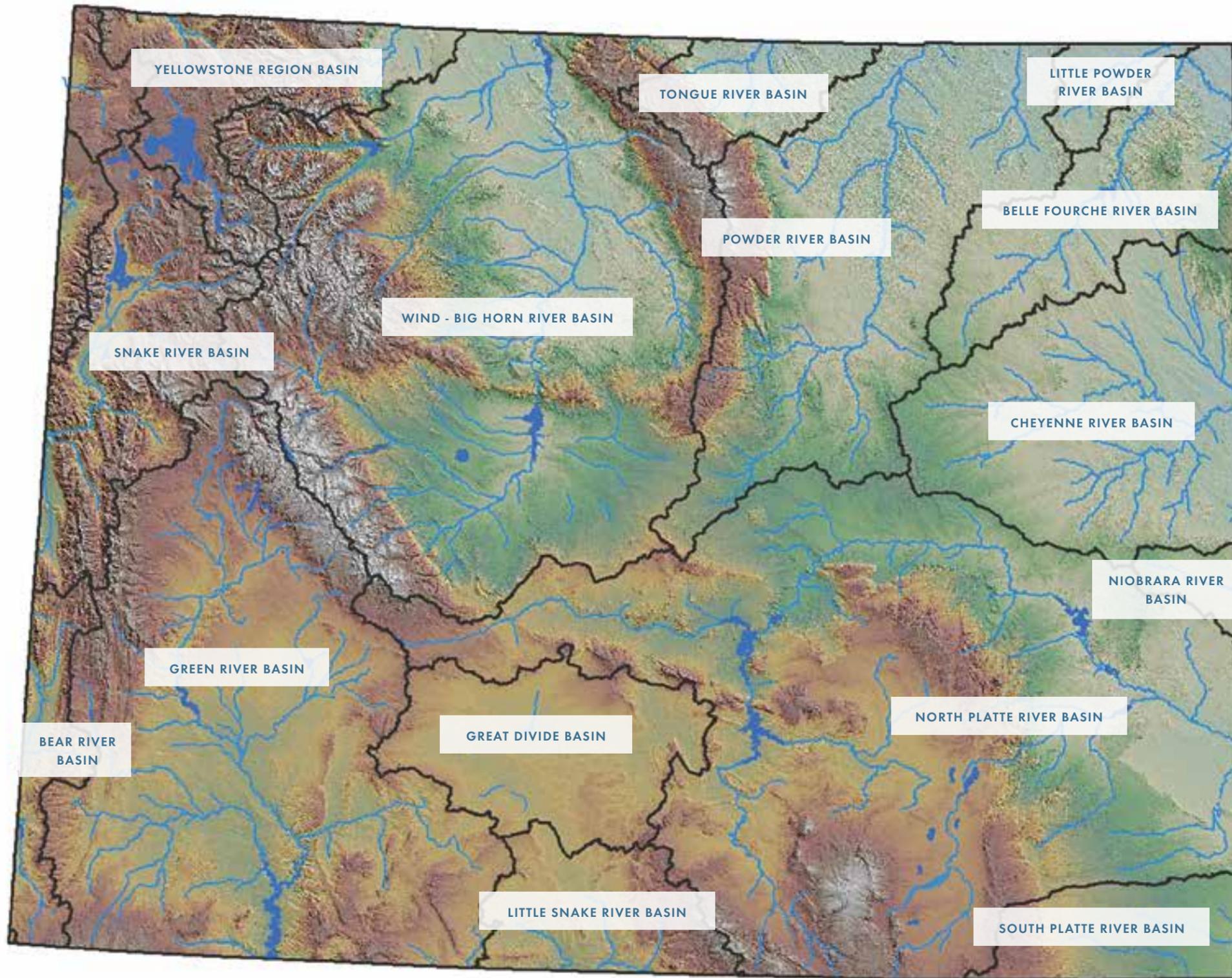
These are captured in the four strategic themes of the Water Strategy: Water Management, Development, Conservation and Protection, and Restoration. The initiatives under these themes were suggested by Wyomingites and vetted in a public process. The ten that rose to the top will go to agencies for the development of implementation strategies that are specific, measurable, attainable, relevant, and time-based.

None of the initiatives would have been possible without the past efforts of Wyoming's citizens and their elected leaders. Implementing the initiatives will be possible only with today's citizens, agencies, and elected officials working together to realize a shared vision of water for the future of Wyoming.

The strategic themes in the Water Strategy, and the initiatives under them, were identified by looking at where we have been and where we need to go in relation to water. In the pages that follow, each theme will be explored. In addition, this strategy takes note of innovative and important individuals who helped establish Wyoming's legacy in water.

This strategy builds for Wyoming's people and for the future.

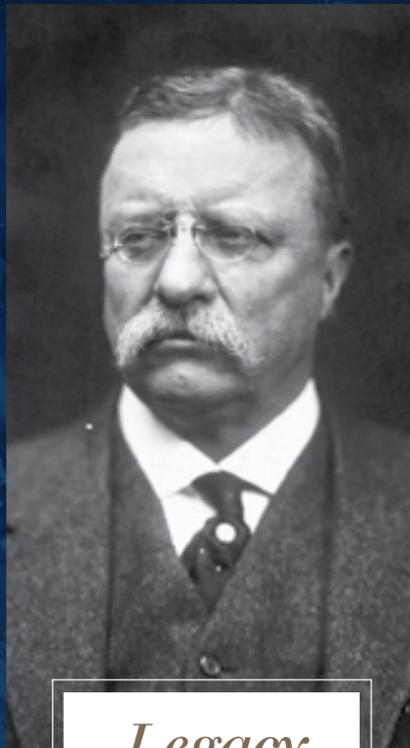
WYOMING RIVER BASINS



-  Basin Borders
-  Major Streams
-  Major Lakes/Reservoirs

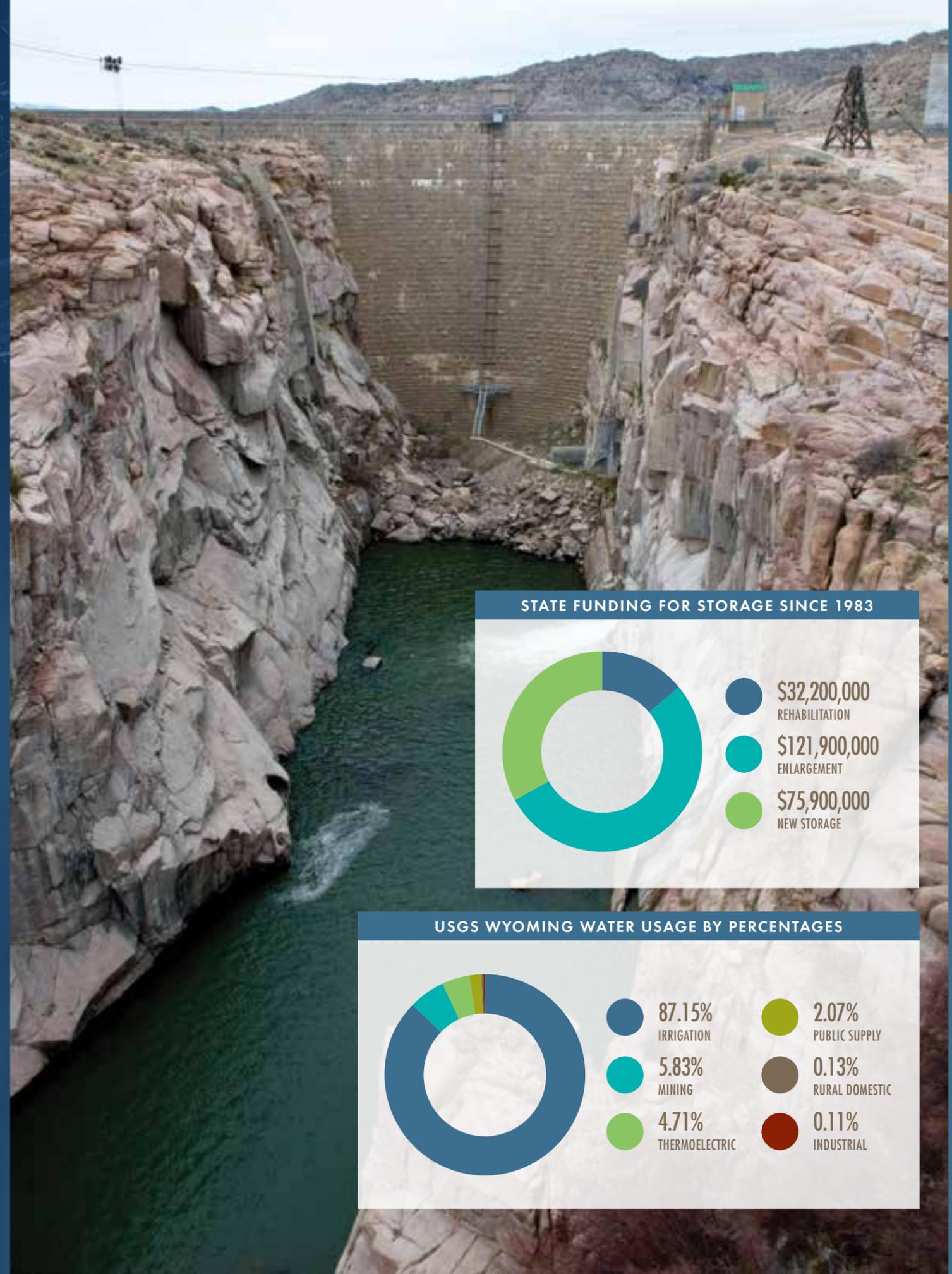
“The waters of our state are among its greatest assets. It is extremely important that our rights to them be maintained and defended. I favor continuing the effort to accomplish this by agreement or compact, but if that fails there should be no faltering on our part, and vigorous action should be taken to protect our rights in the courts.”

– GOV. NELLIE T. ROSS
GOVERNOR’S MESSAGE TO THE LEGISLATURE, 1925

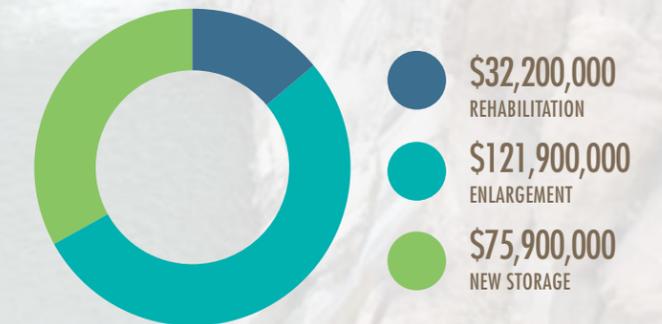


Legacy

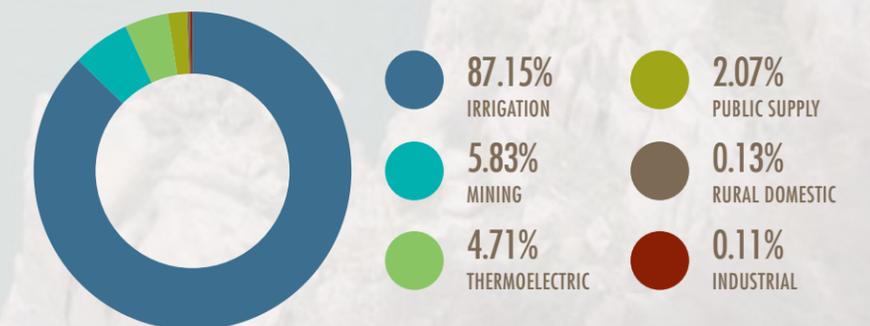
Theodore Roosevelt took personal interest in water. He signed the bill to create the Reclamation Service, now the Bureau of Reclamation, in the first days that it reached his desk. He also established a special “reclamation fund,” intended to pay for the construction of the dams and canals needed to irrigate the West. The Reclamation Act, which authorized the transfer of land to agricultural homesteads, limited people on Reclamation projects to 160 acres. John Wesley Powell thought 160 acres was insufficient in the arid West, and recommended up to 2,560 acres of public land be allocated to an individual settler. The suggestion, offered by one of the nation’s top experts in western water, was not heeded by Congress, which was more familiar with midwestern and eastern agriculture, requiring far less land for profitability.



STATE FUNDING FOR STORAGE SINCE 1983



USGS WYOMING WATER USAGE BY PERCENTAGES





Legacy

The Wyoming Legislature, from the beginning, has carried the state to the forefront in dealing with water. Though the story of Wyoming water predates statehood, the actions of elected representatives have provided a framework and the needed tools for growth and management of the state's most important resource.

Wyoming leaders laid out strong water laws. They viewed water rights as so important that they were included in the Constitution. They established technical expertise for water by designating a State Engineer in the Constitution as well. Wyoming legislators would go on to create the Department of Environmental Quality, Department of Agriculture, Game and Fish Department, Water Development Commission, and Wildlife and Natural Resource Trust. All of these agencies play critical roles in Wyoming's water.

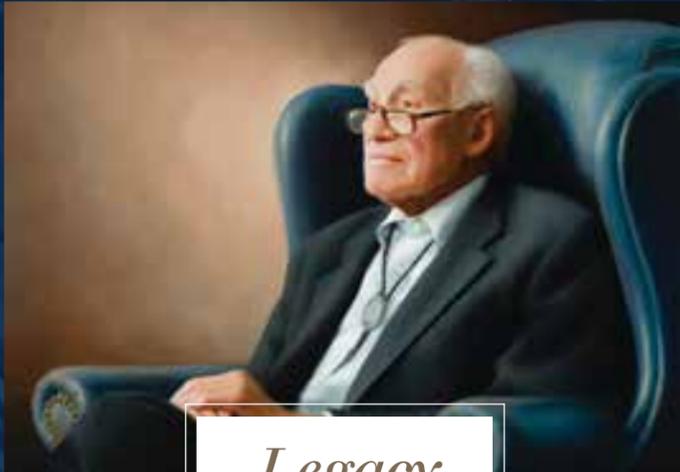
Legislators in Wyoming have protected and will continue to protect Wyoming's water. Over time, they have allocated well over \$1 billion dollars to water. The beneficiaries have been the citizens of Wyoming. Whether it is increased tourism, a growing community, increased tax revenue, agricultural production, electricity production, recreational opportunities, a tap in a home, or an industrial flume, water works for Wyoming.

Themes

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Legacy

Clifford P. Hansen, born in 1912, is an example of one of the many elected leaders in Wyoming who made history working to develop water for the state. His father, Peter Hansen, was a rancher, but had college training as a “practical” engineer. He did survey and design work for the development of irrigation ditches on local ranch lands. Cliff Hansen knew the value of water. He owned the Spring Gulch Ranch, was President of the Wyoming Stock Growers Association, and would eventually become Governor.

As Governor, he was recognized for his work advocating infrastructure like highways and reservoirs throughout the state. Wyoming’s “Cowboy Governor” would go on to serve as a United States Senator. He spearheaded legislation that increased the state’s share of mineral royalties from 37.5 to 50 percent. This brought and continues to bring the state billions of additional dollars in revenue.

Senator Hansen sponsored, co-sponsored, and supported bills authorizing countless reclamation and water development projects in Wyoming and the nation. He worked to amend the Federal Water Pollution Control Act, now commonly called the Clean Water Act, seeking provisions for agricultural exemptions and clarifications for irrigation practices. One of his many bills increased recreational access to Pathfinder Reservoir. In another, he proposed a feasibility study for a series of water developments, dams, and aqueducts, to support a regional coal-to-chemicals industrial facility in the Powder River Basin.

After two terms in the Senate, he returned to Wyoming. Ronald Reagan twice sought his service in his cabinet. Clifford P. Hansen chose to remain in Wyoming. He died in 2009.

Water Management



THE FIRST DIVERTERS

Prior to Wyoming becoming a U.S. Territory on July 25, 1868, early settlers to the river basins of the West had already begun damming and diverting streams and rivers for the production of agriculture. Westward expansion had existed for more than 30 years prior to the establishment of the Wyoming Territory, and many settlers, finding Wyoming’s valleys ideal, called Wyoming home. Still, water usage during the pre-territorial days was unregulated and unruly. Settlers’ early claims to use often resulted in vague declarations of ownership that were poorly assembled and unenforceable.

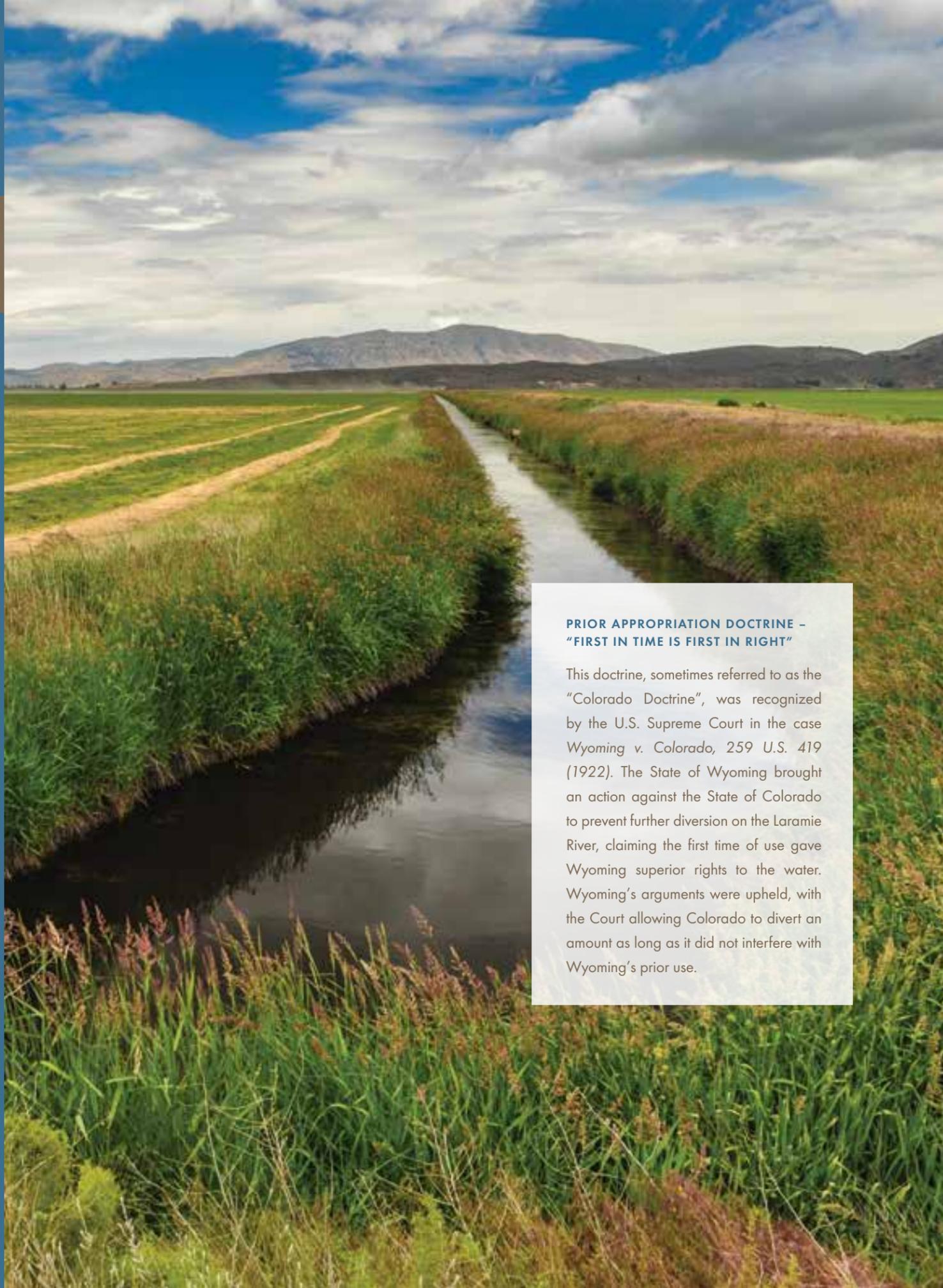
As Wyoming established a territorial government, early settlers looked for a water law structure to organize investments in irrigation infrastructure. A group of Wyoming business and stockmen together invested in an ambitious irrigation venture called the Wyoming Development Company. Francis Warren, leader of the venture, recruited a renowned young engineer named Dr. Elwood Mead.

Mead was an advocate of the Doctrine of Prior Appropriation. Under this doctrine, the first person to put the water to beneficial use establishes the first and best right to the water, or “first in time is first in right.” The earliest rights are entitled to water first during times of limited supply, while later rights must wait. In 1888, at thirty years old, Mead was appointed as Wyoming’s first territorial engineer and tasked with establishing the water law framework for the territory.

WATER MEASUREMENT –

There are three basic units of measurement for water management.

- Flowing surface water is measured in cubic feet per second (cfs), equal to about 7.5 gallons.
- Water stored or impounded is measured by the acre-foot (AF) – one acre to a depth of one foot, equal to 326,000 gallons.
- Water pumped from a well is measured in gallons per minute (gpm).



PRIOR APPROPRIATION DOCTRINE – “FIRST IN TIME IS FIRST IN RIGHT”

This doctrine, sometimes referred to as the “Colorado Doctrine”, was recognized by the U.S. Supreme Court in the case *Wyoming v. Colorado*, 259 U.S. 419 (1922). The State of Wyoming brought an action against the State of Colorado to prevent further diversion on the Laramie River, claiming the first time of use gave Wyoming superior rights to the water. Wyoming’s arguments were upheld, with the Court allowing Colorado to divert an amount as long as it did not interfere with Wyoming’s prior use.

WHAT IS A “WATER RIGHT”?

In 1889, Elwood Mead established a controlled experiment on irrigated lands near Wheatland and determined the minimum amount of water needed to successfully grow oats. It was 1 cfs per 70 acres of land, thereafter known as the “duty of water.”

REVOLUTIONARY WATER LAW

At the first Wyoming Constitutional Convention and Statehood debates in September of 1889, the 49 elected members from the Wyoming Territory present debated the draft state constitution. Two major innovations, unique to Wyoming, were included: water rights and women’s rights.* No other state constitution at the time had discussed the value, importance, and significance of water to the people of the state.

Under Article VIII of the new Constitution, Wyoming crafted an innovative system for regulation of water within its borders. Water was by constitutional authority the property of the state, to be permitted to “beneficial use” with a measured and limited water right. The position of the State Engineer was established in the Constitution. Elwood Mead would hold the position until asked to lead the U.S. Department of Agriculture’s Division of Irrigation Investigation in 1899. He would later go on to become the Director of the Bureau of Reclamation.

The Wyoming Constitution established key principles regarding water usage in Wyoming. No one in Wyoming could acquire the use of Wyoming’s water without first obtaining a permit. All natural streams, springs, lakes, or other collections were the property of the state. The use of the resource would be regulated in priority by the State Engineer and his staff. Second, a board of experts, the Board of Control, would resolve water disputes that arose in Wyoming, protecting state and private interests in water, adjudicating, and overseeing changes or abandonment of water rights. The State Engineer would preside as President of the Board with four water Superintendents filling out the remaining positions.

The systems established in the Constitution remain today. Each Superintendent has a staff of hydrographers and water commissioners located throughout the state. While the State Engineer issues permits for the use of water in Wyoming, the Board of Control approves the adjudication and subsequent changes to water rights. The Wyoming Board of Control is different than most states

which adjudicate water rights through the courts. In Wyoming, proceedings are accessible and affordable, and keep those with special knowledge of the sciences and intricacies of water as decision makers. This results in decrees on paper that have practical application in the real world.

*Women’s rights are beyond the scope of the Water Strategy and are not further discussed here.

HOW DOES ONE GET A WATER RIGHT?

Anyone using water in the state is required to obtain a permit. People who live in municipalities are using water “permitted” to that city or town. The permit defines the conditions of use as well as the priority date. Once a permit has been issued, the permit holders may start construction of the well, ditch, reservoir, etc., to beneficially use Wyoming water.

ADMINISTERING WYOMING’S WATER RESOURCES

The Wyoming State Engineer’s Office is tasked with the regulation and administration of water rights. The Office administers permits for surface water and instream flow, carries out a program for dam safety, oversees the permitting of groundwater, administers Groundwater Control Areas, and maintains statewide observation networks for water. The Office also assures compliance with interstate compacts and decrees and safeguards future water supplies by preserving Wyoming’s right to develop allocations as set out in compacts and court decrees. Wyoming is party to seven such interstate compacts and two U.S. Supreme Court decrees.

Water Development



“Of all Wyoming’s resources, none may more critically affect our growth and well-being than our water supply... Consequently, as we seek to develop our river basin resources, it is absolutely essential that we be completely informed upon all of the facts involving water and, further, that we secure the services of the best qualified persons possible to represent us in these important areas.

If Wyoming is able, along with other interested involved states, to develop programs which will bring about the wise and orderly best use of its water resources—which includes irrigation, reclamation, power development, recreation (including fish and wildlife)—we can hope to keep in our own hands the control we cherish.”

– GOV. CLIFFORD P. HANSEN, MESSAGE TO THE LEGISLATURE, 1963

Water and how we use it have defined what Wyoming is today. Wyoming was built on work. That work was done in areas like mining, farming, ranching, and petroleum, as well as the jobs that support those industries within the communities where we live, work, and recreate. Because water plays a major role in everything we do, water development has been at the center of growth in Wyoming from the beginning. Developing springs, building dams, protecting and improving river banks, constructing ditches and canals—all have a history in Wyoming from the 1800s.

The history of Wyoming and water is one of innovation and leadership. In the late 1870s, the first large-scale canal project, the Pioneer Canal, out of the Big Laramie River, was built. The project included the first use of a reservoir in the state in 1879 and was aptly named the Pioneer Reservoir. In 1883, territorial businessmen and stockmen, including Francis E. Warren, Joseph Carey, Horace Plunkett, and William Irvine, organized the Wyoming Development Company and began constructing another irrigation project which led to the growth of Wheatland. In 1894, after becoming a U.S. Senator, Joseph Carey sponsored the Carey Act, which resulted in the federal government donating unoccupied federal lands to states for irrigation development.

Under the Carey Act, a project called the Cody Canal was financed by a group of investors, led by William F. “Buffalo Bill” Cody. The Canal was crucial in the settlement of the town of Cody and the Big Horn Basin. Today, it still serves as a key component of the Cody Canal Irrigation District. By 1899, Buffalo Bill Cody and his associates were granted water rights to take water from the Shoshone River to irrigate as much as 169,000 acres of land. Cody’s group joined the Wyoming Board of Land Commissioners to work with the federal government on greater development of irrigation for those lands. Their work led to the Shoshone Project, one of the first water development projects under the Reclamation Service, later known as the Bureau of Reclamation.

Directed by Congress, and signed into law by Theodore Roosevelt in 1902, the Bureau of Reclamation (Bureau) was created from within the U.S. Geological Survey (USGS).

The Wyoming Water Development Office has a division dedicated to dams and reservoirs. The division works with communities throughout the state to identify unique needs and opportunities; understand watershed hydrology to determine water demand and availability; investigate the sciences at hand to address site feasibility; identify benefits, impacts, and regulatory requirements; and ultimately lead the design and construction of reservoir storage.

FLAMING GORGE

Flaming Gorge is a 3.8 million acre-foot water storage facility on the Green River in Wyoming. It sits on the border with Utah, near the location where John Wesley Powell, the famous one-armed American Civil War veteran, began his expeditions to explore the Colorado River and its tributaries.



Since the creation of the Wyoming Water Development Commission in 1975, the state has invested approximately \$1.2 billion in programs for water development in Wyoming.

The Bureau's work would follow the path of John Wesley Powell, who as the second director of the USGS had been an advocate of "reclamation", reclaiming arable lands from the desert. The Bureau studied potential water development projects in western states and funded them through the sale of federal lands. When the Bureau took on Cody's project in 1903, engineers recommended constructing a dam on the Shoshone River in the canyon west of Cody. Construction of the Shoshone Dam, later renamed the Buffalo Bill Dam by Congress, started in 1905. When it was completed in 1910, it was the tallest dam in the world. It joined a contemporary structure, Wyoming's Pathfinder Dam, as two of the first dams ever constructed by the agency. The latter ambitiously dammed the flows of the North Platte and Sweetwater rivers. Both structures are as impressive today, if not more so, than they were over a century ago.

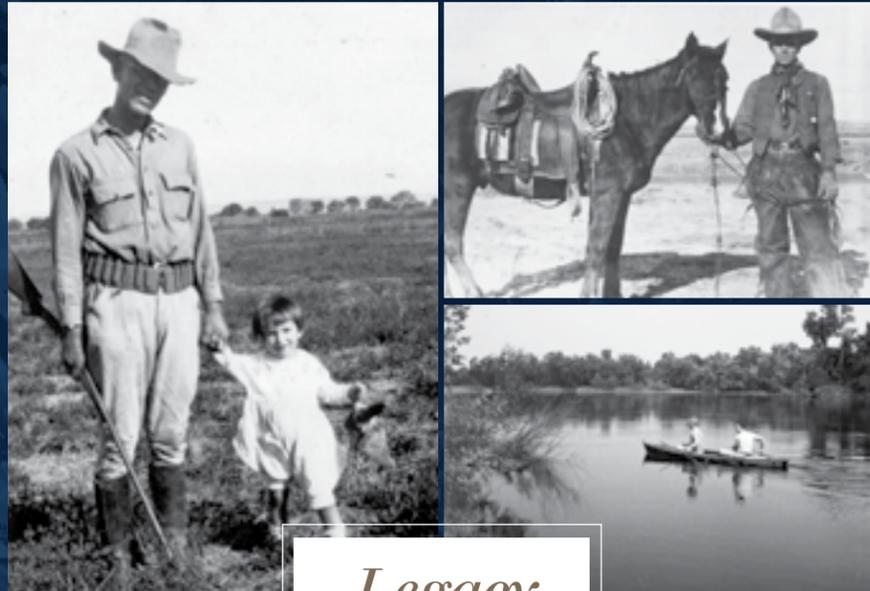
The Bureau has been an important partner in the development of Wyoming's water resources for more than 100 years. The agency's projects supply water for irrigation, municipal use, industry, hydroelectric power, flood control, fish, wildlife, recreation, and tourism. These cooperative projects include 21 dams and reservoirs, providing electricity at 13 hydroelectric power plants.



In addition to the work done with the Bureau, a wide variety of other state, federal, and local entities continued developing water throughout the state. These efforts demonstrated the importance and benefits of planning for water and the foresight of those who worked on them. Where water and its opportunities exist, communities benefit.

In 1967, the state took a pivotal stance on the importance of water development. That year, the Wyoming Legislature authorized the State Engineer to initiate a State Water Planning Program. The program grew out of the State Engineer's Office, becoming the Wyoming Water Development Commission in 1975. Often called simply "Water Development", the Commission promotes the development of the state's water resources.

The Commission has a staff of engineers and support personnel who work on every aspect of water development – from distributing money for small water projects, to planning infrastructure developments and repairs, to construction and management of dams, like the 22,000 acre-foot High Savory. The Commission's activities are funded through specially designated budget accounts, developed by the state Legislature, to further the interests of the State of Wyoming in developing and protecting our water resources.



Legacy

Aldo Leopold was born in Burlington, Iowa, on January 11, 1887, the son of a manufacturer. He grew up on a limestone bluff overlooking the Mississippi River. Aldo loved to read and hunt. He also loved to study birds. In 1909, he graduated from Yale with a Master of Forestry degree.

Aldo Leopold went west that same year and joined the newly formed United States Forest Service in the Arizona and New Mexico territories. He worked in a variety of positions, including Game and Fish Warden, and was effective at promoting practical game laws, creating habitats, and improving herds and fisheries.

After leaving the Forest Service, with the help of funding from the Sporting Arms and Ammunition Manufacturers' Institute, he began conducting wildlife surveys of the North Central States. He published a book, *Game Management*, and was recognized as one of the country's authorities on game animals. He has been called both the "father" of professional wildlife management and of conservation in the United States. Later, he was an instructor at the University of Wisconsin for Game Management. His goal was "to teach the student to see the land, to understand what he sees, and enjoy what he understands."

He had a lifelong love of the West, fishing, hunting, and travelling. Leopold and his family left their mark in Wyoming. While staying at the Paradise Ranch in the Big Horns, he commented on its beauty, writing, "Paradise. What else could you call it..."

Aldo believed that the key to the future of American wildlife was on private lands, in the attitudes and decisions of American farmers and landowners. He had a deep understanding of the relationships between people and natural resources. He famously said, "There are two spiritual dangers in not owning a farm. One is the danger of supposing that breakfast comes from the grocery, and the other that heat comes from the furnace." On April 24, 1948, Aldo Leopold died of a heart attack while helping a neighbor fight a grass fire that threatened his farm.

Water Conservation and Protection



THEMES

CONSERVATION

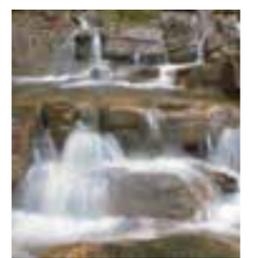


As a headwaters state, Wyoming has been preserving and conserving its streams, rivers, and lakes since territorial times, making the most out of water resources in a semi-arid environment. Wyomingites implemented legislation, policies, and rights that bind water and land together. These actions were put into place to ensure conservation of water and land within the state for future generations.

Water that continues downstream benefits other states. Approximately 25 rivers and streams (45,470 stream miles) produce surface flow 365 days per year. Other smaller waters, which usually go dry during some portion of the year, make up an additional 226,791 stream miles in Wyoming. Water conservation and management of all our streams, rivers, lakes, ponds, and wetlands are vital to our economy and way of life.

Water conservation—managing fresh water as a sustainable resource—is a tool that helps meet the demands placed on a finite supply of water. From industry to urban, to agricultural uses, our water resources are limited. We depend on clean, available water. Conservation is more than saving amounts of water. It includes implementing the right practices to enhance the uses, quality, and lands that depend on it. This takes an understanding of the influences, history, customs, culture, and politics of an area.

Local input and a sense of community are critical to the success of water projects. In Wyoming, individuals, local, state, and federal agencies, the University of Wyoming, community colleges, and conservation groups have a history of cooperation. Conservation Districts are examples of how local leaders develop partnerships for successful natural resource conservation in the state.



What is Nonpoint Source Pollution? Nonpoint source pollution is caused by surface water runoff, coming from widespread lands and a variety of inputs. Point source pollution, in contrast, comes from a single source like the end of a pipe. Nonpoint pollution occurs when the runoff from rainfall or snowmelt picks up and carries pollution until it infiltrates into the ground or enters a stream. Nonpoint sources of pollution nationally are recognized as the largest cause of surface water quality impairments.

Conservation Districts are comprised of locally elected officials and grassroots leaders, who work to leverage opportunities for conservation on private lands. They provide leadership for the conservation of soil and water resources, promote the control of soil erosion, protect water quality, preserve and enhance wildlife habitat, and promote the general welfare of citizens and the state through responsible conservation.

Wyoming's 34 Conservation Districts develop partnerships with federal agencies like the USDA Natural Resources Conservation Service, then work directly with private landowners, homeowners, and Wyoming's communities to implement projects to reduce water consumption, improve water quality, and protect water resources for future generations. These partnerships are responsible for millions of dollars of investment each year in on-the-ground, voluntary conservation.



PROTECTION

Conserving water resources goes hand in glove with protecting the quality of those resources. The quality of Wyoming waters gives us clean water to drink, grow crops, water livestock, support wildlife, meet the needs of industries, promote healthy fisheries, and recreate. Protecting these uses protects our way of life.

Wyoming protects water quality through the combined efforts of local, state, and federal entities, along with the help of organizations, industries, and at the most grassroots level, the private landowners and land managers where waters flow.

In 1972, the Clean Water Act was enacted to regulate water quality in the United States. The purpose of the Act was the restoration and maintenance of the quality of water. The Act recognizes that states have the primary rights and responsibilities for water quality.



Wyoming has primacy to ensure that water resources are managed in an appropriate way. Wyoming's Environmental Quality Act sets out the state's authority in water quality through standards, rules, regulations, and permits. The Wyoming Department of Environmental Quality (DEQ) is the responsible agency.

Every two years, a report is prepared summarizing the condition of Wyoming's waters. It includes "impaired" waters where pollution, like heavy metal or pathogens in a lake, might make water unsafe. The state requires credible data and rigorous sampling, with quality assurance and controls, to ensure that the water is classified accurately.

Wyoming Department of Environmental Quality's Nonpoint Source Program manages federal money to provide financial assistance for planning and implementing watershed protection and restoration projects. Since 1989, over \$22 million in grant funds went into nonpoint pollution reduction. Local governments have brought over \$19 million in additional funds to those projects.

Impaired waters in Wyoming are addressed by local efforts like Watershed Plans or Total Maximum Daily Loads (TMDL). Watershed plans outline best practices that can be applied to address the possible sources of a contaminant. The TMDL, a pollution budget often attached to a watershed plan, details what reductions of a pollutant would be needed to meet standards. Sources of pollution, both known and non-identifiable, are addressed through permits or voluntary conservation practices.

Partners in local government, like Wyoming's Conservation Districts, play important supporting roles in water quality for the state. Districts train to monitor water quality and implement conservation practices that protect and restore waters. They collect credible water quality data, lead watershed planning, and implement projects with landowners. In similar fashion, city,

town, and county governments protect drinking water sources, work to prevent pollution from urban areas, and manage sewage through wastewater treatment plants and septic system permits. Nonprofits, federal agencies, community groups, and local citizens also partner on protection and restoration efforts. Conservation and protection in Wyoming are "all hands on deck" efforts.

Water and Watershed Restoration

WYOMING'S SURFACE WATERS

Wyoming's Surface Waters - DEQ analyzed 17,770.5 miles of Wyoming's streams and rivers. Only 87 stream segments, about 8%, did not meet standards. Bacteria, sediment, and selenium were the primary substances and most came from nonpoint sources.



It is difficult to overstate the importance of water in the American West. The increased demands for water—from a fast-growing human population to an expanding energy industry, to an agricultural industry that must feed a growing world—emphasize the importance of water to the American West. Water can be scarce, with unreliable annual supplies based on variable snow or rain volumes and timing. The water we have is precious.

Wyoming stands out in the world of western water. A single snowstorm that slows down travel over Togwotee Pass in January will send water rushing out to the Pacific from the mouth of the Columbia, trickling toward the Gulf of California through the deserts of Arizona in the Colorado, and through the bayous of Louisiana in the Mississippi. Through the Bear River and its tributaries, Wyoming also contributes to the headwaters of the largest annual water source for the Great Salt Lake, America's inland ocean.

Russian olive and salt cedar trees were introduced in the late 1800s for both functional and ornamental purposes. Over the last few decades, these trees have spread. They now present a serious threat to native species and place stress on existing water uses. The State of Wyoming, through the Wyoming Wildlife and Natural Resource Trust (WWNRT), along with other state and federal agencies, local conservation districts, landowners, non-governmental organizations, and many other partners, has tackled the problem. Together over the last decade, these entities have worked to remove Russian olive trees from river and stream banks throughout the Bighorn Basin. This large effort has resulted in improved water quality and water yield. Removal of invasive species has also restored habitat for deer, game birds, and fish.

Water consumed by thirsty, non-native Russian olive trees and salt cedar in the Bighorn Basin pulls water from the Basin's rivers and streams. Water users on farms, in cities, and in towns require a certain amount of water for agricultural and municipal uses. Excess consumption, rooted in non-native species, can lead to lower average annual flows in the river. Lower flows can have an impact on the anglers, boaters, and kayakers who use these waterways to recreate. Individuals, communities, and local economies can feel the squeeze.

Restoration balances the scales for all stream users. Maintenance of healthy watersheds and restoration in areas of need, can mitigate the need to curtail water uses. Removing Russian olive and salt cedar trees, replacing them with cottonwoods and willows, is one example of watershed restoration that has had a positive impact on the amount of water flowing instream. This in turn benefits all those who rely on healthy water flows.

Wyoming is a great place to fish. Ambitious individuals heading out for a fishing trip can, with luck and skill, catch four subspecies of cutthroat trout in their native Wyoming habitat. For anglers who succeed in catching a Snake River, a Yellowstone, a Colorado River, and a Bonneville cutthroat, the Wyoming Game and Fish Department will recognize their accomplishment with a certificate of achievement, the “Cutt Slam”.

To reach the native habitat for each of the four trout, it is likely an angler will travel by highways and gravel roads. On this road trip, he or she is likely to pass by hay meadows and alfalfa fields, through a handful of rural communities and small cities. The rivers and streams that provide habitat for Wyoming’s cutthroat trout population also provide drinking water for our communities and irrigation water for our food producers. For the families that recreate in the water, the fisheries that populate rivers and streams, and the crops and livestock that depend on them, it is essential that Wyoming’s waterways are healthy and functioning.



Aging infrastructure for irrigation and diversion can negatively affect stream systems. Rebuilding old infrastructure provides opportunities to use new technologies and improve efficiencies in water and in time spent on management. Irrigation practices can be more efficient and precise than ever imagined in earlier generations. There are a growing number of creative solutions to address inefficiencies through technological improvements and increased communication. Analyzing the watershed and working with landowners to engineer solutions can increase the health of rivers and streams, conserve scarce water resources, and improve fish passage. This positively benefits the municipalities, anglers, floaters, and other irrigators who need to utilize the water in a system.

Stream bank stabilization, erosion control projects, and properly engineered channel restoration efforts improve flooding predictability and water quality for users and communities. They reduce the amount of excess sediment in rivers and streams. Simultaneously, they improve the aesthetics of a waterway and the habitat for fish and wildlife. Such ancillary benefits can be a significant boon to local economies. The Platte River Restoration Project through the Casper area is an excellent example of large scale river restoration. It shows the benefits brought to a community’s economy by improving the stream through a city, attracting not only visitors with fly rods, but investors with checkbooks.

Vibrant Wyoming watersheds are essential to the health and sustainability of farms and ranches, kayak rental businesses and fly stores, municipal water systems, and family fishing vacations. In short, ensuring the health of Wyoming’s watersheds is essential to ensuring the health of our state.

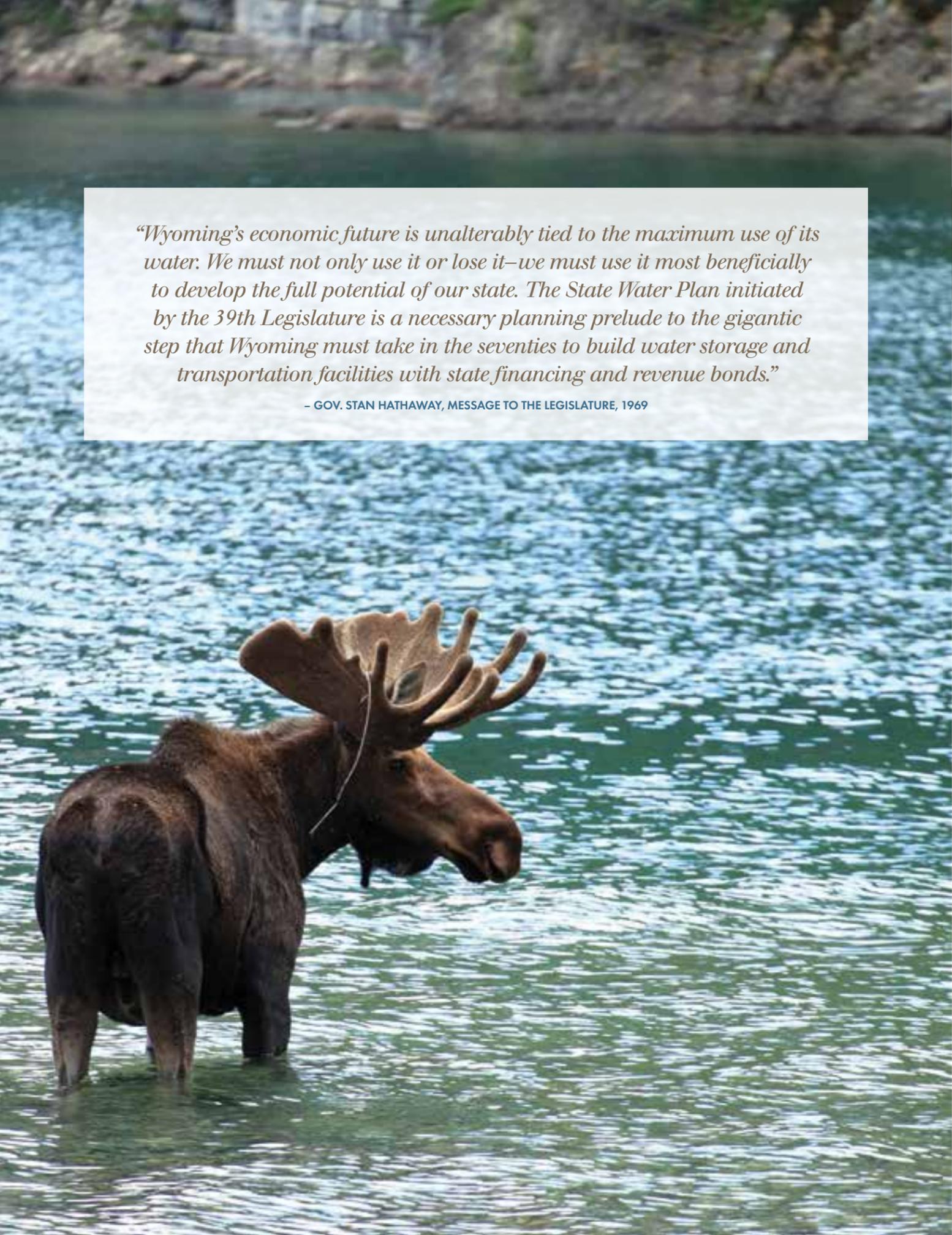


Strategic Initiatives

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THEME 1

Water Management Initiatives

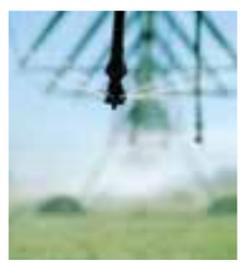
“Wyoming’s economic future is unalterably tied to the maximum use of its water. We must not only use it or lose it—we must use it most beneficially to develop the full potential of our state. The State Water Plan initiated by the 39th Legislature is a necessary planning prelude to the gigantic step that Wyoming must take in the seventies to build water storage and transportation facilities with state financing and revenue bonds.”

– GOV. STAN HATHAWAY, MESSAGE TO THE LEGISLATURE, 1969



1 - CREDIBLE CLIMATE, WEATHER AND STREAM FLOW DATA

Wyoming depends on reliable, credible, and verifiable scientific information on weather and climate. This data is critical for irrigators, municipalities, and industries. Wyoming’s natural climate variability makes it important that data collection is sufficient in all areas of the state to address regional needs. Understanding different atmospheric and climate variables and their effect on water supply is important—for agencies and individuals responsible for forecasting water and regulating river systems, and also for sound long-term planning and decision making. Such information, as well as historic data, needs to be accessible to decision makers.

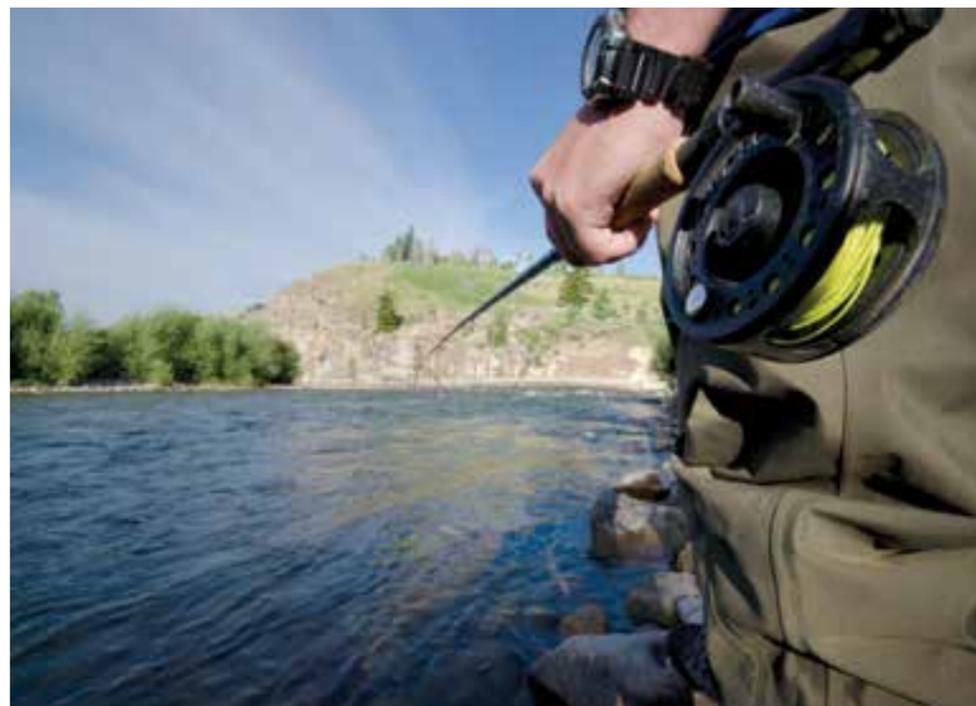


This initiative will focus on two areas. First is to identify, prioritize, and make recommendations for additional data instrumentation, including enhanced monitoring, and for interpretation capacity. These help in understanding climate, weather, snowpack, snowmelt, and stream flow data. The second is to create online data tools that allow easy access to important data sets and background maps.

2 - UNIFORM HYDROGRAPHERS OPERATIONS MANUAL

The principles governing Wyoming water law are well understood. Management can be challenging as systems grow in complexity. Water users depend on uniformity and consistency in the management decisions and the delivery of water.

This initiative is the development of a uniform manual of standards, protocols, and guidance for State Engineer’s Office hydrographers statewide. The Wyoming Board of Control, led by the State Engineer, will oversee development with the help of experts and members of the public.



3 - GROUNDWATER ANALYSIS AND CONTROL AREA MANAGEMENT FRAMEWORK

The challenges of measuring and allocating groundwater are significant. Growing populations, especially in areas dependent on groundwater, can put pressure on these water resources. Some areas of the state have already seen significant declines. Information sharing and management tools in Groundwater Control Areas should be better developed. Wyoming law allows local stakeholders the ability to develop innovative management plans in Groundwater Control Areas, with more options than those available to the State Engineer. These plans must be endorsed by the State Engineer who can manage accordingly.

This initiative will result in the State Engineer's Office working with stakeholders to provide information and support for a locally led pilot to develop a plan for groundwater use in the Laramie County Groundwater Control Area.

Water Development Initiatives



4 - FONTENELLE DAM AND OUTWORKS INFRASTRUCTURE COMPLETION PROJECT

Capacity to store and beneficially use water is a protection to the state, municipalities, business, and individuals. It makes use in the future possible. An accessible pool of stored water provides assurance that commitments can be met to deliver water downstream to appropriators, as well as providing flexibility to deliver water to other states as agreed to by compact.

Fontenelle Dam has 346,000 acre-feet of storage. Two factors limit the utility of the structure to realize its capacity to maximize beneficial use: lack of armoring to protect the lower interior dam face and lack of requisite infrastructure to utilize stored water. Completion of the dam and updating of infrastructure could potentially allow from 100,000 to 200,000 acre-feet of usable storage to be accessed on the Upper Green, without noticeable change to the environmental footprint of the development. This initiative will start the planning, permitting, and collaborative agreements necessary to realize the full potential of this asset.



5 - GLENDO RESERVOIR FULL UTILIZATION PROJECT

Glendo Reservoir has a total capacity of 800,000 acre-feet. Capacity is divided between a 525,000 acre-foot "active operations" pool managed by the Bureau of Reclamation, and a 275,000 acre-foot "flood control" pool managed by the Army Corps of Engineers (Corps). The flood control capacity is only used to store high inflow events that the Corps believes might cause a flood in Wyoming or Nebraska. The Corps allows the flood control space to be filled only until the flood risk subsides, then evacuates the space as quickly as possible. In 57 years of operation, the spillway on Glendo Dam has never been used.

This initiative will seek federal authorization to re-purpose a portion of the flood control space and use that water for operational purposes, thereby extending and

more efficiently using water during good runoff years. The re-purposed space would be the first water to be used and the full 275,000 acre-feet of flood control space would still be available by October 1st of every year.

6 - TEN IN TEN PROJECT

Wyoming has at least ten small water storage facilities that should be completed as soon as possible. These projects are sponsored by local entities, support local beneficial uses, and provide flexibility for future uses of stored water.

The goal of this initiative is the completion of a minimum of ten small (2,000 to 20,000 acre-feet) reservoirs in the next 10 years. All projects will move through the processes developed by the Legislature, the Select Water Committee and Wyoming Water Development Commission. This initiative provides executive support and agency planning for all appropriate actions to accelerate the completion of projects.



7 - COLLABORATIVE PLANNING AND AUTHORIZATION PROCESSES

Geographic planning for water, often on a watershed scale, and assessments by governmental technical experts for related water and natural resources actions are common. The State Engineer, Department of Environmental Quality, Game and Fish, Wyoming Water Development Commission, and local governments such as Conservation Districts perform a variety of planning and analysis functions for water. In some instances, agencies are developing plans where another agency also has a need. Similar analyses on a common area should be coordinated to save costs.

This initiative is to develop a modular framework for information sharing, planning, and decision making that allows for building on existing plans, or utilizing decisions and planning of one agency to meet prerequisites for actions by another. This would have broad applicability. The goal is to allow the creation of planning and technical analysis to be modular, ultimately saving the state time and money.

Water Conservation and Protection Initiatives



8 - WATER QUALITY DATA INTEGRITY INITIATIVE

In 1972, the Clean Water Act was enacted by Congress to regulate water quality, recognizing that the primary rights and responsibilities to do so belong to states. Wyoming's Environmental Quality Act gives the state authority to manage water quality through standards, rules, regulations, and permits, in more ways and on more waters than federal statutes are able to provide. In 1999, Wyoming enacted a statute to ensure that regulatory decisions are based on a suite of appropriate data. It is the responsibility of the Department of Environmental Quality to ensure that data is collected in accordance with outlined procedures by qualified individuals, and that the overall testing methodologies are consistent with the planned analysis.

This initiative will improve current credible data collection. The goal is data (from trained local, state, and federal partners to DEQ) with the consistency and integrity needed to support regulatory decision making. Additional recommendations will identify tiers for the appropriate use of data that fail to meet the higher levels of rigor necessary for a regulatory decision.

Water and Watershed Restoration Initiatives

“Wyoming has undertaken a major commitment to develop our precious water resources.... Within a few short years, the projects we are developing will be ready for construction. We must be prepared to fund their actual construction. Plans alone do not put Wyoming’s water to work.”

– GOV. HERSCHLER, MESSAGE TO THE LEGISLATURE, 1984



9 - RIVER RESTORATION

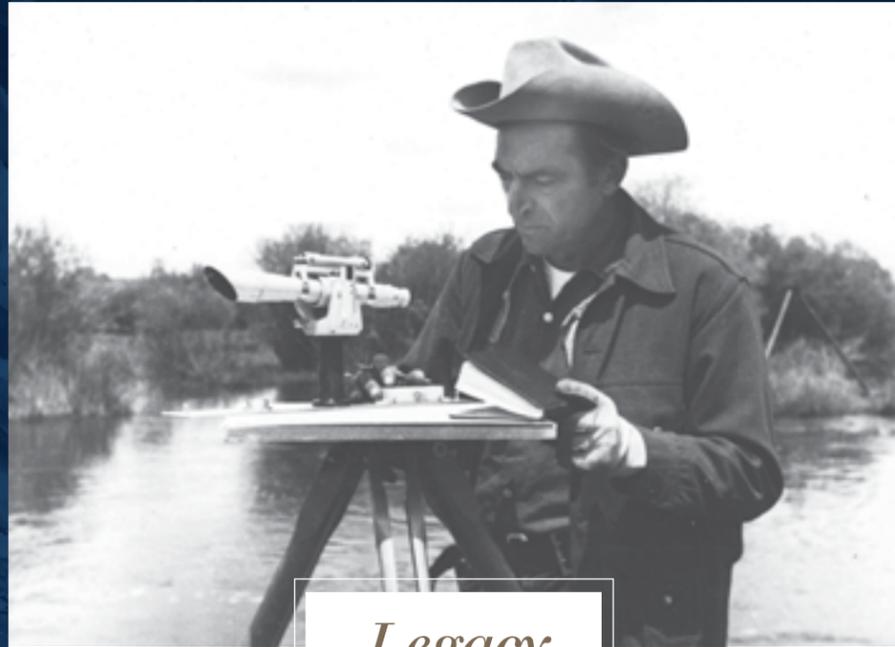
Within the last 50 years, knowledge from engineering, meteorology, geology and hydrology have matured to create an understanding of river processes, as well as practices that can be employed to manage rivers for greater utility and benefit. “Restoration” blends art and science by analyzing the current status of a river or stream and determining which practices can be employed to maximize the system’s capacity for desired uses. For example, the North Platte is one of the most important and utilized rivers in the state. Restoration efforts on the river are currently ongoing in areas like Casper, Saratoga, and Douglas. These initiatives are improving base water quality, improving recreational opportunities for fishing and boating, creating channel stability that protects irrigation and transportation infrastructure, and aesthetically improving the river banks and surroundings.

Communities see significant long-term economic returns as direct results of restoration work. This initiative is to develop strategies, financial tools, technical expertise, and collaborative agreements that further stream restoration efforts throughout Wyoming.

10 - COLLABORATIVE FISH PASSAGE RESTORATION

Repairs and replacement of infrastructure create natural opportunities for improvement. One improvement is fish passage and protection. Water and wildlife fall under state management. Projects should consider these assets. The state has expertise in wildlife management and water development. It has access to funding to support maintenance and improvements for each.

This initiative will result in collaborative agreements among state agencies for “fish friendly structures” when updating water infrastructure. It will identify funding mechanisms available to share the costs of improvements for fisheries in conjunction with traditional water development work on a project.



Legacy

Luna B. Leopold was the son of famed conservationist Aldo Leopold. Luna traveled the nation and the world for work. His ranch in Pinedale provided a getaway and access to a section of river that he forever dubbed “The Project”. Following his father’s death, Luna completed the work to compile, edit, and publish his father’s famous writings in *A Sand County Almanac*. Luna was a great writer, scientist, and conservationist in this own right, publishing over 200 books and papers, including *A View of the River*. Like his father, he was drawn to the water. He revolutionized water science by combining expertise in engineering, meteorology, geology, and hydrology to develop the scientific foundation of modern fluvial geomorphology — the study of rivers and how they affect their surroundings.

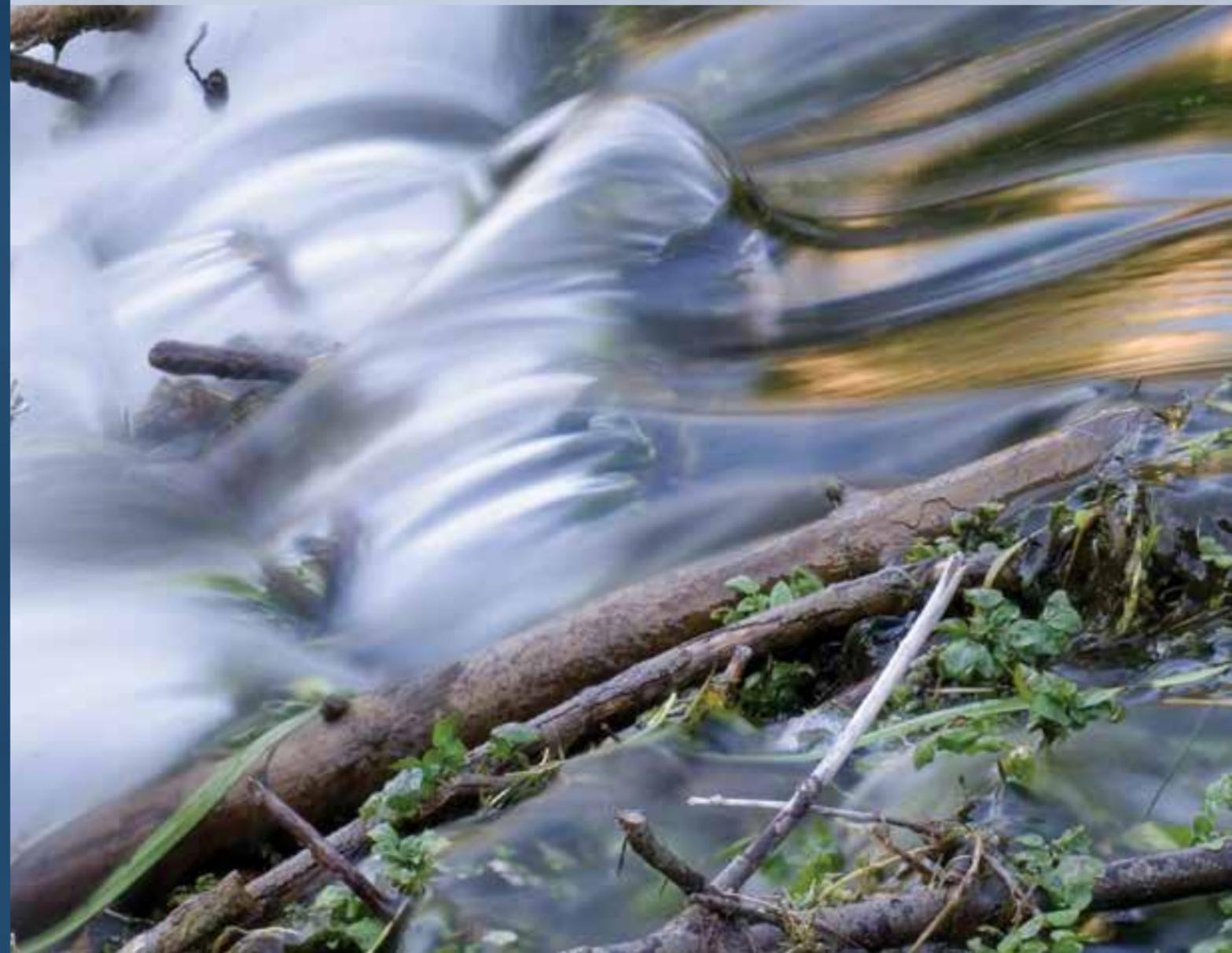
Luna received a degree in civil engineering and worked for the agency that is today known as the USDA Natural Resources Conservation Service. He went on to earn a master’s degree in physics and meteorology from the University of California and a doctorate in geology from Harvard. He became the first Chief Hydrologist in the history of the USGS, before stepping down to concentrate on research and teaching. His methods are world renowned in the field of stream restoration. Dave Rosgen, the leading expert on stream restoration today, was one of his many protégés.

In 1967, Luna became the first hydrologist inducted into the National Academy of Sciences. In 1968, he won the Cullum Geographical Medal from the American Geographical Society, and in 1991 was awarded the National Medal of Science by President George H. Bush. He was a Fellow at the American Academy of Arts and Sciences, the American Philosophical Society, the American Society of Civil Engineers, and the American Geophysical Union.

Late in life, he could frequently be found near his Pinedale home, wearing his Silverbelly Stetson, walking the river. He was awarded the Benjamin Franklin Medal in Earth and Environmental Science following his death in 2006. He was 90 years old.



Moving Forward





Moving Forward

Matthew H. Mead, the son of Peter and Mary Mead, was born in 1962. His grandfather Clifford Hansen, was a rancher, Governor, and Senator. Matt is a graduate of the University of Wyoming Law School. He and his wife Carol own and operate a farm and ranching business in Wyoming. Matt practiced law at a private firm before being appointed by President George W. Bush as U.S. Attorney for Wyoming.

Mead was elected Governor of Wyoming in November 2010, and re-elected to a second term in November 2014. His 2013 Energy Strategy, *Leading the Charge*, outlined provisions for a strong energy sector as well as environmental stewardship. He is a staunch advocate of protecting Wyoming water law and the state's right to manage water within its borders. Matt Mead's vision for protecting Wyoming's water has led to this Water Strategy. It is a strategy to protect, plan for, and utilize our most precious resource for the benefit of Wyoming citizens—now and in the future.

“Water is tied to everything we do in Wyoming. It is tied to everything we have done, and it is tied to everything we will do. The time for action is now, our strategy must be to move forward.”

- GOV. MATTHEW H. MEAD, 2015

Appendix

SOURCES

Wyoming State Engineer’s Office, Wyoming Water Development Commission, Wyoming Department of Environmental Quality, Wyoming Game and Fish Department, United States Geological Survey, the Aldo Leopold Foundation, the Wyoming State Historical Society, the Library of Congress, the Wyoming State Archives

PHOTO CREDITS

Wyoming Department of Environmental Quality, Wyoming State Engineer, Leopold Foundation, Governor’s Office, and the Wyoming Game & Fish Department.

A special thanks to Rick Carpenter.

“Water is the most critical resource issue of our lifetime and our children’s lifetime.”

– LUNA LEOPOLD



This document provides a general overview of Governor Matthew H. Mead's action plan and objectives regarding water. It does not create legally binding requirements, authorizations, benefits, or rights for any state agencies, local governments, companies, or individuals. This action plan is dynamic and may be revised at any time.