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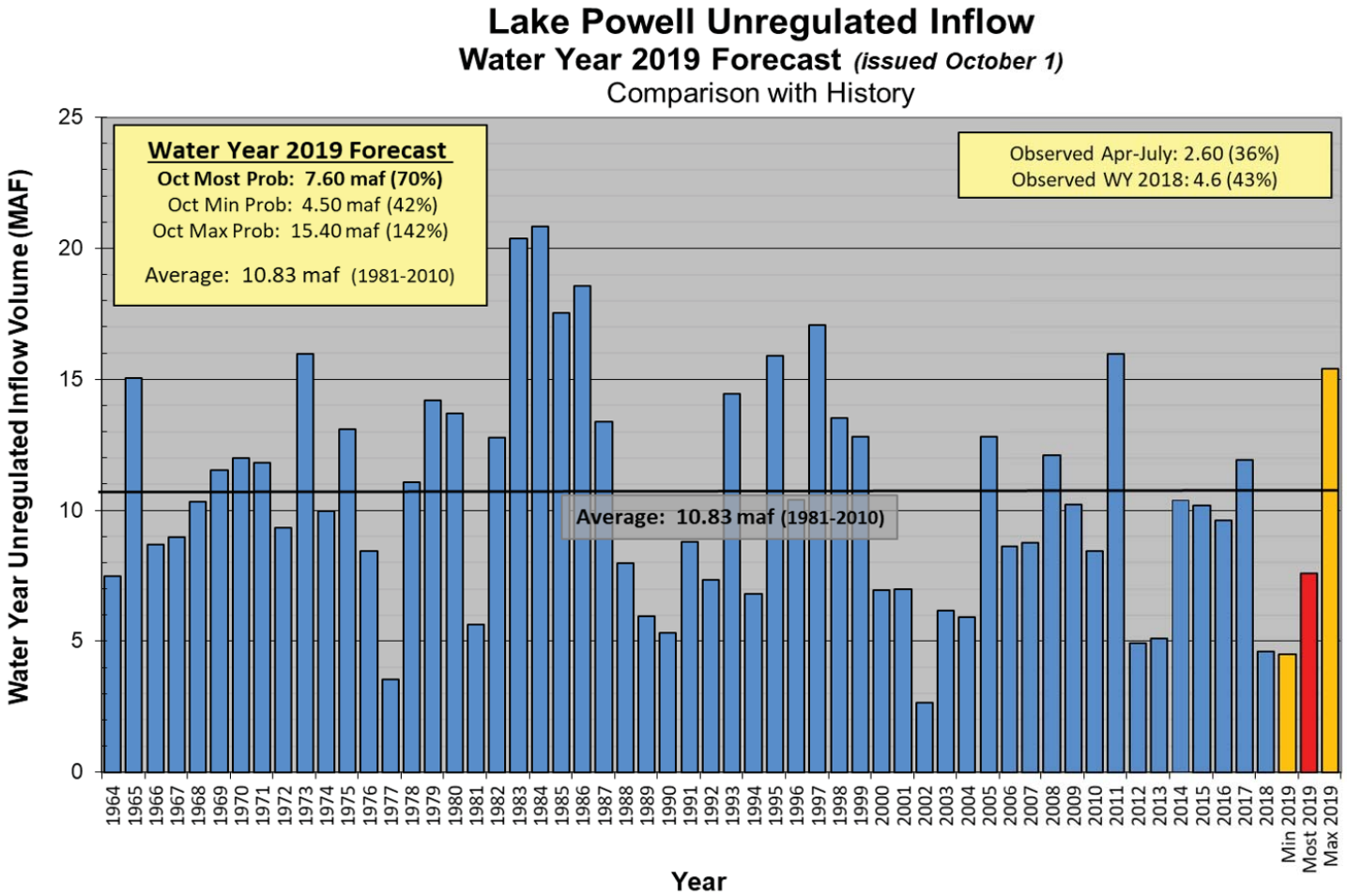

Lake Powell is a barometer for hydrologic conditions in the Colorado River basin. According to this Bureau of Reclamation graph, the 2018 water year that ended Sept. 30 was the third worst since 1964. Inflow into Lake Powell was 43 percent of the average calculated since 1981. The key runoff season of April to July was 36 percent of average. The colored bars at right project 2019 inflows. The "most probable" red bar is not a reason to be optimistic.

Lake Powell and us: It's complicated

Note: This edition of the Colorado River District Board News Summary highlights Drought Contingency Planning (DCP) and demand management policy issues. The Upper and Lower Basins are finalizing DCPs by the end of this year on how to deal with low levels at Lakes Powell and Mead, and the Colorado Water Conservation Board will discuss in-state, demand management policies at is Nov. 14-15, 2018 meeting.

By Andy Mueller
General Manager

Water skiing, fishing, house boating. Hiking and making memories with family and friends; that's what defines Lake Powell to many people. The giant Utah reservoir is one of America's favorite playgrounds. As General Manager of the Colorado River District, I'd like to give you another perspective.

First, it's a reservoir, not a true lake. Lake Powell is a water savings account. The water it holds is a safeguard for our existing uses of Colorado River basin water in Colorado – and our sister Upper Basin states of Utah, New Mexico and Wyoming.

But our savings account is getting low; after 18 years of drought, overuse in the Lower Basin and warmer temperatures, the reservoir is just 42 percent of capacity. This past year, it plunged more than 30 feet.

In plain terms, the Colorado River Compact of 1922 allocates use of half of the river to the Lower Basin states of California, Arizona and Nevada. The remainder goes to

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Not planning invites disaster

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the Upper Basin states. Water leaders knew back then that the river had to be apportioned to assure fair use among all seven states.

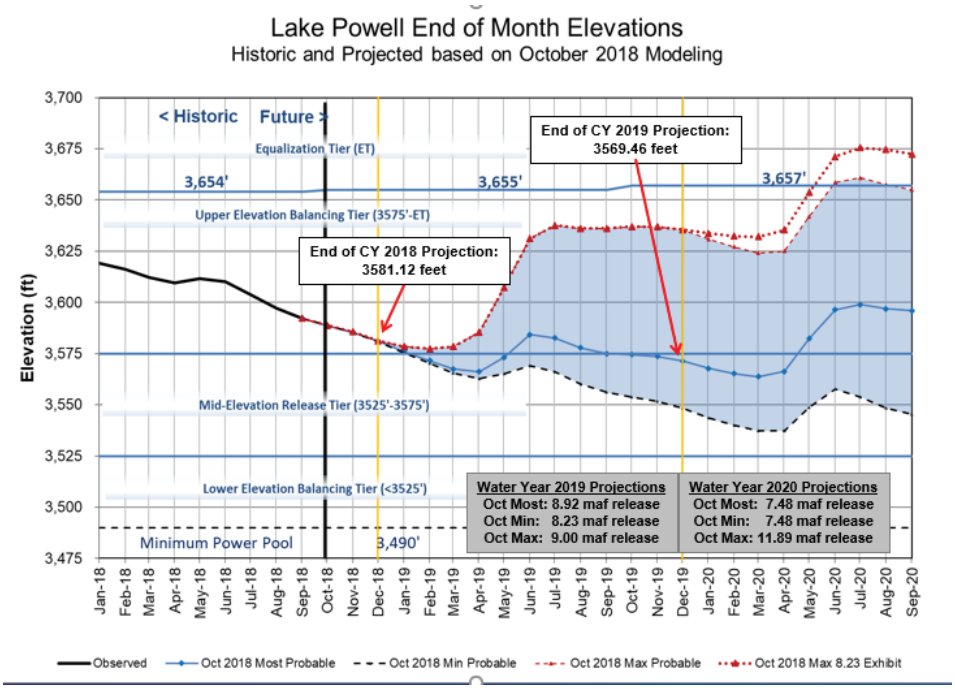
But here's the catch, the Lower Basin states gets its half first. The Upper Basin states get what's left, and our uses that were developed after the compact was signed might someday have to be curtailed to make sure the Lower Basin's rights are satisfied. This is where Lake Powell enters the equation.

The concept of a big reservoir for the Upper Basin was envisioned as far back as the 1920s as a savings account to be drawn down in dry years when the river's natural flow is insufficient to supply the Lower Basin's allocation. It's worked as planned. Now in the 19th year of a drought there is an increasing risk that our Lake Powell savings account may not hold out, and Colorado's water supplies may be at risk.

This should concern everyone who depends upon the Colorado River: city dwellers, boaters, agriculture, snowmakers, those who love the environment and those who support our extractive economies – in other words, all of us. It should also concern all of those on the Front Range who depend upon Colorado River water.

A study shows that if a drought like 2002-04 were to recur, with Lake Powell now less than half full instead of almost full as it was then, Powell would plunge below hydro-power generating levels, also meaning that the Upper Basin soon could not meet its compact obligations.

In the words of federal officials who manage the reservoirs, Lake Powell could "crash." That is, if we don't soon implement new water management policies. Since 2013, Department of the Interior leaders have spurred the states to develop Drought Contingency Plans (DCPs) to protect against low reservoir levels at Powell and Mead. Drafts of the plans, which could be signed by the turn of the year, call for the Lower Basin and the Upper Basin each to use less water at certain trigger points.



This Bureau of Reclamation graph shows Lake Powell elevations as they plunged this year and what it forecasts for next year. The blue is the range of what might happen. The critical elevation for Colorado and the Upper Basin is 3,525 feet, after which Reclamation and Colorado become concerned for future hydro-power generation.

The DCP in the Upper Basin has three tiers:

1. When Powell reaches a specified water level, release water from Flaming Gorge, Aspinall and Navajo reservoirs down to Powell to bolster levels for generating power and fulfilling the compact. While critically helpful, this is mostly a one-shot action that cannot occur in consecutive years;

2. Continue cloud seeding to augment snowfall and efforts to remove Russian olive and tamarisk, non-native trees that consume high amounts of water;

3. Implement demand management programs; induce water users to reduce their consumptive use so more water flows to Powell.

If we get to tier 3, the Colorado River District insists it must be through voluntary, temporary and compensated measures. Challenges are many – as in who reduces their use, who pays for that and how we prevent western Colorado agriculture from becoming the sole sacrifice zone. Cities, industry and agriculture on both sides of the Continental Divide must share in the sacrifice.

The Colorado River District was created in 1937 to protect western Colorado water. Our mission is to protect western Colorado as we know it today, rich in agriculture, recreation and environmental values. This is where we choose to live, and where many love to visit. There may be a day when we all have to modify our water use to save what we cherish. Not to plan invites disaster.

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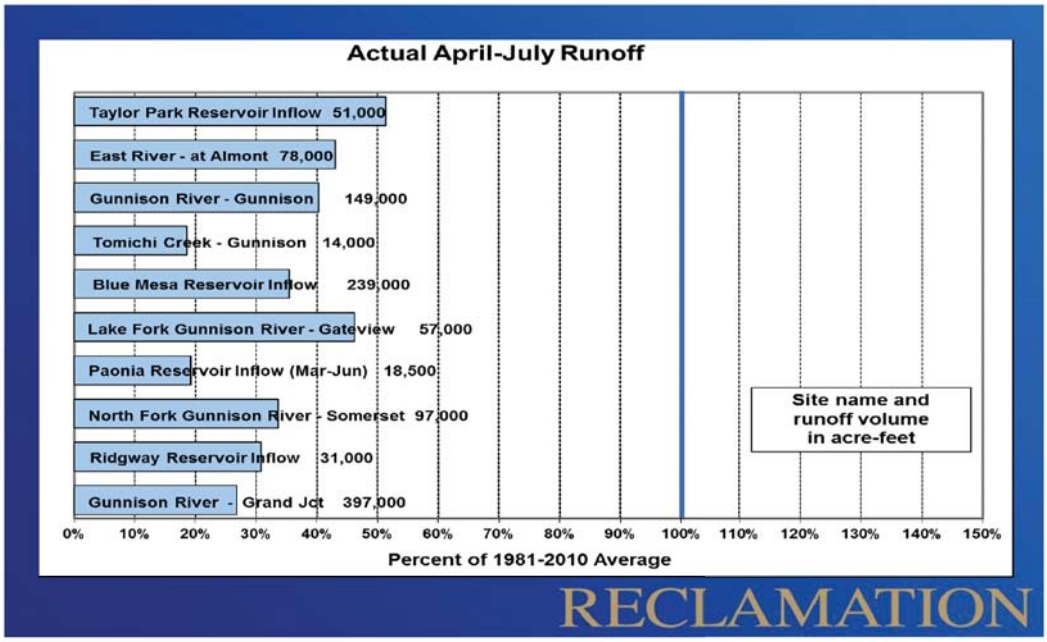

A graph from the Bureau of Reclamation shows what the effects of a snowpack in the 60 percent of average range plus a hot and dry spring can do to streamflows and reservoir inflow. The measurements are in acre feet, a measure of volume.

Planning for drought and demand management

Background

The Colorado River District has been actively engaged in Drought Contingency Planning (DCP) negotiations in the Upper Colorado River Basin for more than a year. Separate plans for the Upper and Lower Basin states were originally spurred forward in 2013 by then-Secretary of the Interior, Sally Jewell, in response to the alarmingly low water levels at Lakes Powell and Mead.

Those efforts have been continued under the current administration's Commissioner of Reclamation, Brenda Burman.

The goal of the plans: develop strategies within the Upper and Lower Basin states to protect reservoir levels at Lakes Powell and Mead thereby preventing shortages in the Lower Basin and curtailment of water uses in the Upper Basin under the Colorado River Compact of 1922.

The DCP for Colorado and its Upper Basin neighbors (Wyoming, Utah and New Mexico) involves a three-tiered approach:

1. **Reservoir Re-operations:** When Powell reaches a specified low water level, release water from Aspinall, Navajo and Flaming Gorge reservoirs to Powell to bolster levels for generating power and to protect against possible compact curtailment. This is mostly a one-time shot that cannot occur in consecutive years.

2. **Snowfall Augmentation and Phreatophyte Removal:** This involves the continuation of efforts to augment snowfall through cloud-seeding, and efforts to remove Russian olive and tamarisk, non-native riverbank trees that consume high amounts of water.

3. **Implementation of Demand Management Programs:** In other words, induce water users to reduce their current consumptive use of water so more water may flow to Lake Powell.

This piece of the Upper Basin DCP is the most controversial component and involves the most risk for water users on the Western Slope.

The Colorado River District has long insisted that any demand management program be a voluntary, compensated and temporary water-reduction program.

The District's first priority is to prevent western Colorado agriculture from becoming the Colorado's sacrifice zone for compact compliance. Because the Colorado River touches every corner of the state, the River District believes that cities, industry and agriculture on both sides of the Continental Divide must share in reductions of water use.

The Lower Basin DCP

The DCP in the Lower Basin States (Arizona, California and Nevada) works to address historic overuse of Colorado River – something also known as the "structural deficit" – that over time has shown the three states using about 1.2 million acre feet (maf) annually more than their compact entitlement of 7.5 million acre feet per year.

A section of the 2007 Interim Guidelines that pertains to the three states use of water against Lake

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Water banking would only protect Powell

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Mead levels calls for reduction of water use equal to about half of the structural deficit once Lake Mead falls below certain thresholds. Current Drought Contingency Planning specifies further cutbacks to achieve the full 1.2 maf goal, roughly equal to the deficit

State and federal nexus

The Upper Basin DCP would require federal legislation to establish a no cost, "non-equalized" space in Lake Powell for storage of conserved water. Conserved water dedicated to this space would be accounted for outside of the "equalization" procedures outlined in the 2007 Interim Guidelines and would be used exclusively to meet downstream delivery obligations under the Colorado River Compact.

In other words, use of this space in Powell and release of water dedicated to this "pool" would be for the exclusive benefit of the Upper Basin states. It would be used to protect Upper Basin water users by ensuring Powell does not fall below the level at which it cannot generate power. If that level is reached, in addition to the power problem, the Compact time bomb starts ticking.

Other components of the DCP would require state-level rulemaking to determine how aspects of the DCP, specifically demand management efforts, would operate in Colorado.

Timeline/recent developments

The River District confirmed this summer that the State of Colorado and the Upper Colorado River Commission are moving quickly toward approval of DCP that includes a non-equalized storage pool at Lake Powell. The conversation around demand management came front and center when Upper Basin DCP was listed on the Colorado Water Conservation Board's September meeting agenda, raising concerns that certain water users in the state were calling for the implementation of an involuntary and uncompensated approach to demand management in Colorado.

General Manager Andy Mueller makes a point during a Board discussion of Drought Contingency Planning and Demand Management. From left at the table are Board members Bill Trampe, Al Vanden Brink, Rebie Hazard, John Ely, General Counsel Peter Fleming and Board member Dave Merritt. Hidden from view is Board President Tom Alvey. In the background are Chief Accountant Ian Philips and Senior Counsel Jason Turner.

With these concerns in mind, the River District and the Southwestern Water Conservation District (Southwestern) sent a letter to the CWCB, Colorado's Upper Colorado River Commission representative and the State Engineer asking that the State of Colorado adopt a resolution affirming the State's commitment to six principles which would guide creation and implementation of a demand management program within Colorado.

The conversation around DCPs continued at the River District's fourth quarterly Board meeting, where General Manager Andy Mueller provided an overview of recently released Upper Basin DCP documents, including a demand management document.

Those documents were outlined for the first time just a week earlier during an onine forum hosted by the Colorado Water Conservation Board, the state's Upper Colorado River Commissioner and the Colorado Attorney General's Office.

Prior to the release of these documents, the Colorado Water Conservation Board formally requested its staff to draft and present a proposed policy to guide the coming efforts to develop a demand management program.

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DM: voluntary, compensated and temporary

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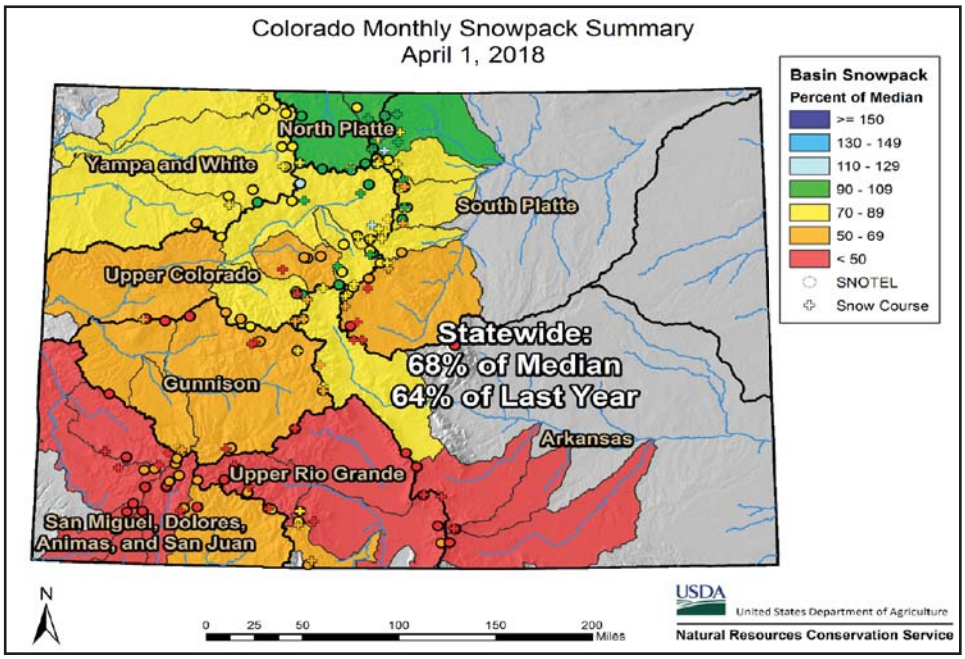
The River District applauded that effort and encouraged the CWCB to make sure that any demand management program in Colorado is voluntary, compensated and temporary, and that water conservation measures for such a program come from both sides of the Continental Divide.

Not surprisingly, many questions and concerns remained for the River District's Board of Directors — mostly stemming from Front Range utilities' testimony at the CWCB's September meeting.

In a memo provided to the River District Board before its quarterly meeting, Mueller reiterated his concerns that if a demand management pool is created through federal legislation and action by the Upper Colorado River Commission, that Front Range water users would push for an anticipatory, non-compensated curtailment model of contributions to a non-equalized demand management pool in Powell.

"If a pool is established without a commitment to principles designed to protect western Colorado agriculture and initially limited to the publicly vetted concept of a voluntary, temporary, compensated program, Western Slope agriculture is at risk of quickly becoming the sacrifice zone," Mueller stated in his memo.

During the meeting, Mueller asked for guidance from the Board and solicited its input on a state-level water reduction program and the federal legislation needed to authorize a pool for conserved water in Powell.



The April 1, 2018 snowpack summary published by the Natural Resources Conservation Service showed how severely southern Colorado was hit by drastically below normal conditions. Red is bad. Orange isn't much better. This chart foretold record low reservoir and streamflow levels.

"We are concerned that once a demand management pool in Powell exists, that it may be used and filled in a manner that has not been talked about and agreed upon publicly," he said.

"We are looking for guidance from this Board outlining what elements of a demand management policy are essential for the District to not oppose state execution of these documents and to not oppose DCP legislation."

What Board members said

Board member Marti Whitmore of Ouray County led off by outlining her understanding of the Colorado Attorney General's authority to regulate water use under a compact call but questioned whether that authority also applied under anticipatory curtailment scenarios. She said she had real concerns about how an anticipatory program would work, and whether or not such a program would involve real and actual reduction of water use on the eastern side of the Continental Divide.

"From my perspective, the Front Range needs to actually turn off water. Front Range users have to turn off the faucet and can't be allowed to just buy their way out of it," Whitmore said.

Board member Doug Monger of Routt County echoed of Whitmore's concerns, emphasizing that all Colorado River water users should share in reductions equally. "I realize we need a plan here but hopefully we're not picking winners and losers. We know where most of the population lies, but I don't want the Yampa River Basin to be the sacrificial lamb," said Monger. "I hope we can come up with an amenable,

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Board grapples with demand management issues

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equitable solution here."

Gunnison County Board member Bill Trampe discussed his concerns about the burden that would be placed on productive agriculture by a demand management program.

"A lot of us who irrigate in the high country are running on decreased water all the time. But now the state's asking us to accept even less," he said. "They want us to remain sustainable as far as agriculture is concerned, but this reduces the resource we need to be sustainable. It just doesn't make sense to me."

Dave Merritt of Garfield County and vice president of the Board, pointed to historical overuse in the Lower Basin states as a primary area of concern and noted that the Lower Basin DCP must address the structural deficit in order to prevent upstream curtailment of uses under the Colorado River Compact.

"I'm concerned that we're spending a lot of time and talent on an issue that really is beyond our direct control. This is really driven by surplus releases to the Lower Basin, and it's beyond anything that the (2007 Interim Guidelines) dictated," he said. "The fact that we are even talking about curtailment is a statement that the Interim Guidelines are not working. Overuse in the Lower Basin is what is driving down levels at Lake Powell."

Blue Mesa Reservoir, Colorado's largest, was less than a third full by early October 2018, a victim of way below average runoff, lack of spring and summer rains, high temperatures and heavy demand.

Trampe wrapped up the Board conversation by pointing out that Front Range residents also enjoy the many values associated with healthy rivers, open spaces and productive agriculture on the West Slope.

Mueller summarized the Board's input, describing it as "nearly universal confirmation" that the approval of the DCP documents at the state level and federal authorizing legislation are not separate processes.

"At a bare minimum, we have to have the state, through the CWCB, affirm that there are protections in place from the risks that we face on the West Slope," Mueller said. "We realize that those principles contain huge risks in and of themselves because the details are not worked out."

"If we are going to authorize the pool and have it established, we have to have some principles that guide the way these programs are set up," Mueller continued. "It's consistent with the State Water Plan, it's an equitable distribution of water savings coming from both the Front Range and the West Slope, it's voluntary, it's compensated and it's temporary.

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Meredith Spyker, Administrative Assistant, was feted at the Board meeting for her 10-year anniversary of employment at the Colorado River District. The Board honors employees on every five-year employment milestone. Presenting Meredith with a citation is Audrey Turner, Administrative Chief.

Keeping things running smoothly

A tradition of the Colorado River District Board of Directors is to recognize service milestones achieved by staff. At the October quarterly meeting, Meredith Spyker was acknowledged for 10 years of service to the District.

Meredith serves as Administrative Assistant, which is a proper fit for one who is as cheerful and good-natured with visitors and staff as Meredith. In addition to the front line from her desk and on the phone, she oversees management of the District's vehicles, compiles and distributes daily water news clippings, makes endless database entries and conducts a variety of other projects – sometimes with crunch-time deadlines.

When receiving her award, her supervisor, Administrative Chief Audrey Turner said, "Meredith runs a lot of critical functions behind the scenes that help keep things running smoothly and does these often without thanks or recognition — or complaint."

Meredith is an outdoor and fitness enthusiast who annually takes winter trips to mountain-top huts, springtime wilderness hikes, summer camping and year-round biking trips.

Board approves 2019 spending

The Colorado River District Board of Directors approved a $4.46 million General Fund expense budget for 2019. Approval came at the October 17, 2018 quarterly Board meeting.

The General Fund is supported by a small property tax mill levy, which will be 0.256 mills for 2019. That means the owner of a residential home valued at $300,000 will pay just under $6 in 2019 to support protection of western Colorado water in the face of competition for Colorado River use in Colorado and among the seven states in the overall Colorado River Basin.

Fifteen counties in Western Colorado comprise the River District. They are Grand, Summit, Eagle, Routt, Pitkin, Garfield, Rio Blanco, Moffat, Mesa, Delta, Montrose, Gunnison, Ouray, Saguache and Hinsdale counties. Total net assessed property valuation across the District rose from $16.6 billion in 2017 to $16.8 billion for 2018. The tax revenue collected in 2019 is based on 2018 valuations. At the height of the energy boom in 2009, the total net assessed valuation was $22.8 billion.

The Board also approved an Enterprise Fund expense budget of $6.9 million. The Enterprise Budget supports the Colorado River District's operation of water storage; revenue is derived from water leasing contracts, not tax dollars. A portion of the expenses reflect the pass-through of federal grants to support irrigation modernization in the Lower Gunnison Project.

A third budget approved is the Capital Fund, which projects expenses of $265,150. The Capital Fund is used for office, fleet, building improvements, water purchases and the Grant Program. Unfortunately, due to flat revenues and rising expenses, the Grant Program for 2019 is going on hiatus, for at least a year or two.

For a complete look at budgets, go to the River District's website.

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Legislative committees look at water, Gallagher and wildfires

The Colorado River District monitored three Colorado legislative Interim Committees this summer: Water Resources Review Committee, special Gallagher Amendment Alternatives Committee and the Wildfire Matters Committee.

Interim committees meet during the non-legislative portions of the year and typically take a deep dive into thornier policy issues facing the state. Zane Kessler, Communications Director, highlighted several of the proposals approved by the interim committees.

Starting with the Interim Water Committee, Kessler noted a bill that will address perennial, natural resources funding challenges in the state budget. The committee approved a bill that would strengthen the budgetary reliability of "Tier II" programs of the Colorado Water Conservation Board.

Tier II programs include such critical programs as the Species Conservation Trust Fund, mussel inspection/prevention programs and Basin Roundtable funding.

Kessler said a proposed bill authorizing a pilot program to examine deficit irrigation failed to secure the Interim Water Committee's approval. The River District supported a similar bill during this year's legislative session that passed the House but failed in the Senate.

Deficit irrigation pilots would explore various practices of irrigating with less water, less frequently and may be a useful tool in Colorado River demand management efforts discussed elsewhere in this newsletter.

The Gallagher Committee analyzed the implications of Front Range housing price escalation on property tax valuations statewide. The so-called Gallagher Amendment in Colorado's constitution requires the state to maintain a constant ratio of property valuations between residential and all other types of property. With the dramatic inflation of Denver-area housing prices, the entire state will see its residential assessment percentage reduced a further 15 percent in 2019.

This has a direct impact on local governments that rely on property taxes, including the River District, with particularly large impacts on areas outside the Front Range that haven't seen comparable housing price escalation.

Kessler explained that the Gallagher Committee approved a bill to ask voters in 2019 to repeal the Gallagher Amendment completely from the constitution. The committee also approved a "replacement" bill that would only go into effect if voters approved repeal of the Gallagher language. It would create eight property tax regions of the state, each with its own residential assessment percentage. Regrettably, the River District would be in four different regions with attendant budgetary confusion. The regionalization "solution" would have a similar financial impact on the River District as no change to the constitution or state law.

Kessler also discussed one of the bills passed by the Wildfire Matters Interim Committee. This bill would create a statewide, citizens' Fire Commission. It is not immediately clear what authority or scope of review it would have.

The 18-member commission would include two non-voting members from the water-provider community, one from the East Slope and one from the West. Kessler noted that this bill will likely be heavily amended during the regular legislative session in 2019.

The state affairs memo can be found on the River District website.

Bridging the gap: funding the Water Plan

"A remarkable collection of civic leaders, both water and non-water leaders from across the state." This is how General Manager Andy Mueller described the nearly two dozen people examining possible alternatives to fund the estimated $70-$100 million annual requirements of implementing Colorado's Water Plan.

Mueller briefed the River District Board on this effort that is being facilitated by the Keystone Group and funded by a partnership of the Gates and Walton Family Foundations. The group is examining a range of alternatives, most requiring a ballot measure.

Recognizing that any initiative must clearly identify where the new money will be spent, the group has outlined six areas that would be eligible to receive funds.

These areas include: heathy rivers, water quality, sustainable agriculture, conservation and efficiency, interstate compact compliance and infrastructure. Each of these interest areas would receive roughly equal funding over time.

Mueller reported that the "leading alternatives" for the source of this new funding are a bottle or liquid container tax and a tourism tax, likely a statewide lodging tax. Mueller, however, stressed that no decisions have been made and considerable conversation and research will occur prior to any final decisions.

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DCP concerns told to federal legislative staffs in DC visit

External Affairs manager Chris Treese met with legislative and administration offices in Washington, D.C. in early Octobe, and in his report to the Colorado River District Board of Directors he called the meetings positive in regard to the West Slope's concerns with Drought Contingency Plan (DCP) legislation planned for the post-election, "lame-duck" session of Congress.

The West Slope's priority is protection of western Colorado's agricultural production and ownership retention of the associated water rights.

His review of meetings with Colorado's two Senate offices and the office of 3rd District Representative Scott Tipton can be found in his federal affairs memo on the River District's website.

The River District is working closely with all Congressional offices to ensure a "fire sale" of western Colorado agricultural water rights does not occur as an unintended consequence of planned legislation amending the "Law of the River."

The legislation would allow the Upper Basin to have a savings account in Lake Powell that would be protected from "equalization" with Lake Mead. The account is necessary should any Compact Water Bank be instituted to store conserved Upper Basin water.

Encouragingly, all three offices understand what's at risk if sideboards or other principles are not established preventing Front Range purchase of West Slope ag water rights to meet East Slope water requirements to any Compact Water Bank established or facilitated by legislation.

Treese also highlighted 2019 funding for the Upper Colorado and the San Juan Endangered Fish Recovery Programs included in the Energy and Water Appropriations bill. This appropriations bill is one of just three that have been signed into law.

Treese noted that due to most appropriations bills not yet having passed, the federal government is operating under a "Continuing Resolution" (CR) that expires on December 7 this year.

Accordingly, another CR or all of the remaining appropriations bills will have to pass the Congress and be signed by the president by that date. This must-pass situation creates opportunity for both constructive amendments and mischief.

Treese said that while the recovery programs are funded for next year, the District and its allies have not been successful in re-authorizing use of hydropower revenues from Colorado River projects for continued annual appropriations.

Treese said that battle would continue but it appears as if water interests will have to struggle through the appropriations process annually without a dedicated source of revenues for the recovery programs.

Both the 2018 Farm Bill and the Water Resources Development Act (WRDA) continue to languish in the legislative process.

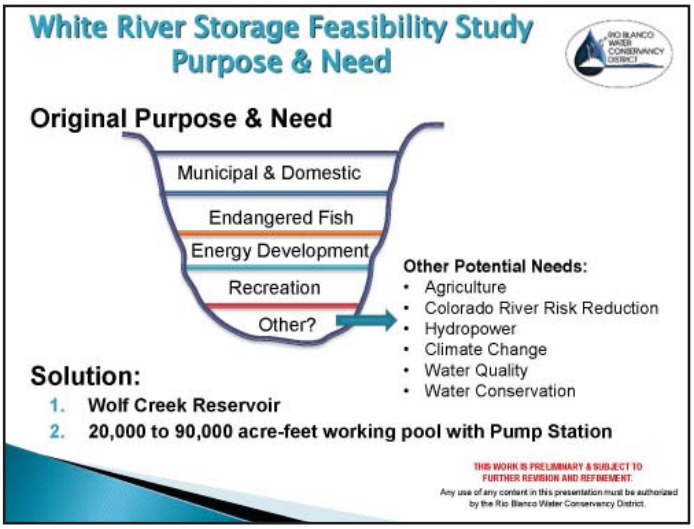
The lame duck session of Congress is seen as the single ray of hope for these important bills. Colorado's congressional delegation has successfully added important programmatic and funding elements to each of these bills and passage is critical to their implementation.

Finally, the Board heard a less-than-encouraging assessment of the status and outlook for the Land and Water Conservation Fund (LWCF). The River District Board prioritized LWCF renewal in its federal goals for 2018. The LWCF uses off-shore oil and gas lease revenues to preserve and maintain national parks, forests, recreational and cultural areas.

LWCF officially expired at the end of the federal fiscal year on September 30. Treese reported encouraging news from Senators Gardner and Bennet who passed LWCF out of committee during his DC visit.

However, Treese countered the Senators' good news with a less sanguine outlook based on reports from senior staff at the House Resources Committee.

The prospects for passage during the lame duck session are dim but can always be brightened by outcome of the November election and renewed motivations.



At left is the prospective off-White River site for Wolf Creek Reservoir in Rio Blanco County. At right is a Rio Blanco Water Conservancy District schematic of the purpose and need for Wolf Creek Reservoir. The off-channel site is the District's preferred location for storage.

Rio Blanco proposing reservoir to bolster Rangely water supply

The Rio Blanco Water Conservancy District (RBWCD) is proposing a new Wolf Creek Reservoir that would be located off-channel along the White River as a necessary water supply and economic development tool to ensure a better future for the Town of Rangely.

The off-channel site would be on Wolf Creek, several miles upstream of the existing and troubled Kenney Reservoir.

Al Vanden Brink, RBWCD Manager and Colorado River District Board member, told his fellow directors that Kenney Reservoir, just upstream from the Town of Rangely, is silting in, losing capacity and has about 10 years of life left as a water supply. Kenney was built in the 1970s with River District help.

"This is really strangling the lower White River community," Vanden Brink said, noting he has talked to three businesses that have shied away from locating in the Rangely area because of water supply uncertainty.

"What we are seeing is a pending White River water crisis," said Brad McCloud of EIS Solutions, RBWCD's project consultant.

McCloud said that studies show that a new reservoir upstream on the White River, off-channel at Wolf Creek, is the best alternative. Modeling places the reservoir sizing at 41,000 acre feet (af) to 130,000 af and water would be pumped to it from the White River, with costs ranging from about $119 million to $191 million, depending on the size.

The site has the possibility of storing up to about 400,000 af.

The Wolf Creek Reservoir could potentially have a hydropower component.

According to Vanden Brink, the RBWCD Board has not yet stated a preferred reservoir size. He noted that in the 41,000 af size, active storage would be 20,000 af. In the 130,000 af size, active storage would be 90,000 af. In either case, the balance would be built for recreational, insurance storage and future sediment buildup.

RBWCD has conducted two phases of study in preparation for an Environmental Impact Statement (EIS) as would be required by permitting, which is hoped to begin late 2019-early 2020. In this stage, Vanden Brink said the RBWCD would choose a size for the reservoir. The goal is to start construction in 2023.

McCloud said as much work as possible is being done ahead of time to engage stakeholders. The next phase of planning work is on project management and facilitation.

Funding for the reservoir is still being worked out. Potential sources are federal, state, local government, a hydropower partner, industry partners and bonding.

RBWCD is asking the River District for financial and technical assistance with planning. The RBWCD presentation can be found on the River District website.

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Colorado Springs depends on West Slope for about half of its water

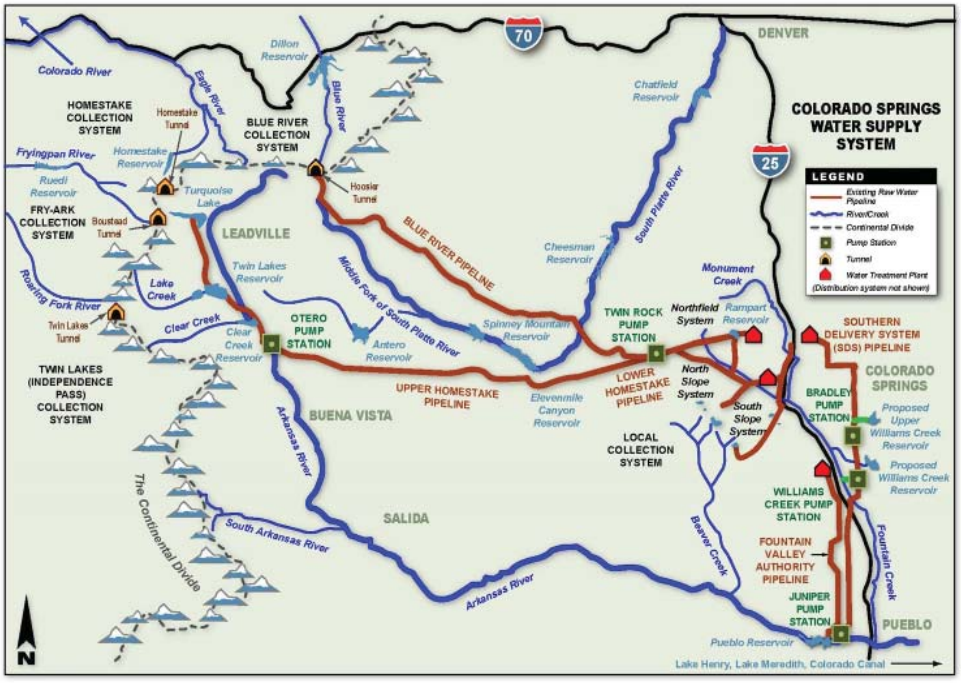
Colorado Springs, Colorado's second largest city, is one of the many Front Range communities that depends on the Colorado River for municipal water supply.

It has two West Slope projects it would like to complete by 2070.

The city realized its native supplies were insufficient for anticipated growth starting in the World War II era with the establishment of Camp Carson, now Fort Carson.

That's when the city looked to the Blue River in Summit County as its first transmountain diversion, taking its first deliveries by 1953. Water is diverted from the headwaters of the Blue River, under Hoosier Pass in a gravity pipeline to the north slope of Pike's Peak. In fact, this water enabled the city to secure siting of the Air Force Academy.

The Colorado River District Board of Directors learned these facts and more when Kevin Lusk, Principal Engineer of Colorado Springs Utilities, gave a presentation on the city's Integrated Resources Management Plan (IRMP). Lusk said other diversions of Colorado River system water come through its shares of the Homestake Project in Eagle County, the Independence Pass Transmountain Diversion Project in Pitkin County and the Fryingpan-Arkansas Project in Eagle and Pitkin counties.



Its overall water supplies come from the Colorado, Arkansas and South Platte river systems, about half from west of the Continental Divide, Lusk said. Conservation and water reuse are major parts of the city's water strategy, he added.

He said the city's IRMP, approved in 2017, looks to the city's buildout in about 50 years, plus or minus. The plan looks to completing a final phase of the Homestake Project and enlarging Montgomery Reservoir in Park County, part of the Blue River system.

"We need to finish those up. That is all we are looking at on (the west) side of the Divide," Lusk said, adding that 2070 is a target and the combined yield would be 10,000 to 15,000 acre feet.

Colorado Springs' neighbors have water supply problems and are looking to the city to help solve their problems. "There is a lot of political pressure on our organization to bail out our smaller neighbors," Lusk said.

At top is a map of the Colorado Springs Utilities' (CSU) water supply system. At bottom, Kevin Lusk, Principal Engineer for CSU, discusses with the Colorado River District Board CSU's future water supply planning.

He said the city is willing to share its infrastructure but the entities need to bring their own water. The city will not increase diversions from the Colorado River to help its neighbors, Lusk said.

Colorado River District
Protecting Western Colorado Water Since 1937

The Airborne Snow Observatory systems is being tested by the Jet Propulsion Lab as a new, improved way to measure snowpack in order to better predict runoff and streamflows.

Improving snowpack measurement

LIDAR, an airborne system, covers watersheds top to bottom

The Snotel system of land-based snow measurement can often over- or under-measure snowpack and thus affect runoff forecasts. This is making water management more difficult in recent years.

At its October 17, 2018 meeting, the Colorado River District Board of Directors learned about the pioneering of airborne snow measurement, a NASA program that is being tested with more accurate results in California as well as in the Upper Gunnison, Rio Grande, Uncompahgre and Blue River basins in Colorado.

Jeffery Deems, PhD, with Western Water Assessment of the National Snow and Ice Data, University of Colorado, presented to the Board his work on the NASA-sponsored Airborne Snow Observatory (ASO) program. Deems has pioneered the method of surveying, mapping and measuring snowpack depth and snow water equivalent with pulsed laser light from aircraft, know as LIDAR.

Deems noted that traditional forecasting over the past 12 years indicated that April predictions for expected streamflows have been off by 5 to 50 percent. These types of forecasting errors at the beginning of the runoff season can lead to errors in water management.

Often forecasting is based on historical runoff-streamflow data, but changing conditions such as warming temperatures, shorter snow season duration, dust on snow, and changes in forest cover due to bark beetle and fires are throwing that system off.

The ASO methods of forecasting decreases the reliance on historical records and increases forecast accuracy by taking into account actual physical landscapes and conditions with spatial data across the landscape.

Deems said ASO maps where the snow accumulation actually ends up near the beginning of the melting season and measures how solar radiation will affect snow melt given the snow location and the amount of dust that is present. One of the greatest benefits of these approaches to forecasting is that they can be monitored remotely by satellite and the airborne program.

The ASO program uses an aircraft equipped with two instruments mounted on it; one is a scanning radar with lasers and the other is a camera that can detect visible and infrared waves. These instruments provide measurements of snow-water equivalent and snow albedo at a 50-meter resolution across entire watersheds. Additionally, snow depth is measured by comparing the landscape with and without snow.

Plans to conduct two snow flights during the melting season in 2019 are set for the Upper Gunnison River with partial funding from the Colorado Water Conservation Board. The Blue River Basin is proposed to be explored with funding collaboration with Denver Water.

Deems said land-based measurement is still required to learn snowpack density.

All Board memos can be found at the River District website.

River trash no more

Colorado River District staff and friends answered the call this summer to help cleanup the Colorado and Roaring Fork Rivers in a community day sponsored by Glenwood Springs. Look what the boaters found! From left are Meredith Spyker, Andy Mueller, Chris Treese, Peter Fleming and Diane Kruse.

Work will soon be completed at Ritschard Dam at Wolford Mountain Reservoir to restore the dam crest which over time had settled, as earthern structures are wont to do. In this case, the uneven settlement required restoration.

Division 4 Engineer Bob Hurford and Assistant Engineer Jason Ullman updated the Colorado River District Board on conditions of streamflows and reservoirs in the Gunnison Basin, which received about 60 percent of average snowpack this past winter. Warm temperatures and the lack of rain in the spring and summer further hammered conditions. Conditions went from very good to really poor in 2018, Hurford said. The year was the third worst, after only 2002 and 1977. Hurford's and Ullman's presentation can be found on the River District website.